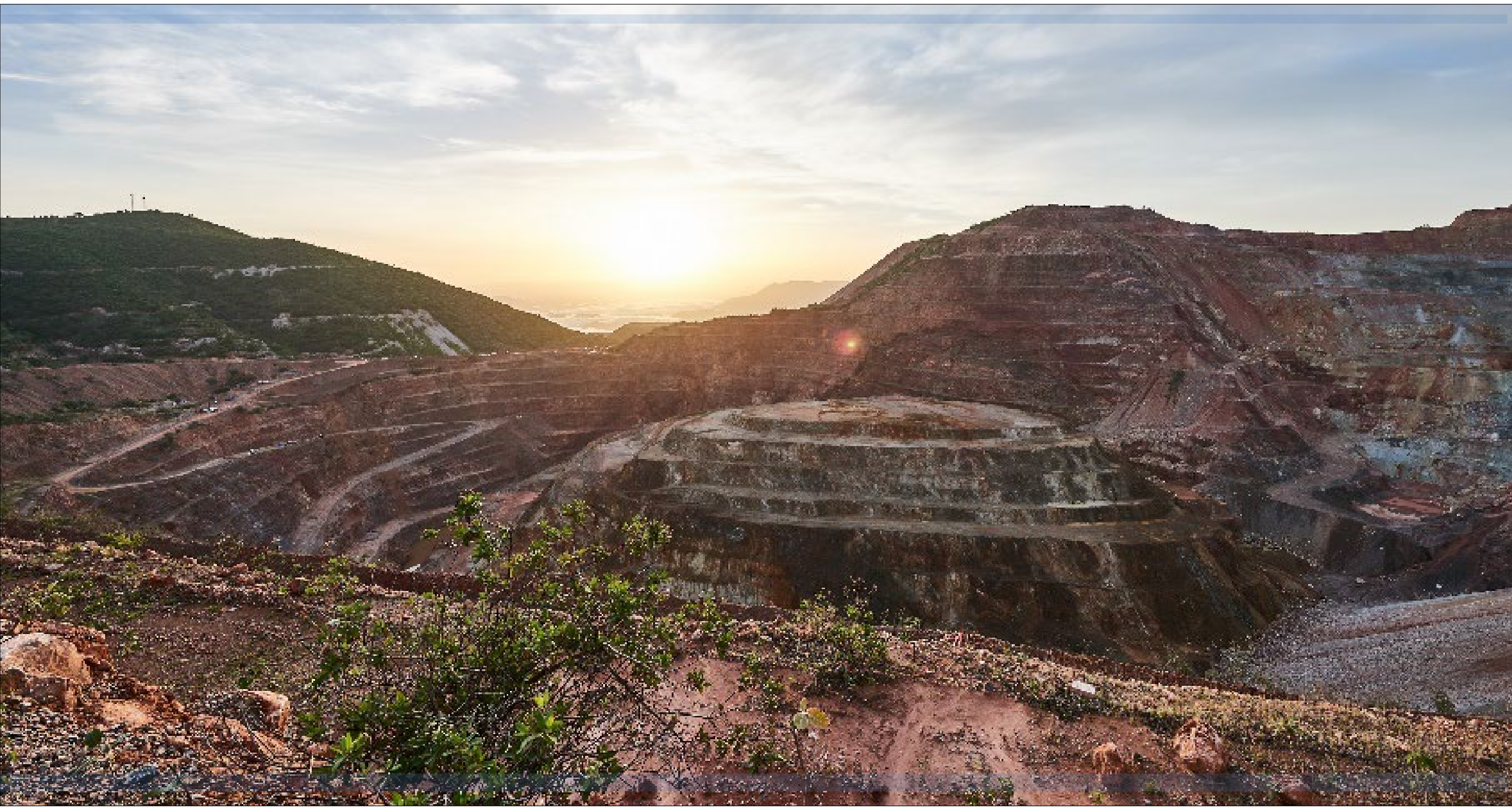
EQUINOX GOLD CORP.

Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico



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FORWARD-LOOKING INFORMATION

This Technical Report contains certain forward-looking information and forward-looking statements within the meaning of applicable securities legislation and may include future-oriented financial information (collectively, “Forward-looking Information”). Forward-looking Information in this Technical Report includes, but is not limited to, statements regarding: Equinox Gold’s plans and expectations for the Los Filos Mine, including the potential expansion of the Bermejal underground and construction of the CIL Plant; projected capital, operating and exploration costs; estimated mine life and production rates; estimates of Mineral Resources and the conversation of Mineral Resources to Mineral Reserves; projected metallurgical recoveries; and anticipated environmental liabilities. Forward-looking Information can be identified by the use of words such as “will,” “expect,” “achieve,” “strategy,” “increase,” “plan,” “potential,” “intend,” “anticipate,” “expect,” “estimate,” “target,” “objective” and similar expressions and phrases or statements that certain actions, events or results “may,” “could,” or “should” occur, or the negative connotation of such terms. The material factors or assumptions regarding Forward-looking information contained in this Technical Report are discussed in this report, where applicable.

Forward-looking Information is subject to known and unknown risks, uncertainties and other factors that may cause actual results and developments to differ materially from those expressed or implied by such Forward-looking Information. Relevant risks and other factors include, without limitation: fluctuations in gold prices; fluctuations in prices for energy inputs, labour, materials, supplies and services; fluctuations in currency markets; operational risks and hazards inherent with the business of mining (including environmental accidents and hazards, industrial accidents, equipment breakdown, unusual or unexpected geological or structural formations, cave-ins, flooding and severe weather); inadequate insurance, or inability to obtain insurance to cover these risks and hazards; employee relations; relationships with, and claims by, local communities and indigenous populations; the Company’s ability to maintain existing or obtain all necessary permits, licenses and regulatory approvals in a timely manner or at all; changes in laws, regulations and government practices, including environmental and export and import laws and regulations; legal restrictions relating to mining; and risks relating to expropriation; increased competition in the mining industry. Forward-looking Information is designed to help readers understand views as of that time with respect to future events and speaks only as of the date it is made.

All the Forward-looking Information in this Technical Report is qualified by these cautionary statements. Except as required by applicable law, Equinox Gold and the Qualified Persons who authored this Technical Report assume no obligation to update publicly or otherwise revise any Forward-looking Information in this Technical Report, whether because of new information or future events or otherwise.

Cautionary Note to U.S. Readers Concerning Estimates of Mineral Reserves and Mineral Resources

Disclosure regarding Equinox Gold's mineral properties, including with respect to mineral reserve and mineral resource estimates included in this Technical Report, was prepared in accordance with National Instrument 43-101 – Standards of Disclosure for Mineral Projects (NI 43-101). NI 43-101 is a rule developed by the Canadian Securities Administrators that establishes standards for all public disclosure an issuer makes of scientific and technical information concerning mineral projects. NI 43-101 differs significantly from the disclosure requirements of the Securities and Exchange Commission (the “SEC”) generally applicable to U.S. companies. Accordingly, information contained in this Technical Report is not comparable to similar information made public by U.S. companies reporting pursuant to SEC disclosure requirements.

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Glossary

Units of Measure

A ..... Amperes
C$ ..... Canadian dollars
cfm ..... Cubic feet per minute
cm ..... Centimetre
cm^3 ..... Centimetre cubic
°C ..... Degrees Celsius
gpm ..... Gallons per minute
g ..... Gram
g/t ..... Grams per tonne
> ..... Greater than
ha ..... Hectare (10,000 m^2)
km^2 ..... Kilometre square
km ..... Kilometre
kPa ..... Kilopascals
kt/a ..... thousand tonnes per annum
kV ..... Kilovolt
kW ..... Kilowatt
< ..... Less than
L ..... Litre
L/min ..... Litres per minute

Ma .... Mega-annum (1 million years)
MVA .... Megavolt ampere
MV.. Megavolt
MW....................................... Megawatt
m^3... Metre cubic
m Level or mL .... Metre Level (relative metres level below surface)
m^2... Metre square
m .... Metre
masl .... Metres above sea level
m^3/h...................................... Metres cubic per hour
µm.. Micron
mm .... Millimetre
ML/d .... Million litres per day
Mt/a .... Million tonnes per annum
Mt .... Million tonnes
Ma .... Million years (annum)
M .... Million
min .... Minutes
oz .... Ounce (troy ounce—31.1035 g)
oz/a .... Ounce per annum
% .... Percent
lb .... Pound
sec .... Second
t/m^3...................................... Tonnes per cubic metre
t/d .... Tonnes per day
t/h .... Tonnes per hour
US$ .... United States dollar
V... Volt

Abbreviations and Acronyms

AD .... absolute difference
AMPRD .... absolute of the mean paired relative difference
ARD .... absolute of the relative difference
ABA...................................... acid-base accounting
ADR .... adsorption, desorption, and recovery
ASEA .... Agencia de Seguridad, Energía y Ambiente
ALS .... ALS Metallurgical laboratory
AMC .... AMC Mining Consultants (Canada Ltd
ANFO .... ammonium nitrate mixed with fuel oil
ANP...................................... Áreas Naturales Protegidas
AACEI .... Association for the Advancement of Cost Engineering International
AA .... atomic absorption

AAS....................................... atomic absorption spectroscopy
BOP .... Bermejal Open Pit
BUG .... Bermejal Underground
Ai.. Bond abrasion index
CWi .... Bond crushing work index
BWi .... Bond work index
BOP N.................................. BOP North
BOP S .... BOP South
BQE .... BQE Water
Britton Brothers..................... Britton Hermanos de Mexico
BQR .... budget quotation request
CNI....................................... Call and Nicholas Inc.
CIM .... Canadian Institute of Mining, Metallurgy and Petroleum
CIC....................................... carbon-in-column
CIL .... carbon-in-leach
CEC .... cation exchange capacity
CRF...................................... cemented rock fill
CRM..................................... certified reference materials
CFE...................................... Comisión Federal de Electricidad
CONAGUA............................ Comisión Nacional del Agua (National Water Commission)
CONANP............................... Comisión Nacional de Áreas Naturales Protegidas (National Protected Environmental Areas Commission)
CONAFOR............................ Comisión Nacional Forestal (National Forestry Commission)
CSV...................................... comma-separated values
CAMMSA .... Construcción, Arrendamiento de Maquinaria y Mineria S.A. de C.V.
CCD .... counter-current decantation
DMSL .... Desarrollos Mineros San Luis S.A. de C.V.
DDH .... diamond drill holes
DEM .... digital elevation model
DSM .... digital surface model
E&I .... electrical and instrumentation
EW .... electrowinning
EPCM................................... engineering, procurement and construction management
MIA....................................... Manifestación de Impacto Ambiental (Environmental Impact Statement)
ETJ....................................... Estudio Técnico Justificativo (Environmental Permit Application)
Equinox Gold .... Equinox Gold Corp.
EGL...................................... equivalent grinding length
GDI....................................... granodiorite composite
GRG..................................... gravity-recoverable gold
PROFEPA............................. Procuraduría Federal de Protección al Ambiente (Federal Prosecutor for the Protection of the Environment)
FTSF .... filtered tailings storage facility

FOB....................................... freight-on-board
FAR....................................... fresh air raises
FEED .... front-end engineering and design
FEL .... front-end loader
G&A .... general and administrative
LGEEPA................................ Ley General de Equilibrio Ecológico y la Protección al Ambiente (General Law of Ecological Equilibrium and the Protection of the Environment)
GSI....................................... Geological Strength Index
GOP .... Guadalupe Open Pit
Hazen................................... Hazen Research, Inc.
HL .... heap leach
IP.. induced polarization
ICP .... inductively coupled plasma
ICP–OES .... induced coupled plasma optical emission spectrometry
Peñoles .... Industrias Peñoles S.A. de C.V.
IMTA .... Instituto Mexicano de Tecnología del Agua (Mexican Institute of Water Technology)
INAH .... Instituto Nacional de Antropologia e Historia (National Institute of Anthropology and History)
INECC.................................. Instituto Nacional de Ecología y Cambio Climático (National Institute of Ecology and Climate Change)
INEGI .... Instituto Nacional de Estadística y Geografía (Mexican National Institute of Statistics and Geography)
ICU....................................... intensive cyanidation unit
ICMC.................................... International Cyanide Management Code
Cyanide Code .... International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold
IFC .... International Finance Corporation
IRA .... inter ramp angle
IBV .... interstitial bed volume
ID^2...................................... inverse distance square interpolation
KCA...................................... Kappes, Cassiday & Associates
LIMS..................................... Laboratory Information Management System
Layne .... Layne de Mexico
LAN .... Ley de Aguas Nacionales
LAU .... Licencia Ambiental Unica (Integrated Environmental License)
LOM .... life-of-mine
LHD...................................... load-haul-dump
LHOS .... Longhole open stoping
LFOP.................................... Los Filos Open Pit
LFTS .... Los Filos Technical Services
LFUG .... Los Filos Underground
Lycopodium.......................... Lycopodium Minerals Canada Ltd.
Major .... Major Drilling de Mexico, S.A. de C.V.
MLI .... McClelland Laboratories Inc.

MWMP .... meteoric water mobility procedure
MSO..................................... Mineable Shape Optimizer
Minera Guadalupe .... Minera Guadalupe S.A. de C.V.
Minera Nuteck....................... Minera Nuteck S.A. de C.V.
SEDENA .... Ministry of Defense
Miranda .... Miranda Mining Development Corporation
INEGI .... National Institute of Statistics, Geography, and Information
NI .... National Instrument
NI 43-101 .... National Instrument 43 101—Standards of Disclosure for Mineral Projects
LAN .... National Water Law
NPR .... net processing return
NEF1 .... Northeast Filos
OLTC .... on-load tap changers
OP .... open pit
OIT .... operator interface terminals
OMC..................................... Orway Minerals Consultants
OHCAF .... overhand cut and fill
OHDAF .... overhand drift and fill
PEMEX .... PEMEX Transformación Industrial, S.A. de C.V.
Pocock .... Pocock Industrial, Inc.
PTO...................................... power take-off
PLS .... pregnant leach solution
PCS...................................... process control system
PLC .... programmable logic controller
ANP...................................... protected environmental areas
QP .... Qualified Person
QA/QC .... quality control and quality assurance
RAR .... return air raises
RMR..................................... rock mass rating
Q' .... rock mass quality
RQD .... rock quality designation
ROM..................................... run of mine
ASEA .... Safety, Energy and Environment Agency
SCSE .... SAG Circuit Specific Energy
SEDENA .... Secretaria de la Defensa Nacional
SEMARNAT .... Secretaría de Medio Ambiente y Recursos Naturales (Secretary of the Environment and Natural Resources)
SAG .... semi-autogenous grinding
SGM .... Servicio Geológico Mexicano
SLS .... solid-liquid separation
SART .... sulphidization-acidification-recycling-thickening
SRCE .... standard reclamation cost estimator

SMP .... structural, mechanical, and piping
SCADA................................. supervisory control and data acquisition
SC .... support class
Teck .... Teck Corporation
TEM .... time-domain electromagnetic
UCS .... unconfined compressive strength
URF...................................... unconsolidated rock fill
UG.. underground
UHDAF................................. underhand drift-and fill
VTS .... Vancouver Technical Services—Goldcorp
WRF .... waste rock facility
WPM .... Wheaton Precious Metals Corp.
WAD..................................... weak acid dissociable
XRD .... X-ray diffraction

1 SUMMARY

Equinox Gold Corp. (Equinox Gold) has prepared this report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico* (the Technical Report), dated October 19, 2022, with an effective date of June 30, 2022.

The Los Filos Mine Complex encompasses the three main open pit mining areas of Bermejal, Guadalupe, and Los Filos, as well as three underground mines, Los Filos South, Los Filos North and Bermejal Underground.

This Technical Report presents the results of a feasibility study to build and operate a 10,000 t/d carbon-in-leach (CIL) plant at the Los Filos Mine Complex and is an update of the Mineral Resource and Mineral Reserve estimates based on operation of the CIL plant in parallel with the current heap leach processing facilities.

This Technical Report provides an update on the *Independent Technical Report for the Los Filos Mine Complex*, Mexico, March 2019, prepared for Leagold Mining Corporation (Leagold), with an effective date of October 31, 2018.

Qualified Persons (QP) from Equinox Gold, AMC Mining Consultants (Canada) Ltd. (AMC), Lycopodium Minerals Canada Ltd. (Lycopodium), Paul M. Sterling, and Struthers Technical Solutions Ltd. prepared this Technical Report.

This Technical Report has been prepared in accordance with the requirements of National Instrument 43-101 (NI 43-101) *Standards of Disclosure for Mineral Projects* of the Canadian Securities Administrators for lodgment on their System for Electronic Document Analysis and Retrieval (SEDAR).

All costs reported in this Technical Report are in United States dollars (US$) unless otherwise stated.

1.1 Property Description, Location, and Access

The Los Filos mine property consists of 30 exploitation and exploration concessions in active mining areas totalling 10,433 ha (Todd y Asociados, 2022). The Mine is in the Eduardo Neri District, Guerrero State, Mexico approximately 180 km southwest of Mexico City. The property is centred on latitude 17°52’13” north and longitude 99°40’55” west (UTM Zone 14Q 1,976,300N 427,400E).

The Los Filos Mine Complex can be accessed by road or by helicopter or fixed-wing charter flight. The four-hour (240 km) drive from Mexico City follows National Highway 95/95D south to the town of Mezcala, then 18 km on a paved road to the mine site.

1.2 History

Minera Guadalupe S.A. de C.V. (Minera Guadalupe) operated the Nukay underground mine (now part of the Los Filos Underground mine) from 1938 to 1940 and from 1946 to 1961, producing approximately 0.5 Mt at 18 g/t Au. Minera Nukay operated an open pit mine at Nukay commencing in 1984. From 1987 to 2001 Minera Nukay operated a 100 t/d process plant near Mezcala to process ore from the Nukay, La Agüita, Subida, and Independencia deposits.

In 1993 Teck Corporation (Teck) entered into an agreement with Minera Miral S.A. de C.V., which was in the process of buying out the owners of Minera Nukay. Teck Corporation and Miranda Mining Development Corporation formed Minera Nuteck S.A. de C.V. (Minera Nuteck) to conduct exploration in the region. The discovery hole for the Los Filos deposit was drilled in August 1995. In November 2003, Wheaton River Minerals gained 100% ownership of Los Filos through the purchase of Miranda Mining Development Corporation and associated agreements with Teck Corporation. Goldcorp acquired Wheaton River Minerals, and therefore Desarrollos Mineros San Luis S.A. de C.V. (DMSL) the operator of the Los Filos mine, in March 2005. Goldcorp also acquired the Nukay mine in 2008, which was subsequently integrated with the Los Filos operations as the Los Filos Underground mine.

Industrias Peñoles S.A. de C.V. (Peñoles) explored the Cerro Bermejal area in 1986 and outlined gold values in association with an oxide zone and jasperoids. In 1988 and 1989 Peñoles conducted a detailed exploration program for bulk-mineable gold mineralization. Peñoles completed a Mineral Resource estimate and prefeasibility study in 1994 that envisaged a 13,000 t/d open pit and heap leaching operation. On March 22, 2005, Goldcorp's wholly owned operating Mexican company Luismin acquired the Bermejal gold deposit from Minera El Bermejal, S. de R.L. de C.V., a joint venture between Peñoles and Newmont Mining Corporation.

Goldcorp completed feasibility-level studies for Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground between 2005 and 2007. Open pit mining commenced at Los Filos in 2005. Underground production at Los Filos commenced in 2007, and the first gold pour occurred that year. Annual open pit ore production rates increased to over 20 Mt/a by 2008, with total mining (ore and waste) of over 45 Mt/a occurring from 2009 to 2015. Production from underground sources has varied from 280 t/d in 2009 to over 1,900 t/d in 2019. In 2013, exploration drilling below Bermejal Open Pit encountered high-grade oxide mineralization that is now referred to as the Bermejal Underground deposit.

On April 7, 2017, Leagold completed the acquisition of 100% ownership of Los Filos Mine Complex through the purchase of DMSL from Goldcorp.

On March 10, 2020, Equinox Gold completed the acquisition of 100% ownership of the Los Filos Mine Complex through its acquisition of Leagold.

A total of 259 Mt of ore at 0.74 g/t Au, containing 6.1 Moz Au, was mined from the Los Filos Mine Complex from 2005 to June 30, 2022.

1.3 Mineral Tenure and Surface Rights

Equinox Gold, through its subsidiary DMSL, holds 30 exploitation and exploration concessions within the municipality of Eduardo Neri, Guerrero State, Mexico. In addition to the 30 exploitation and exploration concessions that cover the entire active mining areas, Equinox Gold holds 12 exploration concessions, including two concessions that have applications in progress, in Guerrero State, Mexico. The 42 concessions are granted for 50-year durations; the expiration dates vary depending on the date of grant of the concession. Renewal dates range from 2032 to 2067. The surface rights held by the mine cover the area needed to support all infrastructure required for the mining operations and CIL plant, including access and power-line easements (Todd y Asociados, 2022).

1.4 Environment, Permitting, Compliance Activities, and Social License

The relevant Mexican federal and state authorities have granted appropriate environmental permits for the Los Filos Mine Complex, including the area of the open pits. The Los Filos Mine Complex secured 4,102 ha to cover surface rights required for the mining operations, including the area of the three open pits, underground mine portals, process and ancillary facilities, roads, services, and a buffer area to allow for any future growth and potential exploration targets.

1.5 Geological Setting and Mineralization

The Los Filos mine property is in the Guerrero Gold Belt near the centre of a large, approximately 200 km-diameter circular feature known as the Morelos–Guerrero sedimentary basin. The basin consists of a thick sequence of Mesozoic platform carbonate and argillaceous rocks including the succession of the Morelos, Cuautla, and Mezcala Formations. The Cretaceous carbonate rocks were intruded by numerous early Tertiary-age granitoid bodies. The distribution of intrusions along northwest-trending belts is interpreted to reflect the control on their emplacement by pre-existing northwest-trending faults (Garza et al., 1996).

Tertiary granodiorites that intrude the carbonate sedimentary units on the Mine property include: the eastern and western Los Filos stocks, the Bermejal–Guadalupe stock, the Xochipala intrusion, and an unnamed granodiorite intrusion in the northeast portion of the property. Mineralization identified within the Los Filos property is typical of intrusion-related gold–silver skarn deposits. Gold skarns typically form in orogenic belts at convergent plate margins and are related to plutonism associated with the development of oceanic island arcs or back arcs.

Mineralization is geologically controlled either by being hosted by, or spatially associated with, skarn development during contact metamorphism of the carbonates by the intruding granitoid rocks. The Los Filos stocks form two circular deposits, each approximately 1.5 km in diameter, with mineralization focused along the contacts with the host rocks. The Bermejal–Guadalupe stock forms an oblong shape over 5 km long, with the Bermejal deposit on the northern end and the Guadalupe deposit approximately 2 km southeast of Bermejal; the stock continues further southeast to the San Pablo deposit. Massive magnetite, hematite, goethite, and jasperoidal silica, with minor associated pyrite, pyrrhotite, chalcopyrite, and native gold typically occur in the veins and metasomatic replacement bodies that develop at the contacts between the carbonate and intrusive rocks. Extensive, deep oxidation of the deposits (that occurred at the time of mineralization) has altered the mineralization into material that is amenable to cyanidation recovery techniques without the need of pre-treatment by roasting or other methods.

In the Los Filos area, known mineralization is associated with early-Tertiary Los Filos and Bermejal–Guadalupe granodiorite stocks that were emplaced into the host carbonate rocks. Mineralization mined in the Los Filos Open Pit is associated with a shallowly east-dipping diorite sill and with the upper portion of the eastern stock. The Los Filos Underground is divided into the Los Filos North (Norte) and South (Sur) sectors along the north and south sides of both the western and eastern stocks. The principal mining areas in the North sector are Nukay and Peninsular, and in the South sector are Independencia and Sur.

Mineralization in the Bermejal–Guadalupe area occurs along the contact of the Bermejal–Guadalupe stock with the carbonate rocks of the Morelos Formation. The Bermejal Open Pit mineralization is typically at the top or on the flanks of the upper portion of the intrusive. On the northern end of the stock, mineralization extends below the Bermejal Open Pit and down the steeply dipping to vertical flanks of the intrusion and is referred to as the Bermejal Underground deposit.

The total circumference of the Los Filos stocks is approximately 8 km, with at least half of this circumference tested by drilling or with mining development. The Bermejal–Guadalupe stock has a circumference of approximately 16 km, and although the contacts along the upper portion of the intrusion have been mined by open pit, only a few kilometres of this contact have been explored at depth. Mineralization extends from surface to over 700 m deep and is variable in grade and width. Additional exploration targets are present along the intrusion contacts in both the Los Filos and Bermejal–Guadalupe areas.

1.6 Exploration

Equinox Gold and previous companies have undertaken exploration at the Los Filos property with a focus on the granodiorite/carbonate contacts in the Los Filos and Bermejal–Guadalupe areas. Exploration activities have included regional and detail mapping; rock and soil sampling; trenching; channel sampling; reverse-circulation (RC) and diamond drilling; ground induced polarization, ground magnetic, and aeromagnetic geophysical surveys; mineralization characterization studies; LiDAR surveys; and metallurgical testing of samples.

Surface mapping and sampling, geochemical surveys, and magnetic surveys highlight the intrusions and related alteration products of contact metamorphism relative to the host carbonate rocks. These alteration zones can host gold skarn mineralization, which requires drilling to delineate.

1.7 Drilling

From 2003 to June 30, 2022, 939,782 m of diamond and RC drilling have been completed on the Los Filos mine property, including 64,930 m since 2019. This drilling includes surface programs at the Los Filos, Bermejal, Bermejal Underground, Guadalupe, San Pablo, and Xochipala areas and the underground drilling programs in the Los Filos North and South sectors. Drilling since 2019 has focused on extending mineralization in the Bermejal–Guadalupe open pits, Bermejal Underground, Los Filos Open Pit, and Los Filos Underground. Three contractors have completed drilling since 2019, using 13 different drill rigs.

Intersection spacing across the deposits that were drilled from surface is approximately 35 x 35 m in areas with closely spaced drilling and widens to about 70 x 70 m in the areas that are less well drilled. Drill spacing is wider again (i.e., 100 x 100 m) in the areas outside the conceptual pit outlines that are used to constrain Mineral Resources. Drill-hole azimuths depend on the orientation of the deposit being drilled. Dips range from 65° to 90° and are commonly 90° for drilling related to the open pit mineralization.

For the Bermejal Underground deposit, the drill azimuth varies due to the arcuate shape of the deposit's strike. The primary azimuths are usually 60° and 180° for the eastern and central portions of the deposit, respectively, whereas the drill holes on the western sector were vertical to provide an intersection angle that is close to perpendicular to the sub-sill mineralization.

In the opinion of the Qualified Person, the quantity, quality, and spacing of the lithological, geotechnical, collar survey, and downhole survey data collected in the exploration and infill drill programs are sufficient to support Mineral Resource and Mineral Reserve estimation.

1.8 Sample Preparation, Analyses, and Data Verification

Sample collection was conducted by the Los Filos mine exploration department from 2003 to present. Minera Nukay, Minera Nuteck, and Luismin employees conducted sampling programs prior to 2003.

The Los Filos exploration department follows industry best practices and is responsible for the following:

- Geological and geotechnical logging
- Core photography
- Density measurements
- Sample selection and numbering
- Core splitting
- Preparation of samples for shipping and submission to the external laboratory
- Incorporation of sample and data assay into the acQuire™ drill-hole database (including data validation)
- Sample storage (after return of pulp and reject from external laboratories)
- Sample security prior to shipping and after return of samples to site.

Geological logging data is recorded on tablet computers directly into an acQuire™ database. Sample and assay data are uploaded digitally. Survey data is imported or uploaded from the survey instruments.

All drill core samples for exploration and resource estimation are sent to an external laboratory for sample preparation (ALS Chemex, Guadalajara, Mexico) and assaying (ALS Chemex, North Vancouver, B.C., Canada).

All samples from the current drilling programs are analyzed for gold using a standard 50 g fire assay with gold detection by flame atomic absorption spectrometry to a 0.01 ppm detection limit. Multi-element analyses are completed using a multi-acid digest method and an induced coupled plasma optical emission spectrometry finish on 36 elements.

The core facility at the Los Filos Mine Complex is within a secure and monitored area on the mine property, and samples are always attended or locked at the sample collection and dispatch facility. Core boxes are transported to the core facility by the drilling contractors. Los Filos mine exploration department personnel undertake sample collection and transportation on site. Independent laboratory personnel using their company vehicles transport samples to the preparation laboratory. The sample preparation and analytical laboratory are independent of Equinox Gold.

A quality assurance/quality control (QA/QC) program is in use by the Los Filos exploration department and the independent laboratory also maintains its own QA/QC program to monitor the performance, accuracy and precision of the laboratory analyses.

The Los Filos exploration department has a standard QA/QC program in place for all drill core and RC sampling, and also underground mine sampling. The QA/QC program for samples from drilling includes routine insertion of duplicate samples, blank samples, and standards (certified reference materials) and also check-assaying of a suite of samples at an external third-party laboratory.

Los Filos geologists routinely perform validation checks on data, including checks on drill hole surveys, collar coordinates, lithology data, and assay data. Equinox Gold corporate staff completed an additional validation, which included checking coordinates of drill hole collars in the field and reviewing approximately 5% of data collected since 2004. Previous operators conducted and documented validation of drill holes completed prior to 2004. No significant errors or omissions were identified with the database following these checks.

In the Qualified Person's opinion, the sampling, sample preparation, security, and analytical methods currently in use are acceptable and meet industry-standard practices. In the opinion of the Qualified Person, the data have also been verified, and are therefore adequate for Mineral Resource and Mineral Reserve estimation, and mine planning purposes.

1.9 Mineral Processing and Metallurgical Testing

Extensive metallurgical testwork on samples from the various deposits that comprise the Los Filos Mine Complex has been conducted over the past two decades.

Los Filos Open Pit uses geometallurgical domains for defining ore types, whereas Los Filos Underground, Bermejal Open Pit, Bermejal Underground, and Guadalupe Open Pit use rock-type domains for defining ore types. The metallurgical test programs performed prior to 2016 were focused on validating the predicted recovery formulas for heap leaching Los Filos Open Pit and Los Filos Underground and Bermejal Open Pit. Metallurgical test programs performed during or after 2016 started to focus on the potential of using CIL to recover gold from ore that contained greater than 1% total sulphur, mainly from Bermejal Open Pit, Bermejal Underground, and Guadalupe Open Pit ore sources.

The metallurgical testwork prior to 2016 focused on determining heap leach gold recovery and heap leach engineering design, and the metallurgical testwork has been performed exclusively by Kappes, Cassiday & Associates (KCA) of Reno, Nevada, U.S.A. Leach Inc. conducted an evaluation of heap leach gold recoveries early in 2005, and the results were incorporated into the projection of gold recoveries based on testwork KCA performed in 1998 and 2004/2005, as well as McClelland Laboratories Inc. Leach Inc.'s evaluation created a predicted gold recovery model for each ore type and for ROM and Crushed material and the model was applied to Los Filos Open Pit, Los Filos Underground, and Bermejal Open Pit ore sources. Table 1-1 shows Simon Hille's predicted gold recovery model, validated in 2016.

Table 1-1: Simon Hille Predicted Gold Recovery Model (2016) for Los Filos Open Pit and Underground and Bermejal Open Pit

Ore Source	Lithology	Crushed Ore Gold Recovery (%)	ROM Ore Gold Recovery (%)
Los Filos Open Pit	Ia	76	64
	Ib	70	50
	II	54	45
	III	61	30
	IV	61	48
Bermejal Open Pit	Oxide	64	48
	Intrusive	68	58
	Carbonate	51	42
Los Filos Underground	All	80	N/A

Several metallurgical testwork programs were completed on Bermejal Underground and Guadalupe Open Pit ores after 2015. The Bermejal Underground metallurgical testwork program focused on comparing heap leach gold recovery to CIL gold recovery and supporting CIL engineering design. KCA performed the metallurgical testwork from 2015 to 2021.

In 2016, KCA tested Bermejal Underground ore based on three different ore source locations, using bottle roll testwork, gravity-recoverable gold (GRG) testwork, agglomeration testwork, and column leach testwork. The bottle roll, GRG, and thickening and filtration testwork was performed to define gold recoveries and design parameters for milled ore for a CIL process flow sheet. The bottle roll tests recovered over 90% of the gold in 96 hours. The GRG testwork showed that the CIL gold recovery could be increased by 3% to 5% with the use of GRG. Agglomeration and column leach testwork was performed to determine the quantity of cement required to maintain optimum percolation of solution in the column leach tests. The column leach tests were performed on fine-grained material with 80% passing (P_{80}) 19 mm, and required 10 kg of cement per tonne of ore. The reported gold recovery for the column leach tests ranged between 77% and 91%.

In 2017, KCA conducted a second metallurgical test program on Bermejal Underground drill core samples that were classified into five distinct lithologic zones, each further subdivided into Above-Sill, In-Sill, and Below-Sill. The samples were subjected to bottle roll tests, agitated leach tests, and column leach tests. The bottle roll and agitated leach test results showed that milling the ore to P_{80} 0.075 mm would recover 76% to 95% of the gold in 96 hours. Samples that contained higher than 1% total sulphur reported gold recoveries between 75% and 93%, showing that total sulphur did not adversely affect gold recovery when milled rather than heap leaching. Column leach tests were performed on material crushed to P_{100} 25 mm and leached for 93 days. The gold recovery results from the column leach tests ranged between 53% and 79%.

In 2021, KCA performed a gold recovery metallurgical program on multiple ore sources and lithologies representing the first four years of heap leach and CIL operation (2023 to 2026).

The heap leach testwork comprised 10-day coarse bottle rolls, preliminary agglomeration, and 90-day column tests. The average gold recoveries for the Los Filos Open Pit individual lithologies compared well to the Simon Hille-predicted recovery model. The Bermejal Open Pit gold recovery results were low, with the Intrusive recoveries ranging from 30.4% to 62.0% and the Oxide recoveries ranging from 14.2% to 50.2%. The Guadalupe Open Pit gold recovery for intrusive ore was 49.8% and the two oxide samples were 19.3% and 68.2% for the 2023 and 2025 composites, respectively.

Direct-leach and CIL bottle roll testwork were performed on each of the different ore sources and by lithology on ore ground to P_{80} 0.075 mm and leached for 48 hours. The CIL bottle roll test results reported higher gold recoveries than the direct-leach bottle roll tests, as shown in Table 1-2.

Table 1-2: CIL Average Gold Recovery by Ore Source (KCA, 2021)

Ore Source	Average Gold Recovery (%)	
	Direct	CIL
Los Filos Underground	82.7	83.3
Bermejal Underground	89.6	90.9
Guadalupe Open Pit Intrusive	71.0	75.1
Guadalupe Open Pit Oxide	89.2	90.2
Bermejal Open Pit Intrusive	82.4	83.1
Bermejal Open Pit Oxide	80.6	89.4
Los Filos Open Pit	89.1	90.3
Composite 1	82.9	86.9
Composite 2	91.2	94.6

The GRG tests results showed that 17% to 20% of the gold can be recovered by gravity separation.

CIL testwork also included Hazen Research, Inc.'s semi-autogenous grinding mill comminution, Bond ball mill work index, and Bond abrasion index testing. The results showed that the Bermejal and Guadalupe Open Pit intrusive ore was the hardest and would require the most energy for grinding. The LOM plan requires blending of ores to reduce the overall energy requirements of the grinding circuit in the CIL plant.

The metal recoveries for gold and silver are based on historical metallurgical testing of the various deposits for heap leaching and recent testwork for CIL processing. Recoveries and associated processing costs vary depending on rock type, copper and sulphur content as well as processing route as shown in Table 1-3 and Table 1-4.

Table 1-3: Processing Costs and Recoveries for Heap Leach Crushed and ROM Ores

Source	Lithology	Recovery formula Au	Recovery Ag (%)	Operating Cost Formula
Bermejal Open Pit Crushed	Carbonate	51%	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
	Intrusive	=IF(%S<=1.0,0.68,-0.0582*%S+0.5321)	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
	Oxide	=IF(%S<=1.0,0.64,-0.0355*%S+0.6337)	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
Bermejal Open Pit ROM	Carbonate	42%	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
	Intrusive	=IF(%S<=1.0,0.58,-0.0582*%S+0.4321)	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
	Oxide	=IF(%S<=1.0,0.48,-0.0355*%S+0.4737)	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
Los Filos Underground Crushed	All Ore	80%	11	=BCRCST+1.63*CNCST
Bermejal Underground Crushed	All Ore	=if(%S<1.0,-0.0508*%S+0.7786,-0.0169*%S+0.6075)	14	=(4.6696*%Cu+1.7502)*CNCST+BCRCST
Los Filos Open Pit Crushed	F1a	76%	11	=BCRCST+1.63*CNCST
	F1b	70%	11	=BCRCST+1.63*CNCST
	FII	54%	11	=BCRCST+1.63*CNCST
	FIII	61%	11	=BCRCST+1.63*CNCST
	FIV	61%	11	=BCRCST+1.63*CNCST
Los Filos Open Pit ROM	F1a	64%	9	=BUCRCST+0.7*CNCST
	F1b	50%	9	=BUCRCST+0.7*CNCST
	FII	45%	9	=BUCRCST+0.7*CNCST
	FIII	30%	9	=BUCRCST+0.7*CNCST
	FIV	48%	9	=BUCRCST+0.7*CNCST
Guadalupe Open Pit Crushed	Carbonate	51%	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
	Intrusive	=IF(%S<=1.0,0.68,-0.0582*%S+0.5321)	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
	Oxide	=IF(%S<=1.0,0.64,-0.0355*%S+0.6337)	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
Guadalupe Open Pit ROM	Carbonate	42%	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST
	Intrusive	=IF(%S<=1.0,0.58,-0.0582*%S+0.4321)	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST
	Oxide	=IF(%S<=1.0,0.48,-0.0355*%S+0.4737)	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST

Notes: BCRCST = base cost crushed = $6.03/t of ore.
BUCRCST = base cost ROM = $2.25/t of ore.
CNCST = cyanide cost = $1.95/kg.

Table 1-4: Processing Costs and Recoveries for CIL

Source	Recovery Formula Au	Recovery Ag (%)	Operating Cost Formula
Bermejal Open Pit	=IF(S%<=2.3,-0.1346*S%+0.8758, -0.0076*S%+0.5812)	39.0	=(8.0185*%Cu+0.9323)*CNCST+BCST
Los Filos Underground	95%	37.0	=IF(%Cu<0.1,0.28,2.4722*%Cu+0.0328)*CNCST+BCST
Bermejal Underground	90%	55.0	=IF(%Cu>=0.25,8.653*%Cu+0.103,1.55)*CNCST+BCST
Los Filos Open Pit	90%	50.0	=(1.19*CNCST)+BCST
Guadalupe Open Pit	=IF(S%<=2.3,-0.1346*S%+0.8758, -0.0076*S%+0.5812)	39.0%	=(3*%Cu+1.6329)*CNCST+BCST

Notes: CNCST = cyanide cost = $1.95/kg.
BCST = base CIL operating cost = $8.99/t of ore.

1.10 Mineral Resource Estimates

Equinox Gold personnel prepared Mineral Resource estimates for the Los Filos, Bermejal, and Guadalupe Open Pits, and the Los Filos and Bermejal Underground deposits with an effective date of June 30, 2022. The Los Filos Mine Complex Mineral Resources after mining depletion to June 30, 2022, and reported exclusive of Mineral Reserves, are as follows:

- 325.3 Mt at an average gold grade of 0.75 g/t, containing 7.9 Moz of gold in the Measured and Indicated classifications
- 135.9 Mt at an average gold grade of 0.74 g/t, containing 3.2 Moz of gold in the Inferred classification.

Estimates are presented by deposit area in Table 1-5.

Table 1-5: Mineral Resource Statement by Deposit for the Los Filos Mine Complex, Exclusive of Mineral Reserves, June 30, 2022

Area	Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Bermejal/Guadalupe Open Pit	Measured	9,898	0.76	243	6.4	2,034
	Indicated	184,152	0.59	3,492	7.6	45,186
	Measured & Indicated	194,050	0.60	3,734	7.6	47,220
	Inferred	44,292	0.55	777	9.8	13,932
Bermejal Underground (below $1,500 pit shell)	Measured	-	-	-	-	-
	Indicated	998	3.97	127	16.3	522
	Measured & Indicated	998	3.97	127	16.3	522
	Inferred	1,501	4.98	241	22.7	1,093
Los Filos Open Pit	Measured	35,327	1.09	1,238	6.4	7,315
	Indicated	90,544	0.79	2,290	6.5	18,857
	Measured & Indicated	125,870	0.87	3,528	6.5	26,172
	Inferred	87,552	0.68	1,914	7.7	21,657
Los Filos Underground	Measured	2,081	4.13	276	22.8	1,527
	Indicated	2,326	3.09	231	25.7	1,920
	Measured & Indicated	4,407	3.58	507	24.3	3,446
	Inferred	2,590	3.67	306	27.5	2,287
Total	**Measured**	**47,306**	**1.15**	**1,757**	**7.2**	**10,876**
	Indicated	**278,020**	**0.69**	**6,140**	**7.4**	**66,485**
	Measured & Indicated	**325,326**	**0.75**	**7,897**	**7.4**	**77,360**
	Inferred	**135,935**	**0.74**	**3,237**	**8.9**	**38,969**

Notes: Mineral Resources are exclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50% to 85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade of: 1.71 g/t Au for Los Filos South Underground; 2.05 g/t Au for Los Filos North Underground; 2.71 g/t Au for Bermejal underground.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar (P.Eng.).

1.11 Mineral Reserve Estimates

Mineral Reserves are reported in accordance with National Instrument 43-101 Standards of Disclosure for Mineral Projects, CIM (2014) definitions.

Modifying factors were applied to convert Mineral Resources to Mineral Reserves, including mining cut-off grades, mining dilution, and mining recovery factors. Only Measured and Indicated Mineral Resources are used to state Mineral Reserves.

AMC estimated Mineral Reserves using a gold price of $1,450/oz, a silver price of $18/oz, and an effective date of June 30, 2022.

The Los Filos Mine Complex Mineral Reserves include open pit Mineral Reserves of 180.6 Mt at an average grade of 0.65 g/t Au, containing 3.8 Moz Au, and underground Mineral Reserves of 12.6 Mt at an average grade of 3.94 g/t Au, containing 1.6 Moz Au. The consolidated open pit and underground Mineral Reserve estimate based on Proven and Probable Reserves for the Los Filos Mine Complex is presented in Table 1-6.

Table 1-6: Consolidated Mineral Reserves Statement for Los Filos Mine Complex as of June 30, 2022

Classification	Mining Method	Tonnes (kt)	Grade (g/t Au)	Contained Au (koz)	Grade (g/t Ag)	Contained Ag (koz)
Proven	Open Pit	35,154	0.74	837	5.0	5,677
	Underground	299	4.15	40	13.7	132
	Proven total	35,453	0.77	877	5.1	5,809
Probable	Open Pit	145,476	0.62	2,921	6.3	29,303
	Underground	12,297	3.94	1,556	18.9	7,458
	Probable total	157,773	0.88	4,477	7.2	36,761
Proven and Probable	Open Pit	180,629	0.65	3,758	6.0	34,980
	Underground	12,597	3.94	1,596	18.7	7,590
	Proven and Probable	193,226	0.86	5,354	6.9	42,570

Notes: CIM *Definition Standards for Mineral Resources and Mineral Reserves* (CIM, 2014) were used for reporting of Mineral Reserves.
Mineral Reserves are estimated using a long-term gold price of US$1,450 per troy oz and a long-term silver price of US$18 per troy oz for all mining areas.
Mineral Reserves are stated in terms of delivered tonnes and grade before process recovery.
Mineral Reserves are defined by pit optimization and are based on variable break-even cut-offs as generated by process destination and metallurgical recoveries.
Metal recoveries are variable dependent on metal head grades, as outlined in Table 15-2 and Table 15-3.
Open pit dilution is applied at: **a.** 5% at a zero grade for Au and Ag for Bermejal Open Pit and Guadalupe Open Pit, and **b.** 7% at zero grade for Au and Ag for Los Filos Open Pit.
Open pit mining recovery is applied at: **a.** 95% for Bermejal Open Pit and Guadalupe Open Pit, and **b.** 93% for Los Filos Open Pit.
Heap leach process recovery varies based on rock type.
The Qualified Persons responsible for this item of the Technical Report are not aware of any mining, metallurgical, infrastructure, permitting or other relevant factors that could materially affect the Mineral Reserve estimates.
Effective date of Mineral Reserves is June 30, 2022.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Underground Mineral Reserves are reported based on a variable net processing return cut-off value varying between $65.80 and $96.60/t
Underground dilution is assigned an average of 10% at a zero grade for Au and Ag.
Underground mining recovery is set to 97%.
Numbers may not sum due to rounding.
The Qualified Person for the open pit estimate is Mr. Eugene Tucker, P.Eng., and for the underground estimate is Mr. Paul Salmenmaki, P.Eng.

1.12 Mining

1.12.1 Underground Mining

The mining methods for Los Filos Underground are overhand cut and fill in the narrow areas and overhand drift and fill in the wider areas. Both are proven methods at Los Filos Underground and allow for a high degree of selectivity. The longhole open stoping mining method is also used in targeted areas of vertical ore body continuity and good rock conditions.

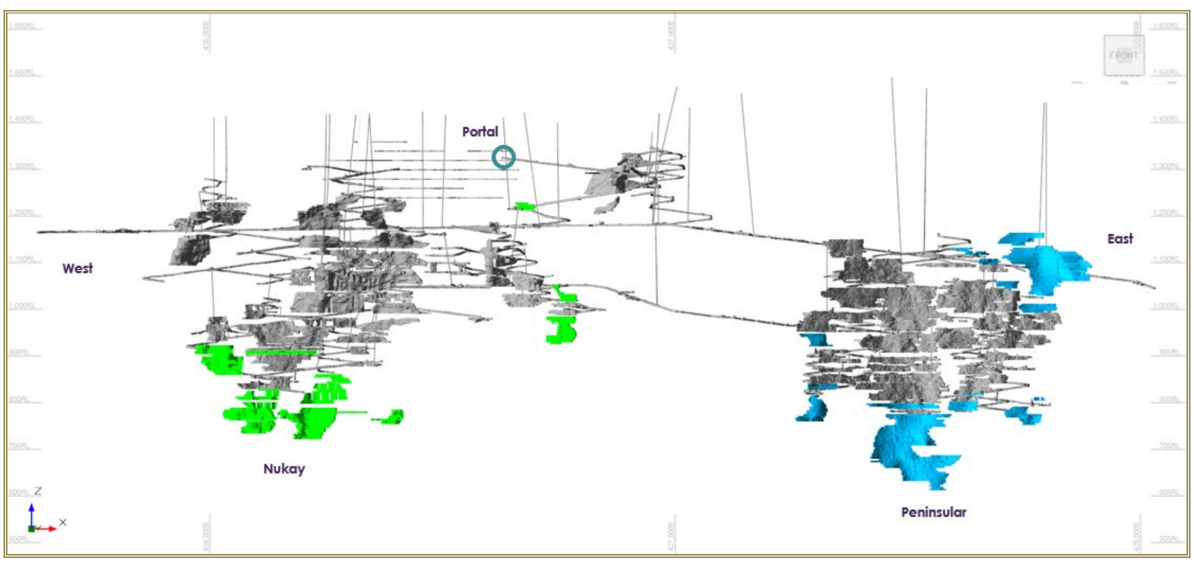
The mining method for Bermejal Underground is overhand drift and fill in oxide ore, which constitutes most of the deposit, and underhand drift and fill in intrusive ore.

Based on the selective nature of the predominant cut-and-fill mining method, AMC anticipates that good mining practices will allow mining dilution to stabilize around 10% and mining recovery at 97%.

Underground ore is sent to the heap leach crushed processing route until the CIL plant becomes available in mid-2024. The cut-off values supporting the estimation of underground Mineral Reserves were developed as a net processing return for Bermejal Underground, as the processing cost and metallurgical recovery to the CIL plant are variable. With respect to Los Filos Underground, the cut-off grade was determined based on a fixed processing cost and metallurgical recovery based on the average grade over the remaining mine life.

The mining operations are contracted out at Bermejal Underground; the Los Filos Underground North mine is owner-operated.

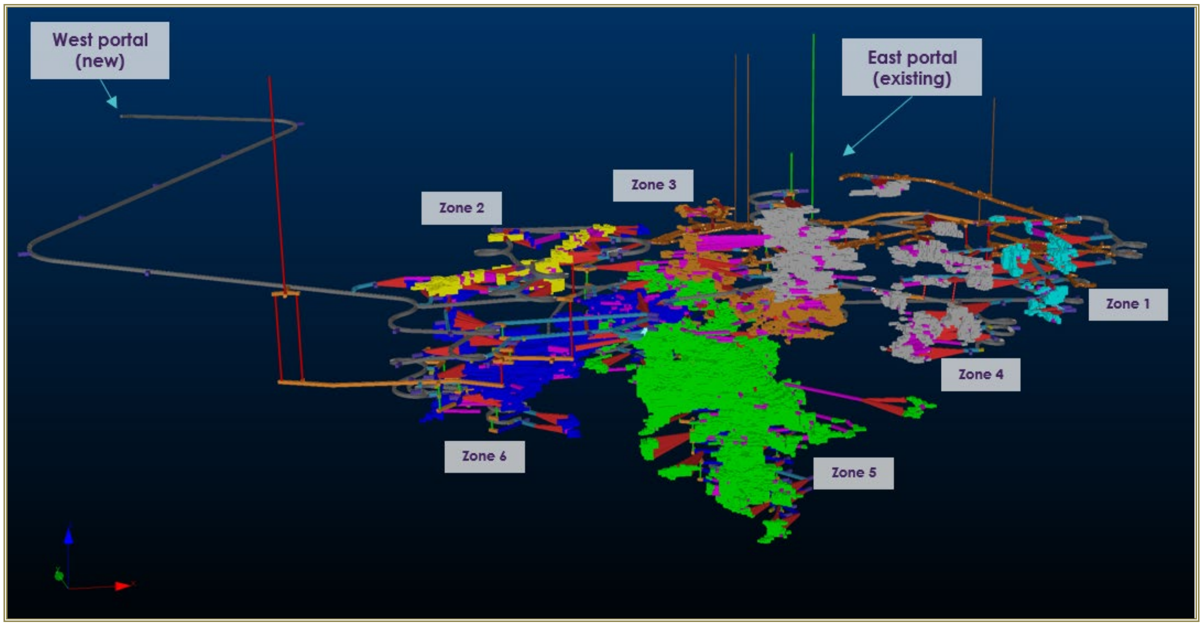
Los Filos Underground is extracting ore from two main zones, Nukay and Peninsular, shown on Figure 1-1. The mine is expected to produce approximately 1.2 Mt of ore at an average production rate of 960 t/d, until the end of its life in 2025.



Source: AMC (2022); not to scale.

Figure 1-1: Long Section of the Los Filos Underground North Mine, Looking North

For Bermejal Underground, access to the ore zones is currently via the East portal. A second portal, the West portal, is planned to provide a second access point by 2025 as shown on Figure 1-2. Once the second portal is completed, Bermejal Underground mining is planned to operate at a steady-state production rate of 2,740 t/d (1 Mt/a) from 2025 to 2032 for total contribution of 12.6 Mt of ore.



Source: AMC (2022); not to scale.

Figure 1-2: Bermejal Underground Mine Design Overview and Zones, Looking North

1.12.2 Open Pit Mining

Open pit mining will remain owner-operated with conventional load, haul, drill and blast on 9 m benches. Loading is currently undertaken by 250-tonne shovels and large front-end loaders (FEL), and haulage by 136-tonne trucks. A larger mining fleet composed mainly of 180-tonne electric-drive trucks and 400-tonne face shovels is proposed to progressively replace the existing mining equipment as it reaches the end of its useful life.

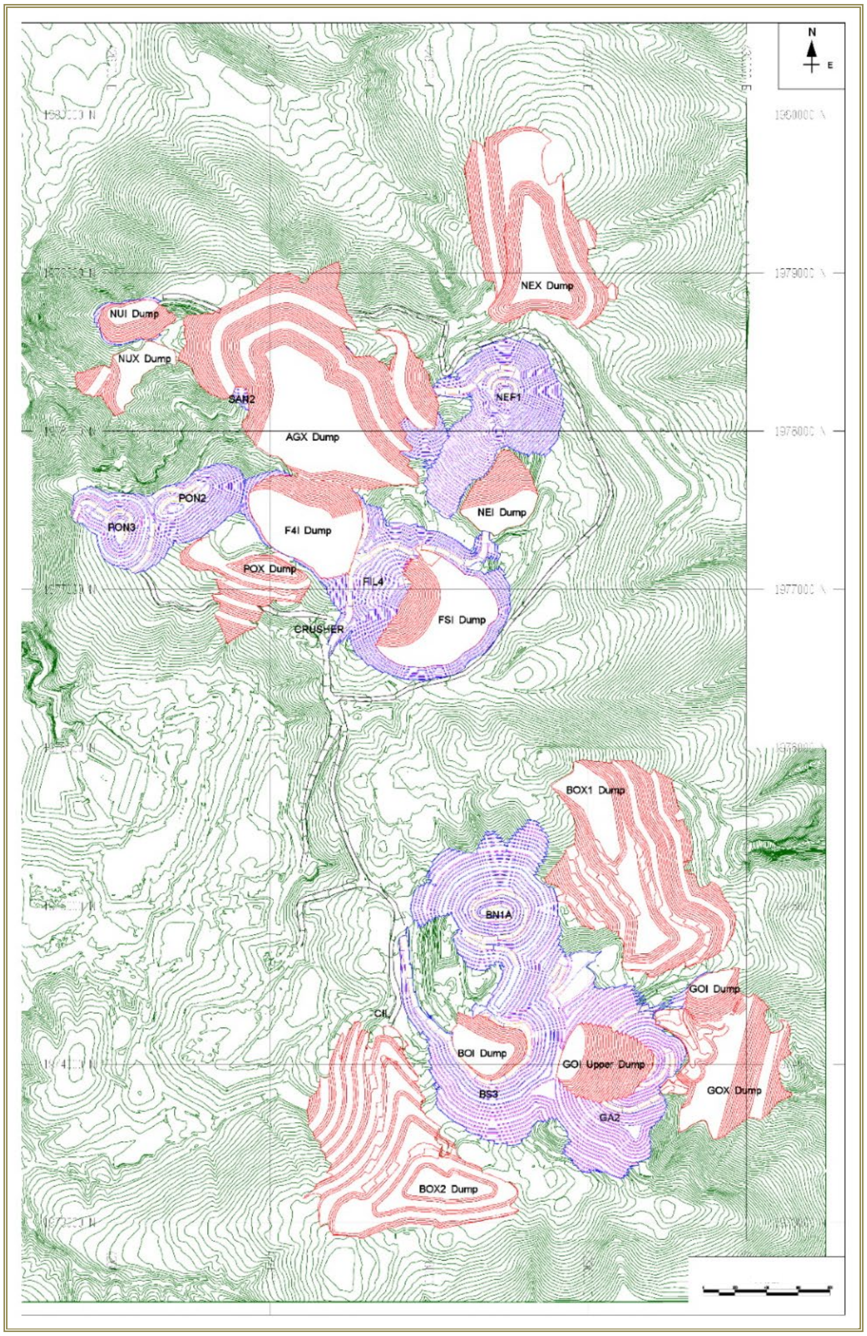
Mathematical equations were used to derive the metallurgical recovery and processing costs for each mining block based on rock type, sulphur, gold, and copper content, and the processing destination (crushed or ROM heap leach, or CIL).

An allowance for mining dilution and mining recovery was used based on historical performance and reconciliation of the resource model to the mining production. Mining dilution and ore loss is estimated at 7% at Los Filos Open Pit and at 5% at the Bermejal and Guadalupe Open Pits.

These inputs, combined with mining costs, general and administrative costs, selling costs, metal prices, and royalties, were used to derive economic open pit cut-off grades. The ultimate open pits were designed based on guidance from pit optimization, geotechnical parameters, and practical constraints.

A combination of external waste dumps and in-pit backfills was used to minimize haul distance for the waste rock mined.

Figure 1-3 presents the final open pit infrastructure layout once all pits are mined and final external and in-pit waste dumps are constructed.



Source: AMC (2022).

Figure 1-3: Open Pit Infrastructure Layout

1.12.3 Combined Schedule

The combined open pit and underground mine plan aimed at optimizing project value by allocating ore to the most attractive processing destination, based on mining and processing constraints, operating costs (OPEX), revenue, and capital costs (CAPEX) considerations.

The combined mine plan contemplates that all underground ore and higher-grade open-pit ore (generally above 0.5 g/t Au) would be directed to the CIL plant once it commences operations in 2024, with lower-grade ore going onto the heap leach pads. Ore that contains higher levels of copper and sulphur would also be directed to the CIL plant to optimize the economic recovery of gold from all ore types. The combined mine plan results in a mine life that extends until 2036 as shown in Figure 1-4.

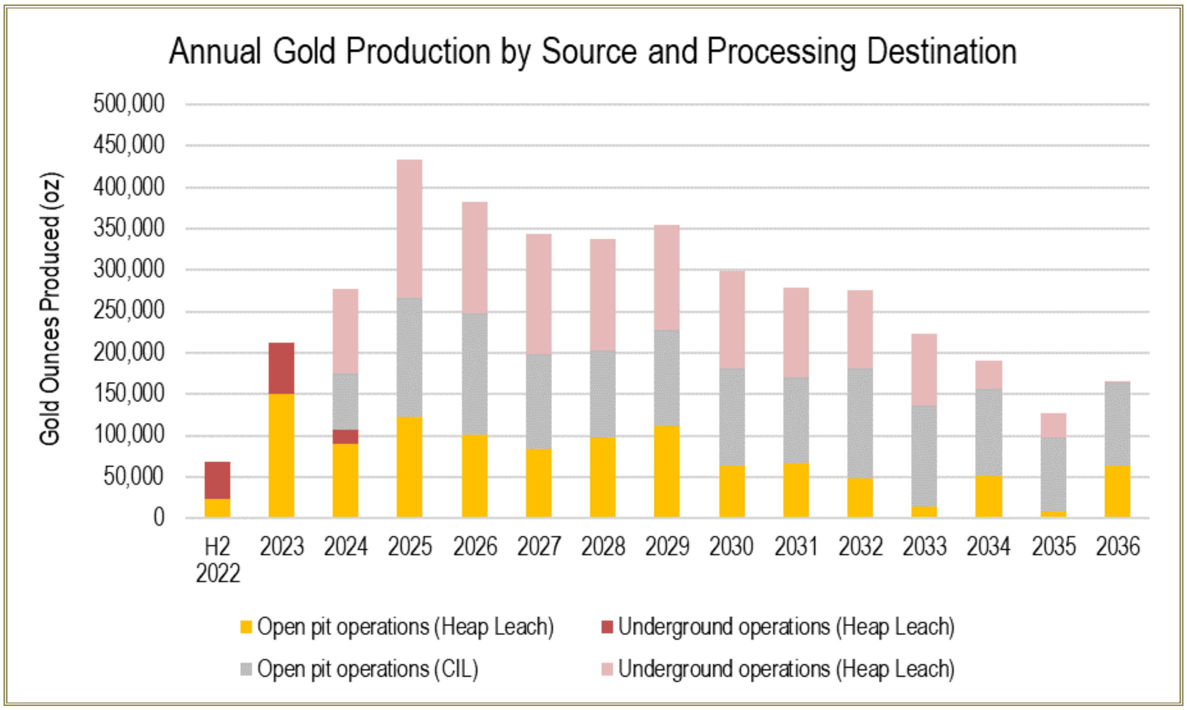
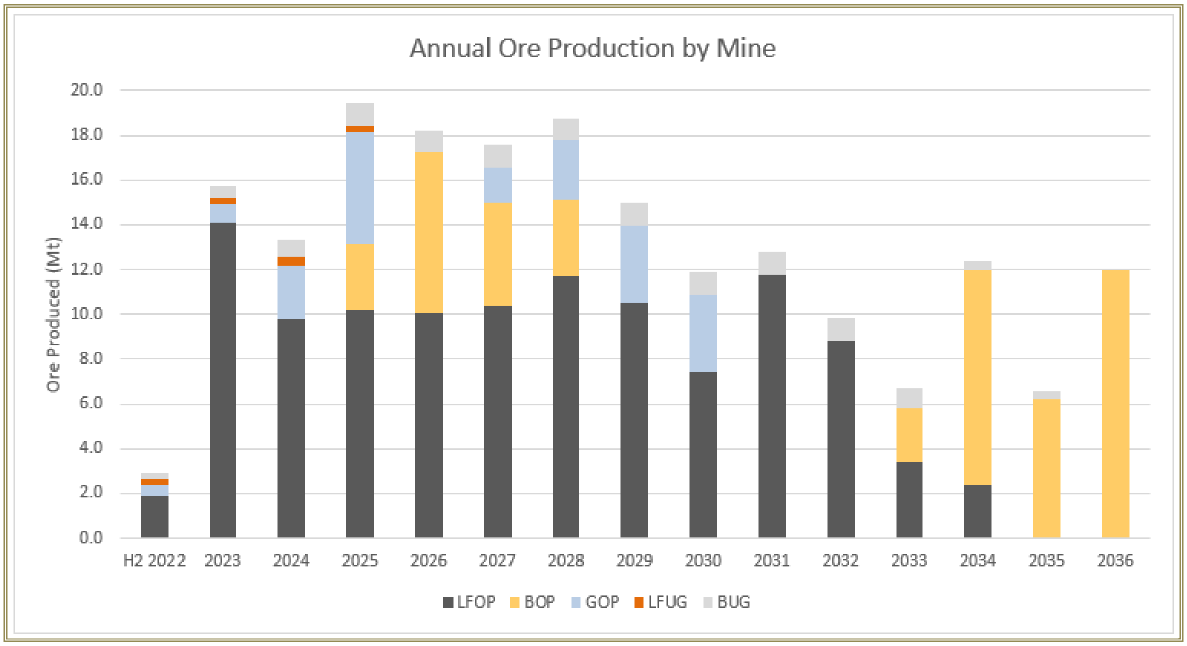


Figure 1-4: Gold Production by Source and Processing Destination

Open pit total material mined from all areas peaks at approximately 85 Mt/a, ore mined from Bermejal Underground reaches 1 Mt/a between 2025 and 2032, and Los Filos Underground ore production peaks at 400 kt/a in 2024 (refer to Figure 1-5). The resulting ore and gold production is presented in Table 1-7.



Source: AMC (2022).

Notes : LFOP = Los Filos Open Pit, BOP = Bermejal Open Pit, GOP = Guadalupe Open Pit, LFUG = Los Filos Underground, BUG = Bermejal Underground; 2022 = H2 2022

Figure 1-5: Ore Production Schedule by Mine

Table 1-7: Annual Processing Production Schedule

Item	Unit	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Heap Leach																	
Total Ore Processed	**kt**	**147,510**	2,942	15,755	11,488	15,763	14,595	13,923	15,138	11,321	8,227	9,143	6,192	3,057	8,745	2,877	8,344
Au grade—ore processed	g/t	**0.47**	1.05	0.68	0.48	0.44	0.39	0.36	0.36	0.59	0.47	0.42	0.41	0.28	0.39	0.24	0.57
Au recovery	%	**55.1%**	68.2%	61.9%	60.1%	55.2%	56.0%	52.4%	55.6%	51.9%	51.4%	54.7%	58.3%	52.7%	46.5%	36.4%	41.9%
Recovered gold	koz	**1,223**	68	213	107	123	101	84	98	112	64	67	48	15	52	8	64
CIL Plant																	
Total Ore Processed	**kt**	**45,716**	0	0	1,877	3,689	3,649	3,649	3,652	3,649	3,649	3,649	3,652	3,650	3,650	3,650	3,650
Au grade—ore processed	g/t	**2.13**	0.00	0.00	3.14	3.04	2.67	2.47	2.31	2.31	2.30	2.00	2.17	2.00	1.39	1.19	1.23
Au recovery	%	**87.7%**	0.00%	0.00%	89.8%	86.2%	89.9%	89.9%	88.6%	89.4%	87.1%	90.0%	90.0%	88.9%	85.7%	85.7%	71.1%
Recovered gold	koz	**2,752**	0	0	170	311	282	261	240	242	235	211	229	209	140	120	103
Total Metal Production																	
Total Silver Production	**koz**	**11,830**	44	167	580	1,148	855	686	1,489	1,657	774	701	560	793	691	911	770
Total Gold Production	**koz**	**3,975**	66	213	277	434	383	345	338	354	300	279	277	224	191	128	166

Note: Numbers may not sum due to rounding.
2022 = H2 2022.

1.13 Recovery Methods

1.13.1 Heap Leach Process

Heap leaching commenced in 2007 with ROM ore stacked on Pad 1. The crushing circuit became operational in 2010, and Crushed ore, too, was initially stacked on Pad 1 with ROM ore. With Pad 2 construction completed in 2013, the Crushed ore from the open pits and the underground mines was stacked on Pad 2, leaving Pad 1 to receive only ROM ore. Historically, ore containing sulphides has been stockpiled; ore with a total sulphur content greater than 1.0% was not mined. Stacking of low total-sulphur-content Crushed and ROM ores will continue to the end of 2036.

Although heap leach processing details have evolved since operations began in 2007, the basic design of the gold ore processing circuit remains that of the original plan, and is based on a heap leach operation using multiple-lift, single-use heap leach pads.

Two large geosynthetic-lined heap leach pads are in operation and are in two sections: one for Crushed ore and the other for ROM ore. ROM ore is currently stacked on Pad 1 and Crushed ore on Pad 2. Pads 1 and 2 cover 2,515,000 and 721,000 m^2, respectively, for a total of 3,236,000 m^2.

The ADR plant is a conventional carbon-in-column recovery facility associated with a gold refinery that produces a gold–silver doré product. The ADR plant is used to recover all heap leached gold.

Three re-leaching programs have been instrumental in reducing the gold-recoverable inventory to 52 koz by June 30, 2022. The re-leaching programs were completed by the end of 2021. Equinox Gold reported the 2021 ending inventory to be 66 koz. Equinox Gold estimates that 14 koz of gold will be recovered in 2022 from ore stacked in Q4 2021. Ore stacked in Q1 and Q2 2022 will be fully leached after 120 days for Crushed and 180 days for ROM ores. Depending on where the stacked ore is in the leaching cycle, it is estimated that 49 koz of recoverable gold will be recovered in Q3 2022 from the ore stacked in Q1 and Q2 2022. The remaining recoverable inventory in the heaps will be 17 koz. Table 1-8 shows the breakdown of the heap inventory as of June 30, 2022, which will be recovered by the end of 2022.

Table 1-8: Breakdown of Remaining Gold Inventory as of June 30, 2022

Area	Gold Ounces (oz)
2021 Ending Inventory	66
Deferred Leaching from Q4 2021	−14
Deferred Leaching from Q1 & Q2 2022	−49
Remaining Inventory	17

1.13.2 CIL Recovery Process

The CIL plant design is based on a robust metallurgical flowsheet developed for optimum recovery, while minimizing CAPEX and OPEX. As the CIL plant is an addition to an existing operation, existing site services (power, water, etc.) will be used, where appropriate, to supply the new facilities. The flowsheet of the new CIL plant includes crushing, milling, gravity, carbon in leach, carbon regeneration, and thickening and filtration of the CIL tailings for dry-stack storage.

The plant design is considered appropriate for its expected 12.5-year operating life. The key criteria for selection of equipment type were cost, suitability for duty, reliability, and ease of maintenance. Due to the project schedule, fabrication and delivery times were used as criteria for selection between vendors of broadly similar equipment. The plant layout provides ease of access to all equipment for operating and maintenance requirements, while maintaining a layout that will facilitate construction progress in multiple areas simultaneously.

The key project design criteria for the CIL plant are:

- Capacity to treat 10,000 t/d (3.65 Mt/a) of varying blends of ore types as determined by the integrated life-of-mine (LOM) production schedule.
- Crushing plant utilization of 75% and CIL and tailings filtration plant utilization of 91.3%, supported by the incorporation of surge capacity and standby equipment, where required.
- The grinding plant will grind ores to P_{80} 0.075 mm and leach them in a CIL circuit for 40 hours to extract an estimated 90.6% contained gold and 38.8% contained silver.
- The grinding flowsheet includes gravity concentration.
- Gold will be recovered from the loaded carbon in a 10-tonne batch ADR plant.
- CIL plant tailings will be thickened, filtered, and delivered by conveyors to the heap leach pad for stacking on an area designated for storage of dry filtered tailings.
- Sufficient automation and plant control will be incorporated to minimize the need for continuous operator intervention, but will allow manual override and control if and when required.

CIL design documents have been prepared and incorporate engineering and key metallurgical design criteria derived from the results of historical and recent metallurgical testwork programs.

1.14 Environmental Studies, Permitting, and Social or Community Impacts

The environmental permit (MIA) for the CIL plant and associated infrastructure was granted in August 2018 and 2021. The permits to construct the new electrical substation and extension of the high voltage transmission line will require updating as the location of the substation has been modified since the MIA process.

For the filtered tailings disposal from the CIL plant, DMSL applied for a MIA permit to construct and operate a filtered tailings storage facility on top of Pad 1, and the MIA permit was granted in 2018; however, the volume and preferred location of the filtered tailings storage facility was subsequently modified, and therefore the current permit will need to be modified accordingly.

The QP is of the opinion that these modifications will be granted.

1.15 Power

The CIL plant infrastructure includes a 40 MW power substation with redundant 30/40/50 MVA transformers and for an extension of the existing 115 kVA transmission line that connects the current substation to the Mezcala substation.

Additional power will be required to operate the CIL plant as the plant will consume additional energy beyond the capacity of the existing substation. An application was made to Comisión Federal de Electricidad (CENACE), Mexico's federal electricity commission utility, for 22 MW of additional energy required (to 38.8 MW in total), and a study was completed. CENACE confirmed energy availability and electrical infrastructure upgrades that are required at its existing Mezcala substation prior to commissioning of the CIL plant.

1.16 Water

Water usage for the Los Filos Mine Complex is currently 1.0 Mm^3/a and the permit allows for 1.2 Mm^3 of extraction. An application to increase the water permit to 2.2 Mm^3 is in process and is expected to be approved.

1.17 Heap Leach Pads

Approximately 260 Mt of ore have been stacked on the heap leach pads. There is sufficient storage capacity for the LOM Crushed ore on Pad 2; however, Pad 1 will not have enough storage capacity to store all the LOM ROM ore. A third pad (Pad 3) will be constructed at the southern end of Pad 2 to provide 63.5 Mt of additional storage for ROM. This new pad will be constructed in three phases, starting with the first phase in 2023. In addition to Pad 3, an "interliner" is proposed to be constructed on top of portions of Pads 1, 2, and 3 once the pads have been filled to their design capacity. The interliner will provide up to 60 Mt of additional storage capacity for ROM ore. The interliner will be built in two phases, with the first phase required by Q1 2031 and the second phase by Q4 2032. The current and planned heap leach pad infrastructure will be sufficient to support mining operations for the LOM plan.

1.18 Filtered Tailings

A total of 45.7 Mt of tailings will be generated from fine grinding the various ores during the CIL process. The tailings will be filtered through a series of pressure filter presses to achieve a high degree of dewatering, with the resultant tailings cake disposed in a filtered tailings storage facility on the eastern side of Pad 1 and close to the planned tailings filter plant. The filtered tailings will be transported from the tailings filter plant to the deposition area by mobile grasshopper conveyors and deposited with a radial stacker. The filtered tailings storage facility will be developed in phases, and the first phase will be prepared by mid-2024 when the CIL plant and tailings filter plant are commissioned.

1.19 Capital and Operating Costs

The LOM CAPEX and OPEX have an effective date of June 30, 2022.

CAPEX and OPEX were estimated by Equinox Gold, Lycopodium, AMC, and Paul M. Sterling based on a combination of quotes, estimates based on historical performance at the mine, historical and in-house databases, and first principles.

The LOM CAPEX estimate is $1,067 million, from the second half of 2022 to the end of the expected mine life in 2036. This value includes $718 million for non-sustaining capital, of which $318 million is for construction of the CIL plant, and $349 million for sustaining capital, as shown in Table 1-9.

Table 1-9: Summary Estimate of LOM CAPEX

Item	Non-Sustaining Capital Costs ($M)	Sustaining Capital Costs ($M)	Total Capital Costs ($M)
Open Pit Mobile Equipment and Workshop Upgrade	125	133	255
Los Filos Open Pit—Capitalized Stripping	112	-	112
Bermejal Open Pit—Capitalized Stripping	77	-	77
Guadalupe Open Pit—Capitalized Stripping	-	44	44
Los Filos Underground	-	16	16
Bermejal Underground	35	70	106
CIL Plant	318	-	318
Heap Leach Pad Expansion	-	86	86
Closure and Reclamation	51	-	51
Total	**718**	**349**	**1,067**

Note: Numbers may not sum due to rounding.

The total LOM OPEX is estimated at $4,015 million, as shown in Table 1-10. Approximately 83% of the LOM OPEX is related to mining and processing, with the remainder attributable to community, land access, and general and administrative costs.

Table 1-10: Summary Estimate of LOM OPEX

Cost Item	LOM	
	($M)	(%)
Mining (Open Pit and Underground)	2,072	52
Open Pit	*1,118*	*28*
Underground	*954*	*24*
Processing	1,288	32
General and Administrative, Community, and Land Access	655	16
Total	**4,015**	**100**

Note: Numbers may not sum due to rounding.

1.20 Taxation and Royalties

The Los Filos Mine Complex is subject to a 30% federal corporate income tax rate. Two mining royalty taxes are also payable to the government of Mexico: a 7.5% mining tax on earnings before interest, taxes, depreciation, and amortization; and a 0.5% gross revenue royalty tax levied on revenue from gold and silver sales. Net smelter return royalties to Servicio Geológico Mexicano, a department of the Mexican government, ranging from 2.5% to 3% are applicable to mining from five concessions of the Mine property. Two of those concessions are also subject to royalties of 0.75% to 1.75% payable to LC Mines S.A. de C.V., a subsidiary of Agnico-Eagle Mines Limited.

1.21 Economic Analysis

The construction and operation of the CIL plant shows strong economic viability, with an after-tax NPV of the cash flow of the entire project, using a discount rate of 5% (NPV_5), estimated at $625 million at the base-case gold price of $1,675/oz and a post-tax internal rate of return of 26%. No inflation or escalation is applied.

The initial capital outlay associated with the CIL plant is estimated at $318 million. A high-level economic analysis determined that the addition of the CIL plant, compared to a heap leach-only scenario, contributes positively to the overall cash flow and NPV of the Los Filos Mine Complex, and added approximately four years of mine life and over 1.1 Moz of gold produced.

The mine schedule features high grades with projected ounces production averaging over 360 koz/a between 2025 and 2030. The high margins potentially achievable during this period drive significant value. A summary of the economic analysis results using a gold price of $1,675/oz is shown in Table 1-11.

Table 1-11: Summary of Economic Analysis

Category	LOM ($M)
Total Net Revenue (Gold and Silver)	6,774
Total Mining Operating Costs (Underground and Open Pit)	2,072
Total Heap Leach Processing Operating Costs	702
Total CIL Processing Operating Costs	585
Land Payment and General and Administrative Operating Costs	655
Total Operating Costs	4,015
Operating Cash Flow	2,759
Total Non-Sustaining Capital Costs	718
Total Sustaining Capital Costs	349
Total Capital Costs	1,067
Total Working Capital	7
Pre-Tax Cash Flow	**1,699**
Pre-Tax NPV_5	**1,107**
Income Tax	491
Mining Duty	216
Post-Tax Net Cash Flow	**993**
Post-Tax NPV_5	**625**
Internal Rate of Return (%)	**26.4**
Payback Period (Years)	**2.5**
Cash Cost per Ounce ($/oz)	**981**
AISC per Ounce ($/oz)	**1,081**

Note: Numbers may not sum due to rounding.

A build up of the cash cost and AISC per gold ounce is presented in Table 1-12.

Table 1-12: Cash Cost per Gold Ounce and AISC per Ounce Build-up

Item	Cost	
	($M)	($/oz)
Mining (Open pit and Underground)	2,072	521
Open Pit	1,118	281
Underground	954	240
Processing	1,288	324
General and Administrative, Community, and Land Access	655	165
Total Operating Costs	**4,015**	**1,010**
Royalties	34	9
Refining and Transport	22	6
Silver Credits	(172)	(43)
Cash Costs	3,899	981
Sustaining Capital	349	88
Reclamation Costs	51	13
AISC	4,299	1,081

Table 1-13 and Figure 1-6 shows the results of single-factor simple sensitivity analysis. It reports the overall project NPV_5 in response to variances in OPEX, CAPEX, and gold price and shows that the expansion project is most sensitive to gold price, followed by operating costs and then capital costs.

Table 1-13: Post-Tax Project NPV Sensitivity ($M)

Variation in Input	Operating Costs	Capital Costs	Gold Price
−15%	920	755	172
−10%	822	712	323
−5%	724	668	474
0%	**625**	**625**	**625**
5%	526	582	776
10%	427	538	926
15%	328	495	1,076

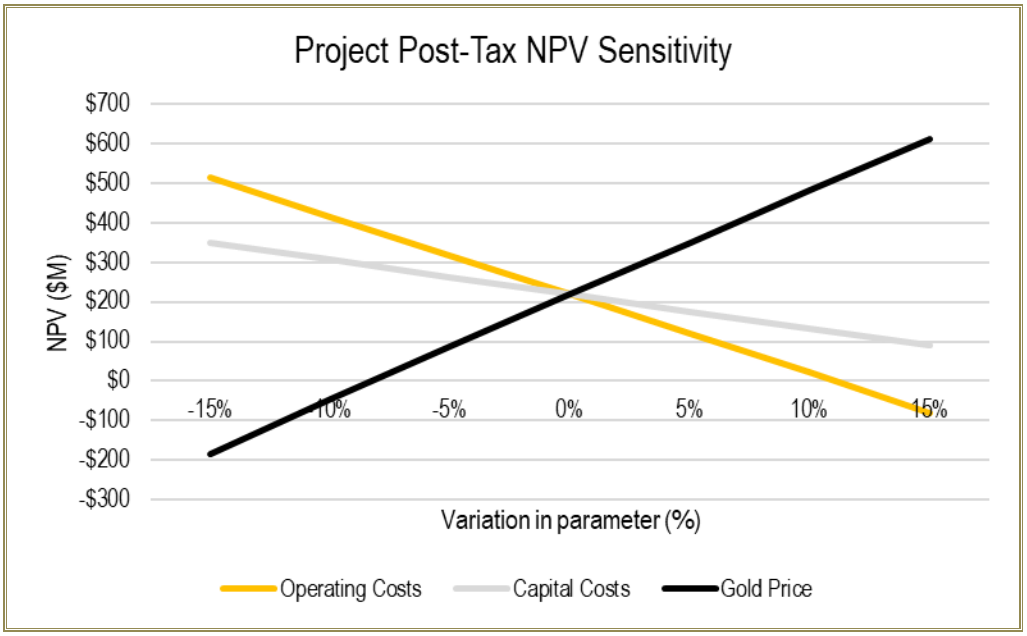


Figure 1-6: Single Factor Sensitivity Spider Chart

1.22 Interpretation and Conclusions

The Los Filos Mine Complex has a projected mine life of 14.5 years (2022 to 2036, inclusive) based on the construction of the CIL plant, and is expected to produce an average of 274 koz Au per year over this period based on 4.0 Moz of recoverable gold from Proven and Probable Mineral Reserves of 5.4 Moz contained gold as of June 30, 2022.

The following conclusions on the various aspects of the Los Filos Mine Complex are direct extracts from the relevant sections of the Technical Report.

1.22.1 Property Title, Land Access, Permitting

- Property title and ownership are in good standing and expiration dates extend beyond the current mine life.
- Surface land agreements are in place and are negotiated regularly.
- All permits for current operations are in place.
- Pending permitting issues are being managed and/or are in the process of resolution. These issues pose minimal risk to operations.

1.22.2 Mineral Resources and Mineral Reserves

Mineral Resources

Mineral Resource estimates presented in this report represent the global Mineral Resources at the Los Filos Mine Complex as of June 30, 2022. Los Filos mine and Equinox Gold personnel prepared the

Mineral Resources estimates. Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.

Mineral Resources for Los Filos Mine Complex as of June 30, 2022 (exclusive of Mineral Reserves), using a gold price of $1,550/oz and silver price of $18/oz, are as follows:

- 325.3 Mt of mineralized material at an average grade of 0.75 g/t Au, containing 7.9 Moz Au in Measured and Indicated classifications
- 135.9 Mt of mineralized material at an average grade of 0.74 g/t Au containing 3.2 Moz Au in Inferred classification.

There are no known environmental, permitting, socioeconomic, legal, title, taxation, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

Mineral Reserves

- Mineral Reserves are reported in accordance with NI 43-101.
- Mineral Reserves were estimated using a gold price of $1,450/oz Au, a silver price of $18/oz Ag, and an effective date of June 30, 2022.
- Los Filos Mine Complex Mineral Reserves are composed of Proven and Probable open pit Mineral Reserves of 180.6 Mt at an average grade of 0.65 g/t Au containing 3.8 Moz Au, and Proven and Probable underground Mineral Reserves of 12.6 Mt at an average grade of 3.9 g/t Au, containing 1.6 Moz Au. Combined Proven and Probable Mineral Reserves are 193.2 Mt at a grade of 0.87 g/t Au and contained 5.4 Moz Au.

The Qualified Persons consider the current Mineral Reserve estimate to be prepared according to CIM (2014) Definition Standards and acceptable for mine planning and production scheduling purposes.

1.22.3 Metallurgical Testwork

Heap Leach Facility

In the QP's opinion, the metallurgical testwork provides reliable gold extraction data that support the declaration of Mineral Resources and Mineral Reserves:

- Tests were performed on samples that were representative of each ore type.
- Testwork has been comprehensive and appropriate for selecting the optimal process technology.
- Heap leaching process conditions, including reagent additions, were appropriately determined to optimize field operation parameters.
- Some areas of the Bermejal and Guadalupe Open Pits and Bermejal Underground deposits contain high sulphur and copper levels. Gold recovery has been found to decrease with increasing sulphur levels in the ore, and sodium cyanide consumption in the heap leach process has been found to increase with increasing copper levels in the ore.

- LOM confirmation testwork has been completed and confirms recoveries for Los Filos Open Pit and Underground to be those derived by the Simon Hille predicted recovery model. Recovery formulas for Bermejal and Guadalupe Open Pits and Bermejal Underground were revised based on the confirmation test program.
- Recovery factors estimated for the heap leaching process are based on appropriate metallurgical testwork, and these have been confirmed by recent production data.

Carbon-in-Leach

It is QP's opinion that the CIL metallurgical testwork provides sufficient and reliable ore characterization and gold extraction data to support a feasibility-level study.

- The variability comminution testwork is adequate to support the comminution circuit design.
- The available testwork clearly indicates the impact of cyanide-soluble copper on reagent consumption. The data yield a reliable OPEX model, applied in optimizing the mining schedule, along with the gold extraction model.
- There is sufficient testwork and other data to support the gold and silver recovery estimates used for all ores scheduled to be fed to the proposed CIL plant.

1.22.4 Open Pit Mining Operations

- Open pit mining commenced at the Los Filos Mine Complex in 2005. Orebody characteristics, geotechnical conditions, and open pit mining productivities are well understood.
- Collectively, the open pits are expected to produce 180.6 Mt of ore (34,100 t/d ore on average) during the Q3 2022 to Q4 2036 period. Total material movement (ore plus waste) is expected to average 185.6 kt/d.
- Estimated capital for open pit mining includes additional haul trucks, shovels and other ancillary equipment required to operate the open pit throughout the LOM. The LOM non-sustaining capital total is $125 million, the LOM sustaining capital total is $133 million, and the capitalized waste-stripping cost is $234 million.
- The estimated mine OPEX for the open pits was developed with a detailed first principles model and verified relative to the average 2021 actual mining costs, with adjustments in future periods for changing haul profiles to the waste rock dumps and the three ore processing destinations (Crushed heap leach, ROM heap leach and CIL).
- The estimated LOM total mine OPEX for the open pit reserves is $1,118 million, and the estimated LOM average unit mining cost is $1.38/t mined.

It is the QP's opinion that the CAPEX and OPEX developed for open pit mining are appropriate for converting Mineral Resources to Mineral Reserves.

1.22.5 Underground Mining Operations

Los Filos Underground

- The Los Filos Underground mine is a mature mining operation with well understood ore body characteristics, geotechnical conditions, and mining productivities.
- Overhand cut-and-fill (OHCAF) and overhand drift-and-fill (OHDAF) are proven mining methods at Los Filos Underground. Both methods offer a high degree of ore selectivity and minimize dilution.
- The mine is expected to produce approximately 1.2 Mt of ore (960 t/d) over its remaining life (Q3 2022 to Q4 2025).
- Estimated sustaining capital for Los Filos Underground is related to ramp construction, horizontal and vertical development, which includes equipment rebuilds and major component replacements, ventilation, and safety. The sustaining capital is $15.5 million (2022 to 2025). No capacity additions are required for the mining fleet.
- The estimated mining costs are based on the average 2021 actual mining costs.
- The estimated LOM total mine OPEX is $89.2 million, and the estimated LOM average unit mining cost is $72.45/t ore.

It is the QP's opinion that the CAPEX and OPEX developed for Los Filos Underground are appropriate for the conversion of Mineral Resources to Mineral Reserves.

Bermejal Underground

- Bermejal Underground should be developed primarily with OHDAF to extract 91% of the Mineral Reserves, and the remainder with UHDAF; both are highly selective and flexible mining methods.
- CRF is an industry-proven backfill material that has been used in Los Filos Underground and other mines employing underhand mining techniques.
- The Bermejal Underground deposit is estimated to produce approximately 1.0 Mt/a (2,740 t/d) during steady-state production (2025 to 2032).
- Annual gold production averages 139,500 oz/a, delivered during steady-state production (2025 to 2032). A peak of 163,000 oz of gold is planned to be delivered in 2027.
- Production and development productivity rates are a function of expected ground conditions and the associated ground support regime employed, among other factors.
- The CAPEX is estimated to be $106 million for the underground development and infrastructure.
- The OPEX for Bermejal Underground was estimated using actual costs from Los Filos Underground with higher cost adjustments for the ground support and backfill due to poorer ground conditions than those encountered in the Los Filos Underground. The estimated LOM OPEX is $864 million, and the estimated LOM average unit mining cost is $76.06/t ore.

It is the QP's opinion that the CAPEX and OPEX developed for Bermejal Underground are appropriate for converting Mineral Resources to Mineral Reserves.

1.22.6 Recovery Methods

Heap Leach

- Conventional Crushed and ROM ore heap leaching is currently used to recover gold and silver from open pit and underground ore sources.
- Installing an agglomerating drum and overland conveyor system in mid-2018 has improved ore agglomeration, ore transport and stacking efficiency, and has led to an increase in gold recovery.
- Installing an interliner within Pad 2 has reduced cyanide consumption in the fresh Crushed ore by preventing pregnant solution from flowing through the low pH of the lower lifts of Crushed ore.
- During the January 2017 to May 2021 period, approximately 184 koz of recoverable gold inventory was recovered from Pad 1 and Pad 2 by following a high-pressure injection, re-handling, and secondary re-leaching process.
- Heap leach OPEX is based on actual costs reported by Equinox Gold for Q1–Q3 2019, 2021 and Q1–Q2 2022. The projected reductions in OPEX are based on initiatives that Equinox Gold is currently implementing.

Carbon-in-Leach

- It is the QP's opinion that the CIL process plant flowsheet and layout designs are suitable for treating the various ore types and tonnages indicated in the CIL feed schedule of the LOM plan, with the caveats being that the ore feed to the CIL plant be blended to avoid extremes in material hardness or high cyanide-soluble copper content.
- It is the QP's opinion that the CAPEX and OPEX developed for the CIL plant have been derived to a sufficient level of accuracy to support a feasibility-level study.

1.22.7 General and Administrative Costs

- General and Administrative costs were estimated and supplied by the Los Filos Mine Complex site personnel and were based on 2021 levels of spending, with a 5% expected improvement from 2022 onward as a consequence of cost-savings initiatives.

1.22.8 Mine Complex Infrastructure

Waste Rock Facilities

- The planned waste rock facilities (WRFs) will provide adequate storage capacity for the LOM open pit waste rock, with the underground waste rock being used primarily as backfill or deposited in small piles adjacent to the underground portals. New facilities are proposed, which will partially or completely overlap the existing WRFs and which include the new in-pit WRFs. Detailed stability analyses for these facilities will have to be completed in the next stage of design. These analyses may require foundation characterization and/or waste material characterization.
- Waste rock is dumped in accordance with a strict Standard Operating Procedures defining safe-dumping practices. Waste rock dumping is a high-risk activity, and careful consideration of the

Standard Operating Procedures, coupled with routine confirmation by the design engineers, are required on an ongoing basis to ensure safe operations.

- Some of the currently existing WRFs reached their storage capacity and reclamation activities have commenced.

Heap Leach Pad Expansions

- Pad 3 will provide additional storage for 63.5 Mt of ROM ore, and once Pads 1, 2, and 3 have been filled to their design capacity an interliner will be constructed on top of portions of all three, to provide an additional 82 Mt of storage for ROM ore. The interliner will allow for ore stacking above the 100 m maximum heap height design criteria for Pads 1 and 2. The construction of an interliner is the most economical solution to expanding the existing and future heap leach pads to store the current LOM Mineral Reserves.
- The current and planned heap leach pad infrastructure will be sufficient to support mining operations for the LOM plan.

Filtered Tailings Storage Facility

- The existing lined heap leach facilities will provide ample footprint to accommodate deposition of the CIL tailings in the form of a filtered tailings storage facility, commonly known as dry-stack tailings. The selected location of the facility will require minimal preparation prior to use by sharing the existing leach pad liner and solution pipe network. Additional stability analyses based on laboratory characterization of the filtered tailings and a geotechnical foundation investigation program will have to be completed in the next stage of design.

1.22.9 Market Studies and Contracts

- Equinox Gold is able to market the doré produced from the Los Filos Mine Complex and will do so in the future.
- The terms contained within the sales contracts are consistent with standard industry practice and are similar to contracts for the supply of gold doré elsewhere in the world.
- Silver production is sold to Wheaton Precious Metals through a long-term contract.
- Metal prices for projected revenue have been reviewed and are appropriate for the commodity and for the mine life projections.

1.22.10 Environmental Permits

Adequate baseline studies have been carried out for the expansion projects, and the existing operations are being performed with all appropriate permits and approvals in hand. A rigorous environmental monitoring program is continuously carried out, which confirms that there are no material concerns pertaining to non-compliance.

1.22.11 Economic Analysis

The overall project execution strategy is feasible on the basis of the analysis undertaken. The forecast input parameters and ongoing performance should be subject to periodic review, and any significant deviation from the assumptions used in this study should be considered as potentially requiring a review of the investment and operating strategy.

1.22.12 CIL Execution Strategy

The execution strategy for the construction of the CIL plant on which this Technical Report is based is that of a conventional Engineering-Procurement-Construction Management (EPCM) approach that is appropriate for the project scope and location. The baseline schedule will be based on executing the project considering the front-end engineering and design, current feasibility study updates, the recommendations of award for procurement of the 12 long-lead and key equipment packages, a price and delivery time revalidation for the long-lead equipment packages along with placing their orders from the commencement of the EPCM phase.

The approximately 24-month preliminary schedule developed for detailed design, construction, and commissioning of the plant is based on realistic past performance parameters for a project of this size and scope, which can be achieved with the assistance of a competent EPCM engineering firm.

1.23 Key Risks

A range of project risk areas related to environmental, social, permitting, health and safety, technical, construction, financial, and others are assessed to provide a risk level perspective for the project and are presented below.

Risk treatment plans will be developed for the project risks to reduce the risks probability of occurring and potential impact to an acceptable or practical level. Certain risk mitigation activities were completed during the feasibility phase, while others will be planned and actioned for the project execution (i.e., engineering, construction, commissioning), operations or closure phases as appropriate.

Various standard engineering risk assessment processes will be undertaken during the detailed engineering of the project execution. Health and safety risk assessment processes will be implemented for the construction phase.

The QP is of the opinion that there are not currently evident risks and uncertainties that could potentially affect the ability to perform the work recommended in this report.

1.23.1 Geology

The estimation of Mineral Resources is not without risks; several factors, such as additional drilling and sampling, may affect the geological interpretation, the conceptual pit shells, or the underground mining assumptions. Other factors that may have an impact, either positive or negative, on the estimated Mineral Resources include the following:

- Gold and silver price assumptions
- Changes in interpretations of lithological, mineralization, or geometallurgical domains
- Pit slope angles for the open pits or geotechnical assumptions for underground stope designs
- Changes to the methodology used to assign densities in the resource models

- Changes to the assumptions used to generate the gold cut-off grades for resource declaration
- Changes in the parameters used for grade estimation
- Changes to the classification criteria used.

1.23.2 Geotechnical

Open Pit

- Time-dependent rock mass-fatigue may be a significant factor in bench to inter-ramp scale stability of weaker rock.
- Increased pore-pressures within the relatively 'tight' altered rock mass associated with the mineralization may trigger overall-scale slope instabilities.
- Convoluted pit shapes with convex slopes in weak rock have an increased risk of instability.

Los Filos Underground

- The design criteria for the Los Filos Underground operations is well established and based on operational experience and knowledge of the geological and geotechnical conditions.
- OHCAF is used in narrow areas with typical sections of 3.5 m wide and 4.0 m high.
- OHDAF is used in the wider areas with typical drift dimension of 3.5 m wide and 4.0 m high.
- Longhole open stoping is used in targeted areas of vertical orebody continuity with good rock conditions. Stopes are typically 12 to 16 m high from back to floor.
- The geotechnical design for Los Filos Underground has followed a less formal, but proactive approach to rock mechanics, which has allowed for mining of several ore bodies in adverse ground conditions.
- For OHCAF and OHDAF mining methods, cemented rock fill is placed in all production excavations requiring mining below or adjacent mining, whereas unconsolidated rock fill is used to backfill stopes where there is no adjacent mining (vertical exposure) or undercutting (horizontal or undercut exposure) required.

Bermejal Underground

- CNI's (2018) rock mass classification assessment indicates that ground conditions in Bermejal Underground are highly variable, ranging from extremely poor to good.
- Typical rock mass conditions are poor to very poor, as commonly observed in highly altered and mineralized Oxide and altered Intrusive (including both the granodiorite intrusive and sill).
- The rock quality of the mineralized zones for Bermejal Underground is generally weaker than the mineralized zone at Los Filos Underground.
- OHDAF is selected as the primary mining method at Bermejal Underground, which is planned to be used to extract 91% of the Mineral Reserves, and UHDAF is selected to reduce the risk of mining in the highly altered and very poor mineralized Oxide domain.

- Ground support design for Bermejal Underground is based on ground control experience gained at Los Filos Underground, with modifications to reflect the actual practice at site.

1.23.3 Processing

- Future heap leach performance is based on process improvements currently being implemented. However, there is a risk that these initiatives may not fully achieve their desired objectives.

1.23.4 Surface Infrastructure and Closure

- The new waste rock facilities proposed were designed based on geometric requirements to accommodate the waste rock from the open pits. Neither waste rock design analysis nor any foundation or waste material characterization have been completed. These characterization studies and engineering analyses are required prior to proceeding with waste rock dumping outside of the current design extents.
- The filtered tailings storage facility was designed based on geometric requirements for storage capacity to accommodate the volume of tailings to be produced. The engineering analysis completed in support of the design is based on historical borehole records and analogous soil strength properties from unrelated investigations as well as general geotechnical tailings characteristics.

1.23.5 Environmental, Social, and Permitting

- Geochemical characterization of the new waste rock and filtered tailings has not been done, but this needs to be carried out to confirm whether additional closure and reclamation requirements are needed.
- The current closure liability estimate does not include: the fully developed Bermejal Underground; the proposed CIL plant and ancillary electrical facilities, filtered tailings storage facility, and Pad 3; or the additional leach ore storage on Pads 1, 2 and 3 from the future heap leach pad interliner.
- The MIA permit for the CIL plant, filtered tailings storage and new electrical substation has been approved; however, the final location for storage of the filtered tailings on Pad 1 and location for the electrical substation have been modified and therefore the permit will require updating. The MIA permit for the Guadalupe phase of the Bermejal Open Pit has been approved. The permit for the new Pad 3 expansion has been approved; however, the vertical expansion of Pads 1 and 2 with the interliner has not yet been submitted for permitting. With most of the required approvals in place, the majority of the expansion projects can start shortly after Equinox Gold makes its final investment decision.
- Security instability in the State of Guerrero and in the local mine area remains a concern and could cause temporary closure of operations or disruptions in services. This security risk may also impact the ability of the company to contract and retain skilled, experienced employees.
- Continued access to properties not owned by DMSL remain a potential risk.

1.23.6 CIL Plant Construction

At this stage Equinox Gold has not made a construction decision; delays in starting construction will negatively impact the value generated by the Project

1.24 Recommendations

Numerous improvement initiatives have already been implemented at the Los Filos Mine Complex in the past years, including many of the recommendations that were presented in the previous technical report (*Independent Technical Report for the Los Filos Mine Complex, Mexico, March 2019)*.

Following are recommendations based on this Technical Report.

1.24.1 Mineral Resources

- Variograms should be further refined. Given the geometry of the deposits, better variograms can be developed by further sub-domaining sectors with different orientations.
- Controls on grade distribution within the larger geologic domains, such as the granodiorite, should be further investigated and modelled either by developing grade shells or further refining the dynamic anisotropy directions and search ellipse parameters used during interpolation.
- Interpolation domains for other important elements, such as sulphur, should be examined and, if necessary, separate domains (such as grade shells) developed for their estimations.
- There should be separate variogram models for sulphur and interpolation by Ordinary Kriging.

1.24.2 Sample Preparation, Analyses, and Security

- Insert pulp and reject duplicates, in addition to field duplicates. Duplicates should not be inserted routinely, but should be representative of key grade thresholds, such as stockpile cut-off grades and those of Mineral Resources and Mineral Reserves.
- Sample batches should not be failed based on duplicates, as these values can represent the inherent grade variability of the deposit.
- Adjust CRM failure criteria based on single laboratory statistics to gain separate measures of accuracy and precision.

1.24.3 Open Pit Mining

- During operation, segregation of the Cat 785 fleet and the Komatsu 730E fleet should be a priority, to maximize the benefit of the faster Komatsu 730E fleet.
- Formal procedures should be developed for open pit mining operations that will be conducted in and around the historical underground workings in Guadalupe Open Pit to ensure the safety of personnel and equipment.
- Formal procedures should be developed for geotechnical monitoring of waste dumps during and after open pit mining operations to ensure the safety of personnel and equipment.

- Metallurgical recovery and OPEX for each mined block will be variable depending on rock type, sulphur grade, copper grade, and processing destination. For this reason, daily ore control decisions (e.g., selecting the optimal processing destination) should be guided by a mining software determination of the maximum profit for each block rather than by a fixed cut-off grade.
- Effects of the specific energy of the ore delivered to the CIL plant should be monitored and measured during the early years of CIL operation to quantify impacts of high percentages of Bermejal Open Pit ore delivered at the end of the mine life.

1.24.4 Underground Mining

Los Filos Underground

- Because mining operations are expected to conclude in 2025 based on the currently defined Mineral Reserves, AMC recommends that Equinox Gold undertake further drilling to identify any potential ore-body extensions, or new, nearby ore bodies that could be accessed efficiently from the existing underground workings.

Bermejal Underground

- The mine design is based on two main declines from surface in the LOM plan. To meet the projected ramp-up of production, the second decline should commence development as soon as possible.
- The second decline is required as soon as possible, to provide adequate ventilation for the mine throughout the LOM plan, as well as second egress.
- A suitable mining contractor should be selected as soon as possible to meet the rapid development requirements of meeting the LOM plan production targets.
- Formalize a training package outlining the UHDAF mining method process, operating practices, QA/QC procedures, and operating parameters.
- Formalize a grade-control and sampling program that will provide key inputs to mine planning.
- Panels should be mined initially at minimum widths, then gradually widened as ground conditions are better understood.
- Further validation work is required to ensure productivity estimates are achievable.
- Ensure the various ground-support regimes are integrated into the planning process and ground control program.
- Formalize a mine planning process that covers both short-, medium-, and long-term planning horizons.
- Revise and optimize ground support standards for improving ground control practice and productivity, and reduction of operation cost.
- Optimize cemented rock fill (CRF) strength design for cost reduction.

- The underground infrastructure assessment was based on the geotechnical block model rather than geotechnical data from selected drill holes. The underground workshop layout and support design are based on general ground conditions. A site-specific assessment and ground support design will be required.

1.24.5 Heap Leach

- Investigate the opportunity of performing secondary leaching test programs through on-site column leach testwork and actual stacking applications on Pad 2. The purpose would be to show that free cyanide percolating through the upper lift of stacked ore can be used to leach the residual gold in the lower lift. The results should also report the cyanide savings and the reduction in OPEX.
- Investigate other leaching aids (e.g., glycine) to assist in recoveries and reduce cyanide consumption.
- Ores from the Bermejal and Guadalupe deposits are expected to contain higher copper and sulphur grades, which may result in higher OPEX due to higher cyanide consumption and lower gold recoveries due to higher total sulphur. Metallurgical testwork programs are already being performed to understand the impacts of the higher copper and sulphur grades with respect to cyanide consumption and gold recovery.

1.24.6 Carbon-in-Leach

- The CIL blend averages 31% for Los Filos Open Pit ore in the first six years of the mine plan, and the contribution of this ore could increase in the later years of mine life. Comminution ore characterisation testwork should be done on variability samples from this pit to confirm the SAG mill and ball sizes. Testwork program could cost up to $50,000.
- In 2020, Elbow Creek Engineering carried out an assessment for the requirement for a SART plant. A review of pertinent test programs indicated that a SART plant may be required in the fifth year of the CIL plant operation. During the first few years of the CIL plant operation, it will be important to closely monitor copper levels in solution. The high cyanide-soluble copper will require operating optimization of the elution to reduce the copper content in the doré ingots.
- Perform modelling and simulation of competitive adsorption of gold, silver, copper, and zinc onto activated carbon. The purpose of this modelling and simulation would be to determine the required carbon movement rate and to determine the deportment of silver, copper, and zinc onto the loaded carbon. This would also yield dissolved gold concentration estimates in the CIL tailings that are needed to design the downstream SART operation, if it is required in the future.
- Testwork currently available indicates variability in gold extraction of open pit ores at high feed sulphur-grades greater than 1%. Current practice is to restrict ore placement on the heap leach pads with a sulphur content greater than 1%. However, testwork indicates that higher sulphur-level material could be economically treated in the CIL circuit. Additional sampling and bottle roll testwork should be carried out on various non-in situ materials that could be suitable for adding to the CIL feed schedule to confirm the head grades and gold and silver recoveries.

- It is the opinion of the Qualified Person that the CAPEX developed for the CIL plant are sufficient to support a feasibility-level study; however, price revalidation must be conducted for equipment packages during the detailed engineering phase to reflect changes in local and international market conditions. For this work, consulting support services could cost up to $300,000.

1.24.7 Heap Leach Pads

- The detailed design of Pad 3 should be initiated by Q1 2023 to determine the optimized construction phase sequence to provide sufficient ROM ore leaching capacity, while minimizing the construction cost for Phase 1. For this work, consulting support services, geotechnical drilling, and laboratory testwork could cost up to $700,000.
- Geotechnical foundation drilling, materials testing, and additional engineering effort should be implemented in the required areas of Pad 1 to further advance the design of the interliner. For this work, consulting support services, geotechnical drilling, and laboratory testwork could cost up to $300,000.

1.24.8 Filtered Tailings Storage Facility

- The design of the filtered tailings storage facility should be advanced with material testing of the filtered tailings to confirm the design criteria, including compaction and permeability testing, as well as updating stability and seepage analyses based on the results of the material testing. For this work, consulting support services and laboratory testwork could cost up to $200,000.

1.24.9 Environmental Permits

- The MIA permit for the CIL plant and filtered tailings storage have been approved; however, the final location for storage of the filtered tailings on Pad 1 has been modified, and therefore the permit must be updated prior to initiating tailings deposition.
- The MIA permit for the new electrical substation and extension of the high voltage transmission line have been approved; however, the relocation of the substation and the subsequent extension of the transmission line will require the permit to be updated. Consulting support services could cost up to $100,000.
- The review of the electrical interconnection requirements and the confirmation of energy supply to support the CIL plant was completed with CENACE; however, the studies must be updated once a final decision to advance the CIL plant is made. The update to the studies will require approximately $150,000 for CENACE and third-party consulting services.
- The permit for the new Pad 3 expansion has been approved; however, permitting of the vertical expansion of Pads 1, 2 and 3 with the interliner must be submitted for approval.

2 INTRODUCTION

Equinox Gold has prepared this Technical Report for the Los Filos Mine Complex in Mexico. It provides an update on the *Independent Technical Report for the Los Filos Mine Complex*, *Guerrero State, Mexico, March 2019*, prepared for Leagold Mining Corporation, with an effective date of October 31, 2018. This report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico* (the Technical Report), with an effective date of June 30, 2022 and dated October 19, 2022 provides the results of a feasibility study to build and operate a CIL plant and ancillary facilities at the Los Filos Mine Complex and is an update of the Mineral Resource and Mineral Reserve estimates based on the operation of the CIL plant in parallel with continued operation of the heap leach facilities.

On March 10, 2020 Equinox Gold acquired Leagold Mining Corp. (Leagold). Ownership of the Los Filos Mine Complex became the property of Equinox Gold as part of the transaction.

Equinox Gold is a Canadian mining company producing gold from seven mines in the USA, Brazil, and Mexico. It is also currently developing the Greenstone gold project in Canada.

Updates to the previous technical report contained in this Technical Report are highlighted below:

- Updated Mineral Resource models for Los Filos, Bermejal and Guadalupe deposits
- Inclusion of a 10,000 t/d CIL processing plant, to be operated in conjunction with the existing heap leach facilities, and ancillary electrical facilities
- Updated life-of-mine (LOM) mine plans for Los Filos Open Pit, Bermejal Open Pit, Guadalupe Open Pit, Los Filos Underground, and Bermejal Underground, arising from the updated Mineral Resource and Mineral Reserve estimates
- Additional storage facilities to accommodate future heap leach ore and filtered tailings from the CIL plant.

2.1 Terms of Reference and Units

As of June 30, 2022, this Technical Report complies with the Standards of Disclosure as set forth in National Instrument (NI) 43-101 and follows the format set out in Form 43-101F for Technical Reports. NI 43-101 uses the definitions and classifications of Mineral Resources and Mineral Reserves as set out in the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *Definition Standards for Mineral Resources and Mineral Reserves* (CIM, 2019).

This Technical Report was prepared by Equinox Gold technical staff and a number of external consultants, all of whom are Qualified Persons (QP) as defined in NI 43-101.

All units of measure in this Technical Report are expressed in metric units (International System of Units), except industry standard units, such as troy ounces for the mass of precious metals. The default currency used in this Technical Report is the United States dollar (US$), unless otherwise noted.

This Technical Report includes the tabulation of numerical data, which involves a degree of rounding for the purpose of the Mineral Resource and Mineral Reserve reporting. The QPs do not consider any rounding of the numerical data to be material to the Los Filos Mine Complex.

2.2 Sources of Information

This Technical Report is based on published and unpublished materials and professional opinions formed by Equinox Gold and its consultants.

Any previous technical reports or literature used in the compilation of this Technical Report are referenced in the relevant text as necessary.

Other sources of information include geological reports, drill-hole information, field observations, block models, geotechnical reports, mine plans, cost estimates, historical cost, productivity information, and economic models.

This Technical Report uses abbreviations and acronyms common to the mineral industry. Definitions have been provided earlier in the report.

2.3 Responsibility

Equinox Gold has prepared this Technical Report with contributions from Lycopodium, AMC, Paul M. Sterling, and Struthers Technical Solutions Ltd. This Technical Report was prepared by the QPs listed in Table 2-1.

Table 2-1: List of Qualified Persons and Section Responsibilities

Qualified Person	Company	Sections
Gary Methven, P.Eng.	AMC Mining Consultants (Canada) Ltd.	21.1.2, 21.1.3, 21.2.2, 21.2.3, and 21.3.2
Paul Salmenmaki, P.Eng.	AMC Mining Consultants (Canada) Ltd.	15.5, 16.1.2, 16.1.4, 16.3, 16.4.1–16.4.3, 16.4.8, 16.4.9, 16.5.1, 16.5.2, 16.6.2, 16.6.3, 16.7.1, and 16.7.2
Mo Molavi, P.Eng.	AMC Mining Consultants (Canada) Ltd.	16.4.4–16.4.7
Eugene Tucker, P.Eng.	AMC Mining Consultants (Canada) Ltd.	15.1–15.4, 15.6,15.7, 16.1.1, 16.1.3, 16.2, 16.5.3, 16.6.1, 16.7.3, 21.1.1, 21.2.1, and 21.3.1
Kelly Boychuk, P.Eng.	Equinox Gold Corp.	1, 2, 3, 18.1–18.5,18.7–18.11,19, 20, 21.2.6–21.2.8, 22, 23, 24, 25, 26, and 27
Ali Shahkar, P.Eng.	Equinox Gold Corp.	4, 5, 6, 7, 8, 9, 10, 11, 12, and 14
Travis O'Farrell, P.Eng.	Equinox Gold Corp.	21.1.4 and 21.4.1
Glenn Bezuidenhout, FSAIMM	Lycopodium Minerals Canada Ltd.	17.3, 17.4.2, 17.4.3, 17.5.2, 21.2.5, and 21.4.2
Paul Sterling, P.Eng.	Paul M. Sterling	13, 17.1, 17.2, 17.4.1, 17.5.1, 21.2.4, and 21.4.3
Riley Devlin, P.Eng.	Struthers Technical Solutions Ltd.	18.6

Other Equinox Gold employees compiled certain sections of this Technical Report under the supervision of the QPs listed in Table 2-1. These employees are experienced technical and finance professionals in their respective areas of expertise.

2.4 Effective Date

The effective date of this Technical Report is June 30, 2022.

2.5 Site Visit

In accordance with NI 43-101 guidelines, QPs visited the Los Filos Mine Complex to inspect the site and review geology and exploration protocols. The most recent site visits are provided in Table 2-2.

Table 2-2: Site Visit Summary

Qualified Person	Date of Site Visit
Ali Shahkar	August 15–19, 2022
Gary Methven	February 28–March 4, 2022
Travis O'Farrell	June 22–28, 2022
Kelly Boychuk	August 22–26, 2021
Paul Sterling	August 22–26, 2021
Riley Devlin	April 23–26, 2018

Eugene Tucker, Paul Salmenmaki, Mo Molavi, and Glenn Bezuidenhout have not been able to visit the Los Filos Mine Complex due to travel restrictions related to the global COVID-19 pandemic.

3 RELIANCE ON OTHER EXPERTS

For legal matters related to property ownership and mining title in Section 4 of this Technical Report, the QPs have relied on title opinion provided by Todd y Asociados on September 23, 2022 (Todd y Asociados, 2022). The QPs have not researched property title or mineral rights for the Los Filos Mine Complex properties and express no further opinion as to the ownership status of these properties.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Summary

The Los Filos Mine Complex is in the Municipality of Eduardo Neri, Guerrero State, Mexico, approximately 180 km southwest of Mexico City (Figure 4-1). The property is centred on latitude 17°52'13" north and longitude 99°40'55" west (UTM Zone 14Q 427,400N, 1,976,300E).

Source: Equinox Gold.

Figure 4-1: Project Location

As of the effective date of this Technical Report, the concessions that constitute the Los Filos Mine Complex property are wholly owned by Desarrollos Mineros San Luis, S.A. de C.V. (DMSL), a Mexican company indirectly wholly owned by Equinox Gold.

DMSL holds 100% of the Los Filos Mine Complex properties and the regional properties. Property agreements for surface rights are discussed in Section 4.4 of this Technical Report.

4.2 Mineral Tenure

Mexican Mining Law was promulgated in 1992 and was most recently amended in 2014 (*Ley Minera*, DOF 11-08-2014). The current mining regulations were published in 2012 and were most recently amended in 2014 (*Reglamento de la Ley Minera*, DOF 31-10-2014). Several government agencies have responsibility for enforcing mining laws.

Mining concessions may only be granted to Mexican companies and nationals, agrarian communities (ejidos), and indigenous communities. Foreign companies can hold mining concessions through Mexican-domiciled companies.

Concessions cover all exploration and mining activities, with concessions lasting for a term of 50 years. The term commences on the date recorded in the registry maintained by the Public Mining Registry (Registro Público de Minería). A second 50-year term can be granted if the applicant has abided by all appropriate regulations and makes the application within five years prior to the expiration date.

Mining concessions confer rights with respect to all mineral substances, as listed in the Public Mining Registry documents. Mining concessions give the holder the right to mine within the concession boundary, sell the mining product, dispose of waste material generated by mining activities within the lease boundary, and have access easements. Concessions can be transferred between companies and can be consolidated.

The main obligations that arise from a mining concession, and which must be kept current to avoid its cancellation, are performing assessment work, paying mining taxes (duties), and complying with environmental laws.

Mining regulations establish minimum amounts that must be spent. Sales of minerals from the mine for an equivalent amount may substitute for minimum expenditures. A report must be filed in May of each year that details the work undertaken during the previous calendar year.

Mining duties must be paid in advance in January and July of each year and are determined on an annual basis under the Mexican Federal Rights Law (*Ley Federal de Derechos,* DOF 09-04-2012). Duties are based on the surface area of the concession and the number of years that have elapsed since the mining concession was issued.

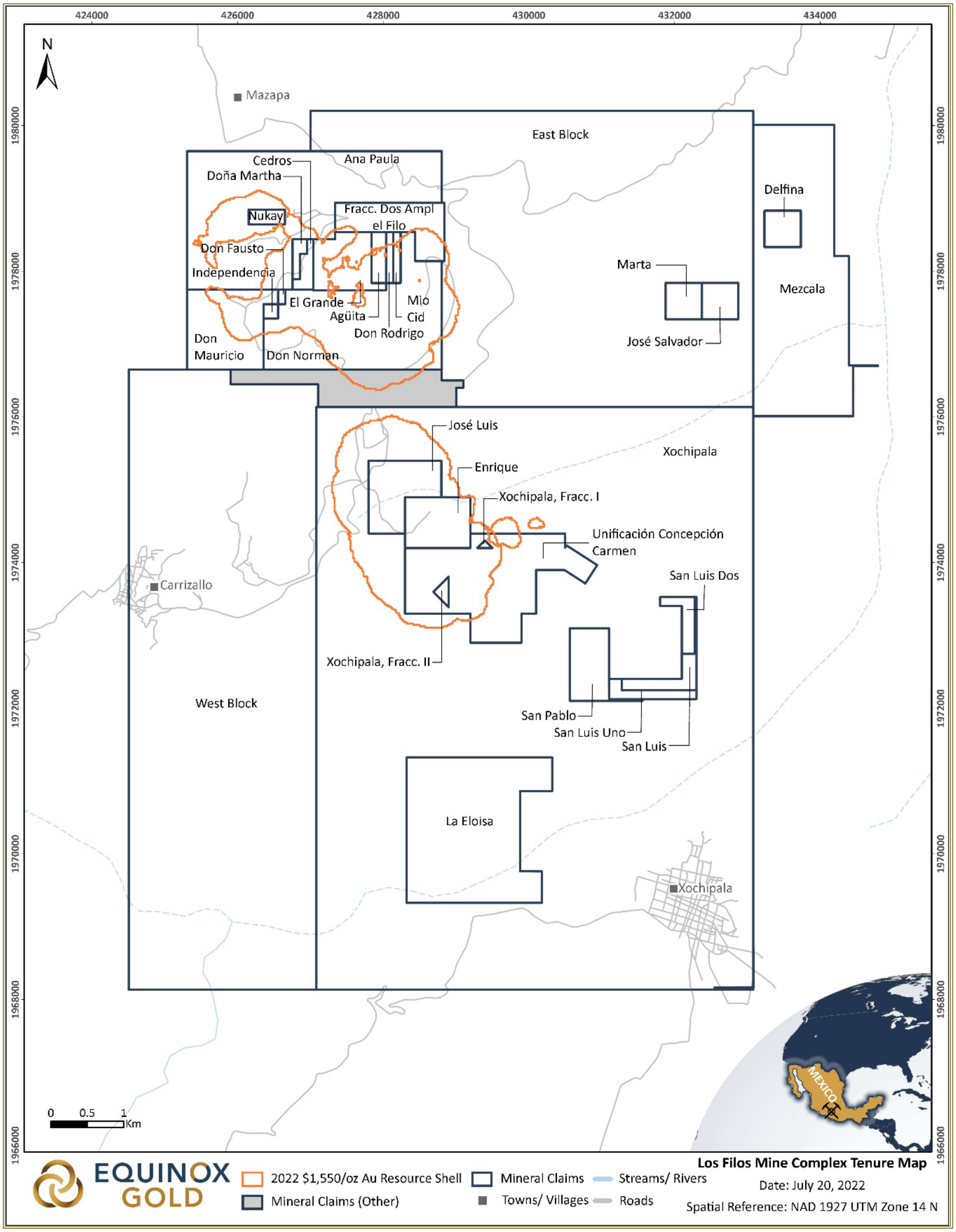
Concessions are maintained on an annual basis by payment of appropriate fees, as determined by the Office of Economic Affairs (Secretaría de Economía) each year. Holders must also supply the Office of Economic Affairs with all activity, contracts, and agreements that affect the concession title to keep and maintain the Public Mining Registry current.

4.3 Los Filos Mine Complex Property Tenure

Equinox Gold requested Todd y Asociados (in Mexico City) to review and provide a summary memo on the status of the mining concessions and exploration properties owned by Equinox Gold in September 2022 (Todd y Asociados, 2022). The Los Filos Mine Complex property comprises 30 exploitation and exploration concessions in active mining areas, totalling 10,433.0 ha (Table 4-1). All the concessions are within the Municipality of Eduardo Neri, Guerrero State, Mexico (Figure 4-2).

Table 4-1: Los Filos Mine Complex Property Tenure Summary

Concession		Validity		Holder Name	Area (ha)
Name	Title	From	To		
Nukay	171533	20-10-1982	19-10-2032	DMSL	10.0
Fracc. 2 de Ampl. a El Filo	171534	20-10-1982	19-10-2032	DMSL	76.0
Unificación Concepción Carmen	172677	28-06-1984	27-06-2034	DMSL	223.3
Enrique	187015	29-05-1990	28-05-2040	DMSL	63.0
Mio Cid	204067	13-10-1989	12-10-2039	DMSL	7.0
Don Mauricio	204068	13-10-1989	12-10-2039	DMSL	119.5
Don Rodrigo	204069	13-10-1989	12-10-2039	DMSL	7.0
Ana Paula	204137	13-10-1989	12-10-2039	DMSL	440.4
La Eloisa	208816	15-12-1998	14-12-2048	DMSL	345.4
Cedros	213075	13-10-1989	12-10-2039	DMSL	12.0
Doña Marta	213076	13-10-1989	12-10-2039	DMSL	7.5
Don Norman	213077	13-10-1989	12-10-2039	DMSL	290.2
Independencia	213078	13-10-1989	12-10-2039	DMSL	4.0
Don Fausto	213079	13-10-1989	12-10-2039	DMSL	2.0
San Luis Dos	216106	09-04-2002	08-04-2052	DMSL	17.4
Xochipala Fracc. I	216166	12-04-2002	11-04-2052	DMSL	1.1
Xochipala Fracc. II	216167	12-04-2002	11-04-2052	DMSL	4.4
San Luis Uno	216168	12-04-2002	11-04-2052	DMSL	17.0
Xochipala	217850	23-08-2002	22-08-2052	DMSL	4,013.6
San Pablo	219804	11-04-2003	10-04-2053	DMSL	55.2
San Luis	220241	25-06-2003	24-06-2053	DMSL	25.0
Delfina	236761	26-08-1943	26-08-2060	DMSL	25.0
Marta	236762	17-08-1944	26-08-2060	DMSL	25.0
Jose Salvador	237117	14-11-1941	28-10-2060	DMSL	25.0
Jose Luis	237118	27-02-1942	28-10-2060	DMSL	75.0
El Grande	237119	04-08-1958	28-10-2060	DMSL	63.0
Agüita	237120	04-08-1958	28-10-2060	DMSL	14.0
East Block	242454	14-12-2004	13-12-2054	DMSL	1,799.9
West Block	242455	14-12-2004	13-12-2054	DMSL	2,197.0
Mezcala	217505	16-07-2002	15-07-2052	DMSL	468.1
Total Area Covered					**10,433.0**



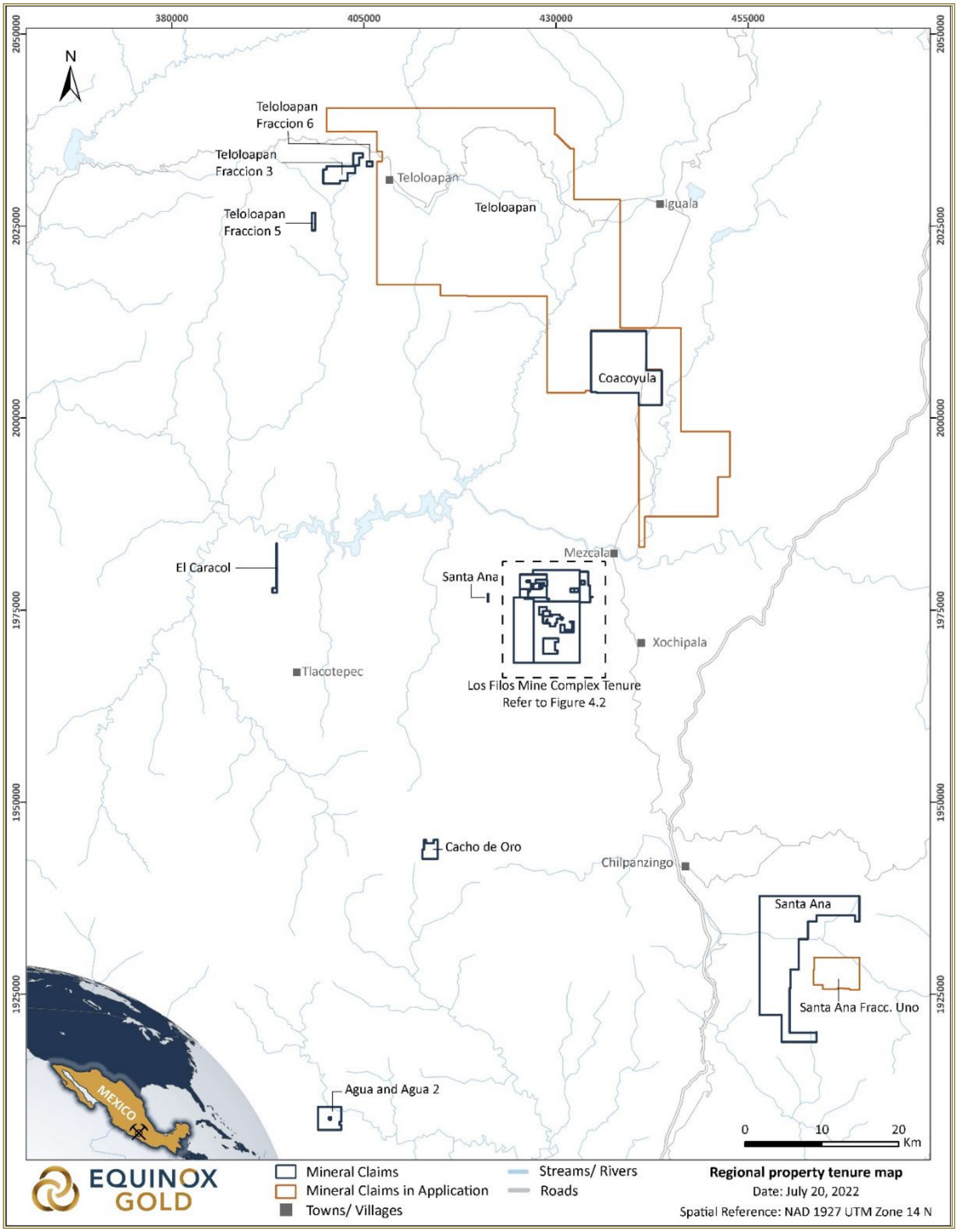
Source: Equinox Gold.

Figure 4-2: Los Filos Mine Complex Tenure

In addition to the 30 concessions that cover the active mining areas, DMSL holds a total of 12 exploration concessions, including two concessions that have applications in progress, totalling 138,475.4 ha in Guerrero State, Mexico (Table 4-2 and Figure 4-3). The total area of all 42 concessions is 148,908.4 ha.

Table 4-2: Regional Property Tenure Summary

Concession		Validity		Holder Name	Area (ha)
Name	Title	From	To		
Agau	218086	03-10-2002	02-10-2052	DMSL	880.4
El Caracol	218944	28-01-2003	27-01-2053	DMSL	94.0
Agau 2	219349	27-02-2003	26-02-2053	DMSL	9.0
Santa Ana	219350	27-02-2003	26-02-2053	DMSL	10.0
Cacho de Oro	221096	19-11-2003	18-11-2053	DMSL	425.0
Coacoyula	234177	05-06-2009	04-06-2059	DMSL	6,816.9
Santa Ana	238964	11-11-2011	10-11-2061	DMSL	10,510.7
Teloloapan Fraccion 3	245943	20-12-2017	19-12-2067	DMSL	886.3
Teloloapan Fraccion 5	245871	08-12-2017	07-12-2067	DMSL	102.1
Teloloapan Fraccion 6	245832	30-11-2017	29-11-2067	DMSL	48.5
Santa Ana Fracc. Uno	In Progress				2,373.5
Teloloapan	In Progress				116,318.9
Total Area Covered (ha)					**138,475.4**



Source: Equinox Gold.

Figure 4-3: Regional Property Tenure

Concessions are granted for 50-year terms; the expiration dates vary depending on the date of grant of the concession. Renewal dates range from 2032 to 2067. All concessions are held in the name of DMSL.

Per Mexican requirements for grant of tenure, the concessions comprising the Los Filos Mine Complex property have been land surveyed by a licensed surveyor.

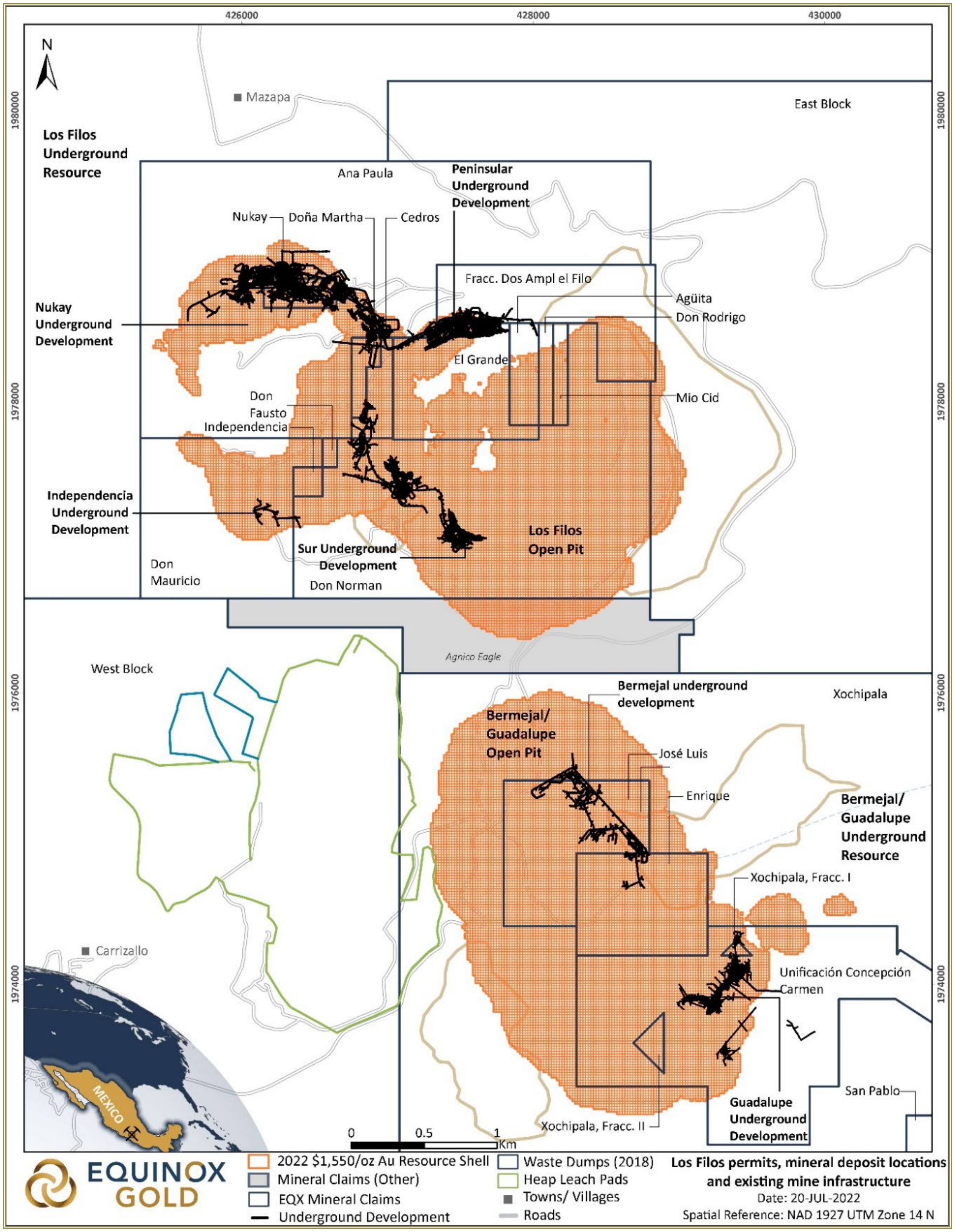
Under the Mexican federal rights law, duty amounts for mineral concessions are updated on an annual basis. Duty payments for 2021 and 2022 were made in January and July of both years. The total payments in 2021 and 2022 were $515,836 and $553,842, respectively, as shown in Table 4-3.

Table 4-3: Mineral Concession Duty Payments

Description	January 2021 ($)	July 2021 ($)	January 2022 ($)	July 2022 ($)[1]
Los Filos Mine Complex Concessions	256,630	256,630	94,099	94,099
Guerrero Sur Concessions	0	0	181,439	181,439
Teloloapan	1,288	1,288	1,383	1,383
Total	**257,918**	**257,918**	**276,921**	**276,921**

Note: [1] All payments are made in Mexican pesos and converted to US dollars at a 20:1 exchange rate.

The mining concessions that comprise the Los Filos Mine Complex property relative to mineral deposit locations and mine infrastructure are shown in Figure 4-4.



Source: Equinox Gold.

Figure 4-4: Los Filos Permits, Mineral Deposit Locations, and Existing Mine Infrastructure

4.4 Surface Rights Title

While a mining concession gives its holder the right to carry out mining work in the area covered by the concession and to take ownership of any minerals found, it does not automatically grant any surface access rights. Such rights must be negotiated separately with the owner of the surface land. If no agreement can be reached with the surface owner (typically for the purchase or lease of the surface land), the Mining Law grants the concessionaire the right to apply to the Mines Bureau (Dirección General de Minas) for the expropriation or temporary occupation of the land, which will be granted to the extent that the land is indispensable for the development of the mining project. Compensation is set through an appraisal carried out by the federal government's National Goods Appraisal Commission. In practice, many surface rights are granted through selective land purchases and temporary occupation agreements.

DMSL secured a total of 4,102 ha to cover surface rights required for the Los Filos Mine Complex, including the area of the current open pits, underground mine portals, process and ancillary facilities, roads, services, and a buffer area to allow for any future growth and potential exploration targets (Todd y Asociados, 2022).

The existence in Mexico of a communal form of agrarian land ownership called “ejidos” and “bienes comunales” can present challenges for surface land use. Ejidos are communal farms where individuals may have surface rights to specific plots of land; however, members of the ejido as a whole must make most land-use decisions. Ejidos and bienes comunales together cover about one-half of Mexico; the remaining half is legally defined as “pequeña propiedad” (private property).

Surface rights for the Los Filos Mine Complex include both private property and “propiedad social” (ejidos and comunidades). Temporary occupation agreements were entered into with the appropriate ejidos and comunidades, and selective private property purchases and leases were completed to ensure continuation of mining activities.

A total of 1,360 ha of surface rights have been secured by acquisition of private land, and 2,741 ha have been secured by entering into temporary occupation agreements with surrounding communities. Agreement payments are made on an annual basis, with the payment amount linked to the gold price. Agreements are typically 5 to 30 years in duration. Currently, temporary occupation agreements are renegotiated every five years (Todd y Asociados, 2022). The start date and term of the agreements are shown in Table 4-4.

Table 4-4: Current Surface Rights with Temporary Occupation Agreements

Community		Surface Rights Area (ha)	Land Use	From	To
Mezcala		1,374.0	Exploitation	October 2009	September 2024
Carrizalillo	Common Land	782.7	Exploitation	April 2014	March 2025
	Parcel	534.6	Exploitation	April 2010	March 2039
Xochipala		50.0	Exploitation	June 2019	June 2039
Total Temporary Occupation		**2,741.3**			

All the titles and contracts are on file at the Los Filos Mine Complex offices.

4.5 Mining Rights

As of the effective date of this Technical Report, the concessions that constitute the Los Filos Mine Complex property are wholly owned by "Desarrollos Mineros San Luis, S.A. de C.V." (DMSL), a Mexican company indirectly wholly owned by Equinox Gold.

Other information that relates to Equinox Gold's ability to declare Mineral Resources and Mineral Reserves includes the following:

- Information provided by Todd y Asociados (2022) supports that the mining tenure held is valid and the area covered is sufficient to support the declaration of Mineral Resources and Mineral Reserves.
- The Los Filos Mine Complex holds sufficient surface rights in the area to support the mining operations, including access and power line easements.
- The Los Filos Mine Complex holds the appropriate permits under local, state, and federal laws to allow mining operations.
- The Los Filos Integrated Environmental License (Licencia Ambiental Unica, or LAU), is based on an approved environmental impact statement (Manifestación de Impacto Ambiental, or MIA) and a land use change authorization.
- Annual land usage and environmental compliance reports have been submitted.
- Appropriate environmental permits have been granted for the Los Filos Mine Complex by the relevant Mexican federal and state authorities.
- At the effective date of this Technical Report, environmental liabilities and compliance issues are limited to those that would be expected to be associated with an operating gold mine where production occurs from open pit and underground sources, including roads, site infrastructure, heap leach, waste dumps, and disposal facilities.
- Site closure costs are appropriately funded by allocating a percentage of sales revenue.
- To the extent known, there are no other significant factors or risks that may affect access, title, or the right or ability to perform work on the property; this includes any significant environmental, social, or permitting issues that would prevent continued exploitation of the mineral deposits on the Los Filos Mine Complex property.

4.6 Encumbrances

The author is aware of no encumbrances related to the Los Filos Mine Complex.

4.7 Agreements with Third Parties

DMSL holds 100% of the Los Filos Mine Complex properties and the regional properties. Property agreements for surface rights are discussed in Section 4.4 of this Technical Report.

4.8 Taxation, Royalties, and Other Agreements

Mexico has been a party to the North American Free Trade Agreement (NAFTA) since 1994, and the subsequent United States-Mexico-Canada Agreement (USMCA) in 2020, and thus has a tax and trade regime comparable to the USA and Canada. Mexico operates under western-style legal and accounting systems, with a contemporary taxation system.

4.8.1 Corporate Income Tax

The Los Filos Mine Complex has a 30% federal corporate income tax rate.

4.8.2 Mining Royalties

Two mining royalty taxes are payable to the Federal Government of Mexico as follows:

- 7.5% mining tax on earnings before interest, taxes, depreciation, and amortization
- 0.5% gross revenue royalty tax levied on revenue from gold and silver sales.

4.8.3 NSR Royalties

Net smelter return (NSR) royalties are applicable to mining from five concessions of the Los Filos Mine Complex property (Table 4-5 and Figure 4-4).

Table 4-5: NSR Royalties Payable by Concession

Concession Name	Title No.	Issuance Date	Expiry Date	Surface Area (ha)	NSR Royalty Payable to (%)	
					SGM[1]	LC MINES[2]
Xochipala Fracc. I	216166	12-Apr-02	11-Apr-52	1.11	3	-
Xochipala Fracc. II	216167	12-Apr-02	11-Apr-52	4.375	3	-
Xochipala	217850	23-Aug-02	22-Aug-52	4,013.585	3	-
East Block	242454	14-Dec-04	13-Dec-54	1,799.888	2.5	0.75 to 1.75
West Block	242455	14-Dec-04	13-Dec-54	2,196.956	2.5	0.75 to 1.75

Notes: [1] Royalties payable to Servicio Geológico Mexicano (SGM), a department of the Mexican Federal Government.
[2] Royalties payable to LC Mines S.A. de C.V., a subsidiary of Agnico Eagle Mines Limited.

The Xochipala, Xochipala Fracc. I, and Xochipala Fracc. II concessions cover portions of the area to be mined by the Bermejal Open Pit; therefore, the NSR royalties have been included in the LOM economic analysis.

4.9 Environmental Regulations

The Mexican federal government department responsible for environmental matters is the Secretary of the Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales, or SEMARNAT), and the responsible for enforcement, public participation, and environmental education is the Federal Prosecutor for the Protection of the Environment (Procuraduría Federal de Protección al Ambiente, or PROFEPA).

Mexico's environmental protection system is based on the General Law of Ecological Equilibrium and the Protection of the Environment (*Ley General de Equilibrio Ecológico y la Protección al Ambiente*, or *LGEEPA*). Under *LGEEPA*, numerous regulations and standards for environmental impact assessment have been issued including for air and water pollution, solid and hazardous waste management, noise and others.

Environmental laws require the filing and approval of a MIA for all exploitation work and for exploration work that does not fall within the threshold of a standard issued by the federal government for mining exploration.

Mining companies must obtain a federal Integrated Environmental License (Licencia Ambiental Unica, or LAU), which sets out the acceptable limits for air emissions, hazardous waste, and water impacts, as well as the environmental impact and risk of the proposed operation.

A change of land use permit (cambio de uso de suelo) is also required when removing native vegetation. This permit depends on a detailed study to determine impacts on flora and fauna.

4.10 Environmental Liabilities

The existing Closure and Reclamation Plan is conceptual and addresses all existing facilities. The current estimated closure liability of $50.9 million is based on the existing facilities at the end of 2021, and as such is exclusive of the majority of the future Bermejal Underground development, the proposed CIL plant, dry stack tailings facility and new electrical substation, and the future heap leach pad expansion. Bonding requirements under Mexican regulatory requirements, pertaining to the current operation, have been met. Current environmental liabilities are typical of those normally associated with active underground and open pit mining operations feeding a heap leach facility.

4.11 Permits

All necessary permits required for the Los Filos Mine Complex, based on its current operations are current and in good standing.

The EIA for the CIL plant, tailings deposition area, new electrical substation and high voltage transmission line has been approved. The EIA for the Guadalupe phase of the Bermejal Open Pit was approved in April 2018 and the land use change permit was received in September 2019.

4.12 Conclusions

To the QP's knowledge there are no other significant factors or risks that may affect access, title, or the right or ability to perform work on the Los Filos Mine Complex.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 Accessibility

The Los Filos Mine Complex can be accessed by road or by helicopter or fixed-wing charter flight from Mexico City, Toluca, or Cuernavaca (Figure 4-1). The four-hour (240 km) drive from Mexico City follows National Highway 95/95D south to the town of Mezcala, then 18 km on a paved road to the mine site.

The Mine has a 1,200 m long paved private landing strip.

5.2 Climate

The mine is in a tropical arid zone characterized by distinct dry and wet seasons. Average daily temperature range is approximately 18°C to 26°C. The wet season (June through September) is hot and humid.

Topographic variations result in a variety of climate types at the property:

- Very hot, semi-dry, which is the prevailing climate at the site. The average daily temperature ranges from 18°C to 28°C.
- Hot sub-humid, which is the second-most prevalent climate at the site. The average daily temperature ranges from 22°C to 26°C.
- Semi-hot, sub-humid, the average daily temperature ranges from 18°C to 22°C.

The average annual precipitation and evaporation are approximately 900 mm and 1,900 mm, respectively. The months with the most rainfall are June through September, with some precipitation occurring in the shoulder-season months of May and October. Very little precipitation (less than 5% of the average annual rainfall) occurs from November to April. Tropical storms and hurricanes can affect the area, producing short-term, high-precipitation events.

The prevailing wind is from the north-northwest; local mountains cause local changes in wind direction.

Mining operations are conducted year-round and are not impacted by most climatic conditions.

5.3 Local Resources

5.3.1 Supplies and Personnel

The Los Filos Mine Complex is near several centres of supply for materials and workers. The closest (by road) local communities are Carrizalillo (13 km), Mezcala (18 km), Mazapa (5 km), and Xochipala (42 km), with the larger populated centres of Chilpancingo (67 km) and Iguala (67 km) nearby. All are accessible via gravel or paved roads.

Approximately 2,500 people are employed on site as unionized workers, non-unionized employees, and independent contractors. Approximately 70% of workers and employees are from the local communities.

5.3.2 Surface Water

The mine is in Hydrologic Region 18 in the Rio Balsas (Balsas River) basin, which covers 22.7% of the total area of Guerrero State, and drains a catchment of 46,530 km^2. Approximately 4 km from the mine property's northern boundary, the Rio Balsas is the closest perennial surface watercourse. The Rio Balsas supplies water to the Mine's Mezcala pumping station near the town of Mezcala. The most important tributaries in the area are the Mazapa and Xochipala streams, both of which are seasonal, and join the Rio Balsas on the property's southern margin.

Water from the Rio Balsas basin is used as the water supply for ore beneficiation processes. DMSL has a yearly extraction permit for 1.2 Mm^3 and has applied for a yearly increase to a total of 2.2 Mm^3, which includes the requirements of the Bermejal Underground mine and the operation of the CIL plant.

Mine operations are within a small watershed covering approximately 60 km^2, bounded by the Los Filos watershed to the east, the Cerro La Lagunilla to the north, the Cerro Azul and El Ocotal to the west, and Cerro El Cedral to the southeast. Within the local watershed, the main watercourse is the shallow Carrizalillo stream, whose headwater is 1 to 2 km south of the town of Carrizalillo, and which flows northward through the Los Filos Mine Complex property where it feeds into the Mazapa stream.

Watersheds east of the Los Filos open pit drain into Cuauhtepetl Canyon, which opens approximately 8 km east, by the Xochipala stream. The Xochipala stream flows only during storm events, toward the north, and is a tributary of the Rio Balsas.

5.4 Infrastructure

The Los Filos Mine Complex has power, water, and communications infrastructure in place. Electrical power is provided via a 115 kV high-voltage transmission line from the Mezcala electrical substation to the mine's substation. The Mezcala substation is interconnected to the national power grid. The majority (approximately 80%) of power for the national grid is generated from thermal sources (burning of natural gas and coal) with hydro, nuclear, and geothermal sources making up the remaining 20% of power.

Process and potable water for the mine are sourced from a large well adjacent to the Rio Balsas, 1.5 km west of Mezcala.

Site communications include satellite and VoIP (for telephones), and Internet Protocol (for regular computer business). The open pit and underground operations use two-way radio communications, and the open pit uses a GPS-based automated truck dispatch system.

The mine site has sufficient surface rights to maintain current and projected mining operation. Power, water, mining personnel, waste disposal areas, heap leach pad areas, and the processing plant site are adequate for the current mining operation. Additional infrastructure information, including water, power, and a mine site layout plan, is contained in Section 18.

5.5 Physiography

The Los Filos Mine Complex property is characterized by large limestone mountains divided by wide valleys. The hillslopes vary from gentle (5% to 10% grade) to very steep (50% grade). Mountain slopes have sparse vegetation, while the valley bottoms are generally used for agricultural purposes.

The maximum elevation on the Los Filos Mine Complex property is the summit of Cerro El Bermejal (1,820 masl). The minimum elevation is the valley on the west side of the Los Filos Mine Complex property, where the gold recovery plant is located, at 1,360 masl.

6 HISTORY

The exploration, development, and mine property history up to this Technical Report's effective date is summarized in Table 6-1.

Table 6-1: Exploration, Development, and Mine Property History

Year	Operator	Activity or Work Undertaken
1938	Minera Guadalupe	Minera Guadalupe S.A. de C.V. purchased the Nukay deposit.
1938–1940	Minera Guadalupe	From 1938 to 1940, development of the underground mine occurred, but no production was reported during this period.
1946–1961	Minera Guadalupe	Development resumed and production commenced after building a 100 t/d cyanide agitation leach plant at the village of Mazapa, north of the Nukay mine site. Production of approximately 500,000 tonnes at 18 g/t Au.
1984–1985	Minera Nukay	Open pit mining of the Nukay deposit began in January 1984 with waste removal and mining from the upper benches. Ore was processed at a government-owned flotation plant near Mezcala.
1986	Peñoles	Jasperoid sampling at Bermejal identifies anomalous gold mineralization.
1987–2001	Minera Nukay	Nukay mill, a 100 t/d cyanide leach Merrill–Crowe operation, built near Mezcala. The plant expanded to 350 t/d in 1994 and expanded again in 1997 to 400 t/d. Production from the La Agüita open pit mine commenced in May 1995. Underground development of the Subida mine began in August 1995; ore production commenced in August 1996. Development of the Independencia deposit initiated in 2001.
1988	Peñoles	Magnetic and induced polarization (IP) surveys at Bermejal.
1991–1993	Peñoles	A total of 35,000 m drilled; Anomalia and BD-3 ore bodies discovered at Bermejal.
1986-1993	Peñoles	Underground mining conducted on the Guadalupe deposit. No record of production can be found, but mappings of development exist.
1993	Teck	Due diligence program; Nukay pit mapped, outlying prospects examined and 1,970 m of reverse-circulation (RC) drilling in 19 holes. Mineral Resource estimate completed.
1994	Teck	District-wide geologic mapping and sampling, litho-geochemical and magnetometer surveys, detailed prospect evaluations, and a total of 14,511 m of RC drilling in 84 holes.
1994	Peñoles	Prefeasibility study completed on Bermejal for 13,000 t/d open pit and heap leaching operation.
1995	Teck	District-wide geologic mapping, grid litho-geochemical sampling, time-domain electromagnetic (TEM) survey, road-cut mapping, and sampling, and drilling of 19,128 m in 90 holes.
1996	Teck	Exploration and delineation of Los Filos and Pedregal prospects. 156 RC rotary and 44 core holes completed at approximate spacing of 35 m on a grid 1,200 m long and 350 m wide. Geological mapping, sampling, density measurements, and metallurgical testing. Seven drill holes at Crestón Rojo and nine holes at El Grande prospect; four holes drilled in other areas of the property.
1997	Teck	Delineation drilling on Los Filos deposit, for a total of 29,219 m in 133 RC holes on a 35 m drilling grid area of 1,400 m × 400 m; metallurgical bottle roll tests and column tests on low- and medium-grade core samples; preliminary geotechnical assessment. Additional drilling of Crestón Rojo (9 holes), Zona 70, also known as Mag Ridge, (14 holes), Peninsular Ridge (3 holes), El Grande (4 holes), and Independencia (6 holes). Completion of scoping level study on Los Filos, Mineral Resource estimate prepared.
1998	Teck	13 exploration holes for a total of 3,190 m completed at Los Filos. Prefeasibility-level assessment, updated Mineral Resource estimate prepared for Los Filos.

Year	Operator	Activity or Work Undertaken
1999	Minera Nuteck	Metallurgical testwork, environmental studies, sediment-control study, aerial photography over Los Filos site.
2000	Minera Nuteck	Geological modelling, a 37-hole, 7,105 m confirmatory drilling program, a study on the structural geology, further metallurgical testwork, environmental permitting studies, and a review of capital cost estimates.
2001	Minera Nuteck	Geological reinterpretation, re-logging of core, geological modelling.
2003	Wheaton River Minerals	Wheaton River Minerals gained 100% ownership of Los Filos through the purchase of Miranda and associated agreements with Teck.
2003–2006	Wheaton River Minerals	81 diamond drill holes, geotechnical and metallurgical testwork, feasibility-level studies completed at Los Filos. Detailed review of the Bermejal deposit resource evaluation data made available by Minera El Bermejal during option-to-purchase negotiations; bulk sampling for metallurgical testwork; 36 diamond drill holes drilled.
2005	Goldcorp	Goldcorp acquired Wheaton River Minerals in March 2005, of which DMSL was a subsidiary, and therefore acquired DMSL, the operator of Los Filos Mine Complex.
2005	Goldcorp	On March 22, 2005, Goldcorp acquired the Bermejal deposit from Minera El Bermejal, S. de R.L. de C.V., a joint venture between Peñoles and Newmont Mining Corporation (Newmont).
2006	Minera Nukay, subsidiary of Goldcorp	Approximately 15,000 m drilled to explore underground targets at the Nukay mine. Two main targets were tested: ore bodies related to the geological contact (skarn-gold) and ore bodies related to the strong fracture system into the limestone close to the intrusion (chimney). Exploration confirmed the extension of the skarn-gold bodies at Nukay, Subida–Independencia, Arroyo Hondo, and Agüita areas.
2006–2007	Goldcorp	Mine construction and permitting activities. First gold poured mid-2007.
2007	Goldcorp	Regional and local geophysical survey performed to provide information used to identify new drilling targets. The survey identified various magnetic anomalies related to iron-skarn bodies along the Guerrero Gold Belt. A 100 m × 25 m grid was used for local survey and geologic mapping. 40 diamond drill holes were drilled at the 4P project (Creston Rojo, Zona 70, Conchita, and El Grande prospects), for a total of 7,918 m.
2008	Goldcorp	142 infill drill holes (26,693 m) completed at 4P, comprising 88 core holes (20,687 m) and 54 RC holes (6,006 m).
2009	Goldcorp	238 core holes (34,762 m) drilled in the Southern Bermejal area, as infill, and to extend known underground mineralized zones.
2010	Goldcorp	205 infill and extension drill holes (44,416 m) completed in Los Filos South underground and at Bermejal Norte open pit.
2011	Goldcorp	200 infill and extension drill holes (51,199 m) completed, primarily at Los Filos South underground and at Bermejal Norte open pit.
2012	Goldcorp	175 infill and extension drill holes (51,146 m) completed. Drilling at Bermejal at a 100 m × 100 m spacing to support Mineral Resource estimates. Drilling at Los Filos in support of upgrade classifications to Mineral Resource and Mineral Reserve classifications.
2013	Goldcorp	133 core holes (37,162 m) completed. Infill and extension drilling completed at Bermejal Norte to support upgrade classification of Inferred Mineral Resources to Measured and Indicated Mineral Resources. Extension drilling completed at Peninsular to extend known underground mineralized zones. Infill drilling also completed at Nukay underground and Los Filos Underground south zone.
2014	Goldcorp	162 core holes (48,360 m) completed. Infill and extension drilling completed at Bermejal Norte to support upgrade classification of Inferred Mineral Resources to Indicated Mineral Resources and to search for continuity of high-grade ore zones. Drilling completed at Peninsular underground to support Mineral Reserve estimates. Infill drilling also continued at Nukay underground and Los Filos underground south zone.

Year	Operator	Activity or Work Undertaken
2015	Goldcorp	218 drill holes (47,496 m) completed, comprising 37 RC holes (5,517 m), 7 RC and core combined holes (1,841 m), and 174 core holes (40,138 m). Extension drilling completed at Bermejal deep and at Peninsular underground to define the ore body shape. Infill drilling completed at Nukay underground, Los Filos underground south zone and Los Filos El Grande zone.
2016	Goldcorp	237 core holes (50,107 m) completed. Drilling in San Pablo completed to look for continuity of mineralization. Drilling in Guadalupe completed to confirm ore grades and continuity of the mineralization. Infill drilling completed at Bermejal underground, extension drilling completed at Zona 70 and Creston Rojo. Drilling completed at Los Filos to confirm ore grades in Agüita and to look for high-grade mineralization that might connect the deep underground mineralization in Los Filos to Peninsular.
2017	Leagold	On April 7, 2017, Leagold completed the acquisition of 100% ownership of Los Filos Mine Complex through the purchase of DMSL from Goldcorp.
2017	Leagold	Bermejal Underground drilling of 111 core holes (56,280 m) completed. Los Filos Underground infill and step-out drilling of 145 holes (15,633 m) at Nukay, Zona 70, and Creston Rojo.
2017	Leagold	Bermejal Underground project commenced with portal and ramp development.
2018	Leagold	Los Filos Underground infill, step-out and expansion drilling of 182 holes (27,212 m) at Nukay, Zona 70, Peninsular, and Creston Rojo.
2018	Leagold	Bermejal Underground infill of 9 core holes (801 m) and 8 geotechnical holes (1,011m). Los Filos and Bermejal pits RC infill drilling of 77 holes (3,485 m). Los Filos pit core drilling of 25 holes (7,806m) and Los Filos Underground core drilling of 163 holes (21,449m).
2018	Leagold	Agglomerator and overland conveyor was commissioned for the segregated processing of the high-grade ore for heap leaching.
2019	Leagold	Initiated mining of the Guadalupe open pit.
2019	Leagold	Bermejal Underground drilling of core holes (2,018m), Guadalupe Open Pit drilling of core and RC holes (10,752 m and 5,294 m, respectively). Bermejal Open Pit drilling of core holes (968 m). Los Filos Open Pit drilling of core holes (4,148 m). Los Filos Underground drilling of core holes (9,395 m).
2020	Equinox Gold	On March 10, 2020, Equinox Gold completed the acquisition of 100% ownership of Los Filos Mine Complex (DMSL) through the acquisition of Leagold.
2020	Equinox Gold	Guadalupe Open Pit infill drilling of core and RC holes (4,008 m and 1,361 m, respectively). Los Filos Underground drilling of core holes (5,968 m).
2021	Equinox Gold	Re-initiated development of the Bermejal Underground mine project.
2021	Equinox Gold	Bermejal Underground drilling of core holes (1,079 m). Guadalupe Open Pit drilling of core holes (1,733 m), RC holes (13,851 m) and combined RC/core holes (589 m). Los Filos Underground drilling of core holes (16,196 m).
2022*	Equinox Gold	Bermejal Underground drilling of core holes (4,298 m). Guadalupe Open Pit drilling of core holes (702 m) and RC holes (10,463 m). Los Filos Open Pit drilling of core holes (191 m), RC holes (188 m) and combined RC/core holes (224 m). Los Filos Underground drilling of core holes (4,082 m).

Note: 2022 drilling information is presented to June 30, 2022.

6.1 Los Filos Deposit

Early exploration and mining activity were focused on the Nukay claim prior to discovery of the Los Filos deposit in 1995. Minera Guadalupe operated the Nukay underground mine from 1938 to 1940; however, there are no production records from this period. Underground operations reopened in

1946 and continued until 1961, producing approximately 0.5 Mt at 18 g/t Au. A third period of exploitation was conducted by Minera Nukay from open pit operations commencing in 1984; there are no production records from this period. From 1987 to 2001 Minera Nukay operated a 100 t/d process plant near Mezcala to process ore from the Nukay, La Agüita, Subida, and Independencia deposits. The plant was expanded to 350 t/d in 1994 and to 400 t/d in 1997.

The Los Filos area was subject to sporadic prospecting through the 20th century. In 1993 Teck Corporation (Teck) entered an agreement (the Nukay Agreement) with Minera Miral S.A. de C.V., which was in the process of buying out the owners of Minera Nukay, the holders of the Nukay mining concession at that time.

Teck and Miranda Mining Development Corporation (Miranda) formed Minera Nuteck S.A. de C.V. (Minera Nuteck) to conduct exploration in the region. Exploration and a drilling campaign around the Nukay operations focused on the potential for mineralized skarns around the target intrusions. The discovery hole for the Los Filos deposit was drilled in August 1995.

Work in 1996 focused on delineating the Los Filos and Pedregal prospects; these were subsequently recognized to be one continuous deposit. In 1997, delineation drilling at Los Filos continued, and a first Mineral Resource estimate was produced. Minera Nuteck undertook Mineral Resource estimate updates, preliminary mining studies, and metallurgical testwork over the period of 1998 to 2002.

In November 2003, Wheaton River Minerals gained 100% ownership of Los Filos through the purchase of Miranda and associated agreements with Teck. In 2004, additional delineation drilling, geotechnical and environmental studies, and metallurgical testwork was conducted to support feasibility-level studies on the mineralization. Mineral Reserves were declared for Los Filos in 2004. Goldcorp acquired Wheaton River Minerals in March 2005, of which DMSL was a subsidiary, and therefore acquired DMSL, the operator of Los Filos Mine Complex.

Goldcorp also acquired the Nukay mine in 2008, which was subsequently integrated with Los Filos operations as the Los Filos underground mine.

6.2 Bermejal Deposit

The Bermejal deposit was initially overlooked by prospectors due to the low gold grades at surface.

In 1986, Peñoles sampled jasperoids within an extensive oxidation zone on top of Cerro Bermejal. Gold values were outlined in association with the oxide zone and jasperoids. In 1988, a geophysical survey was completed, and showed strong magnetic and induced polarization anomalies. In 1989 Peñoles started a detailed exploration program for bulk mineable gold mineralization. Peñoles completed a Mineral Resource estimate and prefeasibility study in 1994 that envisaged a 13,000 t/d open pit and heap leaching operation. Underground mining was completed on the Guadalupe deposit, although there is no record of production. Mappings of underground development exist.

During 2003, Wheaton River Minerals Ltd. evaluated the Bermejal deposit and conducted a due diligence review of the Project.

Subsequently, Peñoles excavated several pits and adits to obtain bulk samples for validation of the local grade estimates and to provide representative material for metallurgical testwork.

On March 22, 2005, Goldcorp's wholly owned Mexican operating company, Luismin, acquired the Bermejal gold deposit from Minera El Bermejal, S. de R.L. de C.V., a joint venture between Peñoles and Newmont.

Due diligence metallurgical studies on the Bermejal mineralization for heap leach amenability were initiated, and additional diamond core drilling was conducted to support Mineral Resource and Mineral Reserve estimates, and to support open pit mining studies. In 2005, further metallurgical, geotechnical, and engineering studies were undertaken, which resulted in the integration of Bermejal and Los Filos into one comprehensive mining operation.

Feasibility-level studies for Los Filos and Bermejal open pits and Los Filos underground were completed from 2005 to 2007.

In 2016 Goldcorp completed an internal conceptual study on the Bermejal underground deposit to examine the potential for developing of a new underground mine to augment existing production. Subsequently, Leagold acquired DMSL from Goldcorp in 2017 and commenced a portal and ramp development into the Bermejal underground for exploration purposes and Mineral Reserves were declared for Bermejal underground in 2018. Construction of the Bermejal underground mine was initiated by Equinox Gold in 2021.

The development plan for the Guadalupe open pit was initiated in 2018 by Leagold and mining of the Guadalupe open pit began in 2019.

6.3 Los Filos Mine Complex Production History

Open pit mining commenced at Los Filos in 2005. Underground production and the first gold pour commenced in 2007. Annual open pit ore production rates have been over 7 Mt in the past five full production years (2017 to 2021), when production was not interrupted by external factors, with total mining (ore and waste) of up to 45 Mt/a occurring over the same period (Table 6-2). Production from underground sources has varied from 949 t/d to 1,954 t/d over the same period (Table 6-3).

In addition to production from the open pit and underground operations, the Los Filos Mine Complex produced 228,693 oz Au by secondary recovery from the existing heap leach piles. Material was re-handled with an excavator to allow better cyanide penetration in compacted portions of the leach pile, and cyanide was introduced into the leach pile by drilling and injection (Hydro-Jex). Table 6-4 summarizes the additional ounces recovered from the heap leach piles between 2015 and 2021. Secondary gold recovery from the existing heap leach piles was completed in 2021.

2020 production was lower than expected as the result of a temporary suspension of mining activities for the majority of the second quarter in compliance with government-mandated restrictions related to the COVID-19 pandemic, and a suspension from September to December due to a blockade from members of one of the three primary communities from which the mine draws its workforce. Production was affected again in 2021 due to blockades from late June to early August.

Table 6-2: Open Pit Production Record 2005–2022

Year	Ore Produced (t)	Grade (g/t Au)	Contained Au (oz Au)	Waste (t)	Strip Ratio (waste:ore)	Ore + Waste (t)
2005	79,968	0.78	2,005	3,682,223	46.05	3,762,191
2006	1,435,230	0.38	17,535	30,561,665	21.29	31,996,895
2007	8,383,675	0.64	172,506	26,816,273	3.20	35,199,948
2008	22,109,446	0.62	440,717	22,555,972	1.02	44,665,418
2009	24,984,922	0.61	490,003	28,655,310	1.15	53,640,232
2010	27,484,169	0.62	547,854	31,644,789	1.15	59,128,958
2011	26,271,849	0.68	574,368	39,663,262	1.51	65,935,111
2012	29,328,604	0.62	584,620	41,172,715	1.40	70,501,319
2013	27,362,485	0.63	554,226	45,805,227	1.67	73,167,712
2014	22,928,394	0.58	427,555	37,360,599	1.63	60,288,993
2015	18,349,859	0.65	383,475	43,862,008	2.39	62,211,867
2016	10,338,984	0.69	229,360	13,344,201	1.28	23,683,185
2017	8,259,030	0.62	164,631	19,632,365	2.38	27,891,395
2018	8,873,158	0.70	200,635	19,972,455	2.25	28,845,613
2019	7,385,899	0.56	132,960	12,163,372	1.65	19,549,272
2020 [1]	525,003	0.34	5,691	13,128,632	25.01	13,653,635
2021 [2]	7,089,686	0.71	161,403	38,027,249	5.36	45,116,935
2022 [3]	2,727,804	0.76	66,297	27,832,319	10.20	30,560,123
Total (to date)	**253,918,165**	**0.63** [4]	**5,155,841**	**495,880,636**	**1.95** [4]	**749,798,802**

Notes: [1] 2020 production was suspended for approximately six months due to COVID-19 restrictions and a blockade by community members.
[2] 2021 production was suspended for approximately 5 weeks due to a blockade by community members
[3] 2022 production is from January 1 to June 30 (inclusive).
[4] Weighted average of years 2005–2022 (January 1 to June 30 (inclusive).

Table 6-3: Underground Production Record 2007–2022

Year	Ore Produced (t)	Grade (g/t Au)	Contained Metal (oz Au)
2007	141,496	7.05	32,072
2008	130,675	6.68	28,065
2009	97,367	5.70	17,843
2010	243,643	6.25	48,958
2011	309,047	6.15	61,107
2012	293,064	6.83	64,354
2013	319,681	6.94	71,329
2014	333,678	6.89	73,916
2015	388,212	6.89	85,996
2016	327,691	6.37	67,111
2017	346,397	6.83	76,065
2018	595,041	5.79	110,679
2019	713,029	4.86	111,306
2020 [1]	324,283	4.06	42,354
2021 [2,3]	523,505	3.22	54,167
2022 [4]	288,449	3.02	27,975
Total (to date)	**5,375,258**	**5.63**[5]	**973,297**

Notes: [1] 2020 production was suspended for approximately six months due to COVID-19 restrictions and a blockade by community members.
[2] 2021 production was suspended for approximately 5 weeks due to a blockade by community members
[3] First ore mined from Bermejal Underground in September 2021.
[4] 2022 production is from January 1 to June 30 (inclusive).
[5] Weighted average.

Table 6-4: Gold Produced from Secondary Leaching of Heap Leach Piles, 2015–2021

Year	Gold Ounces
2015	14,921
2016	24,481
2017	56,845
2018	34,573
2019	30,312
2020	48,250
2021	19,311
Total	**228,693**

6.4 Equinox Gold 2020 Acquisition of the Los Filos Mine Complex

On March 10, 2020, Equinox Gold completed acquisition of 100% ownership of the Los Filos Mine Complex through the acquisition of Leagold.

7 GEOLOGICAL SETTING AND MINERALIZATION

The Los Filos Mine is in the Guerrero Gold Belt (Figure 7-1) near the center of an approximately 200 km-diameter circular feature known as the Morelos–Guerrero sedimentary basin (Garza et al., 1996). The basin is a thick (approximately 2,000 m) sequence of Mesozoic platform carbonate rocks that includes a succession of the Morelos, Cuautla, and Mezcala Formations. The Cretaceous-age carbonates were intruded by several early Tertiary-age granitoid bodies (65–67 Ma; Valencia and Ruiz, 2008) and are underlain by Precambrian and Palaeozoic basement rocks that include gneisses and shists of the Xolapa complex, and quartzites and phyllites of the Ixquinatoyac formation (Garza et al., 1996).

The Morelos Formation is approximately 500 m thick in the area of the property and consists of medium- to thick-bedded fossiliferous crystalline limestones and dolomites (Garza et al., 1996). The lower contact is not observed on the property but from available Petróleos Mexicanos (PEMEX) drill data, the Morelos Formation is known to have a thickness of at least 1,570 m near the nearby community of Mezcala (see Figure 4-1).

The Cuautla Formation is approximately 160 m thick (Garza et al., 1996) and overlies the Morelos Formation across a gradational contact. It consists of thin- to medium-bedded silty limestones and sandstones with argillaceous lenses and minor shale intercalations.

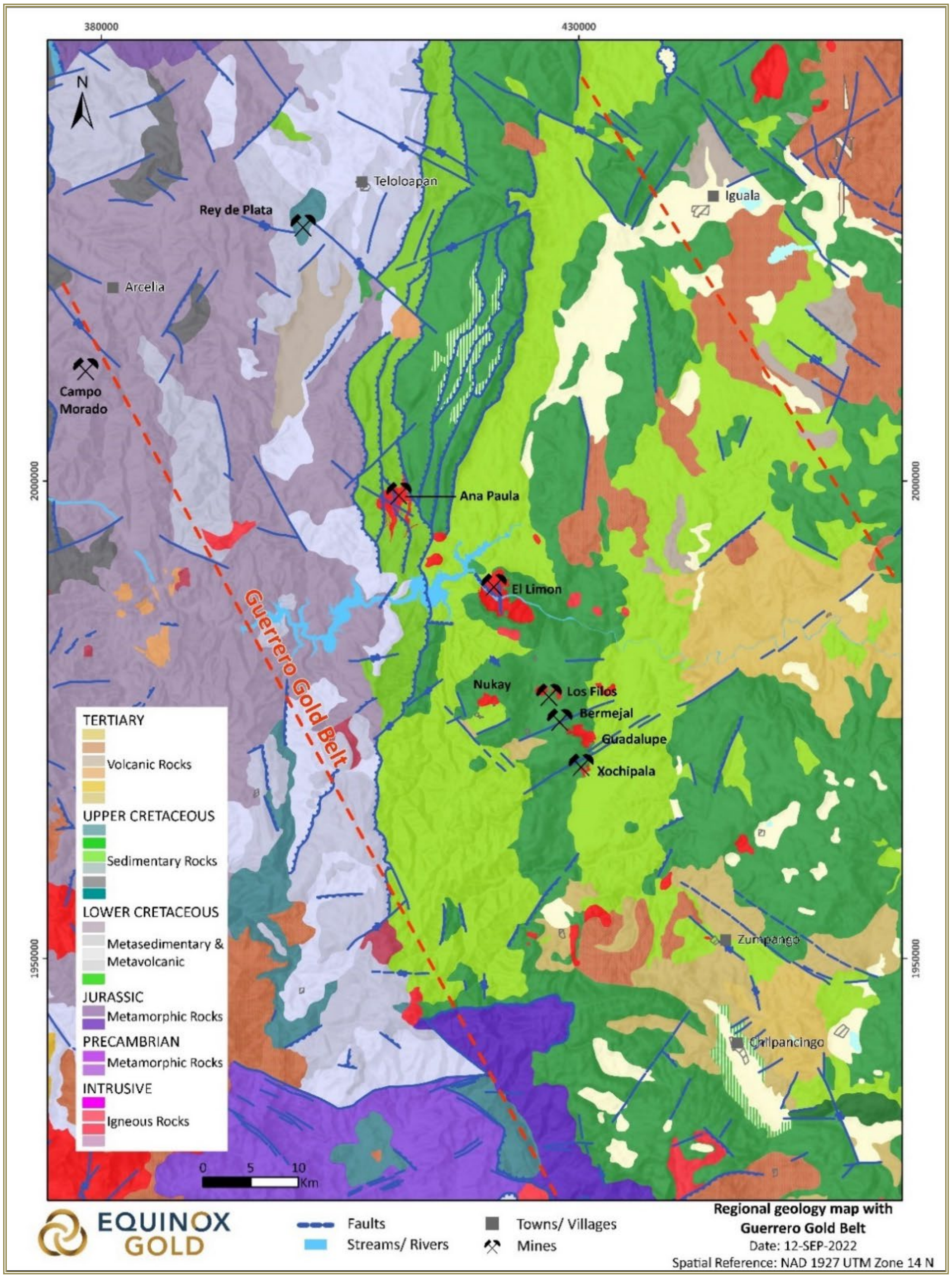
The Mezcala Formation is approximately 1,200 m thick (Garza et al., 1996) and transitionally overlies the Cuautla Formation. It consists of a platform to flysch-like succession of interbedded sandstones, siltstones, and lesser shales, which have been extensively altered to hornfels near intrusion contacts.

The sedimentary succession described above was folded into broad, north-trending anticlines and synclines during east-vergent Laramide compression, 80–45 Ma (Garza et al., 1996). There are also northwest-trending faults, fractures, and veins to the east of the property in the Morelos–Guerrero basin. The Los Filos property lies at the transition between belts of overthrust rocks of the Mezcala Formation to the west and more-broadly folded rocks to the east (Jones & Jackson, 1999c). Most sedimentary rocks observed on the Los Filos property belong to the Morelos Formation.

The Cretaceous sedimentary rocks and Tertiary granitoid intrusions are unconformably overlain by a sequence of Tertiary felsic to intermediate volcanic rocks and alluvial sedimentary rocks (red sandstones and conglomerates) that partially cover the region.

Regional structures include sets of northeast- and northwest-trending faults and fractures that cut both the carbonate sequence and the intrusive rocks. The distribution of intrusive bodies along the northwest-trending Guerrero Gold Belt is thought to reflect the control on their emplacement by pre-existing northwest-trending faults (Garza et al., 1996). The first set of structures are late-Cretaceous in age, run approximately parallel to the overall trend of the Guerrero Gold Belt, and do not cut the Tertiary volcanic rocks. Secondary structures run northeast–southwest and may be contemporaneous with the first set of structures. A slightly younger fault system runs north–south and appears to have been active both pre- and post-mineralization. Finally, concentric faults are noted around the intrusions and are interpreted to result from the cooling of the intrusion and related gravity-driven faulting.

Dissolution of the carbonate rocks has resulted in extensive areas of karst topography consisting of numerous caverns and sinkholes. Typically, a mantle of caliche up to 10 m thick has developed on the carbonate rocks at surface.

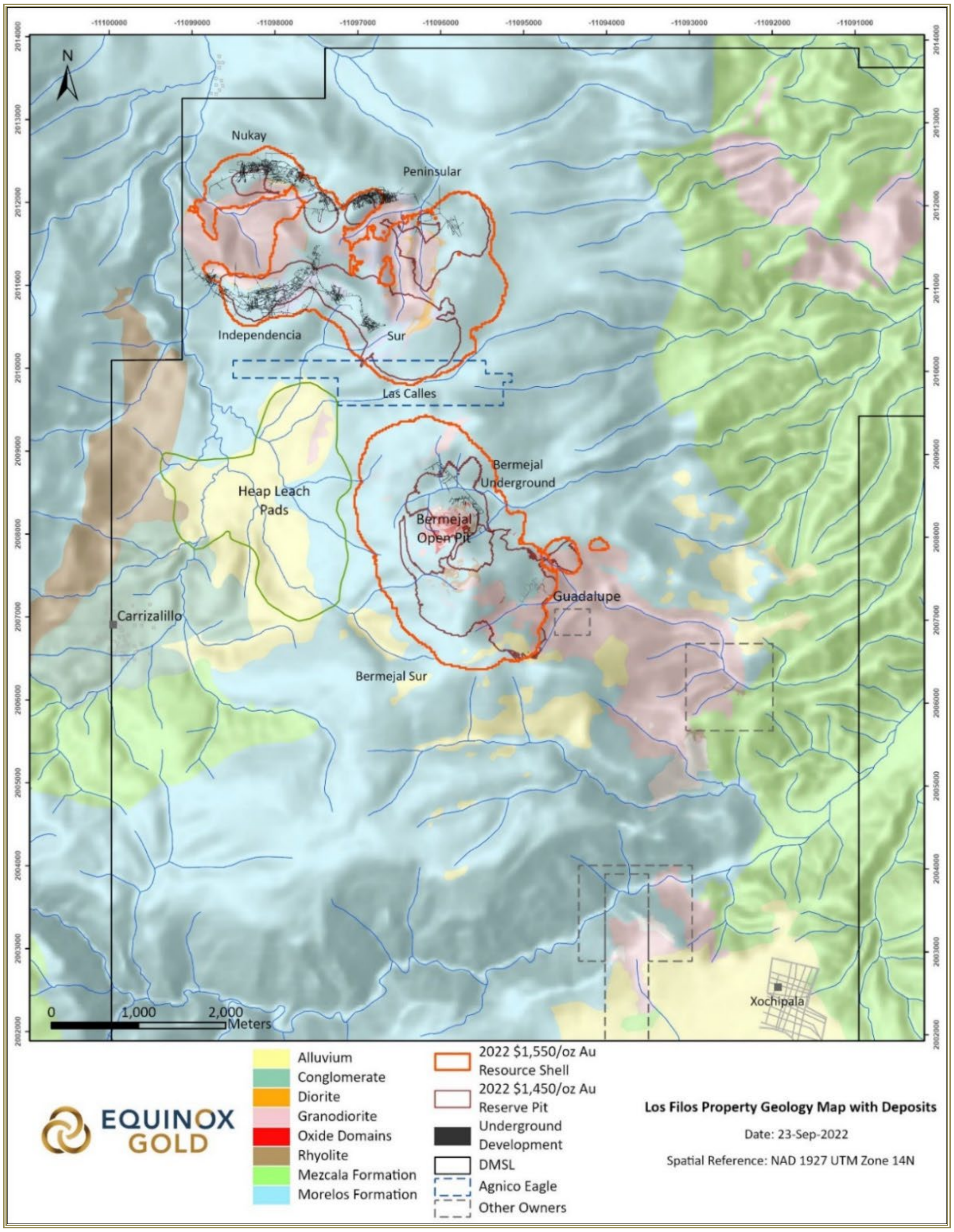


Source: Equinox Gold.

Figure 7-1: Regional Geology within the Guerrero Gold Belt

7.1 Los Filos Property Geology

Los Filos Mine property geology is predominantly Cretaceous Morelos Formation and the overlying Mezcala Formation (Figure 7-2).



Source: Equinox Gold.

Figure 7-2: Los Filos Property Geology with Deposits

The Tertiary granodiorites that intrude the sedimentary units on the Los Filos Mine property include: the eastern and western stocks of the Los Filos intrusion, which both have a roughly circular geometry near surface, and have a total exposed area of about 3.5 km^2; the irregularly shaped, oblong Bermejal–Guadalupe stock, which extends for over 5 km in a northwest–southeast orientation, with a total exposed area of at least 10 km^2 over two separate exposures; and the Xochipala intrusion, which has an area of approximately 4 km^2. There is also an unnamed granodiorite body in the northeast portion of the property. A Tertiary rhyolite volcanic unit is also present on the eastern edge of the property. Both the Los Filos and Bermejal–Guadalupe intrusions are associated with sills that range from diorite to granodiorite in composition and are interpreted to be rapidly chilled phases of intrusion (Garza et al., 1999; Jones, 1999). Both sills were also zones of preferential fluid movement and are important locally for mineralization.

Quaternary conglomerate and alluvium fill valley bottoms on the west and southern edges of the property (Garza et al., 1996).

7.2 Mineralization

Regional mineralization styles include skarn-hosted and epithermal precious metal deposits, as well as volcanogenic massive sulphide base metal deposits (Camprubi et al., 2015). In Guerrero State, these occur in two adjacent arcuate belts, with the Guerrero Gold Belt lying to the east of the volcanogenic massive sulphide belt. Both belts are oriented northwest–southeast, are approximately 30 km wide and are over 100 km long (Figure 7-1).

On the Los Filos property, oxide skarn development occurs at and near the contacts between granitoid intrusions and the carbonate-rich Morelos Formation sediments. Garnet-rich skarn is more common at the base of the deposits, with traces of silica grading upward to chlorite and epidote plus abundant silica toward the top. Sericite in granitoid stock apices is abundant. The oxide skarn formation occurred in four stages (Garza et al., 1999):

- Stage 1—prograde skarn: garnet–pyroxene endoskarn with lesser quantities of exoskarn, including massive magnetite, forming an envelope around the stock.
- Stage 2—retrograde skarn: extensive chlorite–epidote, tremolite–actinolite, and phlogopite–serpentine assemblages, with lesser talc, muscovite, and sericite predominant in the upper 400 m of the stock. This zone can be as much as 170 m wide within the intrusion.
- Stage 3—late skarn: garnet veins that cut through both first-stage prograde and later retrograde skarn.
- Stage 4—late veining: two successive gold-bearing stages of silica, phlogopite, and amphibole veins. Earlier quartz–pyrite–hematite veins were followed by quartz-pyrite, opal chalcedonic quartz veins, and silica flooding along structures, as well as within the intrusive matrix.

Pervasive jasperoids typically occur associated with the late veining stage, replacing skarn and intrusive rocks, and forming a silica cap.

The Los Filos Open Pit includes mineralization contained within or below a shallowly east-dipping diorite sill, and along the contact with Los Filos stocks, and includes several sub-zones. The Los Filos underground mine is divided into Los Filos Norte and Sur which are further subdivided into four main sectors: Nukay and Peninsular (Los Filos Norte), and Sur and Independencia (Los Filos Sur). These four sectors include the sub-sectors Conchita, Diegos, Chimenea, Independencia-Subida, Zona 70, and Crestón Rojo. These sub-sectors are not modelled or estimated separately in the current Mineral Resource but were modelled and mined as distinct areas in the past.

The Bermejal–Guadalupe open pit includes mineralization mined in the Bermejal North and South sectors and the Guadalupe deposit. The Bermejal Underground includes material at the north end of the Bermejal–Guadalupe stock and below the mined-out portion of the Bermejal–Guadalupe open pit.

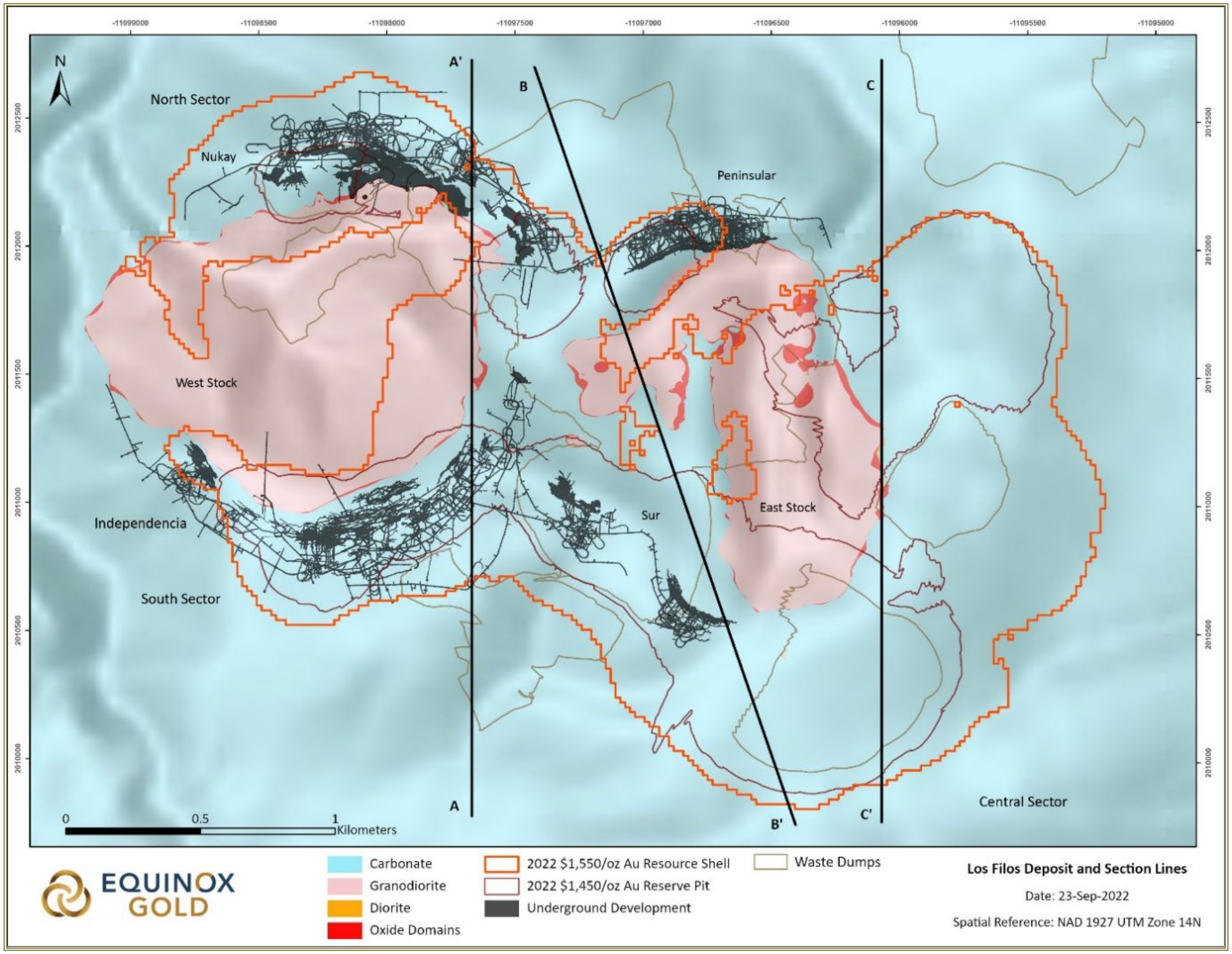
7.3 Los Filos Deposit Area Mineralization

In the area of Los Filos (LFUG and LFOP on Figure 7-2 and Figure 7-3), mineralization is associated with two early Tertiary granodiorite stocks and an associated sill that were emplaced in carbonate rocks, resulting in development of high-temperature calc–silicate and oxide metasomatic alteration (skarn) assemblages that were followed by distinct mesothermal to epithermal alteration (Jones, 1999). Hematite and magnetite are typical skarn minerals, but diopside, which is commonly recognized in skarn assemblages, is not present.

7.3.1 Mineral Deposit Geology

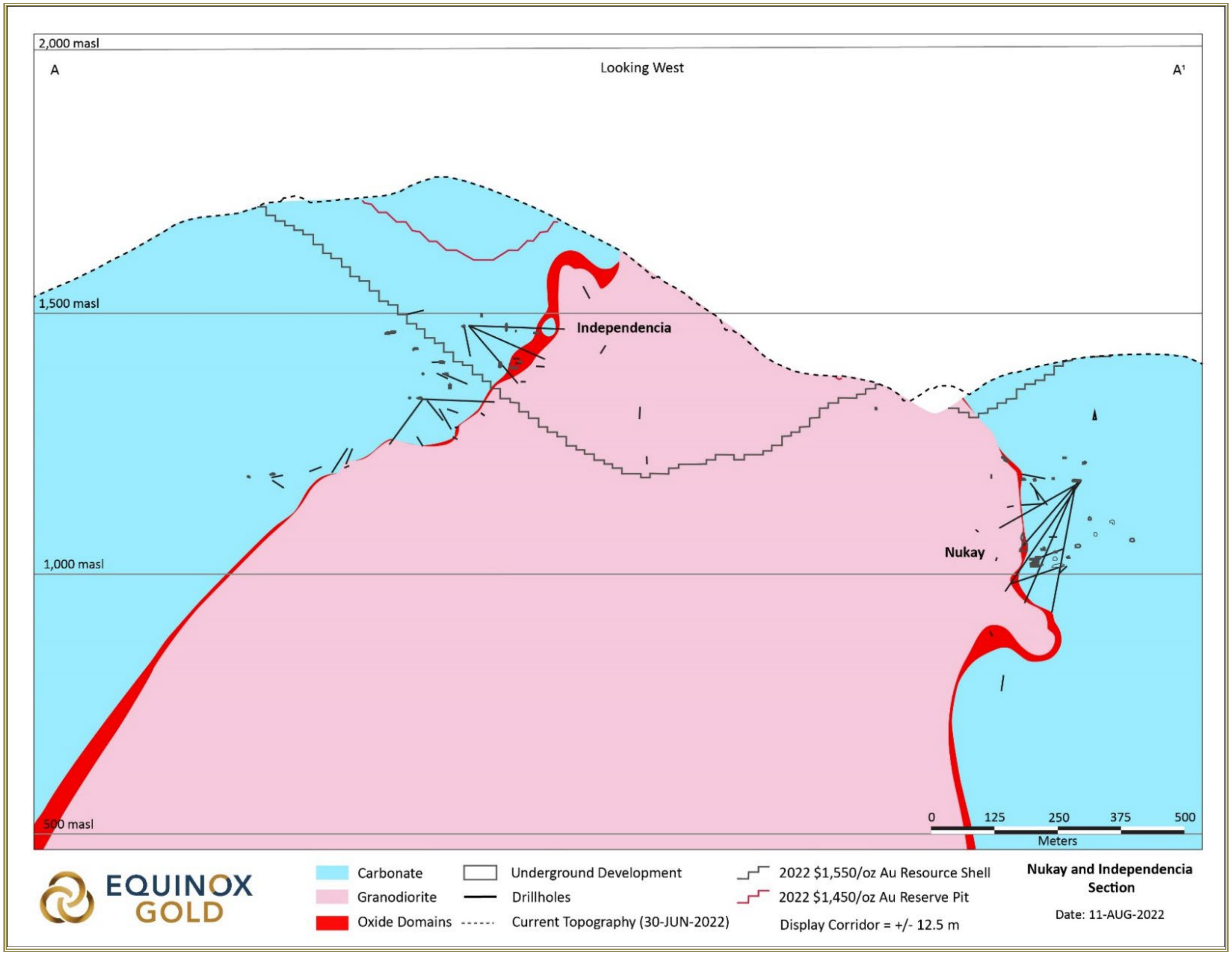
The Nukay and Independencia deposits formed along the north and south margins of the western stock (Figure 7-3). The Peninsular and Sur (including Zona 70) deposits formed on the northern and southwest margins of the eastern stock, respectively (Figure 7-3).

Figure 7-3 shows a plan map of the Los Filos stocks, the $1,550/oz Au resource pit shell, and existing underground development, projected to surface; lines for vertical cross-sections are shown that apply to Figure 7-4 through Figure 7-6. Figure 7-4 is a cross-section through the Nukay and Independencia areas (Section A-A’ on Figure 7-3) showing both the extent of the resource pit and the underground workings. Figure 7-5 is a cross-section through the Sur and Peninsular areas (Section B-B’ on Figure 7-3), highlighting the extent of the open pit and the underground workings. Figure 7-6 is a cross-section through the eastern portion of the Los Filos open pit (Section C-C’ on Figure 7-3) highlighting the importance of the sill in controlling mineralization on the eastern side of the deposit.



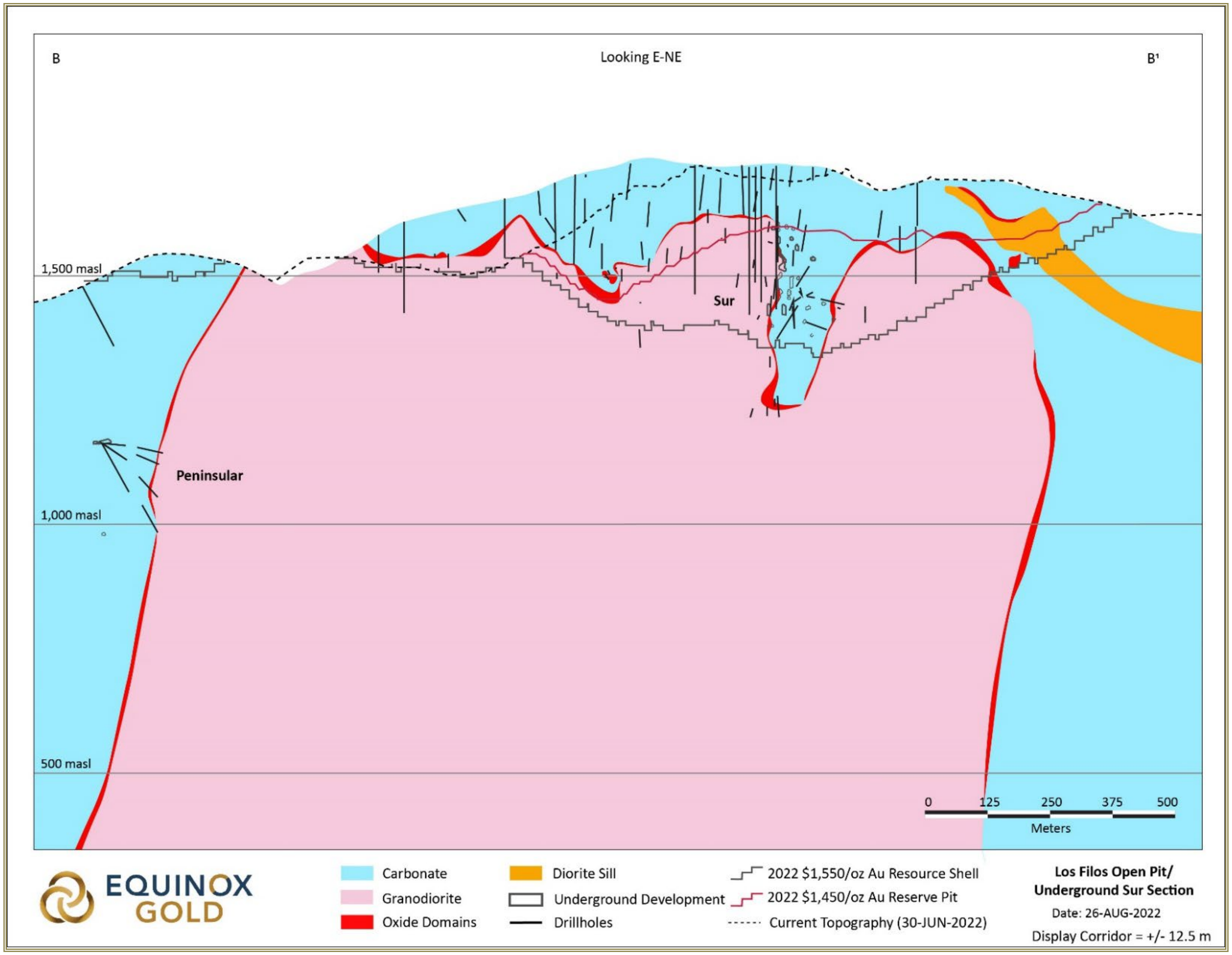
Source: Equinox Gold.

Figure 7-3: Los Filos Open Pit and Underground—Geology and Deposit Location and Cross-Section Lines



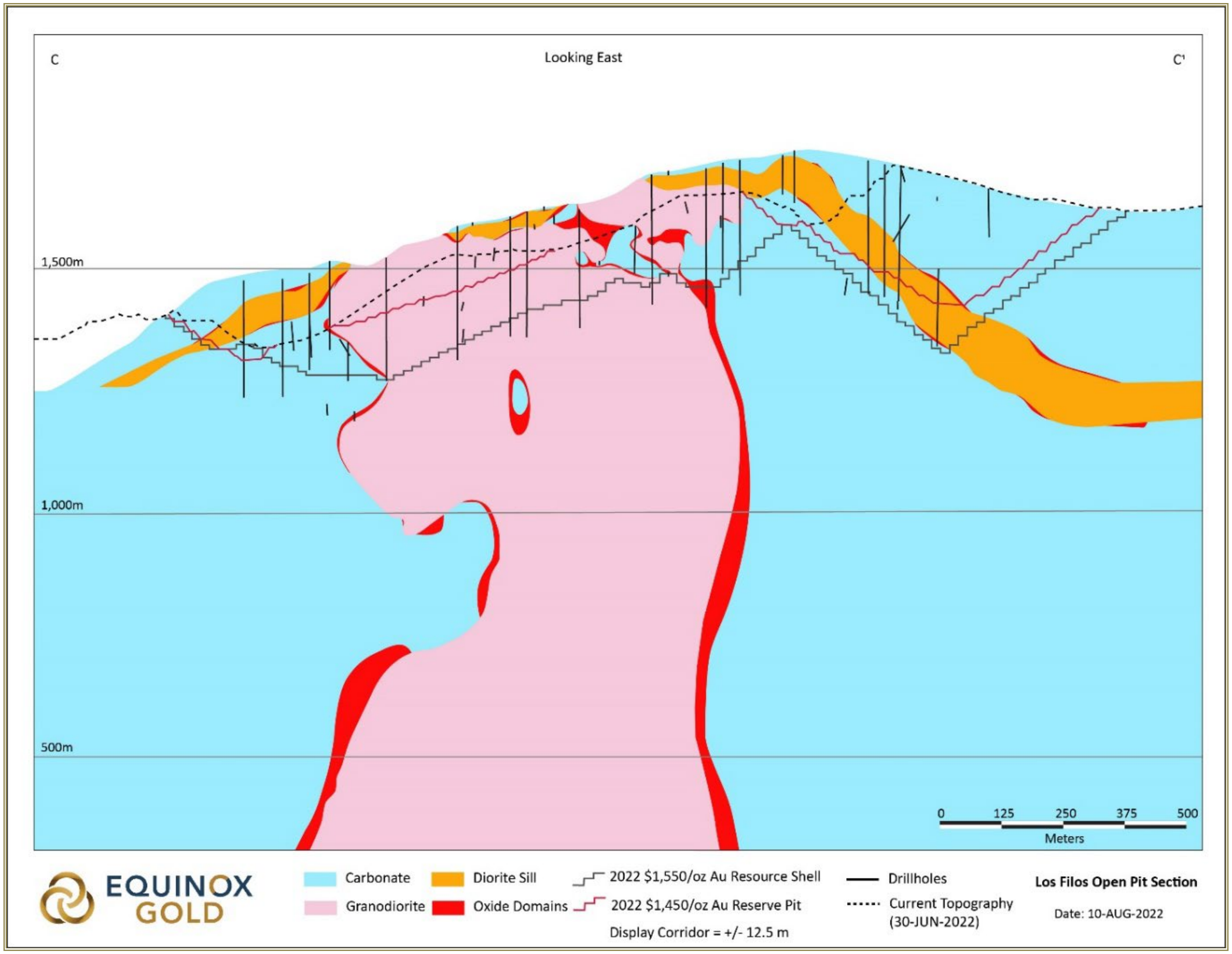
Source: Equinox Gold.

Figure 7-4: Geological Cross-Section, Los Filos Open Pit and Underground (Nukay and Independencia)



Source: Equinox Gold.

Figure 7-5: Geological Cross-Section, Los Filos Open Pit and Underground (Peninsular and Sur)



Source: Equinox Gold.

Figure 7-6: Geological Cross-Section, Los Filos Open Pit

The differing morphology of the eastern and western stocks is interpreted to reflect different relative ages and structural controls during emplacement (Jones, 1999). The western stock is roughly circular and approximately 1.3 km in diameter. It is slightly younger than the eastern stock, interpreted as having been emplaced into rocks preheated by emplacement of the eastern stock. The eastern stock is elongated in a north–south direction, following the dominant fault orientation of the Guerrero Gold belt, and is approximately 1.4 km long and 0.5 km to 0.7 km wide in the south; in the north, a western lobe extends for 1 km in a west-southwest to east-northeast direction, parallel to the secondary set of regional faults.

On the eastern side of the Los Filos Open Pit, economic gold mineralization is hosted primarily within or on the lower contact of a diorite sill that dips from 20° to 50° to the east, away from the eastern stock (Figure 7-6). The diorite sill is interpreted as having been emplaced into a large, moderately dipping active structure that parallels bedding in the carbonate host rocks (Jones and Jackson, 1999a; 1999b). The sill has a sigmoidal shape that starts out roughly flat near the stock, extending east at a moderate dip for approximately 200 m. On the southern side of the Los Filos intrusion, the sill flattens slightly and extends to the Bermejal–Guadalupe stock approximately 2 km to the south.

On the western edge of the sill, the diorite can be difficult to differentiate from the granodiorite of the main intrusion. Erosion has exposed the upper portions of the sill along with some carbonate xenoliths.

Beneath the diorite sill, moderately east-dipping lobes and fingers of granodiorite project into the carbonate wall rocks away from the eastern stock that are generally interpreted to be parallel to bedding in the carbonate rocks. These intrusion projections are interpreted as becoming less pronounced with depth, with the stock becoming essentially vertical a few hundred metres below the sill.

In the north-central portion of Los Filos Open Pit deposit, there are several hundred metres or more of granodiorite above and below the diorite sill.

On the western side of the Los Filos Open Pit area, and in most areas targeted by underground mining, mineralization occurs along irregular, often steeply dipping to vertical contacts between the granodiorite and the host carbonate rocks.

7.3.2 Alteration

Alteration associated with mineralization is extremely varied, and ranges from high-temperature metasomatic fluids (with influence from meteoric water) to lower-temperature epithermal alteration (Jones, 1999). However, both beta-quartz granodiorite (quartz-enriched) and diorite sill rocks host the most characteristic and prevalent alteration types, which include the following:

- Orthoclase mantling and veining from potassium-rich fluids
- Intense silicification and veining from silica-rich fluids
- Calcite veining
- Sericite–illite–smectite–kaolinite alteration
- Hypogene iron oxides, including hematite–specularite, and goethite
- Sulphide mineralization, consisting of pyrite, chalcopyrite, arsenopyrite, bismuth minerals, and tetradymite

Alteration affects both skarn and non-skarn rocks, and the intensity typically reflects the degree of fracturing of the host rock.

7.3.3 Mineralogical Zonation of Veins

There is a distinct mineralogical zonation in veins across Los Filos Open Pit deposit (Garza et al., 1996; Jones, 1999):

- Quartz veining is relatively dominant within or adjacent to beta-quartz granodiorites (i.e., the "proximal" part of the mineralized system). Quartz veins include earlier quartz–pyrite–hematite veins and later quartz–pyrite, opal chalcedonic quartz veins.
- A transition zone in which quartz veining decreases sharply, while sulphide and calcite–quartz veining increases.
- Calcite veining is dominant toward the far edges of the diorite sill (i.e., the "distal" part of the system).
- Gold grades peak in the transition zone and coincide with the dominance of pure sulphide veins.

Relict pods and subsequently altered zones of massive magnetite dominate the exoskarn alteration around the western stock. The higher-grade gold values found in these iron skarn deposits, as in the Nukay, Independencia-Subida, and Agüita zones, are interpreted to result from late-stage alteration overprinting of the pre-existing skarn body.

7.3.4 Mineralization—Eastern Los Filos Open Pit

The diorite sill hosts a significant proportion of the mineralization on the eastern side of the Los Filos Open Pit (Figure 7-7). Mineralization is structurally controlled by breccias and quartz–hematite–gold (± calcite) veins that occur relatively late in the paragenetic sequence, and probably represent the last stage of hydrothermal activity in the deposit. The veins dip at moderate to steep angles (50° to 80°), while the breccias dip more moderately (30° to 40°). Both veins and breccias are developed preferentially within the intrusive rocks and their contacts with the carbonate rocks. The veins typically occur in clusters, with spacings of 5 to 50 cm. The breccias tend to occur as isolated or bifurcating structures.

7.3.5 Mineralization—Central and Western Los Filos Open Pit

The central portion of the Los Filos Open Pit (Figure 7-5) occurs above the underground areas Peninsular and Sur, as well as the previously mined El Grande, Agüita, Zona 70, and Crestón Rojo zones. The western portion of the Los Filos Open Pit occurs above the underground areas of Nukay and Independencia. Previous resource and reserve pit shells for Los Filos did not extend over the western stock, but the current $1,550/oz Au resource pit shell extends over the known mineralization of the western stock, down to a minimum elevation of 1,050 masl. All of these smaller sub-zones are now included in a larger resource pit shell.

Gold mineralization is dominantly hosted within Cretaceous-aged medium-bedded to massive fossiliferous limestone of the Morelos Formation, as well as locally within the Los Filos granodiorite intrusions and associated diorite sill. The carbonate rocks were intruded by granodioritic plutons, with contact metamorphism resulting in the formation of marble within the calcareous rocks and local development of calc–silicate endoskarn in the intrusive rocks. Pods of calc–silicate and iron-rich exoskarn in the marble formed along contacts. The iron-rich exoskarn deposits occur along the contacts of the eastern stock.

7.4 Bermejal–Guadalupe Deposit Area Mineralization

The Bermejal–Guadalupe Open Pit (BOP-GOP) and Bermejal Underground (BUG) area (Figure 7-2 and Figure 7-7) consists of mineralization along the contact of the Bermejal–Guadalupe stock with the carbonate rocks of the Morelos Formation. The Bermejal–Guadalupe Open Pit mineralization occurs along the top and flanks of the intrusion. Mineralization that extends below the open pit and along the northern end of the steeply dipping intrusion flanks is referred to as the Bermejal Underground deposit. The Guadalupe deposit is on the eastern extension of the Bermejal–Guadalupe stock and comprises the southeastern portion of the Bermejal–Guadalupe pit.

7.4.1 Mineral Deposit Geology

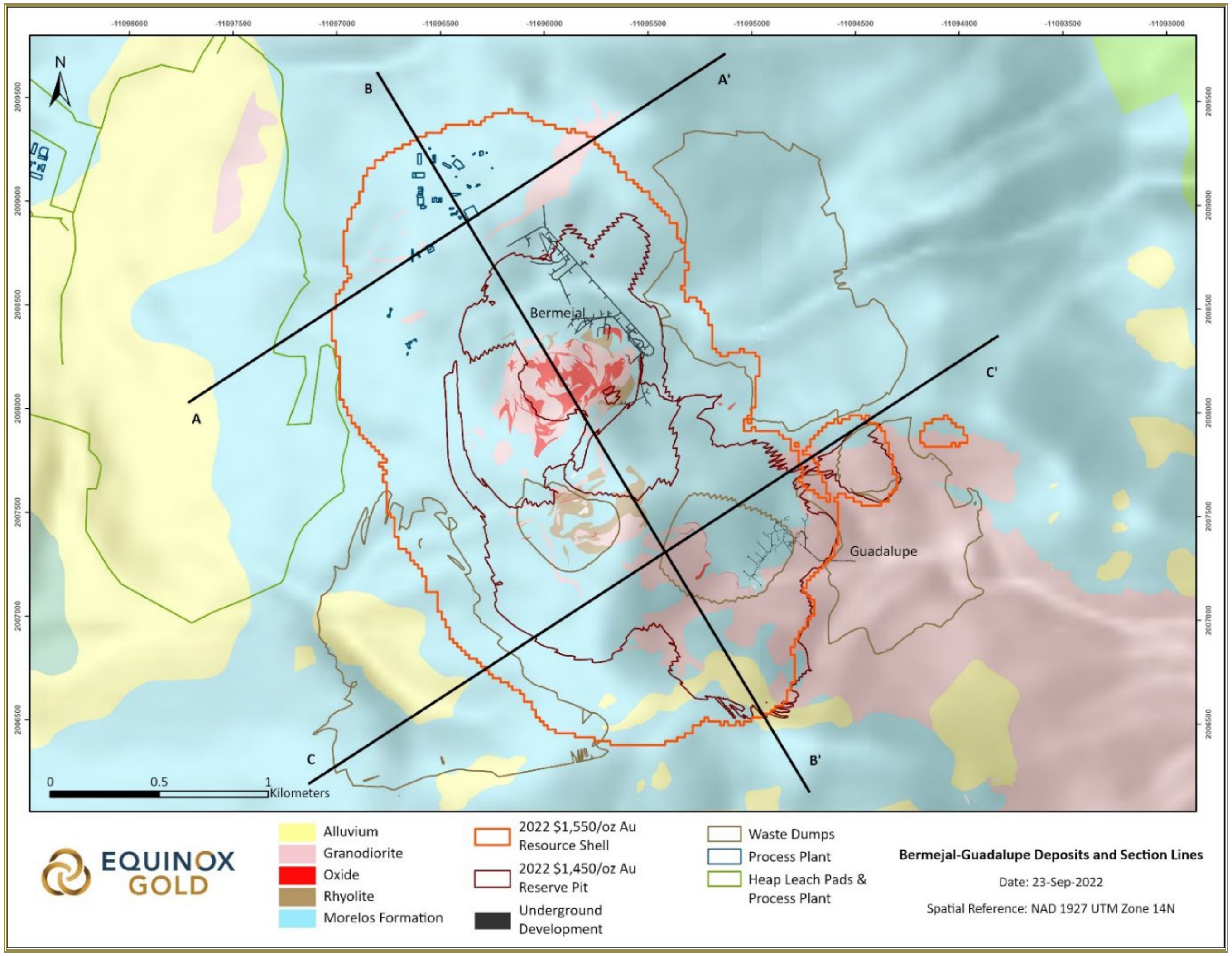
Deposit geology consists of calcareous and argillaceous rocks of Cretaceous age that are intruded by a granodiorite stock of Tertiary age. At the contacts of these two rock types, alteration halos are formed by metasomatic fluids from the intrusion. Iron-oxide skarn mineralization is best developed at the granodiorite–limestone contacts and within endoskarn. The Bermejal–Guadalupe stock has two separate exposures at surface. The northern portion of the stock is approximately 2 km in diameter and is roughly circular, forming the Bermejal deposit. The intrusion connects with the larger intrusion to the southeast (the Guadalupe deposit) and continues for several kilometres further southeast, to the San Pablo deposit (Figure 7-2).

A variably shallow to moderately dipping diorite sill intrudes the carbonate rocks and extends at least 2 km north of the Bermejal–Guadalupe stock to the Los Filos eastern stock. The sill is at least 1.5 km wide, is approximately 100 m thick where it has been constrained, and intersects the northwestern side of the Bermejal–Guadalupe stock. The sill is in contact with the Bermejal stock at approximately 1,200 masl. Gold mineralization occurs along the upper and lower contacts of the sill within a few hundred metres of the stock. Mineralization below the intersection of the sill and the Bermejal stock tends to be wider and higher grade, and is a significant part of the Bermejal Underground deposit.

Figure 7-7 shows a plan view map of the Bermejal–Guadalupe area relative to the $1,550/oz Au resource pit shell, and section lines for three vertical cross-sections. Figure 7-8 is a cross-section (A–A’) through the northern portion of the Bermejal–Guadalupe pit, north of the Bermejal underground area, highlighting the intersection of the granodiorite intrusion and the diorite sill intruding into the host carbonate rocks.

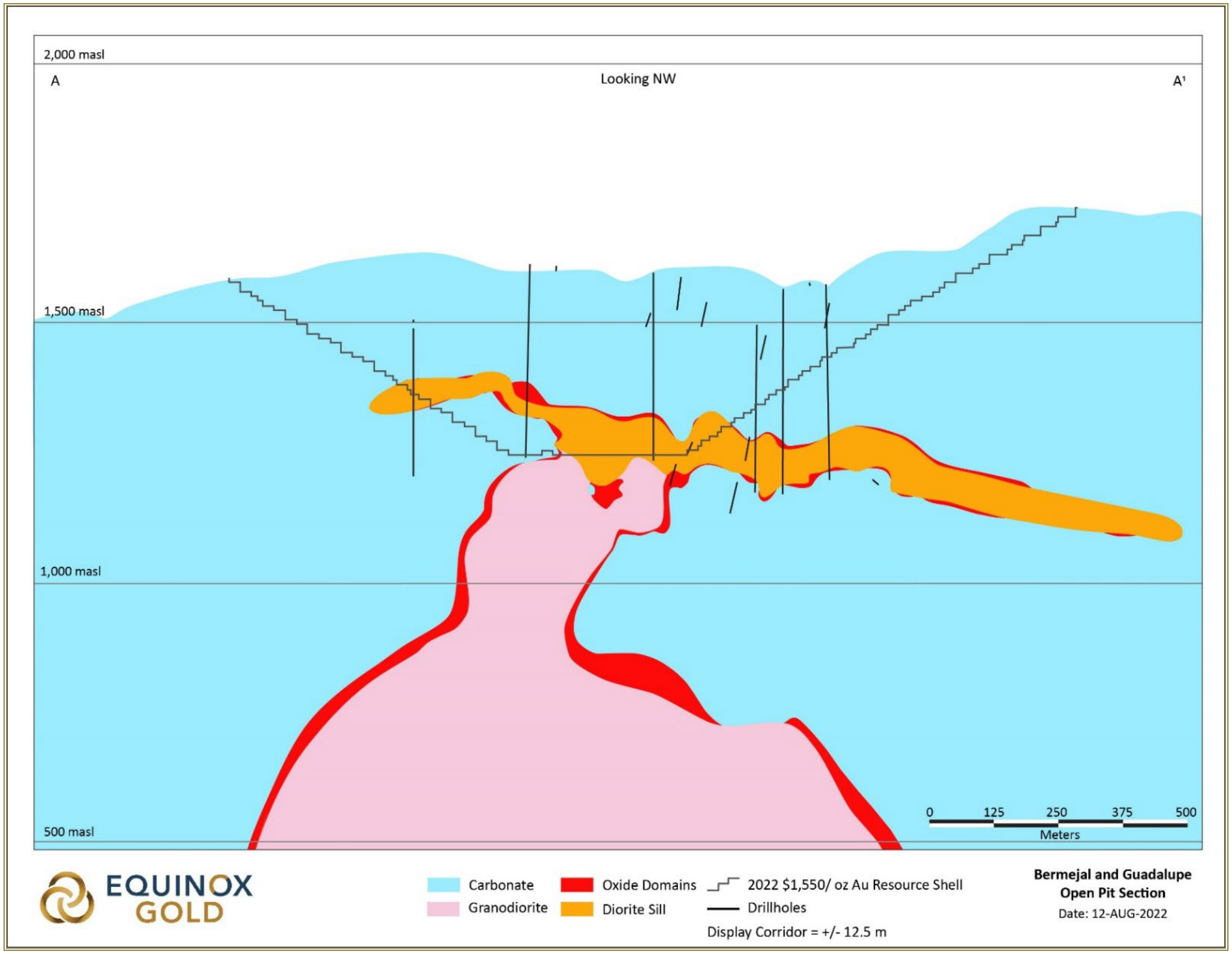
Figure 7-9 is a cross section (B–B’) running the length of the open pit (northwest to southeast), showing the Bermejal and Guadalupe deposits, and highlighting the diorite sill and the mineralization along the upper and lower margins of the sill, as well as the steeply dipping, wide mineralization zone below the sill that is a major target for underground mining.

Figure 7-11 is a cross section (C–C’) across the southern portion of the open pit, highlighting the southern extension of the Bermejal deposit and the Guadalupe deposit.



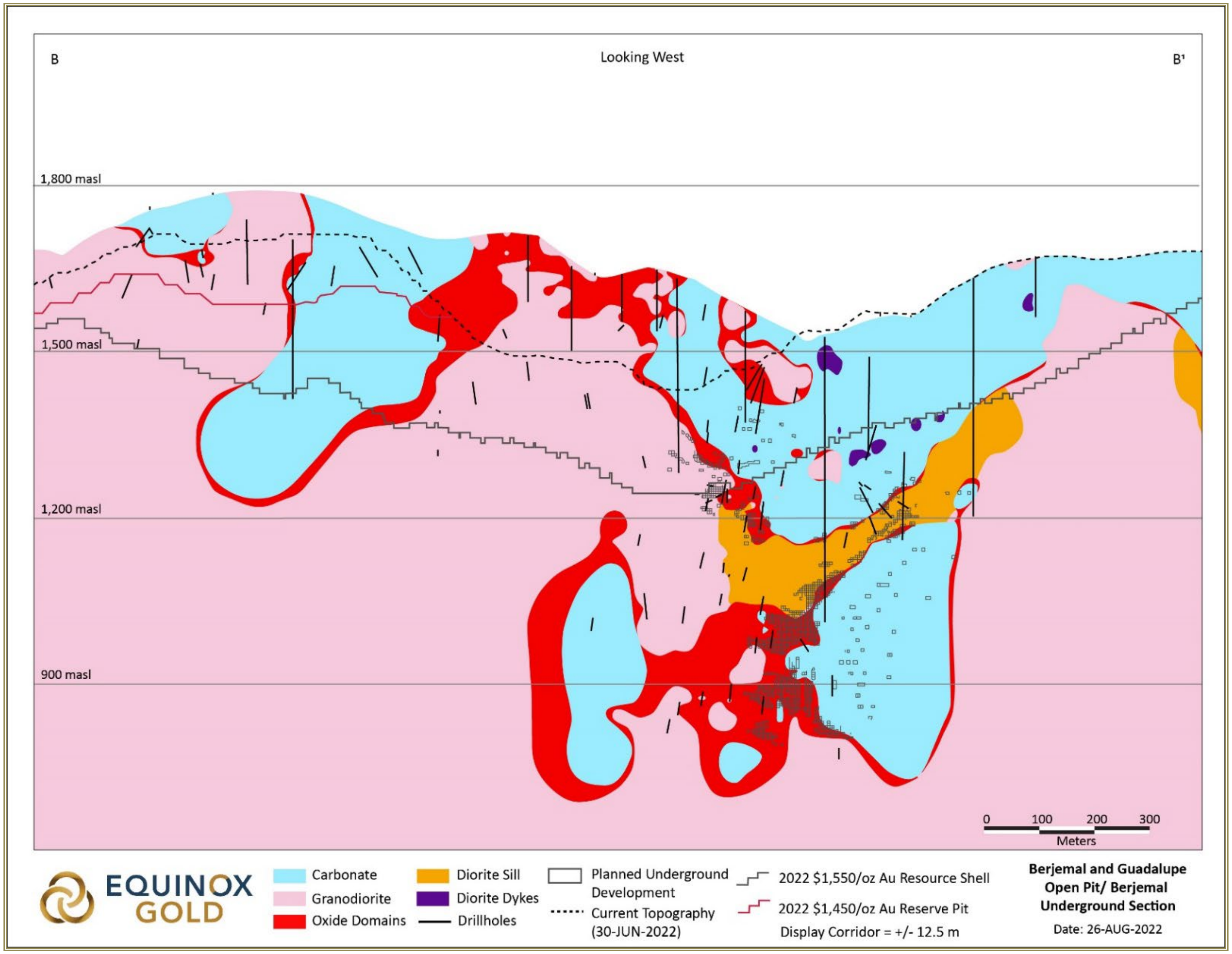
Source: Equinox Gold.

Figure 7-7: Bermejal–Guadalupe Geology and Deposit Location and Cross-Section Lines



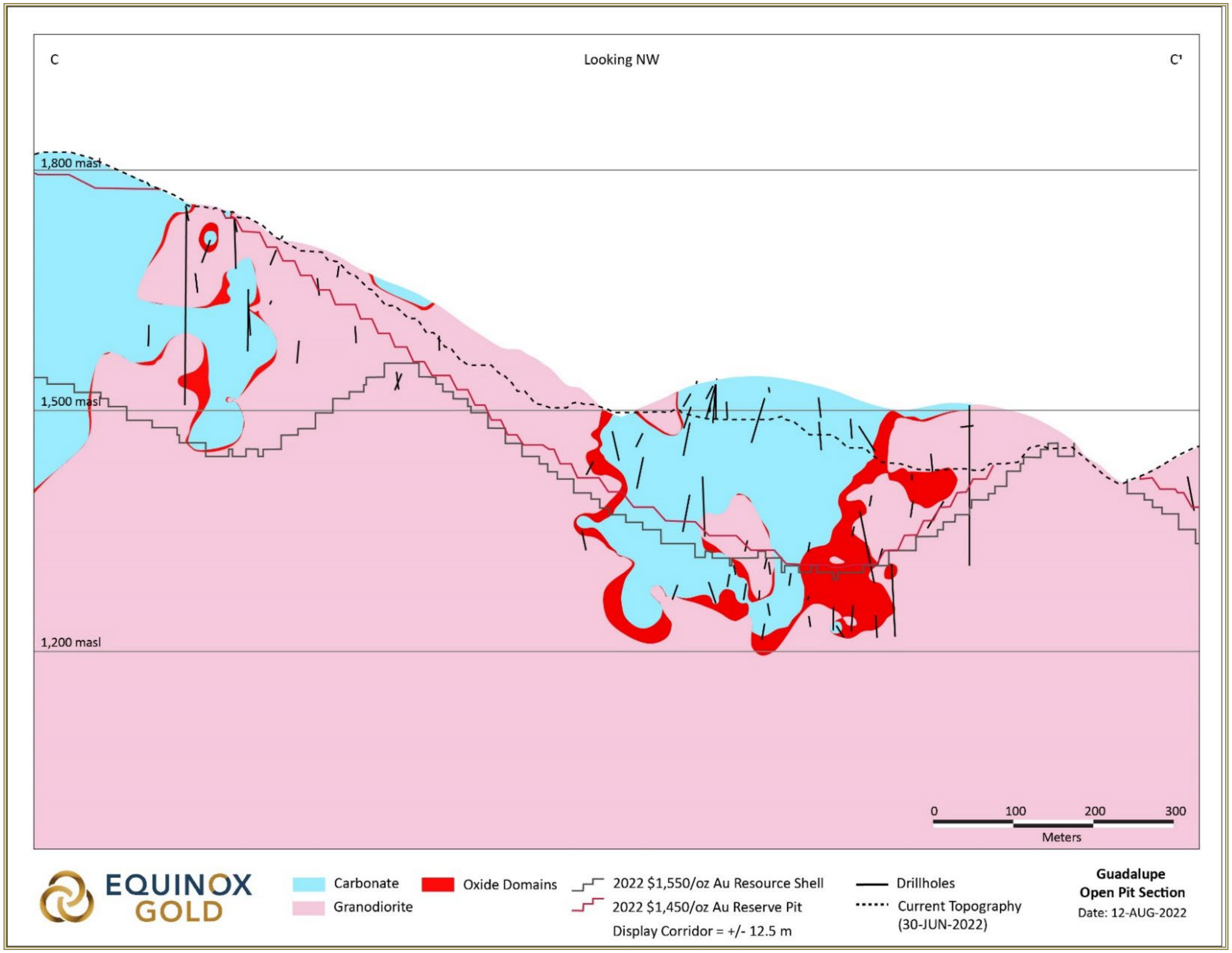
Source: Equinox Gold.

Figure 7-8: Geological Cross-Section, Bermejal–Guadalupe Open Pit



Source: Equinox Gold. Bermejal Underground Planned Development Shown.

Figure 7-9: Geological Cross-Section, Bermejal–Guadalupe Open Pit and Bermejal Underground



Source: Equinox Gold.

Figure 7-10: Geological Cross-Section, Bermejal–Guadalupe Open Pit Guadalupe Area

7.4.2 Alteration

The endoskarn alteration at Bermejal is characterized by pyroxene–garnet–orthoclase–scapolite (Levresse & Gonzalez-Partida, 2003). Exoskarn alteration includes pyroxene–magnetite–garnet–calcite as well as recrystallized limestone. Major pulses of gold and quartz mineralization occurred later, accompanied by strong retrograde alteration. The retrograde alteration stage destroyed the prograde calc–silicate mineral phases, resulting in chlorite, epidote, and other hydrosilicate minerals. Secondary enrichment of gold, and to a lesser extent copper, is common within the oxidation zone.

7.4.3 Mineralization—Bermejal

The major mineralized bodies at Bermejal consist of iron-oxide gold skarn with minor amounts of copper and silver at the intrusion–limestone contact. Disseminated endoskarn mineralization also occurs within the hydrothermally altered intrusive rocks.

Surface drilling defined several mineralized areas around the Bermejal–Guadalupe stock with dips ranging from 30° to vertical. Quartz, iron-oxides, high-grade gold-mineralized veins, stockwork, and disseminated mineralization are locally abundant. Both limestone and intrusive rocks host the quartz–iron-oxide and high-grade gold mineralization. Stockworks and disseminated mineralization are restricted to the intrusion.

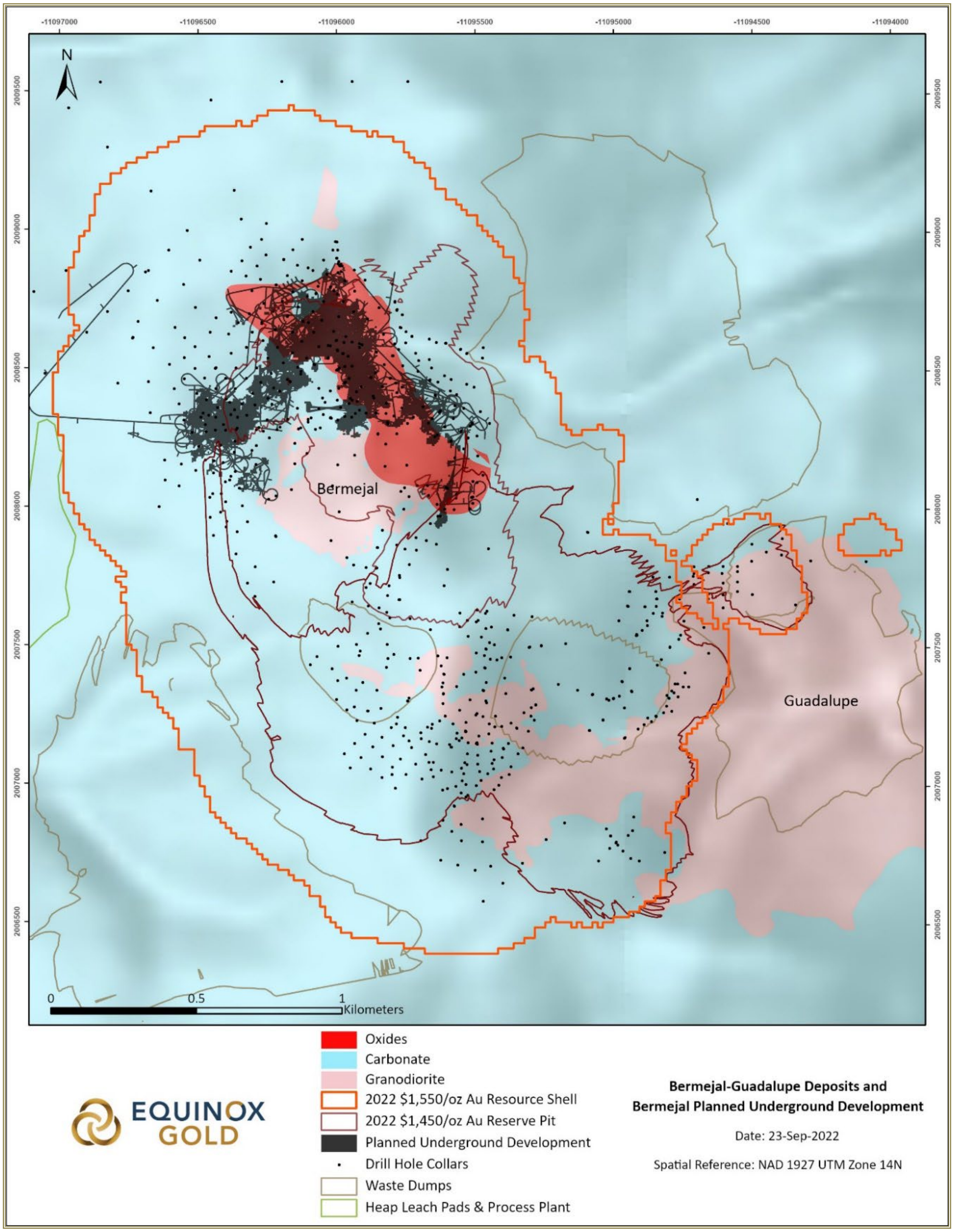
The Bermejal–Guadalupe stock has at least a 900 m vertical extent, and the contact is sub-vertical below the open pit. The Bermejal Underground mineralization extends below the open pit, runs dominantly northwest–southeast, parallel to and under the diorite sill, with additional mineralization running from southwest to northeast along the northern margin of the intrusion (Figure 7-11).

The mineralization at Bermejal underground (Figure 7-9 and Figure 7-11) is divided into five zones, including:

1. Upper intrusion—along the intrusion contact and above the junction of the diorite sill with the Bermejal intrusion
2. Upper sill contact—along the upper side of the diorite sill
3. Sill—mineralization within the diorite sill, including interior oxide zones sub-parallel to the sill margins
4. Lower sill contact—along the lower side of the diorite sill
5. Lower intrusion—along the intrusion contact and below the junction of the diorite sill and the Bermejal Intrusion.

The deposit is open laterally along the sill and down-dip along the granodiorite intrusion.

Bermejal mineralization is predominantly iron-oxide skarn. At depths of more than 250 m, oxidation is pervasive and continuous, while sulphides can occur locally and increase within the intrusion (endoskarn). Although most gold is associated with iron-oxide bodies at the intrusive–limestone contact, there is also gold contained within mineralized structures, quartz veins, and pyroxene-rich zones of both endoskarn and exoskarn.



Source: Equinox Gold.

Figure 7-11: Bermejal Underground Deposit in Plan View

The volume of limestone replacement (exoskarn) is minor compared to the volume of endoskarn. Thickness perpendicular to the intrusion contact of the combined endoskarn and exoskarn zones varies from 10 to 150 m, with an average thickness of 80 m. Mineralization extends continuously around the intrusion, with the deposit forming a dome-shaped shell around it. Important structural controls strike north–south and east–west, resulting in local bends and widening of the mineralized zones.

The mineralogy of the contact zones is predominantly iron-oxides, with gold occurring in carbonates and oxides, as well as sulphides, in association with lesser quantities of copper, lead, zinc, and arsenic. Primary minerals are hematite, limonite, magnetite, and jasper, with lesser amounts of pyrite, chalcopyrite, arsenopyrite, sphalerite, galena, pyrrhotite, and marcasite as accessory minerals. Gold occurs as elemental gold or argentian gold in economic concentrations of 0.3 g/t, and as high as 60 g/t. About 80% of the gold is associated with hematite, limonite, and magnetite; the remainder is within quartz, and associated with sulphides (pyrite, arsenopyrite, and chalcopyrite).

Sieve analysis of samples coupled with electron microscopy show that most gold is microscopic (92% is less than 100 µm; 8% is less than 150 µm). Quartz and calcite, with minor siderite and phlogopite (plus traces of fluorite and orthoclase), occur roughly contemporaneously with primary ore. Anhydrite and gypsum commonly fill vugs within the oxide ores. Secondary oxides are abundant and include plumbojarosite, hematite, goethite, limonite, arsenolite, azurite, malachite, chalcocite, and copper arsenides, with minor amounts of minium, cerussite, and zincite. Calcium and magnesium silicates are abundant and include chlorite, epidote, serpentine, tremolite, actinolite, and talc.

7.4.4 Mineralization—Guadalupe

The Guadalupe deposit is on the eastern extension of the Bermejal–Guadalupe stock, on the southeastern end of the Bermejal–Guadalupe resource pit (Figure 7-7; Figure 7-8). A portion of the mineralization in this area was mined on several levels as a small-scale underground mine between 1939 and 1956. Mineralization comprises iron-oxide gold skarn, with minor amounts of copper and silver developed along the intrusion–limestone contact. Mineralization also occurs within exoskarn and can occur as stockworks or disseminations within the hydrothermally altered intrusive rocks. Both limestones and intrusive rocks host the quartz–iron-oxide and high-grade gold veins.

Oxidation is pervasive and continuous along the granodiorite–carbonate contact down to elevations of 1,200 masl (up to 350 m from surface), while minor sulphides occur locally. Although most gold is associated with massive iron-oxide bodies at the granodiorite–carbonate contact, there is also gold within structures, quartz veins, and the pyroxene skarn zone. Potential exists for additional Mineral Resources at depth.

7.5 Other Prospects and Exploration Targets

Numerous other prospects and exploration targets were summarized in Stantec (2017) and reflect the exploration target areas developed by the exploration department for Los Filos Mine (SRK, 2019). Additional targets have been identified through ongoing exploration by Equinox Gold.

7.5.1 Bermejal West and East

Exploration potential remains on the western and eastern sides of the Bermejal–Guadalupe stock and in the San Pablo area. The corridor from the north end of the Bermejal–Guadalupe stock to southeast of the Guadalupe deposit is particularly prospective, including:

- Lateral and down-dip extensions of known deposits
- Potential for additional iron-oxide mineralization on intrusion contacts in proximity to mined areas
- In proximity to (and down-dip of) past-producing areas, such as at southeast of the Guadalupe area including Lucero, Bermejal East, and San Pablo.

7.5.2 San Pablo

Gold mineralization at San Pablo is related to the emplacement of a Tertiary granodioritic stock into limestones and shales of the Morelos and Mezcala Formations, which produced marble, skarns, and hornfels along the intrusion contacts. Mineralization consists of iron oxides with elevated gold values and has been exploited in the past-producing San Jeronimo mine. San Pablo is approximately 2 km southeast of the historical Guadalupe mine workings.

7.5.3 Los Filos Underground

Infill and step-out drilling at Los Filos Underground could further develop resources that are open both along strike and down-dip of the known deposits, to the east and west of the existing infrastructure. With considerable existing underground mine development and many areas around the Los Filos intrusions with sparse exploration information, there are numerous areas of the Los Filos underground deposits that remain prospective for future exploration.

7.5.4 Xochipala

DMSL previously entered into an exploration agreement for surface rights to allow drilling of the Xochipala prospect. A drill campaign consisting of 28 diamond drill holes (totalling 6,860 m) testing two potentially mineralized targets was completed over the two-year option agreement period of 2011 and 2012. Surface rights for the Xochipala prospect were renewed in 2019 and have been extended to 2039.

Results indicate that the targets are of limited lateral extension, shallow, and contained in a small roof pendant in the intrusive granodiorite. Drilling below the intrusion contact failed to intersect skarn development in the carbonate rocks. Gold values are mainly related to fractures and not to the contact between the intrusive and limestones. However, the prospect is considered to be open and warrants further exploration.

7.5.5 Bermejal Norte—Surface and Underground

Immediately north of the Bermejal deposit, the Bermejal–Guadalupe stock extends to surface as a small plug. Little exploration has been completed around this portion of the intrusion, and it is prospective for exploration on both the southern side of this plug (proximal to known mineralization at Bermejal Underground) as well as to the north at surface. Near-surface drill-hole intersections and surface mapping show anomalous gold mineralization as well as alteration consistent with the active gold system elsewhere on the property.

7.5.6 Guadalupe Underground

Several drill holes have high-grade gold intercepts at the contact between granodiorite and carbonate rocks that could potentially support underground mining below the existing planned open pit. Deep drilling in this area is sparse, but the limited existing data supports a geological model that extends prospective oxide domains to depths of at least 350 m below surface.

7.5.7 Minitas

The Minitas target is based on a mapped outcrop of an unnamed stock southeast of the Bermejal–Guadalupe stock. Limited surface sampling indicates the area is prospective for further exploration. Drill holes on this target are proposed for future drilling programs.

7.5.8 Bermejal and Los Filos Deep Targets

Both the Bermejal and Los Filos deposits are open at depth in numerous areas. There has been some evidence in drill holes of a second, deeper sill, but this has not been confirmed. Testing the concept of a deeper sill connecting the Bermejal–Guadalupe and Los Filos stocks is warranted given the significance of the known (shallow) sill as a conduit for mineralizing fluids.

8 DEPOSIT TYPES

Mineralization on the Los Filos Mine property is typical of intrusion-related gold–silver iron-oxide skarn deposits (Levresse & Gonzalez-Partida, 2003; Camprubi et al., 2017). Gold skarns typically form in orogenic belts at convergent plate margins and are related to plutonism associated with the development of oceanic island arcs or back arcs.

Skarns develop in sedimentary carbonate rocks, calcareous clastic rocks, volcaniclastic rocks, or (rarely) volcanic flows. They are commonly related to intrusion of the sediments by high- to intermediate-level stocks, sills, and dykes of gabbro, diorite, quartz diorite, or granodiorite composition. Skarns are classified as calcic or magnesian types; the calcic subtype is further subdivided into pyroxene, epidote, or garnet-rich members. These contrasting mineral assemblages reflect differences in the host rock lithologies, as well as the oxidation and sulphidation conditions in which the skarns developed, as follows:

- Pyroxene-rich gold skarns typically contain a sulphide mineral assemblage comprising native gold ± pyrrhotite ± arsenopyrite ± chalcopyrite ± tellurides ± bismuthinite ± cobaltite ± native bismuth ± pyrite ± sphalerite ± maldonite. They generally have a high sulphide content and high pyrrhotite:pyrite ratios. Mineral and metal zoning is common in the skarn envelope. Extensive exoskarns generally form with high pyroxene:garnet ratios. Prograde minerals include diopsidic to hedenbergitic clinopyroxene, K-feldspar, Fe-rich biotite, low-manganese grandite (grossular-andradite) garnet, wollastonite, and vesuvianite. Other less common minerals include rutile, axinite, and sphene. Late or retrograde minerals include epidote, chlorite, clinozoisite, vesuvianite, scapolite, tremolite-actinolite, sericite, and prehnite.
- Garnet-rich gold skarns can contain native gold ± chalcopyrite ± pyrite ± arsenopyrite ± sphalerite ± magnetite ± hematite ± pyrrhotite ± galena ± tellurides ± bismuthinite. They generally have a low-to-moderate sulphide content and low pyrrhotite:pyrite ratios. The garnet-rich gold skarns typically develop an extensive exoskarn, generally with low pyroxene:garnet ratios. Prograde minerals include low-manganese grandite garnet, K-feldspar, wollastonite, diopsidic clinopyroxene, epidote, vesuvianite, sphene, and apatite. Late or retrograde minerals include epidote, chlorite, clinozoisite, vesuvianite, tremolite-actinolite, sericite, dolomite, siderite, and prehnite.
- Epidote-rich gold skarns often contain native gold ± chalcopyrite ± pyrite ± arsenopyrite ± hematite ± magnetite ± pyrrhotite ± galena ± sphalerite ± tellurides. They generally have a moderate-to-high sulphide content with low pyrrhotite:pyrite ratios. Abundant epidote and lesser chlorite, tremolite-actinolite, quartz, K-feldspar, garnet, vesuvianite, biotite, clinopyroxene, and late carbonate form in the exoskarn.

Mineralization frequently displays strong stratigraphic and structural controls. Deposits can form along sill–dyke intersections, sill–fault contacts, bedding–fault intersections, fold axes, and permeable faults or tension zones. In the pyroxene-rich and epidote-rich types, mineralization commonly develops in the more distal portions of the alteration envelopes. In some districts, assemblages of reduced, Fe-rich intrusions can be spatially related to gold–skarn mineralization. Mineralization in the garnet-rich gold skarns tends to lie more proximal to the intrusions.

The deposits of the Los Filos Mine are considered examples of calcic-type skarns and display all three subtypes of skarns described above, depending on depth in the system and host rock (Garza et al., 1996). All the deposits are genetically related to porphyritic diorites, tonalites, and granodiorites, as well as the hydrothermal system that accompanied intrusive emplacement.

Mineralization is either hosted by, or spatially associated with, marble formed during contact metamorphism of the carbonates. Massive magnetite, hematite, goethite, and jasperoidal silica, with minor associated pyrite, pyrrhotite, chalcopyrite, and native gold, typically occur in the veins and metasomatic replacement bodies that developed at the contacts between the platform carbonates and intrusive rocks. Extensive, deep oxidation of the deposits (that occurred at the time of mineralization) has altered the mineralization into material that is amenable to cyanidation recovery techniques without the need of pre-treatment by roasting or other methods.

9 EXPLORATION

Equinox Gold and its precursor companies' exploration activities at the Los Filos Mine property include: geophysical surveys (including ground induced polarization, ground magnetic, and aeromagnetic surveys, as shown on Figure 9-1); regional and detailed mapping; rock, silt, and soil sampling, trenching; reverse-circulation (RC) and diamond drilling; petrography studies; mineralization characterization studies; metallurgical testing; and density measurements on all main lithological types.

Exploration and mining activities on the Los Filos property undertaken prior to 2019 are summarized in Table 6-1.

9.1 Coordinate Grids and Surveys

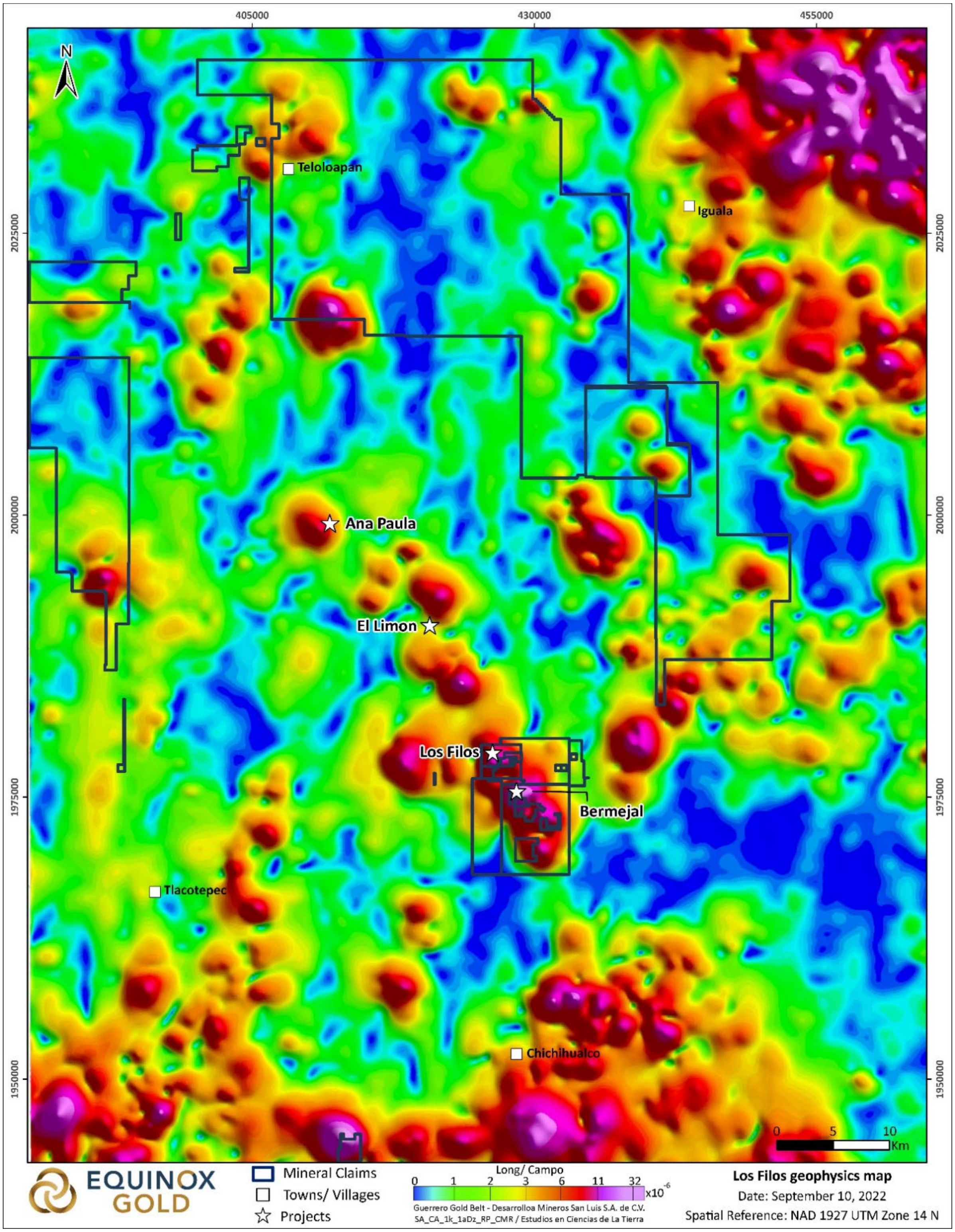
The coordinate system used for all data collection and surveying is the Universal Transverse Mercator (UTM) system (UTM Zone 14Q) and the North American Datum of 1927 (NAD27). Data are converted to NAD27 Zone 14 for use in the database.

Eagle Mapping group of Vancouver, British Columbia, Canada, originally developed the topographic base map for Minera Nuteck in 1999 using photogrammetric methods based on 1:16,000 scale aerial photography. Walcott and Associates undertook ground control surveys. The contours were spaced at two-metre intervals, and the base map scale was 1:2,000. In 2004, Eagle Mapping Group expanded the topographic coverage to support infrastructure planning. Control points included official stations of the National Geodesic Net determined by the National Institute of Statistics, Geography, and Information (INEGI).

Control points were distributed throughout the Los Filos Mine Complex property and were taken as the basis to establish the Project topography, and more specifically, drill-hole collar locations. Collars were surveyed in UTM coordinates using a Sokkia Set 610 total station with 6-second accuracy. Earlier collar surveys were validated by Luismin’s survey crew based on previous triangulation survey landmarks developed by contractor Mr. Juan Herrera, and double-checked with landmarks from the survey developed by Eagle Mapping Group.

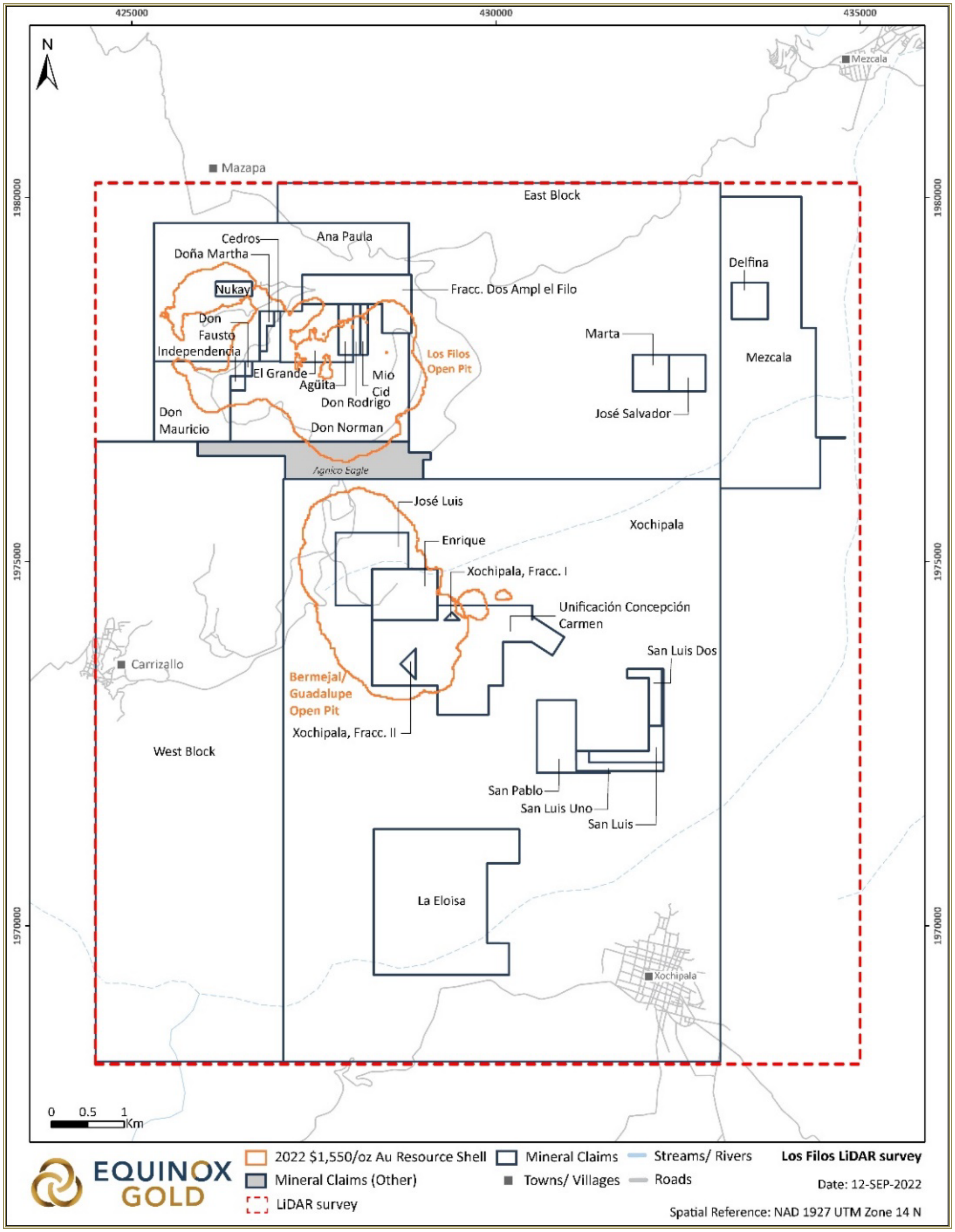
9.2 LiDAR Data and Aerial Photography

In March 2022, Equinox Gold contracted Eagle Mapping group of Vancouver to collect LiDAR and aerial photography surveys of the Los Filos property at a minimum density of 8 ppm with LiDAR accuracies of 15 cm (vertical) and 30 cm (horizontal). Aerial photography was orthorectified to the LiDAR model producing an orthophoto with 15 cm pixel resolution, a digital elevation model (DEM), a digital surface model (DSM), and contour data. The area covered by the surveys includes all concessions of the Los Filos property (Figure 9-2).



Source: Equinox Gold.

Figure 9-1: Airborne Magnetics Geophysical Survey



Source: Equinox Gold.

Figure 9-2: LiDAR Survey, Los Filos Property

9.3 Geologic Mapping

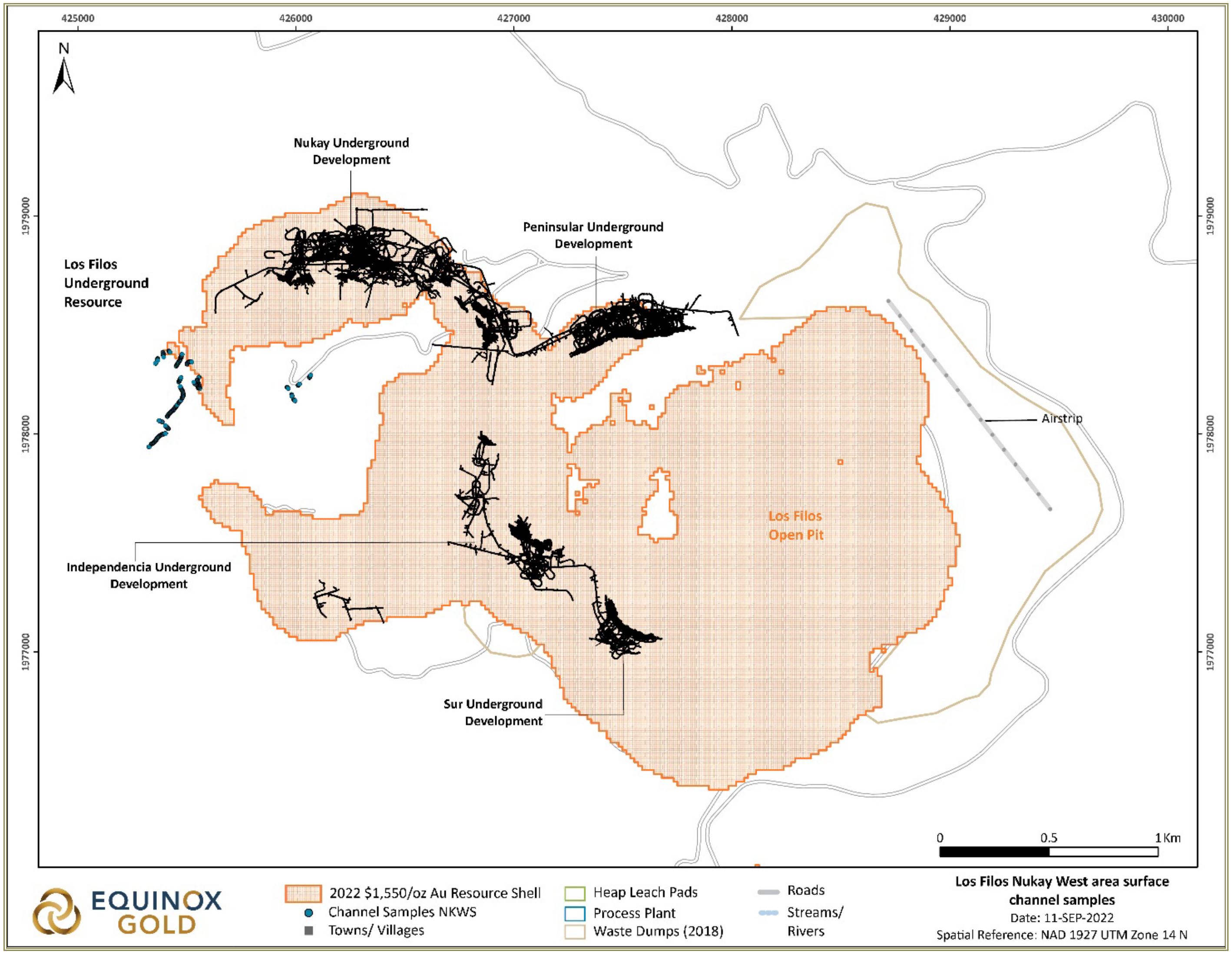
In the early 1990s Teck completed regional and detailed geological mapping in several phases. Map scales varied from regional (1:25,000) to prospect scale (1:1,000). Map results were used to identify areas of quartz veining, alteration, silicification, and sulphide-bearing outcrop that warranted additional work.

At present, the open pits are mapped, as operations allow, at a scale of 1:1,000. Underground mapping is typically performed at a 1:250 scale.

9.4 Geochemical Sampling

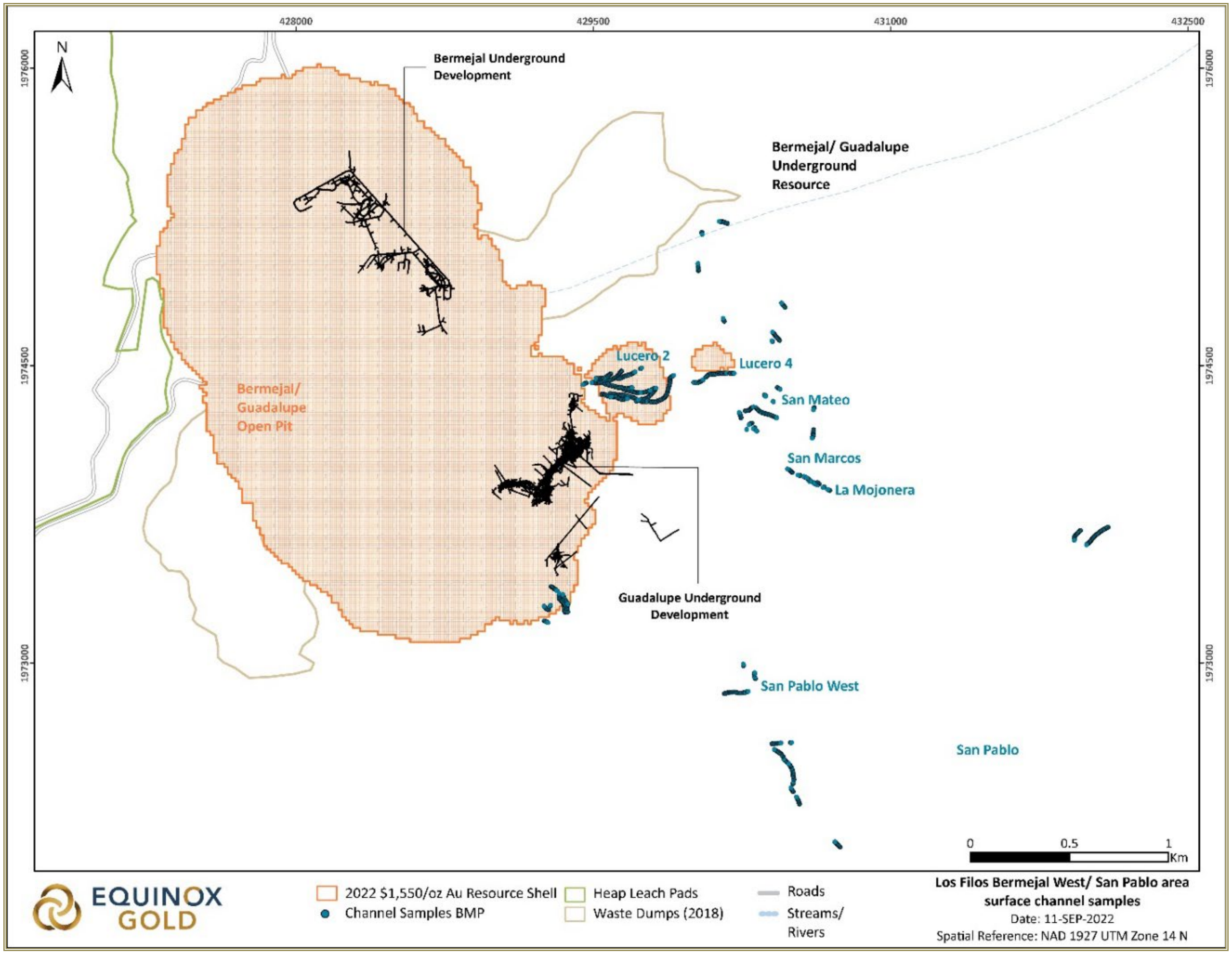
Soil, channel, pit, adit, grab, and rock sampling have been used to evaluate mineralization potential and generate targets for RC and core drilling. Prior to 2017, 6,906 surface channel samples were collected. Surface channel samples are not used in resource estimation but are used to define known deposits on surface and to evaluate the exploration of potential of areas outside of areas with existing data.

Since 2019, Equinox Gold has been collecting surface channel samples from the Nukay southwest area (Figure 9-3) and numerous areas southeast of the Bermejal–Guadalupe pit, including the Lucero, El Carmen, San Mateo, San Marcos, and San Pablo areas (Figure 9-4). A total of 2,148 channel samples was collected southwest of the Bermejal–Guadalupe pit and 381 samples from the Nukay southwest area. Results from these channel samples confirm the location of known deposits, with gold values of most samples greater than detection limit, and 7% to 8% of values greater than 0.5 g/t.



Source: Equinox Gold.

Figure 9-3: Surface Channel Samples from Nukay Southwest Area



Source: Equinox Gold.

Figure 9-4: Surface Channel Samples from Deposits Southeast of the Bermejal–Guadalupe Pit

9.5 Ground Geophysics

In 2007, Desarrollos Mineros San Luis, S.A. de C.V., completed two ground magnetic geophysical surveys over the Los Filos—Nukay zone and the Minitas area (Stantec, 2017). The surveys investigated the possibility of mineralization between the two main sources of magnetic anomalies. The study area of 847 by 893 m was selected due to a series of small sources of magnetism. Both surveys used 100 m station spacing, with readings every 30 m, and were positioned in the field using a GPS. The ground geophysical surveys were used to vector into mineralization and generate targets for drill programs. Magnetic surveys highlight the intrusive bodies and the contact metamorphism that occurs at the intrusion contact, which can be a host for gold skarn mineralization.

9.6 Airborne Geophysics

Goldcorp completed an airborne magnetics geophysical survey in 2016 over the Los Filos Mine and the regional exploration properties (Figure 9-1). The survey highlights the Tertiary intrusive rocks relative to the carbonate rocks and demonstrates the association of mineralization with along these contacts in the Guerrero Gold Belt.

9.7 Petrology, Mineralogy, and Research Studies

Age dating, petrographic studies, mineralogical studies, aerial photography, and QuickBird imagery have been completed since 2009 (SRK, 2019).

Age-dating studies were performed at the University of Arizona on selected rock samples from Nukay, Los Filos, and Bermejal stocks. Resulting age dates show a 63 to 68 Ma range of dates for the samples collected from Nukay, Los Filos, and Bermejal and are similar to other deposits in the Guerrero Gold Belt (Valencia and Ruiz, 2008).

Over a four-year period, Dr. Sidney A. Williams with Paradex Consulting completed petrographic studies in which 491 outcrop samples were examined. Dr. Williams submitted individual sample reports and responses to questions for each batch of samples, including petrographic descriptions, relevant photomicrographs, and in some cases microprobe analyses.

Additional petrographic studies were performed during 2010 to establish vein paragenesis (Universidad Michoacana de San Nicolás de Hidalgo, 2010). In all, 23 samples were sent for petrographic and mineralogical study in 2012 (Universidad Michoacana de San Nicolás de Hidalgo, 2012).

University of Arizona (1995) X-ray studies indicated that the primary clay mineral is smectite, with associated illite and montmorillonite, and kaolinite in strongly oxidized samples.

Data from these specialist studies were used to refine geological and mineralogical descriptions and interpretations.

The aerial photography and QuickBird images were used to help locate areas of alteration and exploration potential.

9.8 Geotechnical and Hydrological Studies

Teck completed initial geotechnical studies during the 1990s, with further studies completed in 2004 in support of feasibility studies for the Los Filos Mine Complex (Golder Associates, 2004). The 2004 geotechnical study (for Wheaton River Minerals) included core logging, desktop, and site assessments of subsurface conditions in the immediate vicinity of the mineralization at Los Filos and Bermejal. Hydrological studies were completed in the same period to provide baseline data. Work included geotechnical assessment of infrastructure locations, such as the proposed plant, waste dump, and tailings sites; groundwater exploration; hydrogeological studies; drainage assessments; and water and contaminant studies.

The geotechnical models are based on drill data, rock mass classification, and stability modelling carried out during the feasibility studies.

Specialized geotechnical and hydrological staff are employed at the Los Filos Mine to monitor the mining areas on a day-to-day basis. In 2016 and 2017 (under Teck and then Leagold) Pakalnis completed geotechnical reviews for underground support and investigation of underhand cut-and-fill mining methods. External consulting firms provide additional support on an as-needed basis.

Call and Nicholas Inc. (CNI) of Tucson, Arizona, was contracted to perform geotechnical studies for the ground support requirements for the exploration portal and decline that is currently being developed as part of the Bermejal Underground resource, and to provide geotechnical data in support of the mining method selection for the Bermejal Underground engineering studies.

Additional information on the geotechnical and hydrogeological setting of the mine is included in Sections 16 and 18, respectively.

10 DRILLING

Between 2003 and June 30, 2022, a total of 939,782 m of diamond and reverse circulation (RC) drilling has been completed on the Los Filos Mine property, including both underground and surface drilling. This drilling includes surface programs at Los Filos, Bermejal, Bermejal Underground, Guadalupe, San Pablo, and Xochipala areas and the underground drilling programs at Los Filos and Bermejal underground. Figure 10-1 and Figure 10-2 are collar location maps for the drill holes completed on the property, highlighting holes completed since the last Los Filos Technical report in 2019. Overall drilling procedures remain the same as reported in SRK (2019).

Table 10-1 summarizes all drill holes completed on the property since 2003. Table 10-2 summarizes the drilling meterage by target area for the holes completed since the previous technical report in 2019 (including all drilling from 2019).

Table 10-1: Drill Hole Summary, Los Filos Mine, 2003–2022 (Data Cut-off June 30, 2022)

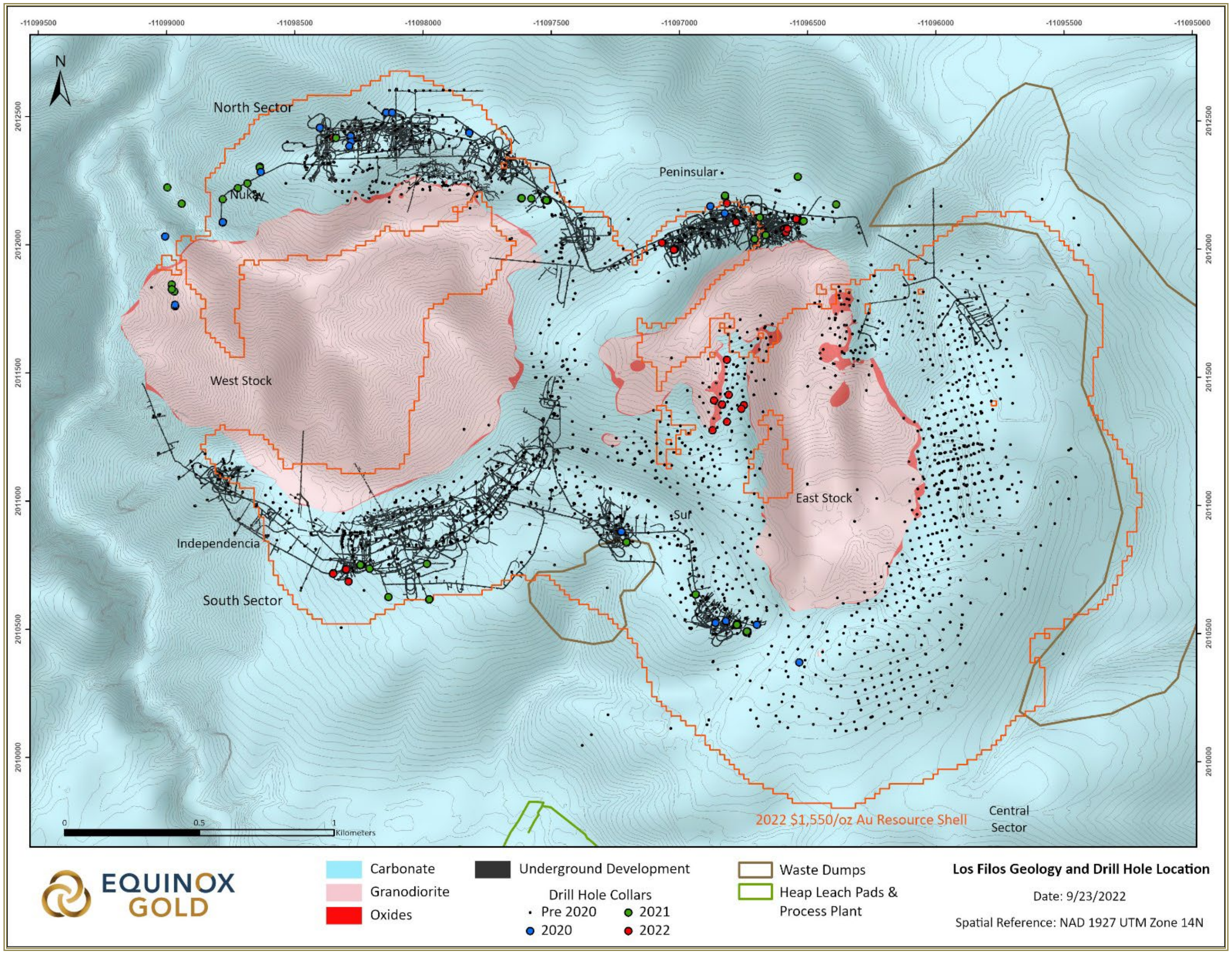
Year	Property Operator	RC		RC-Core (Combined)		Core		Total	
		No. of Holes	Metres	No. of Holes	Metres	No. of Holes	Metres	No. of Holes	Metres
2003	Wheaton River Minerals	927	180,394	0	0	50	10,386	977	190,780
2004	Wheaton River Minerals	237	44,421	0	0	72	17,171	309	61,592
2005	Wheaton River Minerals	0	0	0	0	170	46,195	170	46,195
2006	Goldcorp	0	0	0	0	139	25,718	139	25,718
2007	Goldcorp	0	0	0	0	161	20,187	161	20,187
2008	Goldcorp	54	6,006	0	0	88	20,687	142	26,693
2009	Goldcorp	0	0	0	0	238	34,762	238	34,762
2010	Goldcorp	0	0	0	0	205	44,416	205	44,416
2011	Goldcorp	0	0	0	0	200	51,199	200	51,199
2012	Goldcorp	0	0	0	0	175	51,146	175	51,146
2013	Goldcorp	0	0	0	0	133	37,162	133	37,162
2014	Goldcorp	0	0	0	0	162	48,360	162	48,360
2015	Goldcorp	37	5,517	7	1,841	174	40,138	218	47,496
2016	Goldcorp	0	0	0	0	237	50,107	237	50,107
2017	Leagold	0	0	31	13,992	239	57,921	270	71,913
2018	Leagold	77	3,485	0	0	204	31,067	281	34,551
2019	Leagold	29	5,294	0	0	134	27,280	163	32,574
2020	Equinox Gold	6	1,361	0	0	55	9,977	61	11,337
2021	Equinox Gold	92	13,851	3	589	106	19,008	201	33,447
2022	Equinox Gold	50	10,650	2	224	85	9,272	137	20,146
Total		**1,509**	**270,978**	**43**	**16,646**	**3,027**	**652,159**	**4,579**	**939,782**

Note: Includes underground and surface drilling completed on the Los Filos property as well as the Xochipala prospect.

Table 10-2: Drill Hole Meterage by Target Area, Los Filos Mine, 2019–2022 (Data Cut-off June 30, 2022)

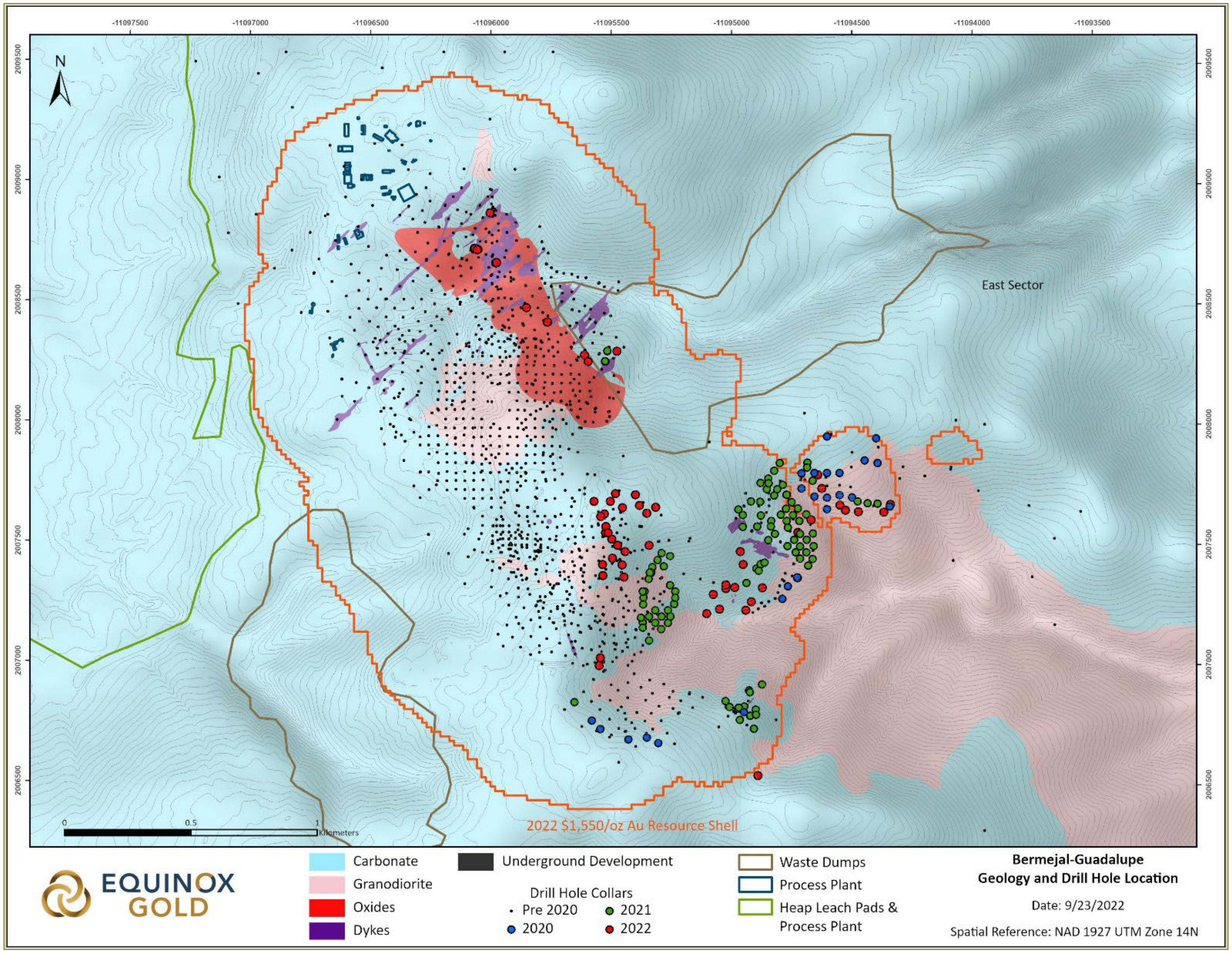
Year	Target Area	RC Drilled (m)	RC/Core Drilled (m)	Core Drilled (m)
2019	Bermejal Underground			2,018
	Guadalupe Open Pit		5,294	10,752
	Bermejal Open Pit			968
	Los Filos Open Pit			4,148
	Los Filos Underground			9,395
2020	Guadalupe Open Pit	1,361		4,008
	Los Filos Underground			5,968
2021	Bermejal Underground			1,079
	Guadalupe Open Pit	13,851	589	1,733
	Los Filos Underground			16,196
2022	Bermejal Underground			4,298
	Guadalupe Open Pit	10,463		702
	Los Filos Open Pit	188	224	191
	Los Filos Underground			4,082

Figure 10-1 shows the drilling completed on the Los Filos deposit and Figure 10-2 shows drilling completed on the Bermejal-Guadalupe deposit, both highlighting drilling completed since 2019.



Source: Equinox Gold.

Figure 10-1: Los Filos Geology and Drill Hole Locations



Source: Equinox Gold.

Figure 10-2: Bermejal-Guadalupe Geology and Drill Hole Locations

10.1 Drilling Contractors and Equipment

From 1991 to 2000 over 75,000 m were drilled in more than 600 holes by Peñoles and Nuteck on the Los Filos and Bermejal areas (SRK, 2019; Table 6-1). The majority of the drilling was RC at Los Filos and after 1995 was performed by Layne de Mexico (Layne) using truck-mounted drills. The main phase of core drilling was completed in 1996 and was carried out by Britton Hermanos de Mexico (Britton Brothers).

Details of the drilling contractors for 2003 to December 31, 2019 are not complete but a summary is provided in Table 10-3. Drill contractors for the 2005 to 2009 drill programs were Major Drilling de Mexico, S.A. de C.V. (Major) and Construcción, Arrendamiento de Maquinaria y Mineria S.A. de C.V. (CAMMSA). Since the last technical report (SRK, 2019), drill contractors have included Servicios Drilling, Energold, and Globexplore.

Table 10-3 provides a summary of drilling contractors and rigs used on the Los Filos property since 2003.

Table 10-3: Summary of Contractors and Drill Rigs from 2003–2022 (June 30, 2022 Cut-off Date)

Year	Contractor	RC Rigs	Core Rigs
2003	No details	?	?
2004	No details	?	?
2005	Major Drilling de México	?	UDR200
2005–2009	Major Drilling de México	URD200	LY38, UDR200
2005–2009	CAMMSA	-	LY38
2006	Canrock Drilling	-	LY38
2007–2008	Advaiser Drilling	-	LF90
2007	Servicios Interlab de México	-	LF90
2007–2012	Servicios Drilling	-	LY44, LF90
2008	Layne de México	ITRH100	-
2011–2012	Maza Drilling	-	Val d'Or
2011–2012	Servicios Interlab de México	-	LY44
2012	Energold	-	RIGG722, RIGG737
2015	Servicios Drilling	Prospector	DE710, LM75, LF90
2016	Servicios Drilling	Prospector	DE710, TITAN, LF90
2016	BD Drilling	-	LF90, HYDX
2016	Energold	-	RIGG722, RIGG737
2017	Servicios Drilling	Prospector	DE-710-1,DE-710-2,TITAN,HYDX-06,LF-90-1
2017	Energold	-	RIGG722, RIGG737, RIG-739, RIG-402, RIG-403, RIG-406,RIG-601
2017	BD Drilling	-	LF-90-18, HYDX-22, HYDX-23,HYDX-24
2017	Major Drilling de México	SCHRAMM 121	MAJOR-64, MAJOR-67, MAJOR-95
2018	Servicios Drilling	Prospector	DE-710-1,TITAN,LF-90-1
2018	BD Drilling	-	LF-90-18, HYDX-22
2018	Energold	-	RIG-404, RIG-405
2018	Major Drilling de México	-	MAJOR-64, MAJOR-67, MAJOR-95

Year	Contractor	RC Rigs	Core Rigs
2019	Servicios Drilling		DE-710, TITAN-01, TITAN-02, LM-75, N-300, LM-90, DISCOVERY-I, DISCOVERY II
2019	Energold	-	RIGG-404, RIGG-405 RIGG-405
2019	Globexplore	NOVAMAC-22	RIGG MP27, RIGG MP32,
2020	Servicios Drilling	-	TITAN-02, LM75,
2020	Energold	-	RIGG-404, RIGG-405
2020	Globexplore	NOVAMAC-22	RIGG MP27, RIGG MP32,
2021	Servicios Drilling	Prospector	TITAN-02, LM-75, LM-75 II
2021	Energold		RIGG-403, RIGG-404, RIGG-405, RIGG-406, RIGG-601, MPOWER-745
2021	Globexplore	NOVAMAC-22	SINEX 49
2022	Servicios Drilling	Prospector	TITAN-02, LM75,LM75 II, N300
2022	Energold		RIGG-405
2022	Globexplore	NOVAMAC-22	

10.2 Drilling Methods

10.2.1 Summary

Due to the soft and fine-grained nature of the oxide mineralization, core drilling with wireline rigs using diamond-faced bits is the principal drilling method at the Los Filos Mine. Core recoveries are recorded for each interval and the average recovery for the oxide mineralization typically in the range of 80% to 85% but locally above 90% for 2020–2022 drilling. Table 10-4 through Table 10-7 summarize the recoveries by rock type of all major drilling programs completed on the Los Filos property since the previous technical report, covering the years 2020, 2021, and 2022 (data cut-off June 30, 2022).

Table 10-4 summarizes core recovery from 2020 to June 30, 2022 for BOP–GOP drilling programs. The Qualified Person considers the core recoveries to be acceptable for the nature of the material being drilled and the drillholes to be suitable for use in Mineral Resource estimation.

Table 10-4: Core Recovery for the 2020–2022 BOP–GOP Drilling Programs (June 30, 2022 Cut-Off)

Year	No. Holes	Rock Type	Drilled (m)	Recovered (m)	% Recovery
2020	11	Overburden	51.0	21.2	41.6
	15	Carbonate	981.0	871.3	88.8
	19	Granodiorite	2,805.0	2,593.9	92.5
	14	Oxide	165.1	149.3	90.5
	1	Sulphide	6.0	6.0	99.3
2021	2	Overburden	18.0	9.0	50.2
	8	Carbonate	523.9	420.2	80.2
	8	Granodiorite	1,106.9	892.7	80.6
	6	Oxide	66.9	55.7	83.2
	1	Sulphide	3.0	3.0	100.0
	4	Void	13.9	0	0
2022	0	Overburden	0	0	0
	2	Carbonate	263.0	243.6	92.6
	2	Granodiorite	369.0	353.1	95.7
	2	Oxide	70.0	65.2	93.1

Table 10-5 summarizes core recovery from 2020 to June 30, 2022 for BUG drilling programs.

Table 10-5: Core Recovery for the 2020–2022 BUG Drilling Programs (June 30, 2022 Cut-Off)

Year	No. Holes	Rock Type	Drilled (m)	Recovered (m)	% Recovery
2021	0	Overburden	0	0	0
	7	Carbonate	671.8	600.2	89.3
	6	Granodiorite	109.8	102.7	93.6
	4	Diorite	62.6	56.6	90.4
	7	Oxide	234.9	215.0	91.6
2022	0	Overburden	0	0	0
	37	Carbonate	1,936.5	1,580.5	81.6
	11	Granodiorite	123.3	104.5	84.7
	25	Oxide	263.2	210.6	80.0
	38	Diorite	1,961.2	1,576.3	80.4
	2	Sulphide	9.0	7.8	87.1
	1	Void	4.5	0	0

Table 10-6 summarizes core recovery from 2020 to June 30, 2022 for LFOP drilling programs.

Table 10-6: Core Recovery for the 2020–2022 LFOP Drilling Programs (June 30, 2022 Cut-Off)

Year	No. Holes	Rock Type	Drilled (m)	Recovered (m)	% Recovery
2022	2	Overburden	42.0	14.8	35.3
	1	Carbonate	3.0	2.2	73.3
	3	Granodiorite	121.5	103.2	84.9
	2	Oxide	24.0	19.5	81.4

Table 10-7 summarizes core recovery from 2020 to June 30, 2022 for LFUG drilling programs.

Table 10-7: Core Recovery for the 2020–2022 LFUG Drilling Programs (June 30, 2022 Cut-Off)

Year	No. Holes	Rock Type	Drilled (m)	Recovered (m)	% Recovery
2020	0	Overburden	0	0	0
	36	Carbonate	4,314.4	3,873.0	89.8
	0	Diorite	0	0	0
	35	Granodiorite	1,263.2	1,156.1	91.5
	26	Oxide	391.3	350.5	89.6
2021	6	Overburden	21.8	14.9	68.5
	90	Carbonate	10,506.3	9,213.7	87.7
	86	Granodiorite	4,401.4	3,978.5	90.4
	1	Diorite	3.0	3.0	98.7
	77	Oxide	1,229.1	1,027.4	83.6
	3	Sulphide	18.3	17.6	96.2
	4	Void	16.4	0	0
2022	0	Overburden	0	0	0
	40	Carbonate	2,908.5	2,279.8	78.4
	40	Granodiorite	824.9	682.6	82.7
	33	Oxide	348.8	280.8	80.5

10.2.2 Core Drilling

Surface core drilling uses HQ size core (63.5 mm diameter), which is reduced to NQ size core (47.6 mm) where ground conditions warrant. Metallurgical holes were drilled using PQ size core (85 mm), which is reduced to HQ size core where necessary. Underground core drilling typically uses NQ (47.6 mm) or NTW (57.1 mm) but can be HQ size, depending on the rig being used.

The core was transferred to corrugated plastic core boxes, marked with “up” and “down” signs on the edges of the boxes using permanent markers. The drill hole number, box number, and starting depth for the box was written before its use, and the final depth of the core in the box was recorded upon completion. All the information was marked with indelible ink on the front side of the box and on the cover.

Any break in the core during removal from the core barrel was marked with a “colour line.” When breakage of the core was necessary to fill the box, use of an edged tool and accurate measurement of the pieces of core to fill the remainder of the box was common practice. The end of every run was marked with a wooden block that was marked with the depth of the end of the run.

A fully equipped logging and sampling core facility and warehouse is present on the mine property, and all core is processed and stored on site. Personnel from the drilling company transport the core boxes to the core facility.

Core handling logs were completed that included details for all persons involved in any step during the logging and sampling procedures.

10.2.3 RC Drilling

For RC drilling, experimentation with various drilling techniques during the exploration programs led to the development of a drilling protocol to optimize sample quality. The rods used are 3 m or 6 m long, and samples of the drill cuttings are collected at 1.5 m intervals. Core drilling penetration rates averaged 30 to 60 m/d per drill, with an average hole depth of approximately 185 m.

Groundwater is generally absent in the limestone, but minor water flow can be present in the adjacent intrusive rocks. Typically, water is injected to improve drilling rates and sample recovery.

Some RC drilling was performed as pre-collars for core drill holes, to reduce costs. The pre-collar was drilled in barren limestone and therefore no material was collected for analyses. The RC drilling was conducted using downhole hammers and tri-cone bits, both dry and with water injection.

10.2.4 Surface Drilling

Intersection spacing across the deposits that were drilled from surface is approximately 35 x 35 m in areas with close-spaced drilling and widens to about 70 x 70 m in the areas that are less well drilled. Drill spacing is wider again (i.e., 100 x 100 m) in the areas outside the conceptual pit outlines that are used to constrain Mineral Resources.

Drill hole azimuths are dependent on the orientation of the deposit being drilled. Dips range from 65° to 90° and are typically 90° for drilling related to the open pit mineralization.

10.2.5 Underground Drilling

Across the deposits that were drilled in the underground areas, intersection spacing is approximately 25 x 50 m and tightened to a final spacing of 25 x 25 m underground drilling. In the South sector of the Los Filos Underground Mine, the drill azimuth is usually at 180°, whereas in the North Sector, azimuths are commonly 0°/360°. The dip of drill holes varies depending on the target mineralization and relative location of the drill hole station; the dips range from 0° to -90°. For the Bermejal Underground deposit, the drill azimuth varies due to the arcuate shape of the strike of the deposit, while drill hole dips vary in order to intersect the mineralization as close to perpendicular as possible.

10.3 Collar Surveys

Upon completion of drill holes, collars are marked and are surveyed by the mine survey department using a differential GPS. Each hole collar is marked in the field with a length of drill pipe and cemented in place.

Current drill collars are based on a topographic survey in UTM coordinates using a Sokkia Set 610 total station with 6-second accuracy. Earlier collar surveys were validated by Los Filos survey crews based on previous triangulation survey landmarks developed by contractor Mr. Juan Herrera and double-checked with landmarks from the survey developed by Eagle Mapping Group (SRK, 2019).

Three exploration grids initially covered the Los Filos deposit: the Mexican State Grid (UTM), the Nuteck grid, and the Los Filos grid. The Nuteck grid orientation was coincident with the UTM grid, and all Nuteck drill hole survey coordinates were initially recorded using the local Nuteck grid system. The Los Filos grid is rotated 15° to the west of the Nuteck grid.

In 2001, Teck re-surveyed all drill hole coordinates from the 2000 drill campaign. Based on this work, a global modification of 60.5 m to all drill hole elevations was made.

All collar surveys in the drill hole database are based on UTM coordinates.

10.4 Downhole Surveys

All core holes are routinely surveyed downhole at 50 m intervals using a REFLEX EZ SHOT instrument that records depth, pullback, raw azimuth (from which is deducted the current magnetic declination to give a true azimuth), inclination, roll, magnetic field, temperature in Celsius, date and time measured. All of this information is captured in the core logging database.

Pre-2003 holes were surveyed for hole inclination using the hydrofluoric acid test-tube etch method. Angle holes were surveyed every 66 m, and vertical holes were tested once at the end of hole. Limited downhole surveying of previous drill holes was undertaken with a computerized gyroscopic probe at intervals of 15 m. However, none of the core holes remained open, and only 67 RC rotary holes could be partially surveyed due to closure and collapse.

10.5 Geological Logging

Logging of core and of RC drill cuttings has followed standard logging procedures since project inception. Initial logging used paper forms, with data hand-entered into a database from the logging form. Current logs are completed using computer tablets, with data uploaded directly into an acQuire™ database through a Wi-Fi connection in the core facility.

Logs currently record: lithologies; skarn type; fracture frequency and orientation; oxidation; sulphide mineralization type and intensity; and alteration type and intensity. Until 2001, the logging descriptions were based on alteration terminology, which led to difficulties with actual lithological identification. In 2001, Minera Nuteck completed a thorough field-based geological reinterpretation, which led to re-logging of all available drill core using lithologies, with alteration as a descriptor. Los Filos site personnel have maintained the logging scheme so that a consistent set of primary lithological records exists for the Los Filos Mine property.

Rock quality designations (RQD) and recoveries are recorded as part of the geotechnical logging. RQD measurements are taken by measuring the sections of core greater than 10 cm in length that were not fractured, over lengths of 5 m. Rock hardness measurements are recorded on a scale of 0 to 5, with 0 being very soft and 5 being very hard. All the discontinuities are classified by type and thickness, and discontinuity orientations were recorded as 0° to 30°, 30° to 60°, and 60° to 90°.

For the 2017 Bermejal Underground geotechnical core logging program, the Q-system for rock mass classification was also used, with joint set, roughness, and alteration values.

Core is photographed and video recorded from collar to end of hole; these digital files are stored on hard disc at site and have been uploaded to Imago™ software for seamless linking with Leapfrog Geo™ software.

10.6 Conclusions

In the opinion of the Qualified Person, the quantity and quality of the lithological, geotechnical, collar survey, and downhole survey data collected in the exploration and infill drill programs are sufficient to support Mineral Resource and Mineral Reserve estimation as follows:

- Drilling spacing, along with ongoing infill programs, is sufficient for the type of deposit and intended mining methods.
- Core logging meets industry standards for gold and silver exploration.
- Collar surveys since 2003 have been performed using industry-standard methods.
- Downhole surveys performed after 2003 were performed using industry-standard instrumentation and methods.
- Recovery data from core drilling programs is acceptable.
- Drilling is normally perpendicular to the strike of the mineralization. Depending on the dip of the drill hole and the orientation of the mineralization, drill intercept widths are corrected to true widths when the drilling is not perpendicular to the mineral deposit.
- Areas drilled pre-2003 have sufficient coverage with newer drilling or have been mined out.

11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

Los Filos mine exploration staff have conducted sample collection from 2003 to present. Minera Nukay, Minera Nuteck, and Luismin employees conducted sampling programs prior to 2003.

Los Filos exploration department personnel are responsible for the following (Figure 11-1):

- Geological and geotechnical logging
- Core photography
- Density measurements
- Sample selection and numbering
- Core splitting
- Sample preparation for shipping and submission to the external laboratory
- Sample and data assay incorporation into the acQuire™ drill-hole database (including data validation)
- Sample storage (after return of pulp and reject materials from external laboratories)
- Sample security prior to shipping and after return of samples to site.

All drill core samples for exploration and Mineral Resource estimation are sent to an external laboratory for sample preparation (currently ALS Chemex, in Guadalajara, Mexico) and assaying (ALS Chemex, in Vancouver, B.C., Canada).

Los Filos Open Pit mine staff are responsible for grade control sampling and assaying of blast holes. Los Filos Underground mine geology staff are responsible for face sampling and muck sampling in the underground mine. These samples are prepared and analyzed in the on-site laboratory. These data are not used for Mineral Resource estimation (with the exception of the LFUG samples that are used with short ranges in the first estimation pass) and are not described further in this section of the Technical Report.

11.1 Sampling Methods

11.1.1 RC Sampling

No RC samples were collected from drilling programs in 2017. From 2018 to the present, RC samples have been collected from drilling programs in the Bermejal-Guadalupe Open Pit and Los Filos Open Pit.

Drill cuttings from previous RC drilling at Los Filos were sampled at intervals of 1.52 m. The material was split at the drill into several portions of 12 kg or less. Of these, a 300 g "assay split" was shipped to the external laboratory, and the "second split" was stored on the property.

Drill cuttings from RC drilling prior to 2017 at the Bermejal deposit were sampled dry at 2 m intervals. The samples were then transferred to the core facility, then riffle split in three cycles until a 10 kg sample was obtained. The split sample was then bagged and tagged and sent to the sample preparation laboratory (at that time the laboratories used were the San Luis Potosi facility of Bondar Clegg and the Hermosillo location of Skyline Laboratories).

For RC samples collected in 2018–2022, drill cuttings were sampled dry at 2 m intervals. All the cuttings were collected in high-strength plastic bags that were previously marked, then weighed to determine the recovery for the interval. The bags were then transferred to the core facility, then riffle split in three cycles until a 6 kg sample was obtained. The split sample was then bagged and tagged and sent to the sample preparation laboratory (ALS Chemex, Guadalajara, sample preparation laboratory). The remainder of the RC sample was saved in high-strength bags and stored on site.

At times, the previous RC drilling required the introduction of water, and the following sampling method was undertaken:

- All material was passed through a cyclone, which permitted 10% of the suspended solids to be recovered.
- Suspended solids and liquid were stored in pre-labelled micropore bags that allowed the samples to dry.
- Once dry, the material was weighed, tagged, and sent to the laboratory for analysis.

All RC drilling from 2018 to present was drilled dry (i.e., without introduction of water during drilling).

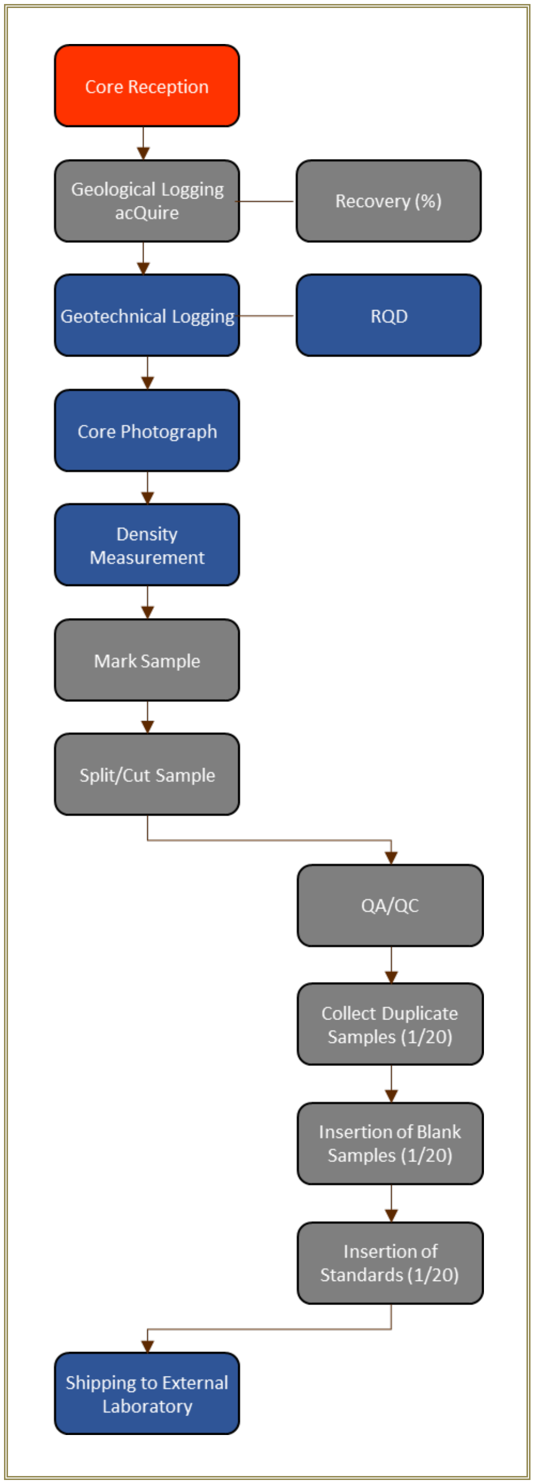
A handful of rock chips from each sample interval was collected and logged by experienced on-site geologists. Data from the drill logs were entered digitally and stored in the exploration acQuire™ database and subsequently used for Mineral Resource estimation.

11.1.2 Core Sampling

Prior to 2003, the mineralized core intervals were logged at the drill rig due to the soft and friable nature of the material, and concern for disturbance of the core during transport. The geologist supervised core splitting and logged the core to ensure sample integrity. Splitting was achieved using a tile saw for solid cores, or a knife for soft cores. Samples were typically shorter than 1.5 m.

All core logging and sampling now takes place in the core facility at Los Filos. The intervals of oxide mineralization are friable and easily damaged; therefore, the boxes are handled with care during transport to the core logging facility. A flow sheet summarizing sample handling is provided on Figure 11-1.

Since 2003, core samples for exploration and infill drill programs were either split or cut depending on the hardness or competency of the mineralized material. Splitting was conducted manually with a spatula or putty knife or split with a HYDRASPLIT manual hydraulic splitter. Core cutting was conducted with 220 V Rockman saws, and the core was cut in half along the core axis. The splitting or cutting takes lithological contacts into account, as determined by the geologist during sample interval selection. Samples are usually shorter than 1.5 m, with a minimum sample length of 0.3 m and a maximum of 3 m.



Source: Stantec (2017).

Figure 11-1: Simplified Core Sampling Procedure for Drill Core Handling

HQ and NQ core is split or cut in half. Half of the core is sent for sample preparation and analysis, and the remaining half is retained in the core box. Splitting or cutting core for metallurgical samples usually involves a larger proportion of the core being sent for analysis (75%), with the rest retained in the core box (typically using PQ size core).

Once the samples are cut or split, they are bagged and numbered in polyethylene bags.

Quality control and quality assurance (QA/QC) samples are added to the sampling sequence prior to packaging sample bags for shipment. The QA/QC program is described in Sections 11.8 and 11.9 of this Technical Report and includes duplicate samples, blank samples, low-, medium-, and high-grade standards, and periodic repeat assays and external check assays.

Groups of 20 sample bags are placed in larger bags and labelled with the name and address of the laboratory, as well as the number and series of samples that were contained within the bag. When approximately 400 samples are accumulated, a truck is sent from the preparation laboratory to collect the samples and transport them to the ALS Chemex, Guadalajara, sample preparation laboratory.

11.2 Preparation and Analytical Laboratories

Sample preparation and analytical laboratories used during the project exploration programs include Chemex, ALS Chemex, Bondar Clegg (merged into ALS Chemex in 2001), and Skyline (once part of ALS Chemex), all of whom are independent of Equinox Gold (and previous owner, Leagold).

All samples are currently processed at the ALS Chemex laboratory in North Vancouver, BC, Canada, which is certified as ISO/IEC 17025:2017 compliant by the Standards Council of Canada.

11.2.1 2003 to Present

From 2003 onwards, ALS Chemex prepared all samples at a facility in Guadalajara, and the ALS Chemex laboratory in Vancouver assayed them. Using standard procedures, ALS Chemex prepared and assayed samples of drill cuttings and drill core for programs prior to 2003.

ALS Chemex sample preparation consisted of:

- Crushed samples were split to provide a 250 g representative cut.
- Samples were then pulverized to a minimum of 85% passing 200 mesh.

These same procedures were used by Leagold, Goldcorp, and for the Luismin and Minera Nuteck programs (SRK, 2019).

All drilling samples were routinely assayed for gold and copper. Following discovery of the Los Filos deposit, the sample pulps for Los Filos drill holes were resubmitted for silver analysis. All subsequent drill samples have been assayed for gold, copper, and silver. If requested, the laboratory also performed inductively coupled plasma (ICP) emission spectroscopy analyses on 0.5 g samples of pulverized pulps.

Gold assays were run using a one assay-ton (30 g) charge, with an atomic absorption (AA) finish. Assays exceeding 10 g/t Au were reanalyzed using fire assay with gravimetric finish. Copper and silver assays were performed using a 1 g charge, aqua regia digestion, and AA analysis. Silver values exceeding 100 g/t Ag were reanalyzed using a one assay-ton fire assay with gravimetric finish.

Approximately 2.5% of the exploration core sample splits were routinely re-assayed to confirm initial results and, if the check assays were at variance with the original assay, a second split sample was assayed.

11.3 Sample Preparation Procedures

The following procedures apply to core samples that are currently sent to the preparation laboratory:

- Checking samples received against the manifest of the samples that were sent from Los Filos
- Weighing the sample as received and entering it into the Laboratory Information Management System (LIMS)
- Drying sample for 12 hours (oven dry at 105°C)
- Crushing sample to P_{100} 2 mm
- Splitting sample to produce a 1.5 kg split and a reject sample
- Pulverizing sample to P_{85} 75 µm in a ring and puck pulverizer.

Every fiftieth sample is screen-tested to check that the above standards of crushing and pulverizing are being achieved.

The live pulverized sample is further split into 50 g samples for fire assay. The laboratory retains all sample pulps for a time, and thereafter returns them for storage in the core facility at the Los Filos Mine Complex site.

Since 2017, ALS Chemex, Guadalajara, has been responsible for preparing all samples from the exploration and infill drilling programs through its sample preparation facilities.

After sample collection, and shipment to the laboratory, no employee, officer, director, or associate of Equinox Gold is involved in any aspect of the commercial laboratory sample preparation or analysis of samples from the exploration activities at Los Filos Mine. Only the laboratory staff has access to samples once they have received the samples and signed the chain-of-custody form.

11.4 Analytical Testing

All samples from the current drilling programs are analyzed for:

- Gold using a standard 50 g fire assay with gold detection by flame atomic absorption spectroscopy (AAS) to a 0.01 ppm detection limit
- Multi-element analyses using a multi-acid digest method and ICP–optical emission spectroscopy (ME-ICP41).

All sample analyses are reported electronically in comma-separated values (CSV) format for easy transfer to the acQuire™ database. The laboratory-prepared certificates for each sample consignment are available for download if required.

All samples were dispatched to the Vancouver laboratory facility of ALS Chemex (or predecessor companies) for analysis, which, at the time the early work was performed, was ISO-9000 accredited for analysis. The laboratory is currently ISO-17025 certified for selected analytical techniques. ALS Chemex is independent of Equinox.

ALS Chemex maintains a laboratory QA/QC program, including preparation duplicates, laboratory duplicates, blank samples, and analytical standards. The laboratory QA/QC sample results are reported within each batch of samples sent to Equinox.

The SGS laboratory in Durango is usually used as a check laboratory; it has held ISO-17025 certifications for selected analytical methods since 2009. The SGS laboratory is also independent of Equinox Gold.

11.5 Bulk Density Data

Since 1997, bulk density samples have been routinely collected as part of the various drill programs. A total of 39,972 density measurements have been collected for use in this Mineral Resource estimate. Bulk density values are determined using the water-immersion method, where samples are weighed before and after waterproofing (lacquer or wax), then immersed in water to determine the amount of displacement. Bulk density is calculated by dividing the sample weight by the volume of displaced water.

A total of 17,243 bulk density measurements has been collected from drill holes in the Los Filos Area and used to assign densities to the Los Filos Open Pit and Los Filos Underground block models. Average bulk density values are summarized by rock type in Table 11-1.

Table 11-1: Los Filos Area, Average Assigned In Situ Bulk Densities

Rock Type	Sample Count	Bulk Density (t/m^3)
Carbonate	8,524	2.67
Diorite (Sill)	1,752	2.43
Granodiorite	4,611	2.52
Oxide	2,337	2.87
Sulphide	19	3.45

A total of 22,729 bulk density measurements has been collected from drill holes in the Bermejal-Guadalupe area. These measurements are divided by rock type and were used to assign densities to the Bermejal–Guadalupe Open Pit and Bermejal Underground block models. Average bulk density values assigned to these models are summarized by rock type in Table 11-2.

Table 11-2: Bermejal-Guadalupe Area, Average Assigned In Situ Bulk Densities

Rock Type	Sample Count	Bulk Density (t/m^3)
Carbonate	8,663	2.63
Granodiorite	9,709	2.55
Oxide	4,357	2.62

11.6 Geological Databases

Geological logging data are logged directly to an acQuire™ database on tablet computers; there is a separate database for drill holes (core and RC) and underground channel samples. Geotechnical data are logged directly into Excel templates. The logging area has Wi-Fi for connection to the server that hosts the database. Sample and assay data are uploaded digitally. Survey data are imported or uploaded from the survey instruments. Collar surveys are completed by mine surveyors and are imported digitally.

The database manager or designated personnel verify the data during import, and filters in acQuire™ screen out invalid or erroneous measurements. Data are regularly backed up. All data are stored on secure servers that are actively monitored for cyber-security threats, with industry-standard data-security measures in place. Access to these servers is limited, to reduce the potential for compromising data. Only designated personnel may access or make changes to the databases.

11.7 Sample Security and Storage

The core facility at Los Filos is in a secure and monitored area on the mine property, and the samples are always attended or locked at the sample collection and dispatch facility. Drilling contractors transport core boxes to the core facility. Exploration department personnel undertake sample collection on site. The independent laboratory's personnel transport samples to the preparation laboratory using their company vehicles.

Currently, ALS Chemex picks up samples at the site that are ready for preparation and analysis and transports them to Guadalajara for preparation. Prepared samples are then sent by air to the ALS Chemex analytical laboratory in Vancouver.

Chain-of-custody procedures consist of filling out sample submittal forms that are sent to the laboratory with sample shipments, to make certain the preparation laboratory receives all samples.

Assay pulps and crushed reject material are returned to the Los Filos core facility for storage. These samples are stored inside the core facility building or on pallets under tarps outside of the core facility.

Drill core is stored in plastic core boxes (wooden boxes for earlier programs) on steel racks in the core facility adjacent to the core logging and cutting facilities. Core boxes are racked in numerical sequence by drill-hole number and depth. Eventually the core boxes are stacked on pallets and stored under tarps outside of the core facility.

11.8 Quality Assurance and Quality Control Programs (Pre-2003)

Prior to 2003, check-assaying campaigns were undertaken, whereby splits from samples were routinely re-assayed to confirm initial results, commonly through a separate analytical laboratory. There is no information whether blanks and standard reference materials (standards) were regularly included with Los Filos samples submitted for assay.

Minera Nuteck introduced blanks and standards in Los Filos sampling programs; this practice has been in place since 2000.

Limited data are available on the QA/QC programs for the Bermejal deposit prior to the Luismin purchase in 2005; however, internal Peñoles documents from 1997 confirm there was a QA/QC program in place for the main laboratory.

The Peñoles QA/QC program and data verification procedures incorporated a system of repeat assaying and blanks. One out of every twenty samples sent to the laboratory was identified for repeat analysis. Goldcorp introduced a blank sample immediately after the repeat sample (i.e., every batch consisted of 22 samples). Blank material was a limestone sourced from the local river; several kilometres from the Los Filos Mine Complex area.

Additional information on check-assaying programs is provided in two previous technical reports—Stantec (2017) and SRK (2019).

11.9 Quality Assurance and Quality Control Programs (2003–Present)

The exploration department has a standard QA/QC program in place for all drill core and RC sampling. The QA/QC program for samples from drilling includes inserting duplicate samples, blank samples, and standards (certified reference materials), and also check assaying of a suite of samples at an external third-party laboratory.

Presently, the QA/QC program includes insertion of a duplicate sample after 20 samples, a blank sample after 20 more, then a standard after 20 more samples. This pattern is repeated downhole as sampling continues. Three standards are used: one targets typical low grades, another targets mid-range grades, and the third targets higher-grade values. The three standards are alternated within each sample set depending on the ore type for those samples.

Assays are received from ALS Chemex as a CSV file. While importing the assays into the acquire database, the software checks the duplicate, blank, and standard samples to determine if they are within the accepted ranges. In the event of a failure, the laboratory is asked to reanalyze the batch of samples that contain the control sample outside the accepted range. Once the re-assays for the batch of samples are received, and if the control sample is within the accepted range, the assays are imported to acQuire™.

To date, the program has shown good, repeatable results.

11.10 Quality Assurance and Quality Control Program Results (2017 to 2019)

For the 2017 to 2019 drilling programs 29,753 samples were collected for Bermejal Underground and 16,014 samples for Los Filos Underground (SRK, 2019). The QA/QC samples collected from the drill programs and their failure frequencies are summarized in Table 11-3.

Table 11-3: QA/QC Program for 2017–2019 Drilling at Los Filos

Sample Type	Grade (g/t Au)	Sample Count	Failure Count	Sample ID
Duplicate Sample	-	1,150	0	Not applicable
Blank	<0.005	1,180	18	Gravel, BLK42, BLK58, BLK84, BLK88 & BLK93
Standard–Low-Grade OP	0.414 & 0.424	128	4	OxD108 & OxD128
Standard–Medium-Grade OP	0.806	115	0	OxF125
Standard–High-Grade OP	2.365	69	0	OxJ120
Standard–Medium-Grade UG	3.604	207	2	OxK119
Standard–Medium-Grade UG	7.679	167	2	OxN117
Standard–High-Grade UG	14.92	134	0	OxP116
External Check Assay	-	822	-	Not applicable

11.11 Quality Assurance and Quality Control Program Results (2019 to 2022)

For the 2019 to June 30, 2022, drilling programs, samples were collected at Los Filos. The QA/QC samples collected from the drill programs and their failure frequencies are summarized in Table 11-4.

Table 11-4: QA/QC Program for 2019–June 30, 2022 Drilling at Los Filos

Sample Type	Grade (g/t Au)	Sample Count	Failure Count	Sample ID
Duplicate Sample	-	86	1	Not applicable
Blank	<0.005	943	4	Gravel, BLK88, BLK93, BLK97, BLK101, BLK108
Standard–Low-Grade OP	0.414, 0.424, 0.43	247	9	OxD108, OxD128, OXD151
Standard–Medium-Grade OP	0.806	209	2	OxF125
Standard–Medium-Grade OP	0.857	1	0	OxF165
Standard–High-Grade OP	2.365	157	2	OxJ120
Standard–Medium-Grade UG	3.604	156	3	OxK119
Standard–Medium-Grade UG	7.679	141	1	OxN117
External Check Assay	-			Not applicable

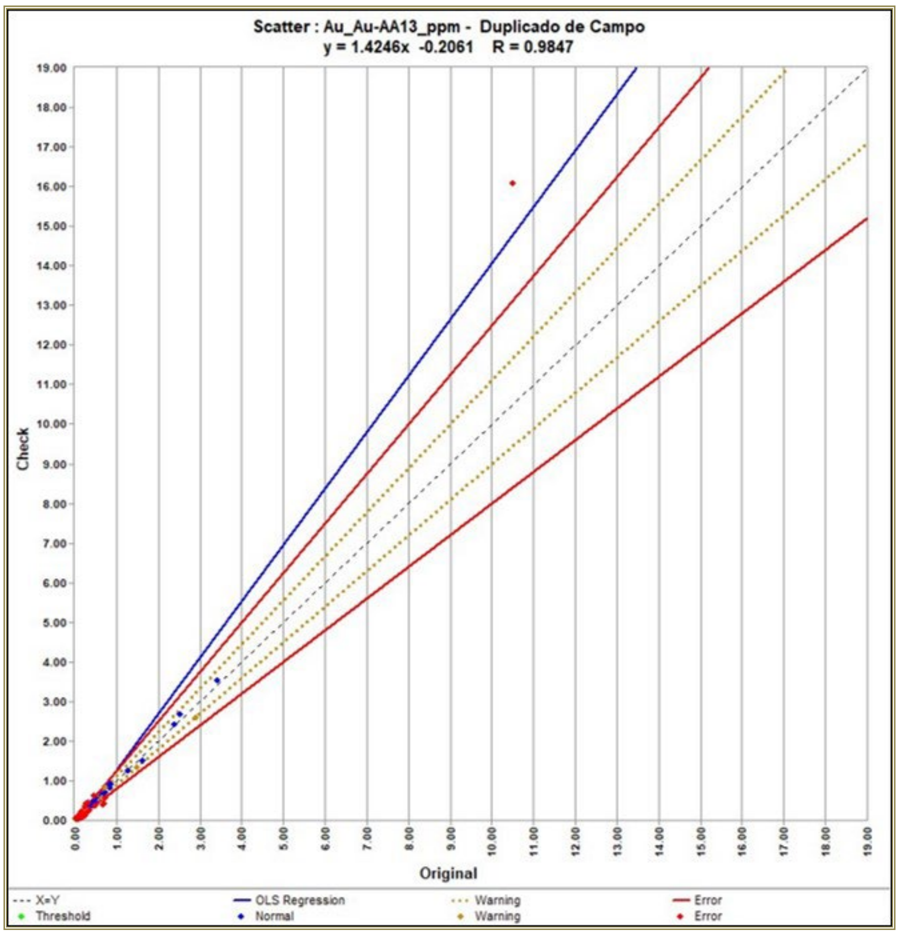
11.11.1 Duplicate Samples

Every 60 samples the drill core interval was quartered to provide a duplicate sample—these are labelled sample duplicates for internal use and are distinct from the crush and pulp duplicates processed as part of the laboratory's QA/QC process. Duplicates start at tag number 20 in the sequence of samples (20, 80, 140, 200, etc.). The duplicate sample information being recorded in the sample book includes the sample interval and the sample number that is being duplicated.

In addition, the scatter plots, calculated absolute difference (AD), absolute of the relative difference (ARD), and absolute of the mean paired relative difference (AMPRD) are reviewed. When a duplicate pair exceeds set thresholds for both the AD and ARD, this pair is failed. At very low grades, the thresholds are very close, and sample differences are not considered failures unless the values are significantly different.

It is important to note that some deposits are characterized by highly variable grades over short distances; such deposits may have higher rates of duplicate sample failures, but these due to the inherent variability of the deposit, not analytical uncertainty.

The performance of duplicates between 2019 and June 30, 2022, is within acceptable limits for use in Mineral Resource estimation (Figure 11-2), with only one sample with grade <1 g/t exceeding the AD and ARD thresholds.



Source: Equinox Gold.

Figure 11-2: Duplicate Samples Scatter Plot for All Los Filos Drilling, 2019–June 30, 2022

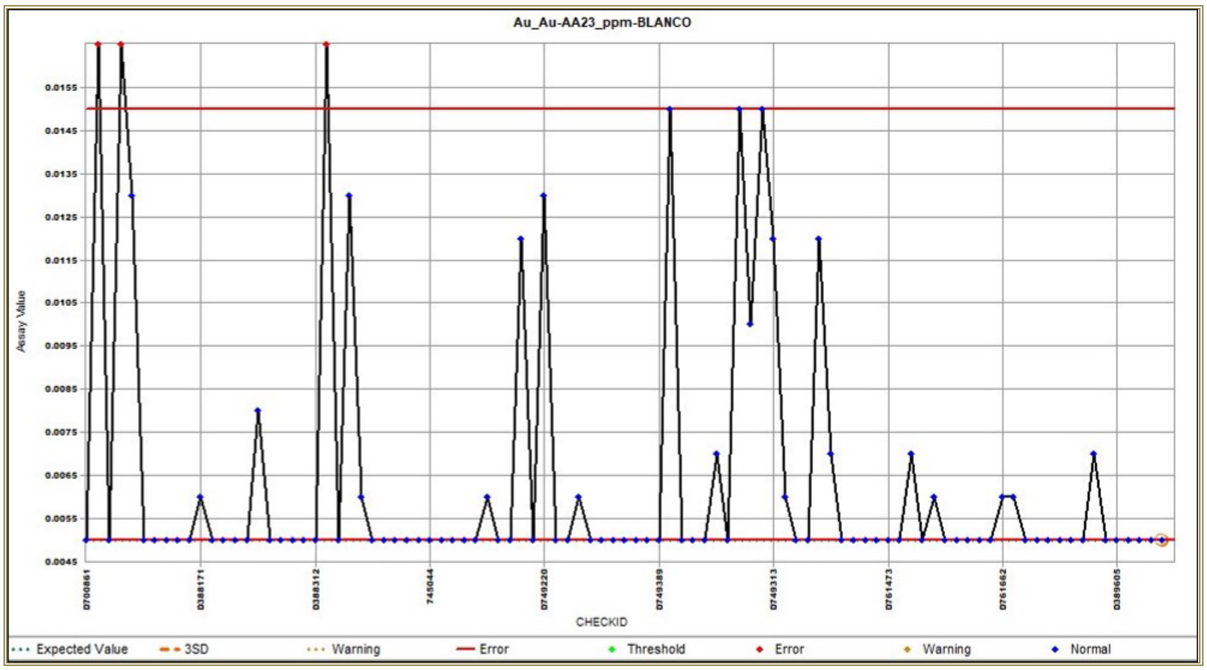
11.11.2 Blank Samples

Los Filos uses two types of blank sample material: a clean barren gravel (BLANCO) and commercially available pulp blanks purchased from Rocklabs (BLK88, BLK93, BLK97, BLK101, and BLK108). A clean local limestone gravel is used for the BLANCO material in order to assess potential carry-over contamination that may occur during sample preparation.

Blank samples were inserted every 60 samples. Blank insertion starts at tag number 40 in the sequence of samples (40, 100, 160, 220, etc.). The blank sample information recorded in the sample book includes the blank number code. When a high-grade interval is intersected, a blank is inserted immediately following the high-grade sample to examine for carry-over contamination during sample preparation.

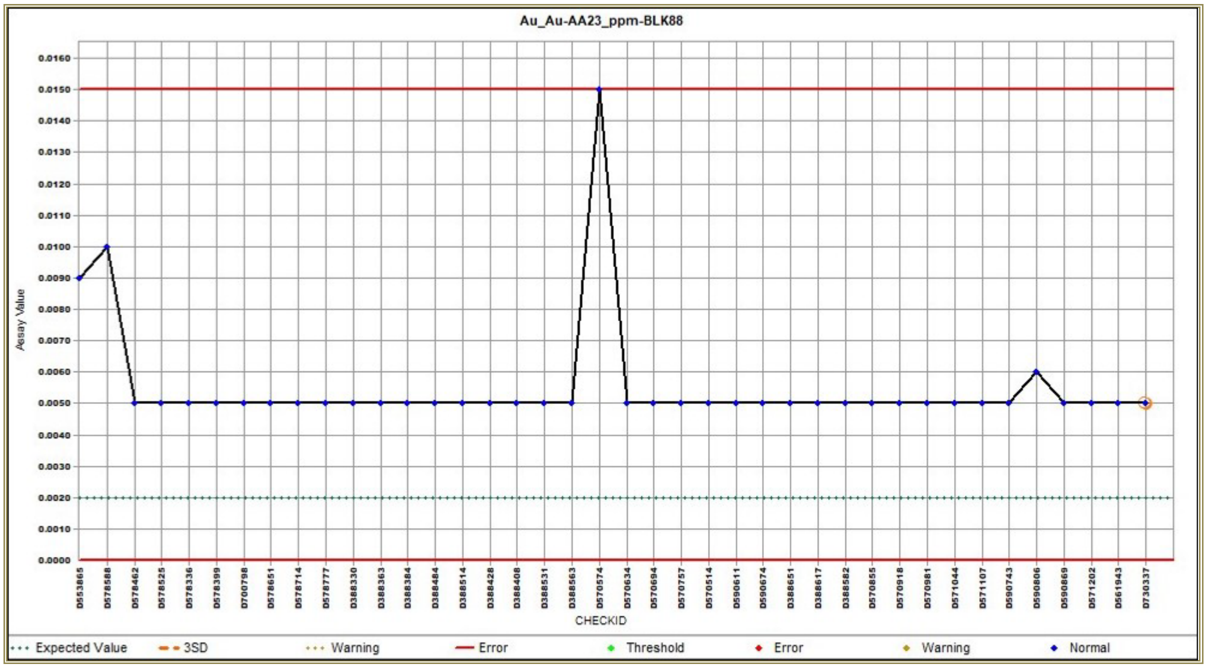
The assay results of the blank samples are evaluated monthly in the corporate QA/QC report. All blank samples that exceed the 0.015 ppm threshold are compared to the preceding sample. If the preceding sample is relatively elevated in gold, the blank sample is deemed to be contaminated and is failed.

Only four blank samples were outside of acceptable limits for 2019–June 30, 2022 drilling (Figure 11-3 to Figure 11-8). The performance of this blank material over the reporting period is considered acceptable and indicates that the laboratories followed good practices during sample preparation and analysis.



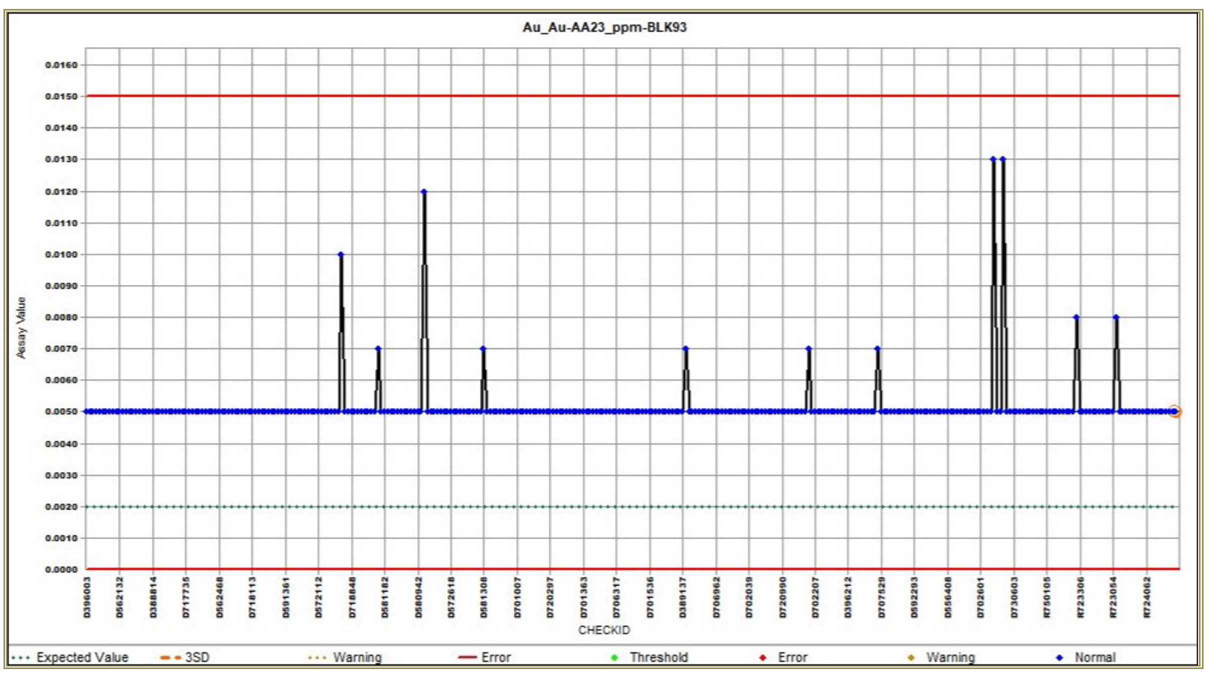
Source: Equinox Gold.

Figure 11-3: ***Blank Sample Blanco Performance for 2019–June 30, 2022 Drilling at Los Filos***



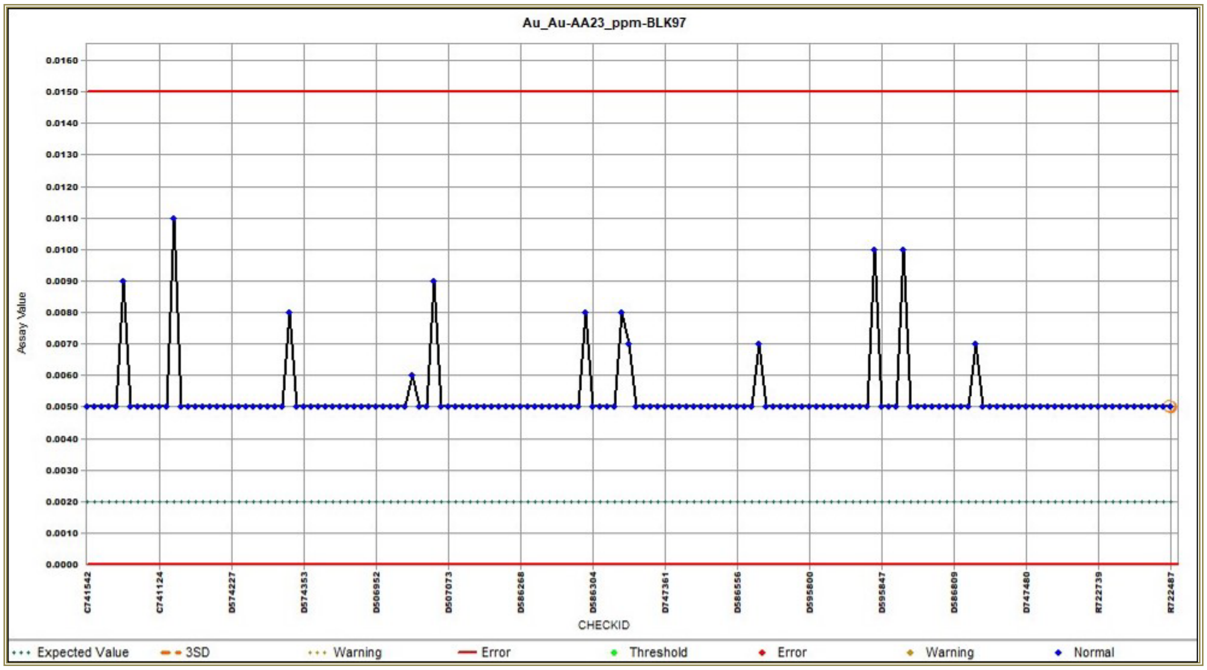
Source: Equinox Gold.

Figure 11-4: Blank Sample BLK88 Performance for 2019–June 30, 2022 Drilling at Los Filos



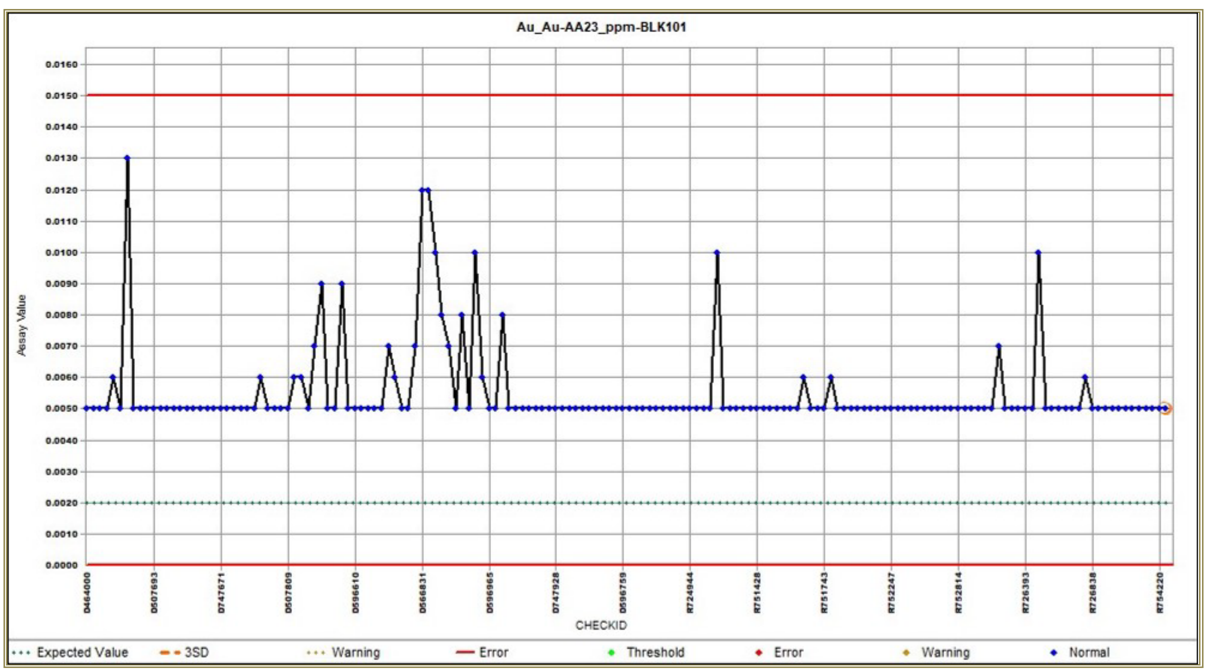
Source: Equinox Gold.

Figure 11-5: Blank Sample BLK93 Performance for 2019–June 30, 2022 Drilling at Los Filos



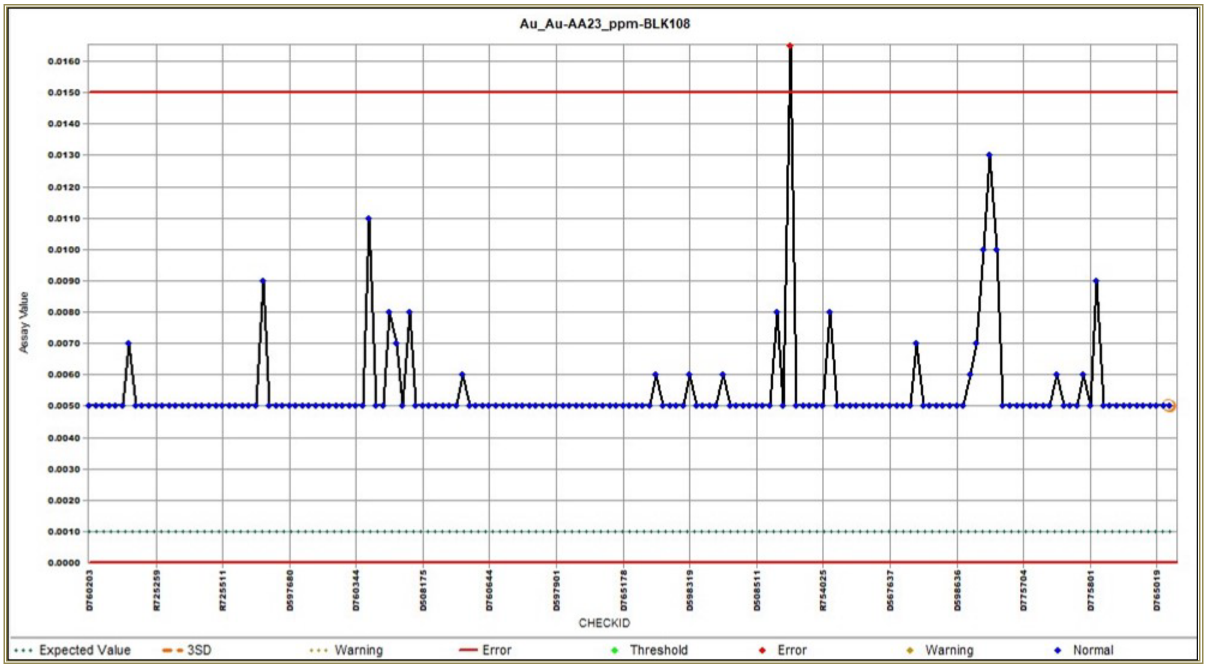
Source: Equinox Gold.

Figure 11-6: Blank Sample BLK97 Performance for 2019–June 30, 2022 Drilling at Los Filos



Source: Equinox Gold.

Figure 11-7: Blank Sample BLK101 Performance for 2019–June 30, 2022 Drilling at Los Filos



Source: Equinox Gold.

Figure 11-8: Blank Sample BLK108 Performance for 2019–June 30, 2022 Drilling at Los Filos

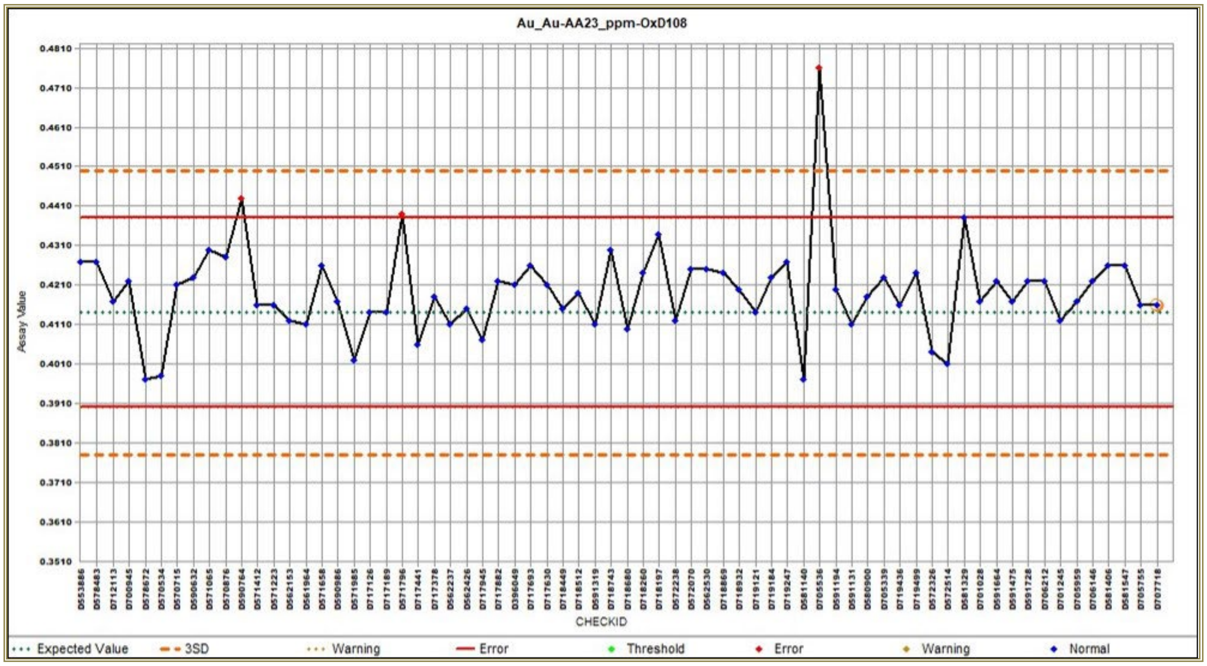
11.11.3 Standard Samples

Standards are certified reference materials (CRM) purchased from Rocklabs, and include low-, medium-, and high-grade material with grade thresholds relative to the grades of the intended mining methods (open pit targets have much lower grade thresholds than underground targets).

Standards are inserted every 60 samples. Standard insertion starts at tag number 60 in the sequence of samples (60, 120, 180, 240, etc.). The identification of the standard is recorded in the sample book for the appropriate sample interval.

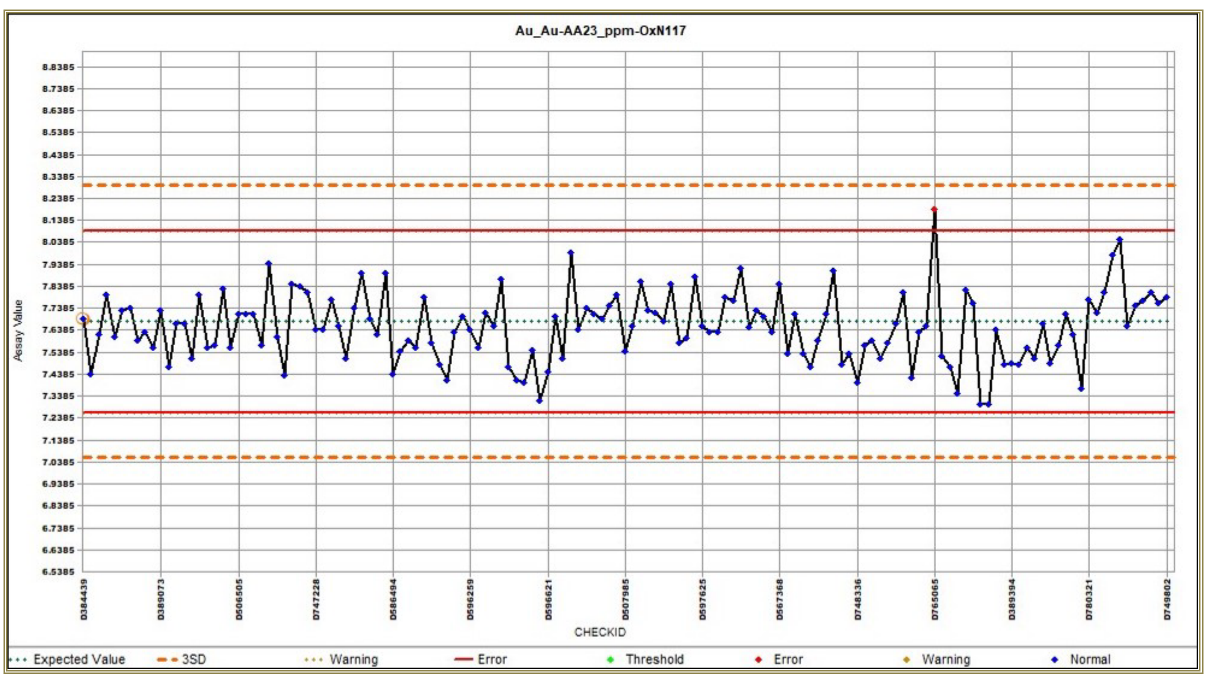
The standards are prepared in advance at the exploration office to eliminate the possibility of contamination. The standard selection for a particular sample number is random, with all standards placed in envelopes in rice bags and selected arbitrarily by the samplers.

Those standard samples that exceed the certified average and two standard deviations provided by the manufacturer are deemed to have failed. With very few exceptions the standards performed within acceptable limits for each of the standards for all drilling completed during 2019 to June 30, 2022 (Figure 11-9 to Figure 11-15). The performance of these standard materials over the reporting period is considered acceptable for the data to be used for Mineral Resource estimation.



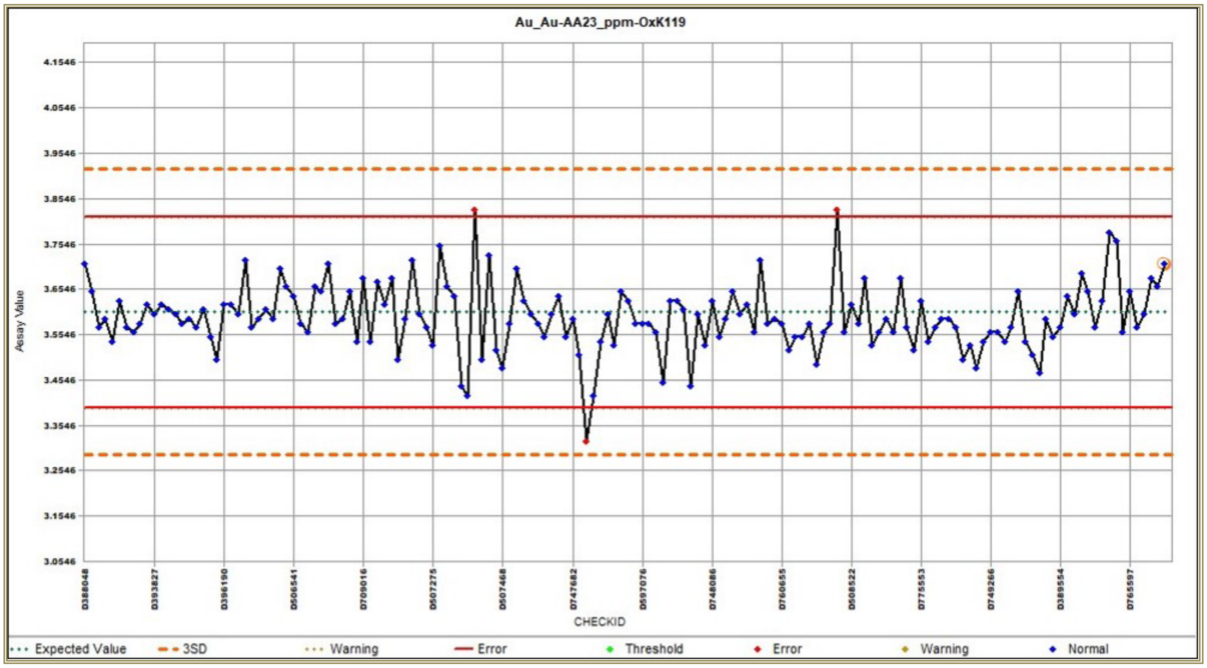
Source: Equinox Gold.

Figure 11-9: CRM–Rocklabs Oxide Low-Grade Au Standard OxD108 Performance, 2019–June 30, 2022



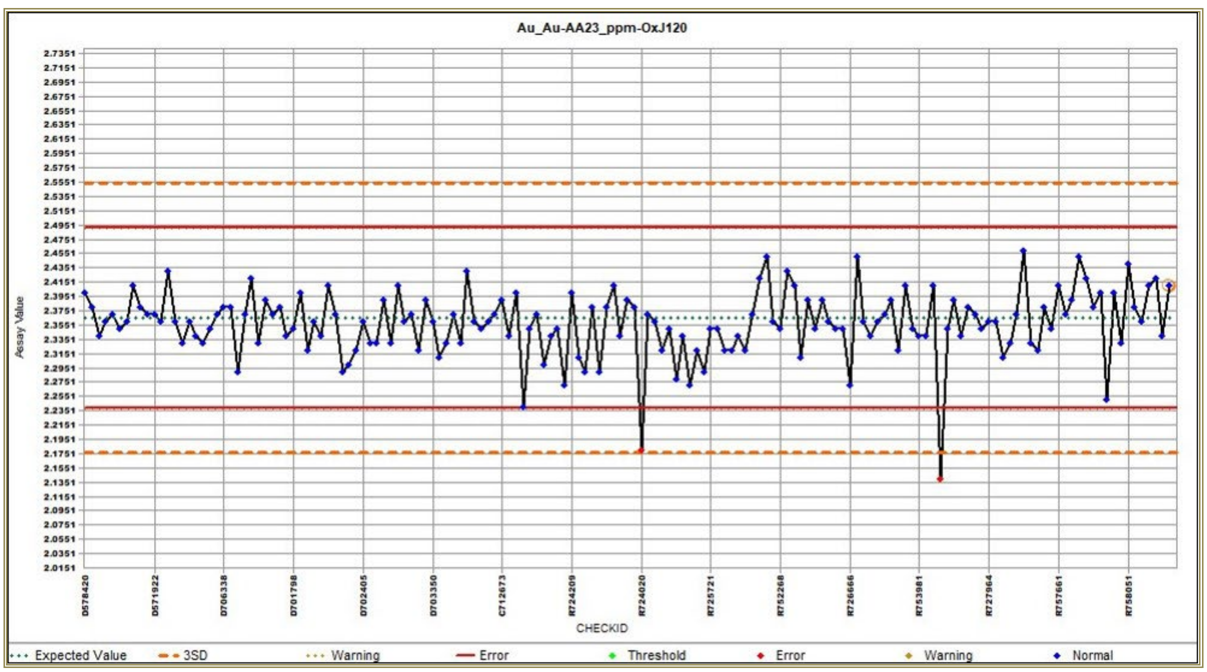
Source: Equinox Gold.

Figure 11-10: CRM–Rocklabs Oxide Low Grade Au Standard OxN117 Performance, 2019–June 30, 2022



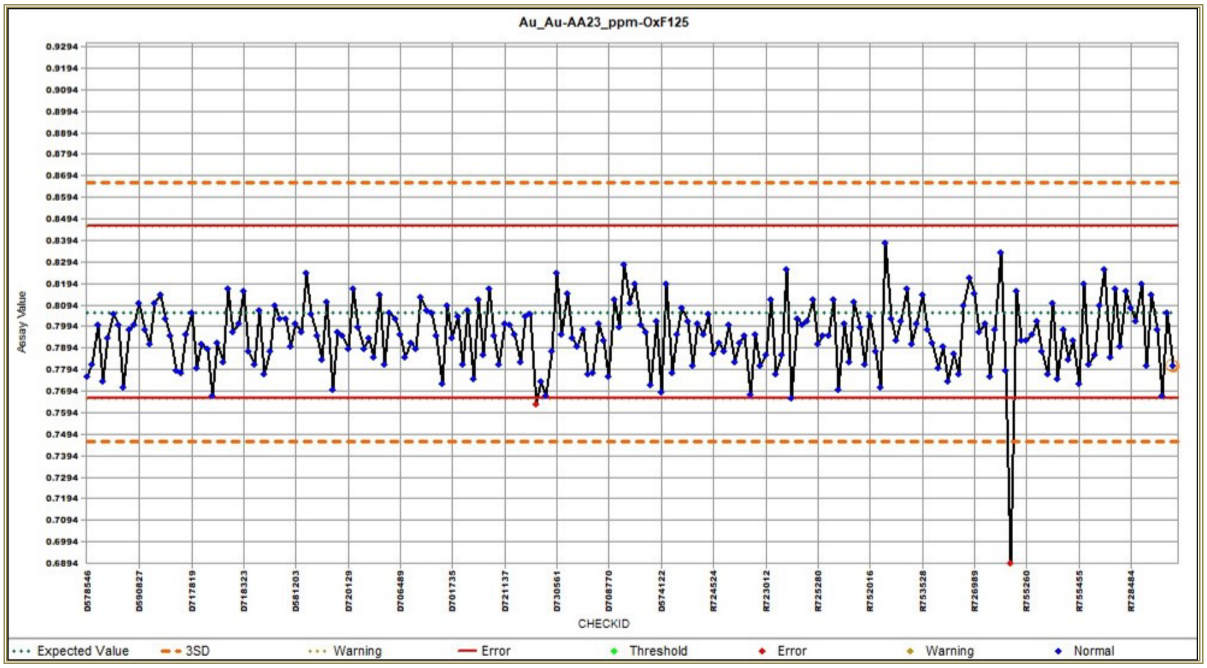
Source: Equinox Gold.

Figure 11-11: CRM–Rocklabs Oxide Low Grade Au Standard OxK119 Performance, 2019–June 30, 2022



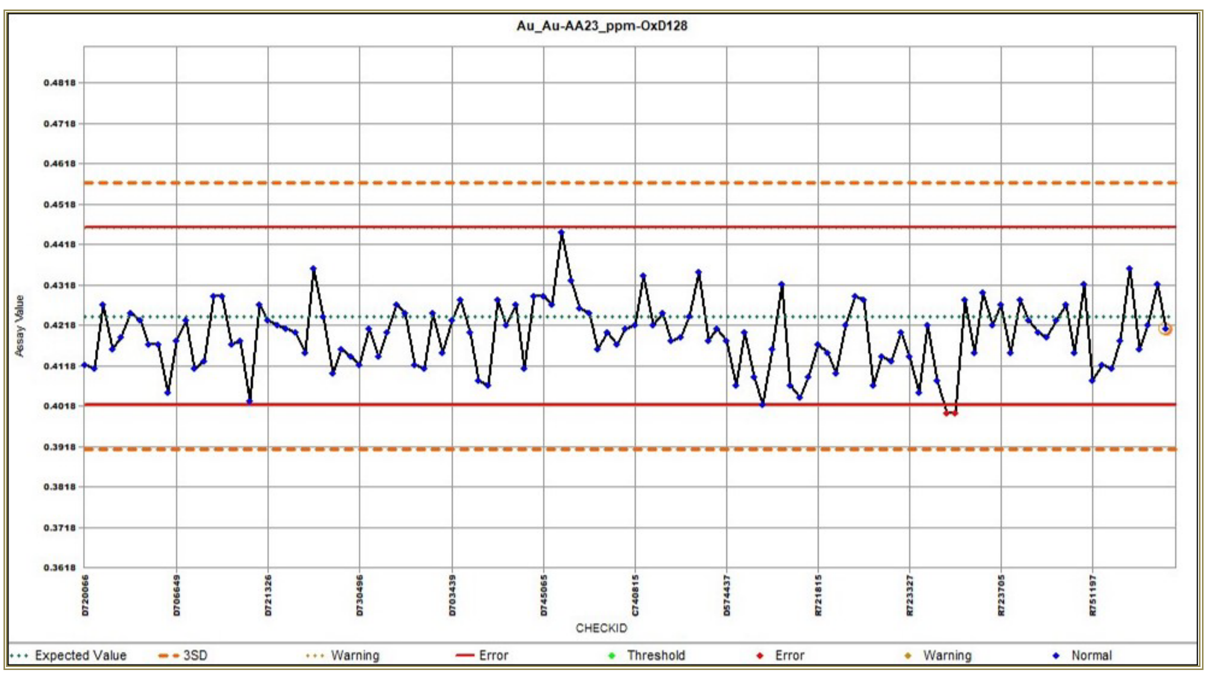
Source: Equinox Gold.

Figure 11-12: CRM–Rocklabs Oxide Low Grade Au Standard OxJ120 Performance, 2019–June 30, 2022



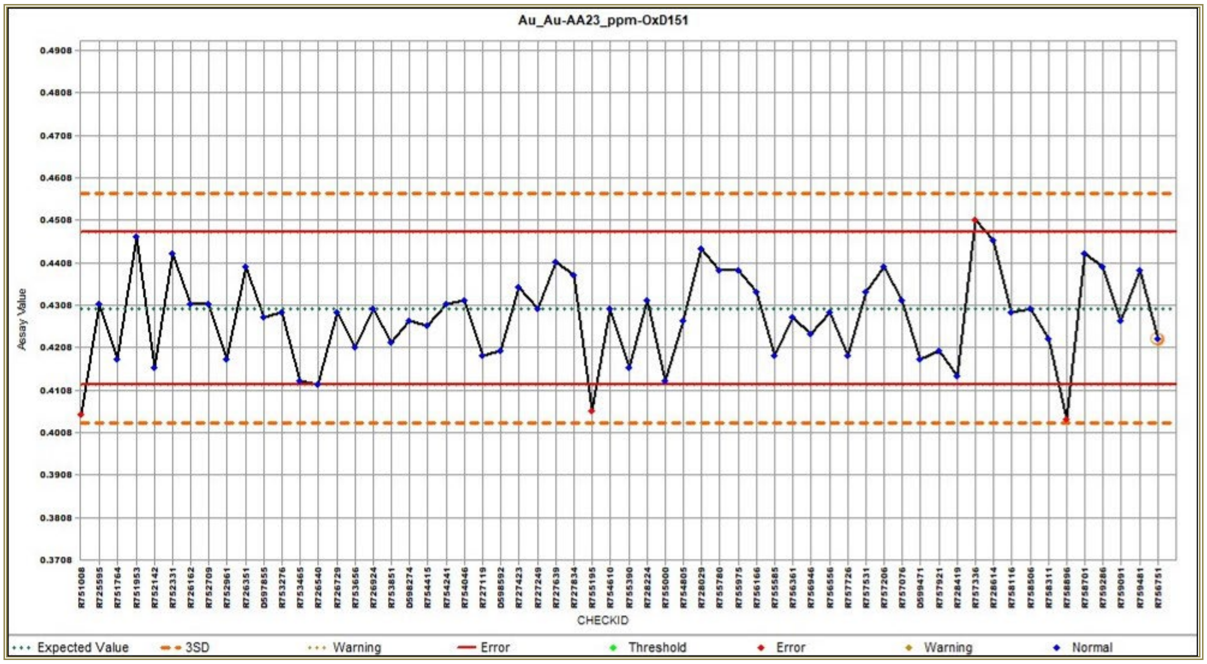
Source: Equinox Gold.

Figure 11-13: CRM–Rocklabs Oxide Low Grade Au Standard OxF125 Performance, 2019–June 30, 2022



Source: Equinox Gold.

Figure 11-14: CRM–Rocklabs Oxide Low Grade Au Standard OxD128 Performance, 2019–June 30, 2022



Source: Equinox Gold.

Figure 11-15: CRM–Rocklabs Oxide Low Grade Au Standard OxD151 Performance, 2019–June 30, 2022

11.11.4 Check Assays

A total of 1,512 samples was sent to SGS for check assays from 2019–2021. A summary of the number of samples submitted to both ALS and SGS is provided in Table 11-5. There were no sample failures of check assays during this time; sample failure is determined using the same criteria as duplicate samples (Section 11.11.1). The check assays provide confidence in results from the primary laboratory (ALS) and demonstrate that the assays are acceptable for use in Mineral Resource estimation.

Check assay samples have been submitted for 2022 drilling, but results were not available for inclusion in this Technical Report.

Table 11-5: Check Assays Submitted for 2019–2021 Drilling at Los Filos

Year	Check Assays Submitted	Failures
2019	859	0
2020	302	0
2021	351	0

11.12 Twinned Drill Holes

A number of RC holes at Los Filos Mine Complex have been twinned with core drill holes (SRK, 2019). Twinned drill holes were reviewed in 2002 resulting in the following conclusions:

- Differences exist between core and RC assays.
- At lower elevations, below 1,500 masl (site elevation), grades from core composites are lower, on average, and at higher elevations they are higher than the grades from RC assays.
- Overall, grades from core composites can be 10% higher than from RC composites.

Micon (2003) reviewed 15 sets of twinned RC-core holes, concluding that only 2 twins out of 15 indicated the possibility of downhole contamination. The remainder of the twin sets showed good agreement in identifying the mineralized zone, with differences in average grades in most cases explained by the nugget effect in two samples taken several metres apart.

Micon (2003) also compared 1,769 core assays to the nearest RC value from the twinned holes. The core samples had a higher mean value of 1.2 g/t Au, compared to 0.98 g/t Au in RC holes. Scatter plots did not indicate any bias, with pairs clustering around the equal value line; however, there was poor agreement overall as shown by a high degree of scatter and a low correlation coefficient.

No twinning of holes has been conducted since 2017.

11.13 Database Validation and Verification on Data Import

Entry of information into databases uses a variety of techniques and procedures to check the integrity of the data entered. Data entry for most logging fields requires selection from an established list to prevent erroneous codes from being entered in the geologic database. Control samples are checked during assay importation to ensure that if the control sample are outside of the accepted range, then the laboratory is asked to re-assay the sample batch. Queries are run to catch errors such as overlapping intervals.

In 2002, a portion of the assay drill-hole database and collar coordinates were verified against source information (SRK, 2019). Approximately 38% of the whole assay database was verified (23,946 of 62,941 assays). Attention was paid to assays from the central high-grade area of the Los Filos deposit, which would provide a significant portion of the ore for initial mining. Errors identified were minor and accounted for less than 1% of the database. A total of 370 of 456 drill collars was checked; errors were noted with the locations of seven holes, and the database was modified accordingly.

During 2003, Micon completed a database review in support of technical report preparation. No significant errors were noted in the database.

Goldcorp (then Wheaton River Minerals) undertook a due diligence review of the Bermejal deposit and Minera El Bermejal's data during 2003. A team of employees and external consultants performed the review; no significant issues were identified.

Snowden (2006) reviewed the Los Filos geological and assay databases supplied by Luismin's geological department in 2004 and cross-checked these with data sourced from Micon's (2003) report and work conducted for Goldcorp in 2003. Any inconsistencies were investigated and resolved. Geological interpretations and data developed by Luismin were reviewed by Snowden as new data became available during 2004 and 2005.

Other data verification work performed by Snowden during 2004 and 2005 included the following:

- Detailed review of 5% of the geological logs provided by Luismin
- Examination of assay certificates and cross-checks against the database supplied by Luismin
- Verification of extreme values
- Four visits to site to review aspects of the drill program and reviews with the geological department
- Review of the QA/QC procedures
- Routine validation of the database to check for inconsistencies, such as inconsistent hole lengths, missing intervals, zero-length intervals, and out-of-sequence records.

Snowden visited the Bermejal site from September 27 to October 2, 2005, and reviewed the geological interpretations, cross-checked assay certificates with the database, and inspected core from the 2005 Luismin core drilling program. The locations of a number of Luismin drill-hole collars were verified.

Database checks comprised the following:

- Routine validation of the database to check for inconsistencies such as hole lengths, missing intervals, zero-length intervals, and out-of-sequence records
- Reconciliation of the drill-hole layout with respect to earlier maps
- The reasonableness of the geological interpretations
- Comparison of the assay statistics with those provided from the Goldcorp 2003 study, as a cross check.

11.14 Conclusions

Prior to 2003, Minera Nukay, Minera Nuteck, Wheaton River, Luismin, or DMSL personnel carried out all collection, splitting, and bagging of RC and core samples, depending on the date of the drill program. The reanalysis program for some of the drill programs conducted prior to 2003 mitigated potential issues with analyses from those programs. The review of earlier programs did not identify any concerns with the practices used for these drilling programs that could affect Mineral Resource or Mineral Reserve estimation.

Current sample preparation, analysis, database management, and sample and data security are completed to industry standards with numerous levels of checks and review.

In the opinion of the Qualified Person, the sampling, sample preparation, security, and analytical methods currently in use are acceptable, meet industry-standard practices, and are adequate for Mineral Resource and Mineral Reserve estimation and mine planning purposes. The sample preparation facility and analytical laboratory are independent of Equinox. A QA/QC program is in use by the Los Filos exploration department and the independent laboratory also maintains their own

QA/QC program to monitor the performance, accuracy, and precision of the analyses at the laboratory.

Bulk density determination methods are acceptable and meet industry-standard practices.

11.15 Recommendations

- Insertion of pulp and reject duplicates, in addition to field duplicates, is recommended. Routine insertion of duplicates is not recommended, but rather duplicates representative of key grade thresholds, such as stockpile cut-off grades and Mineral Resource and Mineral Reserve cut-off grades.
- It is not recommended that sample batches be failed based on duplicates, as these values can represent the inherent grade variability of the deposit.
- Adjusting CRM failure criteria based on single-laboratory statistics is recommended to gain separate measures of accuracy and precision.

12 DATA VERIFICATION

12.1 Site Visits

The Qualified Person has visited site on the following occasions:

- 2022: February 14 to 18, May 17 to 19, and August 15 to 19
- 2021: September 7 to 10 and November 28 to December 1.

Throughout the visits the QP had the opportunity to review the following:

- Surface and underground drilling and mining operations
- Drill hole logging, sampling, and handling procedures
- Database and QA/QC procedures
- Geologic modelling and the underlying data used
- Resource estimation practices, validation, and results.

12.2 Previous Data Verification

As described in more detail in Section 11.13, database validation was completed in 2002 which entailed reviewing 38% of the data available at the time; there were only minor errors that comprised less than 1% of the dataset (SRK, 2019).

During 2003, Micon completed a database review, and noted no significant errors (Micon, 2003).

Goldcorp (Wheaton River Minerals) completed a due diligence review of data in 2003, with no significant issues identified (Goldcorp Mexico, 2003).

In 2006, Snowden reviewed the Los Filos database, including reviewing 5% of geological logs and assay certificates against the database. No significant issues were noted and any inconsistencies were resolved. This review included numerous site visits, verifying drill-hole collar locations, and examining core drilling and sampling procedures (Snowden Mining Industry Consultants, 2004).

SRK carried out several site visits, the most recent of which was February 17 to 21, 2020. Core logging and sampling procedures were examined, drill sites were located and confirmed with a hand-held Global Positioning System (GPS) unit, and QA/QC procedures and results were reviewed (SRK, 2019).

SRK carried out database validations by comparing data from drill logs to digital data and comparing digital assay data in the database against original assay data sheets provided by the assay laboratory. No errors were observed (SRK, 2019).

12.3 Database Validation

Equinox Gold completed a database validation in 2022. The goal was to review the data for 5% of drill holes at Los Filos against original source data, focusing on original assay certificates. Original source data were not available for drill holes completed prior to 2004; these comprise 40% of the total data set and were previously validated (as described above in Section 12.2).

12.3.1 Collar Validation

Active mining at Los Filos makes validation of collar locations difficult, as collar monuments are often destroyed by mining operations. However, Los Filos exploration staff found and surveyed numerous collar monuments, with the results presented in Table 12-1. In all, 63 collars were surveyed, 36 in the Bermejal–Guadalupe area and 27 in the Los Filos area. Collar location measurements in the database are completed with a differential GPS, whereas the check locations were completed with a handheld GPS, which typically has an accuracy of ±3 m with good satellite coverage and an accuracy of around ±10 m in non-ideal conditions and in mountainous terrain (elevations are generally less accurate with handheld GPS devices). The check collar locations in Table 12-1 agree within the expected accuracy with a few exceptions. Drill holes with a discrepancy of around 10 m (BN-110-12, BN-184-13, BN-260-15, and BU-82-17) were resurveyed with a differential GPS, and in all cases the locations agreed with the database values with an accuracy of ±0.3 m, confirming that the discrepancies are due to GPS accuracy and not issues with collar coordinates.

Table 12-1: Collar Location Check Comparison

Area	Drill Hole	Difference in Coordinates (Database—GPS)		
		Easting	Northing	Elevation
Bermejal–Guadalupe	BD-05-16	2.674	-2.884	-8.588
	BDG-01-16	8.1	-3.456	-5.774
	BDG-03-16	6.788	-2.297	-6.885
	BN-110-12	11.257	0.825	-0.361
	BN-113-12	5	-2	-16
	BN-129-12	8.234	-4.371	-5.746
	BN-141A-12	5.42	-4.294	-8.745
	BN-147-12	2.012	-1.809	-5.983
	BN-151-13	4.546	-8.652	1.726
	BN-152-13	7.19	-5.519	-6.222
	BN-160-13	4.447	-3.047	-1.446
	BN-166-13	7.315	-4.904	-9.634
	BN-175-13	6.182	0.098	-16.954
	BN-184-13	10.129	1.215	-9.602
	BN-186-13	5.736	-5.544	-12.635
	BN-189-13	4.711	-7.249	-4.029
	BN-190-13	7.591	-0.271	-6.671
	BN-91-11	3.781	-4.965	-13.938
	BN-199-14	7.34	-4.373	-1.784
	BN-206-14	8.193	-4.838	-0.166
	BN-217-14	5.404	2.675	-10.014
	BN-220-14	4.907	-4.487	-5.919
	BN-223-14	8.937	-4.946	-2.644
	BN-229-14	8.267	-4.294	-5.258

Area	Drill Hole	Difference in Coordinates (Database—GPS)		
		Easting	Northing	Elevation
	BN-260-15	9.046	1.561	-14.806
	BN-283-15	5.72	-6.793	-3.571
	BN-287-15	4.25	-5.913	-13.401
	BN-294-15	6.938	-1.537	-15.068
	BN-59-11	4.996	-7.797	-15.983
	BN-89-11	1.242	-3.781	-4.193
	BU-37-17	8.962	-4.921	-15.677
	BU-41-17	1.938	-5.217	-2.634
	BU-52-17	6.439	0.01	-6.109
	BU-72-17	4.067	-1.833	-9.679
	BU-82-17	10.872	-4.969	-10.715
	BU-83-17	8.129	-3.348	-5.917
Los Filos	FS-45-10	2.627	-5.935	-2.849
	FS-46-10	1.594	-3.475	-3.393
	PEN-01-16	1.091	-4.197	-10.257
	PEN-02-16	0.158	-0.062	-8.595
	PEN-03-16	-6.229	0.707	-16.228
	PEN-04-16	-0.084	-2.182	-6.797
	FS-124-17	2.296	-2.457	-6.11
	FS10-09	-0.374	-5.518	-12.383
	FS-12-10	-1.757	-0.997	-9.041
	FS-20-10	2.361	-2.802	-9.905
	FS-21-10	2.283	-4.306	-7.39
	FS-22-10	0.044	-5.956	-13.322
	FS-27-10	-0.462	-0.222	-10.356
	FS-36-10	-1.914	-2.286	-9.651
	FS-53-11	-3.058	-0.894	-9.264
	FS-91-11	1.565	-3.039	-10.773
	FS-101-12	4.179	-0.975	-5.586
	FS-102-12	1.827	1.005	-6.04
	FS-103-12	0.669	0.959	-6.074
	FS-105-12	2.826	-1.842	-8.518
	FS-106-12	2.539	-0.948	-8.491
	FS-107-12	4.308	-3.175	-1.183
	FS-108-12	2.809	0.842	-3.196
	FS-110-12	1.987	-3.074	-8.494
	FS-111-12	0.746	0.664	-5.295
	FS-118-12	0.122	0.493	-10.024
	FS-121-12	0.606	-0.958	-8.073

12.3.2 Assay Validation

Assays were validated by comparing the gold assay values in the acQuire™ database against original laboratory assay certificates. Approximately 5% of drill holes were reviewed, as summarized in Table 12-2. A total of 51 drill holes was reviewed for the Bermejal–Guadalupe area and 107 drill holes for the Los Filos area, for a total of 158 holes covering the years 2004–2021. From these 158 drill holes, 204 assay certificates were reviewed, covering 24,481 samples. No errors were noted in the assay validation, aside from minor discrepancies in handling of below-detection-limit values.

Table 12-2: Assay Validation—Drill Holes Reviewed by Year and Area

Area	Year	Number of Drill Holes Reviewed
Bermejal–Guadalupe	2005	2
	2006	1
	2009	3
	2010	4
	2011	3
	2012	3
	2013	2
	2014	2
	2015	4
	2016	6
	2017	6
	2018	4
	2019	4
	2020	1
	2021	6
	Area Total	**51**
Los Filos	2004	4
	2005	6
	2006	5
	2007	6
	2008	6
	2009	8
	2010	7
	2011	7
	2012	6
	2013	4
	2014	6
	2015	7
	2016	6
	2017	7
	2018	11
	2019	4
	2020	2
	2021	5
	Area Total	**107**
	TOTAL	**158**

12.4 QA/QC Procedures

Equinox Gold has in place a well-established QA/QC program, described in detail in Section 11. Between 2003 and the time of Equinox Gold's acquisition of the Los Filos Mine Complex, a similar QA/QC program was in place, where standard reference material, blank, and duplicate samples were inserted into the sample stream regularly (Section 11.3 and Section 11.9).

QA/QC samples are continuously monitored, and any sample batches with blank or standard samples that outside ±3 standard deviations of the expected results, and which are failed, are rerun. Monthly QA/QC reports are prepared that track the performance of the laboratory on all standard, blank, and duplicate samples submitted.

In addition to company-inserted QA/QC samples, the assay laboratories insert their own QA/QC samples, with numerous checks in place to ensure reliable results. Laboratory QA/QC sample protocols have been reviewed and are operating to industry standards.

The QA/QC programs confirm that assays collected on the Los Filos Mine property were collected and processed according to industry standards, and the results are considered reliable for use for Mineral Resource and Mineral Reserve estimates.

12.5 Production

The Los Filos Mine has been operating since 1946, and at a large scale since 2007; it has produced approximately 5 Moz of gold to date, with annual production since 2007 varying from approximately 130,000 oz/a to 585,000 oz/a. There has been continued development of Mineral Resources and Mineral Reserves over this time. Reconciliation with mine production is the ultimate verification for the validity of the data used for Mineral Resource estimation and Mineral Reserve definition. In recent years, reconciliation of the resource model with mine production has agreed within 10% for tonnes, grade, and gold ounces (refer to Section 14.18), confirming that the Mineral Resource estimate is robust and reliable.

12.6 Conclusions

The Qualified Person finds the data to be sufficiently verified and adequate for use in Mineral Resource estimation and mine planning and engineering studies.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

Extensive testwork programs have been undertaken at different laboratories for the Los Filos Mine Complex over the last two decades. Metallurgical testwork on samples from the various deposits, ore sources, and ore types were conducted on drill core composites, considered representative of the ore deposit at the time of each test program. A summary list of the programs is included in Table 13-1.

Los Filos Open Pit (LFOP) uses geometallurgical domains for defining ore types, whereas Los Filos Underground (LFUG), Bermejal Open Pit (BOP), Bermejal Underground (BUG), and Guadalupe Open Pit (GOP) use rock-type domains for defining ore types. Targeted ore types by metallurgical domains and rock types are listed in Table 13-2 and Table 13-3, respectively. The relevant metallurgical programs prior to 2016 are presented and summarized in this section. The metallurgical test programs performed prior to 2016 were focused on validating the predicted recovery formulas for Los Filos Open Pit, Los Filos Underground, and Bermejal Open Pit that were created by Simon Hille. Metallurgical test programs performed during or after 2016 started to focus on the potential of using the CIL process to recover gold from ore that contained greater than 1% total sulphur, mainly from the Bermejal Open pit, Bermejal Underground and Guadalupe Open Pit ore sources. The relevant test programs carried out in 2016 or after are presented in detail in this section.

Table 13-1: Summary—Gold Extraction Metallurgical Testwork

Program	Ore	No. of Samples	Head Analysis	Bottle Roll Testwork	Compacted Permeability Testwork	Agglomeration Testwork	Comminution	Diagnostic Leach Test	Gravity	Carbon-in-Leach	Column Leach	Other
KCA 2005–2006	BOP	31	✓	✓	✓						✓	DETOX
KCA 2009	LFUG	7	✓	✓	✓	✓					✓	
	Nukay High Grade											
	Los Filos Low Grade											
KCA 2012	LFOP	39	✓	✓		✓					✓	
KCA 2013	LFOP	33	✓	✓		✓					✓	
	BOP											
	LFUG											
KCA 2014	LFOP	10	✓	✓			✓		✓			
	BOP											
	LFUG											
KCA 2014–Part 1	LFOP	18	✓	✓					✓		✓	
	BOP											
	LFUG											
KCA 2015–Part 2	LFOP	19	✓	✓		✓					✓	
	BOP											
KCA 2015	Peninsular zone	6	✓	✓		✓					✓	
KCA 2015	Bermejal Oxide & Intrusive	35	✓	✓								Acid-Base Accounting (ABA
KCA 2016	Cuerpo Centro	143	✓	✓		✓			✓		✓	Thickening & Filtration
	Cuerpo Este											

Program	Ore	No. of Samples	Head Analysis	Bottle Roll Testwork	Compacted Permeability Testwork	Agglomeration Testwork	Comminution	Diagnostic Leach Test	Gravity	Carbon-in-Leach	Column Leach	Other
	Cuerpo Oeste											
KCA 2017	BUG	11	✓	✓	✓	✓				✓	✓	Multi-Element Analysis
KCA 2018	BUG	6	✓	✓				✓		✓		
	BOP											
ALS 2018	GOP	6	✓					✓				Mineralogical Analyses Agitated Leach tests
KCA 2018	GOP	8	✓	✓								
Outotec 2018	BUG:BOP Blend	1										Thickening & Filtration
BQE/ALS 2018	BUG:BOP Blend	2										SART
KCA 2019	BUG:BOP Blend	1										DETOX
Diemme 2019	BUG:BOP Blend											Thickening & Filtration
ALS 2020	Guadalupe	10					✓					
KCA 2021	All Ore Sources	480	✓	✓		✓	✓	✓	✓	✓	✓	DETOX, Thickening & Filtration, Co-mingling CIL tailings with HL column tests

Note: BOP = Bermejal Open Pit; BUG = Bermejal Underground; GOP = Guadalupe Open Pit; LFOP = Los Filos Open Pit.

Table 13-2: Ore Type Summary by Geometallurgical Code

Deposit	Geometallurgical Domain	Comment
Los Filos Open Pit	Ia	Granodiorite, endoskarn granodiorite, and exoskarn, strongly clay-altered and sheared
	Ib	Granodiorite, moderately altered and sheared
	II	Mineralized carbonate, relatively hard and weakly broken
	III	Fresh endoskarn, hard and weakly sheared or broken
	IV	Exoskarn and jasperoid

Table 13-3: Ore Type Summary by Rock Type

Deposit	Rock Type	Comment
Los Filos—4P	Oxide	Oxide
	Carb	Limestone
	Gran	Granodiorite
Bermejal	Oxide	Oxide
	Intrusive	Granodiorite—Intrusive
	Carbonate	Carbonate
Nukay	Oxide	Oxide—Mixed or mineralized Limestone or Granodiorite mineralization types are not significant
Guadalupe	Oxide	Oxide
	Intrusive	Granodiorite—Intrusive
	Carbonate	Carbonate

13.1 Metallurgical Testwork for Los Filos and Bermejal Open Pits and Los Filos Underground

The metallurgical testwork programs focused on determining heap leach gold recovery and heap leach engineering design. The metallurgical testwork summarized in the following sections has been performed exclusively by Kappes, Cassiday & Associates (KCA) of Reno, Nevada, U.S.A., over the period from 2005 to 2015. Leach Inc. conducted an evaluation of heap leach (HL) gold recoveries early in 2005. The results were incorporated into the projection of gold recoveries based on testwork KCA performed in 1998 and 2004/2005, as well as McClelland Laboratories Inc. (MLI). Leach Inc's evaluation created a predicted gold recovery model for each ore type and for ROM and Crushed material. Leach Inc.'s model was applied to Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground ore sources. Table 13-4 shows Simon Hille's predicted gold recovery model, that was validated in 2016.

The testwork performed from 2005 to 2014 focused on crush size versus gold recovery; heap stability and agglomeration tests; fine ground bottle roll tests; and column leach tests.

Table 13-4: Simon Hille Predicted Gold Recovery Model (2016)

Ore Source	Lithology	Crushed Recovery	ROM Recovery
Los Filos Open Pit	Ia	76	64
	Ib	70	50
	II	54	45
	III	61	30
	IV	61	48
Bermejal Open Pit	Oxide	64	48
	Intrusive	68	58
	Carbonate	51	42
Los Filos Underground	All	80	-

Metallurgical tests were performed on each ore source and lithology, shown in Table 13-4. The crush size versus gold recovery was performed on crush sizes P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm for the column leach tests, and milling sizes of P_{80} 0.212, 0.150, 0.106, 0.075, and 0.053 mm. The best gold recovery for Crushed ore was found to be at a crush size of P_{100} 25 mm based on the column leach tests. The best gold recovery for milled ore size was found to be P_{80} 0.106 mm based on grind optimization bottle roll tests.

Agglomeration tests were performed to determine the quantity of cement required to achieve the KCA criteria for agglomeration of the ore at different crush sizes. The KCA criteria showed that 4 kg of cement per tonne of ore were required to pass the test. Compacted permeability tests were performed under different load conditions to determine the ultimate heap height achievable. Those test results showed that a heap height over 80 m high was achievable at a cement addition rate of 4 kg/t.

In 2015 testwork was performed to evaluate the critical inputs for the heap leach production forecast model because the ore types were considered to be too broad. The ore types had not been updated since before production start-up in 2007 when all the different ore types for each of the Los Filos Open Pit and Bermejal Open Pit were treated as one ore type, and assigned a single recovery value.

To update the production forecast model, the following changes were targeted:

- Assigning recovery values based on ore source (Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground), lithology (Intrusives, Oxides, Carbonates), and process destination (ROM pad or crushing plant)
- Updating the leach curves, leach times, and recovery values for each ore source, lithology, and process destination based on historical column leaching testwork
- Validating the leach curves and recovery values by conducting new column leach testwork on freshly collected samples
- Developing a calibrated bottle roll test as an abbreviated proxy for the column leach tests, to be used as a tool to validate expected future recovery values more quickly (i.e., results in several weeks for the bottle roll tests versus many months for column tests).

Results of the test programs are provided in Sections 13.1.6 and 13.1.7.

13.1.1 KCA (2005–2006)

Eighty-three super sacks of material from the Bermejal Open Pit deposit were composited into 31 samples from various declines within the open pit and sent to KCA for testwork. From the 31 composite samples, 15 separate composite samples were generated: six by location in decline ramps and nine according to lithology, gold content, and percent cyanide-soluble copper. In the nine-sample group, eight were described as oxide material and one as sulphide.

Testwork completed on all 15 composite samples included cyanide bottle roll leach tests. Additionally, compacted permeability tests were performed on two of the oxide bulk composites and column leach tests were completed on all eight of the oxide bulk composite samples: four samples of material as received; and four samples of material crushed to P_{100} 25 mm. Detoxification testwork was performed on two of the column leach tests after the cyanide leaching phase.

The purpose of the test program was to determine gold extractions through grinding to a P_{80} 0.075 mm that simulated milling the ore versus crushing to P_{80} 19 mm and performing column leach tests to simulate heap leaching.

Bottle Roll Testwork

Cyanide bottle roll leach tests reported an average gold extraction of 75.3% after 48 hours of leaching on material that was pulverized to P_{80} 0.075 mm. The average sodium cyanide sodium cyanide consumption was 2.52 kg/t ,and the average lime addition was 3.2 kg/t. The average silver extraction was 54.2%.

Compacted Permeability Testwork

Compacted permeability testwork was completed on two of the as-received oxide bulk composite samples under varying conditions. The variables examined were material type, particle size (P_{100} 150 mm and P_{100} 25 mm), and compaction loading (equivalent to 15, 30, 60, and 90 m of overall heap heights). The first oxide composite sample passed all of the permeability tests for both particle sizes tested, and all effective leach height conditions. The second oxide composite sample failed the permeability tests for both particle sizes tested due to low flow rates and failed on all effective leach height conditions.

Column Leach Testwork

Column leach tests were conducted on the eight oxide bulk composite material samples—from the nine selected from the 15 original composite samples on the basis of lithology, gold content, and percent cyanide-soluble copper. The first four composite samples were completed on as-received material (P_{100} 150 mm), whereas the second set of four columns contained material crushed to P_{100} 25 mm. The columns were all allowed to actively leach for between 122 and 222 days. For the four as-received samples (i.e., non-crushed), the overall average gold extraction was 62% after an average leach period of 222 days based on an average calculated head grade of 0.51 g/t Au. For the four crushed samples (P_{100} 25 mm), the overall average gold extraction was 62% after an average leach period of 126 days based on an average calculated head grade of 1.11 g/t Au.

Detoxification Testwork

Following the column leach testwork, two of the column tests on the crushed material were used for detoxification testwork. Total cyanide (CN_{TOT}) and weak acid dissociable (CN_{WAD}) cyanide analyses were conducted periodically throughout the duration of the detoxification testing, until a CN_{WAD} value of less than 0.2 mg/L was obtained for three consecutive days.

13.1.2 KCA (2009)

In January 2009, 92 drums of mineralized material were sent to KCA for testwork. The received material comprised seven samples and were designated as four Nukay high-grade samples, one Los Filos Open Pit high-grade sample and two Los Filos Open Pit low-grade samples. The four Nukay high-grade samples were sourced from the Nukay West, La Conchita, La Subida, and San Andrés zones.

Metallurgical testwork completed on the Nukay and Los Filos material included milled bottle roll leach testwork, percolation testwork, compacted permeability testwork, and column leach testwork. The purpose of the testwork was to determine the gold recovery based on milling (bottle roll tests) and heap leach (column leach tests) methods. Percolation and compacted permeability tests were performed to determine the maximum heap height that could be achieved without a significant reduction in solution percolation.

Column leach tests were conducted in duplicate on the Nukay high-grade composite material that had been stage-crushed to P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm. Similarly, column leach tests were conducted in duplicate on the Los Filos high-grade sample material that was stage-crushed to P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm.

Bottle Roll Testwork

The bottle roll leach testwork was completed in several test series. A series of time-of-grind versus size tests was completed on 1 kg samples of material crushed to P_{100} 1.70 mm. Each 1 kg sample was subjected to different grind times in order to achieve the following P_{80} grind sizes; 0.6 mm, 0.3 mm, 0.15 mm, 0.075 mm and 0.038 mm. The grind tests were completed for the four Nukay high-grade samples, as well as the LFOP high-grade sample. Results included the following:

- 10-hour leach tests with 2.0 g/L NaCN, all grind sizes:
  - For the Nukay high-grade samples, extraction rates from the coarsest grind to the finest grind ranged from 83% to 92% Au. Silver extraction ranged from 30% to 65%, with the highest extraction in the 0.15 mm grind fraction. Sodium cyanide consumption ranged from 1.10 to 1.68 kg/t.
  - For the Los Filos high-grade composite, extraction rates ranged from 76% to 94% Au and 11% to 23% Ag. Sodium cyanide consumption was from 0.42 to 0.61 kg/t. Higher cyanide consumptions were noted in the coarser grind sizes.
- 24-hour leach tests with 0.25 g/L NaCN on 0.075 mm material revealed:
  - Extraction rates for the Nukay high-grade composite were 34% Au and 10% Ag. Sodium cyanide consumption was 1.01 kg/t.
  - For the Los Filos high-grade sample, extraction rates were 94% Au and 10% Ag. Sodium cyanide consumption was 0.20 g/t.

Agglomeration Testwork

Preliminary agglomeration testwork was completed on the Nukay high-grade composite material and the Los Filos high-grade sample material stage-crushed to P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm.

The P_{100} 50 mm crushed material was agglomerated with the addition of 0, 4, 7.5, and 10 kg/t of Type II cement. Both the P_{100} 25 mm and P_{100} 12.5 mm crushed material were agglomerated with the addition of 0, 7.5, 10, and 15 kg/t of Type II cement.

Based on the results of these agglomeration tests, the Nukay high-grade composite and Los Filos high-grade sample material stage-crushed to P_{100} 50 mm were agglomerated with the equivalent of 4 kg/t of Type II Cement. The Nukay high-grade composite material and the Los Filos high-grade sample material stage-crushed to P_{100} 25 mm and P_{100} 12.5 mm were agglomerated with the equivalent of 7.5 kg/t of cement.

Compacted Permeability Testwork

Compacted permeability testwork was completed on pulp-agglomerated material. A 40 kg portion of Los Filos low-grade material was stage-crushed to P_{100} 50 mm and blended with a 4 kg portion of pulverized Nukay high-grade composite; the Los Filos high-grade sample material was agglomerated with 7.5 kg/t cement. The pulp-agglomerated material was then used for compacted permeability testwork, with compaction loadings that simulated equivalent heap heights of 60 and 80 m.

Compacted permeability testwork was also completed on the Nukay high-grade composite material and the Los Filos high-grade sample material, both stage-crushed to P_{100} 25 mm and P_{100} 12.5 mm. The purpose of the testwork was to examine the permeability of the Nukay high-grade composite material and the Los Filos high-grade sample material under varying conditions. The variables examined were particle size (P_{100} 25 mm and P_{100} 12.5 mm), agglomeration cement levels (0, 4, and 7.5 kg/t cement), and compaction loading simulating an equivalent heap height of 80 m.

Compacted permeability testwork was also completed on Los Filos low-grade material stage-crushed to P_{100} 50 mm at agglomeration cement levels of 0 and 4 kg/t cement ,and a simulated equivalent heap height of 80 m. For this series of tests, the Nukay high-grade composite material stage-crushed to P_{100} 12.5 mm with no cement added failed at an equivalent heap height of 80 m. The remaining compacted permeability tests passed.

Column Leach Testwork

In all, 16 separate column leach tests were completed on the Nukay high-grade composite material and Los Filos high-grade sample material. Column leach tests were conducted in duplicate on the Nukay high-grade composite material stage-crushed to P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm. Similarly, column leach tests were conducted in duplicate on Los Filos high-grade sample material stage-crushed to P_{100} 50 mm, P_{100} 25 mm, and P_{100} 12.5 mm. Results included:

- Nukay high-grade composite—75% to 85% Au extracted at a sodium cyanide consumption of 1.38 to 1.60 kg/t over a 143- to 168-day period. Cement addition ranged from 4 to 7.5 kg/t.
- Los Filos high-grade sample—82% to 85% Au extracted at a sodium cyanide consumption of 0.67 to 0.83 kg/t over a 145- to 167-day period. Cement addition ranged from 4 to 7.5 kg/t.

A series of four pulp-agglomerated column leach tests was completed on milled and partially leached portions of the Nukay high-grade composite and Los Filos high-grade sample material. Material from each sample was milled to a target grind size of P_{100} 0.30 mm and P_{100} 0.075 mm and used for a 10-hour bottle roll leach test. The tailings from the bottle roll leach tests were then agglomerated with portions of the barren rock material stage-crushed to P_{100} 50 mm. The ratio of pulp to barren rock material was 1:10.

The results indicated the following:

- For the Nukay high-grade composite, pulp agglomerated—38% to 50% Au extraction; sodium cyanide consumption of 7.33 to 7.53 kg/t; leach time of 118 days to 140 days; cement addition of 4 kg/t.
- For Los Filos high-grade sample, pulp agglomerated—34% to 56% Au extraction; sodium cyanide consumption of 7.05 to 7.48 kg/t; leach time of 118 days to 140 days; cement addition of 4 kg/t.

Column leaching of the pulp-agglomerated Nukay high-grade material (P_{100} 0.30 mm and P_{100} 0.075 mm) resulted in additional gold recovery of 9% and 4%, for a total recovery of 91% and 93%, respectively. Column leaching of the pulp-agglomerated Los Filos high-grade material (P_{100} 0.30 mm and P_{100} 0.075 mm) resulted in additional recovery of 9% and 3% gold, for a total recovery of 93% Au for both column tests.

13.1.3 KCA (2012)

In June 2012, KCA undertook metallurgical testwork on samples from the Agüita, El Grande, Creston Rojo, Zona 70, and Filos Sur zones of the Los Filos Open Pit. A total of fifty-five 200 L drums of drill core material were combined into 39 metallurgical composites based on deposit name, material type (Intrusive, Oxide, or Carbonate), and grade range (low, medium, or high). Portions from each composite were then prepared for head analyses, head screen analyses with assays by size fraction, bottle roll leach testing, agglomeration testing, and column leach testing.

Bottle Roll Testwork

Bottle roll leach testing was conducted on a portion of material from each composite. An additional bottle roll test was conducted on selected samples from the Crestón Rojo, Zona 70, and Filos Sur mineralization for comparison purposes.

Each bottle roll test was conducted at a grind size of P_{80} 0.075 mm for 96 hours, with solution sampling for pH, dissolved oxygen, sodium cyanide , Au, Ag, and Cu throughout the test. Sodium cyanide was added and maintained at 1.0 g/L of solution. The pH of the solution was maintained at 11.0 with the addition of $Ca(OH)_2$ (hydrated lime). Results included the following:

- Agüita—intrusive composite extraction values from 75% to 92% Au, and sodium cyanide consumption from 0.60 to 1.03 kg/t; oxide composite extraction values from 83% to 96% Au, and sodium cyanide consumption from 0.09 to 3.12 kg/t; carbonate composite extraction values from 80% to 91% Au, and sodium cyanide consumption from 0.84 to 2.23 kg/t.
- El Grande—intrusive composite extraction values from 95% to 96% Au, and sodium cyanide consumption from 0.20 to 0.38 kg/t; oxide composite extraction values from 82% to 95% Au, and sodium cyanide consumption from 0.30 to 3.56 kg/t; carbonate composite extraction values from 79% to 88% Au, and sodium cyanide consumption from 0.11 to 1.43 kg/t.
- Crestón Rojo—intrusive composite extraction values from 81% to 97% Au, and sodium cyanide consumption from 0.19 to 0.26 kg/t; oxide composite extraction values from 63% to 88% Au, and sodium cyanide consumption from 0.98 to 2.15 kg/t; carbonate composite extraction values from 79% to 94% Au, and sodium cyanide consumption from 0.13 to 2.95 kg/t.
- Zona 70—intrusive composite extraction values from 82% to 95% Au, and sodium cyanide consumption from 0.18 to 2.78 kg/t; oxide composite extraction values from 88% to 94% Au, and sodium cyanide consumption from 0.17 to 0.79 kg/t; carbonate composite extraction values from 69% to 95% Au, and sodium cyanide consumption from 0.46 to 1.58 kg/t.
- Filos Sur—intrusive composite extraction values from 39% to 88% Au, and sodium cyanide consumption from 0.24 to 2.34 kg/t.

Agglomeration Testwork

Preliminary agglomeration testwork was conducted on material from each composite. Each test was conducted using 2 kg of material crushed to P_{100} 25 mm and agglomerated with 0, 2, 6 and 10 kg/t cement. Several tests failed the criteria established by KCA due to solution ponding when no cement was added. Additional tests failed due to high slump at the target addition of 2 kg/t cement.

Column Leach Testwork

An individual column leach test was conducted on each composite. Each column test was conducted in a 152 mm inside-diameter column, using material crushed to P_{100} 25 mm and blended with cement as necessary. Tests ran for periods of 60 to 105 days.

Results included the following:

- Agüita—intrusive composite extraction values from 48% to 82% Au, 9% to 40% Ag, and sodium cyanide consumption from 0.64 to 1.07 kg/t; oxide composite extraction values from 63% to 87% Au, 5% to 25% Ag, and sodium cyanide consumption from 0.49 to 1.53 kg/t; carbonate composite extraction values from 59% to 73% Au, 10% to 20% Ag, and sodium cyanide consumption from 0.26 to 0.83 kg/t.
- El Grande—intrusive composite extraction values from 80% to 95% Au, 7% to 36% Ag, and sodium cyanide consumption from 0.62 to 1.25 kg/t; oxide composite extraction values from 19% to 73% Au, 3% to 14% Ag, and sodium cyanide consumption from 0.66 to 1.95 kg/t; carbonate composite extraction values from 33% to 57% Au, 6% to 21% Ag, and sodium cyanide consumption from 0.39 to 1.64 kg/t.
- Crestón Rojo—intrusive composite extraction values from 73% to 89% Au, 30% to 52% Ag, and sodium cyanide consumption from 0.67 to 1.33 kg/t; oxide composite extraction values from 57% to 74% Au, 14% to 19% Ag, and sodium cyanide consumption from 0.98 to 1.57 kg/t; carbonate composite extraction values from 62% to 80% Au, 13% to 36% Ag, and sodium cyanide consumption from 0.70 to 1.72 kg/t.
- Zona 70—intrusive composite extraction values from 40% to 75% Au, 11% to 33% Ag, and sodium cyanide consumption from 0.78 to 1.54 kg/t; oxide composite extraction values from 39% to 89% Au, 2% to 15% Ag, and sodium cyanide consumption from 0.62 to 0.83 kg/t; carbonate composite extraction values from 44% to 71% Au, 8% to 35% Ag, and sodium cyanide consumption from 0.17 to 0.62 kg/t.
- Filos Sur—intrusive composite extraction values from 31% to 73% Au, 37% to 52% Ag, and sodium cyanide consumption from 0.51 to 1.28 kg/t.

13.1.4 KCA (2013)

In May 2013, 33 individual samples were submitted to KCA for metallurgical testwork in 17 drums of mineralized material. The samples were identified from Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground ore sources based on material types (by lithologic zones) and grade range (low, medium, or high). Portions from each composite were then prepared for bottle roll leach testing, agglomeration testing, and column leach testing. The purpose of the testwork was to confirm gold recoveries for milling to P_{80} 0.075 mm and heap leaching at P_{100} 25 mm for the various lithologies for each ore source.

Bottle Roll Testwork

Cyanide bottle roll leach tests were conducted on each test sample at a target grind size of P_{80} 0.075 mm for a period of 96 hours, with solution sampling for pH, dissolved oxygen, sodium cyanide, gold, silver, and copper performed at timed intervals throughout the test. Sodium cyanide was added and maintained at 1.0 g/L. The pH of the solution was maintained at 10.5 to 11.0 with the addition of hydrated lime.

Agglomeration Testwork

Preliminary agglomeration testwork was conducted on each sample. Each test was conducted using 2 kg portions of material crushed to P_{100} 25 mm and agglomerated with 0, 2, 6, and 10 kg/t cement.

When no cement was added, several samples failed the criteria established by KCA due to solution ponding, and several samples also failed due to low flow-out accompanied with high slump or low pH. Additional samples failed due to pellet breakdown at the target addition of 2 kg/t cement.

Column Leach Testwork

In all, 33 column leach tests were conducted on a portion of material from each sample. Each column test used material crushed to P_{100} 25 mm, agglomerated with cement as necessary, and leached for a period of 61 days with a sodium cyanide solution.

The results of the column leach tests reported gold extractions ranging from 1% to 97% based on calculated heads that ranged from 0.14 to 42.24 g/t Au. Silver extractions ranged from 1% to 41% based on calculated heads that ranged from 2.64 to 2,147 g/t Ag. Sodium cyanide consumptions ranged from 0.13 to 2.63 kg/t. Each column was blended with up to 6.3 kg/t hydrated lime or agglomerated with up to 7.9 kg/t cement.

13.1.5 KCA (2014a)

Selected reject material from 30 samples from the completed 2013 testwork program on Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground materials were removed from storage at KCA and used to develop ten composite samples for use in a new metallurgical test program in 2014. Additionally, individual samples of material from the same 2013 test program were used for cyanide shake testwork and preg-robbing testwork. An LFUG sample was subjected to gravity testwork.

Bottle Roll Testwork

Bottle roll leach testwork was performed on each composite. One series of tests was performed for grind size optimization (target milling sizes of P_{80} 0.212, 0.150, 0.106, 0.075, and 0.053 mm) with the Los Filos Underground and Los Filos Open Pit ore reporting a gold extraction greater than 90% at a grind size of P_{80} 0.106 mm. BOP gold extraction was greater than 80% at a grind size of P_{80} 0.106 mm. The second series of tests was used for sodium cyanide optimization (target sodium cyanide levels of 0.5, 1.0, 2.0, and 5.0 g/L) with a target milling size of P_{80} 0.150 mm. The gold extraction for all samples was greater than 85% except for Bermejal Open Pit (V) which contained a high percentage of total sulphur. The sodium cyanide consumption for Los Filos Open Pit ore averaged 1.8 kg/t and for Bermejal Open Pit ore averaged 2.5 kg/t.

Comminution Testwork

Twenty-one samples were selected for Bond work index (BWi) testwork and bulk mineralogical analyses. The purpose of the laboratory testwork and the mineralogical analyses on the same samples was to gain an understanding of the variation in ore hardness of the deposits and to correlate the mineralogy to the BWi values. Mineralogical analyses were performed using X-ray diffraction (XRD), cation exchange capacity (CEC) and chemical analyses via ICP analyses.

A regression analysis was performed for Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground samples, and a good correlation (R^2 of 0.78) was observed between the actual BWi values and the predicted BWi values based on mineralogy, presented in Table 13-5.

Table 13-5: Summary of Predicted vs. Measured Bond Work Indices (BWi)

Description	Rock Type	Predicted BWi (kWh/t)	Actual BWi (kWh/t)
Los Filos (UG)	Oxide	10.6	9.9
Los Filos (Ia)	Diorite	14.6	15[1]
Los Filos (Ib)	Endoskarn	14.4	15.8
Los Filos (II)	Limestone	8.8	9.7
Los Filos (III)	Granodiorite	14.2	14.2
Los Filos (IV)	Endoskarn	13.4	12.6
Bermejal (Ia)	Intrusive	14.2	12.1
Bermejal (II)	Carbonate	9.0	8.1
Bermejal (IV)	Oxide	12.4	11.5
Bermejal (V)	Sulphide	13.6	12.7
Los Filos (F-Ia-BL)	Diorite	10.8	13.3
Los Filos (F-II)	Limestone	8.2	6.8
Los Filos (F-III-AL)	Granodiorite	14.0	14.6
Los Filos (F-IV)	Exoskarn	11.3	13.1
Los Filos (F-Gd-Ia)	Granodiorite	14.7	14.7
Bermejal (B-Ia)	Intrusive	12.7	13[1]
Bermejal (B-III)	Sulphide	13.4	13.6
Bermejal (B-IV)	Oxide	12.2	12.2
Bermejal (B-II-AL)	Carbonate	13.1	13.3
Los Filos (UG-SS)	Oxide	10.7	10.5
Los Filos (UG-SN)	Oxide	13.2	12.6

Note: [1] Samples Los Filos (Ia) and Bermejal (B-Ia) were noted to be very soft and contained high amounts of find material which may have led to inaccurate BWi results.

Gravity Testwork

Gravity testwork was completed on the Los Filos UG Zone sample to generate a concentrate product. Material crushed to a nominal size of 1.70 mm from the selected samples was size-adjusted to P_{80} 0.710 mm and used for this testwork.

The gravity testwork showed that 22.7% of the gold will report to a concentrate that is 0.3% of the total sample used.

13.1.6 KCA (2014b)

Goldcorp initiated a formal review of the Los Filos and Bermejal operations in Q1 2015 to evaluate the critical inputs for the heap leach production forecast model, which had not been updated since before production start-up in 2007. At the time, the ore domains were considered to be too broad:

all the different ore types for each of the Los Filos and Bermejal Open Pits were grouped into a single ore type and assigned a single recovery value.

To update the production forecast model, the following changes were targeted:

- Assigning recovery values based on ore source (Los Filos Open Pit, Bermejal Open Pit, and Los Filos Underground), lithology (Intrusives, Oxides, Carbonates), and process destination (ROM pad or crushing plant).
- Updating the leach curves, leach times, and recovery values for each ore source, lithology, and process destination based on historical column leaching testwork.
- Validating the leach curves and recovery values by conducting new column leach testwork on freshly collected samples.
- Developing a calibrated bottle roll test as an abbreviated proxy for the column leach tests, to be used as a tool to validate expected future recovery values more quickly (i.e., results in several weeks for the bottle roll tests versus many months for column tests).

In November 2014, 18 samples were submitted for metallurgical testwork from 15 drums of material. The samples represented specific components of mineralization in Los Filos and Bermejal Open Pits and Los Filos Underground. Metallurgical testwork included bottle roll tests on samples ground to P_{80} 0.106 and 25 mm, as well as column tests on material crushed to P_{100} 25 mm.

Bottle Roll Testwork

The standard 96-hour bottle roll leach tests on the finely ground individual samples achieved gold extractions ranging from 45% to 97% from test samples that ranged from 0.67 to 14.5 g/t Au, and silver extractions ranging from 7% to 59% from test samples that ranged from 1.91 to 144.9 g/t Ag. Sodium cyanide consumption ranged from 0.11 to 7.49 kg/t. Lime addition ranged from 1 to 4 kg/t. The results indicate generally high gold extractions and moderate reagent consumptions; however, poor gold and silver extractions and high reagent consumption were reported for four BOP samples containing significant levels of sulphide mineralization.

The 10-day coarse ore bottle roll tests on material crushed to P_{100} 25 mm resulted in gold extractions that ranged from 14% to 79%, and silver extractions from 3% to 25%. Sodium cyanide consumption ranged from 0.01 to 4.90 kg/t, and lime addition ranged from 0.5 to 4.0 kg/t.

Column Leach Testwork

Column leach tests were run for 131 days and resulted in gold extractions ranging from 26% to 89%, and silver extractions that ranged from 4% to 40%. Sodium cyanide consumption ranged from 0.95 to 4.11 kg/t, and lime addition ranged from 2.0 to 3.0 kg/t. Cement addition ranged from 3.0 to 8.0 kg/t when the test sample was agglomerated. Column leach testing produced better gold extraction results than the bottle roll tests at the 25 mm crush size. This is attributed to the extended leach time in the column tests

Gravity Testwork

Gravity testwork was completed on four samples to generate a concentrate product. The samples selected were Los Filos Open Pit (F-IV-AL and F-IV-BL), Bermejal Open Pit (B-II-AL), and Los Filos

Underground. The samples were individually crushed to a nominal size of 1.70 mm, then size adjusted to P_{80} 0.710 mm and used for this testwork.

The testwork showed that the Los Filos Open Pit and Underground high-grade gold ore are amenable to gravity concentration. The Los Filos Underground recovered 19.1% of the gold in a concentrate containing 1.0% of the feed material. The Los Filos Open Pit samples recovered 29.9% and 37.2% of the gold in a concentrate containing 1.3% and 0.2% of the feed material for F-IV-AL and F-IV-BL, respectively. The Bermejal Open Pit material was not amenable to gravity concentration.

13.1.7 KCA (2015a)

The second part of the testing program was undertaken on fresh ore samples collected in 2015.

From June to August 2015, KCA received a total of ten drums of samples from the Mine. This material was combined into 19 individual samples based on information provided by Goldcorp. These drums contained ten distinct samples representing the Los Filos Open Pit and nine samples representing the Bermejal Open Pit deposit. Metallurgical testwork included bottle roll and column tests on samples crushed to P_{100} 25 mm.

Bottle Roll Testwork

The 10-day coarse-ore bottle roll tests on Los Filos and Bermejal Open Pit samples crushed to P_{100} 25 mm achieved gold extractions ranging from 26% to 86% and silver extractions ranging from 3% to 34%. Gold and silver extractions did not correlate with the head grade of the samples. Sodium cyanide consumption ranged from 0.08 to 1.45 kg/t, and hydrated lime consumption ranged from 0.50 to 4.50 kg/t.

Column Leach Testwork

Column leach tests were conducted for 75 days on Los Filos and Bermejal Open Pit samples crushed to P_{100} 25 mm. Gold extractions were from 22% to 88% in the Los Filos Open Pit samples that had been agglomerated with 6 to 8 kg/t cement. Sodium cyanide consumption ranged from 0.09 to 1.25 kg/t. Gold extractions ranged from 50% to 89% in the Bermejal Open Pit samples that had been agglomerated with 5.5 to 11.9 kg/t cement. Sodium cyanide consumption ranged from 0.19 to 1.15 kg/t.

Silver extractions ranged from 2% to 23% for the Los Filos Open Pit samples that had been agglomerated with 6 to 8 kg/t of cement. Sodium cyanide consumption ranged from 0.09 to 1.25 kg/t. Silver extractions ranged from 2% to 13% in the Bermejal Open Pit samples that had been agglomerated with 5.5 to 11.9 kg/t cement. Sodium cyanide consumption ranged from 0.19 to 1.15 kg/t.

The gold extraction results of column leach tests for the Los Filos and Bermejal Open Pit samples were greater than the bottle roll extractions in almost all tests. This is likely due to the greater leach time for the column tests and increased diffusion of the leach solution into the coarse mineral grains.

13.1.8 KCA (2015b) Bermejal Oxide and Intrusive

In May 2015, KCA received 217 individual core samples of Bermejal Open Pit oxide and intrusive material for metallurgical testwork. The received samples were combined into 35 composite samples based on lot number and lithology, of which 18 were Intrusives and 17 were Oxides. Metallurgical testwork included bottle roll tests and acid-base accounting (ABA) tests.

Bottle Roll Testwork

10-day coarse-ore bottle roll tests prepared to a grind size of P_{100} 25 mm were performed on all the composite samples. Gold extraction on the intrusive samples ranged from 10% to 75%. Sodium cyanide consumption ranged from 0.27 to 4.8 kg/t and lime addition ranged from 1 to 4.5 kg/t. Gold extraction on the oxide samples ranged from 21% to 64%. Sodium cyanide consumption ranged from 0.53 to 5.77 kg/t, and lime addition ranged from 1 to 4.5 kg/t.

Acid-Base Accounting Testwork

It is generally accepted that an ABA value greater than 20 indicates a non-acid producing material (acid-neutralizing material), and that an ABA value less than 20 is an acid-generating material. Based on the testwork, every sample in this test program would be classified as non-acid producing, although one intrusive sample had a value slightly below 20 (19.1).

13.1.9 KCA (2015c) Peninsular

During May 2015, KCA received 331 samples of oxide material from the Peninsular zone. These samples were composited into six test composites, which were crushed to P_{100} 25 mm, then subjected to head analyses, head screen analyses with assays by size fraction, bottle roll leach testwork, agglomeration testwork, and column leach testwork.

Bottle Roll Testwork

10-day coarse ore bottle roll tests achieved gold extractions that ranged from 50% to 80%. Sodium cyanide consumption ranged from 0.33 to 1.72 kg/t, and lime addition ranged from 0.75 to 1.50 kg/t. No sulphides or significant levels of deleterious metals were found in the samples. One sample was determined to be “preg-robbing.”

Agglomeration Testwork

Agglomeration tests were conducted using 2 kg portions of the material at the crushed size of P_{100} 25 mm. The 2 kg portions were agglomerated with 4, 6, 8, and 10 kg of cement. The purpose of the percolation tests was to examine the permeability of the material under various cement agglomeration levels. The percolation tests were conducted in small (75 mm inside diameter) columns using varying amounts of cement levels with no compressive load applied. All agglomeration tests passed the criteria established by KCA. The material used for leach testing was agglomerated with 3 kg/t of cement of material leached.

Column Leach Testwork

The results of column leach tests conducted for 76 days reported gold extractions that ranged from 57% to 81%. Sodium cyanide consumption ranged from 0.49 to 2.06 kg/t, and lime addition was 3.0 kg/t.

The results of both the bottle roll and column leach tests for the Peninsular oxide samples at the same crush size (P_{100} 25 mm) were compared and it was noted that the bottle roll test extractions were greater than the column test extractions in two of the tests; the four remaining samples showed higher extraction values in the column leach tests.

13.2 Metallurgical Testwork for Bermejal Underground

The metallurgical testwork programs focused on comparing heap leach gold recovery to CIL gold recovery and supporting CIL engineering design. KCA performed the metallurgical testwork described in the following sections from 2015 to 2019. Thickening and filtration work was performed by Outotec in 2018 and by Diemme in 2019. Testwork of sulphidization–acidification–recycling–thickening (SART) was performed by BQE/ALS in 2018.

The Bermejal Underground ore source was tested by KCA in 2016 based on three different locations, and by bottle roll testwork, gravity-recoverable gold (GRG) testwork, agglomeration testwork, column leach testwork and thickening and filtration testwork.

The bottle roll, GRG and thickening and filtration testwork was performed to define gold recoveries and design parameters for milled ore for a CIL process flow sheet. The bottle roll tests recovered over 90% of the gold in 96 hours. The GRG testwork showed that the gold recovery could be increased by 3% to 5%. Thickening and filtration testwork that Pocock Industrial, Inc. (Pocock), performed reported that a conventional or a high-rate thickener could be used to achieve an underflow density of 59% to 64% solids. Vacuum filtration testwork showed that flocculation of the ore was required to reach a filter cake moisture content between 22% and 30%. Pressure filtration was better suited in achieving a filter cake moisture content of less than 15%.

Agglomeration and column leach testwork was performed to determine the quantity of cement required to maintain optimum percolation of solution in the column leach tests. The column leach tests were performed on fine-grained material with a P_{80} 2.2 mm, and required 10 kg of cement per tonne of ore. The reported gold recovery for the column leach tests ranged between 77% and 91%.

A second metallurgical test program was conducted on drill core samples that were classified into five distinct lithologic zones divided into above-sill, in-sill, and below-sill. Section 13.2.2 describes in detail the different lithologic zones and test results. The samples were subjected to bottle roll tests, agitated leach tests and column leach tests. The bottle roll and agitated leach test results showed that milling the ore to a P_{80} 75 µm would recover 76% to 95% of the gold in 96 hours. Samples that contained higher than 1% total sulphur reported gold recoveries between 75% and 93%, showing that total sulphur did not adversely affect gold recovery when milled rather than heap leaching. Column leach tests were performed on material crushed to P_{100} 25 mm and leached for 93 days. The gold recovery results from the column leach tests ranged between 53% and 79%. It was noted that the granodiorite above-sill samples reported less than 60% gold recovery due to high total sulphur content. Details of the results are provided in Section 13.2.2.

13.2.1 KCA (2016)

During September 2016, KCA received three drums for metallurgical testing containing 143 samples from the Bermejal Underground deposit, which represented material from Cuerpo Centro, Cuerpo Este, and Cuerpo Oeste areas of the ore source. The Bermejal Underground ore source has now been expanded, and these samples would now correspond to the West Sector, Central Sector, and the southwestern portion of the West Sector, respectively. The samples comprised assay reject material. The metallurgical program included bottle roll leach, column leach, gravity, and agglomeration testwork.

Head Analyses

Portions of the head material were pulverized and analyzed for gold and silver by standard fire assay and wet chemistry methods. Head material was also assayed semi-quantitatively for an additional series of elements and for whole rock constituents. In addition to these semi-quantitative analyses, the head material was assayed by quantitative methods for carbon, sulphur, and mercury. A cyanide shake test was also conducted on a portion of the pulverized head material. The sample average assays ranged from 6.9 to 10.5 g/t Au and 7.4 to 31.6 g/t Ag.

Bottle Roll Testwork

Baseline bottle roll testwork was conducted on each separate sample at a target grind size of P_{80} 0.075 mm. The results of the initial baseline bottle roll testwork are summarized in Table 13-6.

Table 13-6: Bottle Roll Test Parameters and Results on Ground Samples (P_{80} 0.075 mm) of Bermejal Underground

Location/Description as submitted	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
West Sector/Cuerpo Centro	7.23	96	96	1.17	3.00
Southwest end of West Sector / Cuerpo Oeste	6.05	90	96	3.08	2.50
Central Sector/Cuerpo Este	10.08	93	96	2.08	2.75

After the baseline tests were completed, additional bottle roll tests were conducted on each sample to optimize grind size, sodium cyanide concentration, and leach time. Additionally, oxygen injection was tested on each sample under optimized conditions.

The first test series was conducted to evaluate gold extraction versus grind size over a range from P_{80} 0.150 mm to P_{80} 0.053 mm. All leach tests were conducted for 96 hours, with sub-sampling of solution at timed intervals. When comparing gold extraction with respect to grind size, it was determined that a target size of P_{80} 0.063 mm to P_{80} 0.075 mm would be the ideal grind size, as it yielded favourable gold extractions of 90% to 97%. While extraction continued to increase slightly as the particle size decreased in the Cuerpo Oeste zone only, the gold extraction in the Cuerpo Centro and Cuerpo Este zones were optimal at this grind size range.

The second series of tests was conducted to evaluate gold extraction versus sodium cyanide concentration over a range from 0.5 to 3.0 g/L NaCN, while maintaining the grind size at P_{80} 0.063 mm for Cuerpo Centro and Cuerpo Oeste and P_{80} 0.075 mm for Cuerpo Este. When comparing gold extraction with respect to cyanide concentration, it was determined that a target sodium cyanide level of 1.0 g/L would be optimum.

The third series of tests was conducted to evaluate leach retention time at 24, 32, and 40 hours, while maintaining the grind size at P_{80} 0.063 mm for Cuerpo Central and Cuerpo Oeste samples and P_{80} 0.075 mm for the Cuerpo Este sample. The cyanide concentration was maintained at 1.0 g/L NaCN. When comparing gold extraction with respect to leach times, it was determined that a target time of 32 hours would be ideal for all three composites, as this leach time yielded favourable gold extractions of 90% to 96%.

The higher sodium cyanide consumption shown for the Bermejal Underground material is thought to be due to the higher cyanide-soluble copper values. Total copper values averaged 0.3% Cu, and soluble copper averaged 0.07%.

From the bottle roll and agitated leach testwork, chemical compositions of the samples were measured specifically for carbon, sulphur, and copper content. The results are shown in Table 13-7. Total sulphur was low, and ranged from 0.06% to 0.18%, and below detection limits for sulphide sulphur for all samples. Total copper ranged from 0.23% to 0.40%, and cyanide-soluble copper was low to moderate (15% to 24% of the total copper values).

Table 13-7: Summary of Chemical Composition Analyses from Bottle Roll tests of Bermejal Underground

Location/Description	Calculated Head (g/t Au)	Total Carbon (%)	Organic Carbon (%)	Total Sulphur (%)	Sulphide Sulphur (%)	Total Copper (%)	NaCN Soluble Copper (mg/kg)
West Sector/Cuerpo Centro	7.23	0. 80	0.03	0.06	<0.01	0.23	0.035
Southwest end of West Sector/Cuerpo Oeste	6.05	3.28	0.14	0.08	<0.01	0.4	0.096
Central Sector/Cuerpo Este	10.08	1.37	0.13	0.18	<0.01	0.35	0.074

Gravity Concentration Testwork

The optimized bottle roll leach test results were compared with the gravity test results to determine if generating a preliminary gravity concentrate prior to leaching would be beneficial with respect to gold and silver extraction, as well as sodium cyanide consumption and lime addition. The gold recovery for a gravity-concentrating phase followed by the gravity tailings being leached in a bottle roll versus the gold recovery from just leaching the material in a bottle roll showed a slight improvement in the overall recovery. The differential between the two tests is shown in Table 13-8.

Table 13-8: Overall Improvement of Gravity Testwork vs. Bottle Roll Tests of Bermejal Underground

Location/Description	Au Extracted (Differential) (%)	NaCN Consumption Differential (kg/t)	$Ca(OH)_2$ Addition Differential (kg/t)
West Sector/Cuerpo Centro	−1	−0.50	−0.21
Southwest End of West Sector/Cuerpo Oeste	+3	−0.21	−0.73
Central Sector/Cuerpo Este	+5	−0.48	−0.41

Agglomeration Testwork

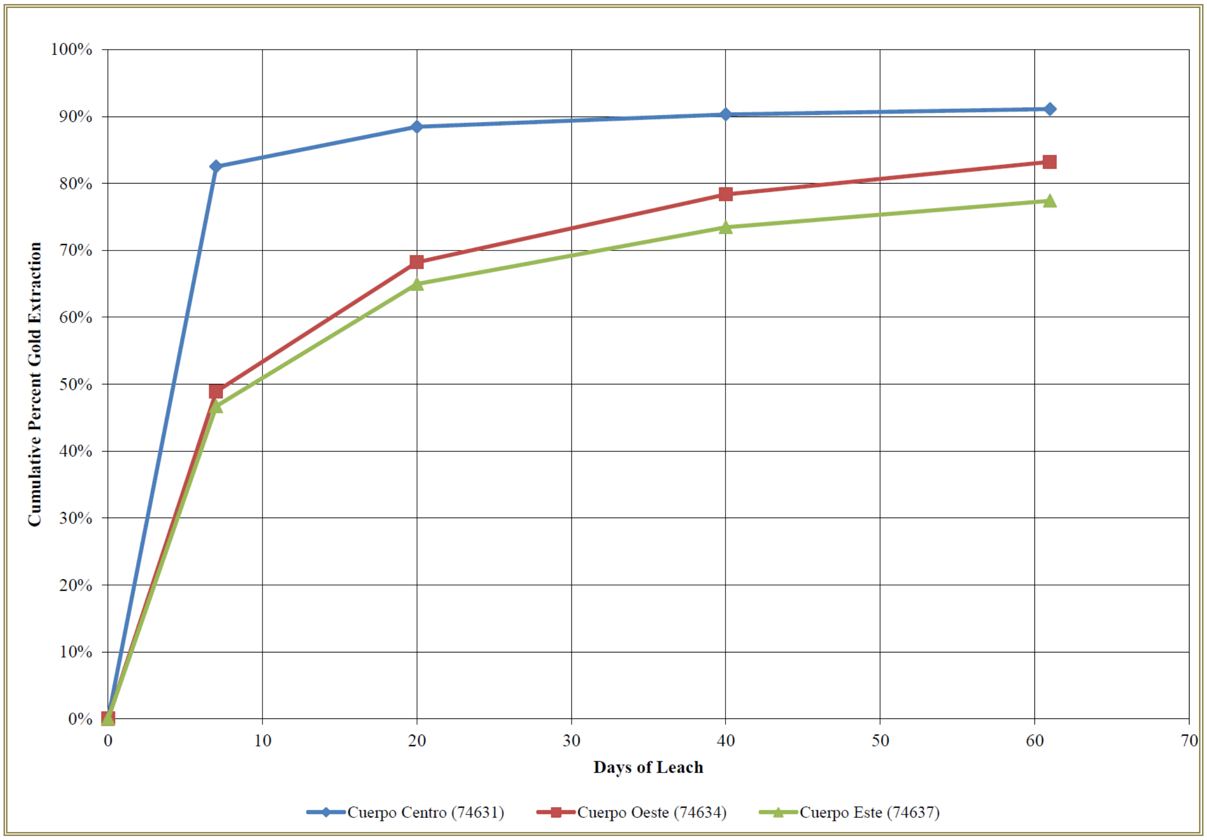
Preliminary agglomeration testwork was conducted on portions of the Bermejal Underground as-received sample material for the three zones. For the testwork, each sample was agglomerated with 5, 10, 20, and 30 kg/t of cement. In the preliminary agglomeration testing, the agglomerated material was placed in a column with no compressive load, then tested for permeability. This type of agglomeration testwork was very preliminary, but did serve to provide an indication of whether or not agglomeration would be required for processing the material at the as-received size. These specific tests should be indicative of cement requirements for a single lift heap having an overall height of not more than 8 m. All tests passed the criteria established by KCA. However, each column was agglomerated with 10 kg/t cement.

Column Leach Testwork

Column leach tests of 61 days duration were performed on the Bermejal Underground as-received composite samples from the three zones, using agglomerated material; the test results are summarized in Table 13-9, and the leach curves are shown on Figure 13-1. It is important to note that the as-received material was fine grained, with an average size of P_{80} 2.2 mm. The sulphide content of each of the three samples was less than 0.01%. The determination of small amounts of organic carbon in two of the three samples may indicate a limited potential for preg robbing. The arsenic content was measured to be slightly elevated, at 0.20% to 0.28% in the three samples. Gold extractions ranged from 77% to 91% (average 84%) based on calculated heads that ranged from 7.78 to 12.20 g/t Au. Sodium cyanide consumptions ranged from 0.84 to 1.23 kg/t. The material used in leaching was agglomerated with 10 kg/t cement due to the fine-grained nature of the material. The cement addition was adequate to maintain the pH for leaching.

Table 13-9: Summary of Column Leach Tests on as-Received (P_{80} 2.2 mm) Samples of Bermejal Underground

Location/Description	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (d)	Consumption NaCN (kg/t)	Addition Cement (kg/t)
West Sector/Cuerpo Centro	8.32	91	61	0.84	10.1
Southwest end of West Sector/Cuerpo Oeste	7.78	83	61	1.23	10.0
Central Sector/Cuerpo Este	12.20	77	61	1.01	10.1



Source: KCA0160114_LF12_02 (KCA, 2017).

Figure 13-1: Leach Curves for Column Leach Testing of Bermejal Underground Samples

Thickening and Filtration Testwork—Pocock

A portion of material from the three zones of the Bermejal Underground ore source was used for bottle roll leach testwork. The slurry that was generated and was submitted to Pocock, for solid-liquid separation (SLS) testwork on a total of six samples.

For each of the samples, decant solution was used to make the necessary dilutions during SLS testing, and pH-adjusted water was used as dilution for counter-current decantation (CCD) simulations. The purpose of testing was to evaluate settling, rheology, and filtration characteristics for SLS equipment sizing. Filtration testing analyzed the effect of varying cake thicknesses, wash, and dry time on the outcome of the filter cake product, and equipment sizing parameters.

An overall summary of recommended thickener design for both standard conventional-type thickeners and standard high-rate-type thickeners is presented in Table 13-10.

Rheology tests were completed on all thickened materials using a FANN (Model 35A) viscometer fitted with rotor and bob attachment, having the proper shear gap distance for the material. This type of testing is important in thickening applications to estimate maximum underflow density, for underflow pump and pipeline design, and for equipment downstream of the thickener.

Table 13-10: Thickening Test Results and Design Parameters for Bermejal Underground

Sample Name	Flocculant Type	Flocculant Dose (g/Mt)	Flocculant Conc. (g/L)	Max. Thickener Feed Solids (%)	Min. Unit Area for Conventional Thickener Sizing (m^2/Mt/d)	Hydraulic Rate for High-Rate Thickener Sizing (m^3/m^2-h)	Estimated Underflow Density for Standard Thickener (%)	Thickener Type Recommended
Cuerpo Centro	SNF AF 303	25–30	0.1–0.2	25–30 **Conv. Type** 20–25 **High-Rate**	0.254	4.70–5.10	62–64	Standard Conventional Type or Standard High-Rate
Cuerpo Oeste	SNF AF 303	25–30	0.1–0.2	20–25 **Conv. Type** 15–20 **High-Rate**	0.150	4.80–5.30	62–64	Standard Conventional Type or Standard High-Rate
Cuerpo Este	SNF AF 303	25–30	0.1–0.2	20–25 **Conv. Type** 15–20 **High-Rate**	0.150	4.80–5.30	59–61	Standard Conventional Type or Standard High-Rate
Cuerpo Centro	SNF AF 303	35–40	0.1–0.2	30–35 **Conv. Type** 15–20 **High-Rate**	0.150	4.10–4.60	55–57 (CCD Stage: 1) 55–57 (CCD Stage: 3–n)	Standard Conventional Type or Standard High-Rate
Cuerpo Oeste	SNF AF 303	40–45	0.1–0.2	30–35 **Conv. Type** 15–20 **High-Rate**	0.161	4.30–4.80	60–62 (CCD Stage: 1) 56–58 (CCD Stage: 3–n)	Standard Conventional Type or Standard High-Rate
Cuerpo Este	SNF AF 303	40–45	0.1–0.2	30–35 **Conv. Type** 15–20 **High-Rate**	0.150	4.30–4.80	60–62 (CCD Stage: 1) 55–57 (CCD Stage: 3–n)	Standard Conventional Type or Standard High-Rate

Note: Conv. = conventional.

Given all aspects of rheology test data, the overall maximum underflow density range for the materials tested based on fully sheared data for standard equipment design is summarized in Table 13-11.

Table 13-11: Predicted Operating Density Range for Standard Thickener for Bermejal Underground

Material	Maximum Predicted Operating Density Range for Standard Thickener Sizing Based on Rheology Data (%)	
	CCD Stage: 1	CCD Stage: 3–n
Cuerpo Centro	62–64	55–57
Cuerpo Oeste	62–64	56–58
Cuerpo Este	59–61	55–57

Vacuum filtration tests were performed to collect a general set of filtration data to design and size vacuum filters, and to examine the effect of cake thickness and dry time, wash rate, and wash efficiency on production rate and filter cake moisture. The results are shown in Table 13-12.

All vacuum filtration tests were conducted at an applied vacuum level of 67.7 kPa (20 inches of Hg). This vacuum level corresponds to the level that can be practically obtained up to an elevation of approximately 2,438 m (8,000 ft) above sea level. The cloth used during testing was a National Filter Media (NFM) 8–10 CFM/ft^2 multifilament polypropylene cloth.

Vacuum filter cakes produced with no flocculant added as filtration aid were dischargeable at the moisture content shown in Table 13-12, but displayed poor stacking properties on discharge into the drying tin; with flocculant added as filtration aid, the cakes displayed both good discharge and stacking properties.

The Bermejal Underground vacuum filtration testwork shows that the material will require flocculation. Generally, a production rate of at least 300 kg/m^2-h is considered a lower limit for economics with respect to vacuum belt filtration for industrial-sized equipment. The results indicate that vacuum filtration works for thickened and flocculated tailings that are filtered with a maximum of one wash cycle.

Pressure filtration tests were performed on thickened leach samples to establish a general set of data to design and size pressure-filtration equipment. Design information for horizontal-type recess plate filter presses and membrane-squeeze filter presses were the main focus. The results are shown in Table 13-13.

The pressure filter cake moisture content for the air blow-only case ranged from 15.0% to 15.8% and for the air-blow and membrane-squeeze case from 14.3% to 15.1%. The higher moisture content occurred when no membrane squeeze was applied. At these moistures the filter cakes produced from pressure-filtration testing were easily dischargeable from the testing apparatus and generated a stackable and conveyable cake.

It is noted that the thickening and filtration tests were performed on Bermejal Underground ore only, and do not represent the mining and blending of ores over the LOM. The ore was milled to P_{80} 106 µm, which is coarser than the expected CIL grind size of P_{80} 75 µm. It is recommended that further thickening and filtration testwork be performed on representative LOM ore, milled to P_{80} 75 µm.

Table 13-12: Vacuum Filtration Test Results for Bermejal Underground

Material	Test Conditions	Filter Feed Solids (%)	Filter Cloth Used (CFM/ft²)	Filter Cake Moisture (%)	Bulk Cake Density (dry kg/m³)	Cake Thickener (mm)	Single Stage Wash		
							Wash Ratio (N)	Soluble Removal Efficiency (%)	Production Rate (dry kg/m²-h)
Cuerpo Centro	No Flocculant added as filtration aid	56.4	8–10	23.4	1,626.7	10	0	56.1	429.8
							1	81.9	236.5
							3	91.4	124.5
							5	94.1	84.5
	85 g/t of SNF AF 303 added at 0.25 g/L	56.4	8–10	30.6	1,311.7	10	0	36.6	555.9
							1	73.9	476.8
							3	87.5	371.1
							5	91.5	303.8
Cuerpo Oeste	No Flocculant added as filtration aid	57.4	8–10	23.0	1,698.3	10	0	55.2	271.4
							1	84.1	106.3
							3	93.1	47.93
							5	95.5	30.94
	85 g/t of SNF AF 303 added at 0.25 g/L	57.4	8–10	27.2	1,485.9	10	0	43.9	547.4
							1	80.1	383.0
							3	91.3	239.2
							5	94.3	173.9
Cuerpo Este	No Flocculant added as filtration aid	56.5	8–10	22.1	1,732.6	10	0	59.1	342.5
							1	80.9	143.8
							3	89.7	66.60
							5	92.5	43.31
	85 g/t of SNF AF 303 added at 0.25 g/L	56.5	8–10	28.4	1,392.0	10	0	42.9	549.8
							1	73.2	405.2
							3	85.5	265.5
							5	89.4	197.5

Table 13-13: Pressure Filtration Test Results for Bermejal Underground

Material	Design Tonnage Dry Solids (t/d)	Filter Feed Solids (%)	Dry Bulk Cake Density (kg/m³)	Recess Plate Depth (mm)	Chamber Spec. (Length/Volume/Area) (mm/m³/m²)	Air Blow/ Squeeze Time	Filter Cake Moist. (%)	Wash Ratio (N/Predicted Soluble Removal Efficiency) (%)	Filter Cycle Time (min)	Pressure Filter Chambers Required/ No. of Presses Required
Cuerpo Centro (Air Blow)	4,800	56.7	1,732.4	15	2,500/0.183/9.3	3.0/0	15.5	0/73.3	16.0	253/2 (P/19)
								1/85.0	17.4	275/2 (P/19)
								3/93.7	20.3	320/2 (P/19)
								5/95.6	23.1	365/2 (P/19)
Cuerpo Centro (Squeeze)	4,800	56.7	2,038.9	15	2,500/0.183/9.3	3.0/3.0	14.7	0/74.9	16.0	253/2 (P/19)
								1/85.9	17.7	275/2 (P/19)
								3/94.1	21.1	320/2 (P/19)
								5/95.8	24.4	365/2 (P/19)
Cuerpo Oeste (Air Blow)	4,800	56.7	1,811.4	15	2,500/0.183/9.3	3.0/0	15.8	0/71.6	16.0	242/2 (P/19)
								1/81.0	22.5	340/2 (P/19)
								3/92.2	35.5	538/3 (P/19)
								5/94.6	48.4	735/4 (P/19)
Cuerpo Oeste (Squeeze)	4,800	56.7	2,290.2	15	2,500/0.183/9.3	3.0/3.0	15.1	0/73.1	16.0	242/2 (P/19)
								1/82.0	24.2	340/2 (P/19)
								3/92.6	40.6	538/3 (P/19)
								5/94.9	57.0	735/4 (P/19)
Cuerpo Este (Air Blow)	4,800	56.7	1,758.2	15	2,500/0.183/9.3	3.0/0	15.0	0/74.5	16.0	249/2 (P/19)
								1/85.0	19.0	296/2 (P/19)
								3/93.5	25.1	391/2 (P/19)
								5/95.3	31.2	485/3 (P/19)
Cuerpo Este (Squeeze)	4,800	56.7	2,260.6	15	2,500/0.183/9.3	3.0/3.0	14.3	0/75.8	16.0	249/2 (P/19)
								1/85.7	19.8	296/2 (P/19)
								3/93.8	27.3	391/2 (P/19)
								5/95.6	34.9	485/3 (P/19)

13.2.2 KCA (2017)

During September 2017, KCA received 13 drums of Bermejal Underground samples for metallurgical testing. Each drum contained drill core sample material and was classified into five distinct lithologic zones: Oxidos–Inferior (Oxide–Below Sill), Oxidos–Superior (Oxide–Above Sill), Diorita (Diorite–In Sill), Endoskarn, and Caliza (Limestone). The Oxides–Below Sill samples were further subdivided by gold grades: low (2 to 5 g/t), medium (5 to 10 g/t), and high (>10 g/t). The Oxides–Above Sill, Diorite–In Sill, and Endoskarn samples were similarly subdivided by gold grades, but into low (2 to 5 g/t) and medium grade (5 to 10 g/t). Limestone samples were subdivided as low grade (<1.75 g/t Au) and high grade (>1.75 g/t Au). In addition, six drums of composite samples were also included; these were classified by the same five lithologic zones plus the addition of an overall Oxide composite sample. These six composites were not subdivided by gold grade. All the composites had higher sulphur contents than the composites used for the 2016 Bermejal Underground testwork discussed in Section 13.2.1. Metallurgical testwork conducted on all 11 composite samples included multi-element analyses, cyanide shake tests, agitated leach, bottle roll, and column leach.

Head Analyses

Portions of the head material were pulverized and analyzed for gold and silver by standard fire assay and wet chemistry methods. Head material was also assayed semi-quantitatively for an additional series of elements and for whole rock constituents. In addition to these semi-quantitative analyses, the head material was assayed for carbon, sulphur, and mercury using quantitative methods. A cyanide shake test was also conducted on a portion of the pulverized head material. Furthermore, a portion of material from each as-received sample was used for head screen analyses with assays by size fraction.

The sample average assays ranged from 1.0 to 23.0 g/t Au and 13.1 to 78.91 g/t Ag.

Multi-Element Analyses

Table 13-14 provides of summary of multi-element analyses conducted on each of the Bermejal Underground test composites. Total sulphur ranged from 0.09% to 6.84%. The carbonate samples contained the lowest amount of total sulphur, and the Endoskarn samples contained the highest. Total copper ranged from 0.04% to 0.42%, with the lower values only in the Carbonate. Soluble copper ranged from 0.007% to 0.189%, with the higher values in the Oxide–Above Sill and in Endoskarn.

Table 13-14: Summary of Multi-Element Analyses on Bermejal Underground Test Composites

Description	Calculated Head (g/t Au)	Total Carbon (%)	Total Sulphur (%)	Sulphide (%)	Total Copper (%)	NaCN Soluble Copper (%)
Composite Samples by Grade						
Oxide–Below Sill (2–5 g/t Au)	3.68	0.50	0.25	0.02	0.25	0.02
Oxide–Below Sill (5–10 g/t Au)	7.94	1.27	0.59	0.06	0.30	0.05
Oxide–Below Sill (>10 g/t Au)	23.00	0.15	0.16	0.04	0.19	0.02
Oxide–Above Sill (2–5 g/t Au)	3.32	1.94	1.54	0.07	0.32	0.19
Oxide–Above Sill (>5 g/t Au)	5.28	1.86	0.91	0.08	0.29	0.13
Diorite–In Sill (2–5 g/t Au)	3.34	0.38	0.87	0.07	0.20	0.02
Diorite–In Sill (>5 g/t Au)	7.77	1.13	1.37	0.14	0.36	0.12
Endoskarn–Above Sill (1–3 g/t Au)	2.78	1.32	4.79	3.32	0.21	0.11
Endoskarn–Above Sill (>3 g/t Au)	5.02	1.33	6.84	4.88	0.42	0.16
Carbonate (>1.75 g/t Au)	5.85	9.05	0.10	0.04	0.13	0.01
Carbonate (>1.29 g/t Au)	1.99	11.30	0.03	0.01	0.04	0.01
Composite Samples						
Oxide–Below Sill	10.97	1.33	0.29	0.03	0.23	0.03
Oxide–Above Sill	4.24	1.98	1.65	0.48	0.34	0.17
Oxide	9.44	0.97	0.82	<0.01	0.27	0.07
Diorite	5.42	0.77	1.08	0.04	0.28	0.06
Endoskarn	5.95	1.41	4.72	3.13	0.33	0.14
Carbonate	2.97	10.36	0.09	0.02	0.08	0.01

Bottle Roll Testwork

The results of bottle roll tests conducted on all the Bermejal Underground test composites are presented in Table 13-15. All tests were conducted at a grind size of P_{80} 0.075 mm.

The Oxide–Below Sill samples resulted in gold extractions of 89% to 95% based on increasing gold grade, while gold extractions from the Oxide–Above Sill samples ranged from 85% to 87%. For the Diorite–In Sill samples, a narrower gold extraction range of 90% to 91% was measured. Gold extraction from the Endoskarn–Above Sill ranged from 77% to 90%, and gold extraction from the Carbonate composites range from 76% to 93%.

Table 13-15: Bottle Roll Test Parameters and Results on Bermejal Underground Samples (P_{80} 0.075 mm)

Description	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	Ca(OH)2 Addition (kg/t)
Composite Samples by Grade					
Oxide–Below Sill (2–5 g/t Au)	3.99	89	96	1.15	2.0
Oxide–Below Sill (5–10 g/t Au)	7.36	89	96	1.76	2.0
Oxide–Below Sill (>10 g/t Au)	25.03	95	96	1.03	1.5
Oxide–Above Sill (2–5 g/t Au)	3.25	87	96	4.58	1.0
Oxide–Above Sill (>5 g/t Au)	5.52	85	96	3.62	1.0
Diorite–In Sill (2–5 g/t Au)	2.92	90	96	0.67	2.0
Diorite–In Sill (>5 g/t Au)	7.65	91	96	3.37	1.5
Endoskarn–Above Sill (1–3 g/t Au)	2.88	77	96	3.04	1.5
Endoskarn–Above Sill (>3 g/t Au)	5.83	90	96	4.86	1.5
Carbonate (>1.75 g/t Au)	4.99	76	96	1.40	2.0
Carbonate (>1.29 g/t Au)	1.00	93	96	0.50	1.0
Composite Samples					
Oxide–Below Sill	10.46	91	96	1.07	2.0
Oxide–Above Sill	3.77	84	96	4.70	1.5
Oxide	9.21	92	96	2.52	2.0
Diorite	5.15	92	96	2.16	2.5
Endoskarn	6.26	83	96	4.52	1.5
Carbonate	2.68	88	96	2.06	1.5

Agitated Leach Testwork

The results of agitated leach tests conducted on all of the Bermejal Underground test composites are presented in Table 13-16. The Global composite–Below Sill samples resulted in gold extractions of 83% to 95%, while gold extractions from the Global composite–Above Sill samples ranged from 68% to 89%. For the Diorite–In Sill samples, a narrower gold extraction range of 91% to 92% was measured. Gold extraction from the granodiorite composite (GDI) ranged from 80% to 81% and from the carbonate composites ranged from 93% to 94%.

Table 13-16: Agitated Leach Test Parameters and Results on Bermejal Underground Samples

Description	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)	Calc./Target P_{80} (mm)
Composite Samples by Grade						
Global Upper Sill	4.12	78	96	4.64	1.50	0.15
Global Upper Sill	3.93	75	96	4.87	1.25	0.11
Global Upper Sill	4.16	78	96	5.13	1.50	0.08
Global Upper Sill	4.08	84	96	5.00	1.50	0.05
Global Upper Sill	4.22	68	96	4.97	1.50	0.05
Global Upper Sill	3.81	83	96	5.19	1.25	0.05
Global Upper Sill	4.05	85	96	5.93	1.00	0.05
Global Upper Sill	4.28	87	96	6.77	1.00	0.05
Global Upper Sill	4.37	84	96	7.20	1.00	0.05
Global Upper Sill	4.13	89	96	5.27	1.50	0.05
Global Upper Sill	3.78	85	8	5.12	0.75	0.05
Global Upper Sill	4.18	87	24	5.95	0.75	0.05
Global Upper Sill	4.18	85	48	6.60	0.75	0.06
Global Upper Sill	4.02	73	24	4.87	0.75	0.06
Global Below Sill	12.00	88	96	0.78	2.18	0.15
Global Below Sill	12.14	90	96	1.03	2.00	0.11
Global Below Sill	11.49	91	96	1.13	2.00	0.08
Global Below Sill	12.16	90	96	1.49	2.00	0.05
Global Below Sill	11.61	90	96	1.18	2.00	0.05
Global Below Sill	10.07	83	96	1.64	1.00	0.05
Global Below Sill	10.67	84	96	1.92	0.75	0.05
Global Below Sill	10.81	89	96	2.68	0.50	0.05
Global Below Sill	10.41	93	96	3.05	0.50	0.05
Global Below Sill	10.03	91	8	2.45	0.50	0.05
Global Below Sill	10.80	90	24	3.22	0.50	0.05
Global Below Sill	9.44	95	48	3.58	0.75	0.06
Global Below Sill	9.82	94	24	2.87	0.50	0.05
Oxide	10.46	94	96	2.20	2.00	0.07
Oxide	10.48	95	96	2.14	2.25	0.05
Diorite	6.06	91	96	2.62	2.25	0.07
Diorite	6.00	92	96	2.69	2.25	0.05
GDI	4.28	80	96	3.36	2.25	0.07
GDI	4.57	81	96	3.74	2.25	0.05
Carbonate	2.07	93	96	1.28	1.50	0.06
Carbonate	2.12	94	96	1.10	1.50	0.05

Column Leach Testwork

Column leach tests were conducted on each Bermejal Underground test composite at P_{100} 25 mm crush size for 91 to 93 days. All composites (except the carbonate composite) were agglomerated with 15 to 20 kg/t cement, which provided sufficient alkalinity. Adding 2 kg/t of lime was sufficient to maintain alkalinity for the carbonate composites. The results of the column tests are presented in Table 13-17. For the individual samples, the gold extraction for the Oxide–Below Sill material ranged from 67% to 79%, and sodium cyanide consumption ranged from 0.78 to 0.94 kg/t when agglomerated with 15 kg/t of cement. For the Oxide–Above Sill samples, gold extraction ranged from 53% to 64%, and sodium cyanide consumption ranged from 1.73 to 1.84 kg/t when agglomerated with 15 kg/t of cement. For the Diorite–In Sill samples, gold extraction ranged from 73% to 79%, and sodium cyanide consumption ranged from 0.79 to 1.78 kg/t when agglomerated with 20 kg/t of cement. For the Endoskarn–Above Sill samples, gold extraction ranged from 50% to 57%, and sodium cyanide consumption ranged from 1.5 to 2.2 kg/t when agglomerated with 15 kg/t of cement. For the Carbonate samples, gold extraction ranged from 75% to 77%; sodium cyanide consumption ranged from 0.62 to 0.93 kg/t with no cement addition for agglomeration, but with 2.04 kg/t of lime added. For the global composite samples, the gold extraction from the Oxide–Below Sill composite was 81%. Gold extraction for the Oxide–Above Sill composite was 58%, and for the Oxide composite was 72%.

Table 13-17: Summary of Column Leach Tests on Crushed (P_{100} 25 mm) Bermejal Underground Samples

Composite	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (d)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)	Cement Addition (kg/t)
Composite Samples by Grade						
Oxide Below Sill (2.0–5.0 g/t Au)	4.22	77	93	0.89	0.0	15.0
Oxide Below Sill (5.0–10.0 g/t Au)	6.67	67	93	0.94	0.0	15.1
Oxide Below Sill (>10 g/t Au)	26.47	79	93	0.78	0.0	14.8
Oxide Above Sill, (2.0–5.0 g/t Au)	3.48	53	93	1.84	0.0	15.4
Oxide Above Sill, >5.0 g/t Au	4.75	64	93	1.73	0.0	15.2
Diorite in Sill, (2.0–5.0 g/t) Au)	2.69	79	93	0.79	0.0	20.3
Diorite in Sill, (>5.0 g/t Au)	8.32	73	93	1.78	0.0	20.4
GDI (Endoskarn) Above Sill (1.0–3.0 g/t Au)	2.42	57	91	1.51	0.0	15.5
GDI (Endoskarn) Above Sill (>3.0 g/t Au)	6.03	50	91	2.18	0.0	15.1
Carbonate Around to Sill >1.75 g/t Au	4.56	75	91	0.93	2.0	0.0
Carbonate Close to Sill 1.29 g/t Au	0.75	77	91	0.62	2.0	0.0
Composite Samples						
Global Composite Below Sill	10.87	81	91	1.08	0.0	10.1
Global Composite Above Sill	4.35	58	91	1.92	0.0	15.4
Oxide Composite	8.72	72	91	1.28	0.0	15.0
Diorite Composite	5.08	77	91	1.35	0.0	20.2
GDI Composite	4.50	48	91	1.92	0.0	18.1
Carbonate Composite	2.11	80	91	0.35	2.0	0.0

13.2.3 KCA (2018a) Bermejal Bottle Roll Testwork

During June 2018, KCA received two buckets containing two samples of Bermejal Underground and four samples of Bermejal Open Pit material. The purpose of the testwork was to determine CIL gold recoveries, optimize operating parameters and perform diagnostic leach on the CIL tailings to determine gold locking characteristics. The Bermejal Underground samples were selected based on the integrated mine schedule. The Bermejal Underground samples were selected based on differing gold grade and total sulphur content to determine if there is a relationship between gold grade and total sulphur. Metallurgical testwork conducted on all six samples included head analyses, bottle roll leach testwork (standard and Leachwell), CIL agitated leach testwork and diagnostic leach testwork. Two of the BOP samples that had low gold extractions were sent to AMTEL for mineralogical evaluation.

Head Analyses

Portions of the head material were pulverized and analyzed for gold and silver by standard fire assay and wet chemistry methods. Head material was also assayed semi-quantitatively for an additional series of elements and for whole rock constituents. In addition to these semi-quantitative analyses, the head material was assayed for carbon, sulphur, and mercury using quantitative methods. A cyanide shake test was also conducted on a portion of the pulverized head material. In addition to the analyses on pulverized head material, a portion of material from each as-received sample was used for head screen analyses with assays by size fraction. The Bermejal Underground sample average assays ranged from 5.4 to 5.9 g/t Au and 24.0 to 62.9 g/t Ag. The Bermejal Open Pit sample average assays ranged from 0.9 to 1.3 g/t Au and 3.0 to 16.0 g/t Ag.

Standard Bottle Roll Testwork

The results of the gold bottle roll tests conducted on all of the Bermejal Underground and Bermejal Open Pit test composites are presented in Table 13-18. All tests were conducted at a grind size of P_{80} 0.075 mm.

Table 13-18: Gold Bottle Roll Test Parameters and Results on Bermejal Open Pit and Underground Samples (P_{80} 0.075 mm)

Description	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	4.54	93	96	2.77	1.50
BUG 2	5.15	92	96	0.29	1.00
BOP 3	0.77	75	96	0.78	3.00
BOP 4	1.17	74	96	1.00	3.50
BOP 5	0.92	41	96	0.96	2.25
BOP 6	0.85	65	96	0.70	2.50

BUG samples resulted in gold extractions of 92% to 93%, while gold extractions from the BOP samples ranged from 41% to 75%. Sodium cyanide consumption on BUG samples ranged from 0.29 to 2.77 kg/t, and lime addition ranged from 1.00 to 1.50 kg/t. Sodium cyanide consumption on BOP samples ranged from 0.70 to 1.00 kg/t, and lime addition ranged from 2.25 to 3.50 kg/t.

The results of the silver extraction for all of the BUG and BOP test composites are presented in Table 13-19. All tests were conducted at a grind size of P_{80} 0.075 mm.

BUG samples resulted in silver extractions of 14% to 59%, while silver extractions from the BOP samples ranged from 32% to 42%. Sodium cyanide consumption on BUG samples ranged from 0.29 to 2.77 kg/t, and lime addition ranged from 1.0 to 1.50 kg/t. Sodium cyanide consumption on BOP samples ranged from 0.78 to 1.0 kg/t, and lime addition ranged from 2.25 to 3.50 kg/t.

Table 13-19: Silver Bottle Roll Test Parameters and Results on BUG and BOP Samples (P_{80} 0.075 mm)

Description	Calculated Head (g/t Ag)	Ag Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	24.41	14	96	2.77	1.50
BUG 2	65.20	59	96	0.29	1.00
BOP 3	3.70	32	96	0.78	3.00
BOP 4	2.99	34	96	1.00	3.50
BOP 5	17.14	42	96	0.96	2.25
BOP 6	8.73	32	96	0.70	2.50

Leachwell Bottle Roll Testwork

The results of gold Leachwell bottle roll tests conducted on all the BUG and BOP test composites are presented in Table 13-20. All tests were conducted at a grind size of P_{80} 0.075 mm. The Leachwell bottle roll tests are performed similar to a standard bottle roll test except that a cyanide leach accelerating agent is used to shorten the time from 96 hours to 12 hours—the benefit of the Leachwell technique.

Table 13-20: Gold Leachwell Bottle Roll Test Parameters and results on BUG and BOP Samples (P_{80} 0.075 mm)

Description	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	5.29	92	12	2.68	5
BUG 2	5.44	90	12	0.16	5
BOP 3	0.88	69	12	3.50	5
BOP 4	1.19	71	12	0.64	5
BOP 5	1.10	47	12	0.50	5
BOP 6	0.92	64	12	0.40	5

BUG samples resulted in gold extractions of 90% to 92%, while gold extractions from the BOP samples ranged from 47% to 71%. Sodium cyanide consumption on BUG samples ranged from 0.16 to 2.68 kg/t, and lime addition was kept constant at 5.0 kg/t. Sodium cyanide consumption on BOP samples ranged from 0.40 to 3.50 kg/t, and lime addition was also kept constant at 5.0 kg/t.

The results of silver Leachwell bottle roll tests conducted on all the BUG and BOP test composites are presented in Table 13-21. All tests were conducted at a grind size of P_{80} 0.075 mm.

BUG samples resulted in silver extractions of 14% to 59%, while silver extractions from the BOP samples ranged from 27% to 43%. Sodium cyanide consumption on BUG samples ranged from 0.16 to 2.68 kg/t, and lime addition was kept constant at 5.0 kg/t. Sodium cyanide consumption on BOP samples ranged from 0.40 to 3.50 kg/t, and lime addition was kept constant at 5.0 kg/t.

Table 13-21: Silver Leachwell Bottle Roll Test Parameters and Results on BUG and BOP Samples (P_{80} 0.075 mm)

Description	Calculated Head (g/t Ag)	Ag Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	24.87	14	12	2.68	5
BUG 2	63.15	58	12	0.16	5
BOP 3	4.21	43	12	3.50	5
BOP 4	3.00	27	12	0.64	5
BOP 5	16.70	39	12	0.50	5
BOP 6	8.98	27	12	0.40	5

Carbon in Leach Agitated Leach Testwork

CIL agitated leach tests were performed to determine gold and silver extraction at a grind size of P_{80} 0.075 mm. The CIL test program was also performed to determine oxygen requirements, pH, and leach time. The results were used to determine design criteria for a CIL leach circuit.

The results of the gold CIL agitated leach tests are presented in Table 13-22. Two of the BOP samples (BOP 3, BOP 5) reported low gold recoveries that suggested gold encapsulation. These samples reported a higher total proportion of certain minerals that possibly inhibited the cyanide gold recovery (i.e., calcite, arsenopyrite, dolomite, iron oxide, pyrites, sulphides). To better understand the recovery characteristics of these samples, finer grind and diagnostic leaching were performed. Grinding tests for a grind size of P_{80} 0.053 mm and P_{80} 0.025 mm were carried out to determine if finer grinding would liberate the gold and result in a higher gold extraction. The BOP 3 sample showed higher gold extraction with a finer grind, which suggested pyrite or silica encapsulation may be present. BOP 5 showed no significant increase in gold extraction when ground finer, which suggested the possibility of the ore being refractory. A sample portion from each CIL tailings was sent to AMTEL for mineralogical investigation and to determine the gold-locking characteristics.

Table 13-22: Gold CIL Agitated Leach Test Parameters and Results on BUG and BOP Samples

Description	P_{80} Milled Size (mm)	Calculated Head (g/t Au)	Au Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	0.075	5.82	91	48	3.01	1.75
BUG 2	0.075	6.21	90	48	1.01	1.00
BOP 3	0.075	0.81	48	48	2.85	2.00
BOP 3	0.053	0.87	63	48	3.91	2.00
BOP 3	0.025	0.86	69	48	3.81	2.25
BOP 4	0.075	1.33	71	48	2.47	2.00
BOP 5	0.075	0.89	41	48	1.78	1.75
BOP 5	0.053	0.92	40	48	2.07	1.75
BOP 5	0.025	0.91	41	48	2.71	1.25
BOP 6	0.075	0.92	60	48	1.88	1.75

For the BUG samples, the gold extraction varied from 90% to 91%, and sodium cyanide consumption ranged from 1.01 to 3.01 kg/t. Lime addition ranged from 1.00 to 1.75 kg/t.

For the BOP samples, the gold extraction varied from 40% to 71%, and sodium cyanide consumption ranged from 1.78 to 3.91 kg/t. Lime addition ranged from 1.25 to 2.25 kg/t. No relation can be established with head grade against silver extraction.

The results of the silver CIL agitated leach tests are presented in Table 13-23. For the BUG samples, the silver extraction varied from 17% to 65%, and sodium cyanide consumption ranged from 1.01 to 3.01 kg/t. Lime addition ranged from 1.00 to 1.75 kg/t. Extraction increased with increasing head grade.

Table 13-23: Silver CIL Agitated Leach Test Parameters and Results on BUG and BOP Samples

Description	P_{80} Milled Size (mm)	Calculated Head (g/t Ag)	Ag Extracted (%)	Leach Time (h)	NaCN Consumption (kg/t)	$Ca(OH)_2$ Addition (kg/t)
BUG 1	0.075	24.41	17	48	3.01	1.75
BUG 2	0.075	65.51	65	48	1.01	1.00
BOP 3	0.075	3.98	40	48	2.85	2.00
BOP 3	0.053	4.52	54	48	3.91	2.00
BOP 3	0.025	4.59	65	48	3.81	2.25
BOP 4	0.075	3.07	41	48	2.47	2.00
BOP 5	0.075	15.70	40	48	1.78	1.75
BOP 5	0.053	16.92	47	48	2.07	1.75
BOP 5	0.025	16.14	50	48	2.71	1.25
BOP 6	0.075	8.54	38	48	1.88	1.75

For the BOP samples, the silver extraction ranged from 38% to 65%, and sodium cyanide consumption ranged from 1.78 to 3.91 kg/t. Lime addition ranged from 1.25 to 2.25 kg/t. No relation can be established for head grade against silver extraction. Extraction increased with increasing head grade.

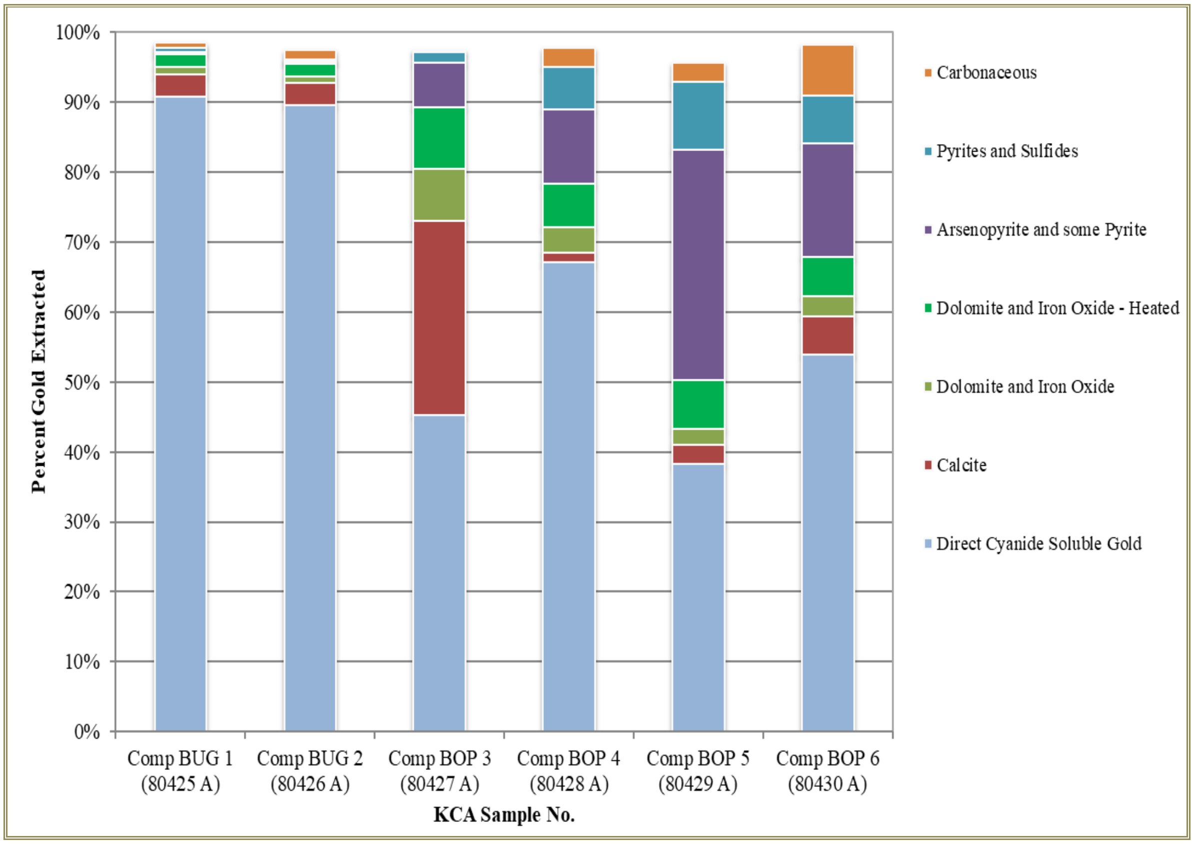
Diagnostic Leach Testwork

Diagnostic leach testing was used to determine the metal association within the sample material by leaching the material in seven sequential stages with various pre-treatments. Diagnostic leach testing was conducted on each of the BUG and BOP samples at P_{80} 0.075 mm crush size. The results of the gold diagnostic leach tests are presented in Table 13-24. For the BUG samples, the cumulative leached gold ranged from 5.75 to 6.06 g/t, and average tailings gold ranged 0.09 to 0.17 g/t. For the BOP samples, the cumulative leached gold ranged from 0.85 to 1.37 g/t, and average tailings gold ranged 0.01 to 0.04 g/t. A chart summarizing the gold extractions from the individual phases of leaching is presented on Figure 13-2.

The AMTEL report, which is part of the KCA (2018) report, supported the findings of the diagnostic leaching tests for BOP 3 and BOP 5. The gold in the BOP 3 CIL tailings was associated with calcite and some pyrite, and was liberated with finer grinding. The gold in the BOP 5 CIL tailings was associated with submicroscopic/refractory gold locked in pyrite and arsenopyrite. Finer grinding would not liberate the gold in BOP 5.

Table 13-24: Gold Summary of Diagnostic Leach Testing on BUG and BOP Samples

Description	Calculated Head (g/t Au)	Cumulative Leach (g/t Au)	Avg. Tailings (g/t Au)
BUG 1	5.83	5.75	0.09
BUG 2	6.22	6.06	0.17
BOP 3	0.86	0.85	0.01
BOP 4	1.40	1.37	0.03
BOP 5	0.95	0.91	0.04
BOP 6	1.03	1.02	0.02



Source: KCA (2018).

Figure 13-2: Summary of Gold Extraction in Each Phase of Diagnostic Leach Testing

The results of the silver diagnostic leach tests are presented in Table 13-25. For the BUG samples, the cumulative leached silver ranged from 10.44 to 50.62 g/t, and average tailings silver ranged 7.28 to 11.28 g/t. For the BOP samples, the cumulative leached silver ranged from 4.0 to 15.81 g/t, and average tailings silver ranged 0.1 to 0.23 g/t.

Table 13-25: Silver Summary of Diagnostic Leach Testing on BUG and BOP Samples

Description	Calculated Head (g/t Ag)	Cumulative Leach (g/t Ag)	Avg. Tailings (g/t Ag)
BUG 1	17.72	10.44	7.28
BUG 2	61.90	50.62	11.28
BOP 3	5.61	5.48	0.13
BOP 4	4.10	4.00	0.10
BOP 5	16.04	15.81	0.23
BOP 6	8.43	8.30	0.12

13.2.4 Outotec (2018)

In October 2018 Outotec conducted thickening testwork on a lab-generated CIL tailings sample from the BOP and BUG resource. The purpose of this study was to determine the thickening characteristics of this sample that has been ground to P_{80} 75 µm.

Thickening Testwork

The thickening testwork was performed to determine the achievable underflow densities, and which would be used for the filtration testwork. The results would be used to obtain the necessary process parameters for sizing the industrial-scale high-rate thickener.

Flocculant screening tests were performed in cylindrical columns to determine which produced the fastest settling rate with the clearest overflow at the lowest dosage.

The optimal thickener feed density was determined using a Vane Feedwell and Outotec's optimum dilution test method, a procedure to determine the best feed conditions for flocculation, and hence thickener operation.

Rheological measurements were carried out using a Thermo Haake VT550 rheometer and an OK600 4-blade vane. The method measured the shear stress versus time, with the peak of this curve equating to the yield stress. A constant shear rate of 0.1 sec-1 was used. The thickener underflow yield stress is determined for use in sizing the thickener rake drive.

Multiple dynamic thickening test runs were conducted on the sample at different solids loading rates and flocculant dosages to determine the impact on the underflow densities and overflow clarities.

The test results for the CIL tailings are summarized in Table 13-26.

Table 13-26: CIL Tailings–Dynamic Thickening Test Results

Run No.	Feed		Flocculant 945 VHM Dose (g/t)	Underflow		Overflow Solid (mg/L)
	Flux (t/m^2-h)	Liquor RR (m/h)		Meas. Solids (% w/w)	YS (Pa)	
3	0.60	3.92	10	50.4	13	100
2	0.60	3.92	15	55.5	35	<100
1	0.60	3.92	20	54.6	31	<100
4	0.50	3.27	15	54.2	27	<100
5	0.70	4.57	15	54.5	31	<100
6	0.80	5.22	15	52.9	23	<100
7	0.90	5.88	15	53.6	28	<100
8	1.00	6.53	15	49.2	13	<100
9	0.50	3.27	15	49.2	12	<100

The testwork on the CIL tailings samples has shown that the material can be successfully thickened to targeted densities with the best-performing test run being recorded as a solids loading rate of 0.6 t/m^2-h at a dosage of 15 g/t of flocculant SNF 945 VHM. This resulted in an underflow density of 55.5% solids w/w, a yield stress of 35 Pa, and overflow clarity below 100 ppm based on samples tested.

Pressure Filtration Testwork

Outotec conducted filtration testwork on a lab-generated CIL tailings sample from the BOP and BUG resource. Pocock performed a previous study using material ground to P_{80} 0.105 mm. The purpose of the 2018 study was to determine the pressure filtration characteristics of the sample ground to approximately P_{80} 0.075 mm.

Tests were conducted in Outotec's Larox 100 test unit to determine the suitability of Outotec Larox Filter Press technology. Targets for the CIL tailings sample were to achieve <15.5 wt% moisture for the filter cake as well as >92% wash efficiency. The cake moisture target was unattainable; however, 91.9% wash efficiency was achieved.

Bench-scale testing was conducted to evaluate filter cloth selection, filter cake thickness, filtration rate, moisture content of the cake, wash efficiency, and cake handling characteristics.

Eight tests were performed for the CIL tailings sample. All tests were performed at a feed concentration of about 56% w/w solids. Tests were conducted to optimize the air-drying time and filtration rate to meet the moisture target of <15.5% w/w water and a wash efficiency of 92%.

Filter cake thicknesses of approximately 44 mm to 47 mm were tested for the CIL tailings sample. All tests were conducted at a pumping pressure of 6 bar, a washing pressure of 7 bar, a pressing pressure of 6 to 12 bar, and an air-drying pressure of 4 to 6 bar. Lower pressure for the pressing and air-drying cycles were required due to the material fineness producing compact filter cakes that displayed impermeable properties at the higher pressure. The pH was measured at 8.4 to 10.5. Lime was added continuously once the sample decreased in pH; however, the sample seemed always to decrease to a plateau of 8.4.

Due to the sample being synthetically generated, lithium sulphate was added to the sample as a tracer to determine wash efficiency. Tests 1 to 4 were conducted without any washing parameters, to optimize filter cloth pumping rate, pressing, and drying cycle times. Tests 5 to 8 were then completed at wash ratios of 0.2, 0.4, 0.6, and 0.8 m^3/t to evaluate optimal washing parameters.

The wash analysis focused on removing lithium. Washing follows the process where the slurry is pumped into the filter, then normally pressed; the cake is formed and the mother liquor is collected. A pre-wash pressing stage was not included in this testing due to compacted cakes that were observed in the no-wash stage testing. As a result, an impermeable cake can be created that will not permit wash water to flow through it.

The cake was still wet, and held the soluble elements within the liquid. The volume of this liquid is referred to as the interstitial bed volume (IBV). Washing aims to recover the elements in the liquid by displacement using set wash volumes equivalent to 1, 2, 3, and 4 IBV. The total filter efficiency includes the recovery of elements in washing combined with the recovery of elements in the mother liquor.

The results showed that 0.2 m^3/t (1 IBV) achieves a total filter efficiency of 71.1% lithium removal. Increasing the wash volume to 0.4 m^3/t (2 IBV) achieves >91.9% total filter efficiency for lithium removal.

The testwork results showed that Outotec pressure filtration technology can readily dewater the CIL tailings at a test filtration rate of 126 kg m^2-h with a cake moisture content of 16.9%. This includes a wash stage using 0.4 m^3/t achieving a total filter efficiency of 91.9% lithium recovery, close to the target of 92% lithium removal.

13.2.5 BQE/ALS (2019)

Mining BOP, BUG, and GOP will involve processing ore with elevated levels of cyanide-soluble base metals. Early in 2018 BQE performed a preliminary assessment of integrating SART into the metallurgical flowsheet to avoid the build-up of copper in leach solution and excessive cyanide consumption. One of BQE's recommendations was to complete locked-cycle metallurgical testing involving SART and re-use leach solution to leach precious metals. The objective of the locked-cycle testing was to confirm the assumptions used for SART plant sizing, including the base metals load reporting to SART and chemical reagents consumption.

SART laboratory testwork was conducted using composite ore samples from the Guadalupe deposit and a blend of underground/open pit from the Bermejal deposit. The primary objectives of the testwork were to evaluate the efficiency of SART metal recoveries and to generate solids that could be assayed for metals content. The metal recovery efficiencies achieved during the tests are summarized in Table 13-27. Overall, metal removals are consistent with expected performance of the SART process.

Table 13-27: Removal Efficiency of SART Testwork

Constituent	Removal Efficiency (%)	
	Guadalupe	Bermejal
Copper	75 to 89	83 to 91
Zinc	81 to 91	96 to >99
Gold	<0.1	<0.1
Silver	79 to 97	96 to 98

Compositions of the filter cakes generated during the testwork are shown in Table 13-28. The combined copper-plus-zinc contents in the filter cakes ranged from 56% to 67%.

Table 13-28: Composition of SART Solids

Constituent	Content	
	Guadalupe	Bermejal
Copper (wt%)	48.7	31.7
Zinc (wt%)	18.1	24.2
Gold (g/t)	2.6	6.0
Silver (g/t)	104	123
Arsenic (g/t)	169	49.3
Cadmium (wt%)	0.3	0.12
Iron (wt%)	0.2	0.2
Mercury (g/t)	260	11.3
Sulphur (wt%)	12.1	11.5

Conclusions from the locked-cycle testing campaign and the updated economic assessment of SART integration into the metallurgical flowsheet at Los Filos are summarized below.

Bottle Roll Leaching Test Conclusions

- Selective leaching of gold and silver from Guadalupe and Bermejal ore is impossible, in that 19% to 30% Cu and 3% to 10% Zn contained in the ore is cyanide-soluble and leaches simultaneously with precious metals.
- Guadalupe and Bermejal composites used in this testwork contained a significantly higher level of cyanide-soluble copper than the blended mill feed in the current mine plan.
- An appreciable quantity of zinc leached into solution from both ore samples. Zinc has not been tracked in the previous testwork.
- More aggressive leaching conditions may be of significant benefit for the Bermejal ore composite due to the potential net gain from the incremental amount of silver, copper, and zinc released and recovered from ore under the aggressive leaching conditions.

SART Process Conclusions

- SART recovered base metals in commercially saleable high-grade sulphide concentrates. Acid digestion of SART solids showed no trace elements above smelter penalty limit. Guadalupe SART solids contained approximately 49% Cu and about 18% Zn, while Bermejal SART solids contained about 32% Cu and around 24% Zn. Separation of Zn from Cu in a two-stage SART process is possible and should be investigated as part of the Project feasibility study to realize the full commercial value of base metals recovered by SART.
- All cyanide consumed by base metals can be recovered by SART and recycled back to leach. This results in sodium cyanide consumption reduced by 50% to 75% depending on the ore type and leach aggressiveness.
- Testing confirmed zero gold loss due to co-precipitation in SART.
- Gold lost across SART caused by solution entrainment in SART solids was approximately 0.15% and about 0.75% of gold in the feed to SART for Guadalupe and Bermejal samples, respectively.
- SART avoids mercury deportment into electrowinning (EW) solids (mercury detected in the SART solids).
- Reagent consumption by SART is within 110% stoichiometric when reactions are properly controlled.

Elbow Creek Engineering (ECE, 2020) was engaged to assess the potential need for a SART plant to control copper levels in the proposed CIL plant for the Los Filos Project. The assessment took into consideration the ore delivery schedule developed by Equinox Gold Corporation in August 2020. The CIL plant at that time was designed to process nominally 8,000 t/d of various ore sources with contained-copper head grades ranging from about 0.16% to 0.41%. Relationships for copper leach extractions for each ore type have been developed. The assessment report concluded the following:

- Without operation of the cyanide detoxification plant and a SART plant, copper concentrations in heap barren solution could increase to 200 mg/L in Year 2028 and to over 400 mg/L in Year 2035. Copper concentrations in the CIL leach tanks will range from about 330 to 980 mg/L.
- The cyanide detoxification plant or the SART plant should begin operation no later than Year 2028. This will prevent copper concentrations in heap barren solution from exceeding 200 mg/L and limit copper concentrations in the CIL leach tanks to about 750 mg/L.
- With operation of the cyanide detoxification plant, there would be no need to operate a SART plant. The cyanide detoxification plant alone would limit copper concentrations to acceptable levels. The primary disadvantage of a cyanide detoxification plant would be the cost of treatment reagents used to destroy both cyanide and copper. A SART plant would also require treatment reagents, but copper would be recovered as a saleable product and free cyanide would be recycled as a source of make-up sodium cyanide . However, if filtered tailings were placed into a pit or used for paste backfill, cyanide detoxification would be required to meet permit limitations.
- The proper sizing basis for a SART plant would be treatment of 100% of the combined cyanide recovery thickener overflow plus filtrate. This would limit copper concentrations in heap barren solution to <200 mg/L and in the CIL leach tanks to <800 mg/L. The design SART plant feed rate for this case would be 250 m^3/h with influent copper levels of about 500 to 800 mg/L.
- Once the CIL plant is operating, copper levels in the barren solution and LOM will be regularly monitored to determine if the SART plant is required.

Further work and review of heap leach operation has determined that the two heap leach pads have a large enough capacity to absorb the high levels of soluble copper in the leach solution. As a result, neither a SART plant or a detoxification plant are likely required. Additional laboratory and/or pilot SART testwork may be conducted in the future once the CIL plant is operational. Such testwork would establish the final design basis for a SART plant, if determined to be a necessary part of the future operation.

13.2.6 KCA Detox (2019)

On October 10, 2019, KCA combined portions of received samples from a previous testwork program to generate a composite. The composite was used for CIL agitated leach, and the leach slurry from these tests was used for detoxification testwork. The composite sample was generated from equal parts of BUG and BOP ores. Table 13-29 summarizes the samples used to generate the composite for this testwork.

Table 13-29: Composite Sample Makeup

KCA Composite No.	KCA Sample Number	Client ID	Weight (kg)
80477 A	80425 A	Comp. BUG 1	2.0
	80426 A	Comp. BUG 2	2.0
	80428 A	Comp. BOB 4	2.0
	80430 A	Comp. BOB 6	2.0
Total			**8.0**

The composite was crushed to P_{100} 2 mm and the crushed material was split into 1.0 kg portions. Seven portions were ground to P_{80} 0.053 mm and used for CIL agitated leach testwork. The gold and silver extraction results after 48 hours are summarized in Table 13-30 and Table 13-31, respectively.

Table 13-30: Summary of Gold Extraction

KCA Test No.	Calculated Head Au (g/t)	Extracted Au (g/t)	Avg. Tailings Au (g/t)	Au Extracted (%)	NaCN Consumed (kg/t)	$Ca(OH)_2$ Addition (kg/t
80478 A	3.625	3.287	0.338	91	2.18	1.50
80478 B	3.590	3.252	0.338	91	2.19	1.50
80478 C	3.826	3.488	0.338	91	2.23	1.50
80478 D	3.652	3.296	0.357	90	2.49	1.50
80478 E	3.511	3.154	0.357	90	1.77	1.50
80478 F	3.640	3.307	0.357	90	1.98	1.50
80478 G	3.705	3.369	0.357	91	1.98	1.50

Table 13-31: Summary of Silver Extraction

KCA Test No	Calculated Head Au (g/t)	Extracted Au (g/t)	Avg. Tailings Au (g/t)	Au Extracted (%)	NaCN Consumed (kg/t)	$Ca(OH)_2$ Addition (kg/t
80478 A	3.62	22.38	11.56	52	2.18	1.50
80478 B	3.59	22.42	11.60	52	2.19	1.50
80478 C	3.82	22.42	11.60	52	2.23	1.50
80478 D	3.65	23.38	11.76	50	2.49	1.50
80478 E	3.51	23.19	11.66	50	1.77	1.50
80478 F	3.64	24.29	12.66	52	1.98	1.50
80478 G	3.70	23.38	11.86	51	1.98	1.50

After completing the leach tests, the leach slurry was transferred and brought to 40% solids by adding water. A clear solution aliquot (100 mL) was sampled from the slurry and assayed for pH, CN_{WAD}, free and total cyanide, copper, iron, nickel, and zinc. The remaining slurry was then agitated and pumped to undergo detoxification. Table 13-32 summarizes the initial concentration of the aliquot.

Table 13-32: Summary of Detoxification Feed Concentrations

KCA Test No.	CN_{WAD} (mg/L)	Free CN- (g/L)	Total Cyanide (mg/L)	pH	Cu (mg/L)	Fe (mg/L)	Ni (mg/L)	Zn (mg/L)
80479	265.09	0.34	320.61	10.1	92.2	4.48	0.04	18.3
80480	248.74	0.34	303.71	10.2	101	3.94	0.03	18.1

The target for the detoxification testwork was to achieve less than 0.2 mg/L of CN_{WAD} in the detoxified slurry, as required by the closure plan. It should be noted that the tests did not achieve this target with the addition of 5 g or 10 g of sodium metabisulphite. The reagent additions for each of the detoxification tests are summarized in Table 13-33, and the results of the detoxification testwork are shown in Table 13-34.

Table 13-33: Summary of Detoxification Reagent Consumption

KCA Test No.	Treatment Time (h)	$Na_2S_2O_5$ Addition (kg/t)	$CuSO_4$ Addition (kg/t)	H_2SO_4 Addition (kg/t)	$Ca(OH)_2$ Addition (kg/t)
80479	4	2.74	0.88	0.46	0.23
80480	4	4.71	0.74	-	1

Table 13-34: Summary of Detoxification Discharge Concentrations

KCA Test No.	CN_{WAD} (mg/L)	Free CN- (g/L)	Total Cyanide (mg/L)	pH	Cu (mg/L)	Fe (mg/L)	Ni (mg/L)	Zn (mg/L)
80479	6.86	0.0	7.65	8.1	63.7	0.02	0.03	0.26
80480	4.94	0.0	5.15	8.3	45.1	0.14	<0.01	0.07

The results showed that the slurry can be detoxified to a CN_{WAD} concentration level less than 10 mg/L. The detoxification circuit will operate only when paste backfill is required in the BUG. The CN_{WAD} concentration allowable for BUG paste backfill will need to be confirmed.

13.2.7 Diemme Pressure Filtration (2020)

Diemme Filtration requested a sample from Equinox Gold to perform thickening and filtration testwork at their laboratory in Italy. ALS prepared a sample consisting of an equal blend of BOP and BUG. The sample was shipped to the Diemme laboratory and a final report was received from Diemme (Diemme, 2019).

Thickening Testwork

The procedure for thickening tests is first to determine the flocculant to use and the quantity required. The flocculant that produced a better supernatant quality and higher settling speeds with medium/low dosages for the dynamic thickening tests was selected. The results of the dynamic thickening tests are shown in Table 13-35.

To define the optimal inlet concentration, a static sedimentation curve was determined for the concentration at which the transition between the free settling phase and the hindered settling phase takes place. Based on the obtained results, the optimal concentration was equal to 11%. The dynamic thickening tests were carried out with a pilot plant 99 mm in diameter, equipped with a feedwell simulating a high-rate thickener with scraping bridge, operating at a speed of 2 rpm. The sludge entering the pilot plant and the flocculating agent are fed with two independent peristaltic pumps and mixed before entering the feedwell. In the tests, the values of solid flux and polyelectrolyte consumption are fixed, and a 26 cm bed is produced. Then, the underflow is characterized in terms of solid concentrations and rheological features. The quality of the overflow is evaluated when the bed reaches a 15 cm height. The thickener diameter was determined based on the peak flow of 200 t/h.

Table 13-35: Dynamic Thickening Test Results

Run No.	Feed			Flocculant		Overflow			Underflow	
	Solid Conc. (% w/w)	Flux (t/m^2-h)	Thickener Diameter (m)	Type	Dose (g/t)	Clarity (ppm)	Clarity (NTU)	Liquor R/R (m/h)	Conc. (% w/w)	Yield Stress (Pa)
1	11	0.5	22.6	MF5250	20	-	169	4.18	61.0	98.1
2	11	0.7	19.1		20	43	190	5.86	58.8	81.4
3	11	0.9	16.8		20	-	139	7.54	59.0	79.9

Based on the results, it was recommended that Test 2 or 3 should be used as a reference for the thickener sizing. The overflow quality is very good, even though it did not reach the requested target. In case a <50 ppm value is inacceptable, considering the use of coagulants before flocculation is recommended.

Pressure Filtration Testwork

The filtration tests were carried out using a bench pilot plant that simulates the formation of a single cake with a filtration surface area of 0.0077 m^2 per side. The operating pressures (feeding, squeezing, blowing, etc.) are carried out using compressed air regulated by a special pneumatic panel.

The sample showed a very good filterability, with a very short feeding time. However, without cake blowing, the obtained cakes are quite plastic, almost thixotropic, and with residual moisture values that are far from the requested target of less than 15%. With cake blowing, cakes become friable and they reach better residual moisture values; with the membrane option, it is possible to achieve a residual moisture lower that 15%, with very-low air consumption.

The pressure filter cakes showed good permeability. Consequently, air was able to penetrate easily, and the filter cake was found to wash easily. Washing curves were measured and evaluated for initial cyanide concentrations of 150 mg/L and 600 mg/L. Below are some notes on the wash test results:

- In both cases it is possible to achieve the requested target (<50 ppm) with a wash water consumption of approximately 0.5 m^3/t.
- The washing time does not seem to influence the washing performance significantly. Thus, it is possible to consider washing times of 5 to 6 min to reduce the cyanide below 50 ppm.

13.3 Metallurgical Testwork for Guadalupe Open Pit

KCA and ALS performed the metallurgical testwork described in the following sections.

13.3.1 ALS (2018)

On May 23, 2018, ALS received six samples for metallurgical testing from the GOP ore source of the Los Filos Mine Complex. Each sample was used for metallurgical testwork, which included element analyses, mineralogical analysis, cyanidation leach tests, and diagnostic leach tests.

Head Analyses

Six composites were analyzed for gold, silver, copper, iron, total sulphur, sulphide sulphur, carbon, and total organic carbon. The results of these assays are presented in Table 13-36. Gold content assayed between 0.59 and 6.06 g/t; silver content assayed between 2 and 83 g/t; copper content assayed between <0.01% and 3.39%; iron content assayed between 2.53% and 28.9%; total sulphur content assayed between 0.04% and 2.27%; sulphide sulphur content assayed between 0.02% and 2.17%; carbon content assayed between 0.61% and 7.94%; and total organic content assayed between 0.02% and 0.04%.

Table 13-36: Head Assay Summary

Composite	Head (g/t Au)	Head (g/t Ag)	Copper (%)	Iron (%)	Total Sulphur (%)	Sulphide Sulphur (%)	Carbon	Total Organic Carbon
1	5.13	3.00	0.03	5.40	0.04	0.02	7.94	0.03
2	2.54	83.00	0.03	23.20	1.29	0.74	0.61	0.04
3	0.59	2.00	0.00	2.53	2.27	2.17	2.43	0.02
4	2.10	22.00	0.30	17.80	0.48	0.12	1.53	0.03
5	6.06	55.00	3.39	28.90	0.51	0.25	3.11	0.02
6	0.70	28.00	0.25	7.70	1.25	1.20	2.52	0.02

Mineralogical Analyses

The mineral content of each of the six composites was determined using QEMSCAN Bulk Mineralogical Analysis protocols. The nature of gold occurrences was assessed using QEMSCAN Trace Mineral Search protocols. The results of mineralogical content analyses are summarized in Table 13-37. The six composites had varying levels of iron oxides, quartz, feldspars, garnet, and carbonate minerals. Sulphide minerals were primarily present as pyrite, measuring between 0.1% and 3.9% in the composites. Chalcopyrite, galena, and sphalerite were also measured at lower levels.

Copper mineralization in Composites 1 through 3, which assayed low in copper, was found to occur primarily as chrysocolla or chalcopyrite. Copper mineralization in Composites 4 through 6, which contained higher levels of copper, was found to occur within copper-bearing goethite/limonite, lead arsenic oxides, zinc silicates, and copper alunite. Copper was also found to occur as malachite, azurite, and chrysocolla. Copper present as malachite and azurite, and to a lesser extent chrysocolla, could be solubilized in a cyanidation leach procedure. Copper occurring in chalcopyrite would be less readily soluble in a cyanidation leach. Lead arsenic oxide minerals were also detected at notable levels in Composites 1 and 2.

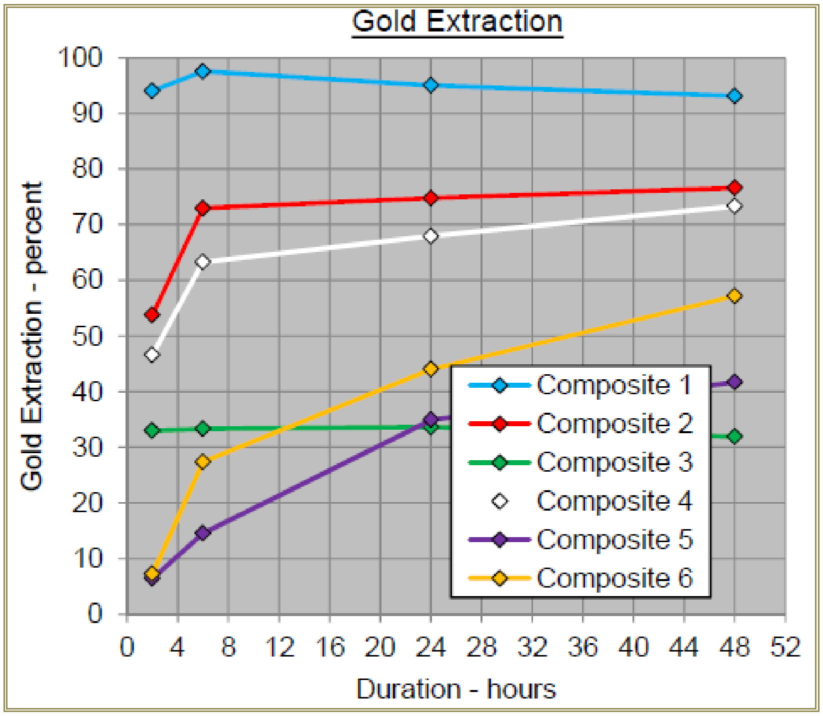
Table 13-37: Mineral Content Summary of Guadalupe Samples

Minerals	Composite 1 (%)	Composite 2 (%)	Composite 3 (%)	Composite 4 (%)	Composite 5 (%)	Composite 6 (%)
Chalcopyrite	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper Oxides[1]	0	0	0	0	1.4	0.1
Chrysocolla	<0.1	<0.1	<0.1	<0.1	3.7	0.1
Galena	<0.1	0.1	0	<0.1	0	<0.1
Lead Arsenic Oxides	2.1	8.3	0.2	0.3	<0.1	0.1
Sphalerite	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Zinc Silicates	0.1	<0.1	0	0.4	<0.1	<0.1
Pyrite	0.1	1.8	3.9	0.2	0.1	2.3
Iron Oxides[2]	7	29	0.1	27.8	50.8	3.8
Quartz	11.4	40.6	35.1	39.1	9.1	22.4
Feldspars	2.8	4.4	28.7	1.7	0.3	17.7
Muscovite	1.3	6.2	7.3	1.4	1.1	3.2
Chlorite	<0.1	0.1	0.2	<0.1	0.5	0.8
Titanium Minerals	0.3	0.4	0.8	0.5	0.2	0.7
Kaolinite (clay)	0.7	0.9	3.6	2.5	1.7	2.4
Carbonates	69.3	3.6	15.5	7	25.9	12.9
Sulphate Minerals	<0.1	2.3	0.4	3	0.9	0.2
Apatite	0.4	0.3	0.5	0.2	0.1	0.6
Amphibole/Pyroxenes	1.0	0.7	0.9	4.1	1.5	10.0
Garnet	2.4	0.8	2.0	10.9	1.4	21.8
Other[3]	1.2	0.4	0.8	0.7	1.3	0.8
Total	**100**	**100**	**100**	**100**	**100**	**100**

Notes: [1] Copper oxides includes malachite/azurite.
[2] Iron oxides includes goethite/limonite, minor magnetite, and hematite.
[3] Other includes trace amounts of zircon, acanthite, nickel sulphide, and unresolved mineral species.

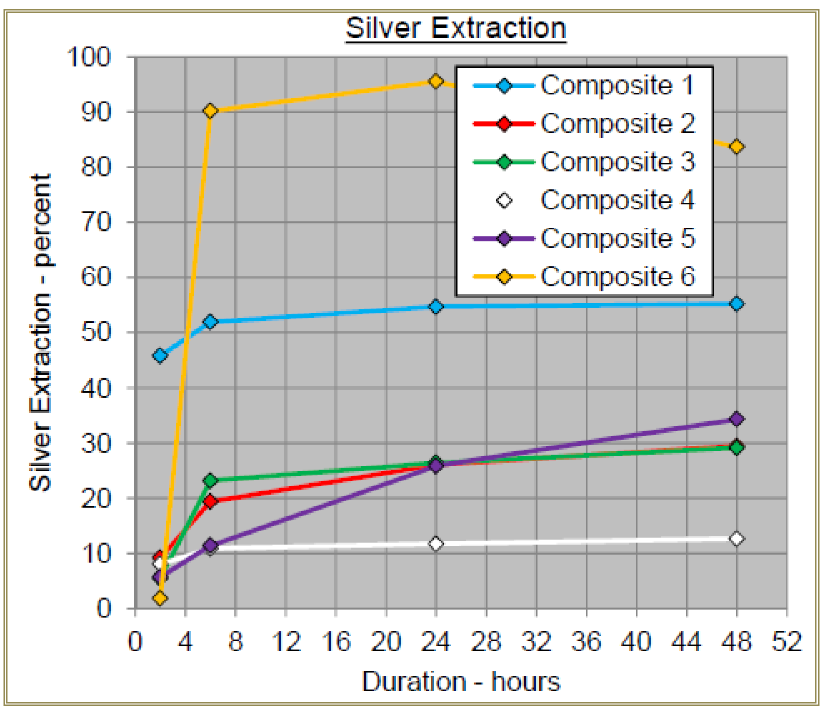
Cyanidation Testwork

Cyanidation tests were conducted on each of the test composites in open-topped bottles with an agitator mixing the slurry for the duration of the tests. Tests were completed using a sodium cyanide concentration of 1,000 ppm, at pH 10, and at a slurry density of 40% solids. Samples were ground to a target primary grind size P_{80} 0.075 mm. Gold extractions ranged from 32% to 93%, and silver extractions ranged from about 13% to 84%. Gold, silver, and copper extractions versus retention times are shown on Figure 13-3, Figure 13-4, and Figure 13-5, respectively.



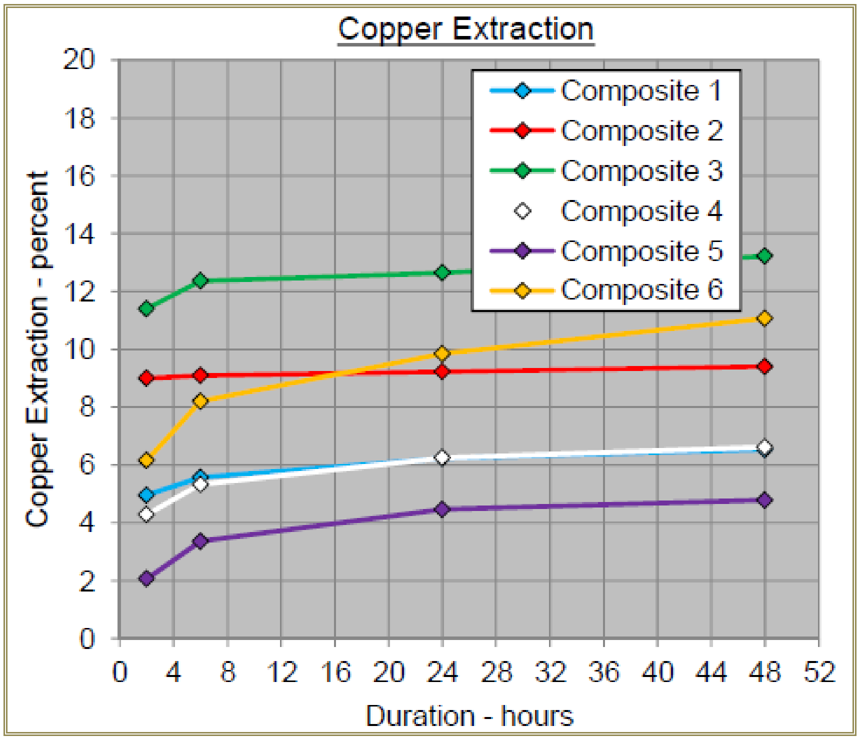
Source: ALS (2018).

Figure 13-3: Gold Extraction vs. Retention Time for GOP Samples



Source: ALS (2018).

Figure 13-4: Silver Extraction vs. Retention Time for GOP Samples



Source: ALS (2018).

Figure 13-5: Copper Extraction vs. Retention Time for GOP Samples

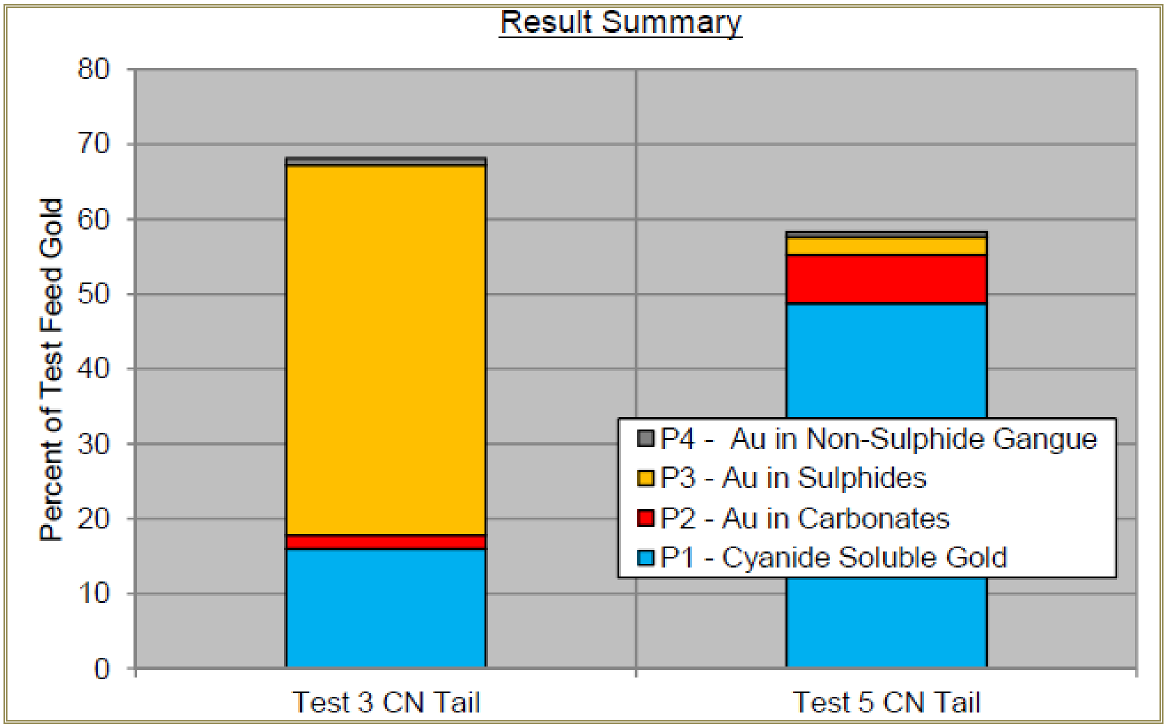
Composite 1 measured the highest gold extraction after 48 hours at about 93%. The extraction was extremely rapid for Composite 1, with peak extraction occurring within the first 2 hours of the test. Silver extraction measured about 55% for Composite 1.

Composite 2 measured extractions of about 77% for gold and 29% for silver. Composite 3 measured gold and silver extractions of about 32% and 29%, respectively. The gold extraction did not increase after two hours for Composite 3. Composite 4 measured gold extractions of about 73% and a silver extraction of only 13%. Composite 5 measured a gold extraction of 42% and a silver extraction of about 34%. Composite 6 measured a gold extraction of 57% and a silver extraction of 84%.

Sodium cyanide consumption ranged from 0.9 kg/t feed (Composite 1) to 11.5 kg/t (Composite 5). The rate of extraction in the test on Composite 5 may have been slowed by high sodium cyanide consumptions, likely caused by cyanide-soluble copper.

Diagnostic Leach Testwork

Four-stage diagnostic leach tests were completed on the cyanidation tailings produced from Composite 3 (Test 3) and Composite 5 (Test 5) to determine the deportment of the gold contained in the leach tailings. The first stage was an intense cyanide leach to recover any remaining cyanide-soluble gold, or gold contained within cyanide-soluble minerals. The second stage used hydrochloric acid digestion to dissolve carbonate minerals, which was followed by a cyanidation leach to extract any gold that had been exposed by the digestion. The third stage included an aqua regia digestion of the residue from the second stage to determine the amount of gold contained within remaining sulphide minerals. The last stage was a fire assay of the aqua regia residue to determine any gold contained within silicate and other remaining non-sulphide gangue minerals. Figure 13-6 provides a summary of the test results.



Source: ALS (2018).

Figure 13-6: Summary of Gold Extraction in Diagnostic Leach Testing

The diagnostic leach of the Test 3 tailings found that most of the remaining gold in the cyanidation leach tailings occurred within sulphide minerals; it is possible that much of the gold may be refractory within sulphide minerals in this sample. About 73% was measured within sulphides and about 23% remained cyanide soluble at more intense cyanidation conditions than the original leach test.

The diagnostic leach test with the Test 5 cyanidation leach tailings found that most of the remaining gold in the cyanide tailings was cyanide soluble. The original cyanidation leach conditions were likely insufficient to overcome the effect of the high cyanide-soluble copper content. In fact, most of the cyanide at 10,000 ppm was consumed over the 24-hour leach. About 84% of the remaining gold was cyanide soluble; this represented about 49% of the feed gold for Test 5.

13.3.2 KCA (2018b)

In September 2018, KCA received two drums containing eight composite samples made up of HQ and NQ core material from the GOP ore source. The GOP ore source is an extension of the Bermejal deposit and is considered to have similar gold mineralization.

The purpose of the test program was to perform simulated column leach testwork in bottle rolls to determine gold recovery. The drill core was crushed to P_{100} 25 mm before being subjected to

240 hours (10 days) of cyanide leaching in a bottle roll. The gold recovery results from the GOP material were to be compared against previous testwork results from BOP for the same lithologies. The results from this GOP program were to confirm the use of the BOP recovery formulas for the GOP for similar lithologies.

The test composite samples from GOP were formulated to represent both higher and lower grade (i.e., Crushed and ROM) oxides and granodiorite ores in the lower, middle, and upper zones of the GOP ore source, with varying total sulphur contents (above and below 1%) as follows:

- Crush, Global Oxide
- ROM, Global Oxide
- Crush, Lower Granodiorite (0.4 to 0.8 g/t Au and total sulphur >1%)
- ROM, Lower Granodiorite (0.2 to 0.8 g/t Au and total sulphur >1%)
- Crush, Middle Granodiorite (0.3 to 0.8 g/t Au and total sulphur <1%)
- ROM, Middle Granodiorite (0.2 to 0.3 g/t Au and total sulphur <1%)
- Crush, Upper Granodiorite (0.4 to 0.8 g/t Au and total sulphur <1%)
- ROM, Upper Granodiorite (0.2 to 0.4 g/t Au and total sulphur <1%).

Multi-Element Analyses

Table 13-38 provides a summary of multi-element analyses conducted on each of the GOP sample composites. Total sulphur was less than 0.25%, except for the Crushed and ROM lower granodiorite samples which were reported to be greater than 2.0% total sulphur. Total copper ranged from 0.001% to 0.907%, with the lower values in the granodiorite composites. The global oxide composites for Crushed and ROM were greater than 0.1% total copper. Soluble copper ranged from less than 0.001% to 0.011% in the granodiorite composites and from 0.014% to 0.187% in the global oxide composites.

Table 13-38: Summary of Multi-Element Analyses on GOP Test Composites

Composite	Calculated Head (g/t Au)	Total Carbon (%)	Total Sulphur (%)	Sulphide Sulphur (%)	Total Copper (%)	Cyanide Soluble Copper (%)
ROM Global Oxide	0.529	2.20	0.20	0.01	0.129	0.014
Crushed Global Oxide	0.729	1.78	0.25	0.01	0.907	0.187
Crushed Lower Granodiorite	0.221	2.45	2.43	1.87	0.008	0.001
ROM Lower Granodiorite	0.343	2.37	2.77	2.16	0.003	0.001
Crushed Middle Granodiorite	0.327	1.65	0.04	0.01	0.021	0.003
ROM Middle Granodiorite	0.218	0.80	0.17	0.01	0.036	0.011
Crushed Upper Granodiorite	0.417	2.33	0.02	0.01	0.013	0.001
ROM Upper Granodiorite	0.333	2.25	0.01	0.01	0.014	0.001

Bottle Roll Testwork

To assess the gold heap leaching characteristics for GOP, a series of coarse intermittent bottle roll tests was conducted on the test composites. The coarse intermittent bottle roll leach tests were conducted to simulate leach extractions achievable from column leach testwork and were conducted under the following conditions:

- Crush size—P_{80} 19 mm
- Cyanide concentration—1 g/L NaCN
- pH—10.5 (maintained with lime)
- Retention time—40 hours
- Roll frequency—1 min every hour

The results of the coarse bottle roll tests are summarized in Table 13-39. Gold extractions from the global oxide composites were similar, at 63% to 64%. Gold extractions from the upper and middle granodiorite composites ranged from 70% to 81%. Gold extractions were zero from the lower granodiorite composites, which contained 2.4% to 2.8% sulphur. However, it should be noted that the lower granodiorite samples were located well below the bottom of the planned GOP ore source and should not be considered as representative of material that would be mined. The results of these tests indicate that gold extractions from GOP are similar to, and in some cases better than, gold extractions experienced from the Bermejal deposit.

Lime consumption was between 0.75 and 1.75 kg/t for all composites with a total sulphur content less than 2.0%, whereas the samples with greater than 2.0% total sulphur consumed more than 2.0 kg/t of lime. Sodium cyanide consumption was less than 0.50 kg/t for all the granodiorite composites, whereas the oxide composite samples consumed 1.95 and 2.85 kg/t for Crushed and ROM composites, respectively. The higher cyanide consumption in the global oxide composites is directly attributable to the amount of cyanide-soluble copper.

Table 13-39: Summary of Coarse Bottle Roll Tests on GOP Test Composites

Composite	Size P_{80} (mm)	Head Grade			Au Extr. (%)	Consumption (kg/t)	
		(g/t Au)	(S_{TOT} %)	(% Cu)		NaCN	Lime
ROMed Global Oxide	19	0.464	0.20	0.129	63	1.95	1.50
Crushed Global Oxide	19	0.719	0.25	0.907	64	2.85	1.75
Crushed Lower Granodiorite	19	0.276	2.43	0.008	0	0.18	2.25
ROM Lower Granodiorite	19	0.276	2.77	0.003	0	0.30	2.75
Crushed Middle Granodiorite	19	0.285	0.04	0.021	81	0.32	1.00
ROM Middle Granodiorite	19	0.221	0.17	0.036	70	0.40	1.00
Crushed Upper Granodiorite	19	0.427	0.02	0.013	79	0.30	1.50
ROM Upper Granodiorite	19	0.365	0.01	0.014	76	0.19	0.75

13.3.3 ALS Metallurgical Laboratory (2020)

Ten samples of GOP ore were shipped to ALS Metallurgical laboratory (ALS) solely for comminution testing on bulk rock and composites formed with drill core samples.

A Bond crushing impact work (low impact) test was completed on each of the bulk rock samples. Bond crushing work indices (CWi) ranged from about 6 kWh/t for Oxido Superficie to 11 kWh/t for Sulfuro

Superficie sample. The rock samples would be categorized as either very soft or soft in terms of crushing. Table 13-40 presents a summary of the Bond CWi test results.

Table 13-40: Average Bond Low Impact Crusher Work Index Results

Sample	Crushing Work Index (kWh/t)
Caliza Superficie	10.7
Granodiorita Superficie	8.5
Oxido Superficie	6.1
Sulfuro Superficie	11.3

Bond abrasion, Bond ball mill, and SMC tests were conducted on each of the drill core composites. A summary of the test results is presented in Table 13-41.

Table 13-41: Summary of Comminution Testwork

Composite	BWi (kWh/t)	Axb	Ai (g)	SCSE (kWh/t)
Carbonatos	8.3	74.5	0.011	7.59
Gran >=3% S	16.6	64.5	0.035	8.22
Gran	15.4	64.9	0.030	8.00
Oxidos Hematita	12.3	68.7	0.080	8.07
Oxidos Limonitas	14.3	88.4	0.019	7.11
Oxidos Magnetita	13.2	94.6	0.026	7.09

Bond abrasion indices measured between 0.011 and 0.080. The drill core composites would be characterized as mildly abrasive in crushing and milling. Bond ball mill work indices (BWi) with a closing screen size of 106 µm recorded between 12.3 and 16.6 kWh/t which would be characterized as moderately soft to moderately hard with respect to ball milling, except for Carbonatos composite; a much lower BWi of 8.3 kWh/t was recorded which would be considered very soft. Axb values derived from the SMC tests ranged from about 65 for Gran ≥3% S which represents a harder composite in terms of SAG/AG milling, to about 95 for Oxidos Magnetita, representing a softer composite. SAG Circuit Specific Energy (SCSE) values ranged from 7.1 to 8.2 kWh/t.

13.4 Life-of-Mine Metallurgical Confirmation Test Program

13.4.1 KCA (2021)

In January 2021, a metallurgical test program was created to confirm the gold recoveries for the different ore sources, lithology, and the year mined based on the LOM production model—July 2020. A total of 480 drill core intervals were selected to represent the first 4 years of heap leach and CIL operation (2023–2026). The drill core intervals were sent to the KCA laboratory in Reno, Nevada, for sample preparation into composites and testing. The individual drill core samples were combined into

42 composites—18 CIL composites and 24 heap leach composites, as shown in Table 13-42 and Table 13-43, respectively.

Table 13-42: CIL Composite Selection by Ore Source, Lithology, and Year

Composites	2023	2024	2025	2026
LFUG	Y	-	-	-
BUG	Y	Y	Y	Y
GOP Carbonate	Y	-	-	-
GOP Intrusive	Y	Y	Y	-
GOP Oxide	Y	Y	Y	-
BOP Carbonate	-	-	-	-
BOP Intrusive	-	Y	Y	Y
BOP Oxide	-	Y	Y	Y

Note: Y = yes.

The CIL composites were subjected to the following testwork:

- Head characterization
- Milled and milled CIL bottle roll tests
- Gravity-recoverable gold (GRG) testwork
- Comminution testing at Hazen Research Laboratory for GOP and BOP
- Batch and continuous slurry detoxification
- Solid-liquid separation testwork at Pocock
- Comingling with heap leach ore column testwork.

Table 13-43: Heap Leach Composite Selection by Ore Source, Lithology, and Year

Composites	2023	2024	2025	2026
LFOP Ia	Y	Y	Y	-
LFOP Ib	Y	Y	Y	Y
LFOP II	Y	Y	Y	Y
LFOP IV	Y	Y	Y	Y
GOP Intrusive	Y	-	-	-
GOP Oxide	Y	-	Y	-
BOP Intrusive	Y	Y	-	Y
BOP Oxide	Y	Y	-	Y

The heap leach composites were subjected to the following testwork:

- Head characterization
- 10-day coarse bottle roll testwork
- Preliminary agglomeration testwork

- 90-day column testwork
- Head and tailings screen analysis
- Comingling with CIL tailings column testwork.

In addition, seven master composites were generated, as shown in Table 13-44.

Table 13-44: Master Composites by Year

Composites	Year
CIL	2023–2024
CIL	2025–2026
HL	2023–2024
HL	2025–2026
CIL+HL (1:1)	2023–2024
CIL+HL (1:2)	2023–2024
CIL+HL (1:5)	2023–2024

The master composites were generated to determine the gold recoveries over a 2-year period, regardless of lithology. The master composites represented the ore that would be mined and either processed through the CIL plant or the heap leach process. Three master composites were prepared at different ratios of CIL-filtered tailings combined with heap leach ore. The blended material was column leach tested to determine the cement addition requirements for agglomeration, and whether additional gold recovery could be recognized from heap leaching the CIL filtered tailings.

Results of the test program are discussed below and can be sourced from the KCA Report–KCA0210027_LF30_02 (KCA, 2021, November).

Head Analyses and Multi-Element Analyses

The head analysis included head assays, multi-element analyses, and cyanide-soluble leach testwork. The head analyses and multi-element analyses are shown in Table 13-45 and Table 13-46 for HL and CIL composites, respectively.

The multi-element results for HL ore sources show that the LFOP ore has very low sulphide sulphur values and negligible cyanide-soluble copper. The BOP and GOP ore sources reported moderate sulphide sulphur values with the highest value of 0.76% for the BOP intrusive. The cyanide-soluble copper levels were moderate except for the 2023 GOP oxide sample that had a cyanide-soluble copper level of 0.521.

The multi-element results for the CIL samples reported low sulphide sulphur values for all ore sources except the BOP intrusive that reported a value of 1.59%. The cyanide-soluble copper values were moderate for all ore sources except for the 2023 GOP sample that reported a value of 0.386%.

Table 13-45: Summary of Multi-Element Analyses on HL Test Composites

Composite	Calculated Head (g/t Au)	Calculated Head (g/t Ag)	Total Sulphur (%)	Sulphide Sulphur (%)	Total Copper (%)	Cyanide Soluble Copper (%)
LFOP Ia HL, 2023	0.45	5.60	0.01	<0.01	0.014	0.002
LFOP Ia HL, 2024	0.57	9.47	0.01	<0.01	0.087	0.006
LFOP Ia HL, 2025	1.78	6.94	0.01	<0.01	0.046	0.006
LFOP Ib HL, 2023	0.55	5.62	0.07	<0.01	0.025	0.003
LFOP Ib HL, 2024	0.57	3.34	0.18	0.02	0.018	0.006
LFOP Ib HL, 2025	0.34	9.08	0.01	<0.01	0.049	0.003
LFOP Ib HL, 2026	0.62	4.61	0.05	<0.01	0.048	0.005
LFOP II HL, 2023	0.40	4.04	0.01	<0.01	0.006	0.001
LFOP II HL, 2024	0.57	3.90	0.01	<0.01	0.008	0.001
LFOP II HL, 2025	0.47	1.36	0.01	<0.01	0.004	0.001
LFOP II HL, 2026	0.66	6.53	0.02	<0.01	0.027	0.002
LFOP IV HL, 2023	0.78	5.64	0.03	<0.01	0.035	0.002
LFOP IV HL, 2024	0.80	4.31	0.04	<0.01	0.040	0.004
LFOP IV HL, 2025	0.84	8.48	0.02	<0.01	0.036	0.004
LFOP IV HL, 2026	2.28	7.55	0.16	<0.01	0.153	0.013
GOP Intrusive HL, 2023	0.70	7.57	1.03	0.23	0.167	0.038
GOP Oxide HL, 2023	3.70	35.22	3.96	0.27	1.256	0.521
GOP Oxide HL, 2025	1.15	16.76	1.05	0.23	0.218	0.041
BOP Intrusive HL, 2023	0.79	15.00	0.25	<0.01	0.056	0.013
BOP Intrusive HL, 2024	0.75	8.36	1.36	0.76	0.047	0.008
BOP Intrusive HL, 2026	0.76	8.11	0.74	0.30	0.092	0.029
BOP Oxide HL, 2023	0.64	5.73	0.02	<0.01	0.029	0.004
BOP Oxide HL, 2024	0.57	6.23	0.79	0.28	0.047	0.013
BOP Oxide HL, 2026	0.79	7.46	0.67	0.14	0.119	0.037

Table 13-46: Summary of Multi-Element Analyses on CIL Test Composites

Composite	Calculated Head (g/t Au)	Calculated Head (g/t Ag)	Total Sulphur (%)	Sulphide Sulphur (%)	Total Copper (%)	Cyanide Soluble Copper (%)
LFUG CIL, 2023	3.52	25.21	0.23	<0.01	0.174	0.032
BUG CIL, 2023	4.14	33.10	0.28	<0.01	0.272	0.112
BUG CIL, 2024	7.22	7.39	0.48	<0.01	0.308	0.096
BUG CIL, 2025	6.70	32.63	0.73	<0.01	0.219	0.073
BUG CIL, 2026	6.20	16.84	0.25	<0.01	0.276	0.075
GOP Carbonate CIL, 2023	0.57	7.70	0.02	<0.01	0.176	0.174
GOP Intrusive CIL, 2023	1.62	18.13	1.05	0.15	0.496	0.150
GOP Intrusive CIL, 2024	1.49	30.60	0.50	0.04	0.130	0.014
GOP Intrusive CIL, 2025	1.29	4.60	0.03	<0.01	0.084	0.010
GOP Oxide CIL, 2023	4.20	33.77	0.51	0.02	0.742	0.386
GOP Oxide CIL, 2024	2.82	32.01	0.13	<0.01	0.352	0.077
GOP Oxide CIL, 2025	3.49	0.91	0.06	<0.01	0.067	0.010
BOP Intrusive CIL, 2024	1.18	15.83	0.90	0.31	0.072	0.014
BOP Intrusive CIL, 2025	0.87	13.56	2.73	1.59	0.094	0.039
BOP Intrusive CIL, 2026	1.72	17.41	0.77	0.41	0.130	0.029
BOP Oxide CIL, 2024	1.72	32.59	0.20	<0.01	0.064	0.011
BOP Oxide CIL, 2025	1.19	5.18	0.05	<0.01	0.146	0.044
BOP Oxide CIL, 2026	1.81	7.50	0.07	<0.01	0.140	0.037

Gravity Recoverable Gold

GRG tests were completed on portions of the master composite samples. The gravity separation tests used a Knelson KC-MD3 batch concentrator. The Knelson-type concentrator creates an enhanced gravitational force that works together with a fluidization process to achieve material separation. These typically work in consecutive stages to achieve better results. In all, three stages were used for the GRG testwork.

The results of the gravity separation testwork are summarized in Table 13-47.

Table 13-47: GRG Testwork Summary

Description	Calc. Head, Au (g/t)	Tail, Au (g/t)	Conc. + Mid Wt. %	Conc. Assay, Au (g/t)	Wt. % Au	Calc. Head, Ag (g/t)	Tail, Ag (g/t)	Conc. Assay (g/t)	Wt. % Ag
CIL Comp. 1, 2023–2024	3.11	2.46	1.0	66.40	21.7%	25.79	24.70	131.50	5.2
CIL Comp. 2, 2025–2026	2.64	2.16	1.0	52.05	18.9%	12.08	11.79	43.07	3.4

In addition, the GRG tailings were used in CIL cyanide bottle roll leach tests. The CIL bottle roll tests ran for a total of 48 hours with the addition of attritioned granular activated carbon. The tests used a sodium cyanide concentration of 1.0 g/L.

The results of the CIL bottle roll tests are presented in Table 13-48.

Table 13-48: CIL Bottle Roll Testwork on GRG Final Tailings

Description	Solution						Tailings		Calculated Head		Actual Recovery	
	pH	Dissolved O_2	CN (kg/t)	Lime (kg/t)	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)
CIL Comp. 1, 2023–2024	10.5	6.8	3.79	1.50	2.28	14.10	0.40	10.37	2.69	24.47	85.0	57.6
CIL Comp. 2, 2025–2026	10.4	6.9	1.78	2.00	2.13	6.55	0.22	3.92	2.35	10.47	90.7	62.6

The overall recovery results of the multi-process leach are presented in Table 13-49.

Table 13-49: Overall Leach Performance GRG followed by BRT on Tailings

	Calculated Head		GRG Recovery		CIL of GRG Tailings		Overall Recovery	
	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)	Au (%)	Ag (%)	Au (%)	Ag (%)
CIL Comp. 1, 2023–2024	3.34	25.56	20.3	5.2	67.7	54.6	88.0	59.8
CIL Comp. 2, 2025–2026	2.83	10.78	17.7	3.8	74.6	60.2	92.3	64.0

The GRG results show that 17% to 20% of the gold can be recovered by gravity separation.

Coarse Bottle Roll Testwork—Heap Leach

Coarse bottle roll testwork was performed on the composites of the individual ores sources by lithology, and on the master composites. The ore was stage crushed to a P_{80} of 19 mm. The coarse bottle roll tests ran for a total of 240 hours (10 days). Particle size reduction can be a problem in bottle roll leach tests completed on coarse material. As such, a testing protocol has been developed by which the bottle is allowed to roll for two minutes out of every hour during the leach period. This intermittent agitation reduces the amount of attrition that a continuously rolled bottle test would have and makes the results of this type of test much more reliable with respect to determining the effect of crush size on precious metal extraction.

The results of the coarse bottle roll tests are shown in Table 13-50.

The coarse bottle roll test results for gold recovery ranged from 14.2% (BOP Oxide) to 79% (LFOP Ia). The average gold recoveries for the LFOP individual lithologies compared well to the Simon Hille-predicted recovery model. The sodium cyanide consumption was low, at an average of 0.22 kg/t.

The BOP gold recovery results were low, with the Intrusive recoveries ranging from 30.4% to 62.0% and the Oxide recoveries ranging from 14.2% to 50.2%. The average sodium cyanide consumption was higher than LFOP, at 0.54 kg/t.

Table 13-50: 10-day Coarse Bottle Roll Test Results

Description	Calculated Head		Tailings		Actual Recovery		Consumption CN (kg/t)	Addition Lime (kg/t)
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)		
LFOP Ia HL, 2023	0.37	5.89	0.12	5.71	68.3	3.1	0.13	2.00
LFOP Ia HL, 2024	0.57	8.29	0.12	7.91	79.0	4.6	0.33	2.00
LFOP Ia HL, 2025	3.41	7.40	0.87	6.58	74.6	11.1	0.20	2.00
LFOP Ib HL, 2023	0.54	7.89	0.31	7.66	42.8	2.9	0.12	0.75
LFOP Ib HL, 2024	0.35	1.82	0.21	1.18	41.4	35.2	0.15	1.00
LFOP Ib HL, 2025	0.31	9.75	0.09	9.39	71.1	3.7	0.18	1.25
LFOP Ib HL, 2026	0.62	6.01	0.18	5.13	71.4	14.6	0.38	4.25
LFOP II HL, 2023	0.47	3.19	0.25	2.99	48.0	6.3	0.15	0.50
LFOP II HL, 2024	0.60	4.49	0.22	4.18	63.7	6.9	0.10	0.50
LFOP II HL, 2025	0.44	1.35	0.20	1.14	53.7	15.6	0.03	0.50
LFOP II HL, 2026	0.72	4.98	0.22	4.33	69.7	13.1	0.30	1.50
LFOP IV HL, 2023	0.88	5.83	0.41	5.48	53.6	6.0	0.18	0.75
LFOP IV HL, 2024	0.83	4.66	0.50	4.26	39.9	8.7	0.21	0.75
LFOP IV HL, 2025	1.04	9.57	0.34	9.10	67.2	5.0	0.21	1.00
LFOP IV HL, 2026	2.07	11.85	0.69	8.59	66.6	27.4	0.68	3.25
GOP Intrusive HL, 2023	0.67	6.27	0.34	4.48	49.8	28.5	0.89	5.75
GOP Oxide HL, 2023	2.65	47.90	2.14	45.18	19.3	5.7	5.12	9.00
GOP Oxide HL, 2025	1.28	18.01	0.41	14.51	68.2	19.4	1.55	3.00
BOP Intrusive HL, 2023	0.73	19.95	0.28	12.79	62.0	35.9	0.53	1.50
BOP Intrusive HL, 2024	0.86	11.12	0.53	9.50	38.8	14.6	0.53	2.00
BOP Intrusive HL, 2026	1.08	13.28	0.75	12.07	30.4	9.1	0.47	1.50
BOP Oxide HL, 2023	0.80	10.81	0.40	9.58	50.2	11.4	0.35	1.50
BOP Oxide HL, 2024	0.61	5.81	0.43	5.35	30.4	8.0	0.43	2.50
BOP Oxide HL, 2026	0.37	4.10	0.32	3.59	14.2	12.3	0.94	4.50
HL Comp. 1, 2023–2024	0.58	6.30	0.34	5.27	41.9	16.3	2.25	1.75
HL Comp. 2, 2025–2026	1.31	7.11	0.34	5.93	74.2	16.6	0.33	2.50

The GOP gold recovery for intrusive ore was 49.8%. The two oxide samples for GOP reported gold recoveries of 19.3% and 68.2% for the 2023 and 2025 composites. The 2023 GOP sample contained a total copper value greater than 1.0%. The sodium cyanide consumption ranged from 0.89 kg/t for the intrusive sample, compared to the oxide samples that reported sodium cyanide consumptions greater than 1.0 kg/t. The 2023 GOP sample reported a sodium cyanide consumption of 5.12 kg/t. The low gold recovery for the 2023 GOP samples was due to a high consumption of cyanide by the presence of cyanide-soluble copper.

The HL Comp. 1 sample that is a blend of the 2023 and 2024 ore source contributions shows the effect of the 2023 GOP sample on cyanide consumption and gold recovery. The HL Comp. 1 gold recovery and cyanide consumption were 41.9% and 2.23 kg cyanide/tonne of ore, respectively.

The HL Comp. 2 gold recovery and cyanide consumption were reported as 74.2% and 0.33 kg cyanide/tonne of ore and contained low cyanide soluble copper.

Direct-Leach and CIL Bottle Roll Testwork—CIL

Direct-leach and CIL bottle roll testwork were performed on each of the different ore sources, and by lithology. The two master composites were also tested. The direct-leach and CIL bottle roll tests were conducted on ore ground to a P_{80} 75 µm and leached for a 48-hour period.

Results of the direct leach and CIL leach are shown in Table 13-51 and Table 13-52, respectively.

Table 13-51: Direct-Leach Bottle Roll Testwork Results

Description	Calculated Head		Tailings		Actual Recovery		Consumption	Addition
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)	CN (kg/t)	Lime (kg/t)
LFUG CIL, 2023	3.26	25.84	0.56	19.09	82.7	26.1	1.03	1.25
BUG CIL, 2023	3.70	38.20	0.58	18.56	84.3	51.4	2.49	1.00
BUG CIL, 2024	6.70	8.08	0.52	4.35	92.3	46.2	1.63	1.50
BUG CIL, 2025	6.00	33.41	0.66	20.48	89.0	38.7	2.54	1.75
BUG CIL, 2026	5.57	15.90	0.40	7.16	92.8	55.0	1.59	1.50
GOP Carbonate CIL, 2023	0.49	8.34	0.10	5.11	79.6	38.7	3.48	0.50
GOP Intrusive CIL, 2023	1.42	19.90	0.55	11.17	61.5	43.9	3.48	2.25
GOP Intrusive CIL, 2024	1.42	30.46	0.53	17.51	62.9	42.5	0.83	2.50
GOP Intrusive CIL, 2025	1.33	4.41	0.15	2.33	88.8	47.2	0.41	2.00
GOP Oxide CIL, 2023	3.43	33.34	1.90	30.79	44.5	7.6	6.82	2.75
GOP Oxide CIL, 2024	2.94	31.58	0.34	20.56	88.3	34.9	1.86	1.75
GOP Oxide CIL, 2025	3.24	1.98	0.32	1.49	90.0	24.7	0.48	1.50
BOP Intrusive CIL, 2024	1.17	15.46	0.30	6.77	74.5	56.2	1.06	2.00
BOP Intrusive CIL, 2025	0.93	12.34	0.19	7.11	79.8	42.4	1.29	2.50
BOP Intrusive CIL, 2026	2.75	13.45	0.19	4.91	93.0	63.5	2.55	2.25
BOP Oxide CIL, 2024	1.92	36.23	0.74	18.95	61.3	47.7	1.24	2.00
BOP Oxide CIL, 2025	1.19	5.23	0.12	2.63	90.1	49.7	1.73	2.25
BOP Oxide CIL, 2026	1.76	6.95	0.17	2.88	90.5	58.5	1.39	2.25
LFOP Ia HL, 2024	0.55	8.31	0.06	6.03	89.5	27.4	0.12	2.50
LFOP Ib HL, 2024	0.68	0.89	0.09	0.19	87.5	78.2	0.67	1.25
LFOP II HL, 2025	0.40	0.99	0.03	0.32	92.0	67.5	0.14	0.75
LFOP IV HL, 2025	0.85	8.66	0.11	6.61	87.5	23.7	0.92	1.25
CIL Comp. 1, 2023–2024	2.85	26.45	0.49	16.00	82.9	39.5	3.96	1.75
CIL Comp. 2, 2025–2026	2.70	10.74	0.24	3.94	91.2	63.3	1.43	2.00

Table 13-52: CIL Leach Bottle Roll Testwork Results

Description	Calculated Head		Tailings		Actual Recovery		Consumption CN (kg/t)	Addition Lime (kg/t)
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)		
LFUG CIL, 2023	3.38	25.63	0.56	19.10	83.3	25.5	1.56	1.00
BUG CIL, 2023	4.00	36.25	0.52	11.48	87.1	68.3	2.71	1.00
BUG CIL, 2024	6.96	7.97	0.50	3.96	92.8	50.3	2.63	1.25
BUG CIL, 2025	6.35	33.45	0.60	14.51	90.5	56.6	3.21	1.75
BUG CIL, 2026	5.97	16.75	0.41	7.01	93.1	58.1	2.19	1.25
GOP Carbonate CIL, 2023	0.57	8.10	0.09	4.64	84.1	42.7	4.01	0.50
GOP Intrusive CIL, 2023	1.54	18.52	0.39	8.75	74.5	52.8	3.71	2.25
GOP Intrusive CIL, 2024	1.42	29.76	0.53	18.00	63.0	39.5	1.61	2.50
GOP Intrusive CIL, 2025	1.42	3.83	0.17	2.51	87.9	34.3	2.41	2.00
GOP Oxide CIL, 2023	3.89	34.39	1.96	26.52	49.7	22.9	6.49	2.75
GOP Oxide CIL, 2024	2.77	32.34	0.32	20.28	88.5	37.3	2.09	1.75
GOP Oxide CIL, 2025	3.32	1.19	0.27	1.15	91.8	3.6	0.85	1.50
BOP Intrusive CIL, 2024	1.16	14.80	0.25	6.61	78.3	55.4	2.05	1.50
BOP Intrusive CIL, 2025	0.94	11.41	0.20	7.21	78.8	36.8	2.32	1.75
BOP Intrusive CIL, 2026	1.66	13.80	0.13	5.83	92.2	57.8	2.22	1.75
BOP Oxide CIL, 2024	1.87	31.67	0.32	17.27	83.0	45.5	1.48	1.50
BOP Oxide CIL, 2025	1.23	4.09	0.09	2.18	92.7	46.6	2.47	1.50
BOP Oxide CIL, 2026	1.79	6.38	0.13	2.78	92.6	56.3	1.93	1.50
LFOP Ia HL, 2024	0.46	8.49	0.04	6.51	90.8	23.3	1.40	2.50
LFOP Ib HL, 2024	0.75	0.90	0.08	0.18	89.5	79.6	1.63	1.00
LFOP II HL, 2025	0.43	1.01	0.03	0.27	92.0	72.8	0.54	0.50
LFOP IV HL, 2025	0.95	8.38	0.10	6.26	89.1	25.3	1.18	1.25
CIL Comp. 1, 2023–2024	3.25	23.85	0.43	11.53	86.9	51.7	4.78	1.50
CIL Comp. 2, 2025–2026	3.82	8.32	0.21	4.01	94.6	51.8	2.26	1.75

The CIL bottle roll test results reported higher gold recoveries than the direct-leach bottle roll tests. The direct-leach result for the 2024 BOP Oxide sample was 61.3% versus the CIL leach result of 83.0%. As a result, the average for BOP oxide was almost 10% lower than the CIL bottle roll test result.

The 2023 GOP Oxide result for both the direct leach and CIL leach reported gold recoveries less than 50%. The 2023 GOP oxide material selected contained high cyanide-soluble copper that resulted in a cyanide consumption greater than 6 kg cyanide/tonne of ore. Consequently, the 2023 GOP Oxide results were not included in the average gold recoveries shown in Table 13-53.

Table 13-53: Average Gold Recovery by Ore Source

Ore Source	Average Gold Recovery (%)	
	Direct	CIL
LFUG	82.7	83.3
BUG	89.6	90.9
GOP Intrusive	71.0	75.1
GOP Oxide	89.2	90.2
BOP Intrusive	82.4	83.1
BOP Oxide	80.6	89.4
LFOP	89.1	90.3
Comp. 1	82.9	86.9
Comp. 2	91.2	94.6

Diagnostic Leach Test on GOP Oxide 2023—CIL Tailings

A diagnostic leach test was conducted on a portion of tailings material from the CIL bottle roll test on 2023 GOP Oxide. The purpose of the test is to determine the gold associations within the sample material. Mineral associations were determined through six sequential phases of leach treatment.

The result of the diagnostic leach is shown on Figure 13-7.

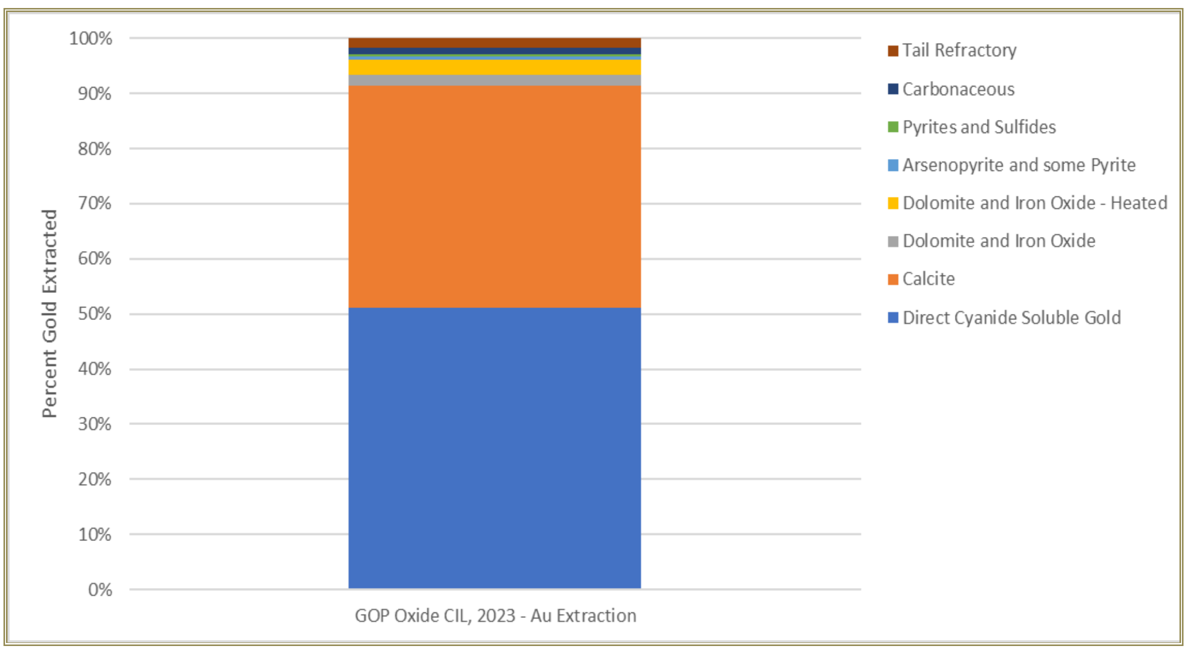


Figure 13-7: Summary of Diagnostic Leach Testing

The information from the diagnostic leach testing shows that 51% of the gold is cyanide soluble and 40% is encapsulated in calcite. The remaining 9% is locked in pyrites, carbonaceous material, and refractory material.

Preliminary Agglomeration Testwork—Heap Leach

Preliminary agglomeration testwork was conducted on portions of the two HL master composite samples using material stage crushed to P_{80} 19 mm. The purpose of the percolation tests was to examine the permeability of the material under various cement agglomeration levels (0, 2, 4, and 8 kg/t of Portland Type II cement). In the preliminary agglomeration testing, the agglomerated material was placed in a column (75 mm inside diameter) with no compressive load, then tested for permeability.

Additional tests were performed on ratios of 1:1, 1:2, and 1:5 of filtered CIL tailings comingled with fresh HL feed. The purpose of testing these different ratios of CIL:HL will assist in determining if filtered CIL tailings could be agglomerated with fresh HL ore.

All test results were considered to have passed based on KCA result criteria, regardless of cement addition for agglomeration.

These tests are indicative of cement requirements for a single-lift heap having an overall height of not more than 8 m. If a multiple-lift heap leach operation is developed, then additional agglomeration testwork will be required. The testwork should examine the material under a static load to determine ultimate heap height.

The preliminary agglomeration testwork results from the CIL filtered tailings agglomerated with fresh HL ore can show that the material can be blended at a 1:1 ratio.

Column Leach Testwork—Heap Leach

Column leach testwork was conducted on portions of the two HL master composite samples and the three different ratio samples of filtered CIL tailings agglomerated with fresh HL ore. During testing, the material was leached with a sodium cyanide solution. The composite material was placed into 0.152 m-diameter columns, then leached with a 1.0 g/L sodium cyanide solution for 98 or 122 days.

Column leach testwork was conducted on portions of the composite material crushed to P_{100} 25 mm.

Gold extractions for the column leach tests ranged from 53% to 83% based on calculated heads, which ranged from 0.67 to 1.71 g/t. The sodium cyanide consumptions ranged from 1.37 to 3.27 kg/t. The material used in leaching was blended with 0 (no hydrated lime), 2.04, or 3.06 kg/t hydrated lime, or agglomerated with 3.0 to 5.0 kg/t cement. The metal extractions are summarized in Table 13-54.

The HL Comp. 1 result contains 2023 GOP Oxide, which has reported a low gold recovery of 57.3%. The low gold recovery is mainly due to the presence of 2023 GOP Oxide in the composite. The HL Comp. 2 gold recovery was very good, at 82.8%. The cyanide consumption for the HL Comp. 1 and HL Comp. 2 was high, at over 2 kg cyanide/tonne of ore.

Table 13-54: Column Leach Test Results

Description	Calculated Head		Tailings		Actual Recovery		Leach	Consumption	Addition	Addition
	Au (g/t)	Ag (g/t)	Au (g/t)	Ag (g/t)	Au (%)	Ag (%)	(d)	NaCN (kg/t)	Lime (kg/t)	Cement (kg/t)
HL Comp. 1, 2023–2024	0.82	7.94	0.35	4.20	57.3	14.6	122	2.08	2.3	-
HL Comp. 2, 2025–2026	1.71	7.52	0.29	4.31	82.8	16.8	122	3.27	3.6	-
Year 1–2 CIL+HL 1:1	0.67	8.78	0.31	6.15	53.5	20.2	98	1.47	-	5.0
Year 1–2 CIL+HL 1:2	0.73	9.42	0.33	5.51	54.9	22.0	98	1.28	-	4.0
Year 1–2 CIL+HL 1:5	0.69	7.91	0.31	5.19	55.3	27.4	98	1.37	-	3.0

The filtered CIL tailings agglomerated with fresh HL ore reported gold recoveries from 53.5% to 55.3%. The fresh HL ore was equivalent to HL Comp. 1, which reported a gold recovery of 57.3%. The results indicate that no additional gold recovery was achieved from the CIL filtered tailings and that all the gold recovered came from the fresh HL ore.

Detox Testwork—CIL Tailings

Detox testwork was completed on portions of the master composite samples (CIL Comp. 1 and CIL Comp. 2). The detox tests used sodium metabisulfite with added oxygen gas to chemically degrade the free and weakly complexed metal cyanides in leached tailings. Two master composite samples were individually milled (target of P_{80} 0.075 mm) and leached in bottles with sodium cyanide for 48 hours. The leached tailings from the bottle roll leach tests were used for the detox testwork. The detox testwork included a batch test and a continuous test for each master composite.

The results of the detox testwork were positive, with the slurry samples showing high reactivity. In the batch tests, the target CN_{WAD} concentrations reached less than 1.0 mm/L in a 90-minute period. Despite the aggressive oxygen gas addition, the dissolved oxygen concentrations fell below the target (above 4 mm/L) at 30 and 60 minutes of the test (CIL Comp. 1, 2023–2024 and CIL Comp. 2, 2025–2026, respectively). The copper levels were depleted within the 90-minute duration of the test.

The continuous tests remained stable with the CN_{WAD} concentrations below 2 mm/L. The copper levels remained low, at less than 5.7 and 0.9 mm/L (CIL Comp. 1, 2023–2024 and CIL Comp. 2, 2025–2026, respectively).

Lycopodium Canada Inc. performed a trade-off study to compare the benefit of detox versus installation of a SART plant. The results showed that the detox would add an additional US$11.42/t to the cost of ore treated in the CIL plant. Thus, Equinox Gold decided that the detox system would be removed from the circuit. The SART plant is still a viable option, as it has a net-neutral operating cost, and adds the benefit of selling a concentrate. Equinox Gold decided that the SART plant would not be included up front, but would instead monitor dissolved copper levels for the first few years of the CIL operation, using the results of monitoring to decide whether to proceed with SART construction. The decision was based on the 2020 Elbow Creek assessment that stated the SART plant may be required by 2028, but it may not be needed at all.

13.4.2 CIL Comminution Testwork—Hazen

Portions of the CIL composite material were submitted to Hazen Research, Inc. (Hazen) in Golden, Colorado, for comminution testing. The testwork included semi-autogenous grinding (SAG) mill comminution, Bond ball mill work index (BWi), and Bond abrasion index (Ai) testing. The Hazen report is included in the KCA (2021) report for completeness. The results are summarized in Table 13-55.

Table 13-55: Summary of Comminution Testwork

Description	BWi (kWh/t)	AxB	Ai (g)	ta	SG	SCSE (kWh/t)
GOP Carbonate CIL, 2023	9.3	63.0	0.0068	0.61	2.68	8.10
GOP Intrusive CIL, 2023	13.2	61.3	0.0704	0.58	2.75	8.27
GOP Intrusive CIL, 2024	16.3	52.6	0.1179	0.51	2.67	8.70
GOP Intrusive CIL, 2025	16.3	66.8	0.0537	0.55	3.17	8.48
GOP Oxide CIL, 2023	15.9	59.9	0.1408	0.41	3.83	8.59
GOP Oxide CIL, 2024	12.1	73.3	0.0462	0.63	3.00	7.99
COP Oxide CIL, 2025	15.0	64.2	0.0531	0.51	3.24	8.68
BOP Intrusive CIL, 2025	12.3	69.1	0.0334	0.68	2.62	7.77
BOP Intrusive CIL, 2026	16.2	49.8	0.1209	0.49	2.61	8.85
BOP Oxide CIL, 2025	14.8	65.5	0.1377	0.59	2.87	8.20
BOP Oxide CIL, 2026	14.0	74.0	0.0373	0.68	2.81	7.73

13.4.3 Thickening and Filtration Testwork—Pocock

A portion of material from the CIL Comp. 1 was submitted to Pocock for SLS testwork.

For the sample, decant solution was used to make the necessary dilutions during SLS testing, and pH-adjusted water was used as dilution for CCD simulations. The purpose of testing was to evaluate settling, rheology, and filtration characteristics for SLS equipment sizing. Filtration testing analyzed the effect of varying cake thicknesses, wash and dry time on the outcome of the filter cake product, and equipment sizing parameters.

An overall summary of recommended thickener design for both standard conventional-type thickeners and standard high-rate-type thickeners is presented in Table 13-56.

Table 13-56: Thickening Test Results and Design Parameters

Sample Name	Flocculant Type	Flocculant Dose (g/Mt)	Flocculant Conc. (g/L)	Max. Thickener Feed Solids (%)	Min. Unit Area for Conventional Thickener Sizing (m^2/Mt/d)	Hydraulic Rate for High-Rate Thickener Sizing (m^3/m^2-h)	Estimated Underflow Density for Standard Thickener (%)	Thickener Type Recommended
CIL Comp. 1	SNF AN 910 SH	30–35	0.1	20–25 **Conv. Type** 20–25 **High-Rate**	0.172	3.15	57	Standard Conventional Type or Standard High-Rate

Rheology tests were completed on all thickened materials using a FANN (Model 35A) viscometer fitted with rotor and bob attachment, having the proper shear gap distance for the material. This type of testing is important in thickening applications to estimate maximum underflow density, for underflow pump and pipeline design, and for equipment downstream of the thickener.

Given all aspects of rheology test data, the overall maximum underflow density range for the materials tested based on fully sheared data for standard equipment design is between 56 to 57 (%).

Vacuum filtration tests were performed to collect a general set of filtration data to design and size vacuum filters, and to examine the effect of cake thickness and dry time, wash rate, and wash efficiency on production rate and filter cake moisture. The results are shown in Table 13-12.

All vacuum filtration tests were conducted at an applied vacuum level of 67.7 kPa (20 inches of Hg).

Filtration aid was used in top-load vacuum leaf testing (for horizontal belt sizing), as filter cakes tended to hold additional liquor and not meet required discharge moistures. Similarly, the 8 to 10 cfm/ft^2 multi-monofilament polypropylene cloth used for top load testing produced clear filtrate for the samples tested.

Filter cake moistures tended to be higher than desirable, especially with the use of flocculant. The cake moistures selected for design examples did not yield reasonable discharge and stacking properties at reasonable dry times with the use of flocculant. Lower cake moistures would require significantly longer dry times that would decrease production rates. Higher cake moistures would yield sticky and unstackable cakes. Vacuum filtration is not recommended for this material. Without the use of flocculant, production rates were too low to be considered economic.

Production rates shown in Table 13-57 were based on the minimum cake thickness recommended for design of these types of filters. Design cake thicknesses greater than these recommended minimums would result in lower production rates at somewhat higher cake moistures. Final designs should consider that production rates below 300 kg/m^2-h are typically not economical for horizontal belt or ceramic disc vacuum filters. A comprehensive economic analysis that includes workforce considerations may be required to determine overall dewatering equipment design for this material. If lower moisture contents are required for downstream operations, pressure filtration should also be considered as a preferred alternative to these technologies.

Table 13-57: Vacuum Filtration Test Results

Material	Test Conditions	Filter Feed Solids (%)	Filter Cloth Used (CFM/ft^2)	Filter Cake Moisture (%)	Bulk Cake Density (dry kg/m^3)	Cake Thickness (mm)	Wash Ratio (N)	Production Rate (dry kg/m^2-h)
CIL Comp. 1	No Flocculant added as filtration aid	56.7	8–10	23.3	1,724.2	10	1	9.30
							2	6.25
							3	4.71
							4	3.78
	122 g/t of SNF AN 910 SH	56.7	8–10	27.4	1,397.9	10	1	219.5
							2	129.4
							3	91.8
							4	71.1

Pressure filtration tests were performed on thickened leach samples to establish a general set of data to design and size pressure-filtration equipment. Design information for horizontal-type recess plate filter presses and membrane-squeeze filter presses were the main focus. The results are shown in Table 13-12.

The pressure filter cake moisture content for the air-blow-only case ranged was 19.1% and for the air-blow and membrane-squeeze case was 17.7%. The higher moisture content occurred when no membrane squeeze was applied. At these moistures the filter cakes produced from pressure-filtration testing were easily dischargeable from the testing apparatus, and generated a stackable and conveyable cake.

Table 13-58: Pressure Filtration Test Results

Material	Filter Feed Solids (%)/ Sizing Basis (dry m³/Mt)	Cake Thickness/ Design Cake Moisture	Single Stage Wash Pressure Filtration				
			Wash Ratio (N)	Soluble Value Removal Efficiency (%)	Filter Cycle Time (min)	Volumetric Production Rate (kg/m³-h)	Area Basis Production Rate (kg/m²-h)
CIL Comp. 1 (Air Blow)	54.5/0.710	35 mm/19.1%	0	16.0	13.4	6.30	110.6
			1	17.4	49.7	1.70	29.9
			2	20.3	86.0	0.98	17.3
CIL Comp. 1 (Squeeze)	54.5/0.671	33 mm/17.7%	0	16.0	13.7	6.51	108.2
			1	17.7	41.8	2.14	35.5
			2	21.1	70.0	1.28	21.2

Notably, the thickening and filtration tests were performed on CIL Comp. 1 that represents the first two years of CIL operation. The CIL Composite 1 tailings material optimum washing efficiency seemed to be achieved at wash ratio of approximately 2 to 3, which achieves 93.04% to 94.48% solute removal (using membrane squeeze). Higher wash volumes only result in slight increases in washing removal at the expense of extended cycle times. Therefore, using wash ratios higher than 1 are not recommended due to the impact on cycle time.

13.5 Estimated Recoveries for Heap Leach Operations

The Los Filos Mine Complex currently processes ore from the open pit mines (LFOP, BOP, and GOP) and underground mines (LFUG and BUG) by conventional crush-for-leach and ROM heap leaching. Ore that is greater than 0.8 g/t Au is crushed in a two-stage crushing circuit to P_{100} 25 mm (P_{80} 19 mm). Ore in the grade range between 0.2 and 0.8 g/t Au is leached as ROM ore. In addition, the BUG mine is being developed along with the option of constructing a CIL cyanidation plant to process the high-grade ores from LFOP, BOP, GOP, LFUG and BUG. The cut-off grade for the LFUG mine is approximately 2.4 g/t Au, whereas the BUG mine’s is 3.5 g/t Au. Ore from the LFOP and LFUG ore sources is generally low in sulphur and copper minerals, whereas high-sulphur and high-copper mineralization has been identified in the BOP, GOP, and BUG ore sources.

13.5.1 Los Filos Open Pit Crushed and ROM Ore Gold Recoveries

Goldcorp conducted metallurgical studies at KCA during 2014 and 2015 to verify the gold recoveries used in their heap leach metallurgical model. The results of this verification test program are documented in a Goldcorp technical memorandum (Jeet Basi to Simon Hille, personal communication, August 30, 2016), which served to validate the Los Filos Open Pit and Los Filos Underground gold recoveries (discounted by 3% to reflect field performance) used in Goldcorp's heap leach model (results shown in Table 13-59). In addition, the verification testwork was used to extrapolate gold extractions from laboratory test results with variations in ore particle size to apply to ROM ores placed directly on the heap leach pads without crushing. Notably, LFOP ore tends to be low in sulphur and copper; hence these two elements do not significantly influence gold recovery. This is in contrast to ore from the BOP, GOP, and BUG, which do contain higher levels of sulphur and copper, and which impact gold recovery, as discussed in Sections 13.5.2 and 13.5.3.

Table 13-59: Gold Extraction Values Assigned to Los Filos Open Pit and Underground Ore Types

Ore Type	Crushed Ore (P_{100} 25 mm)		Average Crushed Ore Au Extraction (%)	ROM Ore (Extrapolated) Au Extraction (%)
	No. Samples Tested	Au Extraction Range (%) (±1 Standard Deviation)		
Open Pit Ores				
Los Filos Ia	19	70–82	76	64
Los Filos Ib	15	61–79	70	50
Los Filos II	5	46–62	54	45
Los Filos III	15	44–78	61	30
Los Filos IV	3	50–72	61	48
Underground Ores				
Los Filos	9	73–87	80	N/A

The LOM metallurgical confirmation test program results documented in the KCA (2021) report and discussed in Section 3.4, were added to the existing metallurgical database that was used to create the Simon Hille recovery model. The confirmation HL results are based on crushing material to a P_{100} 25 mm particle size. The ROM gold extractions used in the heap leach model have been extrapolated from size fraction data developed over the years.

The results of the LOM metallurgical confirmation test program for crush material are compared against the original Simon Hille predicted recovery values and shown in Table 13-60.

Table 13-60: LFOP Simon Hille Model Recoveries vs. Confirmation Test Results

Test Composites	Au (%)	Au Average (%)	Simon Hille Model (%)	Ag (%)	Ag Average (%)	Simon Hille Model (%)
LFOP Ia HL, 2023	68.3	74.0	76.0	3.1	10.9	11.0
LFOP Ia HL, 2024	79.0			4.6		
LFOP Ia HL, 2025	74.6			11.1		
LFOP Ib HL, 2025	71.1	71.2	70.0	2.9		
LFOP Ib HL, 2026	71.4			35.2		
LFOP Ib HL, 2023	42.8	53.2	54.0	3.7		
LFOP Ib HL, 2024	41.4			14.6		
LFOP II HL, 2023	48.0			6.3		
LFOP II HL, 2024	63.7			6.9		
LFOP II HL, 2025	53.7			15.6		
LFOP II HL, 2026	69.7			13.1		
LFOP IV HL, 2023	53.6	56.8	61.0	6.0		
LFOP IV HL, 2024	39.9			8.7		
LFOP IV HL, 2025	67.2			5.0		
LFOP IV HL, 2026	66.6			27.4		

The lithologies for LFOP Ib 2023 and LFOP Ib 2024 were mislabelled and were LFOP II lithology samples as confirmed by Los Filos Gold Mine geological department. As a result, the two samples were included in the LFOP II lithology results. The confirmation test results support the gold and silver recoveries reported by the Simon Hille model and require no change for Crushed and ROM material.

13.5.2 BOP and GOP Crushed and ROM Ore Gold Recovery

BOP and GOP ores include three major lithologies that have been identified as Oxide, Intrusive, and Carbonate. During 2014 and 2015 validation, KCA conducted column testwork to further assess the gold recoveries used in the heap leach model for BOP ore, as shown in Table 13-61. Goldcorp examined the results of these test programs and concluded that the gold recoveries established for BOP ore lithologies remained valid (Jeet Basi to Simon Hille, personal communication, August 30, 2016).

Table 13-61: Original Gold Extraction Values Goldcorp (2015) Assigned to Crushed and ROM BOP Ore Types

Ore Type	Crushed Ore (P_{100} 25 mm)		Average Crushed Ore % Au Extraction	ROM Ore (Extrapolated) % Au Extraction
	No. Samples Tested	% Au Extraction Range (±1 Standard Deviation)		
Bermejal–Oxide	17	52–76	64	48
Bermejal–Intrusive	20	57–79	68	58
Bermejal–Carbonate	15	36–66	51	42

Notably, the gold extractions given in Table 13-61 were based on ore composites that were relatively low in total sulphur and copper, typically <0.3% total sulphur and <0.3% total copper. There are zones of higher sulphur and copper content in BOP, and for that reason the QP conducted a review of available metallurgical testwork to estimate the impact of higher sulphur and copper grades in the ore on both gold extraction and heap leaching operating cost. The basis for the QP review was the testwork KCA conducted on BOP composites over a range of sulphur and copper grades (KCA, 2015d [report KCA0150016_LF05_01]).

The KCA (2015) testwork was limited to bottle roll tests conducted at a P_{100} 25 mm crush size. The bottle roll tests were used as a proxy for column tests, and notably, the bottle roll test from other KCA test programs yielded somewhat lower gold extractions than column tests on the same composite. The results from the KCA (2015) bottle roll tests are summarized in Table 13-62.

Table 13-62: Summary of Bottle Roll Tests on Bermejal Open Pit Test Composites (P_{100} 25 mm)

Test	(g/t Au)	(g/t Ag)	Sulphur Total (%)	Sulphur Sulphide (%)	SS/ST	Cu (%)	Au Extr. (%)	Shake (Cu mg/L)	BR (Cu mg/L)	NaCN (kg/t)	Lime (kg/t)
Lot 1 Intrusive–Upper Composite	0.78	14.9	0.07	0.02	0.29	0.16	75	267		2.0	2.0
Lot 1 Intrusive–Lower Composite	1.02	11.9	0.12	0.01	0.08	0.07	68	28	16	0.3	2.5
Lot 2 Intrusive–Upper Composite	1.02	15.5	0.60	0.29	0.48	0.16	45	379	120	0.8	3.0
Lot 2 Intrusive–Lower Composite	1.02	13.1	0.86	0.24	0.28	0.22	70	776	190	0.9	2.0
Lot 3 Intrusive–Upper Composite	1.24	6.5	2.56	0.70	0.27	0.15	57	82	34	0.3	1.5
Lot 3 Intrusive–Lower Composite	1.21	5.1	1.27	0.81	0.64	0.11	47	242	120	0.7	2.0
Lot 4 Intrusive–Upper Composite	1.83	2.9	1.68	0.81	0.48	0.13	43	302	74	0.9	4.5
Lot 4 Intrusive–Lower Composite	0.77	38.1	1.48	1.14	0.77	0.28	49	928	450	2.0	1.0
Lot 5 Intrusive–Lower Composite	1.38	121.4	2.09	1.77	0.85	0.16	37	522	260	1.3	2.5
Lot 6 Intrusive–Lower Composite	1.97	42.2	2.64	2.16	0.82	0.12	27	211	110	0.8	2.0
Lot 7 Intrusive–Upper Composite	0.89	18.8	4.71	3.23	0.69	0.05	10	46	12	0.4	1.0
Lot 7 Intrusive–Lower Composite	1.00	7.9	3.84	2.70	0.70	0.12	29	367	220	1.2	1.5
Lot 8 Intrusive–Upper Composite	0.76	10.8	5.62	4.95	0.88	0.08	32	147	74	0.8	4.0
Lot 8 Intrusive–Lower Composite	0.80	8.6	5.44	5.24	0.96	0.10	26	314	120	0.9	1.3
Lot 9 Intrusive–Upper Composite	0.87	4.2	5.62	4.94	0.88	0.08	17	147	81	0.6	3.0
Lot 9 Intrusive–Lower Composite	1.00	12.5	-	-	-	0.57	34	2060	870	4.8	3.0
Lot 10 Oxide–Upper Composite	1.14	12.1	0.24	0.14	0.58	0.19	52	280	84	0.5	1.5
Lot 10 Oxide–Lower Composite	1.00	9.7	0.07	0.02	0.29	0.16	56	122	37	0.5	1.0
Lot 11 Oxide–Upper Composite	0.88	12.4	0.77	0.20	0.26	0.17	37	336	100	0.6	2.0
Lot 11 Oxide–Lower Composite	1.24	20.5	1.23	0.18	0.15	0.64	64	1730	450	2.8	2.5
Lot 12 Oxide–Upper Composite	0.89	5.0	1.16	0.95	0.82	0.18	37	517	170	0.8	3.0
Lot 12 Oxide–Lower Composite	1.78	629.0	1.35	0.50	0.37	0.23	56	484	150	1.2	2.5
Lot 13 Oxide–Lower Composite	1.82	53.9	2.73	1.83	0.67	0.23	42	917	430	2.0	1.0
Lot 14 Oxide–Lower Composite	1.08	22.6	2.06	1.14	0.55	0.19	61	761	260	1.2	4.0
Lot 15 Oxide Composite	1.41	6.3	3.01	1.51	0.50	0.39	34	1040	220	0.7	1.0
Lot 16 Oxide–Lower Composite	1.30	19.3	3.41	1.23	0.36	0.47	48	1440	730	3.2	1.5
Lot 17 Oxide–Lower Composite	1.73	14.5	7.46	4.19	0.56	0.38	34	881	450	2.4	3.0
Lot 18 Oxide–Upper Composite	1.66	14.2	-	8.70	-	0.50	21	1310	500	2.5	4.0
Lot 18 Oxide–Lower Composite	1.98	13.2	-	8.37	-		25	2290	950	5.8	4.5

Note: SS/ST = ratio of sulphide sulphur to total sulphur.

SRK derived gold extraction formulas for BOP based on the KCA (2015) test results. Bottle roll tests were performed on GOP ore, KCA (2018), to confirm the gold recoveries. SRK concluded that the BOP predicted recovery formula would be used for the GOP ore. (Metallurgical confirmation testwork was performed on HL material for BOP and GOP for the years 2023–2026. The testwork was performed on the Oxide and Intrusive lithologies. No Crushed Carbonate material was being mined for the HL during the years 2023-2026; as a result, no confirmation testwork was performed. The results of the confirmation test program are shown in Table 13-63.

The gold recovery for the BOP/GOP intrusive lithology ranged from 30% to 62%, while the total sulphur ranged from 0.25% to 1.36%. The total sulphur greater than 0.25% has a significant impact on the gold recovery. The gold recovery for the BOP/GOP oxide lithology ranged from 14% to 68%, while total sulphur ranged from 0.02% to 3.96%. The gold recovery for the oxide lithology is also found to be dependent on the total sulphur content.

Table 13-63: Bermejal and Guadalupe Open Pits Model Recoveries vs. Confirmation Test Results

Test Composites	Recovery					
	S_{TOT} (%)	Au (%)	SRK Model (%)	Ag (%)	Ag Average (%)	SRK Model (%)
GOP Intrusive HL, 2023	1.03	49.8	56.3	28.5	16.1	14.0
BOP Intrusive HL, 2023	0.25	62.0	68.0	35.9		
BOP Intrusive HL, 2024	1.36	38.8	53.5	14.6		
BOP Intrusive HL, 2026	0.74	30.4	58.9	9.1		
GOP Oxide HL, 2023	3.96	19.3	46.6	5.7		
GOP Oxide HL, 2025	1.05	68.2	55.3	19.4		
BOP Oxide HL, 2023	0.02	50.2	64.0	11.4		
BOP Oxide HL, 2024	0.79	30.4	56.1	8.0		
BOP Oxide HL, 2026	0.67	14.2	56.5	12.3		

The predicted recovery formulas for BOP/GOP oxide lithology and BOP/GOP intrusive lithology were compared against the actual confirmation testwork recoveries. The silver recovery was confirmed to be 14%. The gold recovery varied significantly between the predicted recovery formulas and the confirmation results. Consequently, an update to the recovery formulas was generated.

The gold recovery formula for the carbonate lithology became a fixed value of 51% and 42% for Crushed and ROM ore, respectively. The decision to use a fixed recovery value for carbonate ore was based on the fact that all carbonate ore contained less than 0.3% total sulphur.

The BOP/GOP intrusive and oxide lithologies showed a specific change in gold recovery when the total sulphur was greater than 1.0%. Gold recovery versus total sulphur for the intrusive and oxide data sets is shown on Figure 13-8 and Figure 13-9, respectively.

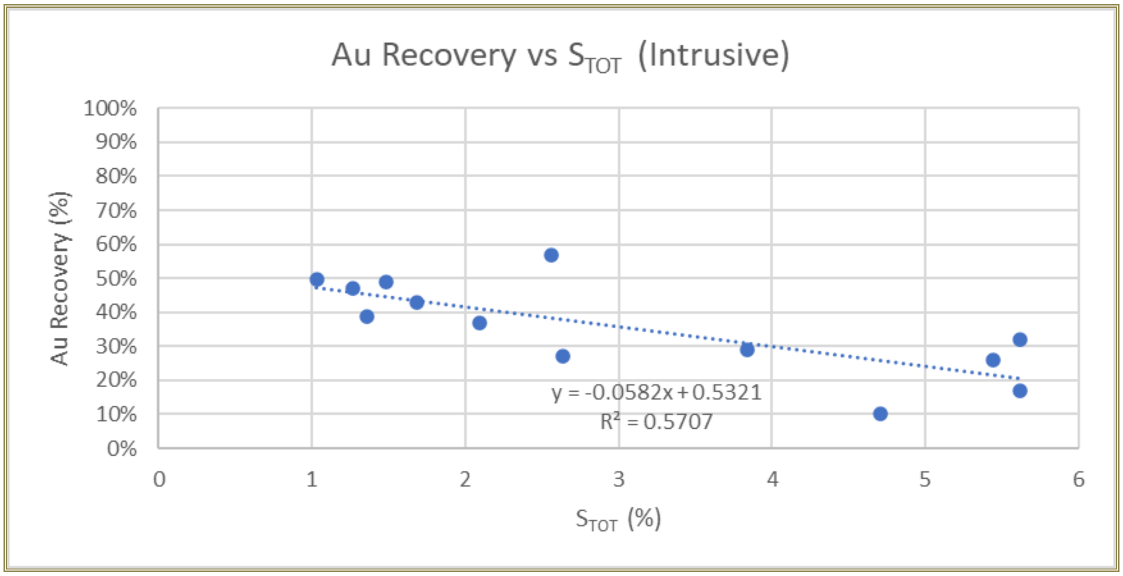


Figure 13-8: BOP/GOP Gold Recovery—Intrusive

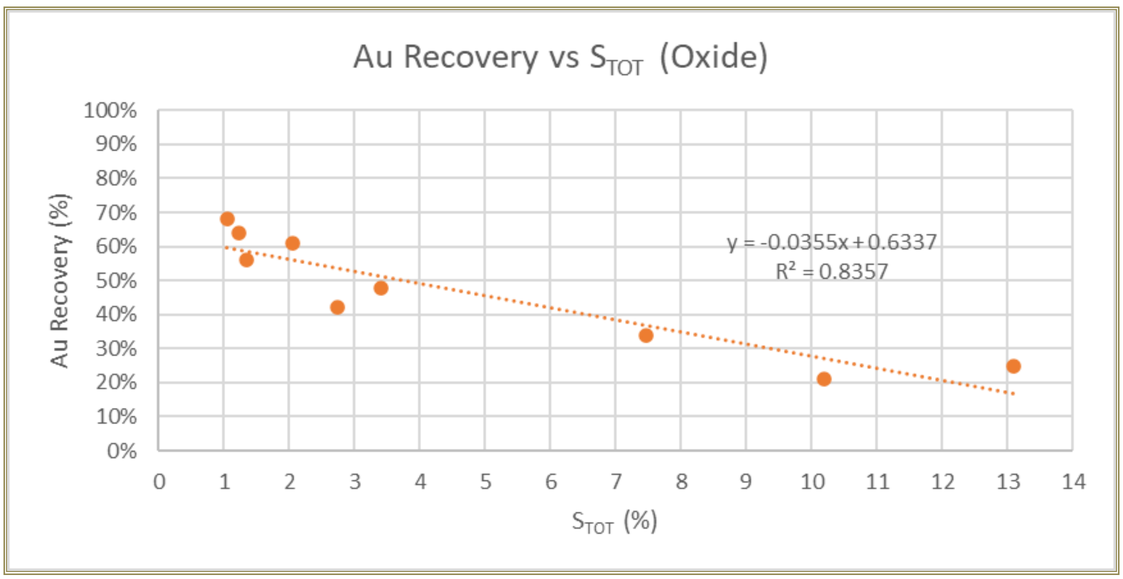


Figure 13-9: BOP/GOP Gold Recovery—Oxide

ROM gold extractions were derived from the Simon Hille model used by Goldcorp (2015). The QP reviewed the BOP/GOP gold extraction data and derived new recovery formulas. The original Goldcorp gold recoveries are reported in Table 13-64.

Table 13-64: Original ROM Ore Gold Extraction from BOP by Goldcorp (2015)

Ore Type	Au Recovery (%)
Bermejal Open Pit ROM Intrusive	58
Bermejal Open Pit ROM Oxide	48
Bermejal Open Pit ROM Carbonate	42

No testwork has been conducted to validate ROM heap leach gold extractions, but it is reasonable to assume that gold extractions will decrease as the total sulphur percentage of the ore increases. Therefore, to estimate ROM gold extractions at higher total sulphur percentage in the ore, the QP has used the same relationships that were established for each of the Crushed ore lithologies, and adjusted the formulas to reflect the maximum ROM gold extractions used in the heap leach model for low total sulphur (<0.3%) ore. The maximum gold extractions used in the ROM heap leach equations have been reduced to reflect the incremental decrease in gold extraction observed for the Crushed ore as the sulphur content rises above <0.3% total sulphur.

The revised BOP/GOP Crushed and ROM recovery formulas are presented in Table 13-65.

Table 13-65: BOP and GOP Updated Gold Recoveries by Lithology

	S_{TOT} (%)	
	≤1.0	>1.0
Crushed		
Oxide	64.0%	$= -0.0355*S_{TOT}+0.6337$
Intrusive	68.0%	$= -0.0582*S_{TOT}+0.5321$
ROM		
Oxide	48.0%	$= -0.0355*S_{TOT}+0.4737$
Intrusive	58.0%	$= -0.0582*S_{TOT}+0.4321$

13.5.3 Bermejal Underground Heap Leach Gold Recovery

BUG was not tested in the confirmation test program since the material would solely report to the CIL plant when constructed. The existing data set used by SRK to generate predicted recovery formula was reviewed by the QP and the recovery formula was updated. The QP separated the BUG formula into two material groups that were designated as material In or Below Sill and Upper Sill, with the relationships between gold recovery and total sulphur are shown on Figure 13-10 and Figure 13-11, respectively.

The data set for the In or Below Sill shows an almost linear gold recovery correlation between 70% and 80% for material containing less than 1.0% total sulphur from which a formula was derived. The data set for the Upper Sill showed a lower gold recovery when total sulphur was greater than 1.0%. Which is also, generally, the case for the In and Below Sill recoveries.

The graphical interpretation shows that the Upper Sill material contains high total sulphur content compared to the In or Below Sill material. The following updated recovery formula was derived and includes a formula change for total sulphur greater than or equal to 1.0% to accommodate the Upper Sill material when encountered.

Gold Recovery = IF(S_{TOT} <1.0, −0.0508 * S_{TOT} +0.7786, −0.0169 * S_{TOT} +0.6075)

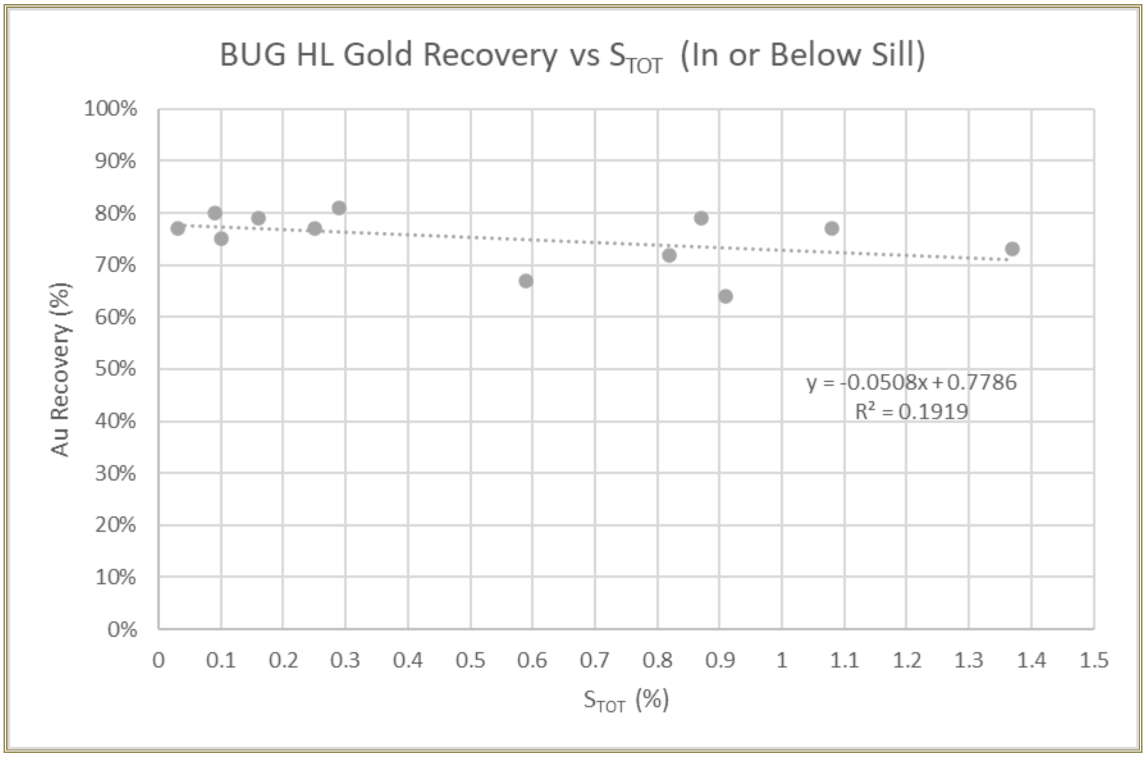


Figure 13-10: BUG Gold Recovery—In or Below Sill

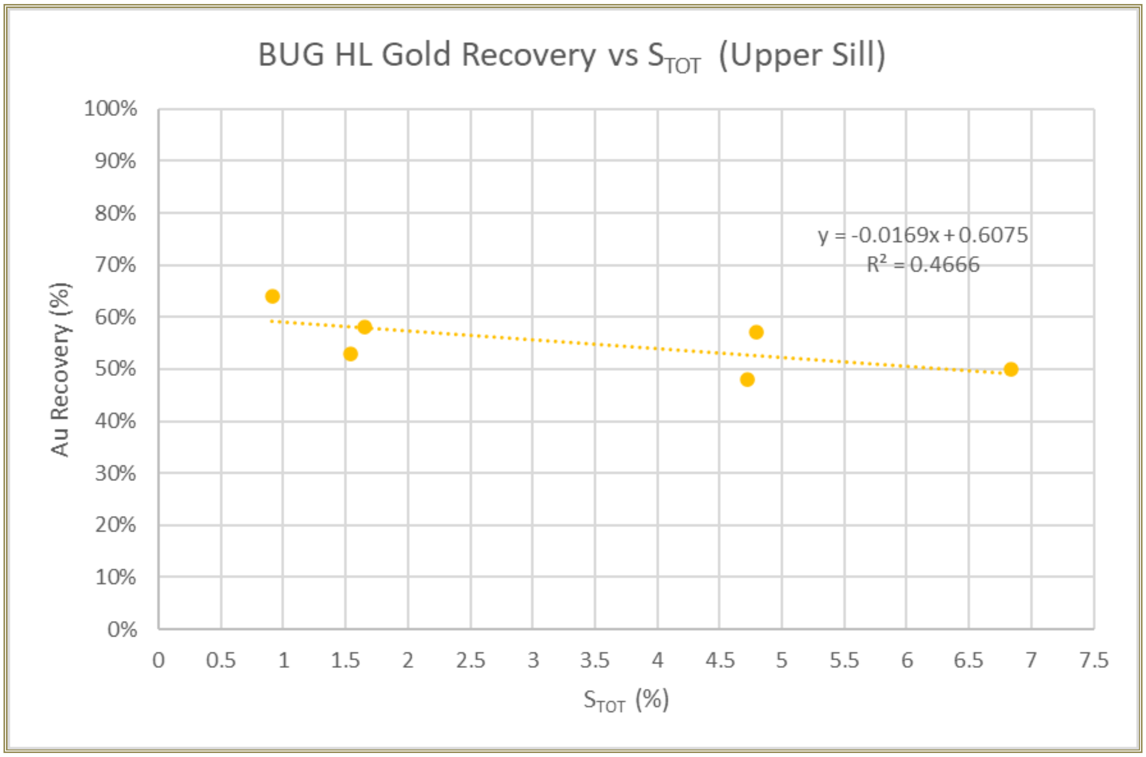


Figure 13-11: BUG Gold Recovery—Upper Sill

13.5.4 Silver Recovery

Silver recovery has historically been assessed at 5% for the purposes of financial modelling. However, after 2016 Leagold increased the concentration of the leach solution from 300 to 450 ppm sodium cyanide , and this higher cyanide concentration resulted in increased silver recovery. Equinox Gold assigned the following silver recoveries to each of the deposits based on historical testwork, actual production recoveries, and confirmation testwork (KCA, 2021):

- Los Filos Open Pit ROM and Crush—9% and 11%
- BOP ROM and Crush—11% and 14%
- GOP ROM and Crush—11% and 14%
- LFUG—11%
- BUG—14%.

13.5.5 Deleterious Elements

Multi-element analyses of all drill core samples and detailed assaying of a large number of metallurgical test samples indicate that the Mineral Resources at Los Filos contain no significant concentrations of deleterious elements, and are amenable to heap leach gold recovery. However, some areas of the BOP, GOP, and BUG deposits contain high sulphur and copper levels. Gold recovery has been found to decrease with increasing sulphur levels in the ore, and cyanide consumption has been found to increase with increasing copper levels in the ore.

The majority of mineralization at Los Filos is Oxide with low sulphur values, and is amenable to heap leach recovery of the gold. Mineral Resources containing over 1.0% total sulphur have been historically excluded from Mineral Reserves and were stockpiled separately from the waste dumps. With the addition of the CIL plant, higher-sulphur-content ores are able to be mined and processed, which provides greater flexibility for ore sourced from the BOP, GOP, and BUG ore sources, all of which contain higher sulphur contents than typically encountered in the LFOP and LFUG ore sources.

13.6 Estimated Recoveries for Carbon-in-Leach Operations

The metallurgical testwork data in this section were sourced from KCA programs from 2013, 2016, 2017, and 2018; the 2018 and 2020 programs at ALS Kamloops; and the LOM confirmation test program (KCA, 2021). These programs evaluated the agitated leach of ores that will make up the feed to the planned CIL plant. The 2018 and 2021 programs included testwork to confirm the CIL recoveries and compare them to the agitated leach recovery.

13.6.1 Selected Bottle Roll Testwork

Bottle roll leach tests were selected from the tests KCA and ALS carried out on samples summarized in Table 13-66, as broadly representative of the proposed leaching conditions. The testwork results for the LOM confirmation test program confirmed the leach parameters stated below.

Table 13-66: Source of Leach Testwork Data

Report	Date	Sample Quality and Source
KCA1300070_LF02_01	Sep 2013	9 x BOP, 3 x LFUG
KCA0140180_LF04_01	Jan 2016	7 x BOP
KCA0160114_LF12_02	Mar 2017	11 x BUG
KCA0170081_LF14_01	Mar 2018	17 x BUG
KCA0180045_LFB20_01	Nov 2018	8 x GOP
ALS KM5664	Oct 2018	6 x GOP
ALS KM6166	May 2020	10 x GOP
KCA0210027_LF30_02	Nov 2021	1 x LFUG, 4 x BUG, 7 x GOP, 6 x BOP, 4 x LFOP , 2 x yearly master composites

Analysis of the testwork resulted in the selection of the following leach parameters:

- Leach retention time—40 hours
- Grind P_{80} 0.075 mm (75 µm)
- Slurry density—51% solids w/w
- Leach aeration—air
- Leach pH—10.2 to 10.5.

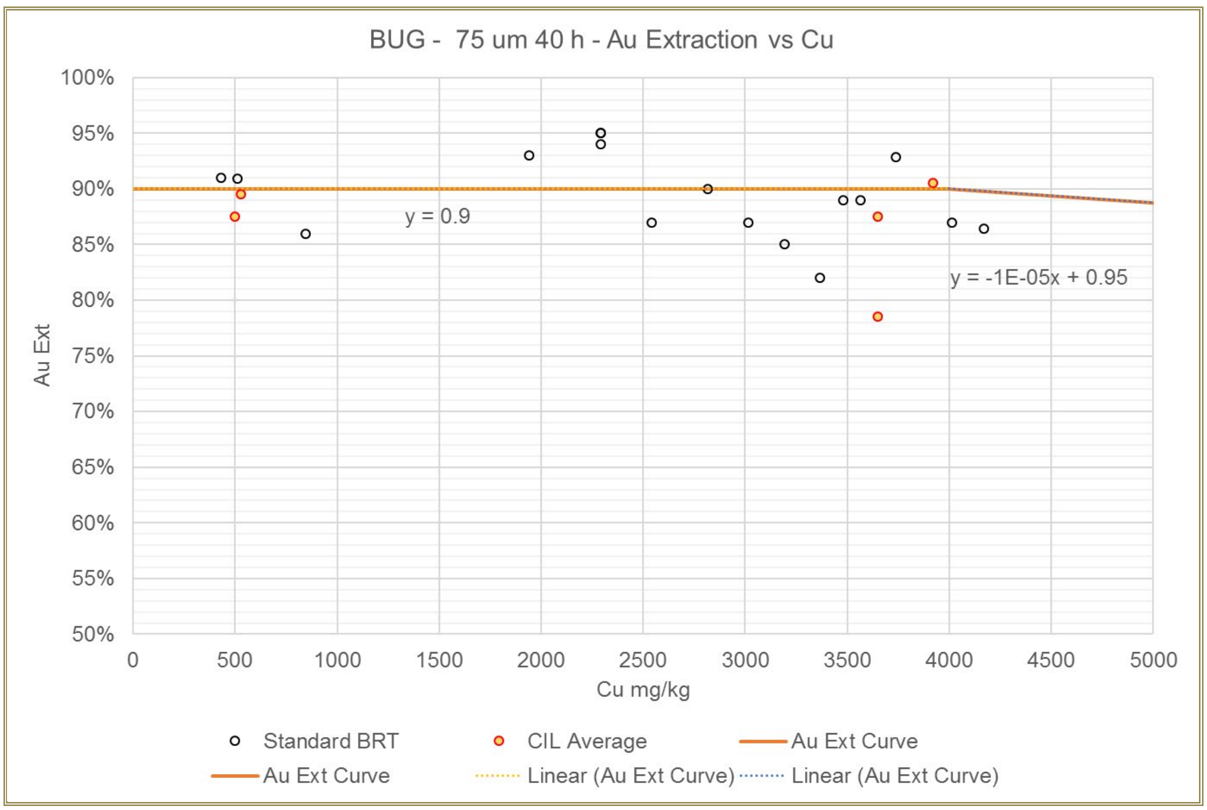
The bottle roll leach tests were performed on samples ground to P_{100} 0.106 mm, equivalent to a grind product of P_{80} 0.075 mm. The leaching conditions were uniform, with a target of 1,000 ppm sodium cyanide , a pH of 10.2 to 10.5 controlled with hydrated lime, and a leach duration time of 48 to 96 hours. Samples of the leach slurry were collected at 0, 2, 4, 8, 24, 48, 72, and 96 hours to assess the leach kinetics. The gold leach extraction after 40 hours was interpolated from the leach curves. Gold extraction at 40-hour retention time averages about 3% lower than the gold extraction calculated after 96 hours.

13.6.2 CIL Recovery Curves

The leach recoveries from the selected tests were modelled considering the impact of copper for BUG and sulphur for BOP and GOP.

The BUG gold extraction is adversely impacted as the cyanide-soluble copper increases, see Figure 13-12. The analysis did not include results from tests where the cyanide-soluble copper interfered with the free cyanide (i.e., where low gold extraction was due to an insufficient cyanide addition for the high copper levels).

The LOM model does not report copper values greater than 0.4% in the feed ore. As a result, the BUG recovery has been fixed at 90%. Table 13-67 summarizes the results from the confirmation test program (KCA, 2021).



Source: OMC (2018).

Figure 13-12: BUG Gold Extraction at Various Copper Content

Table 13-67: Confirmation Test Results

Description	Au (%)	Ag (%)
BUG CIL, 2023	87.1	68.3
BUG CIL, 2024	92.8	50.3
BUG CIL, 2025	90.5	56.6
BUG CIL, 2026	93.1	58.1
Average	90.9	58.4

The BOP and GOP gold recoveries were combined and graphed against total sulphur since their pit locations are adjacent and they share the same mineralization. This comparison revealed a distinct drop in recovery at total sulphur equal to 2.3%. The portion of the graph for total sulphur less than or equal to 2.3% is shown as Figure 13-13; Figure 13-14 shows the relationship for total sulphur greater than 2.3%.

The current LOM model does not report total sulphur values higher than 2.3%. The overall formula for BOP/GOP contain an equation for total sulphur less than or equal to 2.3% (Figure 13-13) and an equation for total sulphur greater than 2.3%.

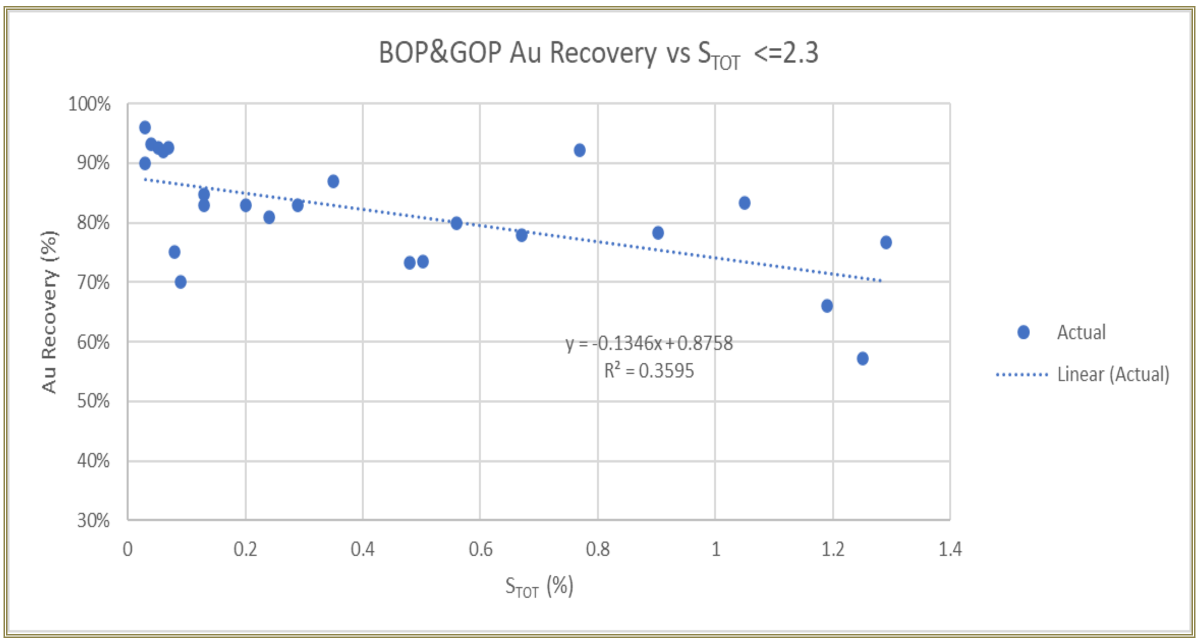


Figure 13-13: BOP and GOP Gold Recovery for Total Sulphur ≤2.3%

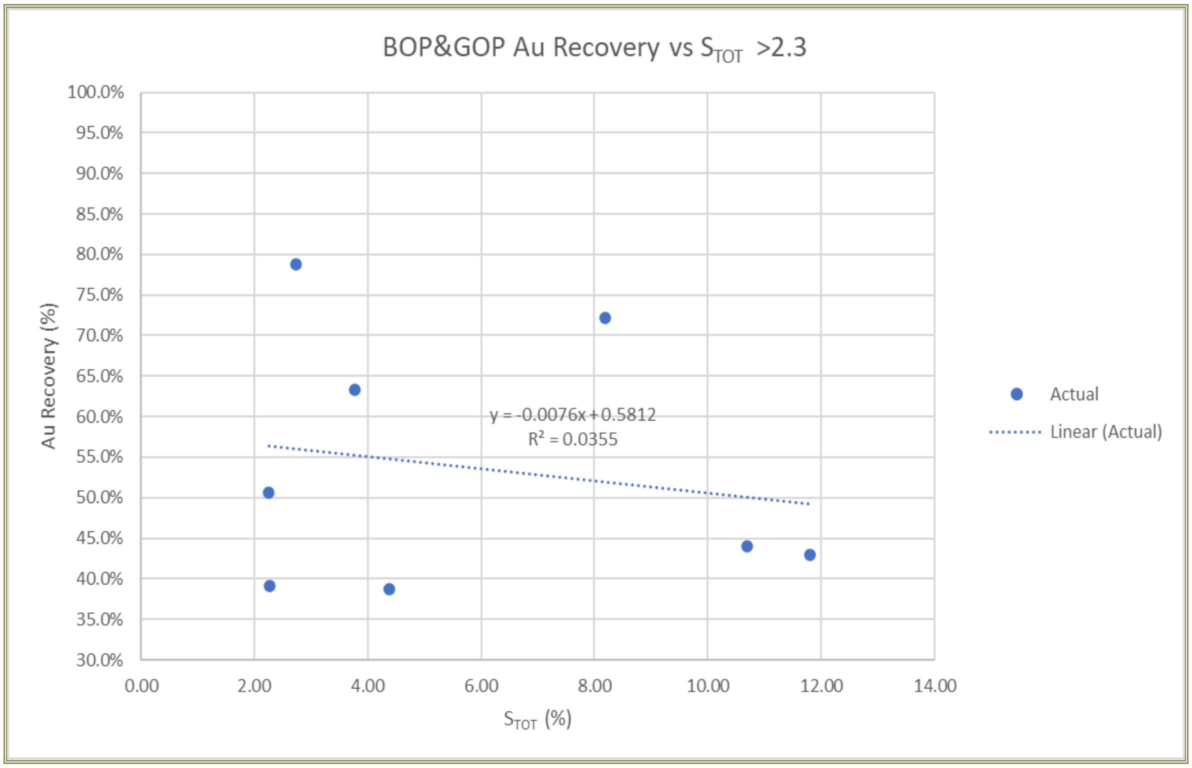


Figure 13-14: BOP and GOP Gold Recovery for Total Sulphur >2.3%

The CIL recoveries for BOP, LFUG, BUG, LFOP and GOP have been revised based on the incorporation of the LOM 2021 metallurgical confirmation test program discussed in Section 3.4 and are shown in Table 13-68.

Table 13-68: CIL Recovery Formulas

Ore Source	Recovery Formula Au	Recovery Ag (%)
BOP CIL	=IF(S% ≤2.3,.−0.1346 * S% + 0.8758, −0.0076 * S% + 0.5812)	39.0
LFUG CIL	95%	37.0
BUG CIL	90%	55.0
LFOP	90%	50.0
GOP	=IF(S% ≤2.3, −0.1346 * S% + 0.8758, −0.0076 * S% + 0.5812)	39.0

13.7 Conclusions and Recommendations

13.7.1 Heap Leach

In the QP’s opinion, the metallurgical testwork provides reliable gold extraction data that support the declaration of Mineral Resources and Mineral Reserves.

- Metallurgical tests were performed on samples that were representative of each ore type.

- Metallurgical testwork has been comprehensive and appropriate for selecting the optimal process technology.
- Recovery factors estimated for the heap leaching process are based on appropriate metallurgical testwork, and these have been confirmed by recent production data.
- Heap leaching process conditions, including reagent additions, were appropriately determined to optimize field operation parameters.
- Some areas of the BOP, GOP, and BUG deposits contain high sulphur and copper levels. Gold recovery has been found to decrease with increasing sulphur levels in the ore, and sodium cyanide consumption has been found to increase with increasing copper levels in the ore.
- LOM metallurgical confirmation testwork has been completed and confirms recoveries for LFOP and LFUG to be those derived from previous testwork. Recovery formulas for BOP, GOP, and BUG were revised based on the confirmation test program.

Further metallurgical test programs are recommended below:

- Investigate the opportunity of performing secondary leaching test programs through column leach testwork, and actual stacking applications on Pad 2. The purpose is to show that free cyanide percolating through the upper lift of stacked ore can be used to leach the residual gold in the lower lift. The results should also report the cyanide savings and the reduction in operating costs.
- Investigate other leaching aids (glycine) to assist in recoveries and reduce cyanide consumption.
- Ores from the Bermejal and Guadalupe deposits are expected to contain higher copper and sulphur grades, which may result in higher OPEX due to higher cyanide consumption and lower gold recoveries due to higher total sulphur. Metallurgical testwork programs are already being performed to understand the impacts of the higher copper and sulphur grades with respect to cyanide consumption and gold recovery.

13.7.2 Carbon-in-Leach

It is the opinion of the QP that the CIL metallurgical testwork provides sufficient and reliable ore characterization and gold extraction data to support a feasibility-level study.

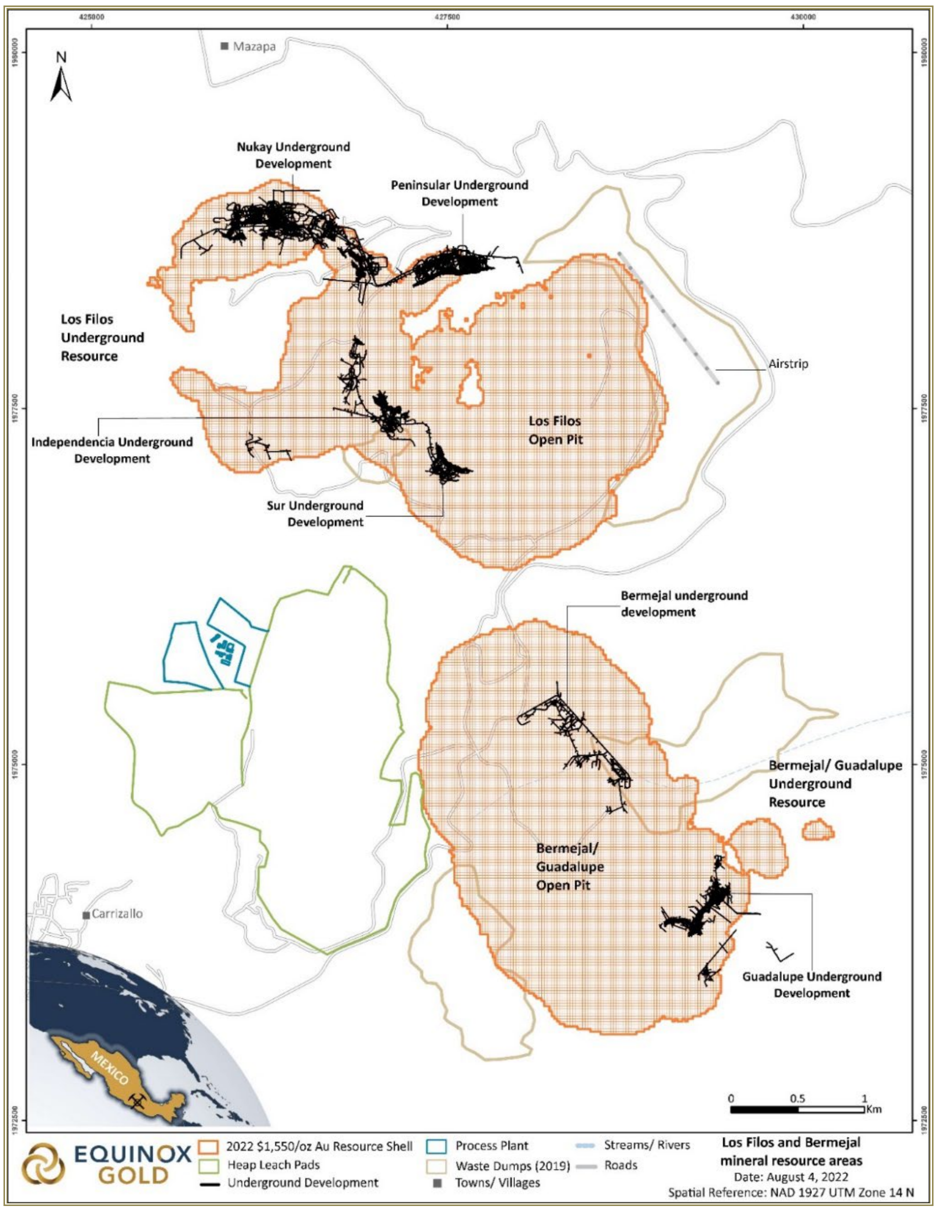
- The variability comminution testwork is adequate to support the comminution circuit design.
- The available testwork clearly indicates the impact of cyanide-soluble copper on reagent consumption. The data yielded a reliable operating cost model, applied in optimizing the mining schedule along with the gold extraction model.
- There are sufficient testwork and other data to support the gold and silver recovery estimates used for all material scheduled to be fed to the proposed CIL plant.

The following recommendations are made to mitigate risk when advancing the project to the next phase:

- Confirmatory comminution testing for SAG milling and ball milling characterization of the LFOP rock types.
- Modelling and simulation of competitive adsorption of gold, silver, copper, and zinc onto activated carbon: purpose of this modelling and simulation would be to determine the required carbon movement rate and to determine the deportment of silver, copper, and zinc onto the loaded carbon.
- Testwork currently available indicates variability in gold extraction of open pit ore at high-feed sulphur grades greater than 1%. Current practice is to restrict placement of material with a sulphur content greater than 1% on the heap leach pads. Testwork, however, indicates that higher-sulphur-level material could be economically treated in the CIL circuit.

14 MINERAL RESOURCE ESTIMATES

Equinox Gold personnel prepared Mineral Resource estimates for the Los Filos Mine Complex (Figure 14-1), which includes the Los Filos Open Pit (LFOP), the Bermejal–Guadalupe Open Pit (BOP–GOP), and the Los Filos Underground (LFUG) and Bermejal Underground (BUG) deposits with an effective date of June 30, 2022. Estimates were derived using data available at the end of 2021, and models were depleted to June 30 for reporting. Ongoing drilling in the first half of 2022 does not materially impact the estimates.



Source: Equinox Gold.

Figure 14-1: Plan View of Los Filos, Bermejal and Guadalupe Mineral Resource Areas

Mineral Resources are reported exclusive of Mineral Reserves in Table 14-1 and inclusive of Mineral Reserves in Table 14-2.

Table 14-1: Los Filos Mine Mineral Resource Statement by Deposit, Exclusive of Mineral Reserves, June 30, 2022

Area	Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Bermejal/Guadalupe Open Pit	Measured	9,898	0.76	243	6.4	2,034
	Indicated	184,152	0.59	3,492	7.6	45,186
	Measured & Indicated	194,050	0.60	3,734	7.6	47,220
	Inferred	44,292	0.55	777	9.8	13,932
Bermejal Underground (below $1,500 pit shell)	Measured	-	-	-	-	-
	Indicated	998	3.97	127	16.3	522
	Measured & Indicated	998	3.97	127	16.3	522
	Inferred	1,501	4.98	241	22.7	1,093
Los Filos Open Pit	Measured	35,327	1.09	1,238	6.4	7,315
	Indicated	90,544	0.79	2,290	6.5	18,857
	Measured & Indicated	125,870	0.87	3,528	6.5	26,172
	Inferred	87,552	0.68	1,914	7.7	21,657
Los Filos Underground	Measured	2,081	4.13	276	22.8	1,527
	Indicated	2,326	3.09	231	25.7	1,920
	Measured & Indicated	4,407	3.58	507	24.3	3,446
	Inferred	2,590	3.67	306	27.5	2,287
Total	**Measured**	**47,306**	**1.15**	**1,757**	**7.2**	**10,876**
	Indicated	**278,020**	**0.69**	**6,140**	**7.4**	**66,485**
	Measured & Indicated	**325,326**	**0.75**	**7,897**	**7.4**	**77,360**
	Inferred	**135,935**	**0.74**	**3,237**	**8.9**	**38,969**

Notes: Mineral Resources are stated exclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50-85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21-$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grades: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-2: Los Filos Mine Mineral Resource Statement by Deposit, Inclusive of Mineral Reserves, June 30, 2022

Area	Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Bermejal/Guadalupe Open Pit	Measured	20,252	0.80	523	7.8	5,064
	Indicated	248,820	0.63	5,021	8.1	65,031
	Measured & Indicated	269,072	0.64	5,543	8.1	70,096
	Inferred	51,152	0.58	950	10.2	16,830
Bermejal Underground (below $1,550 pit shell)	Measured	-	-	-	-	-
	Indicated	7,762	5.49	1,369	19.9	4,962
	Measured & Indicated	7,762	5.49	1,369	19.9	4,962
	Inferred	1,779	5.25	300	22.0	2,291
Los Filos Open Pit	Measured	59,790	1.01	1,950	5.7	10,966
	Indicated	169,240	0.76	4,109	6.0	32,833
	Measured & Indicated	229,030	0.82	6,059	5.9	43,799
	Inferred	115,248	0.67	2,494	6.9	25,579
Los Filos Underground	Measured	2,353	4.26	323	22.6	1,707
	Indicated	2,995	3.38	325	25.4	2,448
	Measured & Indicated	5,348	3.77	648	24.2	4,156
	Inferred	2,594	3.67	306	27.5	2,291
Total	**Measured**	**82,395**	**1.06**	**2,795**	**6.7**	**17,738**
	Indicated	**428,818**	**0.79**	**10,824**	**7.6**	**105,275**
	Measured & Indicated	**511,213**	**0.83**	**13,620**	**7.5**	**123,013**
	Inferred	**170,774**	**0.74**	**4,051**	**8.4**	**45,958**

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50-85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

14.1 Resource Databases

Los Filos Mine drill data are stored in two separate acQuire™ databases, one for drill holes (including Los Filos and Bermejal–Guadalupe areas) and one for channel samples. For the Los Filos deposit, the exploration database contains information for the Los Filos Open Pit and Underground deposits including 2,144 diamond drill holes (DDH) and 708 reverse-circulation (RC) drill holes comprising

520,348 m of drilling (Table 14-3). In addition to drill holes, the Los Filos data set includes channel samples collected from the underground workings, including 26,026 channels for 101,868 m; these samples are considered during creation of the geological model but are only used for Mineral Resource estimation of the LFUG models and not the LFOP model. For the Bermejal–Guadalupe deposit, the database contains information for the Bermejal and Guadalupe Open Pits and for the Bermejal Underground deposit including 870 DDH and 708 RC holes comprising 708,766 m of drilling (Table 14-3). In addition to drill holes, the Guadalupe data set also includes 1,438 channels comprising 4,949 m of channel samples collected from the Guadalupe Underground workings. More-recent channel samples collected during underground mining at BUG were not used in the Mineral Resource estimate. The data cut-off for use in this resource estimate is December 31, 2022.

Table 14-3: Los Filos Resource Database Summary, Data Cut-off December 31, 2022

Database	Type	Total (m)	Number of Entries
Los Filos	Channel	101,868	26,026
	RC	136,473	708
	DDH	383,875	2,144
	Subtotal	622,216	28,878
Bermejal–Guadalupe	Channel	4,929	1,438
	RC	125,756	708
	DDH	283,010	870
	Subtotal	413,695	3,016
Total		**1,035,911**	**31,894**

The Mineral Resources are defined in seven partially overlapping block models (LFOP, LFUG-Nukay, LFUG–Peninsular, LFUG–Independencia, LFUG–Sur, BOP–GOP, and BUG). For this reason, the same drill holes are used in more than one model, but the Mineral Resources do not overlap from model to model, and special care is taken to ensure that resource blocks counted in one model are not counted in the overlapping model. Where models overlap, all open pit Mineral Resources are reported from the open pit models and all underground Mineral Resources are reported from the underground resource models below the overlying resource pit. Backfilling has been completed in some areas of the BOP–GOP and LFOP models, and these blocks were filtered out for all resource tabulations.

14.2 Los Filos Open Pit Model

The LFOP block model used for Mineral Resource estimation is based on a 9 x 9 x 9 m unrotated block model. Data used to support the Mineral Resource estimate consist of 2,852 drill holes, for a total of 520,348 m of sampling. Channel samples were not used in estimation of the LFOP model.

14.3 Bermejal–Guadalupe Open Pit Model

The BOP–GOP block model used for Mineral Resource estimation is based on a 9 x 9 x 9 m unrotated block model. The model was organized so that it occupies the same volume as the BUG block model, to simplify the transition from open pit to underground. The block model data consist of 1,578 drill holes and 1,438 channels for a total of 413,695 m of sampling. The channel samples were collected from the Guadalupe underground mining area and are used in the estimate due to a lack of drill holes in an area of existing mining activity; channel samples for Bermejal underground mining are not used in the estimate. The open pit Mineral Resources were depleted to account for historical mining carried out from underground at Guadalupe, as well as more-recent underground mining at Bermejal (effective date June 30, 2022). Open pit mining was depleted from the block model with a topography date of June 30, 2022.

14.4 Los Filos Underground Models

The LFUG block models are based on 1.5 x 1.5 x 1.5 m blocks and cover the four main areas of LFUG mining—Nukay, Peninsular, Independencia, and Sur (Figure 14-1 and Figure 14-2). The models are not rotated and overlap with the LFOP model. The block model data were derived from the same input data as used for the LFOP model, with the addition of underground channels. To assure that no open pit resource was included in the underground models, all resource blocks above the LFOP resource pit shell were filtered out when tabulating Mineral Resources for the underground models. Underground mining at all four areas was depleted from the block models with an effective date of June 30, 2022.

14.5 Bermejal Underground Model

The BUG block model used for Mineral Resource estimation is based on a 3 x 3 x 3 m blocks and an unrotated model that covers the same volume as the BOP–GOP block model, to simplify the transition from open pit to underground. To assure that no open pit resource was included in the underground models, all resource blocks above the BOP–GOP resource pit shell were filtered out when tabulating Mineral Resources for the underground models. Underground mining at BUG was depleted from the block model with an effective date of June 30, 2022.

14.6 Density Assignment

Density values assigned to the block model were derived from data collected from core samples and 0.5 m^3 bulk density samples from the underground mining operations (see Section 11.5). A total of 39,972 bulk density measurements have been collected from drill holes for use in this Mineral Resource estimate, 17,243 from the Los Filos area and 22,729 from the Bermejal area. Bulk densities were estimated in the block models using inverse distance squared interpolation (ID^2). Average block density values by rock type are summarized in Table 14-4 to Table 14-6.

14.6.1 Los Filos Open Pit Model

Average bulk density values in the Los Filos Open Pit model are based on geological domains as summarized in Table 14-4. Backfilling has been completed in some areas of the LFOP model; these blocks are coded as Domain 55, assigned a density of 2.0 t/m^3, and were filtered out for all Mineral Resource tabulations.

Table 14-4: Average Block Density Values for Los Filos Open Pit Model

Domain (Domain Number)	Bulk Density (t/m^3)
Oxide (20)	2.82
Oxide in Carbonate (19)	2.73
Sill Oxide (21)	2.60
Sill (30)	2.45
Granodiorite (50)	2.56
Dyke (51)	2.52
Backfill (55)	2.00
Carbonate (60, 61, 62)	2.66

14.6.2 Bermejal–Guadalupe Open Pit Model

Average bulk density values in the BOP–GOP model are based on geological domains as summarized in Table 14-5. Backfilling has been completed in some areas of the BOP–GOP model; these blocks are coded as Domain 55, assigned a density of 2.0 t/m^3, and were filtered out for all resource tabulations.

Table 14-5: Average Block Density Values for Bermejal–Guadalupe Open Pit Model

Domain (Domain Number)	Bulk Density (t/m^3)
Oxide (20)	2.62
Oxide (High Grade Zone—22)	2.70
Oxide in Carbonate (19)	2.59
Sill Oxide (Lower—21)	2.64
Sill Oxide (Upper—23)	2.59
Sill (30)	2.52
Granodiorite (50)	2.57
Dyke (51)	2.38
Backfill (55)	2.00
Carbonate (60, 61, 62)	2.63

14.6.3 Los Filos Underground Model

Average bulk density values used in the LFUG model are separated by underground mining areas. The average block density values of the oxide domains for each of the mining areas is summarized in Table 14-6. Granodiorite and Carbonate were not estimated for the Los Filos Underground deposits.

Table 14-6: Average Block Density Values for Los Filos Underground Models

Oxide Domain (Domain Number)	Density (t/m^3)
Nukay (20)	2.78 to 3.12
Peninsular (20)	2.75 to 2.79
Sur (20)	2.59 to 2.84
Independencia (20)	2.83 to 2.90

14.6.4 Bermejal Underground Model

Average bulk density values in the BUG model are based on geological domains as summarized in Table 14-7.

Table 14-7: Average Block Density Values for Bermejal Underground Model

Domain (Domain Number)	Bulk Density (t/m^3)
Oxide (20)	2.61
Oxide (High Grade Zone—22)	2.70
Oxide in Carbonate (19)	2.66
Sill Oxide (Lower—21)	2.65
Sill Oxide (Upper—23)	2.59
Sill (30)	2.52
Granodiorite (50)	2.62
Dyke (51)	2.50
Carbonate (60, 61, 62)	2.64

14.7 Grade Capping

Grade capping was used to restrict outlier assay values. Caps were applied to the assay data after examining the data using log probability plots, histograms, and percentiles. Capping grades were determined using only drill core data, then were applied to all assays prior to compositing for grade estimation.

14.7.1 Los Filos Open Pit Model

Capping for the LFOP model was completed on assays prior to compositing. Capping was based on analysis of grade distribution by geological domain. Table 14-8 summarizes the capping grade limits used in the LFOP model.

Table 14-8: Los Filos Open Pit Model Capping Levels

Rock Type	Zone Code	Au (g/t)	Ag (g/t)	Cu (%)	S (%)
Carbonate	60, 61, 62	7	90	NA	NA
Granodiorite	50, 51	7	160	4	8
Sill (Diorite)	30	18	30	NA	NA
Oxide	20, 19	21	100	4	8
Sill (Oxide)	21	7	10	NA	NA

14.7.2 Bermejal–Guadalupe Open Pit Model

Capping for the BOP–GOP model was completed on assays prior to compositing. Capping was based on analysis of grade distribution by geological domain, and capping of channel samples was handled separately from capping of drill holes in order to avoid overestimation of high grades using the channel samples Table 14-9 summarizes the capping grade limits for drill holes used in the BOP–GOP model and Table 14-10 summarizes the capping grade limits for channel samples used in the BOP–GOP model.

Table 14-9: Bermejal–Guadalupe Open Pit Model Capping Levels—Drill Holes

Rock Type	Zone Code	Au (g/t)	Ag (g/t)	Cu (%)	S (%)	Pb (%)	Zn (%)
Carbonate	60, 61, 62	3	20	NA	NA	1	1
Granodiorite	50, 51	20	600	NA	NA	3	5
Sill (Diorite)	30	20	190	NA	NA	3	3
Sill (Oxide)	21, 23	25	200	NA	NA	NA	NA
Oxide	20, 19	20	700	NA	NA	4	10
High Grade Oxide	22	40	220	NA	NA	5	5

Table 14-10: Bermejal–Guadalupe Open Pit Model Capping Levels—Channels

Rock Type	Zone Code	Au (g/t)	Ag (g/t)	Cu (%)	S (%)	Pb (%)	Zn (%)
Carbonate	60	1	10	NA	NA	NA	NA
Granodiorite	50	10	75	NA	NA	NA	NA
Oxide	20	12	250	NA	NA	NA	NA

14.7.3 Los Filos Underground Models

Grade caps were applied separately to each of the LFUG mining areas (Nukay, Peninsular, Sur, and Independencia). Capping grades were determined separately for drill hole and channel samples. Table 14-11 details the capping grade limits used in each of the models. Estimation is only completed into the oxide domain, and therefore capping only applies to this domain.

Table 14-11: Los Filos Underground Models Capping Levels

Data	Metal	Unit	Nukay	Peninsular	Sur	Independencia
Drill Hole	Gold	g/t	30	30	30	30
Drill Hole	Silver	g/t	220	220	220	80
Drill Hole	Copper	%	2	2	2	NA
Channel	Gold	g/t	20	20	20	20
Channel	Silver	g/t	220	220	200	400
Channel	Copper	%	2	2	2	NA

14.7.4 Bermejal Underground Model

Capping levels for the BUG model are based on statistics from drill holes and were also applied as capping levels for channel and trench data. Table 14-12 summarizes capping grade limits used for the BUG model.

Table 14-12: Bermejal Underground Model Capping Levels

Rock Type	Zone Code	Au (g/t)	Ag (g/t)	Cu (%)	S (%)	Pb (%)	Zn (%)
Carbonate	60, 61, 62	3	20	NA	NA	1	1
Granodiorite	50	20	600	NA	NA	3	5
Sill (Diorite)	30	20	190	NA	NA	3	3
Sill (Oxide)	21, 23	25	200	NA	NA	NA	NA
Oxide	20, 19	20	700	NA	NA	4	10
High Grade Oxide	22	40	220	NA	NA	5	5

14.8 Geological Modelling

Three-dimensional solids were created for geological and mineralization domains for each deposit using Leapfrog Geo 2021.2 software (Leapfrog). The resulting solids are used as boundary controls for resource estimation. Each mining area has a variety of lithologic domains but most mineralization is hosted in a relatively thin oxide layer (mineralized skarn) that occurs at or near the contact with the intrusive rocks (granodiorite or sill) and the host carbonates (refer to Section 7.3 for details and figures). In the Los Filos underground area, the oxide zones are subdivided into sub-zones that identify each of the four underground model areas (Figure 14-2).

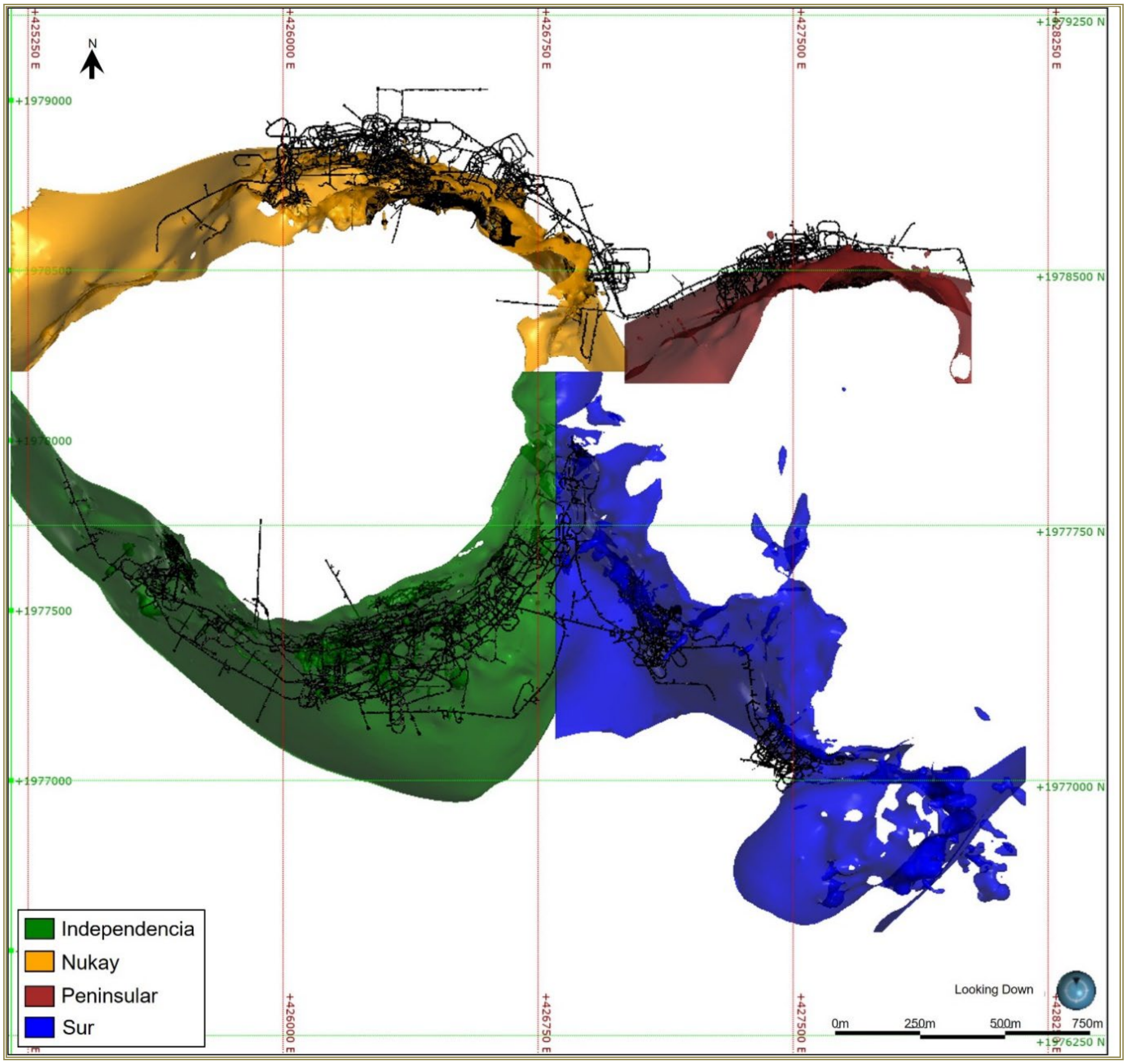
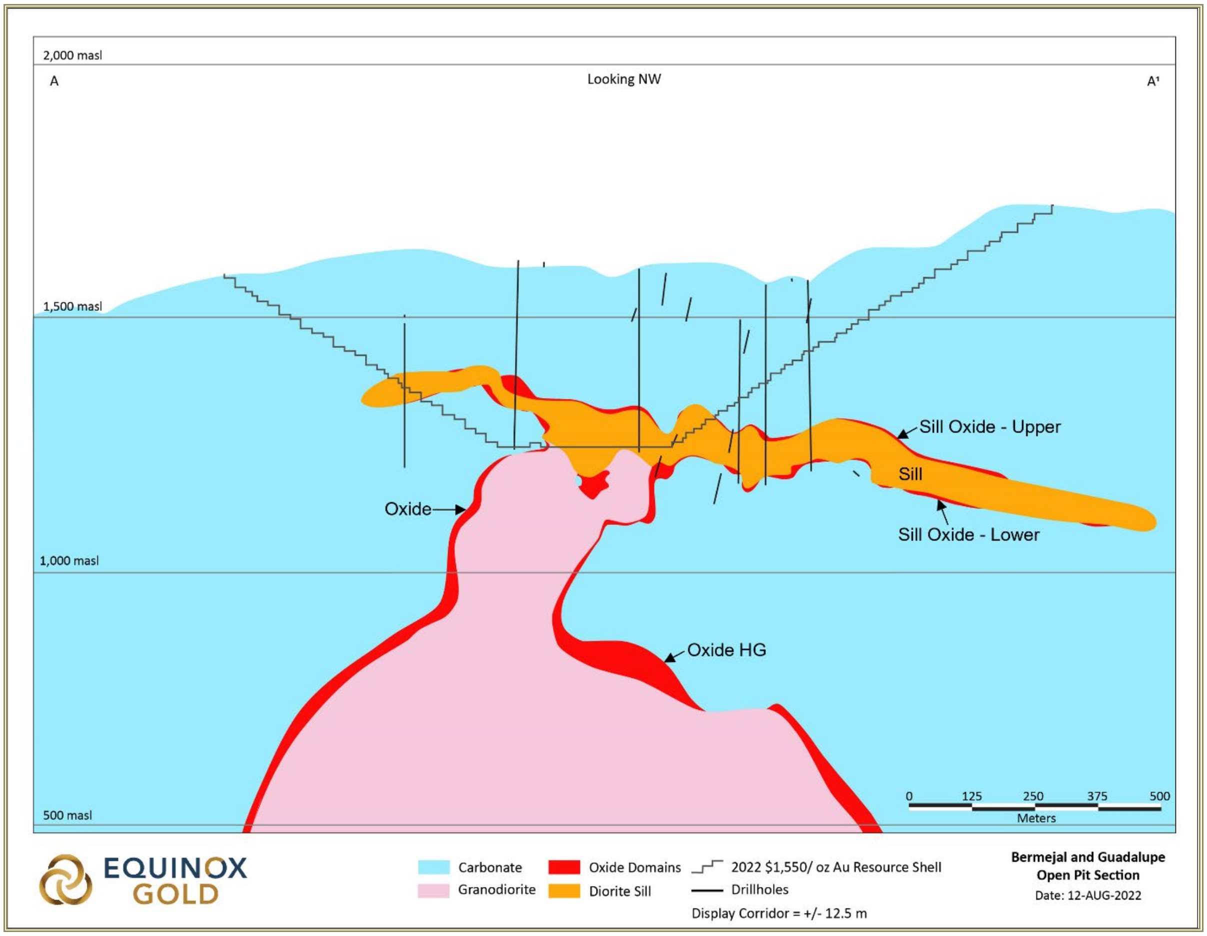


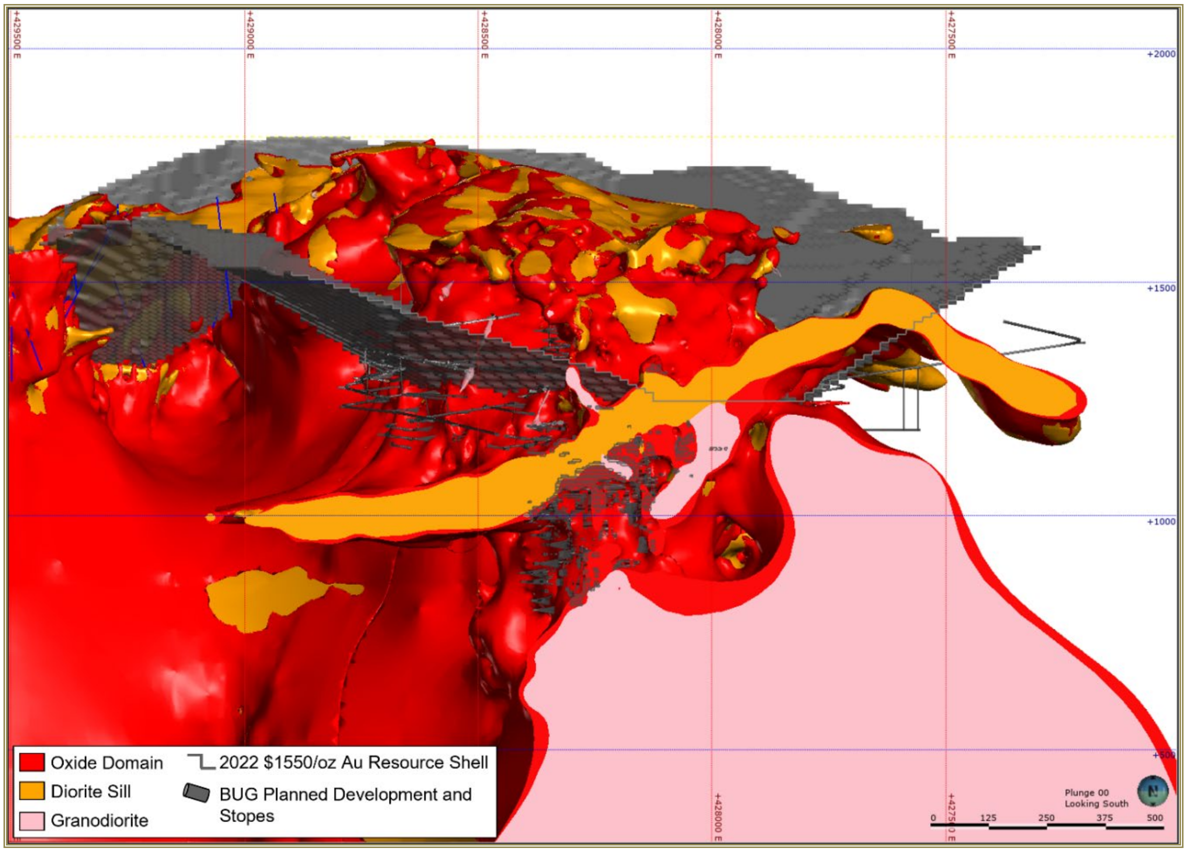
Figure 14-2: Los Filos Underground Oxide Domain Sub-Zones

Solids modelling for the BOP–GOP and BUG models is carried out in a similar manner to the Los Filos models and is completed in Leapfrog. Figure 14-3 shows a representative cross section of the geological solid models at Bermejal. Figure 14-4 shows a three-dimensional view of the model looking south.



Source: Equinox Gold.

Figure 14-3: Bermejal–Guadalupe Cross-Section Showing Solid Models Used for Geological Domaining



Source: Equinox Gold.

Figure 14-4: Perspective View Looking South of the Bermejal–Guadalupe Geological Domains (Not Showing Host Carbonate Rocks) (Scale in Metres)

14.9 Geometallurgical Domains

Geometallurgical domains have been designed for the LFOP model. They are used to separate rock of different metallurgical characteristics and are identified in the block models as "Jones codes," as summarized in Table 14-13. These codes are not used for the BOP–GOP model.

Table 14-13: Los Filos Open Pit Geometallurgical Domain Codes

Domain	Description
Ia	Granodiorite, endoskarn granodiorite, and exoskarn, strongly clay altered and sheared
Ib	Granodiorite, moderately altered and sheared
II	Mineralized carbonate, relatively hard and weakly broken
III	Fresh endoskarn, hard and weakly sheared or broken
IV	Exoskarn and jasperoid

The Jones code for the geometallurgical domain is assigned to the block model based on the drill hole composite data:

- Carbonate rocks are logged as either Type II or Type IV. In the block model, the Carbonate blocks are assigned either Type II or Type IV based on a nearest-neighbor estimation. Only composites designated as Carbonate are used for this estimation. Carbonate composites logged with type code Ia, Ib, or III are considered to have been misclassified and were not used for rock type assignment.
- Granodiorite and Diorite rock types are logged as Type Ia, Ib, or III. In the block model the Granodiorite blocks are assigned as Type Ia, Ib, or III based on a nearest neighbour estimation. Granodiorite and Diorite rock types logged with Types II and IV were considered to have been misclassified and were not used for the assignment.

14.10 Compositing

Assays were composited to 3 m within each of the geological domains for the BOP–GOP and LFOP models, and 1.5 m for the BUG and LFUG models. The composites respected the geological domains and did not cross domain boundaries. Composite length was allowed to vary slightly in order to include all material within a domain, avoiding gaps or very short assays at domain margins.

14.11 Variography

Variography was completed using Datamine RM software. Variograms were created separately for BOP–GOP/BUG, LFOP, and LFUG models. Each domain was analyzed separately for gold and silver.

The same variograms are used for both the BOP–GOP and BUG models, as outlined in Table 14-14; all structures are spherical.

Table 14-14: Variogram Parameters Used for the BOP–GOP and BUG Models

Metal	Domain	Nugget C_0	Sill $C_{1/2/3}$	Rotation (Datamine Convention)			Ranges a_1, a_2, a_3		
				Z	X	Z	X	Y	Z
Gold	20—Oxide	1.037	1.451	−22.5	112.5	0	65.3	34.7	57.7
			0.768				121.4	95.3	133.3
	21/23—Sill Oxide	0.891	5.783	−22.5	67.5	0	45.2	43.9	31.1
			2.235				98.1	100	81.6
	22—High-Grade Oxide	3.032	22.699	−45	157.5	0	13.2	30.1	30.9
			4.59				72.5	79.4	91.6
	30—Sill	0.126	0.733	−45	112.5	0	32.4	28.8	10.0
			0.116				100.1	95.7	72.6
	50—Granodiorite	0.24	0.151	−45	112.5	0	22.3	26.6	51.4
			0.079				79.9	100.0	133.3
	60—Carbonate	0.013	0.012	67.5	45	0	20	14.1	33.1
			0.008				74.8	72.4	88.9
			0.012				131.6	149.7	146.1
Silver	20—Oxide	40.708	583.253	−67.5	157.5	0	31.4	46.1	69.0
			325.104				88.7	125.6	133.3
	21/23—Sill Oxide	19.174	142.317	−90	157.5	0	36.1	55.5	23.7
			102.08				70.9	107.2	132.6
	22—High-Grade Oxide	88.96	598.472	−45	112.5	0	35.8	50.0	34.4
			202.165				74.4	100.0	79.3
	30—Sill	62.185	156.516	45	112.5	0	34.2	25.7	18.1
			24.764				84.4	87.3	83.3
	50—Granodiorite	45.401	35.096	−45	67.5	0	29.7	25.4	30.1
			74.241				98.2	49.8	53.5
			267.432				146.1	147.7	143.9
	60—Carbonate	0.848	0.855	−45	135	0	17.9	30.2	44.4
			0.072				61.6	59.4	88.9
			4.828				154.9	181.9	155.8

Grade is only estimated into the Oxide domains for the LFUG models, and therefore only one gold and one silver variogram is used for each area of the LFUG model. Table 14-15 summarizes the variogram parameters for the LFUG models; all structures are spherical.

Table 14-15: Variogram Parameters Used for the LFUG Models

Metal	Domain	Nugget C_0	Sill $C_{1/2/3}$	Rotation (Datamine Convention)			Ranges a_1, a_2, a_3		
				Z	X	Z	X	Y	Z
Gold	Independencia	0.168	0.546	67.5	112.5	0	5.4	22.9	9.9
			0.286				20.7	39.4	32.2
	Nukay	0.416	0.384	−90	135	0	8.6	8.8	11.5
			0.2				20.7	20.1	22.1
	Peninsular	0.221	0.536	−77.5	135	0	20.1	23.0	12.4
			0.243				39.7	49.1	40
	Sur	0.136	0.576	−45	45	0	7.4	10.2	20.1
			0.288				19.9	27.4	40.4
Silver	Independencia	0.034	0.212	67.5	135	0	40	21.7	18.5
			0.754				70.1	76.6	80.1
	Nukay	0.1	0.52	22.5	112.5	0	15.2	10.1	21.3
			0.38				42.7	50	40.6
	Peninsular	0.45	0.32	−77.5	135	0	14.0	16.0	8.8
			0.23				32.9	36.2	29.6
	Sur	0.1	0.396	−90	67.5	0	20	8.7	15.2
			0.504				44.9	55	40.4

Variogram parameters for the LFOP model are outlined in Table 14-16; all structures are spherical.

Table 14-16: Variogram Parameters Used for the LFOP Model

Metal	Domain	Nugget C_0	Sill $C_{1/2}$	Rotation (Datamine Convention)			Ranges a_1, a_2, a_3		
				Z	X	Z	X	Y	Z
Gold	20—Oxide	0.25	4.545	25	90	−60	21.6	22.5	10.0
			20.68				47.8	58.8	20.0
	21—Sill oxide	0.31	1.657	122.5	90	−45	31.5	39.2	10.0
			1.895				63.9	65.8	25.0
	50—Granodiorite	0.025	0.016	20	0	0	27.8	8.4	10.0
			0.02				50.7	24.3	25.8
			0.188				80.0	63.8	59.8
	30—Sill	1.109	2.499	110	90	−45	6.4	10.9	5.0
			2.519				41.1	30.1	15.0
	60—Carbonate	0.014	0.042	20	0	0	20.9	10.4	14.8
			0.05				46.1	29.3	49.7
			0.034				79.6	65.0	100.2
Silver	20—Oxide	200	203.902	−155	90	−30	7.9	8.3	5.0
			167.244				17.9	21.1	10.0
			1338.827				30.1	55.0	20.0
	21—Sill oxide	0.654	3.415	122.5	90	−45	25.3	40.5	10.0
			2.469				55.6	75.9	25.0
	50—Granodiorite	6.632	4.823	20	0	0	23.1	23.4	10.0
			20.144				47.5	59.7	38.8
			34.717				103.7	100.6	79.4
	30—Sill	1.311	6.55	110	90	−45	21.3	16.5	10.0
			5.095				50.0	68.0	25.0
	60—Carbonate	1.497	1.638	20	0	0	11.3	14.6	28.5
			2.657				31.0	59.7	59.3
			9.179				79.4	103.6	132.2

14.12 Block Model and Grade Estimation

Grade estimations for all block models used multiple passes. All models were estimated in three passes, with four passes used for some domains in the BOP–GOP model. Varying numbers of composites and drill holes were used depending on the pass number and domain for each model. All grade domains are treated as hard boundaries.

Table 14-17 summarizes the parameters used in each of the passes for the BOP–GOP model; separate search parameters were used for both classification and density. Underground channel samples from Guadalupe were also used in the estimation due to a lack of drilling data in the area. These channel samples were only used in the first pass of interpolation, as listed in Table 14-17, limiting the spatial impact of these samples. Interpolation methods completed include Ordinary Kriging (OK), Inverse Distance Squared (IP) and Nearest Neighbour (NN).

Table 14-17: Block Model Grade Interpolation Parameters—BOP–GOP Model

Domain	Search Pass	Interpolation (Au, Ag)	Interpolation (Pb, Zn, Cu, Fe, S)	Rotation			Search Radii			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
62—Carbonate In Oxide	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
61—Carbonate In Granodiorite	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
60—Carbonate	1	OK	ID^2	0	0	0	20	20	5	9	30	3
	2	OK	ID^2	0	0	0	20	20	15	9	30	3
	3	OK	ID^2	0	0	0	40	40	30	9	30	3
	4	OK	ID^2	0	0	0	80	80	60	6	30	3
51—Dyke	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
50—Granodiorite	1	OK	ID^2	0	0	0	20	20	5	9	30	3
	2	OK	ID^2	0	0	0	20	20	15	9	30	3
	3	OK	ID^2	0	0	0	40	40	30	9	30	3
	4	OK	ID^2	0	0	0	80	80	60	6	30	3
30—Sill (Diorite)	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
23—Sill Oxide (Upper)	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
22—Oxide HG	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
21—Sill Oxide (Lower)	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
20—Oxide	1	OK	ID^2	0	0	0	20	20	5	9	30	3
	2	OK	ID^2	0	0	0	20	20	15	9	30	3
	3	OK	ID^2	0	0	0	40	40	30	9	30	3
	4	OK	ID^2	0	0	0	80	80	60	6	30	3
19—Oxide In Carbonate	1	OK	ID^2	0	0	0	20	20	15	9	30	3
	2	OK	ID^2	0	0	0	40	40	30	9	30	3
	3	OK	ID^2	0	0	0	80	80	60	6	30	3
CLASS (DDH)	1 (ME)	OK		0	0	0	30	30	15	3	5	1
	2 (IND)	OK		0	0	0	60	60	30	2	5	1
	3 (INF)	OK		0	0	0	100	100	60	2	5	1
DENSITY	1	ID^2		0	0	0	150	150	150	3	20	-

Table 14-18 summarizes the parameters used in each of the passes for the LFOP model; separate search parameters were used for classification, JCODE (metallurgical zone) and density.

Table 14-18: Block Model Grade Interpolation Parameters—LFOP Model

Domain	Search Pass	Interpolation (Au, Ag)	Interpolation (Pb, Zn, Cu, Fe, S)	Rotation			Search Radii			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
62—Carbonate In Oxide	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
61—Carbonate In Granodiorite	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
60—Carbonate	1	OK	ID^2	0	0	0	25	25	25	9	15	3
	2	OK	ID^2	0	0	0	50	50	50	9	15	3
	3	OK	ID^2	0	0	0	100	100	100	6	15	3
51—Dyke	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
50—Granodiorite	1	OK	ID^2	0	0	0	25	25	25	9	15	3
	2	OK	ID^2	0	0	0	50	50	50	9	15	3
	3	OK	ID^2	0	0	0	100	100	100	6	15	3
30—Sill (Diorite)	1	OK	ID^2	0	0	0	25	25	25	6	15	3
	2	OK	ID^2	0	0	0	50	50	50	6	15	3
	3	OK	ID^2	0	0	0	100	100	100	4	15	3
21—Sill Oxide	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
20—Oxide	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
19—Oxide In Carbonate	1	OK	ID^2	0	0	0	25	25	25	6	12	2
	2	OK	ID^2	0	0	0	50	50	50	6	12	2
	3	OK	ID^2	0	0	0	100	100	100	4	12	2
CLASS (DDH)	1 (ME)	OK		0	0	0	40	40	40	4	24	1
	2 (IND)	OK		0	0	0	60	60	60	3	24	1
	3 (INF)	OK		0	0	0	100	100	100	2	24	1
JCODE	1	NN		0	0	0	100	100	100	1	N/A	N/A
DENSITY	1	ID^2		0	0	0	150	150	150	3	20	-

Table 14-19 summarizes the parameters used in each of the passes for the BUG model; separate search parameters were used for classification and density.

Table 14-19: Block Model Grade Interpolation Parameters—BUG Model

Domain	Search Pass	Interpolation (Au, Ag)	Interpolation (Pb, Zn, Cu, Fe, S)	Rotation			Search Radii			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
62—Carbonate In Oxide	1	OK	ID²	0	0	0	20	20	10	12	24	3
	2	OK	ID²	0	0	0	40	40	20	12	24	3
	3	OK	ID²	0	0	0	80	80	40	9	18	3
61—Carbonate In Granodiorite	1	OK	ID²	0	0	0	20	20	10	12	24	3
	2	OK	ID²	0	0	0	40	40	20	12	24	3
	3	OK	ID²	0	0	0	80	80	40	9	18	3
60—Carbonate	1	OK	ID²	0	0	0	20	20	10	12	24	3
	2	OK	ID²	0	0	0	40	40	20	12	24	3
	3	OK	ID²	0	0	0	80	80	40	9	18	3
51—Dike	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
50—Granodiorite	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
30—Sill (Diorite)	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
23—Sill Oxide (Upper)	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
22—Oxide HG	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
21—Sill Oxide (Lower)	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
20—Oxide	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
19—Oxide In Carbonate	1	OK	ID²	0	0	0	20	20	10	9	18	3
	2	OK	ID²	0	0	0	40	40	20	9	18	3
	3	OK	ID²	0	0	0	80	80	40	6	12	3
CLASS (DDH)	1 (ME)	N/A		-	-	-	-	-	-	-	-	-
	2 (IND)	ID		0	0	0	30	30	18	3	-	1
	3 (INF)	ID		0	0	0	50	50	30	2	-	1
DENSITY	1	ID²		0	0	0	150	150	150	3	20	-

Table 14-20 summarizes the parameters used in each of the passes for the LFUG models, including separate search parameters for classification and density; all four sub-zones of LFUG used the same search parameters. Channel sample assays collected during underground mining were used for search pass 1 (Measured Mineral Resources) and not passes 2 and 3 (Indicated and Inferred Mineral Resources).

Table 14-20: Block Model Grade Interpolation Parameters—LFUG Models

Domain	Search Pass	Interpolation (Au, Ag)	Interpolation (Pb, Zn, Cu, Fe, S)	Rotation			Search Radii			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
Oxide—includes oxide subdomains 18, 19, 20, 51, and 61	1	OK	ID^2	0	0	0	20	20	10	8	16	2
	2	OK	ID^2	0	0	0	40	40	20	8	16	2
	3	OK	ID^2	0	0	0	100	100	50	6	12	2
CLASS (DDH)	1 (ME)	OK		0	0	0	25	25	25	4	10	1
	2 (IND)	OK		0	0	0	50	50	50	3	10	1
	3 (INF)	OK		0	0	0	100	100	100	2	10	1
DENSITY	1	ID^2		0	0	0	100	100	100	3	10	-

14.13 Model Validation

Block models were validated by comparing block values against composited drill data, visually on section and statistically. Interpolation runs using different interpolation methods were completed and compared to analyze the degree of smoothing in the interpolation. Swath plots were completed for all models, and representative examples are included below. The ultimate validation of any block model is reconciliation with mining, and a summary of mining reconciliation is provided in Section 14.18.

14.13.1 Swath Plots

Swath plots are one-dimensional plots in a specific direction that compare sample points, typically composited data, with block model values, averaged along the plotted direction. They are commonly used to compare the effect of different interpolation methods, to analyze if there is bias (systematic underestimation or overestimation) and to examine the degree to which grades are smoothed.

Figure 14-5 to Figure 14-11 show swath plots, in the easting direction, for all open pit and underground block models. Interpolation methods shown include OK, IP and NN.

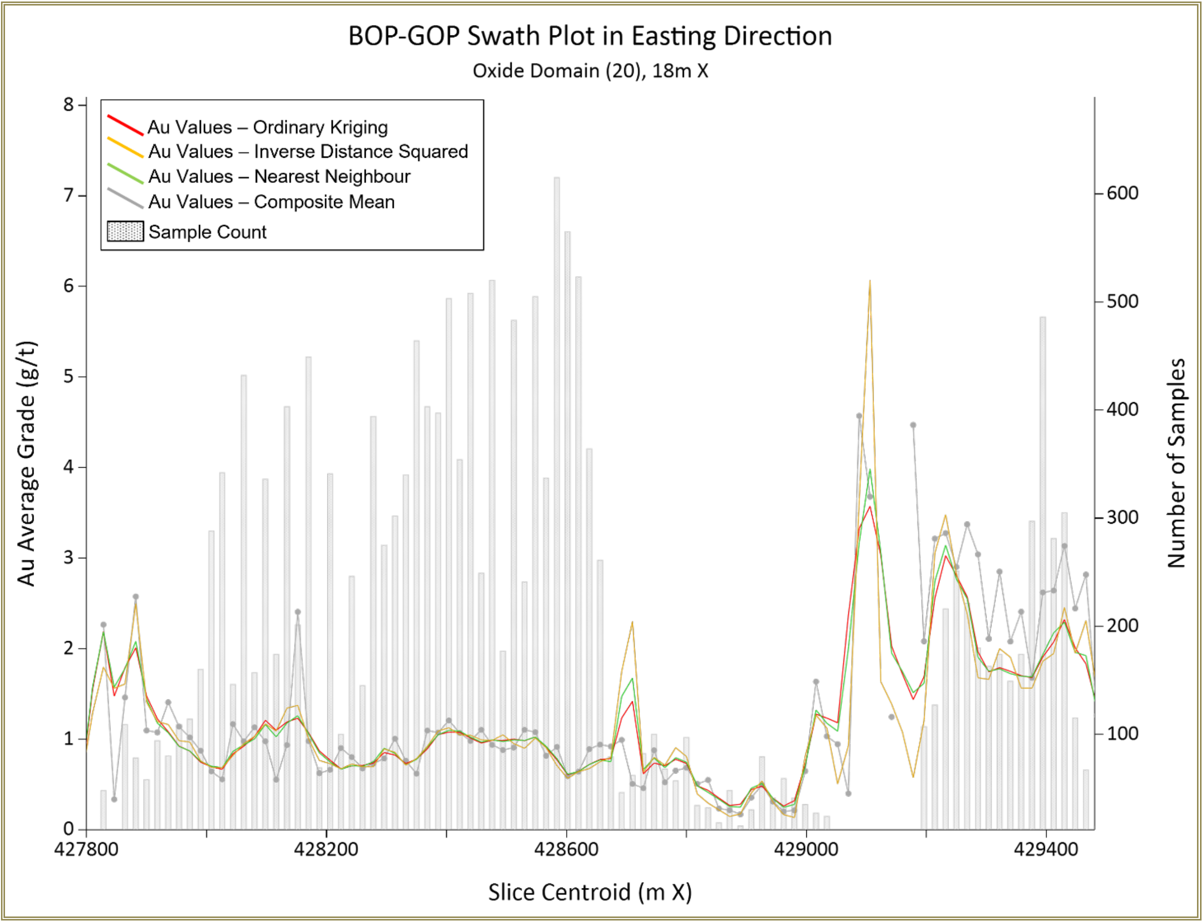


Figure 14-5: Swath Plot, Easting Direction, of the BOP–GOP Model

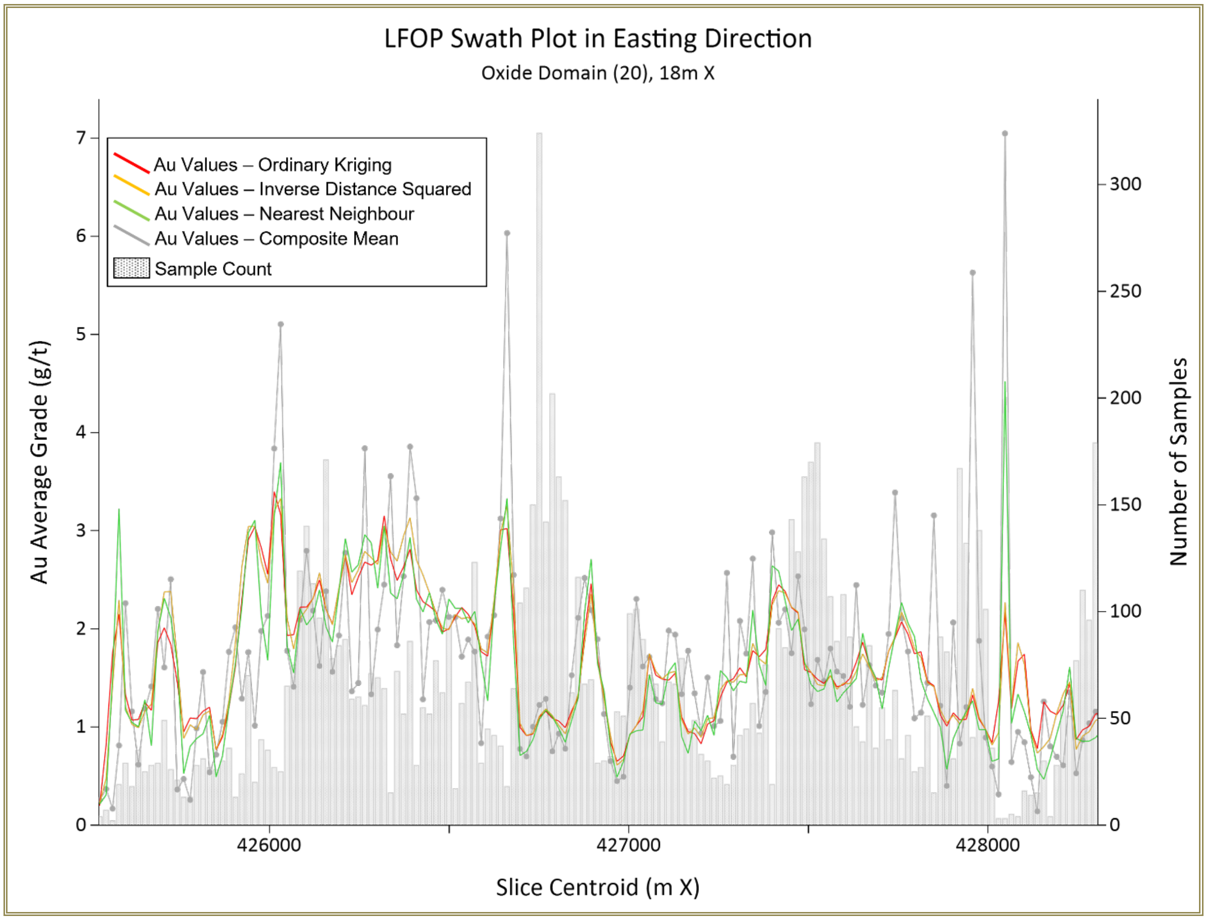


Figure 14-6: Swath Plot, Easting Direction, of the LFOP Model

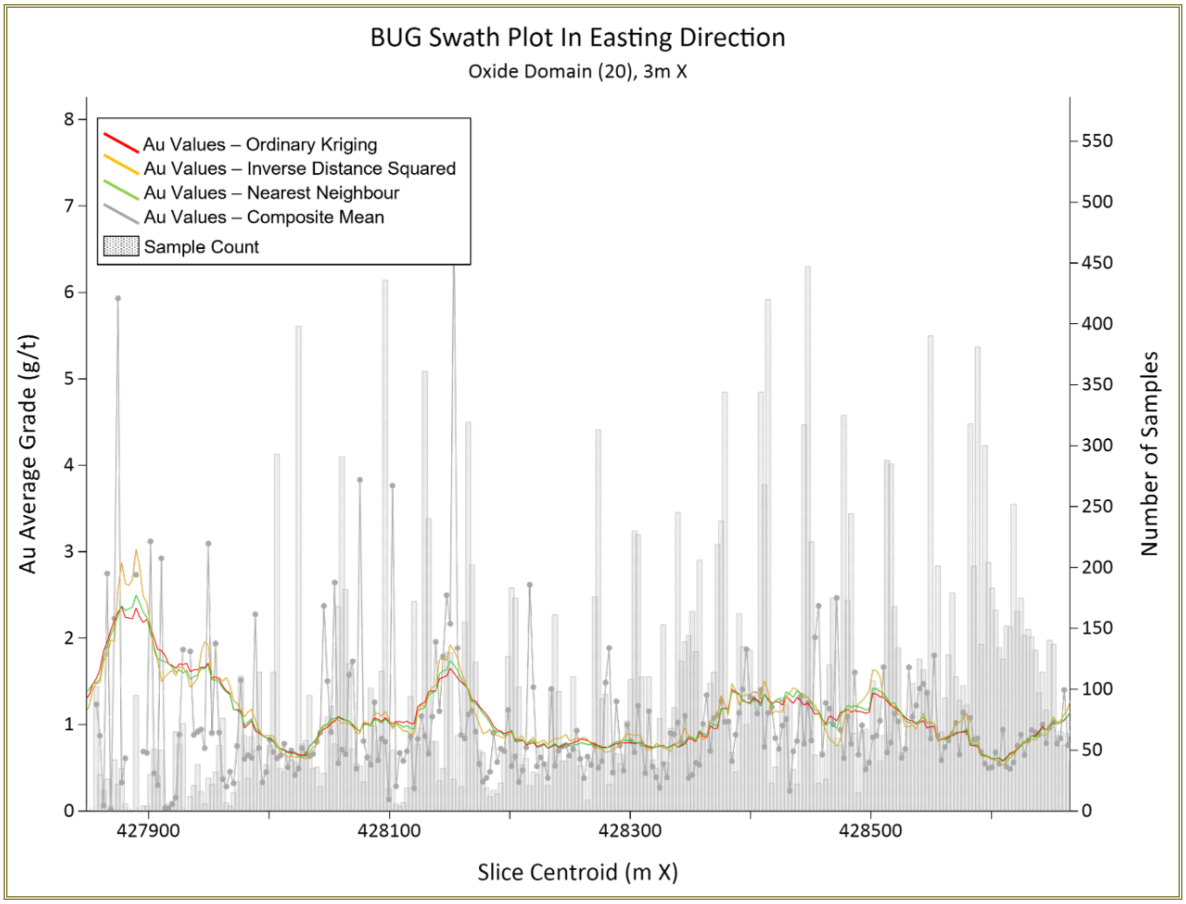


Figure 14-7: Swath Plot, Easting Direction, of the BUG Model

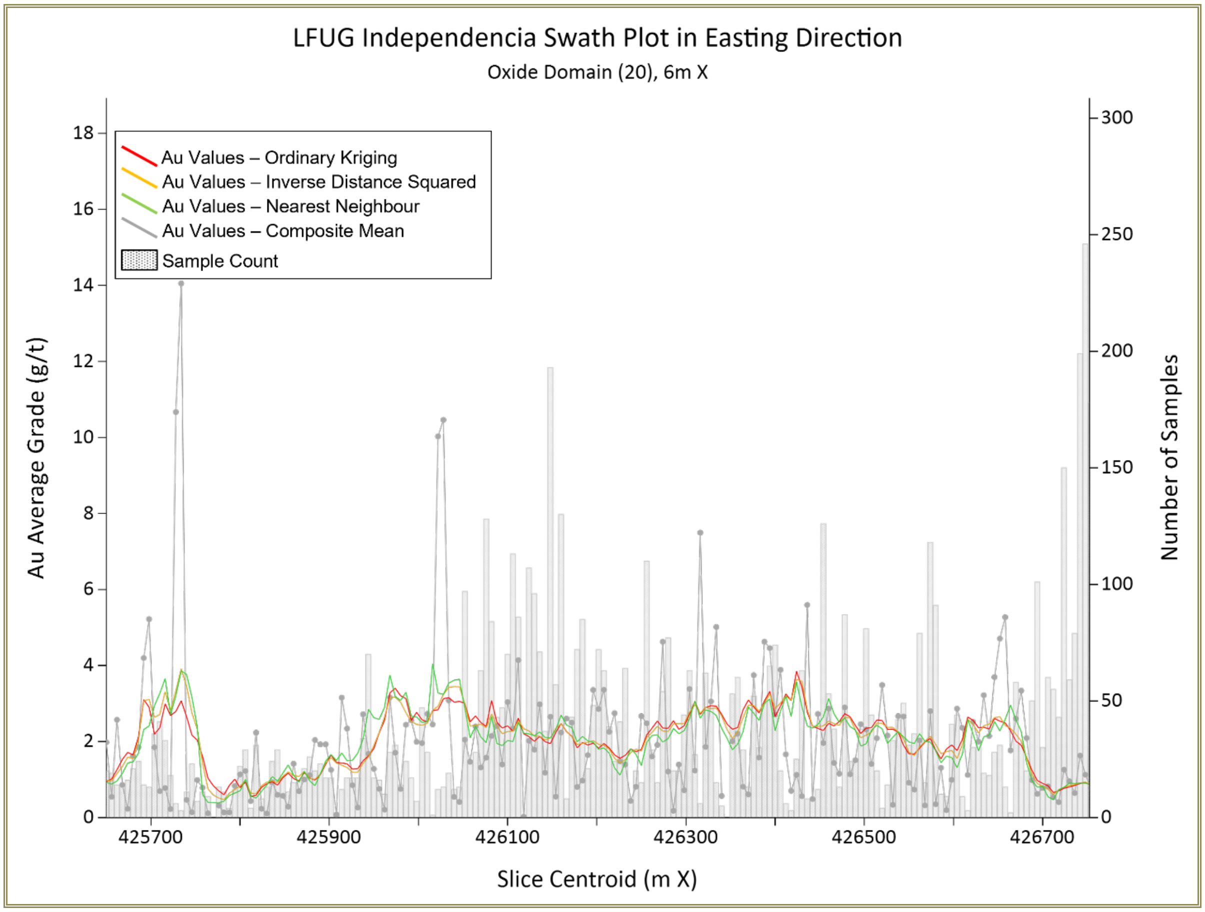


Figure 14-8: Swath Plot, Easting Direction, of the LFUG Independencia Model

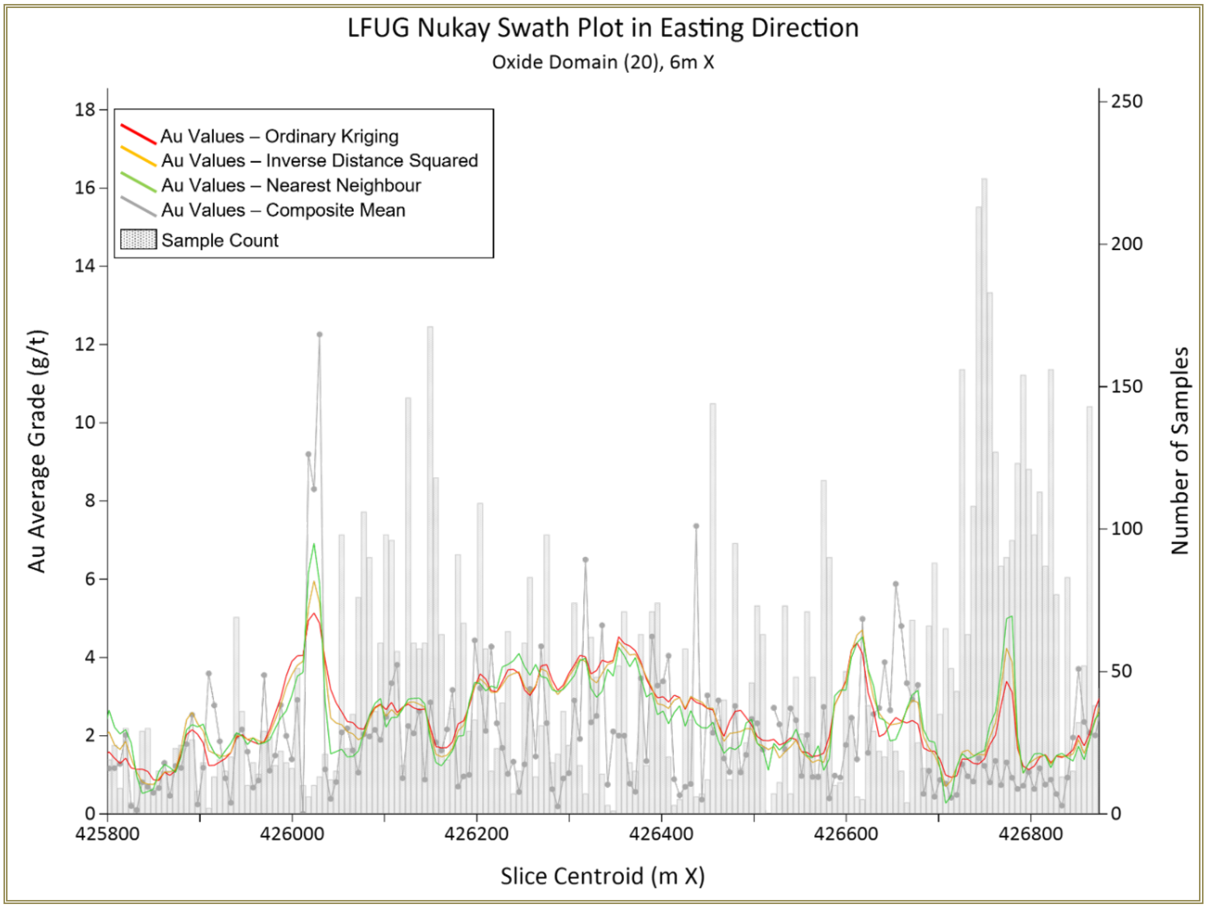


Figure 14-9: Swath Plot, Easting Direction, of the LFUG Nukay Model

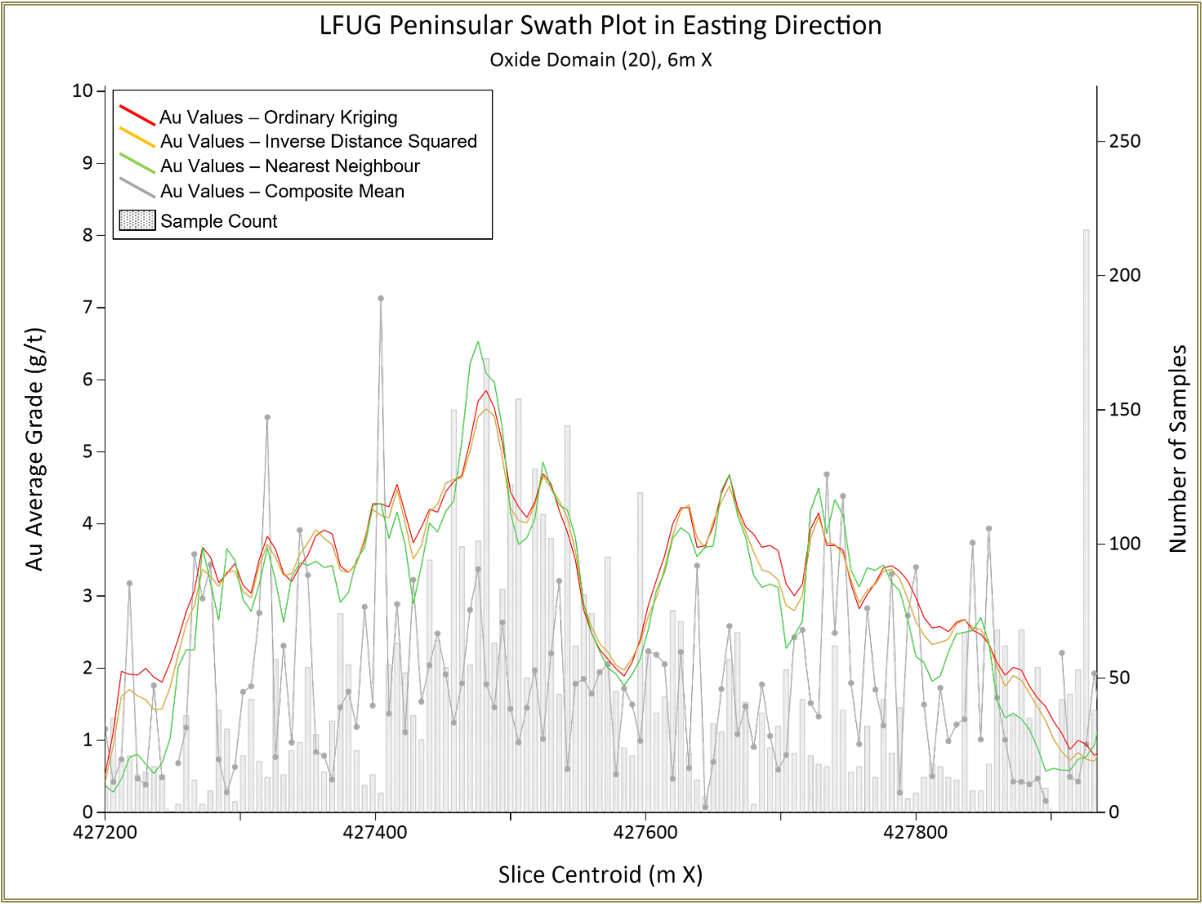


Figure 14-10: Swath Plot, Easting Direction, of the LFUG Peninsular Model

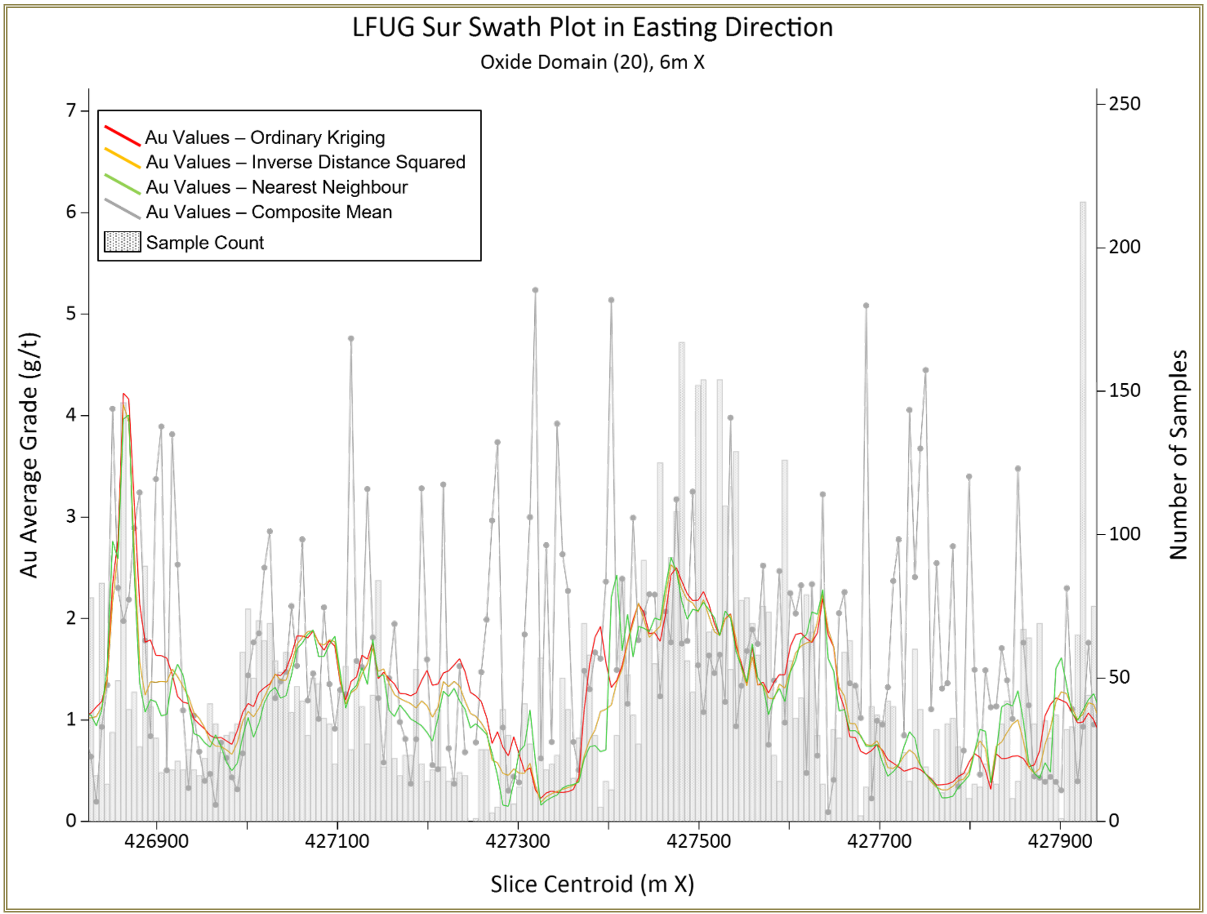


Figure 14-11: Swath Plot, Easting Direction, of the LFUG Sur Model

14.13.2 Comparison of Composites and Blocks

Table 14-21 to Table 14-24 provide a summary comparison of statistics of composites and blocks for all open pit and underground block models. Tables for the BOP–GOP (Table 14-21), LFOP (Table 14-22), and BUG (Table 14-23) models show statistics for the main geological domains. Only the oxide domain was estimated into for the LFUG models (Table 14-24).

Table 14-21: Comparison of Statistics of 3 m Composites and Blocks for the BOP–GOP Model

Domain	3 m Composites				Blocks			
	Count	Mean	Coefficient of Variation	Maximum	Count	Mean	Coefficient of Variation	Maximum
Oxide-in-Carb (19)	72	1.12	1.53	8.92	53	1.01	0.60	2.52
Oxide (20)	14,631	1.23	1.60	20.00	68,313	0.92	0.99	13.11
Sill Oxide Lower (21)	280	1.76	1.47	16.87	2,572	2.01	0.76	9.20
Sill Oxide Upper (23)	379	0.97	1.72	13.92	2,646	0.83	0.89	8.21
Sill (30)	2,379	0.52	1.86	17.93	26,135	0.50	0.91	6.68
Granodiorite (50)	34,748	0.31	2.35	20.00	255,691	0.29	1.03	3.95
Dyke (51)	675	0.07	2.40	2.95	3,394	0.08	1.12	1.02
Carbonate (60)	46,218	0.07	2.66	3.00	425,078	0.07	1.50	1.83

Table 14-22: Comparison of Statistics of 3 m Composites and Blocks for the LFOP Model

Domain	3 m Composites				Blocks			
	Count	Mean	Coefficient of Variation	Maximum	Count	Mean	Coefficient of Variation	Maximum
Oxide-in-Carb (19)	195	1.87	1.59	21.00	589	1.55	1.14	13.74
Oxide (20)	5,645	1.40	1.91	21.00	56,183	1.33	1.13	17.55
Sill Oxide Lower (21)	800	1.16	1.42	7.00	16,744	1.26	0.74	6.04
Sill (30)	12,235	0.91	1.95	18.00	54,875	0.67	0.89	6.88
Granodiorite (50)	21,385	0.30	2.19	7.00	226,275	0.20	1.23	3.72
Dyke (51)	283	0.20	2.98	6.89	1,378	0.16	2.22	2.76
Carbonate (60)	61,238	0.10	3.46	7.00	566,436	0.07	1.80	4.51

Table 14-23: Comparison of Statistics of 1.5 m Composites and Blocks for the BUG Model

Domain	1.5 m Composites				Blocks			
	Count	Mean	Coefficient of Variation	Maximum	Count	Mean	Coefficient of Variation	Maximum
Oxide-in-Carb (19)	76	1.16	2.30	19.30	351	0.88	1.24	4.14
Oxide (20)	6,546	1.27	2.08	20.00	489,365	1.07	1.45	17.47
Sill Oxide Lower (21)	574	2.41	1.77	25.00	41,727	2.38	0.90	19.56
Oxide HG (22)	3,487	2.50	2.29	40.00	341,924	1.85	1.52	36.63
Sill Oxide Upper (23)	558	1.95	1.89	25.00	32,269	2.05	0.91	17.05
Sill (30)	9,199	0.69	1.73	20.00	818,525	0.70	0.91	13.44
Granodiorite (50)	24,630	0.21	3.08	20.00	2,137,680	0.22	1.38	8.95
Dyke (51)	459	0.26	2.76	12.80	11,352	0.23	1.02	2.23
Carbonate (60)	31,555	0.08	3.15	3.00	2,599,662	0.10	1.42	2.39

Table 14-24: Comparison of Statistics of 1.5 m Composites and Blocks for the LFUG Models

Domain	1.5 m Composites			Blocks		
	Count	Mean	Coefficient of Variation	Count	Mean	Coefficient of Variation
Independencia	2,557	1.8	2.0	1,750,314	1.63	1.27
Nukay	2,427	2.0	1.9	1,157,427	2.03	1.11
Peninsular	1,400	2.9	1.5	724,560	2.50	0.90
Sur	897	0.6	2.0	560,352	0.81	0.83

14.14 Mineral Resource Classification

Block model quantities and grade estimates for the Los Filos and Bermejal–Guadalupe deposits were classified according to the *CIM Definition Standards for Mineral Resources and Mineral Reserves* (CIM, 2014). The QP for these Mineral Resources is Ali Shahkar (P.Eng.), Director Mineral Resources at Equinox Gold.

Mineral Resource classification is subjective and depends on the experience of the QP and their confidence in the geological and grade continuity of mineralization, confidence in the quality, quantity, and distribution of data supporting the estimates, and the geostatistical confidence in the resource estimates. Classification should delineate regular areas at a similar resource classification.

The QP is satisfied that the geological modelling accurately reflects the available geological information and knowledge at a scale appropriate for the mining methods considered. The sample locations and assay data, which include samples from core and RC drilling, and underground channels, are sufficiently reliable to support resource evaluation.

Mineral Resource classification for all block models at Los Filos is done in three search passes, with the first pass classified as Measured, second pass as Indicated, and third pass as Inferred. Blocks classified in the first two passes show good geological and grade continuity, with adequate data spacing, to support mine planning and to allow evaluation of the economic viability of the deposit. Blocks classified in the third pass show inferred geologic or grade continuity, and confidence in the estimate of these is considered insufficient to support mine planning or evaluation of economic viability.

Mining at Los Filos is conducted by both open pit and underground methods, on two separate and complex deposits. As such, the confidence in geological and grade continuity, and the data spacing required for classification as Measured and Indicated Mineral Resources (and therefore sufficient for mine planning) varies depending on both the mining method and the detailed nature of the deposits. Classification at Los Filos is primarily based on search distances from data (drill holes and in some cases channel samples). BOP–GOP and BUG models did not use hard boundaries for classification (distance searches were allowed to cross geological boundaries), whereas at LFOP and LFUG, due to more irregular data spacing in some geological domains, classification used hard boundaries for the three main domain types (Oxide, Granodiorite, and Carbonate). The BOP–GOP model considered Guadalupe underground channel samples for Indicated and Inferred classification, but not Measured. Channel samples were considered for classification in the LFUG models, but not the LFOP or BUG models. A small resource area within the BOP–GOP model known as the 7 Vetas area was assigned only Inferred classification. In the BUG model, all blocks within Carbonate (domain numbers 60, 61, and 62) are set as Inferred Mineral Resources.

Table 14-25 summarizes the resource classification parameters for each of the mineral deposits at Los Filos, separated by mining method (open pit and underground).

Table 14-25: Parameters Used to Classify Mineral Resources at Los Filos

Block Model	Measured (Pass 1)		Indicated (Pass 2)		Inferred (Pass 3)	
	Search Distance (m)	Minimum No. of Drill Holes	Search Distance (m)	Minimum No. of Drill Holes	Search Distance (m)	Minimum No. of Drill Holes
BOP–GOP	30 x 30 x 15	3	60 x 60 x 30	2	100 x 100 x 60	2
LFOP	40 x 40 x 40	4	60 x 60 x 60	3	100 x 100 x 100	2
BUG	None	N/A	30 x 30 x 18	3	50 x 50 x 30	2
LFUG	25 x 25 x 25	4	50 x 50 x 50	3	100 x 100 x 100	2

14.15 Reasonable Prospects of Economic Extraction

CIM Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014) defines a Mineral Resource as:

> 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.
>
> The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling (CIM, 2014).

This requires that the quantity and grade estimates meet certain economic thresholds, and that the Mineral Resources are reported at an appropriate cut-off grade considering extraction scenarios and processing recoveries. Mineralization at the Los Filos Mine is amenable to both open pit and underground mining extraction, and the economic thresholds for these different extraction methods can vary considerably. To determine the quantities of material that could potentially be economically extracted, pit and stope optimizer software is used (Section 15) and reasonable mining assumptions to evaluate the portions of the block model that would fit these criteria.

The pit optimization parameters were selected based on costs developed from the current open pit mining operations at Los Filos (Table 14-26); costs for the Bermejal and Guadalupe areas of the BOP–GOP pit are provided separately, as are costs for the Nukay area of the LFOP due to higher haulage costs given the longer distance from the processing plant. The Mineral Resource pits are used solely for the purpose of testing the "reasonable prospects for eventual economic extraction" by an open pit and do not represent an attempt to estimate Mineral Reserves (discussed in Section 15). The results are used as a guide to assist in preparing a Mineral Resource statement and to select an appropriate resource-reporting cut-off grade. Based on the costs assumed in Table 14-26, an economic cut-off gold grade of 0.2 g/t is applied to define the Mineral Resources reported within both the BOP–GOP and LFOP conceptual pits.

The block model quantities and grade estimates were also reviewed to determine the portions of the Los Filos and Bermejal–Guadalupe deposits that could potentially be economically extracted from an underground mine, based on parameters summarized in Table 14-26. The underground Mineral Resources are reported using a cut-off grade based on these parameters and covering contiguous zones proximal to existing areas of mining. Based on the costs assumed in Table 14-27, the economic cut-off grades applied to underground Mineral Resources are 2.71 g/t for the BUG area, 2.05 g/t for the northern LFUG areas (Nukay and Peninsular), and 1.71 g/t for the southern LFUG areas (Independencia and Sur).

Table 14-26: Conceptual Assumptions Considered for Los Filos Open Pit Optimization

Open Pit Mining Area	Processing Destination	Mining Cost ($/t mined)	Processing Cost ($/t ore)	Fixed Cost ($/t ore)	Gold Price ($/oz)	Silver Price ($/oz)	Refining Cost ($/oz)
Bermejal	ROM	1.43	4.20	3.2	1,550	18	5.5
	Crush	1.43	8.50	3.2	1,550	18	5.5
	Cyanide Leach	1.43	12.81	3.2	1,550	18	5.5
Guadalupe	ROM	1.27	5.00	3.2	1,550	18	5.5
	Crush	1.27	10.80	3.2	1,550	18	5.5
	Cyanide Leach	1.27	12.81	3.2	1,550	18	5.5
Los Filos Open Pit	ROM	1.24	3.40	4.2	1,550	18	5.5
	Crush	1.24	8.60	4.2	1,550	18	5.5
	Cyanide Leach	1.24	12.81	4.2	1,550	18	5.5
Nukay Open Pit	ROM	1.31	3.40	4.2	1,550	18	5.5
	Crush	1.31	8.60	4.2	1,550	18	5.5
	Cyanide Leach	1.31	12.81	4.2	1,550	18	5.5

Note: A 0.5% royalty is assumed for all costs above. Metal recovery varies from 50%–85% depending on ore treatment method. Based on the above costs, an economic gold cut-off grade of 0.2 g/t is applied to Mineral Resources reported within the conceptual resource pits.

Table 14-27: Conceptual Assumptions Considered for Los Filos Underground Resource Reporting

Mining Area	Mining Cost ($/t mined)	Processing Cost ($/t ore)	G&A Cost ($/t ore)	Gold Price ($/oz)	Remediation ($/t ore)	Refining Cost ($/oz)	Recovery (%)	Cut-off Grade (g/t)
Bermejal	93.12	11.64	3.2	1.550	1.32	5.5	90	2.71
Los Filos South (Independencia and Sur)	57.21	9.53	3.2	1.550	1.32	5.5	95	1.71
Los Filos North (Nukay and Peninsular)	73.25	9.53	3.2	1.550	1.32	5.5	95	2.05

Note: A 0.5% royalty is assumed for all costs above. G&A = general and administrative.

14.16 Total Mineral Resource Estimates

Equinox Gold prepared Mineral Resource estimates for the Los Filos Mine. Mineral Resources are reported both exclusive and inclusive of Mineral Reserves and do not include dilution. Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability but do have 'reasonable prospects of economic extraction.' Mineral Resources have an effective date of June 30, 2022 and are depleted to topographic surveys at this date. Table 14-28 summarizes the Mineral Resources exclusive of Mineral Reserves for the Los Filos Mine, including open pit and underground mining methods.

Table 14-28: Los Filos Mine Complex Mineral Resources Statement, Exclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	47,306	1.15	1,757	7.2	10,876
Indicated	278,020	0.69	6,140	7.4	66,485
Measured & Indicated	325,326	0.75	7,897	7.4	77,360
Inferred	135,935	0.74	3,237	8.9	38,969

Notes: Mineral Resources are stated exclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t.
Recovery ranges from 50%–85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-29 summarizes the Mineral Resources inclusive of Mineral Reserves.

Table 14-29: Los Filos Mine Complex Mineral Resources Statement, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	82,395	1.06	2,795	6.7	17,738
Indicated	428,818	0.79	10,824	7.6	105,275
Measured & Indicated	511,213	0.83	13,620	7.5	123,013
Inferred	170,774	0.74	4,051	8.4	45,958

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50%–85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

14.16.1 Open Pit Mineral Resources

The Los Filos and Bermejal–Guadalupe Open Pit Mineral Resources were estimated by constraining blocks to the topographic surveys conducted on June 30, 2022, and the $1,550/oz Lerchs–Grossmann pit shells (Lerchs–Grossmann, 1965). The resulting Mineral Resource estimates for deposits considered amenable to open pit mining are summarized in Table 14-30.

Table 14-30: Total Open Pit Mineral Resource Statement, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	80,042	0.96	2,473	6.2	16,030
Indicated	418,060	0.68	9,130	7.3	97,864
Measured & Indicated	498,102	0.72	11,602	7.1	113,895
Inferred	166,400	0.64	3,444	7.9	42,409

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50%–85% depending on ore treatment method.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-31 and Table 14-32 are the Mineral Resource estimates for the Los Filos Open Pit and the Bermejal–Guadalupe Open Pit, respectively. Both open pit models cover areas with backfill; these areas are tagged in the block model and filtered out in the tabulations below.

Table 14-31: Los Filos Open Pit Mineral Resource Statement, Inclusive of Mineral Reserves, June 30, 2022, at 0.2 g/t Au Cut-off

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	59,790	1.01	1,950	5.7	10,966
Indicated	169,240	0.76	4,109	6.0	32,833
Measured & Indicated	229,030	0.82	6,059	5.9	43,799
Inferred	115,248	0.67	2,494	6.9	25,579

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t.
Recovery ranges from 50%–85% depending on ore treatment method.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-32: Bermejal–Guadalupe Open Pit Mineral Resource Statement, Inclusive of Mineral Reserves, June 30, 2022, at 0.2 g/t Au Cut-off

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	20,252	0.80	523	7.8	5,064
Indicated	248,820	0.63	5,021	8.1	65,031
Measured & Indicated	269,072	0.64	5,543	8.1	70,096
Inferred	51,152	0.58	950	10.2	16,830

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t.
Recovery ranges from 50%–85% depending on ore treatment method.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

14.16.2 Underground Mineral Resource Estimates

Mineral Resource estimates for the deposits considered amenable to underground mining are summarized in Table 14-33 (includes Los Filos Underground and Bermejal Underground). Table 14-34 to Table 14-38 present the individual Mineral Resource estimates for the deposits of the Los Filos underground mine, below the $1,550/oz pit shell.

Table 14-39 is the Mineral Resource estimate for the Bermejal Underground deposit for the portion of the deposit that is below the $1,550/oz pit shell.

Table 14-33: Total Underground Mineral Resource Statement, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	2,353	4.26	323	22.6	1,707
Indicated	10,758	4.90	1,695	21.4	7,411
Measured & Indicated	13,111	4.79	2,017	21.6	9,118
Inferred	4,373	4.31	607	25.2	3,549

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-34: Mineral Resource Statement for the LFUG Nukay deposit, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	748	4.79	115	15.2	366
Indicated	1,024	3.55	117	29.0	955
Measured & Indicated	1,773	4.07	232	23.2	1,321
Inferred	575	3.56	66	25.0	462

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-35: Mineral Resource Statement for the LFUG Peninsular Deposit, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	575	4.62	85	14.8	273
Indicated	969	3.50	109	20.7	646
Measured & Indicated	1,544	3.92	194	18.5	919
Inferred	557	3.20	57	26.5	476

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-36: Mineral Resource Statement for the LFUG Sur Deposit, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	26	3.15	3	24.7	20
Indicated	212	2.50	17	16.1	109
Measured & Indicated	237	2.57	20	17.0	130
Inferred	200	2.33	15	15.2	97

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-37: Mineral Resource Statement for the LFUG Independencia Deposit, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t Au)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	1,004	3.70	119	32.5	1,048
Indicated	790	3.25	82	29.1	738
Measured & Indicated	1,794	3.50	202	31.0	1,787
Inferred	1,262	4.14	168	31.0	1,256

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-38: Mineral Resource Statement for the Los Filos Underground Mines, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	2,353	4.26	323	22.6	1,707
Indicated	2,995	3.38	325	25.4	2,448
Measured & Indicated	5,348	3.77	648	24.2	4,156
Inferred	2,594	3.67	306	27.5	2,291

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-39: Mineral Resource Statement for the Bermejal Underground Deposit, Inclusive of Mineral Reserves, June 30, 2022

Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Indicated	7,762	5.49	1,369	19.9	4,962
Inferred	1,779	5.25	300	22.0	1,257

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Recovery ranges from 50%–85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

14.16.3 Summary of Mineral Resources by Mining Method and Deposit

The following summaries of Mineral Resources by mining method (Table 14-40) and deposit (Table 14-41) are compilations of the preceding tables.

Table 14-40: Mineral Resource Statement by Mining Method for the Los Filos Mine Complex, Inclusive of Mineral Reserves, June 30, 2022

Class	Mining Method	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Measured	Open Pit	80,042	0.96	2,473	6.2	16,030
	Underground	2,353	4.26	323	22.6	1,707
Total, Measured		82,395	1.06	2,795	6.7	17,738
Indicated	Open Pit	418,060	0.68	9,130	7.3	97,864
	Underground	10,758	4.90	1,695	21.4	7,411
Total Indicated		428,818	0.79	10,824	7.6	105,275
Measured & Indicated	Open Pit	498,102	0.72	11,602	7.1	113,895
	Underground	13,111	4.79	2,017	21.6	9,118
Total Measured & Indicated		511,213	0.83	13,620	7.5	123,013
Inferred	Open Pit	166,400	0.64	3,444	7.9	42,409
	Underground	4,373	4.31	607	25.2	3,549
Total Inferred		170,774	0.74	4,051	8.4	45,958

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50%–85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

Table 14-41: Mineral Resource Statement by Deposit for the Los Filos Mine Complex, Inclusive of Mineral Reserves, June 30, 2022

Area	Classification	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Bermejal–Guadalupe Open Pit	Measured	20,252	0.80	523	7.8	5,064
	Indicated	248,820	0.63	5,021	8.1	65,031
	Measured & Indicated	269,072	0.64	5,543	8.1	70,096
	Inferred	51,152	0.58	950	10.2	16,830
Bermejal Underground (below US$1,550 pit shell)	Indicated	7,762	5.49	1,369	19.9	4,962
	Inferred	1,779	5.25	300	22.0	1,257
Los Filos Open Pit	Measured	59,790	1.01	1,950	5.7	10,966
	Indicated	169,240	0.76	4,109	6.0	32,833
	Measured & Indicated	229,030	0.82	6,059	5.9	43,799
	Inferred	115,248	0.67	2,494	6.9	25,579
Los Filos Underground (below US$1,550 pit shell)	Measured	2,353	4.26	323	22.6	1,707
	Indicated	2,995	3.38	325	25.4	2,448
	Measured & Indicated	5,348	3.77	648	24.2	4,156
	Inferred	2,594	3.67	306	27.5	2,291
Total	**Measured**	82,395	1.06	2,795	6.7	17,738
	Indicated	428,818	0.79	10,824	7.6	105,275
	Measured & Indicated	511,213	0.83	13,620	7.5	123,013
	Inferred	170,774	0.74	4,051	8.4	45,958

Notes: Mineral Resources are stated inclusive of Mineral Reserves.
Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.
Mineral Resources are reported to a gold price of US$1,550/oz and a silver price of US$18/oz.
Open pit Mineral Resources are defined within pit shells that use variable mining and recovery estimates depending on the geometallurgical domain and whether mineralization is projected to report to crush–leach, run-of-mine or CIL for processing requirements.
Open pit Mineral Resources are reported to a gold cut-off grade of 0.2 g/t.
Open pit Mineral Resources use variable mining costs of US$1.27–$1.43/t and variable processing costs of US$3.40–$12.81/t. Recovery ranges from 50%–85% depending on ore treatment method.
Underground Mineral Resources use variable mining costs of US$57.21–$93.12/t and variable processing costs of US$9.53–$11.64/t, and a process recovery of 90%–95%.
Underground Mineral Resources are reported to a gold cut-off grade: Los Filos South Underground, 1.71 g/t Au; Los Filos North Underground, 2.05 g/t Au; Bermejal underground 2.71 g/t Au.
Quantity of material is rounded to the nearest 1,000 tonnes; grades are rounded to two decimal places for Au, one decimal place for Ag; rounding as required by reporting guidelines may result in apparent summation differences.
The Qualified Person responsible for the Mineral Resource estimate is Ali Shahkar, P.Eng.

14.17 Additional Resource Tables for Bermejal Underground Resource

Table 14-42 summarizes the BUG Mineral Resource estimate at a range of cut-off grades, below the US$1,550 BOP–GOP resource pit shell.

Table 14-42: Mineral Resources at a Range of Cut-off Grades for the BUG Deposit (below US$1,550 BOP–GOP Resource Pit Shell), Inclusive of Mineral Reserves, June 30, 2022

Classification	Cut-off Grade (g/t Au)	Tonnage (kt)	Gold Grade (g/t)	Contained Gold (koz)	Silver Grade (g/t)	Contained Silver (koz)
Indicated	4.0	4,362	7.23	1,014	21.3	2,988
	3.0	6,687	5.91	1,271	20.2	4,341
	2.5	8,616	5.20	1,441	19.6	5,425
Inferred	4.0	963	6.94	215	22.4	694
	3.0	1,520	5.66	276	21.8	1,068
	2.5	1,985	4.97	317	21.7	1,384

14.18 Reconciliation

The ultimate validation of any block model is reconciliation with mining; a summary of open pit mining reconciliation is provided in Table 14-43 and Table 14-44. The resource models referred to in this section are the current models, as reported in this section, with an effective date of June 30, 2022, and are also referred to as the long-term models (LT). The production models, or short-term models (ST), are block models intended for short-range use in mine planning and are updated monthly based on blasthole data only.

Table 14-43 compares the BOP–GOP LT and ST models for 2020, 2021, and the first half of 2022 (cut-off June 30, 2022).

Table 14-43: Gold Mining Reconciliation for 2020, 2021, and 2022 (Cut-off June 30, 2022) at BOP–GOP: Long-Term and Short-Term Models

	BOP–GOP LT Model			BOP–GOP ST Model			Difference (ST-LT)			Reconciliation (ST/LT)		
	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade	Au Oz
2020	515,246	0.410	6,796	466,437	0.388	5,823	-48,809	-0.02	-973	91%	95%	86%
2021	5,077,520	0.597	97,436	4,691,313	0.709	107,006	-386,207	0.11	9,570	92%	119%	110%
2022	1,943,267	0.899	56,155	2,358,698	0.899	68,200	415,431	0.00	12,045	121%	100%	121%
Total	**7,536,034**	**0.662**	**160,387**	**7,516,448**	**0.749**	**181,028**	**-19,585**	**0.09**	**20,641**	**100%**	**113%**	**113%**

Table 14-44 compares the LFOP LT and ST models for 2021 and the first half of 2022 (cut-off June 30, 2022). Data is not available for 2020 because mining was not active in the Los Filos pit during that year.

Table 14-44: Gold Mining Reconciliation for 2021 and 2022 (Cut-off June 30, 2022) at LFOP: Long-Term and Short-Term Models

	BOP–GOP LT Model			BOP–GOP ST Model			Difference (ST-LT)			Reconciliation (ST/LT)		
	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade (g/t)	Au Oz	Ore Tonnes	Grade (g/t)	Au Oz
2021	2,862,042	0.786	72,367	2,894,062	0.760	70,729	32,020	-0.03	-1,639	101%	97%	98%
2022	124,367	0.335	1,341	303,931	0.312	3,045	179,564	-0.02	1,703	244%	93%	227%
Total	**2,986,409**	**0.768**	**73,708**	**3,197,993**	**0.718**	**73,773**	**211,583**	**-0.05**	**65**	**107%**	**93%**	**100%**

14.19 Comparison with Previous Mineral Resource Estimate

The most recent Mineral Resource estimate reported for the Los Filos mine was completed by SRK in 2019. Table 14-45 shows a comparison of ore tonnes, gold grade, and contained gold ounces in the 2022 estimate with the 2019 estimate (both Inclusive of Mineral Reserves).

The increase in Mineral Resources in the Bermejal–Guadalupe open pit in the current model compared with the previous model is due to the increase in gold price used in the 2022 model, additional drilling allowing more material to be included in all classification categories, and the addition of the Guadalupe deposit to the pit shell.

The decrease in the Bermejal underground Mineral Resources is largely due to changes in the model methodology to better reflect current understanding of the deposit following additional drilling and the beginning of underground mining.

The overall increase in Mineral Resources for the Los Filos open pit is due to the increase in gold price used in 2022, additional drilling, and extension of the model further west to cover the entire Nukay and Independencia underground areas. Decrease in Measured Mineral Resources is due to depletion by mining.

The decrease in Mineral Resources for the Los Filos underground models is due to depletion by mining.

Table 14-45: Comparison of Ore Tonnes, Gold Grade, and Contained Ounces of Gold in Mineral Resource Estimates, 2019 Versus 2022

Area	Class	2022 Estimate (Equinox)			2019 Estimate (SRK)			Difference (2022-2019)		
		Tonnes (kt)	Gold Grade (g/t)	Contained Gold (koz)	Tonnes (kt)	Gold Grade (g/t)	Contained Gold (koz)	Tonnes (kt)	Gold Grade (g/t)	Contained Gold (koz)
Bermejal–Guadalupe Open Pit[1]	Measured	20,252	0.80	523	2,689	0.60	52	17,563	0.20	471
	Indicated	248,820	0.63	5,021	116,570	0.83	3,111	132,250	-0.20	1,910
	Measured + Indicated	**269,072**	**0.64**	**5,543**	**119,259**	**0.82**	**3,163**	**149,813**	**-0.18**	**2,380**
	Inferred	51,152	0.58	950	29,798	0.86	824	21,354	-0.28	126
Bermejal Underground	Measured	-	-	-	445	7.37	105	-445	-7.37	-105
	Indicated	7,762	5.49	1,369	11,012	5.79	2,050	-3,250	-0.30	-681
	Measured + Indicated	**7,762**	**5.49**	**1,369**	**11,457**	**5.85**	**2,155**	**-3,695**	**-0.36**	**-786**
	Inferred	1,779	5.25	300	4,071	4.56	597	-2,292	0.69	-297
Los Filos Open Pit[1]	Measured	59,790	1.01	1,950	107,981	0.62	2,152	-48,191	0.39	-202
	Indicated	169,240	0.76	4,109	80,691	0.5	1,297	88,549	0.26	2,812
	Measured + Indicated	**229,030**	**0.82**	**6,059**	**188,672**	**0.57**	**3,450**	**40,358**	**0.25**	**2,609**
	Inferred	115,248	0.67	2,494	62,604	0.5	1,006	52,644	0.17	1,488
Los Filos Underground	Measured	2,353	4.26	323	3,516	4.79	541	-1,163	-0.53	-218
	Indicated	2,995	3.38	325	3,405	4.24	464	-410	-0.86	-139
	Measured + Indicated	**5,348**	**3.77**	**648**	**6,921**	**4.52**	**1,005**	**-1,573**	**-0.75**	**-357**
	Inferred	2,594	3.67	306	1,731	3.7	206	863	-0.03	100
TOTAL	Measured	82,395	1.06	2,795	114,631	0.77	2,851	-32,236	0.29	-56
	Indicated	428,818	0.79	10,824	211,678	1.02	6,922	217,140	-0.23	3,902
	Measured + Indicated	**511,213**	**0.83**	**13,620**	**326,309**	**0.93**	**9,773**	**184,904**	**-0.10**	**3,847**
	Inferred	170,774	0.74	4,051	98,204	0.83	2,633	72,570	-0.09	1,418

Notes: [1]2022 open pit Mineral Resources reported in $1,550/oz Au resource shell; 2019 open pit Mineral Resources estimated in $1,400/oz Au pit shell; 2019 Bermejal Open Pit model does not include Guadalupe.

14.20 Conclusions and Recommendations on the Mineral Resource Estimates

Mineral Resource estimates presented in this Technical Report represent the global Mineral Resources located at the Los Filos Mine as of June 30, 2022 as prepared and reviewed by Equinox Gold staff. The Resources were validated and verified by Ali Shahkar (P.Eng.), Director of Mineral Resources for Equinox Gold and a Qualified Person for the purposes of National Instrument 43-101. Mineral Resources are stated both exclusive and inclusive of Mineral Reserves and do not include dilution. Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.

There are no known environmental, permitting, socioeconomic, legal, title, taxation, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

14.20.1 Mineral Resource Risks

Estimating Mineral Resources is not without risks: factors such as additional drilling and sampling may affect the geological interpretation, the conceptual pit shells, or the underground mining assumptions. Other factors that may have a positive or negative impact on the estimated Mineral Resources include the following:

- Gold and silver price assumptions
- Changes in interpretations of lithological, mineralization, or geometallurgical domains
- Pit slope angles for the open pits or geotechnical assumptions for underground stope designs
- Changes to the methodology used to assign densities in the resource models
- Changes to the assumptions used to generate the gold cut-off grades for resource declaration
- Changes to the parameters used for grade estimation
- Changes to the classification criteria used.

14.20.2 Mineral Resource Opportunities

Opportunities to expand on the Mineral Resources near the known deposit are considered favourable. The geological unit that hosts the gold mineralization extends beyond the known drilled area, and it is expected that additional drilling along this geological unit could identify further mineralization.

14.20.3 Recommendations

The following is recommended to improve the resource estimation models in the future:

- Variograms should be further refined. Given the geometry of the deposits, better variograms can be developed by further sub-domaining sectors with different orientations.
- Controls on grade distribution within the larger geologic domains, such as the granodiorite, should be further investigated and modelled either by development of grade shells or further refinement of the dynamic anisotropy directions and search ellipse parameters used during interpolation.
- Interpolation domains for other important elements such as sulphur should be examined, and if necessary, separate domains (such as grade shells) should be developed for their estimations.
- Separate variogram models for sulphur and interpolation by Ordinary Kriging is recommended.

15 MINERAL RESERVE ESTIMATE

Mineral Resources and Mineral Reserves are reported in accordance with NI 43-101—Standards of Disclosure for Mineral Projects (NI 43-101). CIM (2014) definitions were followed for Mineral Reserves.

AMC estimated Mineral Reserves using a gold price of $1,450/oz, a silver price of $18/oz, and an effective date of June 30, 2022.

15.1 Consolidated Mineral Reserves Summary

The Los Filos Mine Complex Mineral Reserves are composed of open pit Mineral Reserves of 180.6 Mt at an average grade of 0.65 g/t Au, containing 3.8 Moz Au plus underground Mineral Reserves of 12.6 Mt at an average grade of 3.94 g/t Au, containing 1.6 Moz Au. The consolidated open pit and underground Mineral Reserve estimate based on Proven and Probable Reserves for Los Filos Mine Complex is presented in Table 15-1.

Table 15-1: Consolidated Mineral Reserves Statement for the Los Filos Mine Complex as of June 30, 2022

Classification	Mining Method	Tonnes (kt)	Grade (g/t Au)	Contained Au (koz)	Grade (g/t Ag)	Contained Ag (koz)
Proven	Open Pit	35,154	0.74	837	5.0	5,677
	Underground	299	4.15	40	13.7	132
	Proven Total	35,453	0.77	877	5.1	5,809
Probable	Open Pit	145,476	0.62	2,921	6.3	29,303
	Underground	12,297	3.94	1,556	18.9	7,458
	Probable Total	157,773	0.88	4,477	7.2	36,761
Proven and Probable	**Open Pit**	**180,629**	**0.65**	**3,758**	**6.0**	**34,980**
	Underground	**12,597**	**3.94**	**1,596**	**18.7**	**7,590**
	Proven and Probable	**193,226**	**0.86**	**5,354**	**6.9**	**42,570**

Notes: CIM *Definition Standards for Mineral Resources and Mineral Reserves* (2014) was used for reporting of Mineral Reserves.
Mineral Reserves are estimated using a long-term gold price of US$1,450 per troy oz and a long-term silver price of US$18 per troy oz for all mining areas.
Mineral Reserves are stated in terms of delivered tonnes and grade, before process recovery.
Mineral Reserves are defined by pit optimization and are based on variable break-even cut-offs as generated by process destination and metallurgical recoveries.
Metal recoveries are variable dependent on metal head grades, as outlined in Table 15-2 and Table 15-3.
Open pit dilution is applied at: **a.** 5% at a zero grade for Au and Ag for BOP and GOP. **b.** 7% at zero grade for Au and Ag for LFOP.
Open pit mining recovery is applied at: **a.** 95% for BOP and GOP. **b.** 93% for LFOP.
Heap leach process recovery varies based on rock type.
The QPs responsible for this item of the Technical Report are not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimates.
Effective date of Mineral Reserves is June 30, 2022.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Underground Mineral Reserves are reported based on a variable NPR cut-off- value varying between $65.8/t and $96.6/t.
Underground dilution is assigned an average of 10% at a zero grade for Au and Ag.
Underground mining recovery is set to 97%.
Numbers may not sum due to rounding.
The QP for open pit estimate is Mr. Eugene Tucker, P.Eng., and for the underground estimate is Mr. Paul Salmenmaki, P.Eng.

15.2 Resource Models

The Los Filos Mine Complex comprises three main open pit (OP) areas and three main underground (UG) areas:

- Los Filos Open Pit (LFOP)
- Bermejal Open Pit (BOP)
- Guadalupe Open Pit (GOP)
- Los Filos Underground Sur (LFUG Sur)
- Los Filos Underground Norte (LFUG Norte)
- Bermejal Underground (BUG).

The following 3-D block Resource models developed by Equinox Gold were used as basis for the Mineral Reserve:

- LFOP: bm_lfop_02232022.csv
- BOP: bm_bop_gop_05032022.csv
- GOP: bm_bop_gop_05032022.csv
- LFUG Norte:
  - Nukay area: mb_nukay_211231_min.csv
  - Peninsular area: mb_pen_211231_min.csv
- LFUG Sur:
  - Sur area: mb_sur_211231_min.csv
  - Zona 70 area: mb_indep_211231_min.csv
- BUG: bm_bug_04042022.csv.

15.3 Input Parameters

15.3.1 Processing Parameters

The metal recoveries for gold and silver are based on historical metallurgical testing of the various deposits for heap leaching as well as recent testwork for CIL processing. Metal recoveries for gold and silver and associated processing costs vary depending on rock type, copper (Cu) and sulphur (S) content, and processing route, as shown in Table 15-2 and Table 15-3.

Table 15-2: Processing Costs and Recoveries for HL Crushed and ROM

Source	Lithology	Recovery Formula Au	Rec. Ag (%)	Operating Cost Formula
BOP Crushed	Carbonate	51%	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
	Intrusive	=IF(%S<=1.0,0.68,−0.0582*%S+0.5321)	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
	Oxide	=IF(%S<=1.0,0.64,−0.0355*%S+0.6337)	14	=(4.8682*%Cu+1.8812)*CNCST+BCRCST
BOP ROM	Carbonate	42%	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
	Intrusive	=IF(%S<=1.0,0.58,−0.0582*%S+0.4321)	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
	Oxide	=IF(%S<=1.0,0.48,−0.0355*%S+0.4737)	11	=(4.8682*%Cu+0.9512)*CNCST+BUCRCST
LFUG Crushed	All Ore	80%	11	=BCRCST+1.63*CNCST
BUG Crushed	All Ore	=if(%S<1.0,−0.0508*%S+0.7786,−0.0169*%S+0.6075)	14	=(4.6696*%Cu+1.7502)*CNCST+BCRCST
LFOP Crushed	F1a	76%	11	=BCRCST+1.63*CNCST
	F1b	70%	11	=BCRCST+1.63*CNCST
	FII	54%	11	=BCRCST+1.63*CNCST
	FIII	61%	11	=BCRCST+1.63*CNCST
	FIV	61%	11	=BCRCST+1.63*CNCST
LFOP ROM	F1a	64%	9	=BUCRCST+0.7*CNCST
	F1b	50%	9	=BUCRCST+0.7*CNCST
	FII	45%	9	=BUCRCST+0.7*CNCST
	FIII	30%	9	=BUCRCST+0.7*CNCST
	FIV	48%	9	=BUCRCST+0.7*CNCST
GOP Crushed	Carbonate	51%	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
	Intrusive	=IF(%S<=1.0,0.68,−0.0582*%S+0.5321)	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
	Oxide	=IF(%S<=1.0,0.64,−0.0355*%S+0.6337)	14	=(2.893*%Cu+1.9897)*CNCST+BCRCST
GOP ROM	Carbonate	42%	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST
	Intrusive	=IF(%S<=1.0,0.58,−0.0582*%S+0.4321)	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST
	Oxide	=IF(%S<=1.0,0.48,−0.0355*%S+0.4737)	11	=(2.893*%Cu+1.0597)*CNCST+BUCRCST

Notes: BCRCST = base cost crushed = $6.03/t of ore. BUCRCST = base cost ROM = $2.25/t of ore. CNCST = cyanide cost = $1.95/kg. Rec. = recovery.

Table 15-3: Processing Costs and Recoveries CIL

Source	Recovery Formula Au	Rec. Ag (%)	Operating cost formula
BOP CIL	=IF(S%<=2.3,−0.1346*S%+0.8758,−0.0076*S%+0.5812)	39	=(8.0185*%Cu+0.9323)*CNCST+BCST
LFUG CIL	95%	37	=IF(%Cu<0.1,0.28,2.4722*%Cu+0.0328)*CNCST+BCST
BUG CIL	90%	55	=IF(%Cu>=0.25,8.653*%Cu+0.103,1.55)*CNCST+BCST
LFOP CIL	90%	50	=(1.19*CNCST)+BCST
GOP	=IF(S%<=2.3,−0.1346*S%+0.8758,−0.0076*S%+0.5812)	39	=(3*%Cu+1.6329)*CNCST+BCST

Notes: CNCST = cyanide cost = $1.95/kg. BCST = base CIL OPEX cost = $8.62/t of ore. Rec. = recovery.

15.4 Open Pit

Pit optimizations were performed using the Lerchs–Grossmann algorithm to define economically mineable shapes using an open pit mining method.

Two pit optimization scenarios were analyzed to define the optimum mining shapes to use as the basis for pit designs; the first scenario incorporated the G&A costs in the cost structure used for pit optimization (G&A included), whereas the second scenario omitted the latter costs (G&A excluded). The two scenarios were used to evaluate the impact of fixed costs on pit phase selection for inclusion into the mine plan, due to excess processing capacity at stages of the mine life.

Pit phases were designed based on the selected optimized pit shells for the two scenarios and by taking into account geotechnical parameters and operational constraints.

Topographic surveys as of June 30, 2022, were used to deplete the open pit mines.

15.4.1 Open Pit Ore Loss and Dilution

Open pit mining ore loss and dilution parameters were assessed based on operational practices and reconciliations between the block model and production actuals. Based on these reconciliations and expected future mining conditions mining loss and dilution for the LFOP pit area were both estimated at 7%. For the BOP and GOP pit areas mining loss and dilution were estimated at 5%.

15.4.2 Pit Optimization Parameters

Inputs to the optimization process include slope angles (refer to Section 16), metallurgical recoveries, operating costs, selling costs, and government royalties.

Mining operating costs are based on historical costs and first principles estimates. An incremental haulage cost increase of approximately $0.02/t per bench was applied to material mined from benches that are above or below the reference bench elevation, which is the bench elevation at which haul trucks exit each pit. Mining costs vary by destination due to variable surface haulage distances to the respective destination.

The economic parameters used for the pit optimization are presented in Table 15-4 and Table 15-5.

Table 15-4: Economic Parameters Used for the LFOP Pit Optimization

Input Parameter	Unit	Value
Gold Price	$/oz	1,450
Silver Price	$/oz	18
Government Royalty	% of metal sales revenue	0.50
Treatment Charges/Refining Charges	$/oz gold	5.50
Payable Metal	%	100
LFOP Mining Cost—Crushed HL	$/t	1.09
LFOP Mining Cost—ROM HL	$/t	1.40
LFOP Mining Cost—CIL	$/t	1.35
Mining Cost—Waste	$/t	1.24
Incremental Haulage Cost	$/t/bench	0.02
Processing Costs	$/t	Refer to Table 15-2 and Table 15-3
Metallurgical Recovery	%	Refer to Table 15-2 and Table 15-3
Sustaining Costs HL	$/t	0.55
Sustaining Costs CIL	$/t	0.07
G&A	$/t	4.20
Discount Rate	%	5.00

Table 15-5: Economic Parameters Used for the BOP and GOP Pit Optimization

Input Parameter	Unit	Value
Gold Price	$/oz	1,450
Silver Price	$/oz	18
Government Royalty	% of metal sales revenue	0.50
Treatment Charges/Refining Charges	$/oz gold	5.50
Payability	%	100
BOP Mining Cost—Crushed HL	$/t	1.52
BOP Mining Cost—ROM HL	$/t	1.55
BOP Mining Cost—CIL	$/t	1.08
BOP Mining Cost—Waste	$/t	1.43
GOP Mining Cost—Crushed HL	$/t	1.73
GOP Mining Cost—ROM HL	$/t	1.75
GOP Mining Cost—CIL	$/t	1.50
GOP Mining Cost—Waste	$/t	1.27
Incremental Haulage Cost	$/t/bench	0.02
Processing Costs	$/t	Refer to Table 15-2 and Table 15-3
Metallurgical Recovery	%	Refer to Table 15-2 and Table 15-3
Sustaining Costs HL	$/t	0.55
Sustaining Costs CIL	$/t	0.07
G&A	$/t	3.20
Discount Rate	%	5.00

15.4.3 Cut-Off Value

The economic cut-off varies based on the metallurgical recovery and operating cost assigned to each mined block. The metallurgical recovery for each block varies based on the rock type, sulphur content, and the processing destination (crushed HL, ROM HL or CIL). The operating cost for each block varies based on the mining, processing, and G&A cost. The mining cost is dependent on the haulage distance to the processing destination.

Blocks within the designed pit that have positive cash flows are considered as ore. Blocks within the designed pit that have negative cash flows are considered to be waste.

15.4.4 Los Filos Open Pit Optimization Results

The results of the pit optimizations for the LFOP are presented in Table 15-6, Table 15-7, and Figure 15-1 and Figure 15-2.

Table 15-6: Results of the Pit Optimization for LFOP—G&A Included

Pit Shell	Revenue Factor	Equivalent Gold Price ($/oz)	Cash Flow Undiscounted ($ M)	Cash Flow Discounted Best ($ M)	Cash Flow Discounted Worst ($ M)	Processed Tonne (Mt)	Waste Tonne (Mt)	Total Tonne (Mt)	Strip Ratio	Ounces Contained Gold (koz)	Head Grade Gold (g/t)
16	0.60	870	356	301	285	11	84	95	8.0	496	1.46
17	0.62	899	523	397	341	22	181	203	8.4	864	1.25
18	0.64	928	570	420	349	25	209	234	8.3	974	1.20
19	0.66	957	605	436	349	28	229	257	8.2	1,057	1.17
20	0.68	986	623	444	347	30	241	270	8.1	1,104	1.16
21	0.70	1,015	740	486	332	43	318	361	7.4	1,409	1.02
22	0.72	1,044	755	492	333	44	330	374	7.4	1,450	1.02
23	0.74	1,073	770	496	326	46	345	391	7.5	1,496	1.01
24	0.76	1,102	865	522	295	60	435	495	7.2	1,796	0.93
25	0.78	1,131	883	527	289	63	456	519	7.3	1,857	0.92
26	0.80	1,160	888	528	287	64	461	525	7.2	1,874	0.92
27	0.82	1,189	1,017	546	213	81	687	768	8.5	2,430	0.93
28	0.84	1,218	1,063	552	175	91	766	857	8.5	2,642	0.91
29	0.86	1,247	1,069	553	170	92	776	868	8.4	2,675	0.90
30	0.88	1,276	1,085	555	151	95	822	917	8.6	2,770	0.91
31	0.90	1,305	1,101	557	124	100	874	973	8.8	2,882	0.90
32	0.92	1,334	1,104	558	118	100	886	987	8.8	2,907	0.90
33	0.94	1,363	1,105	558	116	101	890	991	8.8	2,916	0.90
34	0.96	1,392	1,113	559	87	105	943	1,048	9.0	3,018	0.90
35	0.98	1,421	1,114	559	83	106	953	1,059	9.0	3,037	0.89
36	1.00	1,450	1,114	559	79	107	965	1,072	9.0	3,060	0.89

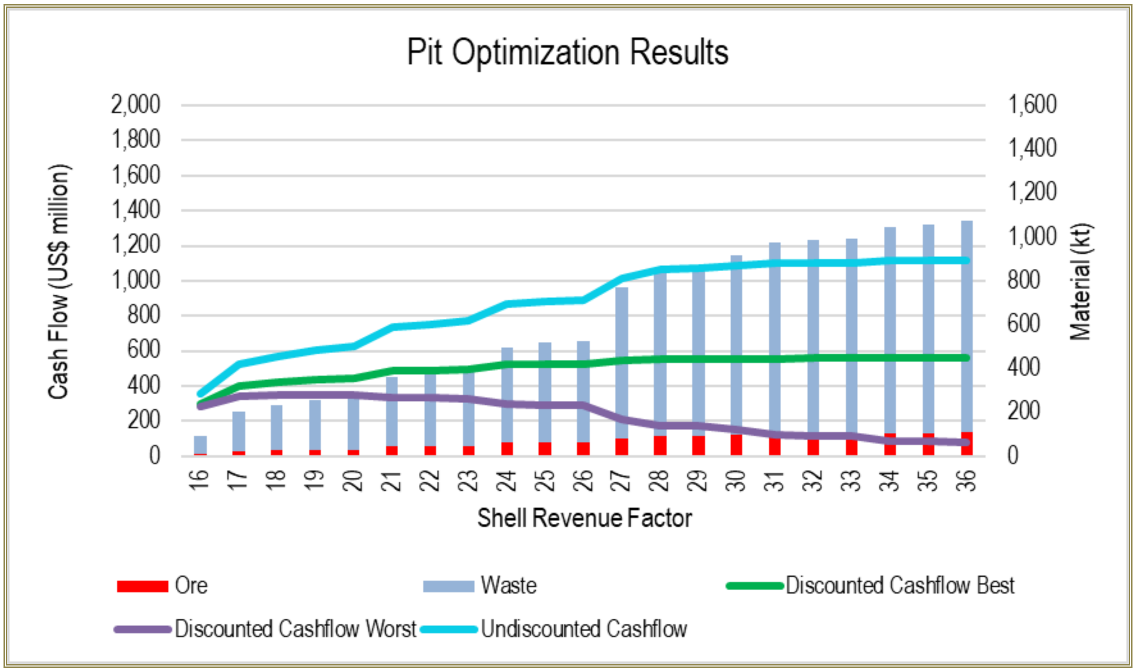
Notes: Cash Flow Discounted Best represents mining of each incremental shell in sequence.
Cash flow Discounted Worst represents mining of the complete shell with no internal phases.
Cash flows are based on Whittle optimized limits and not designed pit limits, and exclude initial and non-specified sustaining capital costs, taxes, depreciation, amortization, etc. Values to be interpreted accordingly.

Table 15-7: Results of the Pit Optimization for the LFOP—G&A Excluded

Pit Shell	Revenue Factor	Equivalent Gold Price ($/oz)	Cash Flow Undiscounted ($ M)	Cash Flow Discounted Best ($ M)	Cash Flow Discounted Worst ($ M)	Processed Tonne (Mt)	Waste Tonne (Mt)	Total Tonne (Mt)	Strip Ratio	Ounces Contained Gold (koz)	Head Grade Gold (g/t)
16	0.60	870	1,101	623	462	89	339	428	3.8	1,868	0.65
17	0.62	899	1,188	644	448	99	384	483	3.9	2,063	0.65
18	0.64	928	1,224	653	450	104	406	510	3.9	2,145	0.64
19	0.66	957	1,232	655	448	105	410	515	3.9	2,163	0.64
20	0.68	986	1,331	674	434	123	476	599	3.9	2,428	0.62
21	0.70	1,015	1,346	676	430	125	492	616	3.9	2,468	0.62
22	0.72	1,044	1,560	702	369	148	707	855	4.8	3,067	0.64
23	0.74	1,073	1,586	705	359	152	734	887	4.8	3,145	0.64
24	0.76	1,102	1,620	709	339	159	775	934	4.9	3,259	0.64
25	0.78	1,131	1,650	712	323	165	820	985	5.0	3,366	0.64
26	0.80	1,160	1,653	712	322	165	823	989	5.0	3,377	0.64
27	0.82	1,189	1,665	714	317	168	843	1,011	5.0	3,431	0.63
28	0.84	1,218	1,699	717	291	177	907	1,084	5.1	3,587	0.63
29	0.86	1,247	1,718	718	268	182	950	1,132	5.2	3,687	0.63
30	0.88	1,276	1,724	719	262	185	966	1,151	5.2	3,726	0.63
31	0.90	1,305	1,727	719	260	186	975	1,161	5.2	3,751	0.63
32	0.92	1,334	1,748	720	224	199	1,053	1,252	5.3	3,951	0.62
33	0.94	1,363	1,756	720	207	205	1,092	1,296	5.3	4,045	0.62
34	0.96	1,392	1,759	721	198	207	1,113	1,320	5.4	4,090	0.61
35	0.98	1,421	1,759	721	197	208	1,116	1,324	5.4	4,101	0.61
36	1.00	1,450	1,762	720	157	224	1,269	1,493	5.7	4,401	0.61

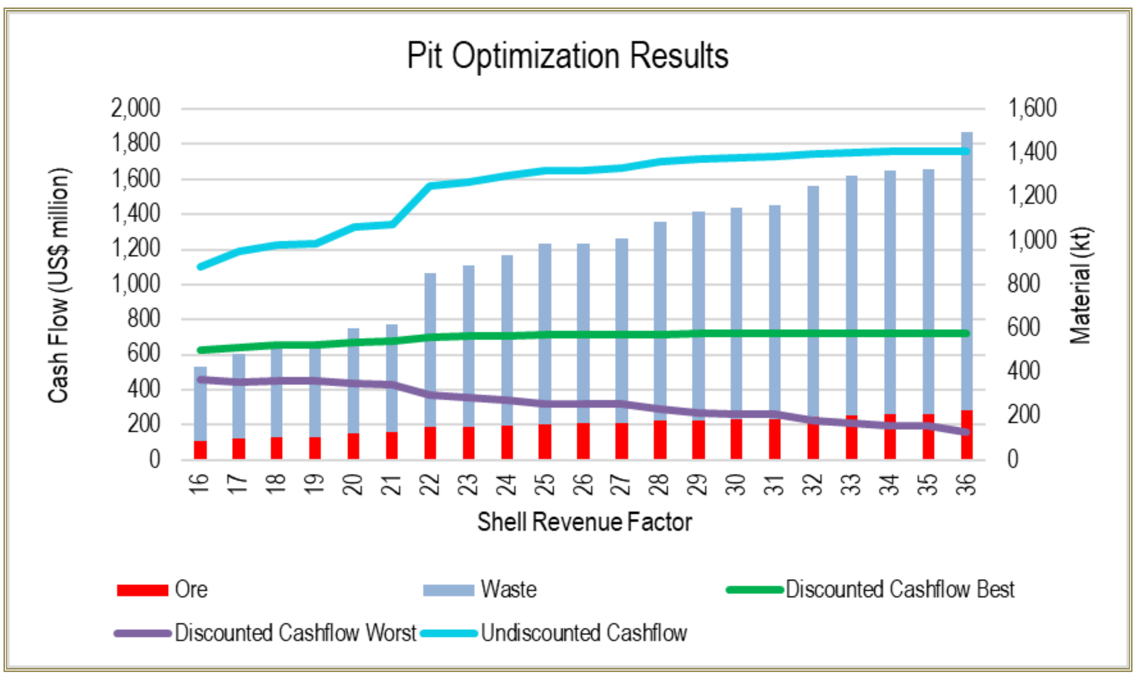
Notes: Cash Flow Discounted Best represents mining of each incremental shell in sequence.
Cash Flow Discounted Worst represents mining of the complete shell with no internal phases.
Cash Flows are based on Whittle optimized limits and not designed pit limits, and exclude initial and non-specified sustaining capital costs, taxes, depreciation, amortization, etc. Values to be interpreted accordingly.

Pit shell 27 for the G&A included scenario and pit shell 36 for the G&A-excluded scenario were selected to guide the detailed pit design for the Los Filos open pit area (Figure 15-1 and Figure 15-2).



Source: AMC (2022).

Figure 15-1: Discounted Pit Value by Optimized Pit Shell for the LFOP—G&A Included



Source: AMC (2022).

Figure 15-2: Discounted Pit Value by Optimized Pit Shell for the LFOP—G&A Excluded

15.4.5 Bermejal and Guadalupe Open Pit Optimization Results

The results of the pit optimization for the G&A included and G&A excluded scenarios for BOP and GOP are presented in Table 15-8, Table 15-9.

Table 15-8: Results of the Pit Optimization for BOP GOP—G&A Included

Pit Shell	Revenue Factor	Equivalent Gold Price ($/oz)	Cash Flow Undiscounted ($M)	Cash Flow Discounted Best ($M)	Cash Flow Discounted Worst ($M)	Processed Tonne (Mt)	Waste Tonne (Mt)	Total Tonne (Mt)	Strip Ratio	Ounces Contained Gold (koz)	Head Grade Gold (g/t)
16	0.60	870	251	235	234	7	44	51	6.1	387	2.28
17	0.62	899	253	236	236	7	44	52	6.2	393	2.24
18	0.64	928	272	252	251	8	50	59	6.1	439	2.15
19	0.66	957	290	268	265	10	56	66	5.8	479	2.01
20	0.68	986	295	273	269	10	58	68	5.7	495	1.96
21	0.70	1,015	297	275	270	10	58	69	5.6	503	1.91
22	0.72	1,044	353	321	308	16	86	102	5.3	650	1.66
23	0.74	1,073	365	330	314	18	92	110	5.2	691	1.58
24	0.76	1,102	380	342	321	19	102	122	5.3	741	1.51
25	0.78	1,131	381	343	322	20	103	123	5.2	754	1.47
26	0.80	1,160	403	360	332	23	121	144	5.2	842	1.37
27	0.82	1,189	409	365	333	24	126	151	5.2	874	1.33
28	0.84	1,218	418	372	336	26	133	159	5.0	930	1.29
29	0.86	1,247	423	375	336	27	138	165	5.0	965	1.25
30	0.88	1,276	430	380	336	29	148	177	5.0	1,018	1.21
31	0.90	1,305	434	383	336	31	154	185	5.0	1,059	1.18
32	0.92	1,334	438	386	334	32	163	196	5.1	1,103	1.15
33	0.94	1,363	442	388	331	34	176	210	5.2	1,163	1.12
34	0.96	1,392	450	393	319	40	213	252	5.3	1,316	1.07
35	0.98	1,421	457	396	291	47	266	314	5.6	1,521	1.02
36	1.00	1,450	457	396	284	49	283	332	5.8	1,582	1.01

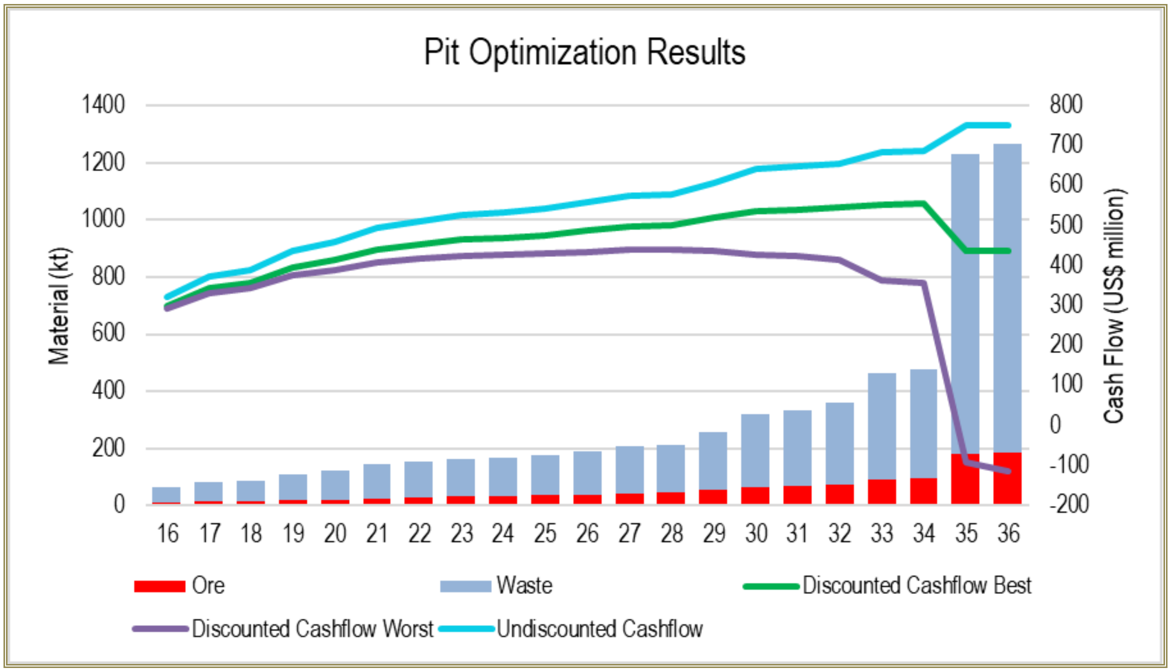
Notes: Cash Flow Discounted Best represents mining of each incremental shell in sequence.
Cash flow Discounted Worst represents mining of the complete shell with no internal phases.
Cash flows are based on Whittle optimized limits and not designed pit limits, and exclude initial and non-specified sustaining capital costs, taxes, depreciation, amortization, etc. Values to be interpreted accordingly.

Table 15-9: Results of the Pit Optimization for BOP GOP—G&A Excluded

Pit Shell	Revenue Factor	Equivalent Gold Price ($/oz)	Cash Flow Undiscounted ($M)	Cash Flow Discounted Best ($M)	Cash Flow Discounted Worst ($M)	Processed Tonne (Mt)	Waste Tonne (Mt)	Total Tonne (Mt)	Strip Ratio	Ounces Contained Gold (koz)	Head Grade Gold (g/t)
16	0.60	870	321	298	293	13	50	63	3.9	492	1.69
17	0.62	899	373	343	332	20	62	82	3.1	599	1.40
18	0.64	928	388	356	343	21	65	86	3.0	638	1.33
19	0.66	957	438	396	377	27	84	111	3.1	756	1.25
20	0.68	986	460	414	390	29	94	123	3.2	814	1.19
21	0.70	1,015	495	440	408	35	109	144	3.2	910	1.11
22	0.72	1,044	510	452	416	37	116	153	3.1	960	1.07
23	0.74	1,073	528	465	424	40	122	162	3.0	1,030	1.03
24	0.76	1,102	534	470	426	42	125	167	3.0	1,061	1.00
25	0.78	1,131	543	476	430	43	131	174	3.0	1,103	0.97
26	0.80	1,160	559	488	435	47	144	191	3.0	1,179	0.94
27	0.82	1,189	575	498	438	51	156	208	3.0	1,260	0.90
28	0.84	1,218	579	501	439	53	160	213	3.0	1,294	0.89
29	0.86	1,247	608	519	438	61	197	258	3.2	1,469	0.85
30	0.88	1,276	642	537	426	71	251	322	3.6	1,705	0.83
31	0.90	1,305	647	540	423	73	260	333	3.6	1,758	0.81
32	0.92	1,334	656	545	415	78	282	360	3.6	1,859	0.79
33	0.94	1,363	682	553	363	94	367	461	3.9	2,187	0.76
34	0.96	1,392	685	554	357	97	380	477	3.9	2,248	0.74
35	0.98	1,421	750	436	−93	181	1,050	1,231	5.8	4,285	0.75
36	1.00	1,450	751	435	−114	185	1,079	1,264	5.8	4,403	0.74

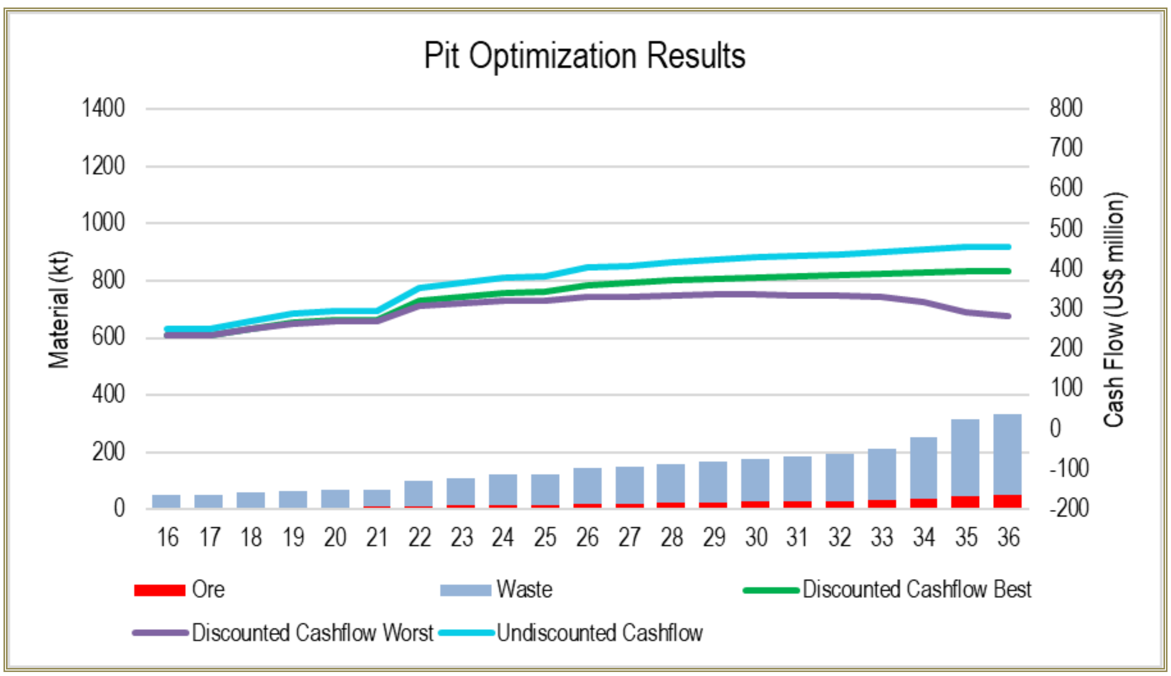
Notes: Cash flow Discounted Best represents mining of each incremental shell in sequence.
Cash flow Discounted Worst represents mining of the complete shell with no internal phases.
Cash flows are based on Whittle optimized limits and not designed pit limits, and exclude initial and non-specified sustaining capital costs, taxes, depreciation, amortization, etc. Values to be interpreted accordingly.

Pit shell 34 for the G&A included scenario and pit shell 36 for the G&A-excluded scenario were selected to guide the detailed pit design for Bermejal and Guadalupe open pit areas (Figure 15-3 and Figure 15-4).



Source: AMC (2022).

Figure 15-3: Discounted Pit Value by Optimized Pit Shell for the BOP GOP—G&A Included

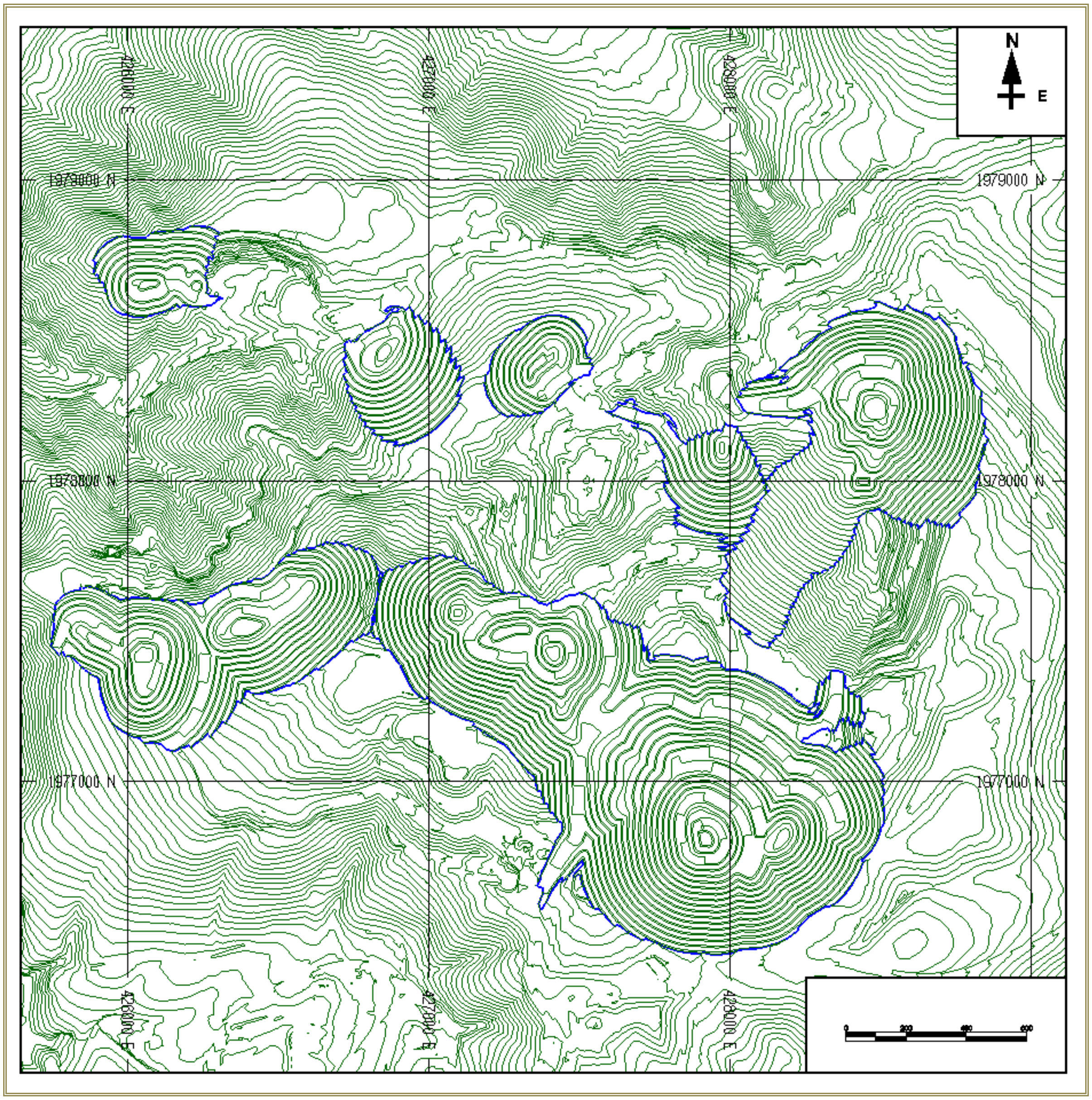


Source: AMC (2022).

Figure 15-4: Discounted Pit Value by Optimized Pit Shell for the BOP GOP—G&A Excluded Costs

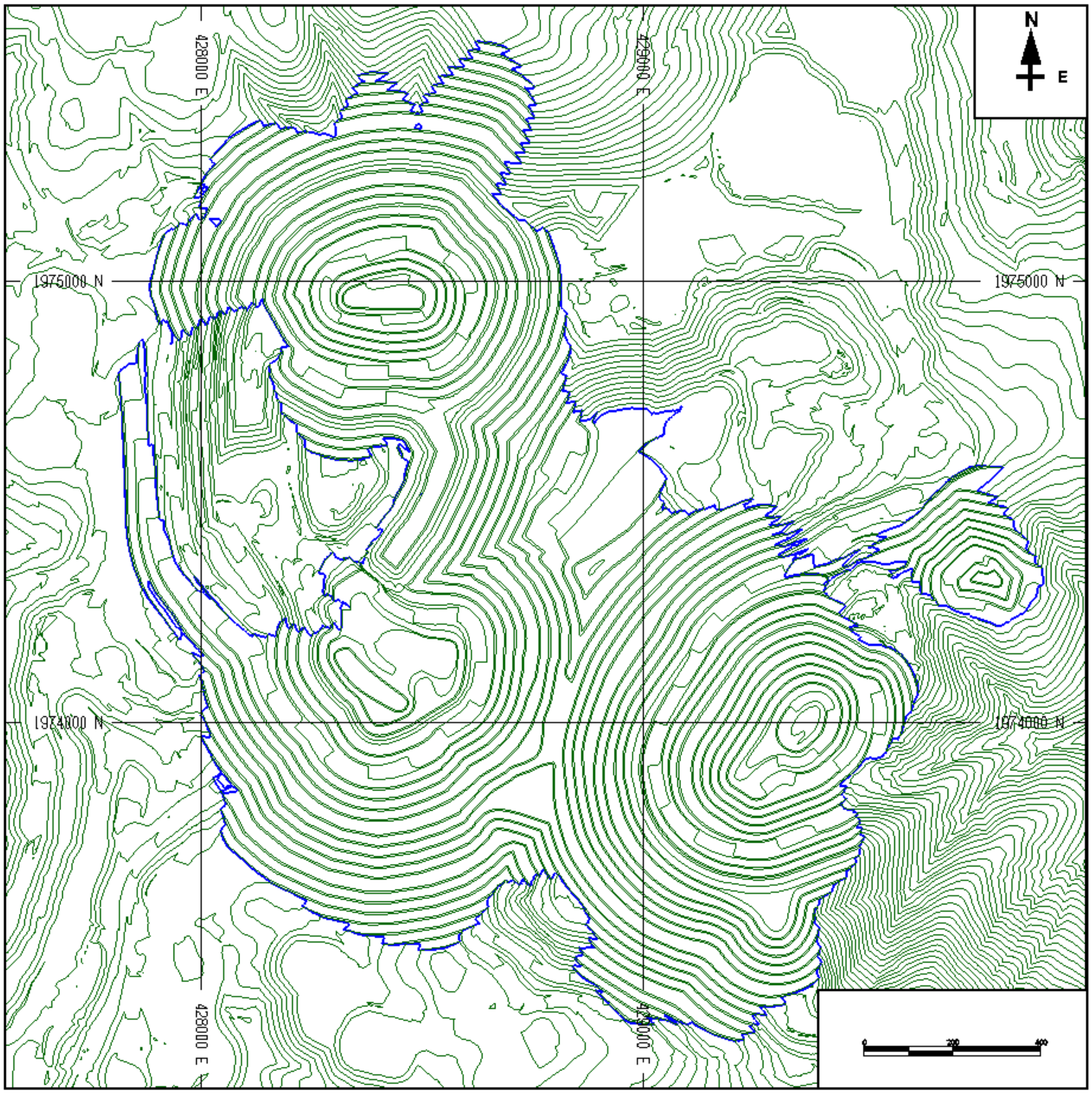
15.4.6 Reserve Pit Design

Detailed pit designs were completed based on the selected pit shells for the respective pit optimization scenarios. Haulage ramps were designed nominally at 27.4 m width and maximum ±10% grade, with the exception of the bottom few benches where ramps were reduced to 19.6 m wide to accommodate single-lane traffic. Figure 15-5 and Figure 15-6 illustrate the resulting open pit final designs for LFOP and BOP GOP, respectively.



Source: AMC (2022).

Figure 15-5: LFOP Final Reserve Pit Design



Source: AMC (2022).

Figure 15-6: BOP GOP Reserve Pit Design

15.4.7 Open Pit Mineral Reserve Estimate

The Proven and Probable Mineral Reserves in the combined open pit areas at Los Filos are estimated to be 180.6 Mt at 0.65 g/t Au as shown in Table 15-10 and Table 15-11. The Mineral Reserves have been incorporated into a LOM production schedule (refer to Section 16) and have been confirmed by cash-flow modelling (refer to Section 22). The contained gold is estimated at 3,758 koz.

15.4.8 Mineral Reserves Summary

The Mineral Reserve estimate for LFOP, BOP, and GOP are presented in Table 15-10 and Table 15-11.

Table 15-10: Los Filos Open Pit Mineral Reserve Statement as of June 30, 2022

Classification	Tonnes (kt)	Grade (g/t Au)	Contained Au (koz)	Grade (g/t Ag)	Contained Ag (koz)
Proven	25,587	0.75	614	3.9	3,243
Probable	86,844	0.59	1,634	4.8	13,484
Total Proven and Probable	**112,431**	**0.62**	**2,249**	**4.6**	**16,727**

Notes: CIM *Definition Standards for Mineral Resources and Mineral Reserves* (2014) were used for reporting of Mineral Reserves.
Mineral Reserves are estimated using a long-term gold price of US$1,450 per troy oz and a long-term silver price of US$18 per troy oz.
Mineral Reserves are stated in terms of delivered tonnes and grade, before process recovery.
Mineral reserves are defined by pit optimization and are based on variable break-even cut-offs as generated by process destination and metallurgical recoveries.
Metal recoveries are variable dependent on metal head grades, as outlined in Table 15-2 and Table 15-3.
Dilution is assigned an average of 7% at a zero grade for Au and Ag.
Mining recovery is set to 93%.
Heap leach process recovery varies based on rock type.
The qualified persons responsible for this item of the Technical Report are not aware of any mining, metallurgical, infrastructure, permitting or other relevant factors that could materially affect the mineral reserve estimates.
Effective date of Mineral Reserves is June 30, 2022.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Numbers may not sum due to rounding.

Table 15-11: Bermejal and Guadalupe Open Pit Mineral Reserve Statement as of June 30, 2022

Classification	Tonnes (kt)	Grade (g/t Au)	Metal Contained (koz Au)	Grade (g/t Ag)	Metal Contained (koz Ag)
Proven	9,567	0.72	223	7.9	2,434
Probable	58,632	0.68	1,287	8.4	15,819
Total Proven and Probable	**68,199**	**0.69**	**1,510**	**8.3**	**18,253**

Notes: CIM *Definition Standards for Mineral Resources and Mineral Reserves* (2014) were used for reporting of Mineral Reserves.
Mineral Reserves are estimated using a long-term gold price of US$1,450 per troy oz and a long-term silver price of US$18 per troy oz.
Mineral Reserves are stated in terms of delivered tonnes and grade, before process recovery.
Mineral reserves are defined by pit optimization and are based on variable break-even cut-offs as generated by process destination and metallurgical recoveries.
Metal recoveries are variable dependent on metal head grades, as outlined in Table 15-2 and Table 15-3.
Dilution is assigned an average of 7% at a zero grade for Au and Ag.
Mining recovery is set to 93%.
Heap leach process recovery varies based on rock type.
The qualified persons responsible for this item of the Technical Report are not aware of any mining, metallurgical, infrastructure, permitting or other relevant factors that could materially affect the mineral reserve estimates.
Effective date of Mineral Reserves is June 30, 2022.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Numbers may not sum due to rounding.

15.5 Underground

15.5.1 Mining Method and Mine Design

The mining methods for the LFUG are overhand cut and fill (OHCAF) in the narrow areas and overhand drift and fill (OHDAF) in the wider areas. Both are proven methods at LFUG and allow for a high degree of selectivity. Longhole open stoping (LHOS) mining method is also used in targeted areas of vertical ore body continuity and good rock conditions.

The mining method at BUG is OHDAF in oxide ore, which constitutes the majority of the deposit, and underhand drift and fill (UHDAF) in intrusive ore.

Refer to Section 16 for additional detail on the underground mining methods.

Cut-off Value—General

The cut-off value is the minimum grade estimated to be economically mineable. It is a key factor in mine design, but is not the sole determinant of economic viability of the material. Material above the cut-off value may not be economically mineable if its occurrence is such that the capital development and other costs cannot be amortized by the overall margin generated by that material. For example, the material may be too remote and/or occur in small "pockets" that are not profitable to access. Conversely, material that is lower than the cut-off grade may be mined and sent for processing if the material is mined as a consequence of the overall mine plan. An example is mineralized development material that must be mined to access other areas of the mine.

Cut-off Value—Calculations

The stopes were designed and optimized by applying a cut-off value to the block model and then using a semi-automated software tool, Mineable Shape Optimizer (MSO), which is part of Datamine's Studio 5D planner software.

Ore mined from underground is routed initially to HL crushed and then to the CIL once commissioned in July 2024.

As the processing cost to the CIL is variable for BUG a net processing return (NPR) was calculated and used to evaluate whether a block is potentially considered ore or waste. With respect to LFUG a fixed processing cost was used that reflects the average grade over the remaining LOM.

The operating cost assumptions used to determine the NPR cut-off value are shown in Table 15-12 on a dollar-per-tonne of ore feed basis. These costs are the key inputs to the cut-off value that were used for stope optimization. In the case of mineralized development material, processing of that material may be justified exclusive of the mining cost.

Table 15-12: Cost Assumptions for MSO Cut-off Value Calculation for the Underground Operations

Cost Category	BUG Oxide OHDAF	BUG Oxide UHDAF	LFUG Norte OHDAF	LFUG Norte LHOS
Gold Price ($/oz)	1,450	1,450	1,450	1,450
Silver Price ($/oz)	18	18	-	-
Gold Treatment Charges/ Refining Charges ($/oz)	5.5	5.5	-	-
Silver Treatment Charges/ Refining Charges ($/oz)	0.05	0.05	-	-
Payability (%)	100	100	100	100
Mining ($/t)	77.7	92.1	73.3	54.0
G&A and Land Payment ($/t)	3.2	3.2	8.7	11.5
Remediation ($/t)	1.3	1.3	0.3	0.3
NPR Total[(1)] ($/t)	**82.2**	**96.6**	**82.3**	**65.8**
Processing ($/t)	Refer to Table 15-2 and Table 15-3	Refer to Table 15-2 and Table 15-3	Refer to Table 15-2 and Table 15-3	Refer to Table 15-2 and Table 15-3

Source: AMC (2022) and Equinox Gold (2022).
Notes: [(1)]NPR Total = sNSR–Processing cost. Equinox Gold provided G&A and land payment.

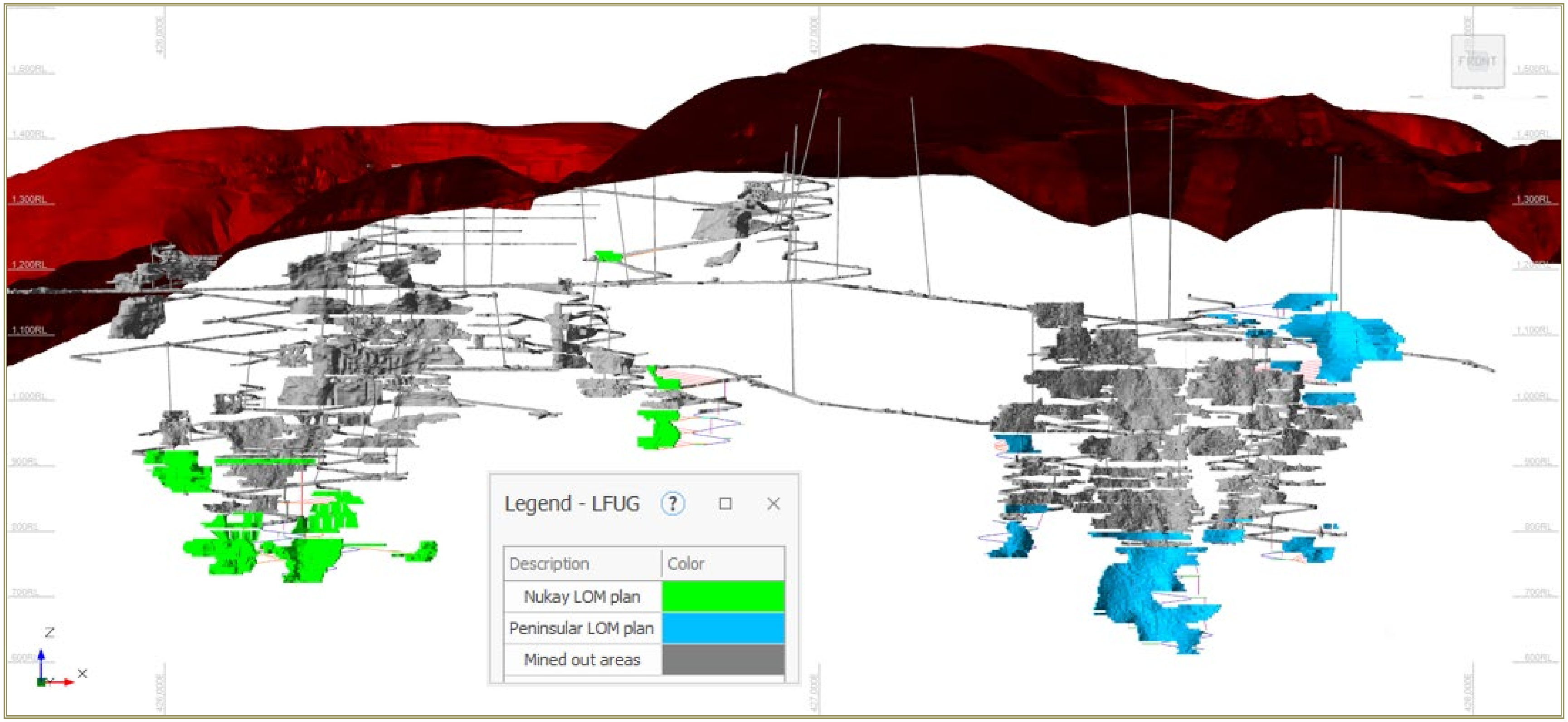
Stope Optimization and Design

MSO applies 3-D stope shapes according to geometric and economic constraints, and is an efficient method for guiding mine design. However, practical considerations and efficiency of capital infrastructure still need to be applied by the mining engineer. The shapes generated by MSO were reviewed and adjusted manually by the mining engineer to ensure that the final stope designs are practical mineable shapes.

An example of the mine design is provided on Figure 15-7.

Dilution and Recovery Estimates

Mining dilution and mining recovery allowances have been applied to the LFUG and BUG Mineral Reserves for all of the mining methods. Unplanned external dilution of 10% is applied to stope ore at zero gold and silver grade, regardless of the modelled grades. An average mining recovery of 97% was assumed. This is considered reasonable given the highly selective mining methods being employed. Achievement in practice of the estimated dilution and recovery allowances is dependent on continued good grade control and production management processes.



Source: AMC (2022), not to scale.

Figure 15-7: Designed Stopes and Accesses in the LFUG Norte Area

15.5.2 Underground Mineral Reserves Summary

The Proven and Probable Mineral Reserve estimate for LFUG is presented in Table 15-13 at 1.2 Mt, at 3.5 g/t Au and 17.4 g/t Ag, on a delivered-to-process plant basis. Delivered gold is estimated at 0.1 Moz and delivered silver is estimated to be 0.7 Moz.

Table 15-13: LFUG Mineral Reserves Statement as of June 30, 2022

Classification	Quantity (kt)	Grade (g/t Au)	Contained Au (koz)	Grade (g/t Ag)	Contained Ag (koz)
Proven	299	4.15	40	13.7	132
Probable	932	3.29	98	18.5	555
Total Proven and Probable	**1,231**	**3.50**	**138**	**17.4**	**687**

Notes: CIM (2014) definitions were followed for Mineral Reserves.
Mineral Reserves are stated in terms of delivered tonnes and grade, before process recovery.
Mineral Reserves include all material contained within stope solids plus an allowance for external dilution and mining recovery.
Metal price assumption was $1,450/oz for Au.
Mineral Reserves are reported based on a NPR cut-off value varying between $65.8/t and $82.3/t depending on the location and mining method.
Dilution is assigned an average of 10% at a zero grade for Au and Ag.
Mining recovery is set to 97%.
Heap leach process recovery for Au is 80% and 95% for CIL.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Numbers may not sum due to rounding.

The Proven and Probable Mineral Reserves estimate for BUG is presented in Table 15-14 at 11.4 Mt, at 4.0 g/t Au and 18.9 g/t Ag, on a delivered-to-process plant basis. Contained gold is estimated at 1.5 Moz and contained silver is estimated to be 6.9 Moz.

Table 15-14: BUG Mineral Reserves Statement as of June 30, 2022

Classification	Quantity (kt)	Grade (g/t Au)	Contained Au (koz)	Grade (g/t Ag)	Contained Ag (koz)
Proven	0	0.00	0	0.0	0
Probable	11,366	3.99	1,457	18.9	6,903
Total Proven and Probable	**11,366**	**3.99**	**1,457**	**18.9**	**6,903**

Notes: CIM (2014) definitions were followed for Mineral Reserves.
Mineral Reserves are stated in terms of delivered tonnes and grade, before process recovery.
Mineral Reserves include all material contained within stope solids plus an allowance for external dilution and mining recovery.
Metal price assumption was $1,450/oz for Au.
Mineral Reserves are reported based on a NPR cut-off value varying between $65.8/t and $82.3/t depending on the location and mining method.
Dilution is assigned an average of 10% at a zero grade for Au and Ag.
Mining recovery is set to 97%.
Heap leach process recovery for Au is 80% and 95% for CIL.
Tonnage and grade measurements are in metric units. Contained Au and Ag ounces are reported as troy ounces.
Numbers may not sum due to rounding.

The Mineral Reserves have been incorporated into a LOM production schedule (refer to Section 16) and have been confirmed by cash flow modelling (refer to Section 22).

15.6 Factors Impacting Mineral Reserve Estimate

The following items could have an impact on the Mineral Reserves. However, the QP is satisfied that these have been addressed in this report

- Commodity prices
- Mining recovery and metallurgical recovery assumptions
- Presence of unexpected quantities of copper or sulphur, which may impact economical treatment of ore at the process plant or heap leach facility
- Methodology of assigning ore densities
- Geotechnical characteristics of the rock mass
- Excess underground mining dilution
- Ability to consistently deliver the required process plant feed to the process plant.

Significant changes in the above information, may impact both the tonnes and grade of the Mineral Reserve estimate.

15.7 Conclusions

- Mineral Reserves are reported in accordance with NI 43-101—Standards of Disclosure for Mineral Projects .
- Mineral Reserves were estimated using a gold price of $1,450/oz Au, a silver price of $18/oz Ag, with an effective date of June 30, 2022 (Table 15-1).
- Los Filos Mine Complex Mineral Reserves are composed of Proven and Probable open pit Mineral Reserves of 180.6 Mt at an average grade of 0.65 g/t Au, containing 3.8 Moz gold plus Proven and Probable underground Mineral Reserves of 12.6 Mt at an average grade of 3.94 g/t Au containing 1.6 Moz gold.
- The QPs consider the current Mineral Reserve estimate to be prepared according to CIM (2014) Definition Standards and acceptable for mine planning and production scheduling purposes.

16 MINING METHODS

The Los Filos Mine Complex comprises three open pit areas—the LFOP, BOP, and GOP—and two active underground mines—the LFUG and BUG.

Open pit mining entails conventional drilling and blasting, with loading by excavator and haulage by trucks to a crusher (for Crushed heap leach processing) or directly to a run-of-mine leach pad. A 10,000 t/d CIL processing plant is planned to be constructed to offer an alternative processing destination starting in Q3 2024. Waste is hauled to external or in-pit waste rock dumps.

At LFUG, the OHCAF mining method is used in narrow areas and the OHDAF method is used in the wider areas. Both are proven methods at LFUG and allow for a high degree of selectivity. LHOS mining method is also used in targeted areas of vertical ore-body continuity and good rock conditions. The mining methods planned for BUG are OHDAF and UHDAF.

16.1 Geotechnical Engineering

AMC has reviewed the geotechnical work completed for the open pit and underground deposits and adopted the findings of the QP for this Technical Report. The following information was provided to support the QP's findings and conclusions:

- Golder Associates (2004, 2005) developed the geotechnical engineering for the Los Filos open pits, which Call and Nicholas (CNI, 2009–2021) has modified incrementally.
- SRK (2020–2021) developed the geotechnical assessment and design for BOP and GOP.
- The geotechnical guidelines for the LFUG and BUG operations are based on the past performance of mining at these operations.
- Call and Nicholas (CNI, 2018) developed the geotechnical assessment and design guidelines for BUG and prepared an updated geotechnical model (CNI 2020).

Production benches in the open pits are designed to be 9 m high and stacked in double benches of 18 m, which is the current practice at Los Filos.

Design criteria for the proposed open pits inter-ramp angles (IRA) range from 35° to 43° in the LFOP area. In the BOP area IRAs range from 37° to 45°, with geotechnical catch benches every 90 m.

The geological and geotechnical conditions have been defined for the Bermejal underground at a feasibility level based on exploration drilling. Drill-hole data and mapping of the development drifts at Los Filos are used to characterize the geologic and geotechnical conditions.

Current mining at Bermejal is focused on developing the decline for the planned underground operation. Mineralization at Bermejal is contained within oxide domains along the granodiorite contact with carbonate sediments and below the sill intrusion. Mineralization along the granodiorite contact is steeply dipping and narrow, while the top and bottom contacts of the sill tend to be flat-lying and more massive, with a greater lateral extent. The mineralized oxide is heavily altered and of poor rock quality. The rock quality of the mineralized zone at Bermejal is generally weaker than that at Los Filos.

Open Pit Hydrogeology

No hydrogeological assessments have been carried out for the Los Filos area. The groundwater table at LFOP is below any current mining activity. Water levels at the Presa Caracol and nearby water courses are at about 500 masl, whereas the current minimum pit floor elevation is at 1,642 masl in LFOP, with no indications of groundwater. The minimum proposed pit floor is at 1,426 masl at the Los Filos ultimate pit. The final pit bottom for BOP is at 1,281 masl, and the current minimum pit floor elevation is at 1,659 masl. There is no evidence of groundwater in the highwalls.

16.1.1 Los Filos Open Pit Geotechnical

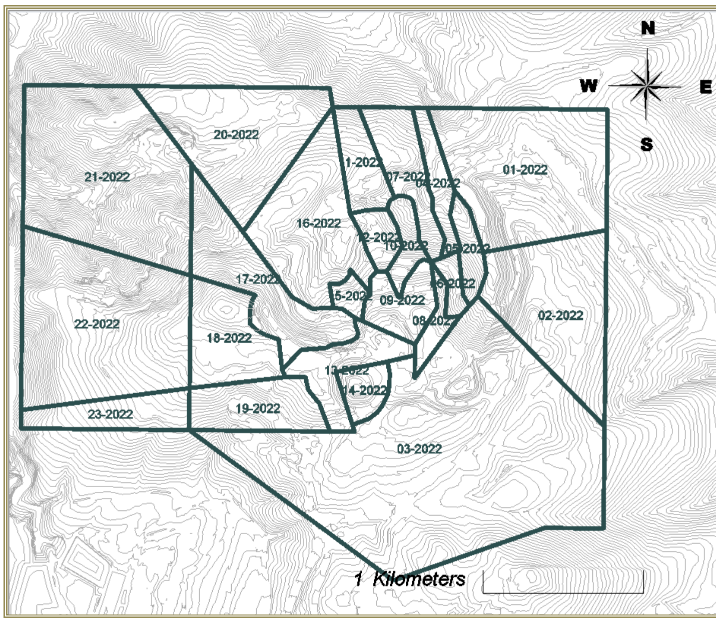
Mine Design Criteria

Golder Associates (2004, 2005) developed slope angles used by AMC for the current LFOP designs, which CNI (2009–2021) has modified incrementally based on additional geotechnical drilling.

Slope Design

Sector-based design guidelines governed the LFOP pit designs. Equinox Gold completed an analysis of the as-built pit slope configurations for the LFOP, using the available data to confirm geotechnical parameters are being achieved.

Figure 16-1 depicts the pit-slope design sectors and provides a summary of the LFOP sector-based slope design used by AMC.



Pit Sector	Bench High (m)	Interramp Angle (ISA)	Bench Face Angle (BFA)
1	18	43	
2	18	42	Granodiorite (East wall) (BFA) = 55º Granodiorite (West wall) (BFA) = 60º Limestone (BFA) = 65º
3	18	43	
4	18	40	
5	18	36	
6	18	35	
7	18	40	
8	18	40	
9	18	36	
10	18	40	
11	18	35	
12	18	40	
13	18	41	
14	18	32	
15	18	40	
16	18	42	
17	18	42	
18	18	43	
19	18	43	
20	18	39	CZ, GDI
21	18	39	CZ, GDI
22	18	40	CZ, GDI
23	18	40	CZ, GDI

Source: CNI (2022).

Figure 16-1: Plan View of Los Filos Open Pit and Slope Design Guidelines

Geotechnical Block Model

CNI (2012, 2015) constructed the geotechnical block model for LFOP and LFUG based on RQD values of drill cores, which were geologically and geotechnically logged at the core facility on site.

16.1.2 Los Filos Underground Mine Geotechnical

Mine Design Criteria

The design criteria for the LFUG operations are well established and based on operational experience and knowledge of the geological and geotechnical conditions. Mining at Los Filos is carried out along the mineralized contact between the sedimentary rocks of the Morelos Formation and the dome-shaped granodioritic intrusive bodies. The underground ore bodies at Los Filos are generally narrow and steeply dipping while being constrained to the contact between the carbonate sediments and intrusive rocks, which are heavily altered and of poor rock quality. Mining methods adopted at LFUG include:

- OHCAF used in the narrow areas, with typical sections being 3.5 m wide and 4.0 m high.
- OHDAF used in the wider areas, with typical drift dimension being 3.5 m wide and 4.0 m high, on a herring bone layout, with primary and secondary mining sequence and strike lengths from the central access being limited to 75 m for stability reasons.
- UHDAF, which has been successfully trialled.
- LHOS used in targeted areas of vertical ore-body continuity with good rock conditions. Stopes are typically 12 m to 16 m high from back to floor.

Ground Support Design

The geotechnical design for LFUG has followed a less formal, but proactive approach to rock mechanics, which has allowed for mining of several ore bodies in adverse ground conditions. Based on the ranges of rock mass ratings (RMR), LFUG uses six geotechnical classes, as shown in Table 16-1.

Table 16-1: Geotechnical Classes for Los Filos Underground

Geotechnical Class	GSI = RMR
R0: Extremely poor	0–15
R1: Very Poor	16–20
R2: Poor	21–40
R3: Fair	41–60
R4: Good	61–80
R5: Very Good	81–100

Site personnel developed a geotechnical classification based on the Geological Strength Index (GSI). This classification is used to describe ground support classes (SC). The ground support design was based on Grimstad and Barton’s (1993) empirical design, with subsequent adjustments based on site-specific experiences of ground support performance and rock-mass conditions, and external consultants' recommendations. Typical primary ground support implemented at LFUG includes:

- 2.4 m-long Ø16 mm rebar for permanent development and 2.1 m-long standard Swellex bolts for temporary development.
- Surface support including wire mesh, shotcrete and fibrecrete.
- 6 m-long spiling (hollow core bar, Ø32 mm) for very poor or extremely poor ground.

Bolt spacing, shotcrete (or fibrecrete) thickness, and requirements for spiling vary based on the ground conditions and excavation dimensions. During the development and production stage, underground face mapping is conducted to assess ground conditions and provide geotechnical input to the planning, support design, and sequence of activities.

For extremely poor ground, additional ground support implemented at LFUG includes:

- 5 m- or 7 m-long Ø16 mm cable bolt on 1.0 m by 1.5 m spacing for large span or extremely poor ground.
- Shotcrete arch every 1.5 m advance.

For large-span excavations, secondary ground support implemented at LFUG includes:

- 5 m- or 7 m-long Ø16 mm cable bolt on 1.5 m by 1.5 m spacing.

Backfill

For OHCAF and OHDAF mining methods, cemented rock fill (CRF) is placed in all production excavations requiring mining below or adjacent; unconsolidated rock fill (URF) is used to backfill stopes where there is no adjacent mining (vertical exposure) or where undercutting is required (horizontal or undercut exposure). To maintain the backfill stability upon exposure, the CRF strength requirement adopted at LFUG is:

- 28-day unconfined compressive strength (UCS) of 4 MPa is used for vertical exposure.
- 28-day UCS of 8 MPa is used for undercut exposure.

For LHOS mining method, URF or cemented aggregate fill (CAF) is required depending on ground conditions.

AMC has reviewed the backfill strength design and concluded that the required strengths for backfill exposure stabilities are over-designed for exposure dimensions. Further optimization of strength design is recommended to reduce operating costs.

Hydrogeology

No hydrogeological assessments have been carried out for LFUG. It was previously determined that the groundwater table at the mine was below any current mining activity. Water levels at the Presa Caracol, and nearby water courses were at about 500 masl, whereas the current mine design only extends down to 750 masl. The underground workings are generally dry, with no signs of significant groundwater.

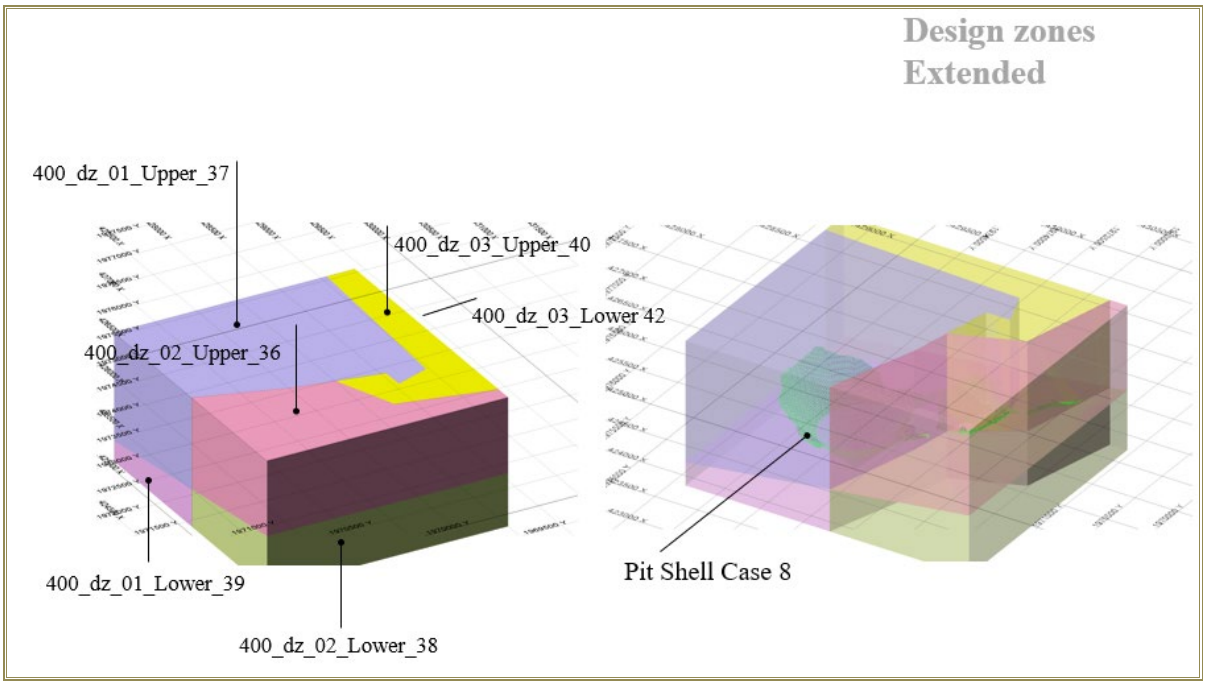
16.1.3 Bermejal Open Pit Geotechnical

Mine Design Criteria

SRK developed pit slope design criteria for BOP in 2020; they were based on a series of Golder Associates and CNI geotechnical drill holes. The GOP is considered part of the BOP for geotechnical designs.

Slope Design

The BOP pit designs were governed by complex slope design guidelines (a combination of zones and sectors). Figure 16-2 and Table 16-2 show the zones and associated slope design guidelines used by AMC for the BOP pit designs. Following first-pass designs of the BOP pits, Equinox Gold completed an analysis of the pit slope configurations to assess the factor of safety. Following this analysis, two regions in the Bermejal pit and two in the Guadalupe pit were identified where the width of the geotechnical catch bench could be reduced while still achieving the desired factor of safety. The adjusted regions and guidelines for the Bermejal pit are shown on Figure 16-3 and Table 16-3, Table 16-4, and Table 16-5 and Guadalupe pit are shown on Figure 16-4 and Table 16-6.



Source: SRK (2020).

Figure 16-2: Bermejal Open Pit Design Zones and Slope Design Guidelines

Table 16-2: Bermejal Open Pit Slope Design Guidelines

	Design Zone 01_Lower 39	Design Zone 01_Upper 37		Design Zone 02_Lower 38	Design Zone 02_Upper 36	Design Zone 03_Upper 40		Design Zone 03_Lower 42		
Wall Direction (°)	90–180	90–135	135–180	89–180	135–180	0–90	180–270	0–160	160–270	270–300
Bench Height (m)	18	18	18	18	18	18	18	18	18	18
Berm Width (m)	15	16	15	15	15	15	15	13	13	13
Batter Angle (°)	70	70	65	70	65	70	70	75	70	70
Inter-Ramp Angle (°)	40	39	38	38	37	40	40	45	43	43
Maximum Inter-Ramp Height (m)	90	90	90	90	90	90	90	90	90	90
Catch Berm Width (m)	25	30	30	25	30	25	25	25	25	25
OSA	**40**	**38**	**37**	**38**	**36**	**37**	**40**	**42**	**42**	**42**
OSA Whittle	**39**	**37**		**38**	**36**	**49**		**42**		

Source: Equinox Gold.

Table 16-3: Adjusted Bermejal Open Pit Design Guidelines

	Design Zone 01_Lower 39	Design Zone 01_Upper 37		Design Zone 02_Lower 38	Design Zone 02_Upper 36	Design Zone 03_Upper 40		Design Zone 03_Lower 42		
Wall Direction (°)	90–180	90–135	135–180	89–180	135–180	0–90	180–270	0–160	160–270	270–300
Bench Height (m)	18	18	18	18	18	18	18	18	18	18
Berm Width (m)	15	16	15	15	15	15	15	13	13	13
Batter Angle (°)	70	70	65	70	65	70	70	75	70	70
Inter-Ramp Angle (°)	40	39	38	38	37	40	40	45	43	43
Maximum inter-Ramp Height (m)	90	90	90	90	90	90	90	90	90	90
Catch Berm Width (m)	25	30	30	25	30	25	25	25	25	25
OSA	**40**	**38**	**37**	**38**	**36**	**37**	**40**	**42**	**42**	**42**

Source: Equinox Gold.

Table 16-4: Adjusted Bermejal Open Pit Design Guidelines—Section 1

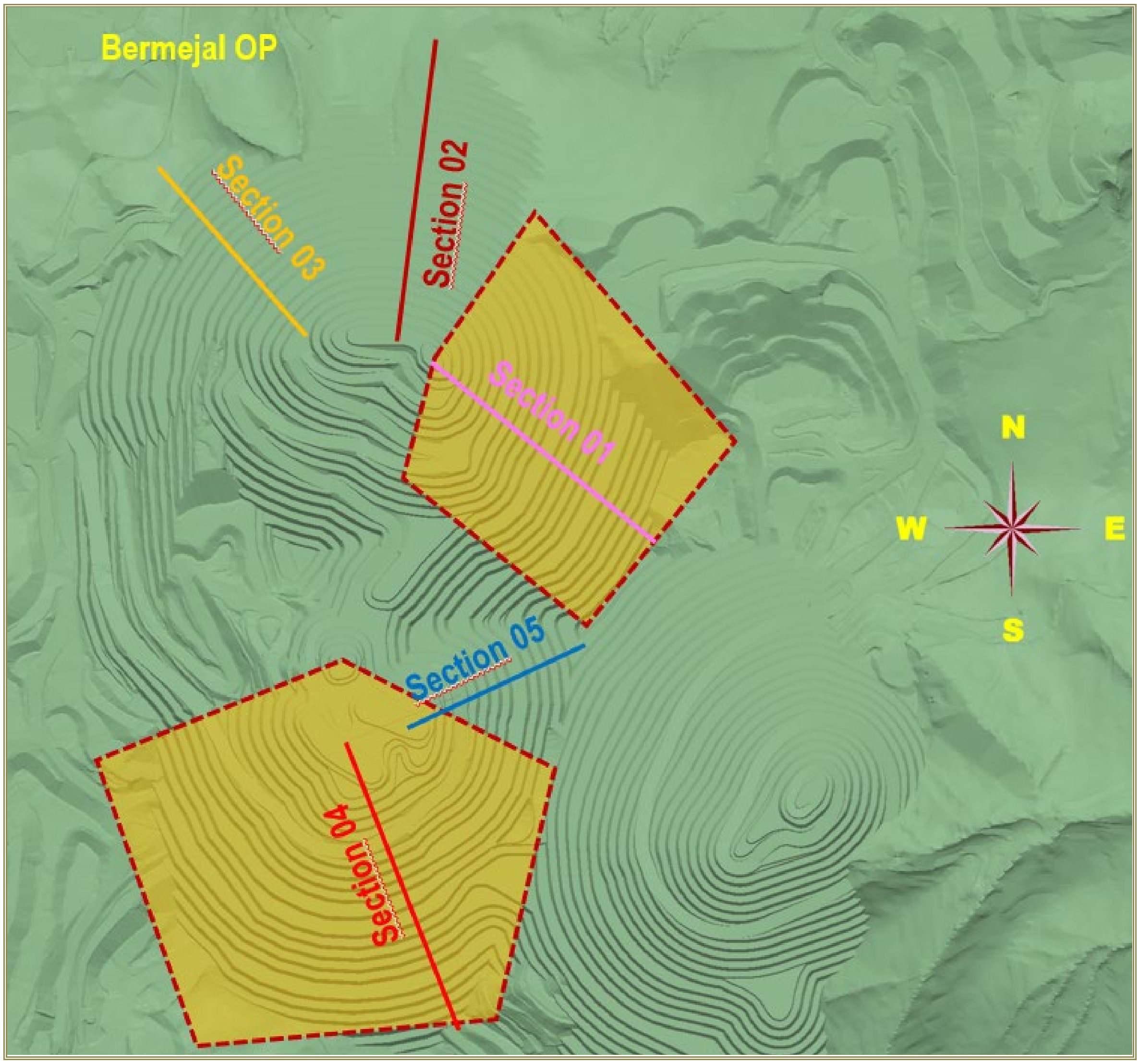
	Zone 01_Lower 30	Zone 01_Upper 37
Bench height (m)	18	18
Berm width (m)	15	15
Batter angle (°)	70	70
Inter-Ramp Angle (°)	40	39
Maximum Inter-Ramp Height (m)	90	90
Catch berm width (m) CBW	20	20
OSA	41	41

Source: Equinox Gold.

Table 16-5: Adjusted Bermejal Open Pit Design Guidelines—Section 4

	Zone 02_Lower 38	Zone 02_Upper 36
Bench Height (m)	18	18
Berm Width (m)	16	15
Batter Angle (°)	70	65
Inter-Ramp Angle (°)	38	37
Maximum Inter-Ramp Height (m)	90	90
Catch Berm Width (m) CBW	25	25
OSA	35	38

Source: Equinox Gold.



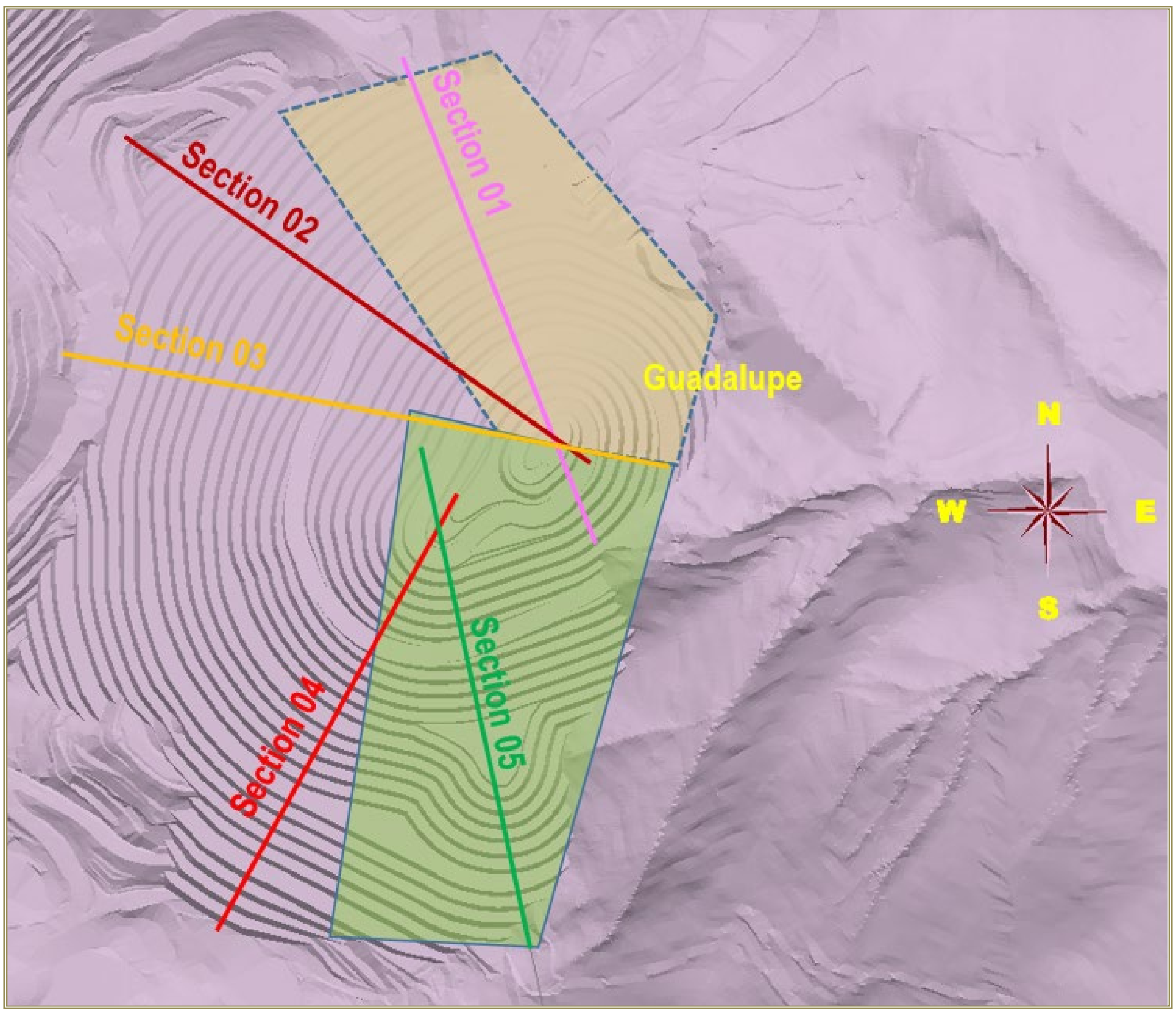
Source: Equinox Gold 2022, not to scale

Figure 16-3: Bermejal Open Pit Adjusted Regions

Table 16-6: Guadalupe Open Pit Adjusted Design Guidelines

	Design Zone 01_Lower 39	Design Zone 01_Upper 37		Design Zone 02_Lower 38	Design Zone 02_Upper 36	Design Zone 03_Upper 40		Design Zone 03_Lower 42		
Wall Direction (°)	90–180	90–135	135–180	89–180	135–180	0–90	180–270	0–160	160–270	270–300
Bench Height (m)	18	18	18	18	18	18	18	18	18	18
Berm Width (m)	15	16	15	15	15	15	15	13	13	13
Batter Angle (°)	70	70	65	70	65	70	70	75	70	70
Inter-Ramp Angle (°)	40	39	38	38	37	40	40	45	43	43
Maximum Inter-Ramp Height (m)	90	90	90	90	90	90	90	90	90	90
Catch Berm Width (m)	25	30	25	25	30	25	25	25	25	25
OSA	40	38	37	38	36	37	40	42	42	42
OSA Whittle	39	37		38	36	40		42		

Source: Equinox Gold.



Source: Equinox Gold 2022, not to scale

Figure 16-4: Guadalupe Open Pit Adjusted Regions

16.1.4 Bermejal Underground Geotechnical

CNI conducted prefeasibility and feasibility studies of the BUG project in 2017 and 2018, respectively, and developed a reasonable understanding of the geology and geotechnical conditions, and proposed sound geotechnical design criteria for mining methods, excavation dimensions, backfill requirements, ground support, and infrastructure guidelines.

Rock mass characterization was carried out based on geotechnical data of 54,900 m of cores logged during 2017 and 2018 drilling programs, and laboratory testing programs for intact and fractured rock strength properties. CNI developed a geotechnical block model using geotechnical core logging data and an interpretation of the rock mass properties for each of the lithologies. The rock mass quality (Q') block model was populated based on the Rock Quality Designation (RQD) model and assigned joint properties by geotechnical domain. In 2020, CNI updated the geotechnical block model by including 3,200 m of drill-hole data collected after 2018, as well as improved estimation techniques.

Major rock types of the BUG deposit include:

- Granodiorite—calc-alkaline granitoids modelled as a vertical intrusive body.
- Sill—bedding-parallel granitoids modelled as a flat to southwest-dipping intrusion.
- Oxide—endoskarn associated with granodiorite and sill intrusions.
- Limestones—Morelos Formation (Lower Cretaceous) limestone and dolomites.

Mineralization at BUG is contained within oxide domains along the granodiorite contact with carbonate sediments and below the sill intrusion. Mineralization along the granodiorite contact is steeply dipping and narrow, while the top and bottom contacts of the sill tend to be flat-lying and more massive, with a greater lateral extent. CNI's (2018) rock-mass classification assessment indicates that ground conditions at BUG are highly variable, ranging from extremely poor to good. Typical rock-mass conditions at BUG are poor to very poor, as commonly observed in highly altered mineralized Oxide and altered Intrusive (including both granodiorite and sill). The rock quality of the mineralized zone at Bermejal is generally weaker than that at Los Filos.

Mine Design Criteria

The mine design criteria were developed based on the geotechnical domains (Q' ranges) to guide the mining method selection, excavation dimensions, support requirements, and productivity. Given that OHDAF methodology has been successfully applied at LFUG for many years, OHDAF is selected as the primary mining method at BUG (planned for 91% of the BUG Reserves), and UHDAF is used to reduce the risk of mining in highly altered and very poor-strength mineralized Oxide domains.

The underground excavation assessment was primarily based on established practices at the LFUG operation, with some variation to account for differences in ground conditions and ore-body geometry. Excavation dimensions, as considered for the stability assessment and support design, are based on the type of excavation and ground conditions. Infrastructure development will be 5.0 m high and 5.0 m wide to accommodate large equipment. UHDAF and OHDAF excavation dimensions range in size from 3.5 m to 6.0 m wide and 4.0 m high, with a target maximum strike length of 75 m. The production area will typically be divided into 20 m-high sublevels.

Ground-Support Design

Ground-support design for BUG is based on ground control experience gained at the LFUG, with modifications to reflect the actual practice at site. Table 16-7 presents the ground support classes based on RMR ranges (where RMR = GSI is adopted at site).

BUG uses a similar ground support standard as LFUG. The ground support standard was updated in 2022 to address inadequate ground support experienced in R0 to R2 ground conditions as per 2019 standard, and reflects actual ground support practice at Los Filos. Table 16-7 provides the ground support requirement for temporary and permanent development at Los Filos.

Table 16-7: Bermejal Underground Ground Support Requirements (updated in 2022)

Support Class	Round Length (m)	Temporary Development	Permanent Development
R5 Very Good RMR = 81–100	3.5	Wire mesh 2.1 m or 2.4 m standard Swellex on 1.5 x 1.5 m spacing.	Wire mesh 2.4 m rebar (Ø16 mm) on 1.5 x 1.5 m spacing.
R4 Good RMR = 61–80	3.5	50 mm shotcrete 2.1 m or 2.4 m standard Swellex on 1.5 x 1.5 m spacing.	50 mm fibrecrete 2.4 m rebar (Ø16 mm) on 1.5 x 1.5 m spacing.
R3 Fair RMR= 41–60	3.5	50 mm fibrecrete 2.1 m mor 2.4 m standard Swellex on 1.5 x 1.5 m spacing.	50 mm fibrecrete 2.4 m rebar (Ø16 mm) on 1.5 x 1.5 m spacing, wire mesh occasionally.
R2 Poor RMR = 21–40	3.5	Wire mesh 50 mm shotcrete 2.1 m or 2.4 m standard Swellex on 1.0 x 1.5 m spacing.	Wire mesh 50 mm shotcrete 2.4 m rebar (Ø16 mm) on 1.0 x 1.5 m spacing.
R1 Very Poor RMR = 16–20	2.5	6 m spiling wire mesh 50 mm fibrecrete 2.1 m or 2.4 m standard Swellex on 1.0 x 1.5 m spacing.	6 m spiling wire mesh 50 mm fibrecrete 2.4 m rebar (Ø16 mm) on 1.0 x 1.5 m spacing shotcrete arch every 1.5 m 5 m or 7 m cablebolt (Ø16 mm) on 2.0 x 1.5 m spacing.
R0 Very Poor RMR = 0–15	2.5	6 m spiling wire mesh 50 mm fibrecrete 2.1 m or 2.4 m standard Swellex on 1.0 x 1.5 m spacing shotcrete arch every 1.5 m 5 m or 7 m cablebolt (Ø16 mm) on 2.0 x 1.5 m spacing, and 2 10 m 35° cablebolt (Ø16 mm).	6 m spiling wire mesh 50 mm fibrecrete 2.4 m rebar (Ø16 mm) on 1.0 x 1.5 m spacing, shotcrete arch every 1.5 m m or 7 m cablebolt (Ø16 mm) on 2.0 x 1.5 m spacing, and 2 10 m 35° cablebolt (Ø16 mm).

Source: Equinox Gold.

Major changes in ground support requirements for BUG and LFUG include:

- R2: Plain shotcrete and mesh is replaced with fibrecrete and mesh.
- R1: Plain shotcrete and mesh is replaced with fibrecrete and mesh. Spiling is installed prior to development. For permanent development, additional shotcrete arch and cablebolts are installed.
- R0: Additional shotcrete arch and cablebolts are installed after installation of primary support.

In July 2022, AMC conducted a site visit to inspect the ground conditions, and excavation and ground support performance, and reviewed the updated ground-support requirements. AMC proposes the following changes to optimize the ground support in order to reduce cost and improve productivity.

- Remove shotcrete requirements for SC R3 to R5. Variation of shotcrete installation can be implemented for large and permanent excavations.
- Remove mesh installation for R0 to R2 and increase fibre dosage rate to increase post-cracking capacity of fibrecrete.
- Use alternative support such as hollow-core bar in conjunction with fibrecrete, which is more effective in very-poor to extremely poor ground.
- Include requirements for face support in the standard.

Underground Backfill

Similar backfill strategies and CRF strength requirements are adopted at BUG as for LFUG. Backfill operation review and further backfill strength optimization is recommended for cost reduction.

Underground Infrastructure

Mining infrastructure at BUG includes ventilation raises and an underground mobile-equipment workshop. Ventilation raise stability was assessed using the empirical McCracken and Stacey reliability chart (1989). The rock mass condition assessment was based on the geotechnical block model, as no site-specific geotechnical drilling data were available at the time. The planned diameter of the raise-bored ventilation raises ranges from 2.1 m to 4.0 m, depending on the expected ground conditions.

The underground workshop layout and support design are based on general ground conditions. A site-specific assessment and ground support design will be required.

Hydrogeology

No hydrogeological study has been carried out for BUG. Groundwater seepage is observed more often at BUG than LFUG.

16.2 Open Pit Mining

The Los Filos Mine Complex comprises three open pit areas: LFOP, GOP, and BOP.

Open pit mining is owner-operated, with conventional drilling and blasting. Loading is currently undertaken by shovels and front-end loaders (FEL), and haulage by 136-tonne trucks. A larger mining fleet is proposed to replace the existing equipment at the end of their useful life. Benches are 9 m high with safety berms every second bench (i.e., double-benched to 18 m).

Ore (Crush) is hauled either to the crusher, for crushed heap leach, or directly to an ROM leach pad for processing. A 10,000 t/d CIL processing plant is planned to be constructed to offer an alternative processing destination starting in Q3 2024. Waste is hauled to external or in-pit waste rock dumps.

Mining is planned to span 14.5 years. The key open pit LOM highlights are:

- 982.3 Mt total material mined:
  - 180.6 Mt of ore
  - 801.7 Mt waste
  - 4.4:1 strip ratio
- Total open pit production:
  - Ore to CIL: 34.8 Mt at 1.53 g/t Au
  - Ore to Crushed leaching: 24.6 Mt at 0.67 g/t Au
  - Ore to ROM leaching: 121.2 Mt at 0.39 g/t Au
  - 2.57 Moz Au produced from open pit sources.

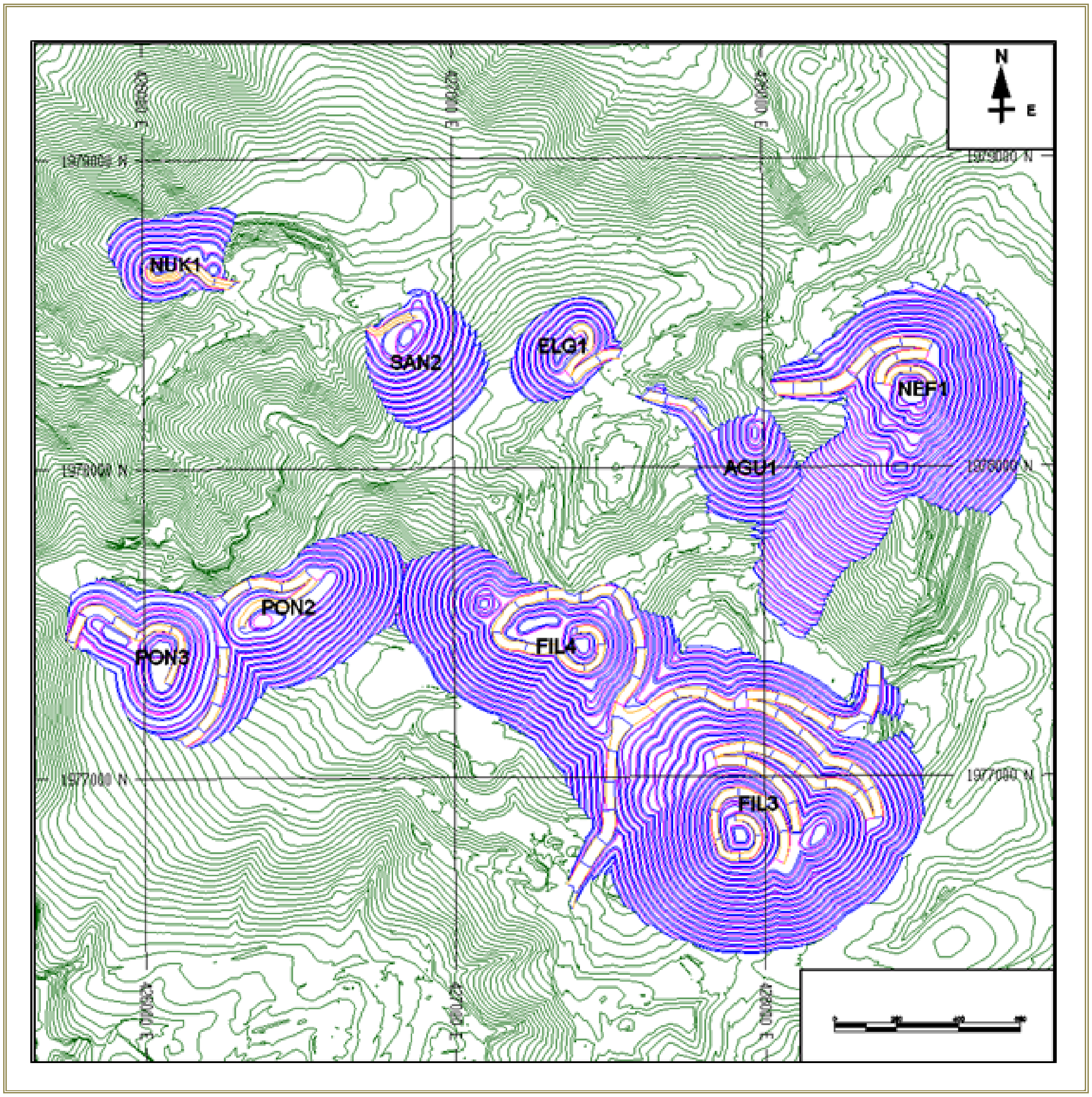
16.2.1 Mining Ore Loss and Dilution

Open pit mining ore loss and dilution parameters were assessed based on operational practices and reconciliations between the block model and production actuals. Based on these reconciliations and expected future mining conditions, mining loss and dilution for the LFOP pit area were each estimated at 7%. Similarly, for the BOP and GOP pit areas mining loss and dilution were each estimated at 5%.

16.2.2 Los Filos Open Pit Design

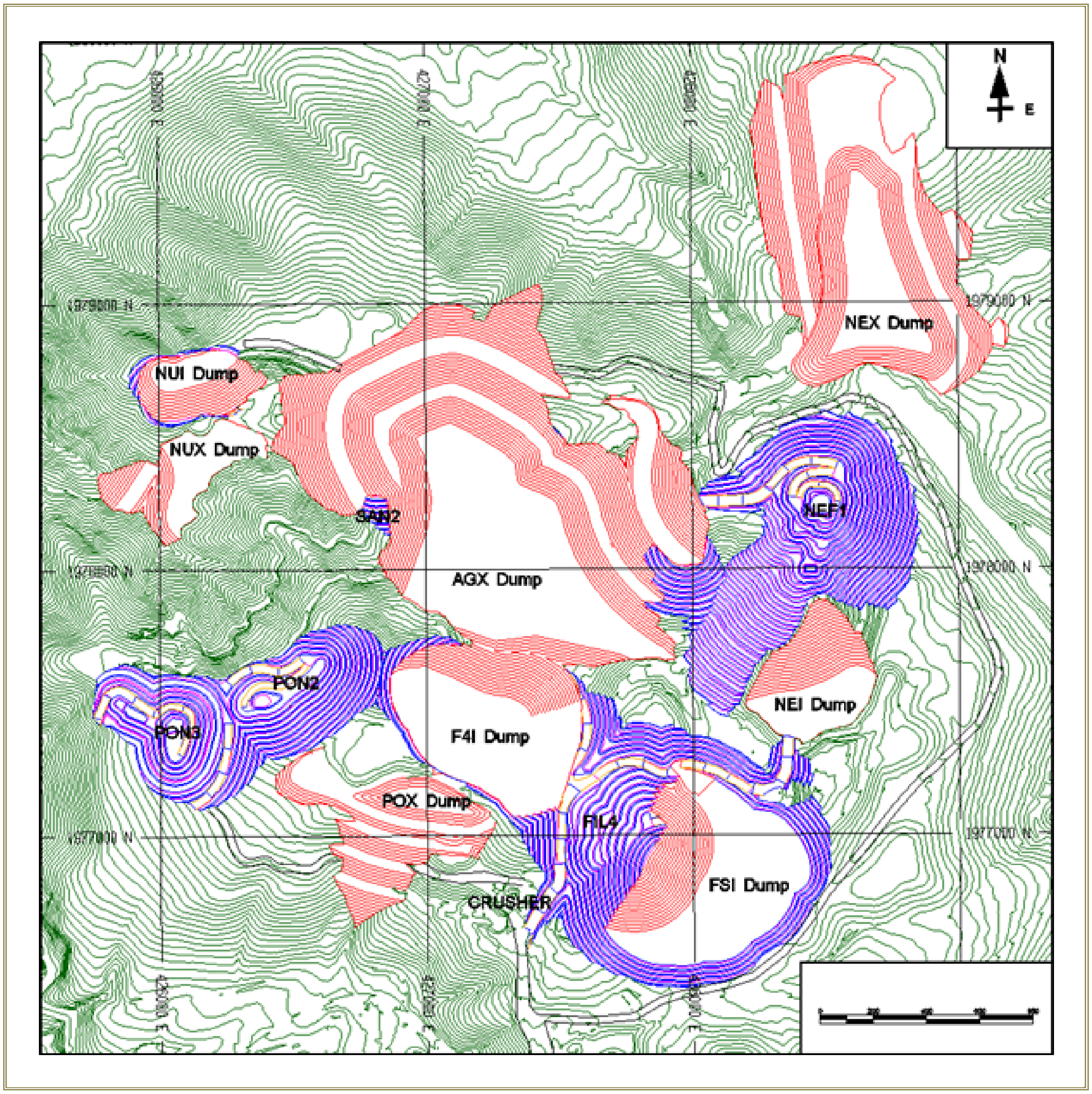
LFOP pit designs are based on the selected optimized pit shell, as discussed in Section 15.5. Pit-slope design criteria are discussed in Section 16.1.1. Production benches are designed to be 9 m high, stacked in double benches of 18 m. The standard haul road width is 27.4 m to allow two-way traffic, but is narrowed to allow only one-way traffic when extracting the lowest benches of the pit. The maximum haul road gradient is 10%; minimum mining width is 40 m.

Figure 16-5 illustrates the ultimate LFOP pit designs after backfilling.



Source: AMC (2022).

Figure 16-5: Ultimate Los Filos Open Pit Design



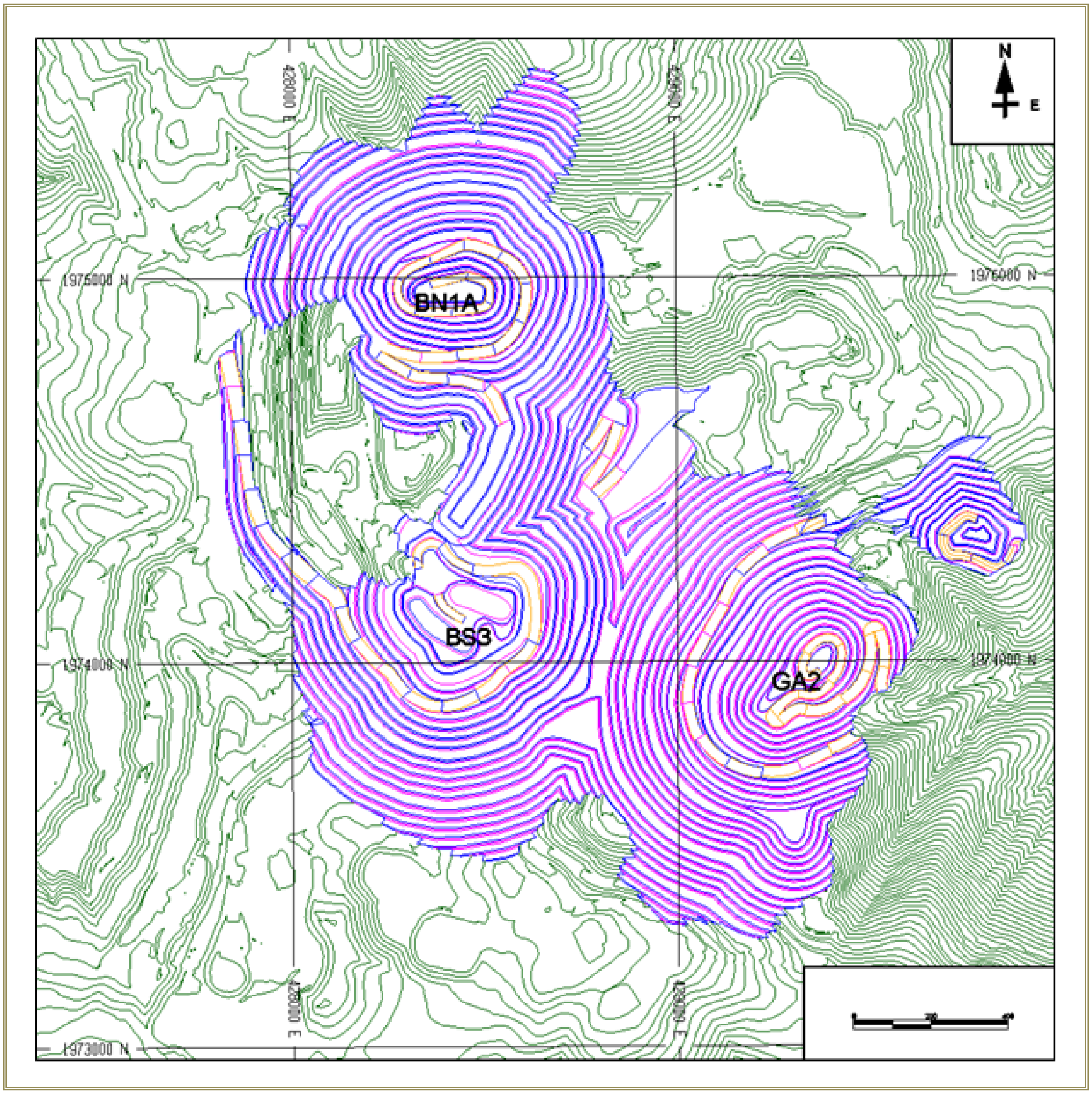
Source: AMC (2022).

Figure 16-6: Ultimate Los Filos Open Pit Design with Waste Dumps

16.2.3 Bermejal and Guadalupe Open Pit Designs

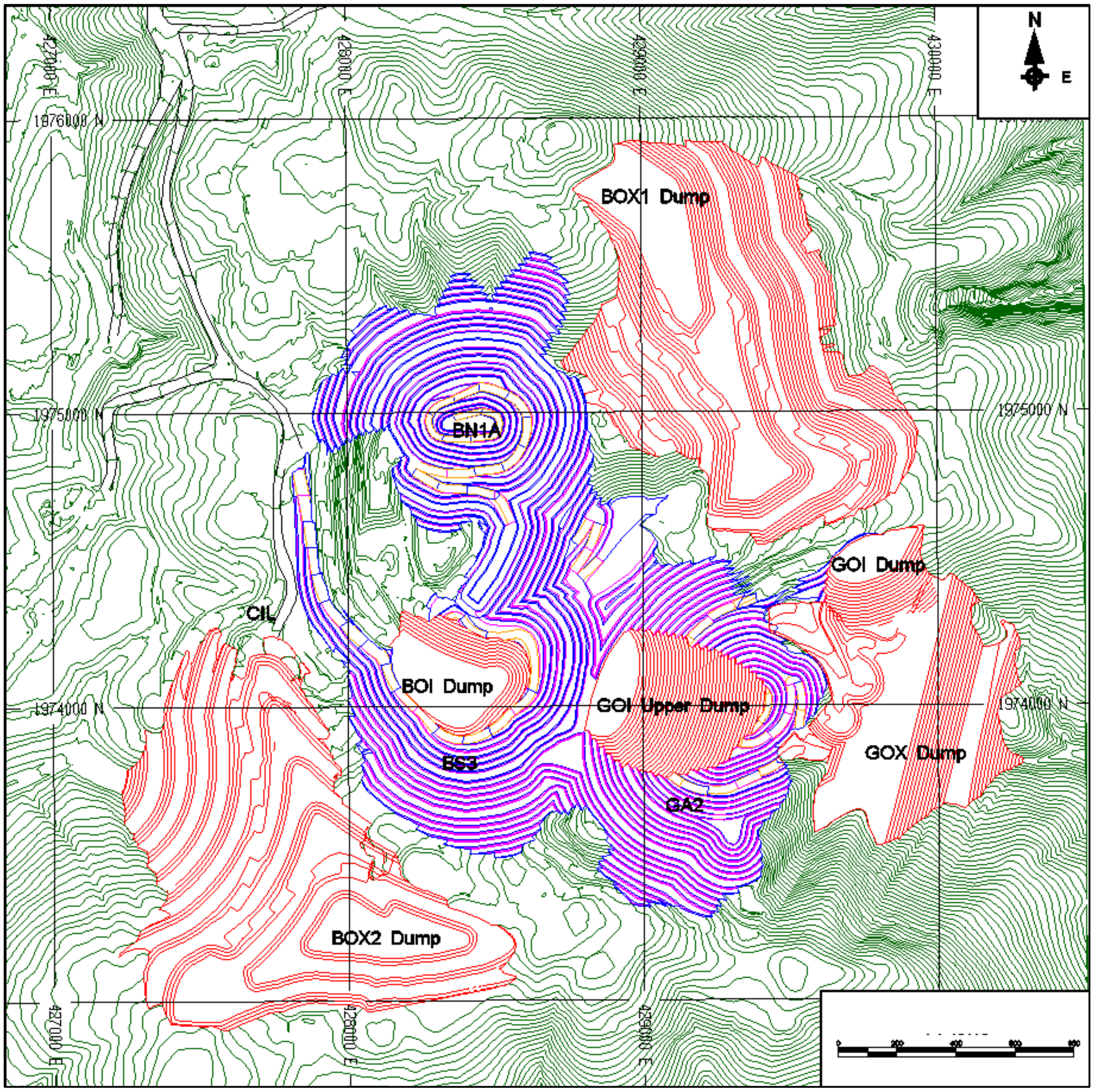
The BOP and GOP pit designs are based on the selected optimized pit shell, as discussed in Section 15.5. Pit slope design criteria are discussed in Section 16.1.1. Production benches are designed to be 9 m high and stacked in double benches of 18 m. The standard haul road width is 27.4 m to allow for two-way traffic, but is narrowed to allow only one-way traffic when extracting the lowest benches of the pit. The maximum haul road gradient is 10%; the minimum mining width is 40 m.

Figure 16-8 illustrates the ultimate LFOP pit designs after backfilling.



Source: AMC (2022).

Figure 16-7: Ultimate Bermejal and Guadalupe Open Pit Designs



Source: AMC (2022).

Figure 16-8: Ultimate Bermejal and Guadalupe Open Pit Designs with Waste Dumps

16.2.4 Mining Footprint

AMC generated an ultimate pit design with a surface footprint of approximately 1,124 ha. A breakdown of surface area by mining area is presented in Table 16-8.

Table 16-8: Surface Footprint by Open Pit Mining Area

Mining Area	Surface Footprint (ha)
LFOP	265
BOP	138
GOP	721
Total	**1,124**

16.2.5 Drill and Blast

Production blast holes are drilled on a 9 m bench using 171.5 mm-diameter holes and 0.5 m of subdrill. All ore and waste material requires blasting, with the exception of the old dumps mined out in Northeast Filos (NEF1). Current practices are to blast waste at the same powder factor as ore, providing sufficient fragmentation for the installed and planned crushing equipment. As the mine moves to a truck-constrained operation and larger loading equipment, the level of fragmentation in waste becomes less critical, and powder factor is reduced by 5%; this occurs from 2024. Blast pattern designs for ore and waste are presented in Table 16-9.

Production drilling is completed by an existing fleet of Epiroc DM45, Cat MD6290, and Sandvik Di650 drills.

Explosives used for production blasting are a combination of ammonium nitrate mixed with fuel oil (ANFO) and bulk emulsion. Dufil SA DE CV provides explosives loading services on a contract basis. Crushed rock is used for stemming, and is loaded by a skid steer loader. The contract service only relates to explosive loading, with the explosives magazine owned and managed by Equinox Gold.

Table 16-9: Blast Pattern Design

Description	Unit	Ore	Waste(1)
Bench Height	m	9	9
Hole Diameter	m	171.5	171.5
Burden	m	4	4.5
Spacing	m	5	5
Burden/Stiffness Ratio		2.25	2
Spacing/Burden Ratio		1.25	1.11
Charge Length	m	4.5	4.5
Stemming Height	m	3.75	5
Air Deck	m	1.25	0
Powder Factor	kg/m^3	0.55	0.52
Charge Weight/Hole	kg/hole	98.8	106.7

Note: [1] Waste pattern shown is for 2024 to end of mine life.

16.2.6 Grade Control

On-site grade control consists of production blasthole sampling. Single samples per bench are recovered and assayed to guide the mark-up of ore zones in the field.

16.2.7 Dust Control

Dust is generated primarily at digging faces and along sections of haul roads in active use. A Cat 769 and Cat 773 class water truck are in constant service to control on-site dust.

16.2.8 Waste dump design

AMC generated designs for external and in-pit waste dumps. Current practice at Los Filos is to construct waste dumps in small lifts from the bottom up or top down in different areas of the property. AMC completed a review of waste-dump designs and provided waste-dump design criteria to allow for the safe construction of waste dumps using a combination of buttresses and larger lifts. In-pit dumps within mined-out pit areas will be dumped from elevation with no buttress required. The design criteria used for external waste rock dumps are shown in Table 16-10.

Table 16-10: External Waste Dump Criteria

Parameter	Unit	Value
Lift Height	m	70–100
Face Angle	°	37
Berm Width	m	40
Ramp Width	m	27.4
Ramp Gradient	%	10

These design criteria were adopted from CNI's (2011) dump foundation assessments and back analysis of existing waste dumps in the Bermejal North area. Stability analysis of the proposed designs were completed.

The following general observations are applicable to the stability analysis:

- Dump faces will adjust to dump material's angle of repose (i.e., friction angle of the material in that state).
- The designs have assumed an angle of repose of 37°, which is applicable to uncompacted clean rockfill; however, the Los Filos material may probably adjust to a slightly lower angle.
- The shear strengths used in the analysis are conservative; therefore, a target FOS ≥1.2 for static and ≥1.0 for seismic loading are reasonable and achieved for all sections.
- The reason for FOS <1.0 observed for some lifts under seismic loading is due to the conservative shear strength parameters used in the analysis. When the lift-face angle is reduced to match the friction-angle used in the analysis, the FOS increases to ≥1.0.
- Even if some surface sloughing occurs under seismic loading, the berm width is adequate to retain indicated slough volumes.

The stability assessment of the ex-pit dumps indicates that the planned dumps meet the target FOS under static and pseudo-static modelling. The dumps can be safely constructed under the assumed conditions by adopting the following recommendations:

- Lift heights should be limited to ≤100 m.
- 40 m berm width between layers should be maintained.
- Effective surface water management practices should be in place to divert surface water.
- As much as possible dump head should be maintained parallel to topographic contour and concave crest orientation.
- During construction and post-construction dumps should be monitored regularly.

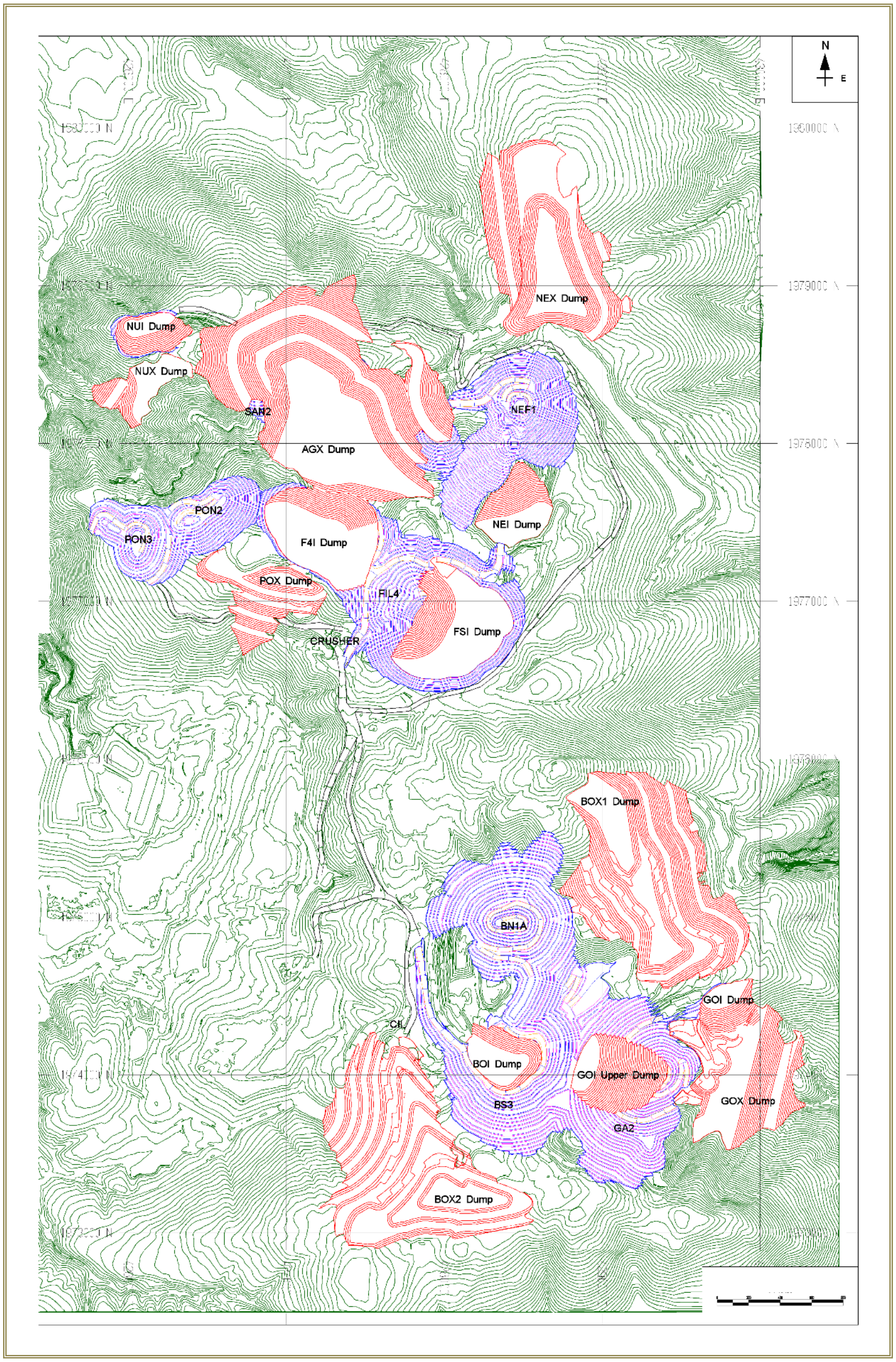
AMC has used a swell factor of 25% when converting in situ volumes to bulk and placed volumes for evaluating the capacity of stockpiles and waste rock dumps. The swell factor was reconciled with performance of existing waste dumps at the mine. The design capacity of the waste dumps is summarized in Table 16-11.

Table 16-11: Waste Dump Design Capacities

Waste Dump	Volume (Mm^3 loose)
Nukay Expit (NUX)	3.9
Aguita Expit (AGX)	108.0
Northeast Filos Expit (NEX)	63.3
Poniente Expit (POX)	7.6
Nukay Inpit (NUI)	4.2
Northeast Filos Inpit (NEI)	12.7
Filos South Inpit (FSI)	13.3
Filos 4 Inpit (F4I)	35.3
Northeast Bermejal Expit (BOX1)	55.2
Southwest Bermejal Expit (BOX2)	34.0
Guadalupe Expit (GOX)	21.0
Bermejal Inpit (BOI)	9.0
Guadalupe Inpit (GOI)	14.4

16.2.9 General Layout

The general site layout is shown on Figure 16-9.



Source: AMC (2022).

Figure 16-9: Layout of Open Pit Infrastructure

16.2.10 Strategic Mine Plan

Three high-level production schedules were developed to compare various operational and processing scenarios to determine the ultimate strategy for the project. The Minemax Scheduler 6 software package was used to prepare the LOM schedules. Minemax seeks to maximize the discounted operating cash flows while honouring constraints relating to processing and mining inputs. Ore destinations are selected based on the highest block value of each process, as well as their ability to meet process feed targets.

The parameters common to all scenarios are as follows:

- Scheduled on quarterly periods from July 2022 until December 2023, and in annual periods for the remainder of the LOM.
- Process throughput of maximum 10,000 t/d and specific grinding energy of maximum 67.89 MWh for CIL, maximum 5 Mt/a for Crushed heap leach, and maximum 13.45 Mt/a for ROM heap leach.
- The underground schedule is fixed, and the open pit makes up the difference to process feed. Underground ore is direct-fed to Crushed heap leach; once the CIL circuit becomes available, underground ore will be fed there, instead.
- 100% direct ore-feed (no long-term stockpiling).
- Vertical advance rate of maximum 16 benches (144 m) per year as per current site performance.
- In-pit dumping can start right after the ultimate pit is mined out.
- Discount rate of 5%.

The following scenarios were assessed:

- Scenario A: CIL process starting from July 2024.
- Scenario B: CIL process starting from January 2026.
- Scenario C: Crushed and ROM heap leach only (no CIL).

AMC developed Scenario A, with Scenarios B and C completed by Equinox Gold. For the purposes of comparing the initial scenarios, high-level economic assessments were generated, including indicative discounted cash flows. The indicative cash flows include preliminary operating mining and processing costs, capital expenses, and sustaining capital costs.

The summary results of the three strategic schedules are presented in Table 16-12.

Table 16-12: Initial Scenarios Results Comparison

Scenario	Description	Cash Flow LOM $1,450/oz Au ($M)	NPV $1,450/oz Au ($M)	NPV $1,700/oz Au ($M)	End of Mine Life	Ore OP (Mt)	Ore UG (Mt)	Total Ounces Produced (koz)	Total HL Feed (Mt)	Total CIL Feed (Mt)
A	CIL from July 2024	430	231	681	2036	181	12	3,976	148	45
B	CIL from January 2026	399	207	640	2036	178	12	3,847	151	40
C	Crushed and ROM heap leach only (No CIL).	150	89	420	2032	150	11	2,802	161	0

Scenario A maximizes project value and was used as guiding strategy to develop the detailed production schedule. Scenario A was used as guiding strategy to develop the detailed production schedule.

16.2.11 Production Schedule

AMC completed a detailed mine plan using Hexagon Mining's Atlas software. The mine plan starts in July 2022, with mining operations extending over 14.5 years.

A detailed monthly production schedule was generated for July 2022 through December 2023, followed by quarterly schedules for two years, and annual schedules thereafter, to ensure mining practicality and to maintain ore feed throughout the year.

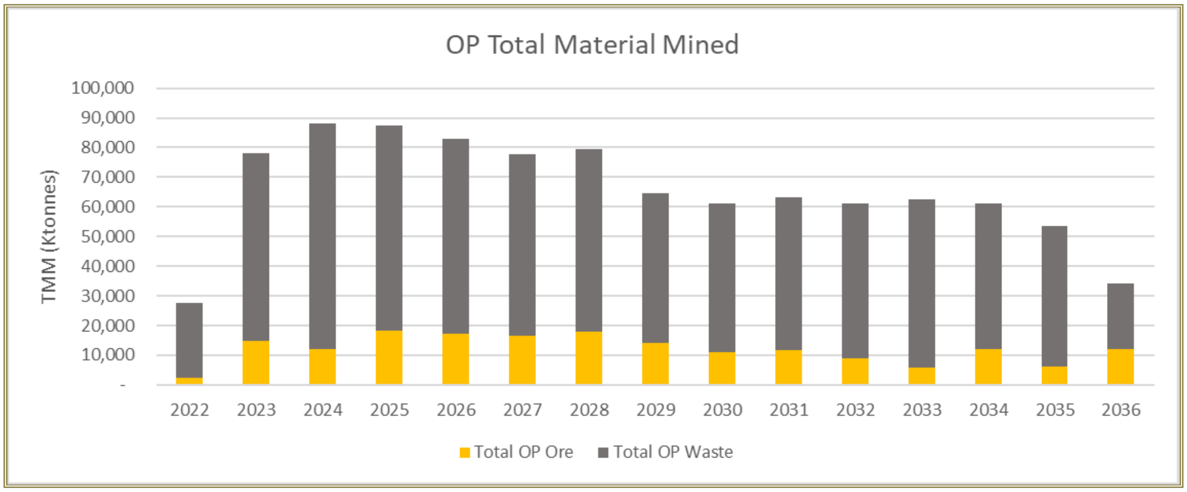
The total annual ex-pit material movement peaks in 2024 at 88 Mt/a, drops progressively to 68 Mt/a in 2029, maintains 62 Mt/a from 2030 to 2035, then drops until the end of mine life in 2036. The production schedule is summarized in Table 16-13.

Table 16-13: Open Pit Production Schedule

Year	Total Ore (Mt)	Total Waste (Mt)	Total Mined (Mt)	Strip Ratio (Mt)	Ore				Waste			
					GOP (Mt)	BOP South (Mt)	BOP North (Mt)	LFOP (Mt)	GOP (Mt)	BOP South (Mt)	BOP North (Mt)	LFOP (Mt)
2022[1]	2.38	25.38	27.76	10.6	0.46	-	-	1.92	5.20	-	-	20.18
2023	14.89	63.23	78.13	4.2	0.77	-	-	14.12	8.38	-	-	54.86
2024	12.17	75.81	87.98	6.2	2.41	-	-	9.76	13.33	0.84	-	61.64
2025	18.18	69.33	87.50	3.8	5.00	2.97	-	10.20	11.06	6.18	-	52.08
2026	17.24	65.57	82.82	3.8	-	7.20	-	10.05	0.28	30.65	-	34.64
2027	16.57	61.06	77.63	3.7	1.58	4.62	-	10.37	14.35	11.15	-	35.56
2028	17.79	61.55	79.34	3.5	2.67	3.44	-	11.68	29.02	2.01	-	30.52
2029	13.97	50.49	64.46	3.6	3.46	-	-	10.51	18.65	-	-	31.84
2030	10.88	50.40	61.28	4.6	3.46	-	-	7.42	0.72	-	-	49.68
2031	11.79	51.44	63.23	4.4	-	-	-	11.79	-	-	-	51.44
2032	8.84	52.36	61.21	5.9	-	0.04	-	8.80	-	9.97	-	42.39
2033	5.80	56.65	62.46	9.8	-	2.40	-	3.41	-	24.85	-	31.80
2034	11.96	49.03	61.00	4.1	-	9.44	0.13	2.40	-	13.69	10.73	24.61
2035	6.18	47.37	53.55	7.7	-	2.63	3.55	-	-	0.88	46.49	0.00
2036	11.97	22.04	34.00	1.8	-	-	11.97	-	-	-	22.04	-
Grand Total	**180.63**	**801.72**	**982.35**	**77.7**	**19.82**	**32.73**	**15.65**	**112.43**	**100.99**	**100.23**	**79.25**	**521.25**

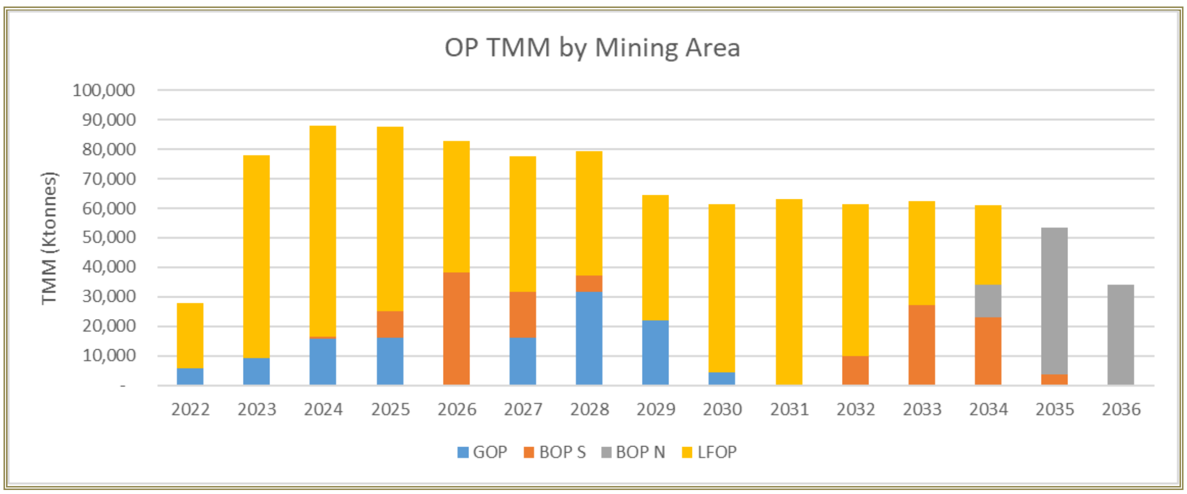
Note: [1] Includes only July through December.

Figure 16-10 shows the annual open pit production schedule graphically and Figure 16-11 summarizes the mining sequence by mining area LFOP, BOP South (BOP S), BOP North (BOP N), and GOP.



Source: AMC (2022).

Figure 16-10: Annual Total Open Pit Material Mined



Source: AMC (2022).

Figure 16-11: Annual Total Open Pit Material Mined by Mining Area

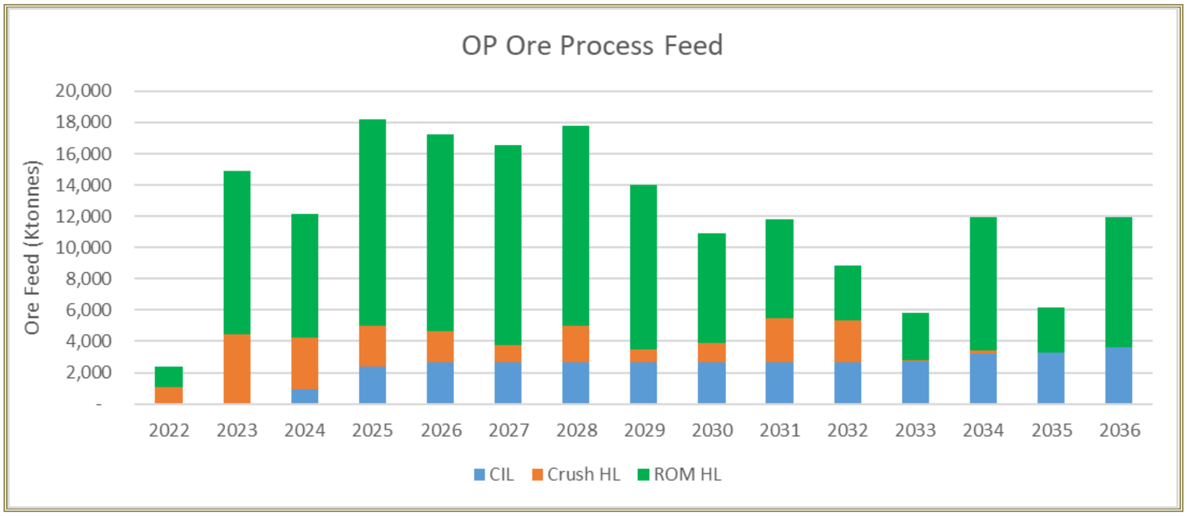
The mining sequence of the 21 pushbacks and the tonnes mined in each pushback, are summarized in Table 16-14.

Table 16-14: Open Pit Mining Sequence by Pushback (Mt Mined)

Area	Pushback	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
GOP	AGU1	2.9	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	GA1	5.7	9.2	15.7	16.1	-	-	-	-	-	-	-	-	-	-	-
	GA2	-	-	-	-	0.3	15.9	31.7	22.1	4.2	-	-	-	-	-	-
BOP S	BS1	-	-	0.8	9.2	-	-	-	-	-	-	-	-	-	-	-
	BS2	-	-	-	-	37.8	15.8	5.5	-	-	-	-	-	-	-	-
	BS3	-	-	-	-	-	-	-	-	-	-	10.0	27.2	23.1	3.5	-
BOP N	BN1A	-	-	-	-	-	-	-	-	-	-	-	-	10.9	50.0	34.0
LFOP	ZO70	19.2	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIL0	-	33.9	7.6	0.4	-	-	-	-	-	-	-	-	-	-	-
	FIL1		13.2	30.2	11.8	7.3	-	-	-	-	-	-	-	-	-	-
	FIL2		4.3	20.0	44.3	22.7	30.4	-	-	-	-	-	-	-	-	-
	FIL3						15.5	38.4	18.9	-	-	-	-	-	-	-
	FIL4								18.3	26.1	17.8	-	-	-	-	-
	ELG1			12.3	-	-	-	-	-	-	-	-	-	-	-	-
	NUK1					12.6	-	-	-	-	-	-	-	-	-	-
	NEF1	-	-	-	-	-	-	-	-	27.5	45.5	33.3				
	PON1	-	-	-	5.8	2.1	-	-	-	-	-	-	-	-	-	-
	PON2	-	-	-	-	-	-	-	-	-	-	17.8	28.8	-	-	-
	PON3	-	-	-	-	-	-	-	-	-	-	-	6.4	27.0	-	-
	SAN1	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-
	SAN2	-	-	-	-	-	-	3.8	8.7	-	-	-	-	-	-	-

16.2.12 Process Feed Schedule

Figure 16-12 summarizes the annual open pit ore feed by process. The schedule was developed considering the underground ore feed as fixed and the open pit ore making up the difference to achieve the total process feed. There are no long-term stockpiling or ore-reclaiming requirements.

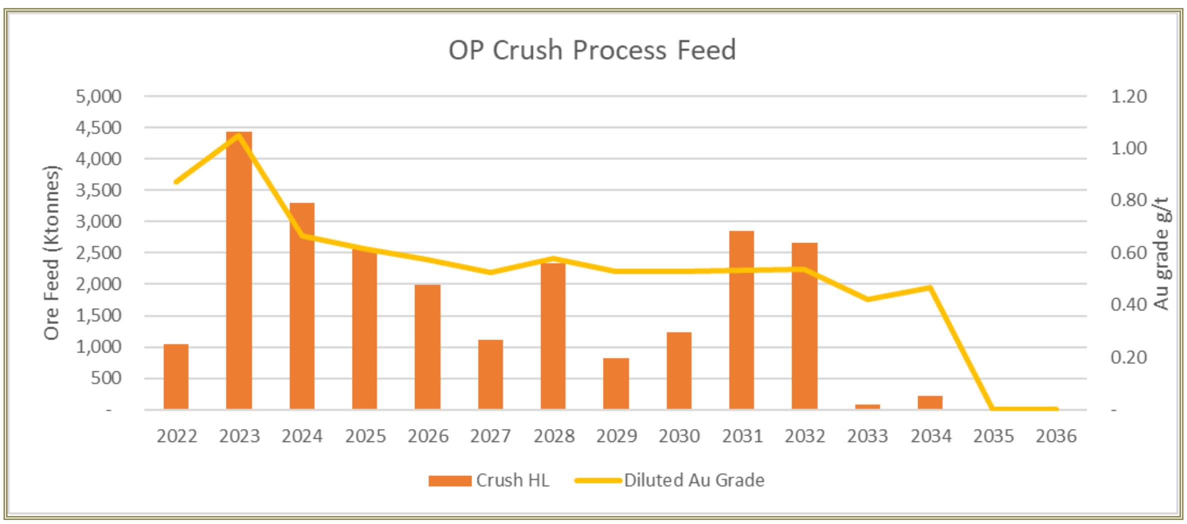


Source: AMC (2022).

Figure 16-12: Annual Ore Process Feed by Process—Open Pit

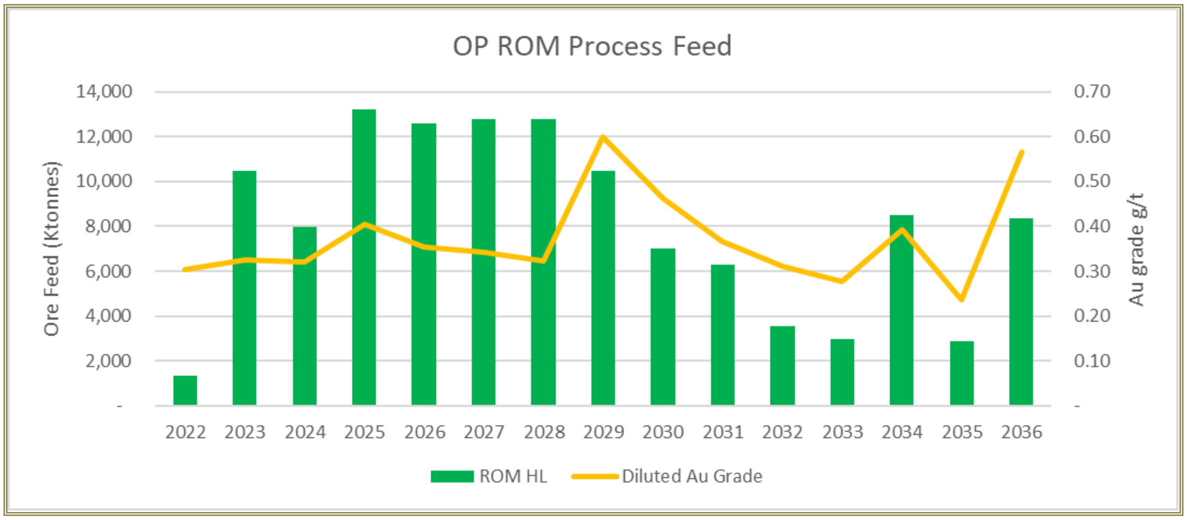
16.2.13 Heap Leach Feed

Figure 16-13 and Figure 16-14 show the process feed of Crushed heap leach and ROM heap leach feed, respectively.



Source: AMC (2022).

Figure 16-13: Crushed Heap Leach Process Feed Schedule—Open Pit



Source: AMC (2022).

Figure 16-14: ROM Heap Leach Process Feed Schedule—Open Pit

16.2.14 CIL Feed

The CIL feed schedule includes the following CIL process-plant ramp-up:

- 60% capacity in Month 1 of operation
- 75% capacity in Month 2 of operation
- 85% capacity in Month 3 of operation
- 90% capacity in Months 4 and 5 of operation
- 100% capacity from Month 6 of operation.

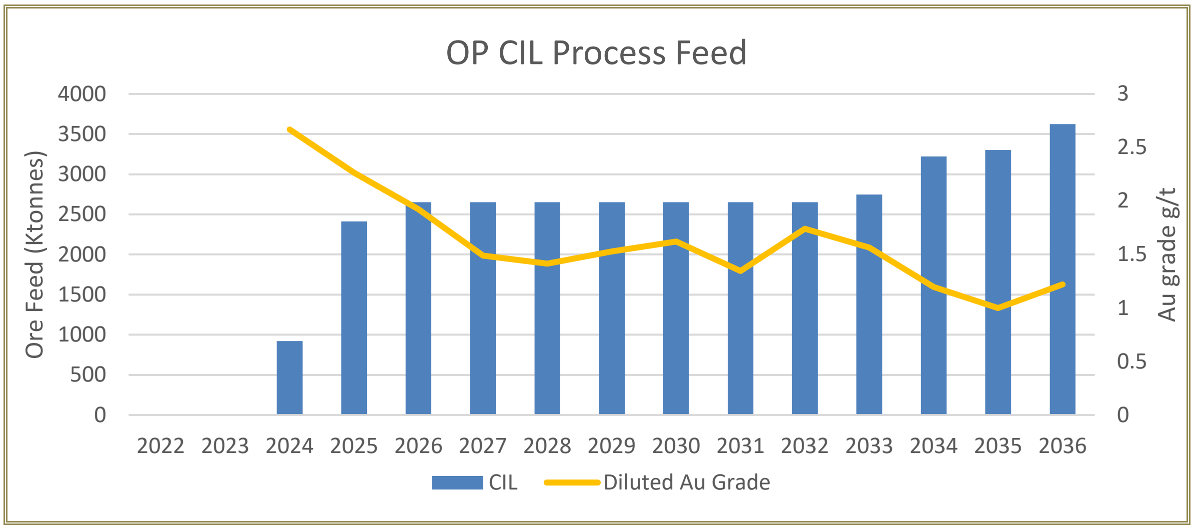
The CIL plant throughout during its ramp-up period in 2024 is 1.5 Mt. The yearly CIL throughput from year 2025 is 3.65 Mt/a (10,000 t/d). The P_{80} 106 µm specific grinding energy was also considered in the CIL process feed schedule, at 67.9 MWh maximum per annum. Table 16-15 shows the grinding energy used, by mining area and material type.

Table 16-15: Specific Grinding Energy

Mining Area—Material Type	P_{80} 106 µm Grinding Energy (kWh/t)
BOP Oxide	15.8
BOP Intrusive	22.7
BOP Carbonate	9.2
GOP Oxide	16.4
GOP Intrusive	17.9
GOP Carbonate	12.4
LFOP Oxide	14.2
LFOP Intrusive	17.2
LFOP Carbonate	10.4

Mining Area—Material Type	P_{80} 106 µm Grinding Energy (kWh/t)
BUG Oxide	15.9
BUG Intrusive	13.5
BUG Carbonate	12.0
LFUG Oxide	16.7

Figure 16-15 shows the annual ore feed from open pit to CIL process.



Source: AMC (2022).

Figure 16-15: CIL Process Feed Schedule—Open Pit

16.2.15 Mine Fleet

Table 16-16 shows the existing open pit mining equipment owned by Equinox Gold, and shared amongst the Los Filos, Bermejal, and Guadalupe open pits.

Table 16-16: Current Mining Equipment, Open Pit

Open Pit Equipment	Quantity
136 t Haul Trucks—Cat 785	33
15 m^3 Shovels—Hitachi EX2500	4
Front Loaders	1 x Cat 994; 1 x Cat 993; 2 x Cat 992
Blasthole Drills	8 x DM45; 1 x MD6290; 2 x DI650
Bulldozers	3 x Cat D10; 2 x Cat D9; 2 x Cat D8
Wheel Dozers	3
Graders	4
Water Trucks	4

The size and match of different equipment fleets were evaluated to determine the preferred fleets to replace the existing Cat 785 trucks, Hitachi EX2500 shovels, and Cat 994 loaders when they reach their equipment life.

A range of truck and loading-equipment fleets was evaluated to assess the costs and production capacities of the production sets. Key criteria assessed were:

- Capital and operating costs
- Match of loading units and truck fleets.

Size of the equipment relative to the existing fleet, and the effects of safety, production, and costs of operating a mixed fleet with the current equipment. Table 16-17 summarizes the results of the mine fleet review.

Due to the similar size (small change to road width) to the existing Cat 785 truck fleet and the improved operating speeds on grade, Komatsu 730Es were selected for the new truck fleet. The Komatsu PC4000 was the best match for the 730E truck fleet, providing the best combination of production performance and costs of the loading units reviewed. The combined PC4000 shovel and 730E truck fleet will move the majority of the material for the LOM.

With respect to FEL replacement options, the Letourneau L-1350 loader provided the best combination of productive capacity and costs of the loaders reviewed. However, this unit was not selected, as it would add a single loader of a different fleet, requiring additional spares and a different skill set to maintain than the existing fleets. For this reason, the Cat 994 loader was selected.

Table 16-17: Mine Fleet Review

		Truck				
		130-t Class	180-t Class		220-t Class	
		Cat 785	Cat 789	Komatsu 730E	Komatsu 830E	Cat 793
Loader	Cat 934				Requires high lift, at maximum end of capabilities	
	Komatsu WA1200					
	Komatsu WE1350			Similar cost per tonne to Cat 994 with lower capital cost and higher productivity.		
Primary Shovel	Cat 6040	Cat 785 same capital cost as Komatsu 730E.	Cat 789 higher capital and operating cost than Komatsu 730E.	Cat 6040 higher capital and operating costs than Komatsu PC4000 (equivalent shovel).	No significant cost savings evident for scaling up truck class.	
	Komatsu PC4000	Cat 785 same capital cost as Komatsu 730E.	Cat 789 higher capital and operating cost than Komatsu 730E.	Recommended. Optimum shovel for bench height and lowest cost per tonne.	No significant cost savings evident for scaling up truck class.	
	Komatsu PC5500	Requires increase in bench height. At lower end of truck/shovel productivities.	Requires increase in bench height and minimum mining width.		Requires increase in bench height, minimum mining width and ramp widths.	

To provide flexibility to the mining operation and backup to the PC4000 shovel fleet, a loader of sufficient size will be maintained in the Los Filos pit area and in the combined Bermejal and Guadalupe pit areas. At the start of the schedule the existing Cat 993 and Cat 994 loaders will serve this purpose. At the end of 2029, when the Cat 785 fleet will be used only in limited capacity, a second Cat 994 loader will be purchased. In 2033 a Cat 994 loader will reach the end of its useful life and will not be replaced; at this point the fourth PC4000 in the fleet will be used as a backup loading unit in the Bermejal pit area.

AMC estimated equipment requirements based on the production schedule. Table 16-18 summarizes the average yearly productivities of trucks and excavators.

Table 16-18: Load and Haul Productivity Inputs

Input	Unit	Hitachi EX2500 Cat 785	Cat 994 Cat 785	Komatsu PC4000 Cat 785	Cat 994 Komatsu 730E	Komatsu PC4000 Komatsu 730E
Shift						
Days per Year		365	365	365	365	365
Hours per Day		24	24	24	24	24
Shift Time	h	12	12	12	12	12
Shifts per Day		2	2	2	2	2
Downtime	d	11	11	11	11	11
Working Days per Year	d	354	354	354	354	354
Calendar Time	h	8,496	8,496	8,496	8,496	8,496
Truck Type		Cat 785	Cat 785	Cat 785	Komatsu 730E	Komatsu 730E
Truck Payload	t	132	132	132	177	177
Truck Availability	%	85	85	85	85	8
Truck Utilization	%	65.4	65.4	65.4	65.4	65.4%
Productive Truck Hours		5,557	5,557	5,557	5,557	5,557
Excavator Type		Hitachi EX2500	Cat 994	Komatsu PC4000	Cat 994	Komatsu PC4000
Bucket Size	m^3	15.0	18.0	23.0	18.0	23.0
Fill Factor	%	90	90	90	90	90
Bucket Load	t	28.7	34.4	43.9	34.4	43.9
Passes per Truck		5	4	3	6	4
Load Time per Truck	sec	150	120	90	160	120
Waiting/Delay Time	sec	30	48	30	48	30
Excavator Availability	%	85	85	85	85	85
Excavator Utilization	%	65.3	66.1	65.3	66.1	65.3
Net Operating Hours per Year	h	5,548	5,614	5,548	5,614	5,548
Efficiency Factor	%	67	67	67	71	67
Productivity per Hour	t/h	1,485	1,639	2,228	1,705	2,385
Productivity per Year	Mt/a	9.8	10.8	14.7	11.3	15.8

Haul cycles were developed based on haul profiles and manufacturers rimpull and retard curves for each truck fleet. The following maximum speeds were applied:

- Primary haul road, loaded—45 km/h
- Primary haul road, empty—45 km/h
- On-bench/on-lift—20 km/h.

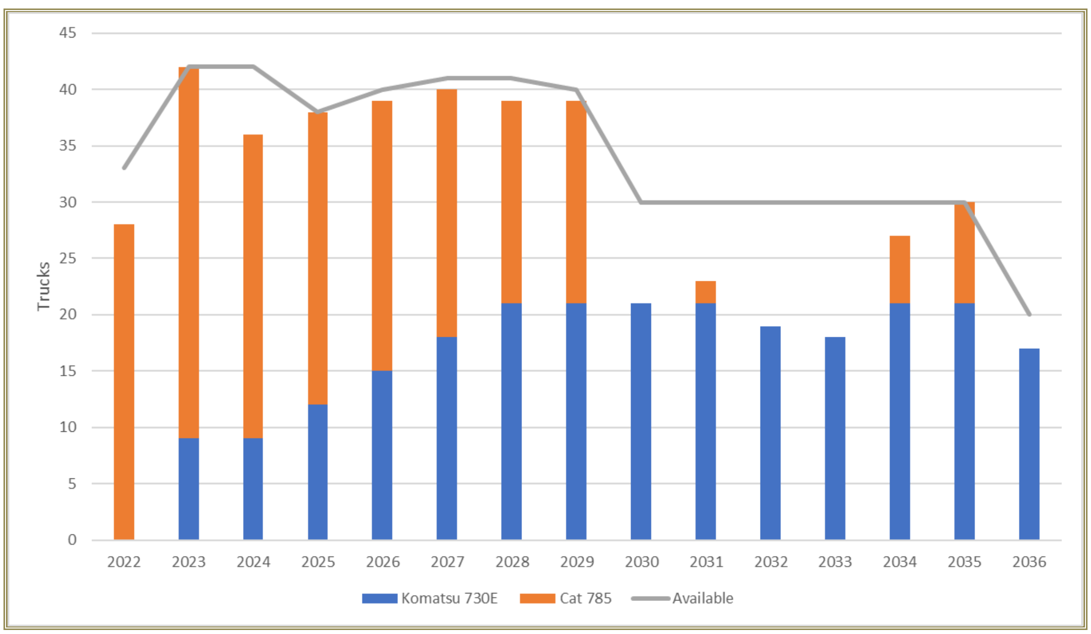
The cycle times generated were compared to actual achieved speeds at site in similar conditions and found to be within 3% of loaded speeds achieved currently at Los Filos. When the empty speeds were compared, a larger variation was identified. The empty speeds achieved at site were found to be low compared to industry standards, which was identified as an area for improvement. AMC accounted for reasonable speed improvements in the calculation of the empty cycle times.

The average haul distances used in the schedule are summarized in Table 16-19.

Table 16-19: Average Haul Distances by Destination and Year

	Unit	Avg.	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Mine to Crushed HL Process	km	3.2	3.7	2.6	3.2	2.1	2.8	2.5	2.1	3.9	2.4	4.0	5.9	2.3	2.5	-	-
Mine to ROM HL Process	km	6.3	5.6	5.6	5.6	5.7	6.9	7.0	6.3	7.0	6.4	7.0	8.7	5.0	5.7	5.4	5.7
Mine to CIL Process	km	5.2	-	-	5.5	4.9	6.7	5.6	5.1	6.2	5.4	5.4	7.9	3.5	4.7	3.4	4.4
Waste Dumps	km	2.3	2.6	3.1	2.7	2.7	3.2	3.7	4.0	5.0	2.5	2.2	1.7	1.9	2.9	4.0	3.5

The resulting number of trucks required and available are shown on Figure 16-6. The minimum number of trucks was estimated based on 5,557 operating truck-hours per year.



Source: AMC (2022).

Figure 16-16: Trucks Required and Available

The mining fleet AMC recommended is listed in Table 16-20.

Table 16-20: Recommended Mining Fleet (Numbers Required)

Fleet	Current	2028	Maximum
Hitachi EX2500 Shovel	4	0	4
Komatsu PC4000 Shovel	0	4	4
Cat 994 Loader	1	1	2
Cat 993 Loader	1	1	1
Cat 992 Loader	2	0	2
Cat 785 Haul Truck	33	18	33
Komatsu 730E Haul Truck	0	21	21
DM45 Drill	8	9	10
MD6290 Drill	1	0	1
DI650 Drill	2	2	2
Cat D10 Dozer	3	2	3
Cat D9 Dozer	2	2	2
Cat D8 Dozer	2	3	3
Wheel Dozer	3	3	3
Grader	4	4	4
Water Truck	4	4	4
Tire Handler	1	1	1
Small Excavator	2	2	2
Fuel and Lube Truck	2	2	2
Light Vehicle	17	17	17

16.2.16 Fuel Consumption

Fuel requirements for the open pit mining equipment were estimated based on the mine production schedule and main fuel-consumption assumptions listed in Table 16-21. Equipment fuel-consumption was based on actual performance at the mine for the existing fleets. Future fleet fuel-consumption is based on manufacturer's information for similar load factors.

Table 16-21: Load and Haul Parameters for Fuel Consumption

Equipment	Fuel (L/h)
Shovel EX2500	200
Front-End Loader (FEL) 994	156
Excavator PC4000	240
Truck CAT 785	70
Truck Komatsu 730E	80

The annual fuel requirements for mobile equipment are summarized in Table 16-22.

Table 16-22: Fuel Requirements for Open Pit Mining Fleet

Equipment	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Trucks	ML	3.3	9.0	9.7	9.1	8.5	8.0	8.1	6.6	6.1	6.3	6.1	6.2	6.1	5.4	3.3	**200.0**
Excavators	ML	5.2	17.1	16.8	17.0	19.2	19.7	19.5	19.2	11.2	11.8	10.1	9.1	13.5	14.7	9.0	**420.7**
Support Equipment	ML	5.7	14.4	14.9	14.7	14.2	13.9	14.0	12.3	11.3	11.7	10.9	11.1	11.9	11.4	8.6	**356.3**
Total	**ML**	**14.2**	**40.5**	**41.4**	**4.7**	**41.9**	**41.5**	**41.6**	**38.1**	**28.5**	**29.7**	**27.1**	**26.3**	**31.5**	**31.4**	**21.0**	**977.0**

16.2.17 Explosives Consumption

Drill and blast consumables are based on the production schedule, and are provided in Table 16-23.

Table 16-23: Drill and Blast Requirements

Blast Requirements	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Blasted Waste Movement (kt/d)	69.5	173.2	207.7	189.9	179.6	167.3	168.6	148.0	102.5	124.1	135.7	155.2	134.3	129.8	60.4
Blasted Ore Movement (t/d)	6.5	40.8	33.3	49.8	47.2	45.4	48.7	38.3	29.8	32.3	24.2	15.9	32.8	16.9	32.8
Total Explosives per Year (t)	3,984	11,343	12,161	12,237	11,581	10,864	11,123	9,022	7,243	7,997	8,181	8,554	8,510	7,362	4,870
Downhole Detonators per Year	53,899	153,383	171,762	172,100	162,870	152,742	156,283	126,830	101,860	112,496	115,477	121,171	119,778	104,138	67,909
Surface Detonators per Year	3,593	10,226	11,451	11,473	10,858	10,183	10,419	8,455	6,791	7,500	7,698	8,078	7,985	6,943	4,527
Boosters per Year	53,899	153,383	171,762	172,100	162,870	152,742	156,283	126,830	101,860	112,496	115,477	121,171	119,778	104,138	67,909

AMC estimated that the mine will consume between 10,000 and 12,200 t/a of bulk explosives during peak production years. Blasting will be scheduled to minimize production delays due to blasting and to ensure equipment is not waiting for blasted muck.

16.2.18 Mining Personnel

Open pit personnel are shared amongst the pits based on operational requirements in each period.

The technical services team will be responsible for ensuring grade control procedures are completed ahead of mining, and generating short-, medium-, and long-term mine plans. The technical staff will provide visual spotting and survey services, and reconcile mining production to the mine plan.

Mine operations personnel will be responsible for in-pit mining activities and providing ancillary support.

AMC estimated labour requirements based on production throughput and equipment numbers at peak requirement for the open pit operations using the following assumptions:

- Three work crews working a 7-days-on, 7-days-off roster; 12 hour shifts for operators.
- 5 days on, 2 days off (residential) for national management staff.

A summary of peak requirements for mining personnel is presented in Table 16-24.

Table 16-24: Open Pit Mine Personnel Summary

Position	Department	Total No. of Units
Personnel Requirements—Total		**348**
Mine Manager	Mine Operations	1
Mine Operations Superintendent	Mine Operations	1
Mine Operations Supervisor	Mine Operations	3
Drill and Blast Superintendent	Mine Operations	1
Drill and Blast Supervisor	Mine Operations	3
Trainer	Mine Operations	2
Truck Operator	Mine Operations	135
Shovel Operator	Mine Operations	30
Track Dozer Operators	Mine Operations	33
Ancillary Operator	Mine Operations	54
Dispatch Operator	Mine Operations	3
Maintenance Superintendent	Mine Maintenance	1
Maintenance Supervisor	Mine Maintenance	1
Maintenance Senior Planner	Mine Maintenance	1
Maintenance Planner	Mine Maintenance	1
Maintenance Operator B	Mine Maintenance	15
Maintenance Operator C	Mine Maintenance	48
Maintenance Turner	Mine Maintenance	1
Chief Mine Engineer	Technical Services	1
Planning Engineer	Technical Services	4
Senior Mine Geologist	Technical Services	1
Mine Geologist	Technical Services	1
Mine Surveyor	Technical Services	3
Surveyor Assistant	Technical Services	1
Grade Control Geologist	Technical Services	1
Geotechnical	Technical Services	2
Mine Operations		**266**
Mine Maintenance		**68**
Technical Services		**14**

16.3 Los Filos Underground Mining

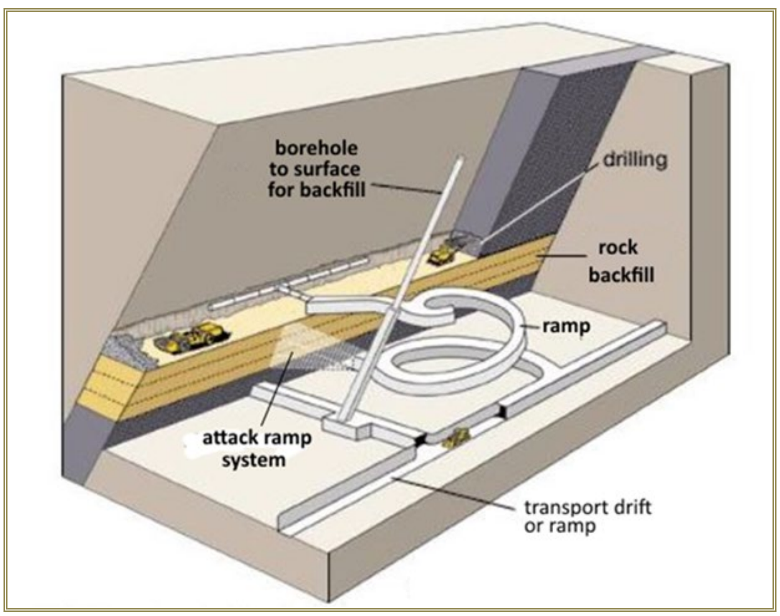
16.3.1 Mining Methods

The LFUG operations are focused on the mineralized skarn on the perimeter of the Los Filos Intrusive and are accessed by multiple portals outside of the current open pit operations. The main ramps are driven at a gradient of 12.5% and have a profile of 4.5 x 4.5 m to accommodate 10-wheel, 14 m^3-class highway dump trucks. The main ramps are in the hanging wall, in competent limestone, at a distance of 60 m to 100 m from the ore, to minimize geotechnical issues. The main ramps provide access to ore zones that are separated by sub-economic material (i.e., waste rock). The ore and the immediately adjacent waste zones have a poor rock quality and require increased ground support for stability.

The primary mining methods at LFUG are OHCAF and OHDAF, with the latter being used in wide areas of the ore body. The generalized OHCAF method is depicted on Figure 16-17. Ore drives typically have a profile of 3.5 m wide x 4.0 m high. Underground development waste rock is used for backfill. When adequate development waste rock is not available, rock from open pit waste dumps is dropped into the underground mine through 3 m diameter vertical borehole raises.

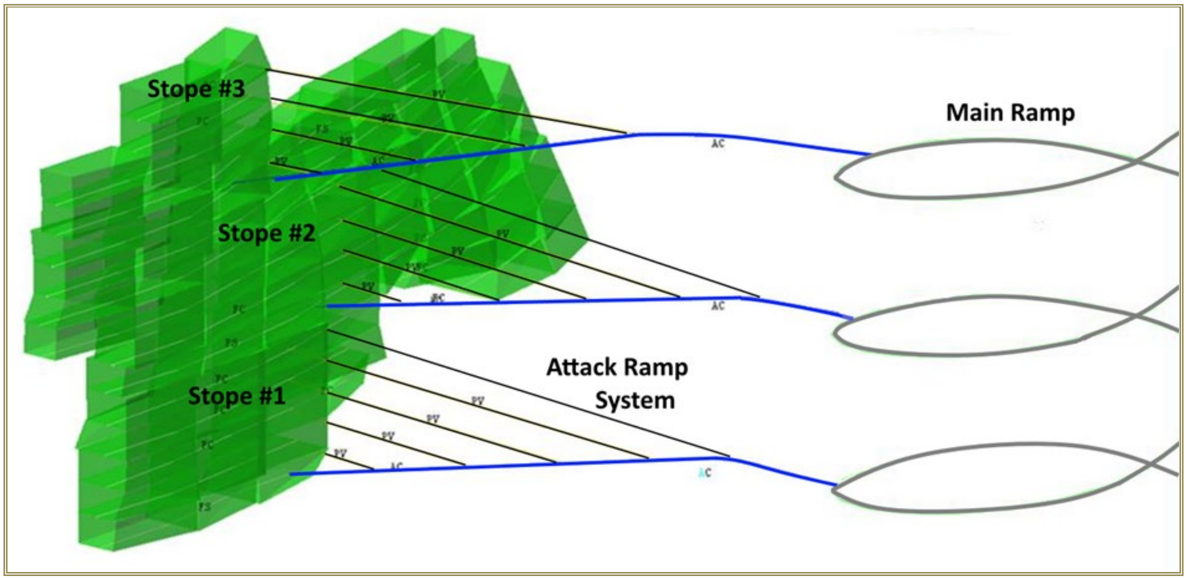
In some instances, the entire stope is mined bottom up using only URF as the backfill medium, as shown on Figure 16-18. In other instances, the stope is mined at multiple elevations simultaneously to increase the overall extraction rate, as shown on Figure 16-19. This variation on the OHCAF method requires the first lift at each producing elevation to be backfilled with high-strength CRF (8 MPa) as shown on Figure 16-19. In areas of the ore body that are greater than 3.5 m wide, an OHDAF herringbone layout is used, as depicted on Figure 16-20. The herringbone layout requires alternating stope drives to be backfilled with medium strength CRF (4 Mpa) to support the stope back.

For all of the mining method configurations, a short access (attack) ramp is driven exterior to a targeted portion of the skarn to begin stoping. The attack ramp is typically developed in seven passes, in 4 m vertical lifts, and begins from the bottom of a planned stope and progresses upward (Figure 16-18) as each successive lift of the stope is mined out. The bottom ramp of an attack ramp system is developed at a gradient of −15%, and each subsequent ramp is built upon development waste rock that is backfilled into the completed level and the attack ramp.



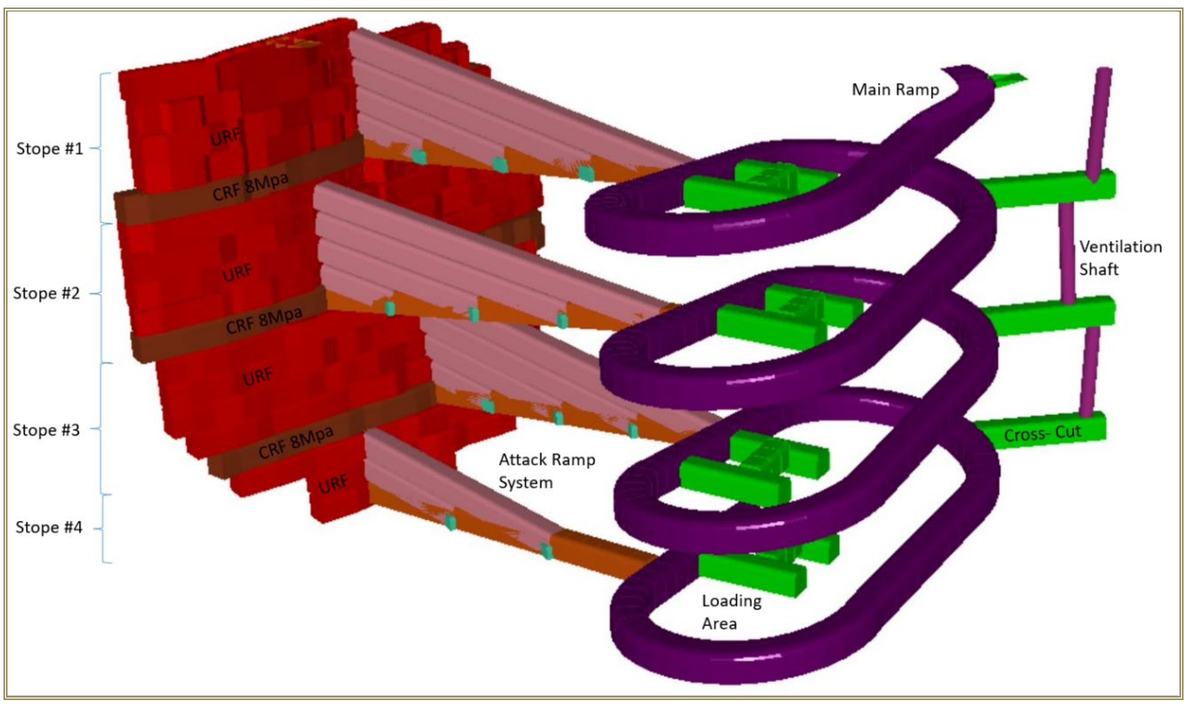
Source: Atlas Copco (1997).

Figure 16-17: Generalized Overhand Cut-and-Fill Mining



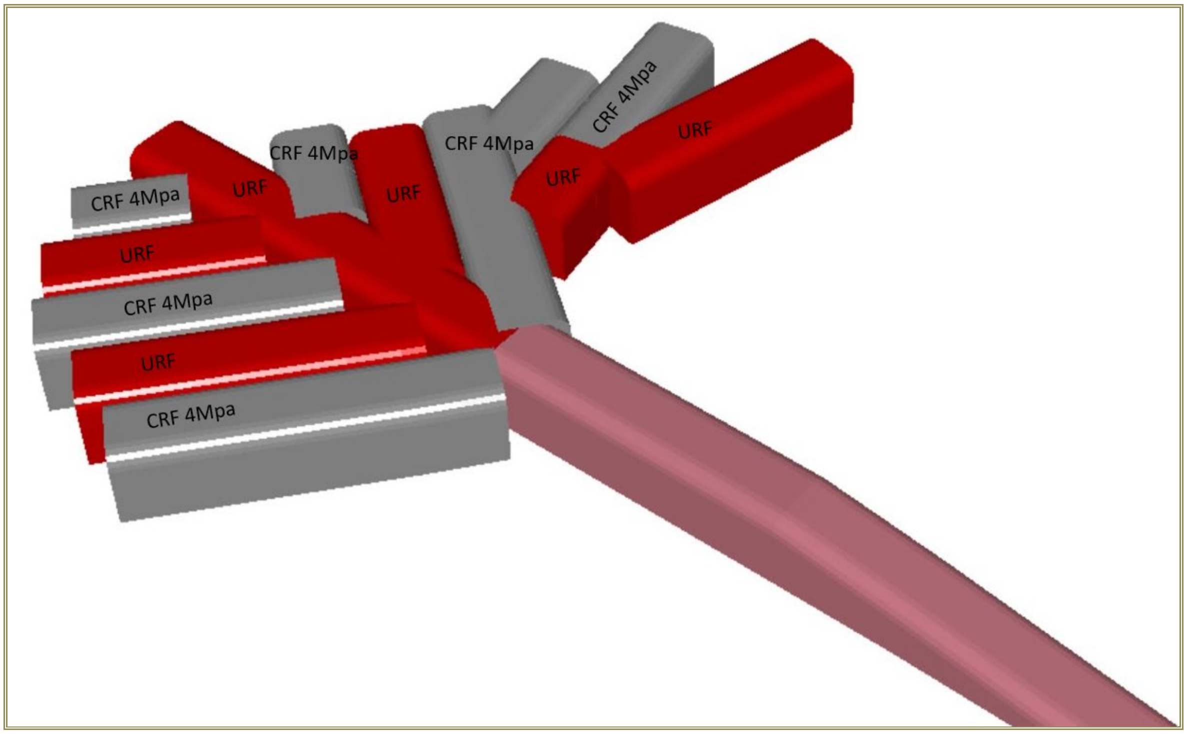
Source: SRK (2018).

Figure 16-18: OHCAF with URF for Bottom-Up Extraction



Source: SRK (2018).

Figure 16-19: OHCAF with CRF to Allow Simultaneous Production from Multiple Levels



Source: SRK (2018).

Figure 16-20: OHDAF with Herringbone Layout and CRF to Allow Extraction of Wide Areas

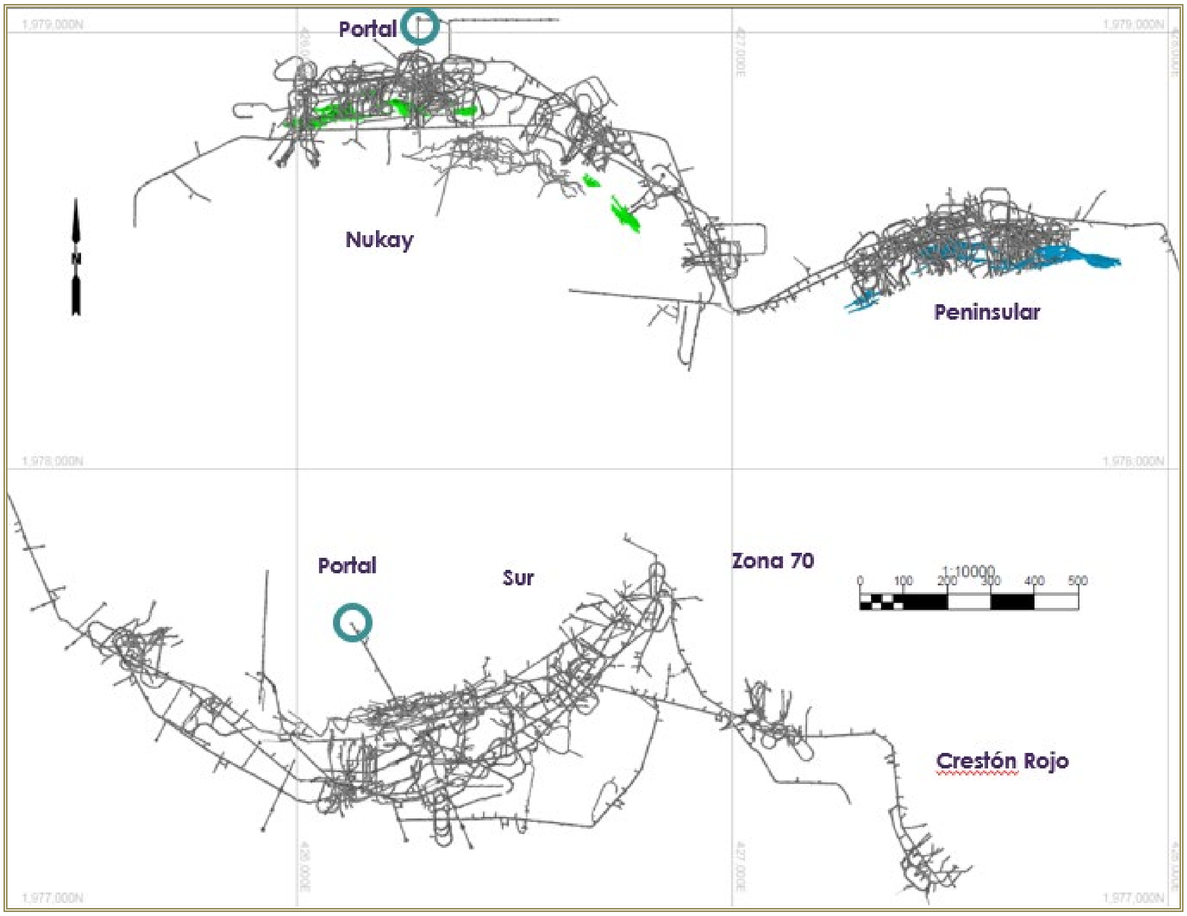
The LHOS method is also used in targeted areas of vertical ore-body continuity and good rock conditions. The stopes are 16 m to 20 m high from floor to floor and are mined longitudinally. The stopes are mined from the bottom up and use backfill. Open stopes are primarily located in the lower part of the Nukay Zone.

16.3.2 Dilution and Recovery Estimates

Mining dilution and mining recovery allowances have been applied to the LFUG Mineral Reserves for all of the mining methods. Unplanned external dilution of 10% is applied to stope ore at zero gold and silver grade, regardless of the modelled grades. An average mining recovery of 97% was assumed. This is considered reasonable given the highly selective mining methods being employed. Achievement in practice of the estimated dilution and recovery allowances is dependent on continued good grade-control and production management processes.

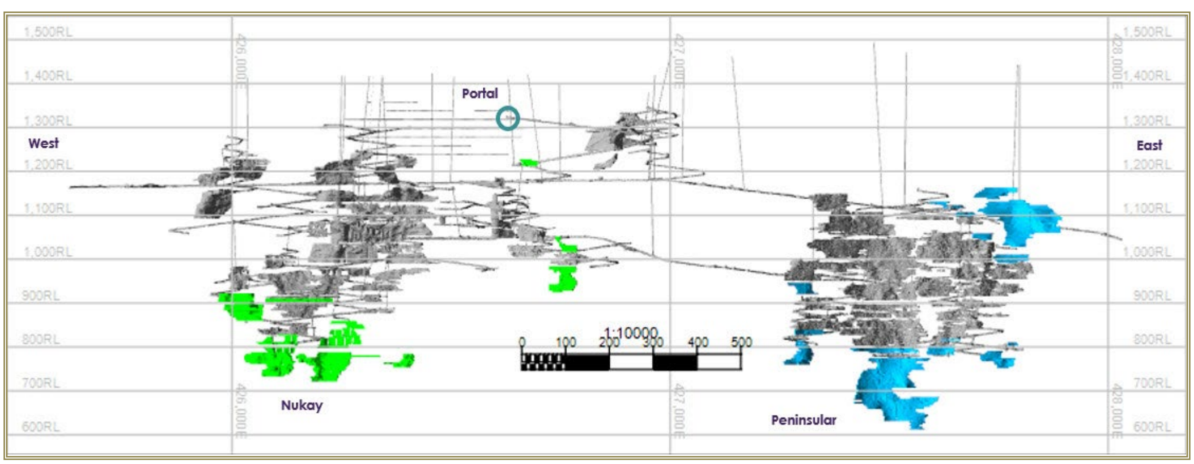
16.3.3 Mine Layout

As shown on Figure 16-21, there are four main underground mining areas positioned around the perimeter of the western Los Filos intrusive stock. On the north side of the stock is the Norte Mine, which includes the Nukay and Peninsular areas (refer to Figure 16-22). On the south side of the stock is the Sur Mine, which includes the Sur, Zona 70, and Creston Rojo areas (refer to Figure 16-23).



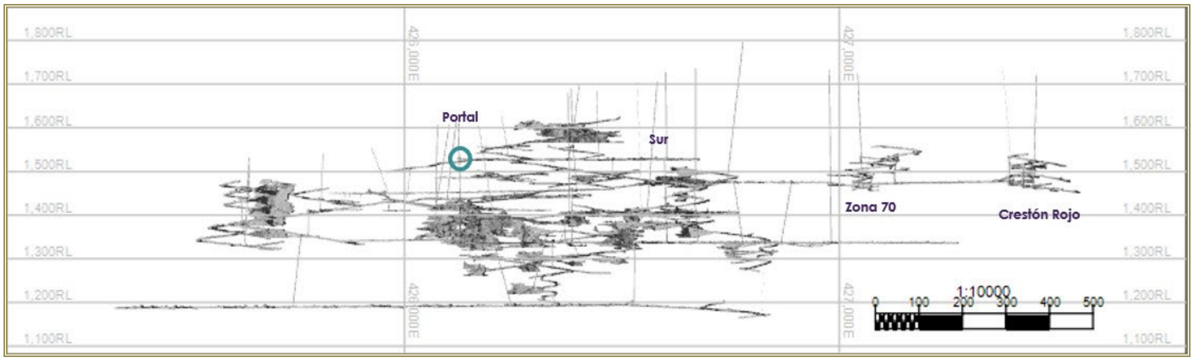
Source: AMC (2022).

Figure 16-21: Plan View of the Los Filos Underground Mining Areas



Source: AMC (2022).

Figure 16-22: Long Section of the Los Filos Underground, North Mine, Projection Looking North



Source: AMC (2022).

Figure 16-23: Long Section of the Los Filos Underground, South Mine, Projection Looking North

Currently, the deposit for Sur Mine is low-grade and uneconomic; therefore, all mining on that side is not included in the LOM Plan and is not part of the Mineral Reserve estimate.

AMC has conducted a trade-off study on the Nukay upper zone. The results indicated that the Nukay upper zone should be mined by open pit due to a higher net revenue compared to underground mining. For ore reserve reporting, this has been removed from the underground Mineral Reserve estimate.

16.3.4 Mining Operations

Single-boom electrohydraulic jumbo drills are used for drilling blastholes in the development headings and the stopes; ANFO is used for blasting. Packaged explosive is used for controlled blasting on the perimeter holes in the stopes and elsewhere, as needed.

Blasted ore is removed from the stopes with 3.1 m^3-class load-haul-dump (LHD) FELs and transported to muck bays positioned near each stope. The ore is then loaded into 14 m^3-class trucks with 5.4 m^3-class LHD loaders for transport to the surface and to the surface crusher, which is shared by the open pit and underground operations. The waste rock from mining the main ramps is removed with 5.4 m^3-class LHDs. After each round in a stope or development heading is mucked out, primary ground support is installed with a mechanical bolter and, as necessary, a shotcrete sprayer.

Production from the underground is scheduled for two, 10-hour daily shifts, seven days per week. Ore is transported by the haulage contractor from underground to the surface crusher with 14 m^3-class trucks for all underground areas.

Table 16-25 is a summary of the total underground employees for the LFUG. Los Filos employees mine the Norte mine with Los Filos-supplied equipment.

Table 16-25: Los Filos Underground Mine Personnel Summary (as of June 30, 2022)

Personnel Category	Number of Personnel
Non-Union Los Filos Personnel—Underground	59
Union Los Filos Personnel—Underground	166
Contractor Personnel—Underground	332
Total Personnel at Los Filos Underground	**557**

16.3.5 Los Filos Underground Mining Equipment

Table 16-26 shows the Equinox Gold-owned underground equipment.

Table 16-26: Los Filos Underground Mining Equipment

Underground Mining Equipment	Quantity
3 m Jumbo Drills	1
4.3 m Jumbo Drills	4
4.9 m Rock Bolters	5
1.5 m^3 Scoops	3
2.7 m^3 Scoops	2
3.1 m^3 Scoops	2
5.4 m^3 Scoops	5

16.3.6 Underground Infrastructure

Compressed-air lines, service-water piping, power cables, leaky feeder communications cable, blasting cables, and ventilation ducts are installed in each of the main declines as needed. Centralized blasting is used underground.

Underground water sources include water that is introduced during mining. Groundwater is minimal and has negligible impact on the mine operations. There is no underground pumping system.

Ventilation is achieved by main surface fans that pull air from raisebore holes extending into the underground workings. Secondary underground fans and ventilation ducts distribute the air to work areas as necessary.

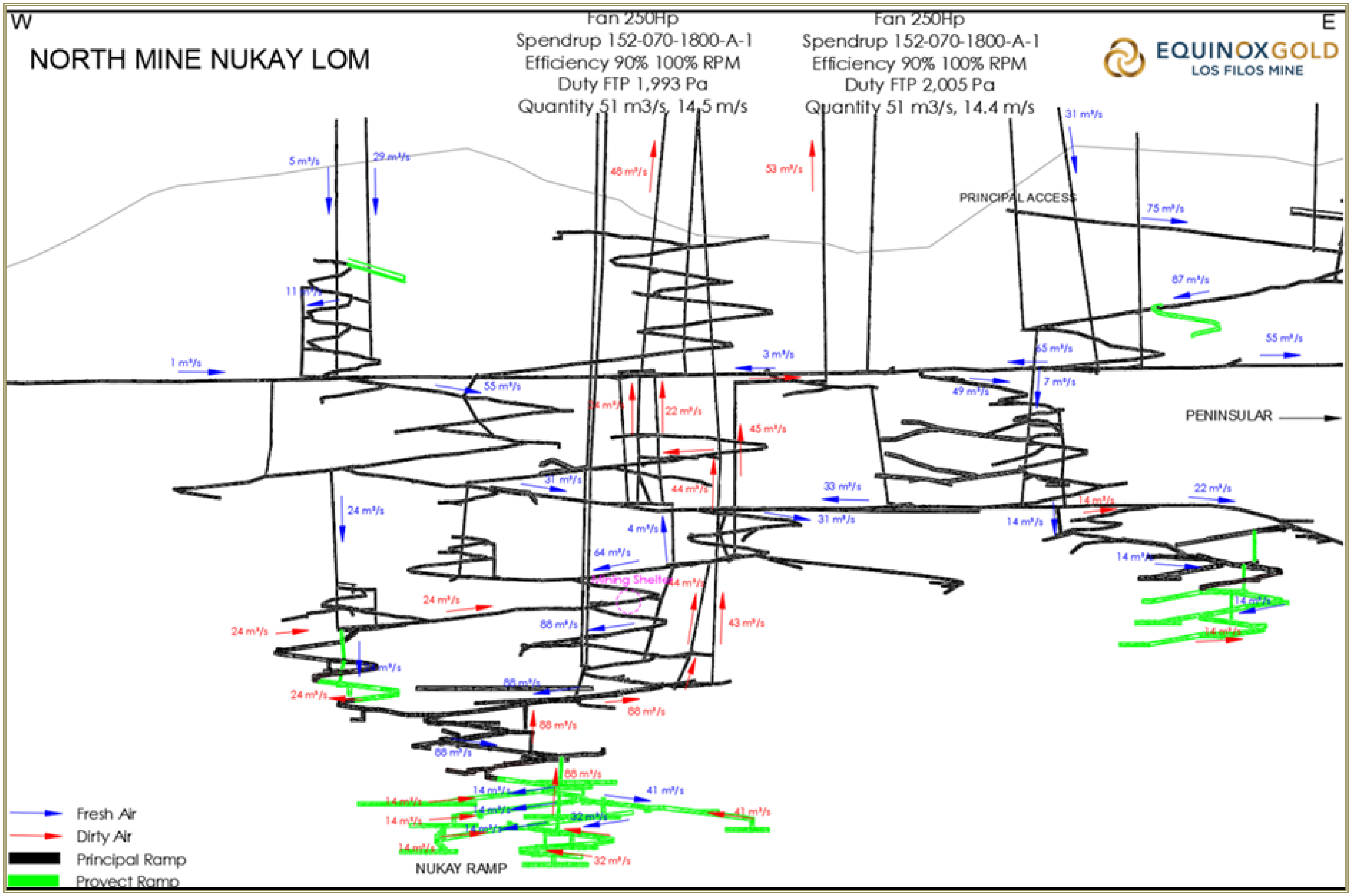
Development and ventilation layouts, including planned extensions to allow extraction of the Mineral Reserves, are shown on Figure 16-24 for Nukay, Figure 16-25 for Peninsular, and Figure 16-26 for South Zone.

16.3.7 LOM Schedule

The LOM production schedule for LFUG is presented in Table 16-27. This mine plan is based on the LFUG Mineral Reserves as of June 30, 2022.

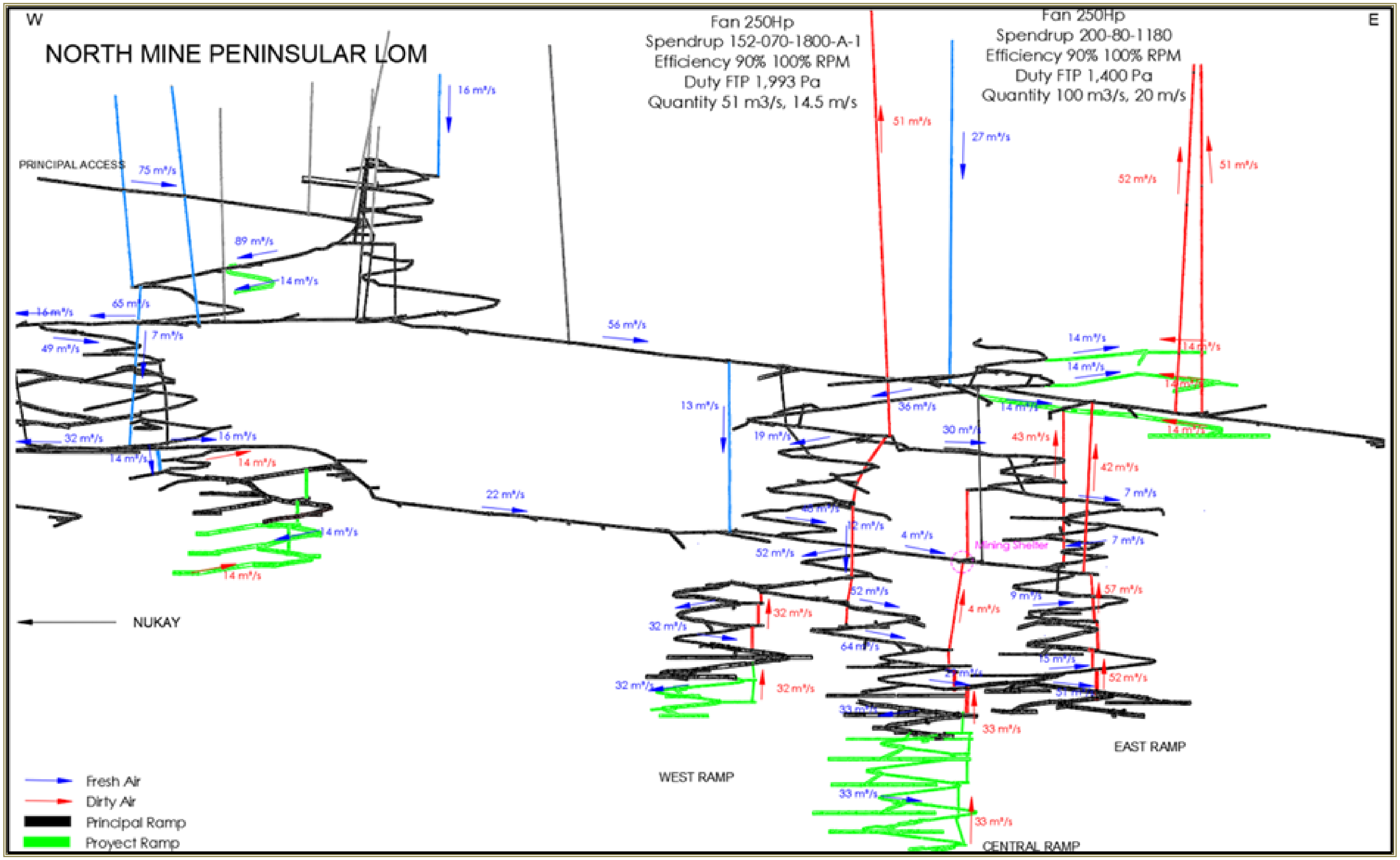
Table 16-27: Los Filos Underground Production Schedule

Year	Ore Mined (kt)	Grade				Metal Contained	
		(g/t Au)	(g/t Ag)	(% Cu)	(% S)	(koz Au)	(koz Ag)
2022	260	3.60	8.62	0.12	0.10	30	70
2023	300	3.25	18.87	0.13	0.25	30	180
2024	400	3.64	19.64	0.14	0.23	50	250
2025	280	3.47	20.56	0.10	0.12	30	180
Total	**1,230**	**3.50**	**17.36**	**0.12**	**0.18**	**140**	**690**



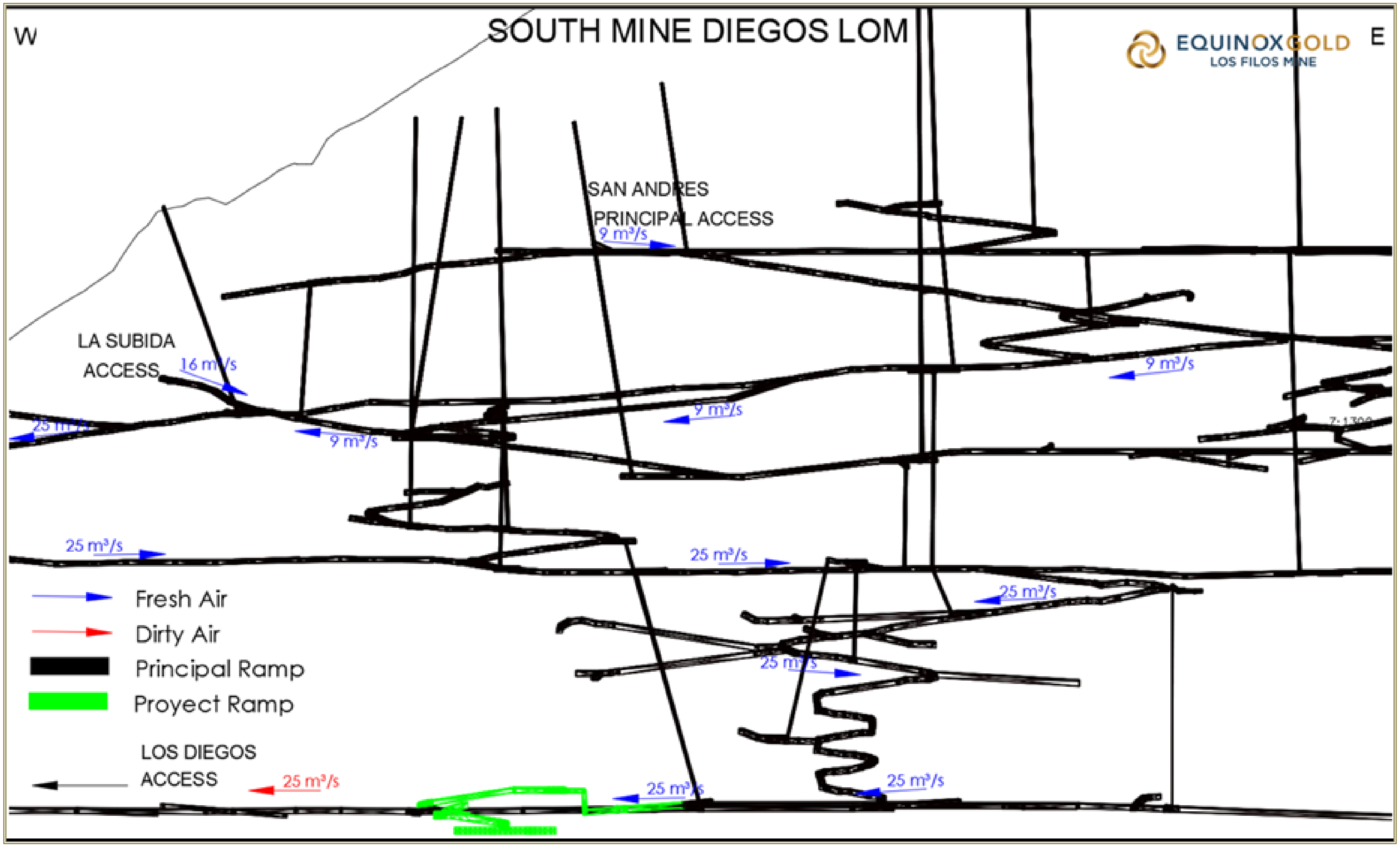
Source: Equinox Gold 2022, not to scale.

Figure 16-24: Development and Ventilation Plan, Los Filos Underground, Nukay Mine , Projection Looking North



Source: Equinox Gold 2022, not to scale.

Figure 16-25: Development and Ventilation Plan, Los Filos Underground, Peninsular Mine, Projection Looking North



Source: Equinox Gold 2022, not to scale.

Figure 16-26: Development and Ventilation Plan, Los Filos Underground, South Zone, Projection Looking North

16.4 Bermejal Underground Mining

16.4.1 Mining Methods Selection

The mining methods selected for BUG are OHDAF and UHDAF. These methods are highly selective, fully supported, man-entry systems that allow maximum flexibility and the ability to control mining recovery and dilution through good management and planning practices.

OHDAF is the primary mining method used for BUG and accounts for approximately 91% of the tonnages in the BUG LOMP. OHDAF is suitable where the geotechnical conditions are fair to good, and the ore body is sufficiently wide (typically >10 m) to allow multiple-pass drift-and-fill mining. The OHDAF will be applied in the same fashion as currently being used at LFUG. The OHDAF mining method is described in Section 16.3.1 and will be employed similarly at BUG.

UHDAF is the secondary mining method used for the remainder of the BUG stopes. It is suitable for deposits where geotechnical conditions do not allow for large open spans or unsupported ground, or where mine openings should be kept to a minimum size. UHDAF has also been selected due to variable ore-body geometry. As a self-defining method, short-interval changes in orientation can be accommodated, as well as pockets of extremely poor-quality rock.

UHDAF consists of a sequence of mining that is replicated throughout the ore body:

1. An attack ramp is driven from a level drive towards the ore body.
   - A top-cut in mineralized material in the form of a fully supported drift is made at the top of the sequence to be mined. Drift widths vary from 3.5 to 4.0 m. Drift heights are fixed at 4.0 m.
2. The drift is backfilled with engineered CRF that is designed to be stable across the span planned for cuts immediately below. The drift is tight filled to the back using a pusher arm (rammer-jammer) fitted to an underground loader.
   - Drifts immediately adjacent to the preceding drift are driven until the entire plan area of the cut has been mined and backfilled with CRF.
3. The attack ramp is partially backfilled with CRF to provide a full face and back cover for subsequent cuts.
   - Another attack ramp is driven towards the next cut, 4.0 m below the previous cut. This cut is known as an undercut. Widths of the undercut panels will vary from 4.0 m to 6.0 m.
4. The back of the undercut is the floor of the previous cut, and is an engineered CRF beam with predictable characteristics. The sides of the cut can be either fresh rock or fill from adjacent cut sequences.
5. The sequence repeats with further undercuts. The total number of cuts in a sequence is typically five.

This process is repeated for each sequence of cuts, thus extracting the ore body.

Deposit Context for Bermejal Underground

The BUG ore body is controlled by intrusion contacts and is irregularly shaped, varying in width, strike, and dip over relatively short distances. Changes in ore-body orientation can occur on the scale of the smallest mining unit. Mineralized material is not easily distinguished visually and may appear in several rock types (granodiorite, sill, oxide, and carbonates). Geological support and guidance is required throughout the mine planning and operating phases, with a robust grade-control program (i.e., face sampling for grade control). Thus, OHDAF and UHDAF are suitable methods for mining the BUG ore body.

16.4.2 Dilution and Recovery Estimates

Mining dilution and mining recovery allowances have been applied to the LFUG Mineral Reserves for all of the mining methods. Unplanned external dilution of 10% is applied to stope ore at zero Au and Ag grade, regardless of the modelled grades. An average mining recovery of 97% was assumed. This is considered reasonable given the highly selective mining methods being employed. Achievement, in practice, of the estimated dilution and recovery allowances is dependent on continued good grade-control and production management processes.

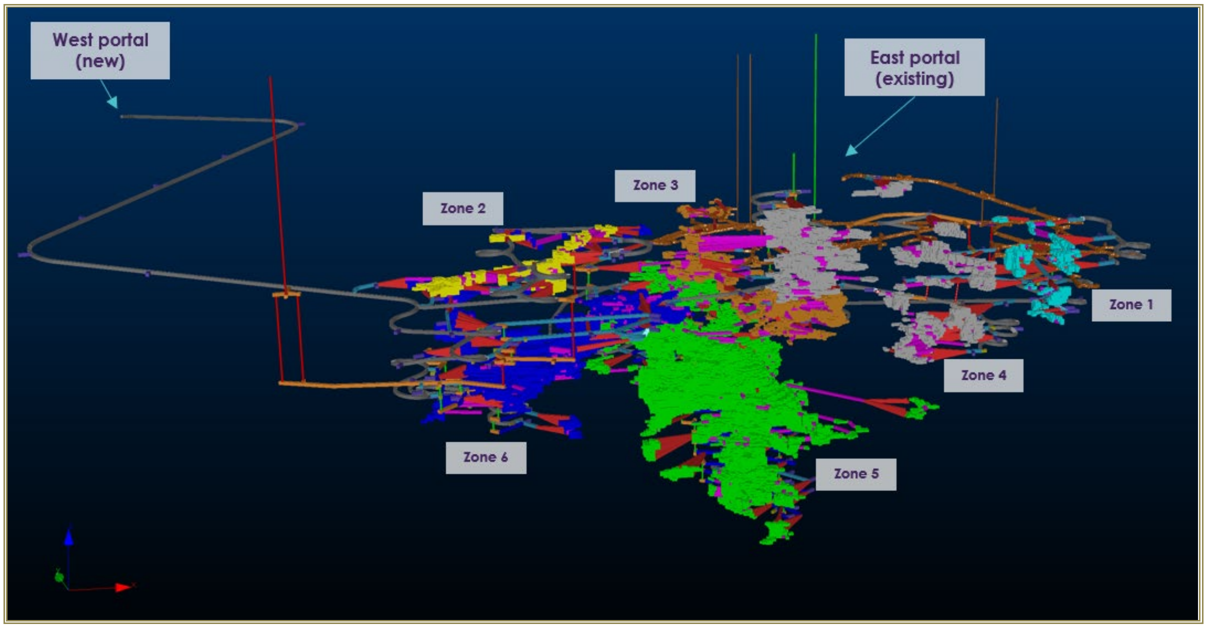
16.4.3 Mine Design

Mine Development and Production Design

The mine design is based on trackless mobile equipment with ramp-access from two portals. The existing portal is within the mined-out portion of the north end of the BOP. This portal is constructed and currently in use. The second portal is planned to be constructed in 2022, outside and to the west of BOP. Ore and waste material will be trucked to the surface through these two portals and re-handled by larger, surface mobile equipment to its ultimate destination.

Lateral development sizes range from 5.0 m high x 5.0 m wide for main access ramps, levels, and ancillary development, to narrower headings up to 4.0 m high x 3.5 m wide in top-cut production stopes. Undercut production stopes are planned to be mined with 4.0 m-high headings and widths varying from 4.0 m to 6.0 m, depending on local geotechnical conditions. The largest excavations are in the main shop area, where several 6.0 m-high x 6.0 m-wide excavations and one 7.0 m-wide x 8.0 m-high excavation are planned. Ramp grades are kept to within ±15%, with some attack ramps being driven at a maximum of 20% where required. A minimum turning radius of 25 m is maintained in the main ramps.

Figure 16-27 provides a general overview, looking south, of the BUG mine design and Zones.



Source: AMC (2022), not to scale.

Figure 16-27: Bermejal Underground Mine Design Overview and Zones, Isometric View Looking South

16.4.4 Underground Infrastructure

Underground Access

Main access declines are driven to connect each ore zone, forming a network of ramps. From the main access declines, production levels are typically driven on 20 m vertical intervals from the footwall or hanging wall side of the ore body. Levels are used to store blasted ore, waste, and ground support materials, as well as to provide excavations for electrical substations, ventilation access, and haul-truck loading areas. Attack ramps are driven off production levels, or in some cases, directly off the main decline. These ramps are used to access stoping cuts.

Vertical development sizes range from 2.1 m- to 3.0 m-diameter raises. Drop raises (3.0 x 3.0 m) are also used for level connections.

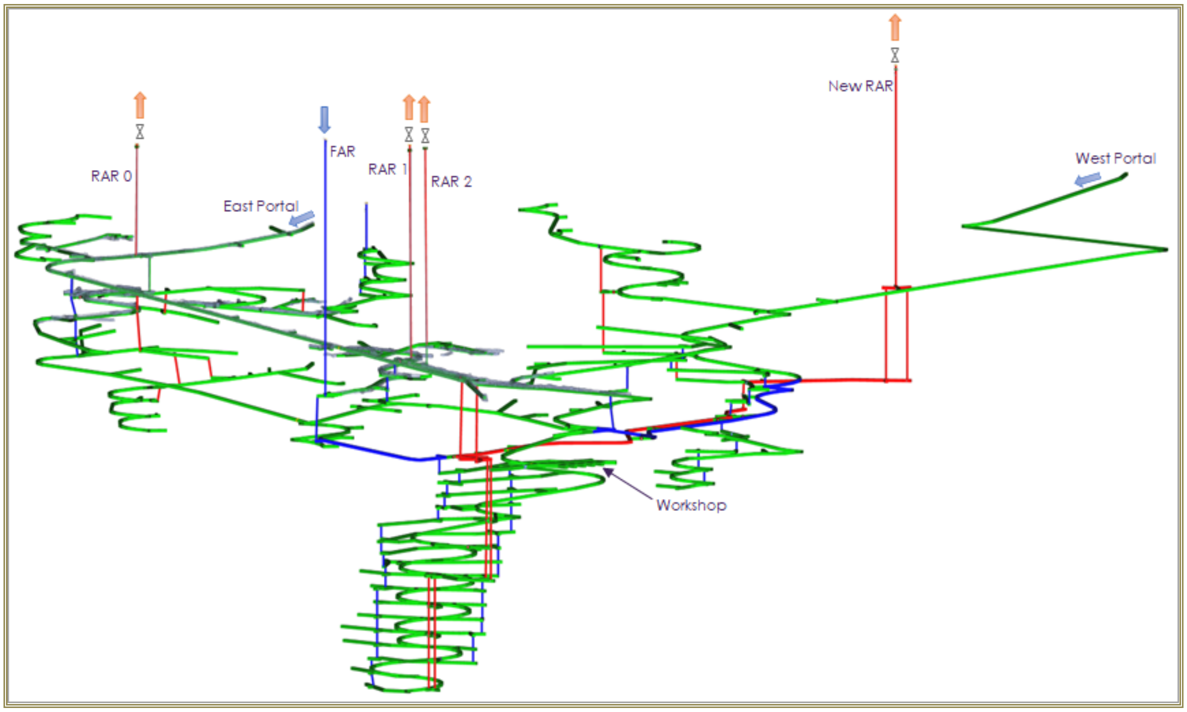
Mining zones are created to group stopes that are common to an access ramp, shown on Figure 16-27.

Mine Dewatering

The BUG is expected to be relatively dry, based on known water table elevations and experience with the LFUG mine. Therefore, no specific provision for dewatering infrastructure was included in the mine design (no sumps or pump-station drives). All mines have water introduced to them from the drilling operations, dust control, and wetting of the muck as (operational water), and an allowance has been included in the mine costing to account for suitable dewatering facilities. Small level sumps will be required to collect excess drill water, which needs to be pumped to surface or collected and reused in the mine after settling.

Underground Facilities and Services

The general layout of facilities and services is shown on Figure 16-28. The layout has been designed to support the requirements of the mine plan and schedule.



Source: AMC (2022); looking south, not to scale.

Figure 16-28: Bermejal Underground General Layout of Mine Facilities and Services

Compressed Air

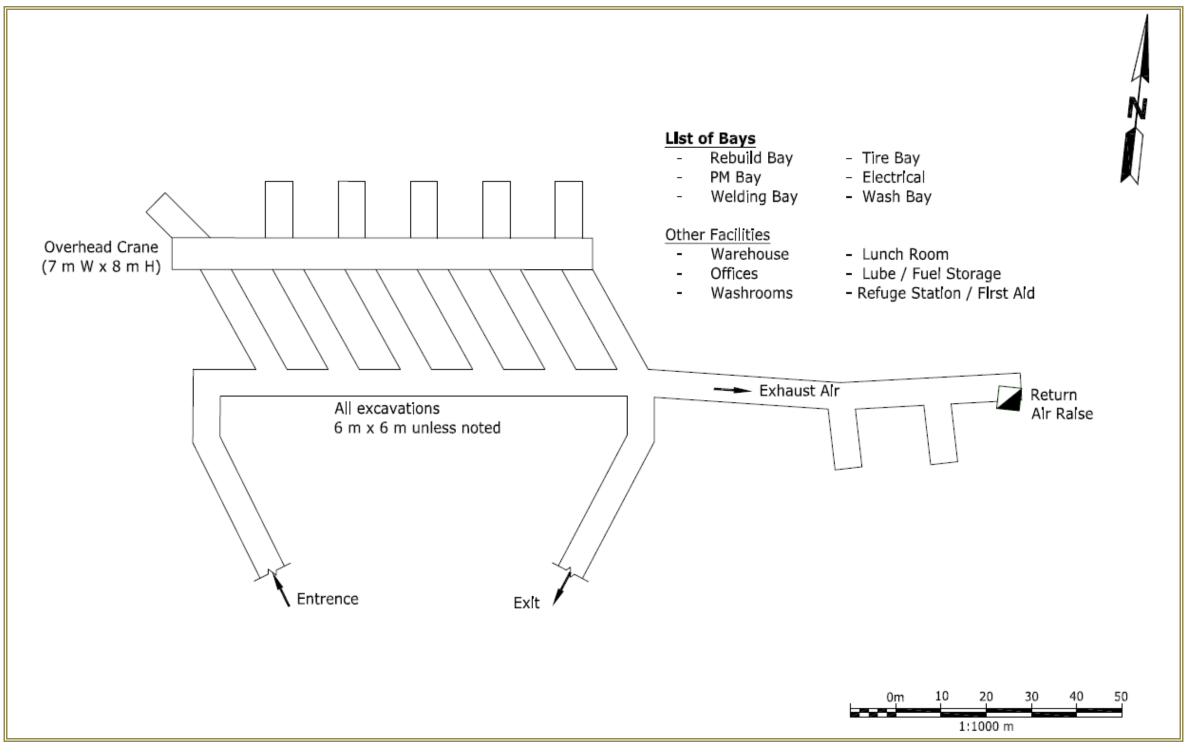
Compressed air is provided for development and production and is supplied from the surface plant through a network of distribution pipes installed during decline and lateral development. The underground maintenance shop will have a dedicated air compressor for tire fills, pneumatic tools, and a lubricant-dispensing system.

Underground Workshop

An underground workshop will be constructed to supplement the main surface workshop activities. It will ensure that facilities are provided to maintain mobile and fixed plant equipment that do not regularly come to surface. The existing surface workshop will continue to be used for servicing all other equipment. All major equipment and extensive component repairs will also be provided at the surface workshop when possible.

Figure 16-29 will have the following components:

- Combined rebuild and preventive maintenance bay
- Wash bay with oil- and grease-separating and de-sliming capabilities
- Welding bay
- Warehouse
- Tire bay
- Fuel and lube bay
- Office
- Lunchroom
- Electrical substation
- Overhead travelling crane
- Monorails and jib cranes
- Work benches and toolboxes
- Sprinkler fire-suppression system in preventive maintenance bay
- Fire extinguishers
- Chemical and electric washroom facility
- Refuge station
- Sink and eye-wash station.



Source: AMC (2022).

Figure 16-29: Bermejal Underground Workshop Plan

Monorails and jib cranes will be installed in welding and tire bays and the warehouse. Wall mounted, retractable hose-reel stations will be located at designated service bays to dispense grease, oils, service water, compressed air, and other fluids.

SatStat, a self-contained lubricant storage and handling system will be in a convenient location for access to mobile equipment maintenance. This system is supplied complete with fire doors and a fire-suppression system. Lubricant containers will be located within a spill-containment wall and are on a raised concrete slab to protect them from vehicle collisions.

There are two entrances to the workshop area, this will provide for one-way flow-through traffic. Optional roll-up doors for emergency fire isolation should also be considered. An exhaust air raise will be used to ventilate vehicle emissions as well as welding fumes.

The maintenance shop should meet all applicable fire code requirements. Fire-detection and -suppression sprinkler system will interface with the emergency alarm system, and will be included in areas at high risk of fires.

The lunchroom will provide a clean space with potable water, tables, and chairs. This space will have multiple uses and can also be used by the mine rescue team for training, and to store equipment and supplies.

Satellite Fuel Bays

The SatStat fuel storage and handling system has been specified for the mine. These units are equipped with thermally and manually activated fire-suppression systems, four-hour fire-rated doors and 150% containment in case of spills.

Explosives and Detonator Magazines

Underground explosives and detonator storage magazines will be set at a safe distance from underground work areas and infrastructure. There will be a separate magazine for explosives and detonators. Explosives products used for production and development activities will be securely stored and handled in these magazines.

Explosives and detonator materials will be transported by special trucks from the surface via the decline to the underground magazines. Only authorized individuals will transport explosives materials from the underground magazines to the workplace.

Explosives will be stored, stacked, and labelled to facilitate a first-in/first-out inventory control system. They will be located and distanced from the travel way in accordance with the explosive regulations for Guerrero State. Magazines will be equipped with a lockable door and wooden benches covered with rubber matting. The space will be ventilated and kept cool. The intent is to provide a small amount of detonators, cord, and high-velocity explosives for daily task specific activities.

Underground Electrical Distribution

Power to the underground mine will be via 13.8 kV feeders. Feeder 1 will be installed in the existing East Portal decline. Feeder 2 will run down the West Portal decline. They will be interconnected at the top of the Zone 5 ramp.

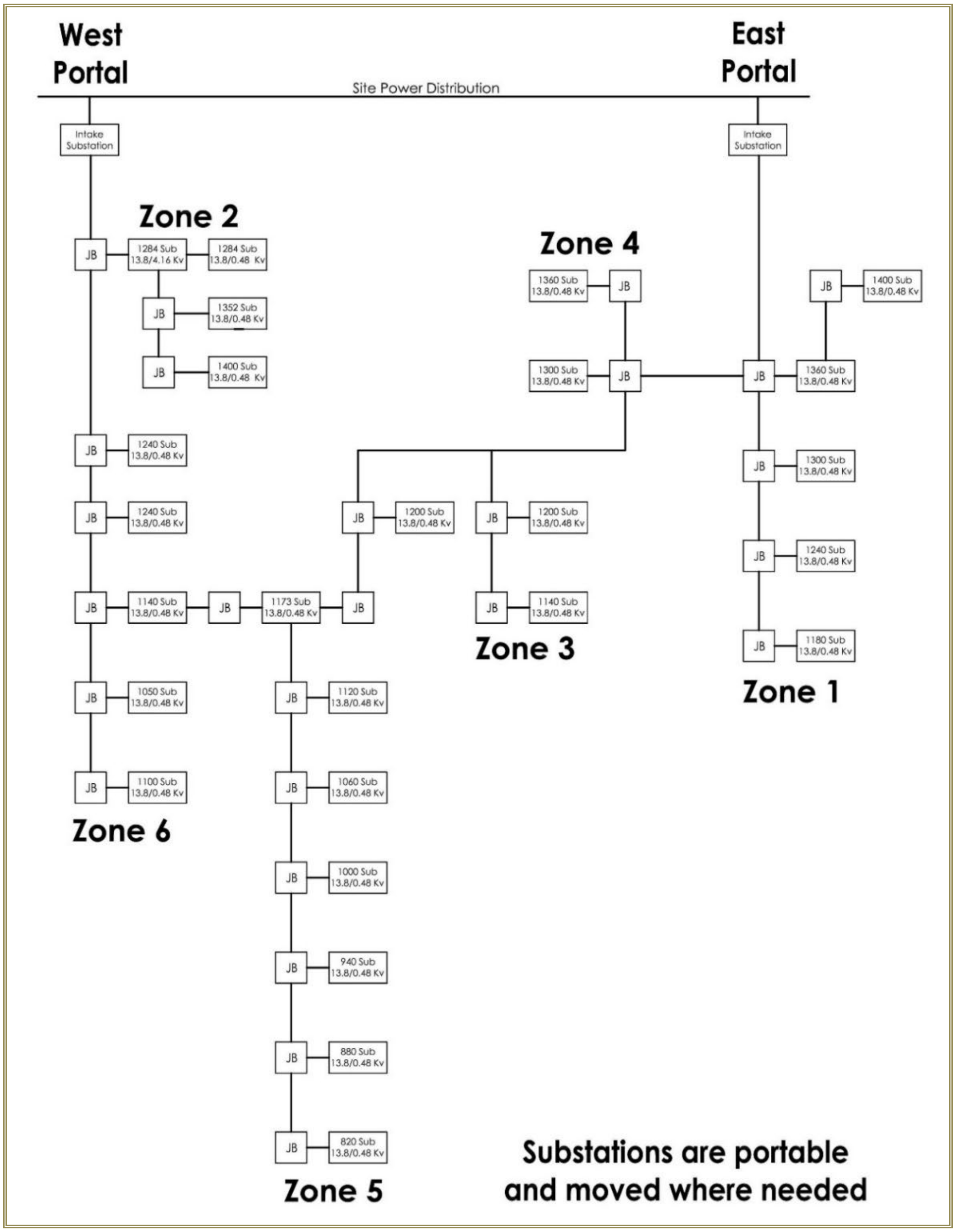
Electrical distribution at the East and West portals will include 15 kV switchgear to feed the surface ventilation fans and other underground demands. A transformer and diesel generators have been included at the 'In-pit' portal for emergency back up of the primary ventilation fans, and any other needs.

The diesel generators will be equipped with paralleling switchgear that will enable them to supplement the utility power supplying the underground mine. The switchgear and paralleling equipment will be designed to accommodate two additional generators if required. Once the new substation is commissioned the generators will serve as emergency backup only.

Underground Electrical Infrastructure

The 13.8 kV system will be reticulated underground along the portal declines via permanently installed electrical cables hung from suspended messenger wires. A total of twenty 1000 kVA portable substations, 13.8 kV:480 V, will be required to support the mine plan with a maximum of 20 active areas. The portable substations will be designed to support the auxiliary ventilation fans and the development or production equipment operating on that level. Each mobile substation will be equipped with a 150 kVAR capacitor to assist with voltage regulation and power-factor correction. Figure 16-30 provides a general overview of 13.8 kV:480 V substation block diagram of the BUG mine design.

The 480 V equipment will be fed from power take-off (PTO) units installed at each end of the main stope. The PTOs will feed the mobile equipment using portable mining cable fitted with cable couplers to reduce the labour and time required between equipment changes.



Source: AMC (2022).

Figure 16-30: Bermejal Underground Substation Block Diagram

16.4.5 Ventilation

AMC has undertaken an estimate of the ventilation requirements based on the underground development and production activities being concurrently undertaken. The function of the ventilation system is to dilute or remove airborne dust, diesel emissions, and explosive gases, as well as to maintain temperatures at levels necessary to ensure safe production throughout the LOM. The ventilation system has been designed to meet the requirement of Mexican Ministry of Labor regulations (Norma Oficial Mexicana NOM-023-STPS-2012) and industry best practice.

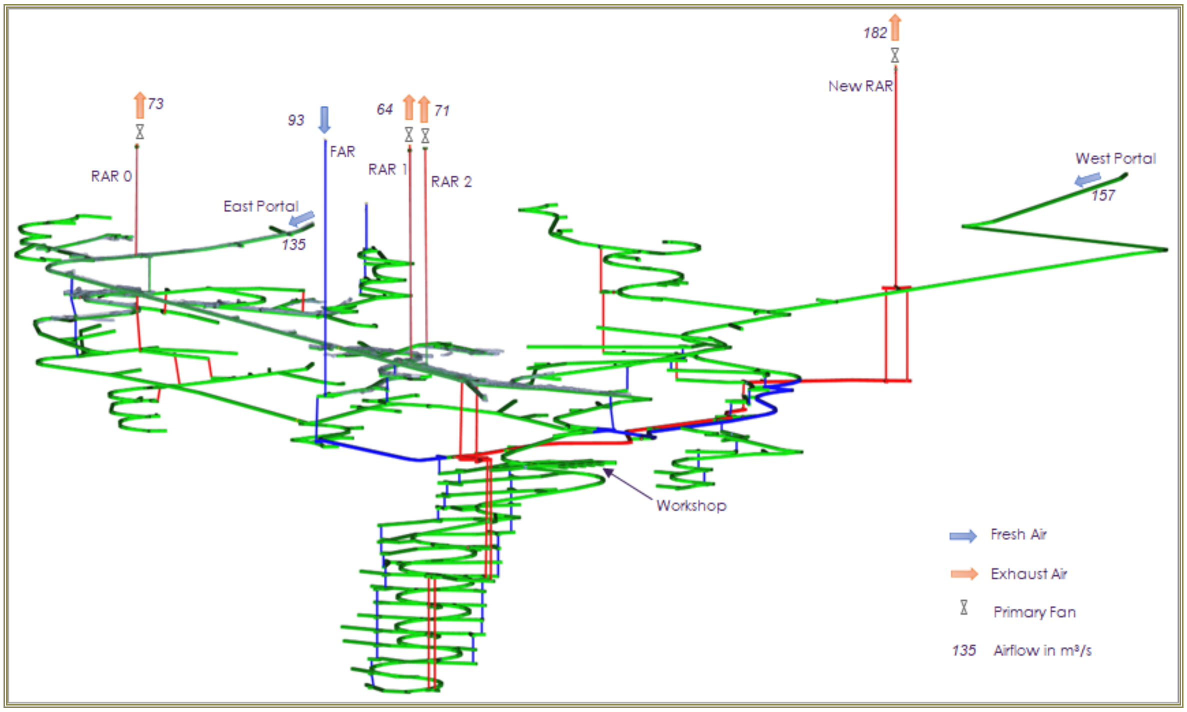
The BUG ventilation system is designed as a 'pull' system, with primary exhaust fans on surface at the top of each primary exhaust raise. Figure 16-28 (above) shows the projected steady-state ventilation configuration. Fresh air is delivered into the mine from the two portals and fresh air rases (FAR). Fresh air is distributed both in the ramps and internal FARs. Internal RAR carried with the production ramps connect to a dedicated exhaust airway and the RARs to surface.

The proposed ventilation system has been modelled using Ventsim software to check air velocities and overall system practicality. Based on the projected equipment requirements and the development and production activities being concurrently undertaken, a maximum total of 390 m^3/sec airflow is required. Figure 16-31 shows the BUG mine airflow requirements, by year.

Source: AMC (2022).

Figure 16-31: Airflow Requirements by Year

The distribution of airflow during the time of maximum mine airflow is shown on Figure 16-32. The discrepancy between total intake and total exhaust airflows is accounted for by the difference in air densities between intake air and exhaust air.



Source: AMC (2022); looking south, not to scale

Figure 16-32: Bermejal Underground Main Fresh and Return Air Flows (m^3/sec)

The mine design requires a new RAR to be driven as shown on Figure 16-32. This fan is required, at maximum, to deliver 182 m^3/sec at 3,960 Pa collar pressure. This will require a twin parallel fan arrangement such that each fan motor is sized at 630 kW.

16.4.6 Underground Emergency System

Each of the mine ventilation systems will be provided with an ethyl mercaptan (stench gas) system (activated manually or remotely) to warn underground personnel in the event of an emergency. Radio contact via the Leaky feeder system provides an alternative method of communication.

16.4.7 Cemented Rock Fill

The mining method requires the placement of CRF in volumes roughly equivalent to the extracted ore.

The CRF batch plant is on the surface near the portal. As all ore is hauled by truck to the portal area, underground haul trucks can pick up loads of CRF for delivery back underground without a significant detour from the ore haul route. The batch plant mixes rock fill, cement, additives, and water to create the CRF according to the required formulation. Additives are typically used to ensure an appropriate curing time that allows for placement, and cures rapidly enough for efficient production scheduling.

The batch plant is a relatively simple modular surface construction item, and is shown on Figure 16-33.

Source: AMC (2022).

Figure 16-33: Los Filos CRF Plant

The safety and effectiveness of the UHDAF mining method relies on good performance of the CRF. Quality assurance and control procedures will be in place to control the characteristics of the material and the effectiveness of the placement.

16.4.8 Mine Scheduling

The mining production and development schedule are further described in the following section.

Development Schedule

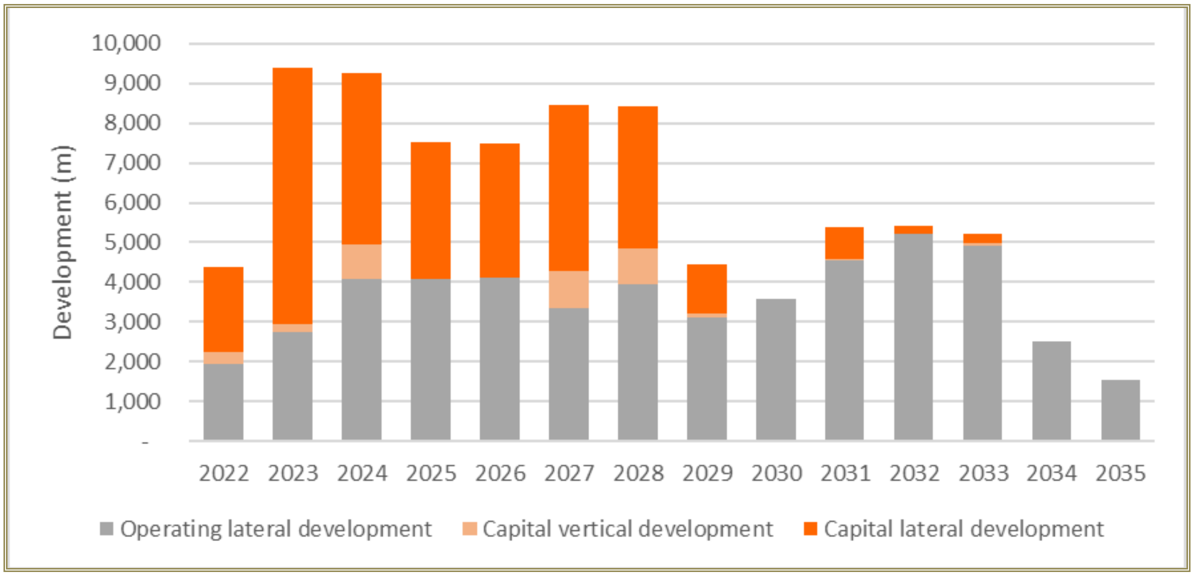
The mine development schedule considers advance rates of crews for ramp and single-heading development, multiple-heading development, and vertical development, which are summarized in Table 16-28.

Table 16-28: Bermejal Underground Development Advance Rates by Development Type

Development	Metres per Month
Ramp and Single Heading Development	120
Multiple Heading Development	150
Vertical Development	90

Source: AMC.

The BUG LOM development schedule is provided on Figure 16-34.



Source: AMC (2022).

Figure 16-34: Bermejal Underground LOM Development Schedule

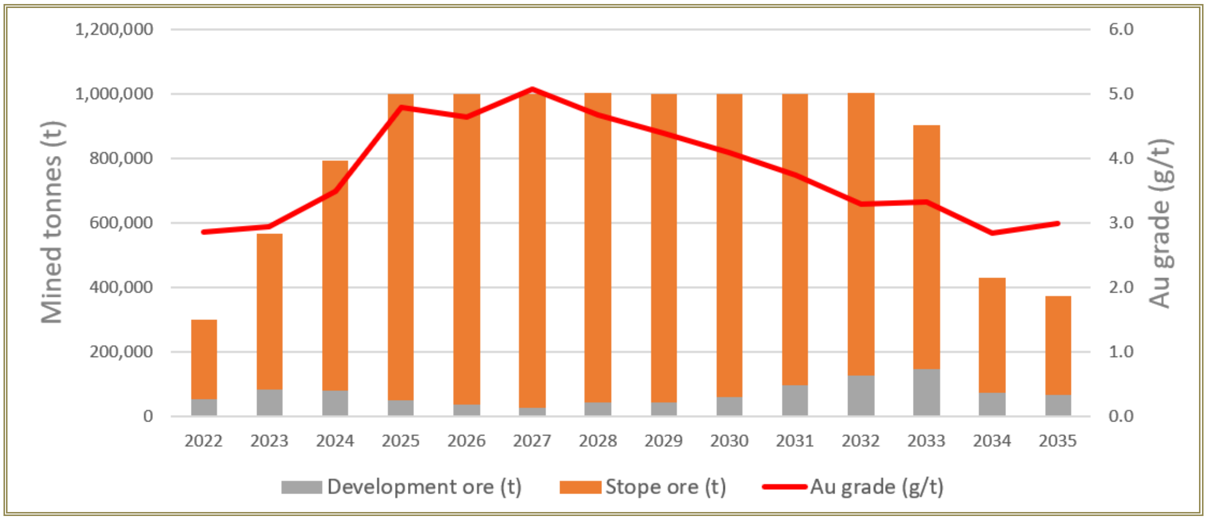
Production Rate and Schedule

The BUG production rate is based on the advance rates of stope development for the UHDAF and OHDAF mining methods. AMC assumed that the mining production would be operated with multiple headings in a stope, with an average advance rate of 180 m/month, which is equivalent to a production rate of 250 t/d (Table 16-29).

Table 16-29: Bermejal Underground Production Rate

Description	Unit	Value
Production Rate by Length	m/month	180
Production Rate by Mass	t/d	250

The BUG LOM development schedule is provided on Figure 16-35.



Source: AMC (2022).

Figure 16-35: Bermejal Underground Production Schedule

Equipment and Fleet-Sizing Considerations

Consideration was given to the overall mining rate required, the geotechnical conditions likely to be encountered, the ventilation and logistic requirements, and general practice and availability of equipment. The mine development schedule and production plan were initially developed on an unconstrained basis using only expected unit advance and production rates. This plan was then resource-levelled to produce a practical plan that required a consistent number of personnel and equipment.

Mobile Equipment

AMC estimated the mobile and auxiliary equipment fleet requirements at steady-state production, shown in Table 16-30 and Table 16-31 (note: the contents of Table 16-30 and Table 16-31 are only indicative, as the contractors will supply their own recommended mobile equipment fleet).

Table 16-30: Bermejal Underground Major Equipment Requirements

Major Equipment Type	Estimate Number Required
Two Boom Jumbo	16
ANFO Loader	5
Rockbolter	8
Shotcrete Sprayer	5
Transmixer	7
Cablebolter	2
LHD	12
Scissor Lift	3
Haulage Truck, 40 t	12

Table 16-31: Bermejal Underground Auxiliary Equipment Requirements

Auxiliary Equipment Type	Estimate Number Required
Grader	2
Boom Truck	2
Flat Deck Tuck	2
Mechanics Truck	2
Fuel-Lube Truck	2
Personnel Carrier	4
Supervisor/Engineering Vehicle	8
Forklift/Telehandler	2

16.4.9 Mine personnel for Bermejal Underground

Production from the underground is scheduled for two 10-hour daily shifts, seven days per week.

Table 16-32 is a summary of the total underground employees for BUG (note: the content of Table 16-32 is only indicative, as the contractors will supply their own recommended mine personnel).

Table 16-32: Bermejal Underground Mine Personnel Summary

Personnel Category	Number of Personnel
Underground Management	6
Mine Maintenance Staff	5
Underground Technical Services	36
Underground Labour	221
Underground Maintenance	54
Total	**322**

16.5 Interpretation and Conclusions

16.5.1 Los Filos Underground

- The Los Filos Underground mine is a mature mining operation with well understood ore body characteristics, geotechnical conditions, and mining productivities.
- OHCAF and OHDAF are proven mining methods at Los Filos Underground. Both methods offer a high degree of ore selectivity and minimize dilution.
- The mine is expected to produce approximately 1.2 Mt of ore (960 t/d) over its remaining life (Q3 2022 to Q4 2025).

16.5.2 Bermejal Underground

- Bermejal Underground should be developed primarily with OHDAF to extract 91% of the Mineral Reserves, and the remainder with UHDAF; both are highly selective and flexible mining methods.

- CRF is an industry-proven backfill material that has been used in Los Filos Underground and other mines employing underhand mining techniques.
- The Bermejal Underground deposit is estimated to produce approximately 1.0 Mt/a (2,740 t/d) during steady-state production (2025 to 2032).
- Annual gold production averages 139,500 oz/a, delivered during steady-state production (2025 to 2032). A peak of 163,000 oz of gold is planned to be delivered in 2027.
- Production and development productivity rates are a function of expected ground conditions and the associated ground support regime employed, among other factors.

16.5.3 Open Pit Mining Operations

- Open pit mining commenced at the Los Filos Mine Complex in 2005. Orebody characteristics, geotechnical conditions, and open pit mining productivities are well understood.
- Collectively, the open pits are expected to produce 180.6 Mt of ore (34,100 t/d ore on average) during the Q3 2022 to Q4 2036 period. Total material movement (ore plus waste) is expected to average 185,600 t/d.

16.6 Key Risks

16.6.1 Open Pit Geotechnical

- Time-dependent rock mass-fatigue may be a significant factor in bench to inter-ramp scale stability of weaker rock.
- Increased pore-pressures within the relatively ‘tight’ altered rock mass associated with the mineralization may trigger overall-scale slope instabilities.
- Convoluted pit shapes with convex slopes in weak rock have an increased risk of instability.

16.6.2 Los Filos Underground Geotechnical

- The design criteria for the Los Filos Underground operations is well established and based on operational experience and knowledge of the geological and geotechnical conditions.
- OHCAF is used in narrow areas with typical sections of 3.5 m wide and 4.0 m high.
- OHDAF is used in the wider areas with typical drift dimension of 3.5 m wide and 4.0 m high.
- LHOS is used in targeted areas of vertical orebody continuity with good rock conditions. Stopes are typically 12 to 16 m high from back to floor.
- The geotechnical design for Los Filos Underground has followed a less formal, but proactive approach to rock mechanics, which has allowed for mining of several ore bodies in adverse ground conditions.
- For OHCAF and OHDAF mining methods, cemented rock fill is placed in all production excavations requiring mining below or adjacent mining, whereas unconsolidated rock fill is used to backfill stopes where there is no adjacent mining (vertical exposure) or undercutting (horizontal or undercut exposure) required.

16.6.3 Bermejal Underground Geotechnical

- CNI’s (2018) rock mass classification assessment indicates that ground conditions in Bermejal Underground are highly variable, ranging from extremely poor to good.
- Typical rock mass conditions are poor to very poor, as commonly observed in highly altered and mineralized Oxide and altered Intrusive (including both the granodiorite intrusive and sill).
- The rock quality of the mineralized zones for Bermejal Underground is generally weaker than the mineralized zone at Los Filos Underground.
- OHDAF is selected as the primary mining method at Bermejal Underground, which is planned to be used to extract 91% of the Mineral Reserves, and UHDAF is selected to reduce the risk of mining in the highly altered and very poor mineralized Oxide domain.
- Ground support design for Bermejal Underground is based on ground control experience gained at Los Filos Underground, with modifications to reflect the actual practice at site.

16.7 Recommendations

16.7.1 Los Filos Underground

- Because mining operations are expected to conclude in 2025 based on the currently defined Mineral Reserves, AMC recommends that Equinox Gold undertake further drilling to identify any potential orebody extensions or new, nearby orebodies that could be accessed efficiently from the existing underground workings.

16.7.2 Bermejal Underground

- The mine design is based on two main declines from surface in the LOM plan. To meet the projected ramp-up of production, the second decline should commence development as soon as possible (Q3 2022).
- The second decline is required as soon as possible in order to provide adequate ventilation for the mine throughout the LOM plan as well as second egress.
- A suitable mining contractor should be selected as soon as possible to meet the rapid development requirements to meet the LOM plan production targets.
- Formalize a training package outlining the UHDAF mining method process, operating practices, QA/QC procedures, and operating parameters.
- Formalize a grade control and sampling program that will provide key inputs to mine planning.
- Panels widths should be mined initially at minimum widths, then gradually widened as ground conditions are better understood.
- Further validation work is required to ensure productivity estimates are achievable.
- Ensure the various ground support regimes are integrated into the planning process and ground control program.

- Formalize a mine planning process that covers both short, medium, and long term planning horizons.
- Revise and optimize ground support standards for improvement of ground control practice and productivity and reduction of operation cost.
- Optimize CRF strength design for cost reduction.
- The underground infrastructure assessment was based on the geotechnical block model rather than geotechnical data from selected drill holes. The underground workshop layout and support design are based on general ground conditions. A site-specific assessment and ground support design will be required.

16.7.3 Open Pit General

- During operation, segregation of the Cat 785 fleet and the Komatsu 730E fleet should be a priority to maximize the benefit of the faster Komatsu 730E fleet.
- Formal procedures should be developed for open pit mining operations that will be conducted in and around the historical underground workings in Guadalupe Open Pit to ensure the safety of personnel and equipment.
- Formal procedures should be developed for geotechnical monitoring of waste dumps during and after open pit mining operations to ensure the safety of personnel and equipment.
- Metallurgical recovery and operating costs for each mined block will be variable depending on rock type, sulphur grade, copper grade, and processing destination. For this reason, daily ore control decisions (e.g., selecting the optimal processing destination) should be guided by a mining software determination of the maximum profit for each block rather than by a fixed cut-off grade.
- Effects of the specific energy of the ore delivered to the CIL plant should be monitored and measured during the early years of CIL operation to quantify impacts of high percentage of BOP ore delivered at the end of the mine life.

17 RECOVERY METHODS

Heap leaching commenced in 2007 with ROM ore stacked on Pad 1. The crushing circuit became operational in 2010, and Crushed ore, too, was initially stacked on Pad 1 with ROM ore. With the Pad 2 construction completed in 2013, the Crushed ore from the open pits and the underground mines was stacked on Pad 2, leaving Pad 1 to receive only ROM ore. Historically, ore containing sulphide has been stockpiled; ore with a total sulphur content greater than 1.0% was not mined. Stacking of low total-sulphur-content Crushed and ROM ores will continue to the end of 2036.

Equinox Gold is planning to construct a CIL plant to treat high-total-sulphur-containing ore from the BOP, GOP, and BUG ore sources. The CIL process will liberate and recover the gold through standard industry methods of grinding, leaching, and carbon adsorption, desorption, and recovery (ADR). The plant is designed to handle 10,000 t/d of ore from all ore sources.

The following sections discuss in detail the current heap leaching process and the future CIL gold recovery process.

17.1 Heap Leach Processing

Heap leach ore is sourced from five areas: LFOP, LFUG, GOP, BUG, and BOP. There are several ore types from these deposits, including oxides, intrusives, carbonates, endoskarn (altered intrusives), and sulphides. Mineralization from the open pit and underground operations is classified as either low-grade or high-grade ore. Low-grade ore is heap leached as ROM and high-grade ores are heap leached as Crushed.

Two heap leach pads (Pads 1 and 2) are currently in operation, each with a separate leachate collection system. As mentioned above, Pad 1 has been loaded historically with both Crushed and ROM ore, but is presently loaded with only ROM ore. Pad 2 was initially loaded with ROM ore for the first one to two lifts, but is currently being loaded with only Crushed ore at 5 m lift heights.

A geomembrane interliner was installed on Pad 2 in 2019 and 2020. The purpose of the interliner was to reduce the lag time for leach solution reporting to the pregnant leach solution (PLS) pond. The lag time has been reduced from 30 days to 3 days. The secondary purpose of the interliner was to reduce cyanide consumption that occurs in the lower lifts of Pad 2. The free cyanide in the PLS solution has increased from 5 ppm to 50 ppm since the interliner was installed. There is no plan to install an interliner on Pad 1. The plan is to stack Pad 2 to an elevation where it is overlapping Pad 1, at which point an interliner may be considered.

A third leach pad (Pad 3) will be constructed in three phases beginning in 2023. The second and third phases will be built in 2025 and 2027, respectively. The current LOM model requires additional space for placement of Crushed ore, ROM ore, and CIL-filtered tailings. Pad 3 will provide enough capacity for placement of future ores.

High-grade ore is crushed to 80% passing (P_{80}) 19 mm in a two-stage crushing circuit consisting of a primary jaw crusher and two Metso HP-800 secondary cone crushers operated in closed circuit with double-deck banana screens. From 2010 to present, Crushed ore had been blended with cement, lime, and water on a conveyor belt system for agglomeration and pH control, with agglomeration achieved via transfer points, then conveyed to a staging area near the leach pad where it was stacked onto a stockpile. The Crushed ore was then loaded into haul trucks and transported to Pad 2, where an excavator was used to place the ore in 5 m high lifts. The Crushed ore was then leached with a solution containing about 450 mg/L NaCN at an application rate of 12 L/h/m^2.

During 2018, new overland conveyors were installed to convey Crushed open pit ore from the crushing circuit to an agglomeration drum on Pad 1, where the ore is agglomerated with cement for improved quality of agglomeration, then conveyed directly onto Pad 2 where the ore is stacked via mobile conveyors (grasshoppers) and a radial stacker. However, high-grade underground ore is agglomerated in the agglomeration drum, then discharged to a staging area near the agglomerator before being truck-hauled to a separate leaching area on Pad 2.

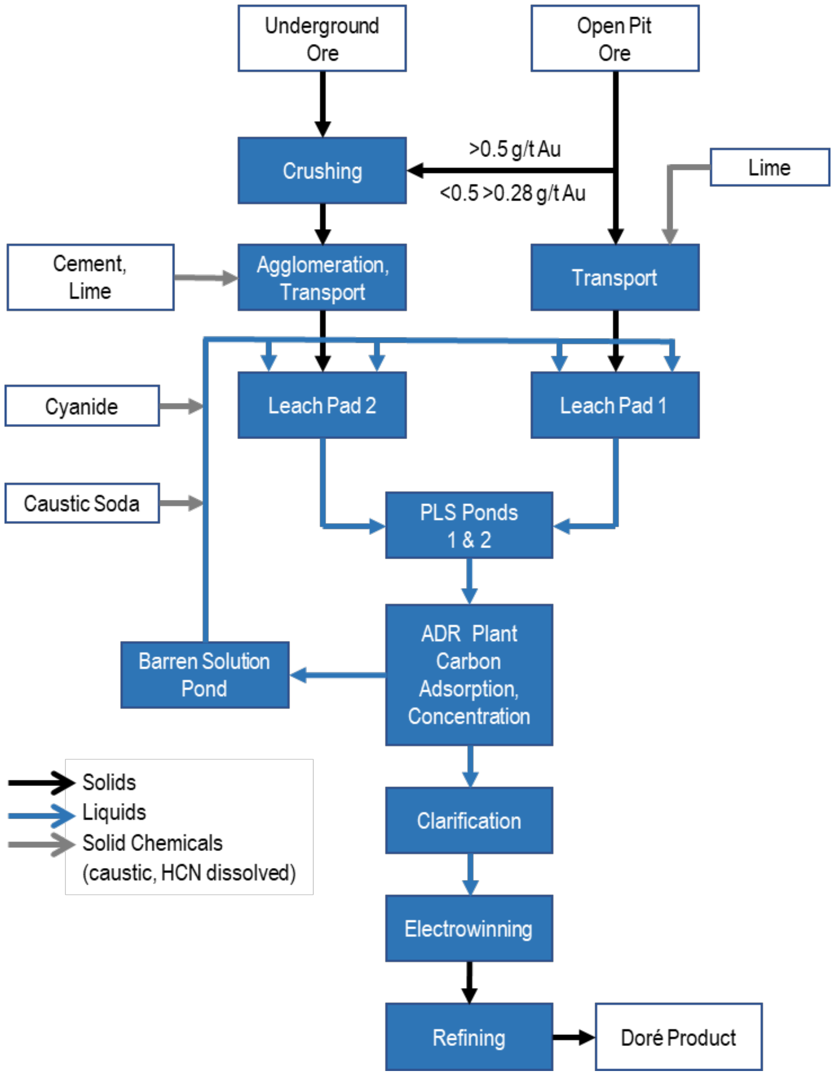
Mine trucks haul low-grade ore and place it separately on Pad 1 as ROM ore for leaching, following the addition of lime at a rate of 5 kg/t on each loaded haul truck. No ore sourced from Los Filos Underground is classified as low grade.

The gold-rich PLS from each heap leach pad is collected at the bottom of the geosynthetically lined heap leach pads via a network of solution collection pipes, and channeled into separate PLS ponds for Pads 1 and 2. Pad 3 solution collection will drain towards the southeast corner, then into the Pad 2 drainage system and report to the Pad 2 PLS pond. The PLS is pumped from these ponds to an ADR plant where the gold is adsorbed onto carbon in a conventional carbon-in-column (CIC) circuit. The gold that has been adsorbed onto the carbon is then stripped (eluted) from the carbon using the pressure Zadra process. The eluted gold and silver, now in a higher-grade solution, are passed through a series of electrowinning cells where the gold and silver are recovered as a cathodic precipitate. The resulting gold and silver precipitates are dried, blended with various fluxes, and processed in an induction furnace to produce a final gold- and silver-bearing doré product.

After the gold and silver are extracted from the PLS solution through carbon adsorption, the barren solution is recharged with sodium cyanide, then pumped back to the heap leach pads for distribution by a drip irrigation system at the specified cyanide concentration, to leach the Crushed and ROM ores.

17.1.1 Heap Leach Process Flowsheet

A simplified processing flowsheet of the heap leach process is shown on Figure 17-1. Although heap leach processing details have evolved since operations began in 2007, the basic design of the gold ore processing circuit remains that of the original plan, and is based on a heap leach operation using multiple-lift, single-use heap leach pads.



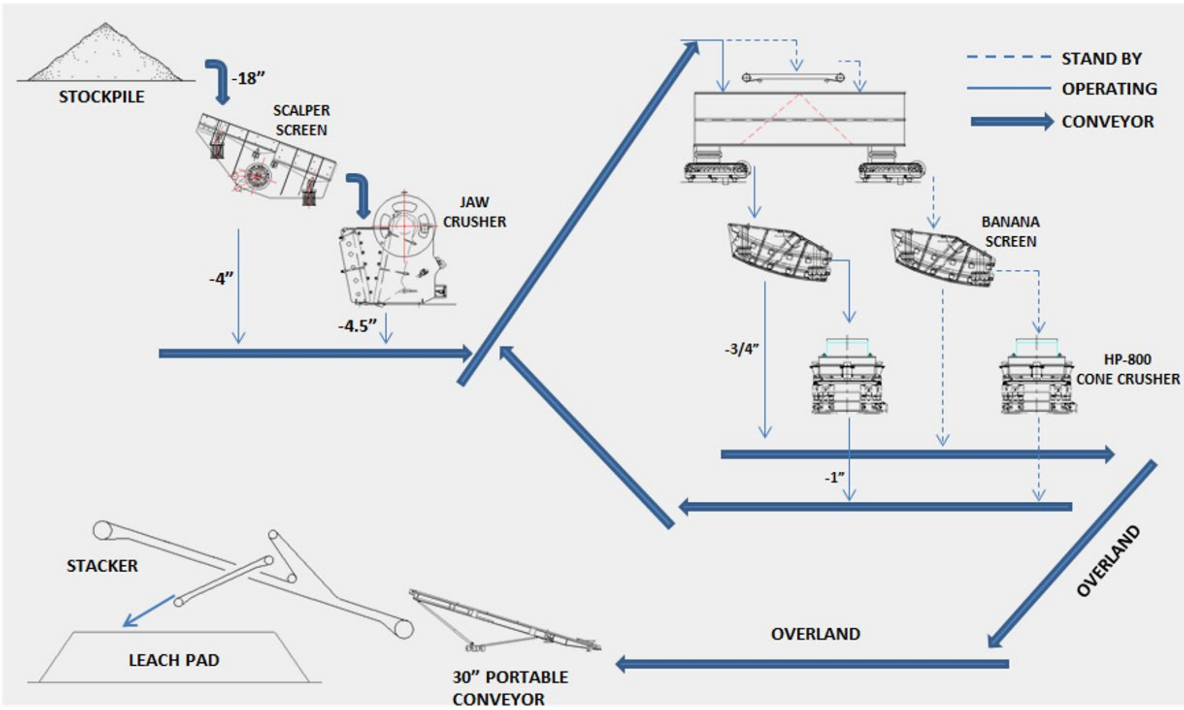
Source: Equinox Gold.

Figure 17-1: Simplified Los Filos Processing Flowsheet

17.1.2 Heap Leach Process Description

Ore Delivery and Crushing

Ore classified as low-grade is stacked as ROM ore on Pad 1 for leaching. High-grade ore is crushed to P_{80} 19 mm, agglomerated with lime and cement, and transported by conveyors as Crushed ore to Pad 2 for leaching in 5 m lifts. The Los Filos crushing flowsheet is shown on Figure 17-2.



Source: Equinox Gold.

Figure 17-2: Los Filos Mine Complex Crushing Flowsheet

The crushing circuit has a maximum operating capacity of 1,200 t/h; based on actual 2016 to 2021 production rates, depending on ore supply, crusher feed size distribution, and moisture content, the circuit normally operates between 830 and 875 t/h for 16 to 18 h/d for a total of 15,000 t/d on average.

High-grade open pit ore is end-dumped from 136-tonne-capacity mine haulage trucks near the primary crusher into a 200 kt stockpile without significant blending of ore types. Underground ore is end-dumped in a separate stockpile by 20-tonne-capacity dump trucks.

The ore is delivered to the jaw crusher feed hopper, which is equipped with a 400 mm grizzly and fed by a dedicated CAT 992 FEL from the stockpile. The separately stockpiled underground ore is fed to the crusher at a rate of 2,000 t/d. The underground feed frequency is 5 d/week on average. Grizzly oversize material is broken down with a remotely operated stationary rock breaker on the grizzly or by a track-mounted rock breaker.

As shown on Figure 17-2, the major components of the crushing plant include a primary jaw crusher (Sandvik JM 1312) set at a 100 mm opening, and two secondary cone crushers (Metso HP-800) operated in closed circuit with double-deck banana screens to produce a P_{80} 19 mm final crushed product.

A scalping screen with 100 mm openings precedes the jaw crusher. Crusher tonnage is measured by a weightometer on Conveyor 1, which is calibrated monthly by Los Filos technicians and checked annually by the manufacturer. A cross-belt sampling system is used at the discharge end of one of the intermediate conveyors. The sampler automatically cross-cuts the discharge stream every 15 minutes throughout the shift. The collected sample is then reduced in size, dropping by gravity through a series of riffle splitters. The final shift sample, weighing 150 kg, is then taken to the laboratory for preparation and analyses. The shift samples are analyzed in the site laboratory for gold, silver, copper, and moisture content. A portion of the sample is retained and used as part of the weighted monthly average composite sample for column leach testing.

Crushed Ore Treatment and Transportation to Heap Leach Pads

In the past, ore has been agglomerated by adding 6 kg/t cement and 3 kg/t lime directly to the ore on the conveyor belt, along with barren solution sufficient to achieve a 9% moisture content. It had been expected that the cascading action of the ore from multiple conveyor drop points would be sufficient to agglomerate the ore. However, it has been determined that this procedure does not achieve the degree of ore agglomeration required for optimal heap leach performance.

A new conveying and drum agglomerating system was commissioned in May 2018 to improve the efficiency of ore transport and the quality of agglomerated Crushed ore. The new overland conveyor started at the eastern edge of Pad 1 (where the original overland conveyor ends) and extended across Pad 1 to the eastern edge of Pad 2. The new overland conveyor replaced all of the mobile grasshopper conveyors that had been used previously to stockpile Crushed ore in the middle of Pad 1; the mobile grasshopper conveyors were then relocated onto Pad 2 to transport Crushed ore from the end of the overland conveyor onto the pad. The new overland conveyor eliminated the need for material re-handling by the mine haul trucks, as well as re-handling by smaller loaders and excavators to place the material on the heap in lifts. The total length of the new overland conveyor is approximately 1,400 m.

A 3.7 m-diameter x 8.0 m-long agglomerating drum was installed on Pad 1 and integrated with the new overland conveyor to allow for continuous Crushed ore material to be stacked onto Pad 2. The agglomerating drum is powered by two 112 kW (150 hp) motors, and is installed at an angle of 3.7°. The agglomerator is operated at a nominal throughput capacity of 850 t/h and allows the ore to be held in the drum for 60 seconds, allowable time for making agglomerates, before discharging onto the overland conveyor. To produce the agglomerated product, lime is added at 3 kg/t for pH control, cement at 8 kg/t as a binding agent for agglomerates, and barren cyanide solution. The use of barren cyanide solution achieves more uniform contacting with cyanide solution during the leaching process. Lime, cement, and barren solution additions are controlled with PLC and a belt scale.

In 2019, a reversible conveyor belt was installed at the discharge point of the last new overland conveyor. The reversible conveyor allows feed to the grasshopper conveyors and radial stacker system for stacking open pit ore on Pad 2. When underground ore is being crushed, the reversible conveyor discharges onto six refurbished FLSmidth grasshopper conveyors, and deposits in the far south end of Pad 2. The purpose of separating the underground ore and the open pit ore is to allow better metallurgical accounting, and in anticipation of the possibility of re-handling the underground ore and processing it through a CIL plant in the future.

Heap Leach Pad Operation

Operation of the heap leach pads has evolved over the years since the Los Filos Mine Complex began operation. Two large geosynthetic-lined heap leach pads are in operation, both of which have been divided into two sections: one for Crushed ore and the other for ROM ore. ROM ore is currently stacked on Pad 1 and Crushed ore on Pad 2. Pads 1 and 2 cover 2,515,000 and 721,000 m², respectively, for a total of 3,236,000 m². As of June 2022, approximately 260 Mt of ore have been stacked on the heap leach pads. The current heap leach pad operating parameters are summarized in Table 17-1.

Table 17-1: Leach Pad Operation—2022

Ore	Lift Thickness (m)	Irrigation Rate (L/m²/h)	Cyanide Concentration (mg/L)	Irrigation Time (d)	Rip During Leach Cycle
ROM	10	8	300	180	No
Crushed	5	12	400	120	Yes

After 120 days of leaching, the drip lines are removed from the surface of the Crushed ore, and the top of the lift is ripped to a depth of 3.5 m using a CAT D11 dozer. Drip lines are reinstalled after ripping, leaching is resumed and continued for an additional 60 days. An anti-scaling agent (Zalta MA11) is added to prevent scale build-up in the leach pad irrigation system and ADR plant.

Adsorption-Desorption-Recovery Plant

The ADR plant is a conventional CIC recovery facility associated with a gold refinery that produces a gold-silver doré product.

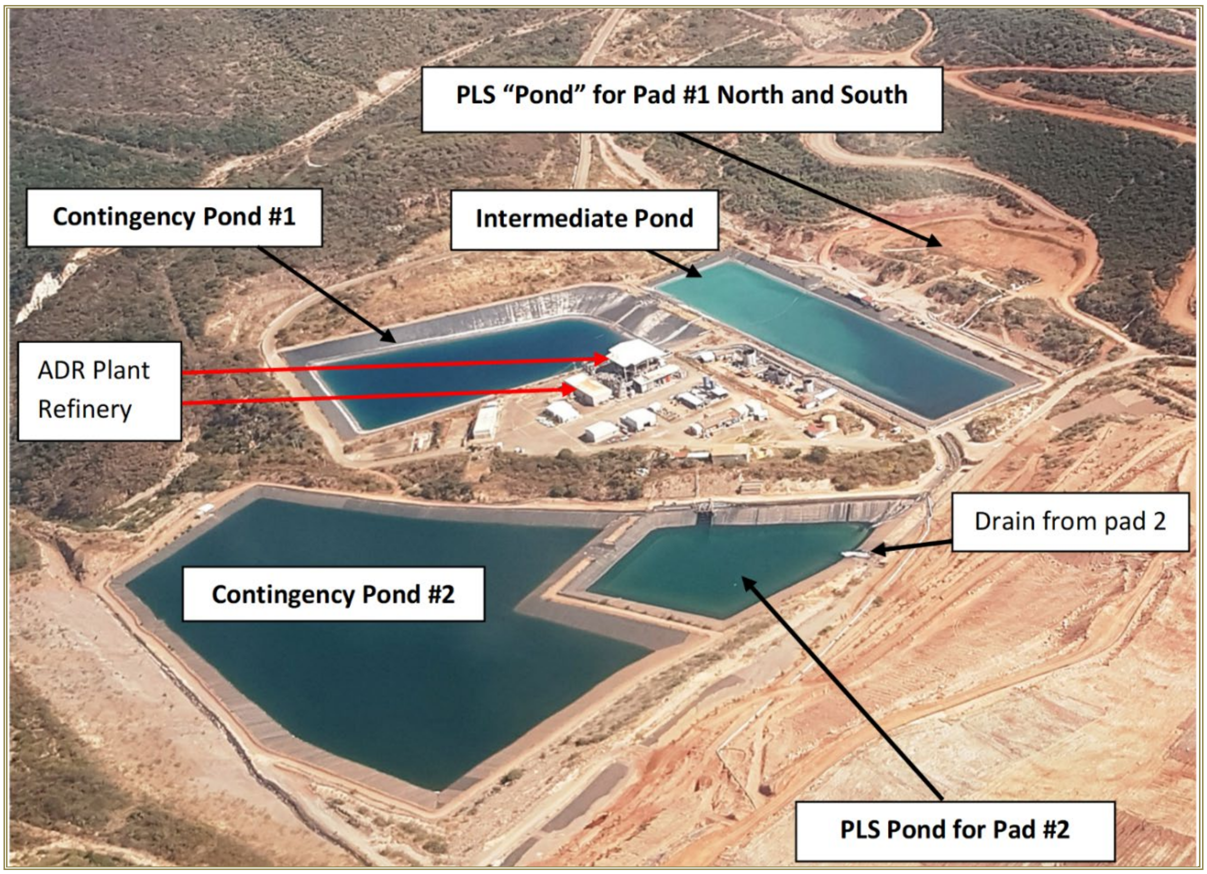
The plant's adsorption component consists of seven trains of four carbon columns, which serve to adsorb gold from the PLS ponds onto carbon. The PLS typically contains 0.12 ppm Au; after adsorption the barren solution typically contains 0.002 ppm, representing over 98% adsorption efficiency. Each carbon column has a volume of 15 m³, and is filled with 6 tonnes of carbon. Total PLS flow to the seven trains is approximately 6,100 m³/h. In 2019, the flow rate was reduced to 5,500 m³/h, which allowed for the operation of six trains of carbon columns. At the end of 2019, the Los Filos Open Pit stopped producing ore, and the application flow rate was reduced to 4,600 m³/h, resulting in the use of five trains. The nominal design flow for each train was 835 m³/h, while the maximum design flow was 950 m³/h. Ore placement was again reduced during 2021 and the first six months of 2022 allowing four carbon trains to be operational.

There are three carbon-stripping circuits, where gold is stripped from loaded carbon using a hot alkaline-cyanide solution. The concentrated gold strip solution is cooled, clarified, and circulated through four electrowinning cells where the gold is precipitated onto stainless-steel cathodes as a sludge that is removed by high-pressure water.

The refinery is a secure facility that includes the electrowinning cells, a filter to dewater the metal-rich electrowinning sludge, a mercury retort, and an electric induction furnace that produces the gold-silver doré product. The mercury content of Los Filos ore is very low, resulting in only 0.02 ppm in the PLS. Approximately 0.5 L of mercury is produced per year. The 500 to 1,000 oz doré bars are stored in a vault in the refinery until a security contractor transports them to a refinery off site.

The desorption circuit was stripping five lots containing 6 tonnes of carbon per day or 150 strips per month. The high frequency of stripping was producing 30 tonnes of carbon fines per month that contained 400 oz of gold. The carbon fines were collected and filtered in a plate-and-frame pressure filter, bagged, and shipped to an off-site refinery. During the fourth quarter of 2019, the number of strips per month was reduced to 45, resulting in a large reduction in the carbon fines generation—below 15 tonnes per month. The original purpose of stripping 150 times per month was to reduce the gold inventory on carbon by month-end. The new procedure of stripping less has reduced the amount of carbon fines generation while keeping the month-end gold inventory on carbon low, typically under 2,000 oz. During 2020 a bypass system was installed that directed barren solution and carbon fines, generated during carbon transfers, to the recirculation pond (intermediate pond on Figure 17-3). The bypass system stops carbon fines reporting to the heap leach pads and the potential for gold losses to the carbon fines during leaching of fresh ore stacked on the upper lifts.

An important aspect of the ADR facilities is the management of large volumes of water and leaching solutions. As shown on Figure 17-3, there are six ponds with large storage capacities, summarized in Table 17-2. The Pad 1 PLS flows into two separate ponds: one to collect leachate solution from the northern portion of Pad 1, and the other to collect solution from the southern portion. These two ponds were backfilled with gravel several years ago, but remain operational. The other four ponds are open.



Source: Equinox Gold.

Figure 17-3: ADR Plant and Associated Storage Ponds

Table 17-2: Los Filos ADR Pond/Reservoir Characteristics

Pond Name	Storage Capacity (m^3)
Pad 1 PLS Ponds (x2)	97,900
Pad 2 PLS Pond	147,000
Recirculation/Intermediate	180,000
Contingency Pond No. 1	448,450
Contingency Pond No. 2	973,720
Total Storage Capacity	**1,847,070**

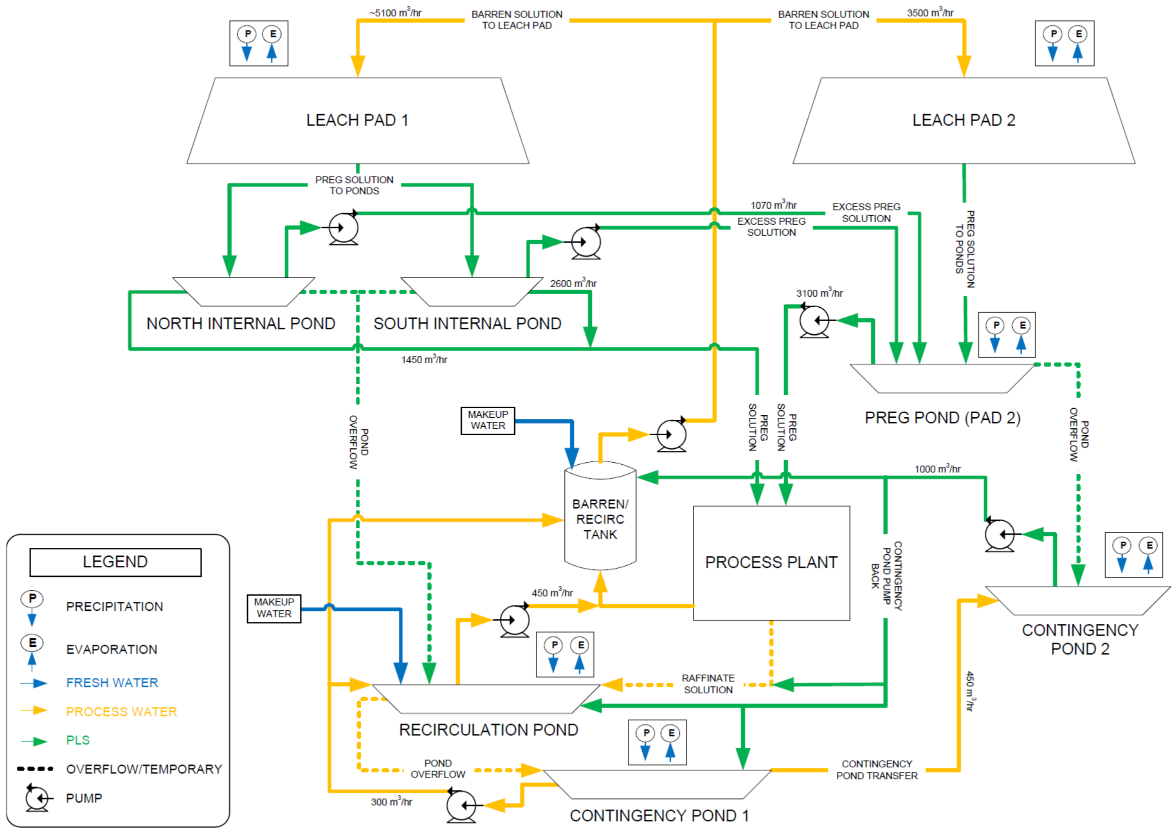
The solution volumes in each pond fluctuate throughout the year. Generally, pond volumes are at their minimum by the end of the October–May dry season, and increase over the June–September wet season with the accumulation of direct precipitation and runoff from the heap leach pads. In July 2017, a total of five evaporators were installed to reduce the amount of stored, barren solution that had collected in the two contingency ponds. These evaporators continue to operate until the solution volume in the contingency ponds is reduced enough to allow the two contingency ponds to store the 1:100-year storm event (150 mm in 24 hours) without risk of overtopping.

In May 2022, a pump was installed in Contingency Pond 2 that pumped solution to a field of sprays on inactive leaching areas to assist in evaporation of solution. The purpose of the system was to reduce cyanide consumption through evaporation and metal consumption in leached areas by using barren solution that contained 300 to 450 ppm of free cyanide concentrations. Contingency water contains no free cyanide concentrations, and it was determined that using high-pressure sprays on inactive areas of the pad(s) would allow for evaporation of water, reduce cyanide losses, maintain the contingency pond water volumes, and prepare the operation for the wet season.

Water and Solution Balance

The Los Filos Mine Complex heap leach system currently consists of an ADR plant, two heap leach pads, three process ponds, one recirculation pond, and two contingency ponds. A flow diagram based on the current infrastructure is shown on Figure 17-4.

In 2017, the heap leach water balance model was updated; the update primarily incorporated historical operational data collected from December 2011 through November 2016. The updated 2017 model focused on infrastructure and operational logic to address significant post-2011 changes to site operational strategies and infrastructure, primarily the addition of Pad 2, PLS Pond for Pad 2, and Contingency Pond for Pad 2.



Source: Golder Associates (2017).

Figure 17-4: Flow Diagram of Heap Leach Pads and ADR Plant Facilities

The 2011 water balance model was updated to provide a more accurate forecast tool amid rising solution-storage volumes in 2016–2017. Based on the 2017 updated water balance model, five evaporators were installed in mid-2017 to reduce the excess water volume in the contingency ponds and reduce the overflow probability through 2027 to less than 15% with recirculation. The evaporators are available to continually reduce the pond volumes prior to the onset of the wet season. Current water management meets appropriate operational requirements. The model has been updated on a monthly basis, with values added for stacked tonnes, precipitation, evaporation, and month-end pond volumes. The model is up to date and current to June 30, 2022.

Laboratory

The Los Filos Mine Complex analytical and metallurgical testing facilities are in a secure compound that includes the ADR plant, ponds, and reagent mixing facilities. KCA contributed the analytical and metallurgical procedures currently in use.

Approximately 300 solid samples are processed daily from the open pits, and 80 samples from underground. A 300 g subsample is cut from the 10 kg head sample using an automatic proportional sampler. The 300 g cut is finely ground in one of two ring-and-puck pulverizers. The fire assay routine includes inserting one duplicate, one blank, and one standard in a 24-sample batch. Two certified standards are available: 5.0 ±0.2126 g/t Au for fire assay/gravimetric assaying and 0.424 g/t Au for fire assay/atomic absorption (AA) assaying. Aqua regia is used to leach samples for silver and copper assays, and AA is used to measure the concentrations. Analyses completed in the site laboratory include gold, silver, and copper by AA; and sulphur and carbon using a Leco furnace. Cyanide analyses are performed by titration and colourimetric methods.

The assay laboratory is staffed with 21 persons and operates 24 h/d. In addition, the nearby metallurgical test laboratory is staffed with three persons who perform particle-size analyses, and bottle roll and column leach testing.

The metallurgical laboratory has two sets of leach columns for evaluating the heap leach characteristics of selected ore samples (350 mm diameter × 3 m high and 150 mm diameter × 2 m high). The leach test procedures are designed to replicate field conditions with respect to time, solution strength, and irrigation rates, and have been adapted from procedures used at KCA in Reno, Nevada.

Heap Leach Performance

Table 17-3 provides a summary of cumulative gold production from the time operations began, in 2007, through June 30, 2022. During the earlier years of the Los Filos Mine Complex, the heap leach did not achieve the anticipated gold recovery due to a variety of operational issues, including poor percolation of solution from the lack of effective ore agglomeration and a coarser crush size. At the end of 2014, overall gold recovery was reported at 49.5%, as compared to the predicted recovery of 61.1%, and the inventory of recoverable gold in the heap was booked at 480 koz.

KCA and Vancouver Technical Services—Goldcorp (VTS) completed a first audit (Audit 1) in January 2015. KCA agreed with VTS's revised booked inventory estimate of 390 koz Au (a downward adjustment of 90 koz Au), and both parties believed this estimate to be valid given the data available at the time, which would be verified through further data collection and analysis in 2015. An additional adjustment due to sulphide stacking was also applied, bringing the total final adjustment value to −115 koz Au (revised booked inventory of 365 oz Au as of Jan 2015). The final adjustment distribution is shown in Table 17-4.

KCA, VTS, and Los Filos Technical Services (LFTS) performed a second audit (Audit 2) in early 2016. Audit 2 concluded that agglomeration and percolation issues accounted for lower-than-predicted gold recovery. The booked value was adjusted in August 2016, with a further 70 koz reduction in the recoverable inventory. At the end of August 2016, the estimated recoverable gold inventory in the heaps was 267 koz.

KCA also noted numerous operational improvements that were positively affecting overall heap leach operations, including:

- Increased irrigation capacity and leaching time
- Increased cyanide addition and control
- Greater attention to achieving the desired crush size of P_{80} 19 mm

- New production and inventory modelling based on reassessing ore types and recoveries
- Implementing secondary gold recovery programs, including:
  - Re-handling and releaching of previously leached Crushed ore
  - Injection well program for Crushed ore.

Leagold purchased the Los Filos mine in April 2017, and an internal audit on the remaining recoverable ounces was performed in December 2017. It was believed that the recoverable ounces were overstated, resulting in a further reduction of 89 koz. The corrected recoverable ounces reported at the end of 2017 was 143 koz.

Table 17-3: Los Filos Mine Complex Historical Leach Production and Recovery To Date (June 30, 2022)

Parameter	Unit	Cumulative															
		2007	2008	2009	2010	2011	2012	2013	2014	2015(1)	2016(2)	2017(3)	2018	2019	2020	2021	2022
Stacked	koz Au	178	597	1,088	1,692	2,324	2,976	3,609	4,108	4,564	4,850	5,099	5,407	5,654	5,696	5,933	6.024
Recoverable	koz Au	100	340	622	994	1,395	1,787	2,188	2,512	2,686	2,794	2,870	3,077	3,246	3,277	3,696	3,753
Predicted																	
Recovery	%	56.0	57.0	57.2	58.8	60.0	60.1	60.6	61.1	58.8	57.6	56.3	56.9	57.4	57.5	62.3	62.3
Poured	koz Au	44	233	457	764	1,100	1,441	1,773	2,032	2,305	2,536	2,727	2,922	3,125	3,211	3,356	3,426
In-Process																	
Ending Inventory	oz Au	3,463	2,981	2,320	6,297	4,129	2,993	6,989	3,322	3,752	1,569	2,065	1,204	1,869	3,608	4,831	1,666
Left in Heap	koz Au	131	361	628	922	1,220	1,532	1,829	2,073	2,256	2,312	2,370	2,483	2,528	2,484	2,577	2,599
Recoverable Inventory	koz Au	56	107	165	231	295	347	415	480	381	258	143	155	122	66	66	52
Overall Au																	
Recovery	%	26.5	39.6	42.3	45.5	47.5	48.5	49.3	49.5	50.6	52.3	53.5	54.1	55.3	56.4	56.6	56.9
Efficiency	%	47.4	69.5	73.9	77.4	79.1	80.8	81.4	81.0	85.9	90.8	95.1	95.0	96.3	98.1	98.1	98.5

Notes: [1] Recoverable Au oz adjusted down by 115 koz to reflect adjustments in the recovery model based on KCA Audit 1 and year-end 2015.
[2] Recoverable Au oz adjusted down by 70 koz based on operational issues found in KCA Audit 2.
[3] Recoverable Au oz adjusted down by 89 koz as of December 2017 due to Leagold Internal Audit.

Table 17-4: Audit 1 Adjustment Distribution

Period No.	Dates	Adjustment (koz)	Cause of Adjustment	% Ore Blend (oz stacked)		
				Filos ROM	Bermejal ROM	Crushed
1	Jan 2007 to Dec 2008	18	Operational	59	41	0
2	Jan 2009 to Jun 2010	18	Operational	42	52	6
3	Jul 2010 to Dec 2012	15.7	Operational	14	54	32
4a	Jan 2013 to Dec 2014	36	Lower Crushed ore recoveries	100% due to Crushed ore		
4b	Jan 2013 to Dec 2014	27.3	Sulphides stacked on pads	18	37	45

An injection well program to extract recoverable gold was performed starting in 2016, and continued through mid-2018. It was decided in 2018 to stop the injection program and physically re-handle the leached Crushed ore on Pad 1 using haul trucks and excavators. The leached Crushed ore was excavated in 10 m lifts, blended with lime, and placed on a new area of Pad 1. The re-handling of the leached Crushed ore continued to May 2021 when it was completed.

In addition, a drum agglomerator was installed during 2018 (see Section 17.2.3). The drum agglomerator has enhanced heap leach operations by improving heap permeability, pH control, leach solution, and ore contacting.

Section 17.3 discusses secondary gold recovery programs that included re-handling and re-leaching of previously leached Crushed ore, and the injection well program for Crushed ore.

17.2 Secondary Gold Recovery Programs for Heap Leach Pads

17.2.1 Solution Injection, Surface Ripping, and Re-leaching on Pad 1

Starting in late 2016 and continuing through 2017 an active campaign recovered gold held in low-permeability, incompletely leached Crushed ore that was historically placed and leached on Pad 1. The program involved drilling 200 injection wells on a grid pattern of approximately 35 m centres and to a depth within 10 m of the underlying geosynthetic liner. The injection wells were drilled and a perforated steel casing was installed. The steel casing was perforated in separate zones at different depths that would allow high pressure injection of a leaching solution (450 ppm cyanide) and at high pressure (1,200 kPa) and flow (up to 180 m^3/h) for gold extraction. Hydrated lime (milk of lime) was injected into the wells prior to cyanide solution injection, to maintain a pH of 9.0 or greater to ensure that cyanide gas would not be produced. The injection of cyanide solution was typically applied for three to four hours per perforated zone in the well, and each well typically had three to six zones in total. The leachate solution passed through the perforations in the wells and into the surrounding ore. The leachate solution was collected in the existing solution collection pipework system at the base of Pad 1, where it drained into the Pad 1 South PLS collection pond, and was then pumped to the ADR plant for gold recovery. The high-pressure injection phase was applied to six wells at a time. After high-pressure injection of the six wells was complete, a surface irrigation of the heap was performed over the area that had undergone high-pressure injection. The surface irrigation was to assist in driving solution towards the base of the pad and into the PLS ponds.

Once the initial, high-pressure injection phase was completed, the wells were re-injected with a lower-pressure cyanide solution rinse over a period of several weeks to months, during which the wells were gravity fed at approximately 40 to 50 m^3/h. Each well was connected to a surface pipe network that supplied the leachate solution. A dedicated flow meter was attached to each well head to measure and monitor the flow into each well.

After the secondary phase of low-pressure injection was completed, the surface of the well field was scarified with a dozer and re-leached at a rate of approximately 8.5 L/h/m^2 for approximately two months. The completion of the surface re-leaching completed the first cycle of the Pad 1 re-leaching program.

17.2.2 Heap Leach Inventory

As mentioned above, after the adjustments made following the two audits and the Leagold correction, the heap leach gold inventory at the end of 2017 was 143 koz of recoverable gold. The re-handling and re-leaching programs performed from 2018 to the June 30, 2022, have reduced the overall heap leach inventory by 91 koz. The recovery of these ounces has reduced the overall heap leach recoverable inventory to 52 koz remaining as of June 30, 2022, as shown Table 17-3.

In 2019 it was decided to reprocess material that was abandoned at the north end of Pad 1, known as the Fault Zone. The area was abandoned in 2008 when a ground failure occurred and the integrity of the area was compromised. No further ore stacking or leaching has occurred in this area to date. A stability review of the area reported that 2.4 Mt of material grading 0.45 g/t Au could be safely removed and relocated to the south part of Pad 1.

Metallurgical testwork was performed on the Fault Zone material, and the expected gold recovery was determined to be 51.7% for Crushed material and 32.0% for ROM material. Based on the test results, recoverable gold was calculated to be 13 koz. By the end of 2020, 12 koz of gold had been recovered.

Also at the end of 2020, a total of 2.23 Mt of material containing 33 koz of gold had been removed and relocated. That material was either treated through the crusher and placed on Pad 2, or directly placed as ROM material on Pad 1 south. The amount of material crushed was reported as 660 kt grading 0.46 g/t Au, while the ROM placed was 1.6 Mt grading 0.45 g/t Au. The combined predicted recoverable gold placed was 13 koz. The final placement of Fault Zone material was performed in the first quarter of 2021, and was estimated to be 125 kt, with 1,750 contained ounces and 560 recoverable ounces of gold.

In 2017, the underground ore was crushed and placed separately from the crushed open pit ore on Pad 2. This segregation has allowed the Los Filos Mine Complex personnel to actively re-handle and re-leach the underground ore. Re-handling, re-leaching, and in-situ leaching of underground ore was performed in July and August 2020. Equinox Gold reported that this program resulted in 4,606 oz of gold being recovered. Further re-handling, re-leaching, and in situ leaching occurred in 2021 for the underground ore placed on Pad 2. It is estimated that an additional 1,134 oz was recovered in 2021.

The Pad 1 Crushed ore described in subsection 17.2.1 was re-handled in 2021. Upon completion of the re-handling program, an additional 6,420 oz of gold was recovered.

The three re-leaching programs have been instrumental in reducing the gold-recoverable inventory to 52 koz by June 30, 2022 . The re-leaching programs discussed above were completed by the end of 2021. Equinox Gold reported the 2021 ending inventory to be 66 koz. It is estimated that 14 koz of gold will be recovered in 2022 from ore stacked in Q4 2021. Ore stacked in Q1 & Q2 2022 is fully leached after 120 days for Crushed and 180 days for ROM ores. Depending on where the stacked ore is in the leaching cycle, it is estimated that 49 koz recoverable gold will be recovered in the third quarter of 2022 from the ore stacked in Q1 and Q2 2021. The remaining recoverable inventory in the heaps will be 17 koz. Table 17-5 shows the breakdown of the heap inventory as of June 30, 2022, which will be recovered by the end of 2022.

The remaining gold inventory is located on Pad 1 under the overland conveyor systems feeding and discharging from the agglomeration drum. These ounces will not be recovered until re-location of the agglomeration drum and overland conveying system to accommodate the LOM stacking plan is scheduled, at which time the material will be re-handled and leached.

Table 17-5: Breakdown of Remaining Gold Inventory as of June 30, 2022

Area	Gold Ounces (oz)
2021 Ending Inventory	66
Deferred Leaching from Q4 2021	-14
Deferred Leaching from Q1 & Q2 2022	-49
Remaining Inventory	17

17.3 Carbon-in-Leach Processing

The proposed CIL process feed comprises five main ore types: BUG, BOP, LFUG, LFOP, and GOP.

The average LOM gold grade is 2.23 g/t and silver is 14.0 g/t. A LOM ore production and CIL plant feed schedule are provided in Section 22.4. Gold and silver production has been estimated for the economic analysis by applying the CIL gold recovery formulae in Section 13.18.

The CIL plant design is based on a robust metallurgical flowsheet developed for optimum recovery, while minimizing capital expenditure and operating costs. As the CIL plant is an addition to an existing operation, existing site services (power, water, etc.) will be used, where appropriate, to supply the new facilities. A new ADR plant will be used to recover gold from the loaded carbon. The flowsheet of the new CIL plant includes crushing, milling, gravity, carbon in leach, carbon regeneration, thickening, and filtration of the CIL tailings for dry stack storage. A new pressure Zadra/electrowinning circuit will be constructed to strip gold and silver from loaded carbon, and the precious metals will be smelted to doré bars in a new gold room. An area has been allocated for construction of a future sulphidization, acidification, recycling, and thickening (SART) plant, if required.

The plant design is considered appropriate for a project with an expected 15-year operating life. The key criteria for selection of equipment type are cost, suitability for duty, reliability, and ease of maintenance. Due to the project schedule, fabrication and delivery times are used as criteria for selection between vendors of broadly similar equipment. The plant layout provides ease of access to all equipment for operating and maintenance requirements, while maintaining a layout that will facilitate construction progress in multiple areas simultaneously.

The key project design criteria for the plant are:

- Capacity to treat 10,000 t/d (3.65 Mt/a) of varying blends of the main ore types as determined by the integrated LOM production schedule.
- Crushing plant utilization of 75% and CIL and tailings filtration plant utilization of 91.3%, supported by the incorporation of surge capacity and standby equipment where required.
- The grinding plant will grind ores to P_{80} 0.075 mm and leach them in a CIL circuit for 40 hours to extract an estimated 90.6% contained gold and 38.8% contained silver.
- The grinding flowsheet includes gravity concentration.
- Gold will be recovered from the loaded carbon in a 10-tonne batch ADR plant.

- CIL plant tailings will be thickened, filtered, and delivered by conveyors to heap leach pads for stacking.
- Sufficient automation and plant control will be incorporated to minimize the need for continuous operator intervention, but will allow manual override and control if and when required.

The CIL design documents have been prepared, incorporating engineering and key metallurgical design criteria derived from the results of historical and recent metallurgical testwork programs. The testwork is described in Section 13.

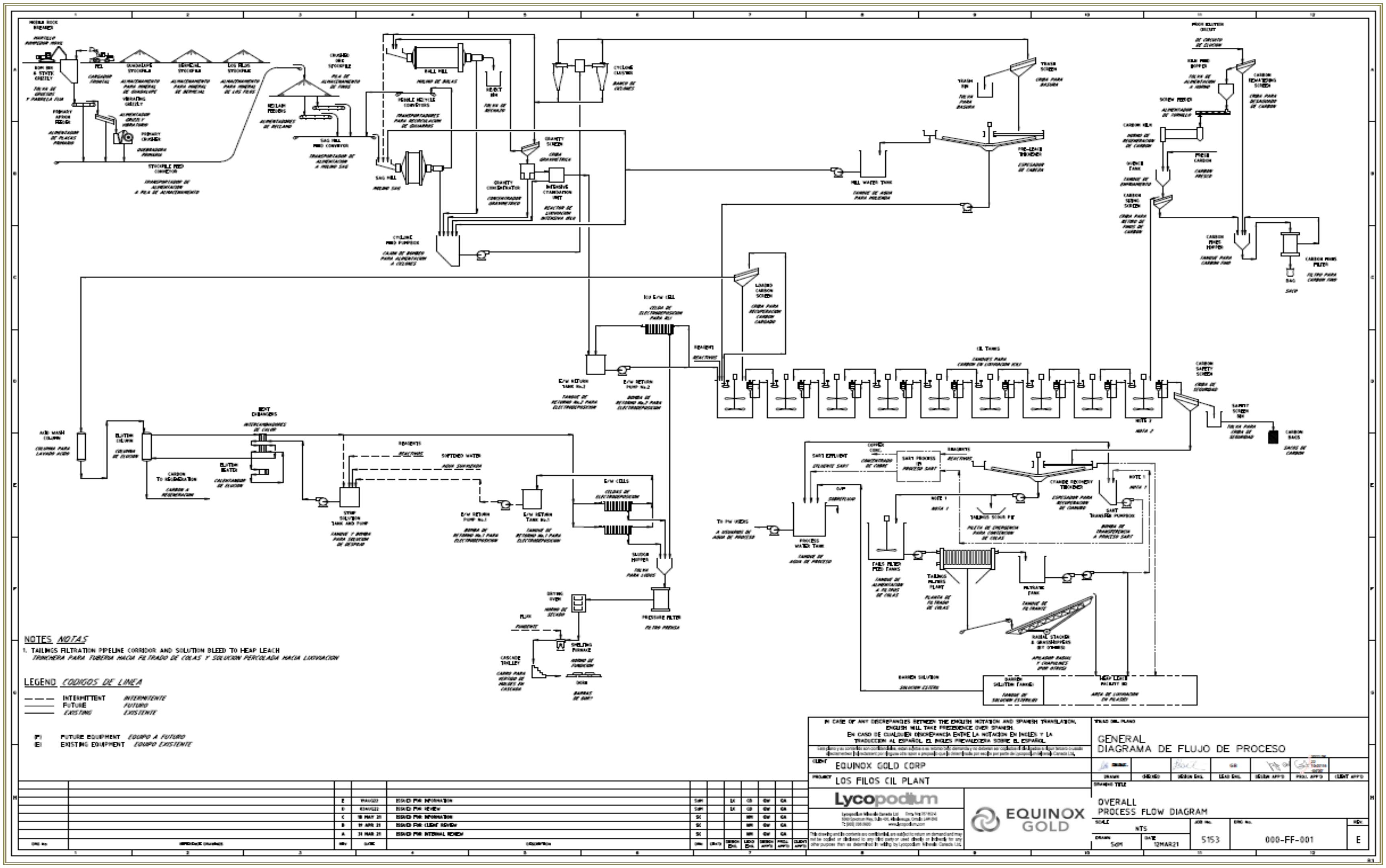
17.3.1 CIL Process Flowsheet

The CIL process incorporates the following operations:

- ROM ore is fed through a static grizzly to a bin providing 222-tonne surge capacity.
- An apron feeder, vibrating grizzly, primary crusher, and primary crusher discharge conveyor feed the crushed ore to the crushed ore stockpile.
- A crushed ore stockpile provides 18 hours of mill feed surge capacity.
- Two apron feeders withdraw from the crushed ore stockpile onto a SAG mill feed conveyor feeding the milling circuit.
- A SAG mill and ball mill, in closed circuit with hydrocyclones, to produce a grind size of P_{80} 0.075 mm and an overflow slurry density of 25% solids w/w.
- A pebble recycle conveyor on the trommel discharge of the SAG mill.
- A gravity circuit comprising gravity scalping screen, centrifugal gravity concentrator, and an intensive cyanidation unit (ICU).
- A leaching circuit with a pre-leach thickener and nine CIL tanks to achieve the required 40 hours of residence time for optimum leach recovery.
- A 10-tonne ADR plant for gold recovery with a carbon regeneration kiln.
- A gold room with electrowinning cells and an induction furnace.
- The SAG discharge oversize return conveyors designed such that a pebble crusher could be installed if required in the future. A cyanide recovery thickener for process water and cyanide recovery to provide an optimum slurry density for filtration.
- Plate and frame pressure filter to reduce the filtered tailings cake moisture content.
- Conveyors for transporting the filtered tailings to long-term storage.

Provision has been made in the layout of the CIL plant to install a SART plant, if required in the future, to treat the cyanide-recovery thickener overflow and filtrate to recover copper and cyanide from the circuit and allow the economic treatment of ores with a higher-cyanide soluble-copper content.

Figure 17-5 presents an overall process flow diagram depicting the unit operations incorporated in the selected process.



Source: Lycopodium (2022).

Figure 17-5: Overall CIL Process Flow Diagram

17.3.2 CIL Process Design Criteria

The process design criteria uses 10,000 t/d as the basis of design. Key process design criteria are outlined in Table 17-6.

Table 17-6: Summary of Key CIL Process Design Criteria

Criteria	Unit	Design	Source
Plant Throughput	kt/a	3,650	Equinox Gold
	t/d	10,000	Equinox Gold
Feed Blend			
Bermejal Underground	% (t/d)	26.5 (2,669)	Equinox Gold
Bermejal Open Pit	% (t/d)	4.2 (417)	Equinox Gold
Los Filos Underground	% (t/d)	2.4 (235)	Equinox Gold
Los Filos Open Pit	% (t/d)	17.9 (1,794)	Equinox Gold
Guadalupe Open Pit	% (t/d)	48.8 (4,884)	Equinox Gold
Operating Schedule			
Crushing Plant Utilization	%	75	Equinox Gold
Milling, CIL, and ADR Plant Utilization	%	91.3	Equinox Gold
Head Grade			
Gold	g/t Au	2.23	Calculated
Silver	g/t Ag	14.00	Calculated
Head Grade—Design			
Gold	g/t Au	4.0	Calculated
Silver	g/t Ag	20.0	Calculated
Overall Gold Recovery	%	90.6	Testwork
Maximum Silver Recovery	%	38.8	Testwork
Overall Copper Leached	%	9.1	Testwork
Ore Moisture Content	%	5	Equinox Gold
Ore Specific Density	t/m^3	2.62–2.77	Calculated
Ore Bulk Density	t/m^3	1.4–1.8	Lycopodium
Angle of Repose	degrees	35.0	Lycopodium
Crushing Work Index (CWi, average)	kWh/t	10.0	Testwork
Bond Ball Mill Work Index (BWi, average)	kWh/t	16.1	Testwork
Bond Abrasion Index (Ai, average)		0.091	Testwork
Grind Size (P_{80})	µm	75	Testwork
CIL Circuit Residence Time	h	40	Testwork
CIL Slurry Density	% solids (w/w)	51	Lycopodium
Number of CIL Tanks (Stages)		9	Lycopodium
Air Addition Rate	mg/L/min	0.05	Lycopodium
Cyanide Recovery Thickener Underflow Density	%	56	Testwork
Thickener Solids Loading	$t/m^2/h$	0.6	Testwork
Filtration Rate	$kg/m^2/h$	145	Testwork
Cake Moisture	%	15–18	Testwork

Criteria	Unit	Design	Source
Elution Circuit Type		Pressure Zadra	Lycopodium
Elution Circuit Size	t	10.0	Lycopodium
Frequency of Elution	strips/week	7	Lycopodium
Kiln Capacity	kg/h	500	Lycopodium
Future SART Plant Capacity	m^3/h	250	Lycopodium

17.3.3 CIL Process Description

Ore Receiving and Crushing

Ore will be loaded by a FEL from the Guadalupe, Bermejal or Los Filos stockpiles to the ROM bin. The FEL will also be used to clear any buildup of material from the grizzly. The ore stockpile will facilitate ore blending to ensure a uniform feedstock to the plant.

The feed ore bin will have a live capacity of approximately 222 dry tonnes (equivalent to 24 minutes of surge capacity). A static grizzly mounted on top of the bin will prevent the ingress of oversize material. A mobile rock breaker will break oversize materials. Ore will be drawn from the bin by a variable-speed apron feeder, discharging into the jaw crusher via a vibrating grizzly. The primary crushing circuit will reduce the underground and open pit ores from a nominal top size of 600 mm to a product size of P_{80} 122 mm. The jaw crusher is a C130 or equivalent with a 160 kW motor. Crushed ore and vibrating grizzly undersize will discharge directly onto the primary crusher discharge conveyor, which will convey the crusher product to the crushed ore stockpile.

The crusher discharge conveyor will be fitted with a weightometer to monitor and control the crushing area throughput by adjusting the output of the apron feeder variable-speed drive.

The crushing circuit will be serviced by a single dust-collection fan system.

A static magnet will be installed at the discharge end of the primary crusher discharge conveyor. Tramp metal will be manually removed from the magnet as required.

Crushed Ore Storage

The crushed ore stockpile will have a live capacity of 8,000 tonnes (equivalent to 18 hours of mill feed rate). Crushed ore will be withdrawn from the stockpile by two variable-speed apron feeders. The feeders will discharge onto the SAG mill feed conveyor, which will convey the crushed ore to the SAG mill feed chute. The SAG mill feed conveyor will be fitted with a weightometer, used for controlling the speed of the apron feeder, and hence the feed rate to the grinding circuit.

Quicklime will be added directly onto the SAG mill feed conveyor, using a variable-speed screw feeder. Lime addition will be adjusted by a pH meter in the CIL circuit and by the mill feed rate as measured by the conveyor weightometer. Raw water will be sprayed on the SAG mill feed conveyor to suppress dust.

Grinding and Classification

The grinding circuit consists of a SAG mill with a 5.3 MW variable-speed drive motor and an overflow ball mill with a 5.3 MW motor. The SAG mill is 7.92 m in diameter and has a 4.42 m equivalent grinding length (EGL). The ball mill is 5.80 m in diameter and has a 9.03 m EGL. The grinding mills are adequate for grinding expansion throughput.

Process water from the mill water tank will be added to the SAG mill feed chute to control the mill pulp density. The mill will discharge through a 15 mm trommel screen to the cyclone feed pump box.

Grinding media will be added to the SAG mill through a feeder and pebble discharge conveyor from a reload bin.

Undersize from the SAG mill trommel screen will gravitate to the cyclone- feed pump box, from where it will be pumped to the classifying hydrocyclones by one of two cyclone feed pumps (one standby). Process water will be added to the pump box to control the hydrocyclone feed density. The hydrocyclone overflow will gravitate via a vibrating trash screen to the pre-leach thickener. The trash removed (wood chips, etc.) will be discharged to a trash bin for disposal.

A portion of the cyclone underflow will gravitate to the ball mill feed chute. Ball mill discharge will flow back to the cyclone-feed pump box. The rest of the cyclone underflow will flow to the gravity concentration circuit.

Gravity Concentration

The gravity circuit will consist of a gravity scalping screen, a gravity concentrator, an ICU, and a dedicated electrowinning (EW) cell. The screen will be 2.44 m wide and 4.27 m long, and the gravity concentrator will be a Knelson 48-inch concentrator or equivalent. An ILR 1000 or equivalent unit will be required for intensive cyanidation. The EW cell will be a 12-cathode unit with 800 x 800 mm plates and a 1200 A rectifier.

A portion of the cyclone underflow will discharge onto the vibrating gravity screen. Gravity screen oversize material (>1.7 mm) is returned to the ball mill feed chute, and gravity screen undersize material (<1.7 mm) is fed to the gravity concentrator.

Concentrate from the gravity concentrator will be sent to the ICU for intense cyanidation. Tailings from the gravity concentrator will gravitate to the cyclone-feed hopper. Gravity concentrate will be leached with a solution made of sodium cyanide, sodium hydroxide, and a leach-aid (hydrogen peroxide) in an agitated reaction vessel. Once the leach cycle is complete, the PLS will be pumped to a storage tank. The residue within the reaction vessel will be washed, with the wash water recovered to the reaction vessel. The washed residue solids are then pumped to the cyclone feed hopper.

The ICU PLS will be pumped to the EW cell to recover gold and silver onto stainless steel cathodes. Periodically, the gold and silver sludge will be washed off the cell cathodes and bottom of the EW cell with a hand-held high-pressure washer. The sludge will be collected in a hopper and will then be filtered, dried, and smelted into doré ingots.

Pebble Crusher (Provision)

Primary crushed ore is ground in a SAB grinding circuit. Pebble generation will be low; hence the design caters for recycling only. However, provision will be made in the site layout for a future pebble crusher if required.

Pre-Leach Thickener

Trash screen underflow will flow to a 35 m diameter high-rate pre-leach thickener. Slurry will be thickened to 51% solids prior to being pumped to the CIL circuit. Pre-leach thickener overflow will report to the mill water tank.

Pre-leach thickener underflow will be pumped to the leach feed distribution box. From the distribution box, the slurry will gravitate to CIL Tank 1. If CIL Tank 1 is offline, the slurry can be diverted to CIL Tank 2 via an internal dart plug distribution system.

Carbon-in-Leach Circuit

The CIL circuit consists of nine mechanically agitated tanks operating in series. The tanks each have a live volume of approximately 2,800 m^3, providing a cumulative 40 hours of total leach residence time. The first CIL tank will operate with a carbon concentration of 15 g/L; subsequent CIL tanks will operate with a carbon concentration of 10 g/L.

Cyanide, as a 20% w/w solution will be added to the circuit by the cyanide dosing pumps. The operating pH of the circuit will be maintained between 10.0 and 10.5 by adding quicklime to the mill feed conveyor to maintain the protective alkalinity of the circuit and prevent the generation of gaseous hydrogen cyanide.

To aid with gold dissolution, low-pressure air will be added to the circuit to maintain oxygen in the slurry. Air will be supplied from air blowers and distributed down the agitator shafts.

Slurry will flow sequentially through the CIL circuit tanks driven by the hydraulic gradient across the circuit provided by inter-tank weirs. Activated carbon will be retained in each of the CIL tanks by a self-cleaning inter-tank screen. Carbon will be advanced through the CIL circuit, counter current to the slurry flow, using recessed vertical impeller pumps.

Daily, the loaded carbon recovery pump and screen will recover a complete batch of 10 tonnes of loaded carbon from the first CIL tank. The washed loaded carbon (screen oversize) will gravitate to the acid-wash column. Undersize from the loaded carbon screen will gravitate to CIL Tank 1 or CIL Tank 2.

To replace the recovered loaded carbon, regenerated carbon (or fresh carbon) will be pumped to CIL Tank 9 from the carbon regeneration circuit via the carbon distribution box. Carbon from this distribution box can bypass to CIL Tank 8.

Slurry discharging from the last CIL tank will gravitate to the carbon safety screen to remove any remaining carbon. Carbon safety screen underflow will have the ability to be split into two flows. A portion of the underflow will report to the cyanide destruction circuit (if required), while the rest will report to the cyanide recovery thickener.

Should a CIL tank be off-line for any reason, it will be possible to bypass the off-line tank using the pneumatically actuated gate valves within the CIL inter-stage launders. This will divert slurry to the next CIL tank in line.

The CIL tank area will be serviced by two sump pumps. The sump pump closer to CIL Tank 1 will return spillage to the leach-feed distribution box. The sump pump closer to the other end of the sump will return spillage to CIL Tank 6. In emergencies, the CIL bund area will overflow to the event pond. The combined volume of the bunded area and the event pond is sufficient to contain the contents of the largest vessel in the area, plus rainfall from a severe storm event, without overflowing to the environment.

ADR—Acid Wash, Elution, Electrowinning, and Gold Room

The ADR plant consists of one 10-tonne acid wash and one 10-tonne elution column, a 1639 kW strip solution heater, two heat exchangers, two EW cells, the gold room and associated tanks and pumps. The loaded carbon will be stripped by the pressure ZADRA method.

Loaded carbon will gravitate from the loaded carbon screen into the acid-wash column to undergo acid wash. Following acid washing, loaded carbon will be transferred to the elution column where the gold and silver will be stripped off the loaded carbon to produce a pregnant eluate. The pregnant eluate will then undergo electrowinning to produce metal sludge. The metal sludge will then be filtered, dried, and smelted in the gold room to produce doré.

Acid Wash

The acid-wash sequence is required to remove accumulated calcium scale (caused by the lime) from the carbon surface. This process improves elution efficiency and has the beneficial effect of reducing the risk of calcium magnesium slagging on the carbon during the regeneration process. The acid-wash column fill sequence will be initiated once the loaded carbon transport pump starts pumping to the existing loaded carbon dewatering screen. Carbon will gravitate from the loaded carbon dewatering screen directly into the acid- wash column. Once the acid- wash column is filled to the required level, the carbon fill sequence will be stopped.

The acid-wash cycle will use a 3% w/w hydrochloric acid solution. Hydrochloric acid will be diluted to 3% w/w by injecting a measured amount of acid into raw water in the storage and mixing tank. The diluted acid will fill the acid-wash column. The carbon will be allowed to soak in the dilute acid for 30 minutes.

Upon completion of the acid soak, the acid rinse cycle will be initiated; loaded carbon will be rinsed with water to displace acid solution and contaminants as per current standard operating procedure.

The acid-wash sequence will conclude with carbon being transferred to the elution column.

Elution

A solution of caustic, cyanide, and soft water is measured into the barren storage tank to achieve a final solution concentrate of 0.2% w/w cyanide and 1.0% w/w caustic. The tank is filled with raw water to a predetermined level. This barren eluate solution is heated, and flows through the loaded carbon bed in the elution column to strip the gold and silver from the carbon. Eluate is passed through the carbon until essentially all precious metals are recovered. The pregnant eluate solution is passed through heat exchangers to preheat the barren eluate and cool the PLS before passing it through the electrowinning cells to recover the gold and silver. After electrowinning, the eluate is returned to the barren eluate tank for reuse in the current or subsequent elution.

Upon completion of the strip, the barren carbon is cooled and pumped to the carbon regeneration circuit.

Electrowinning and Gold Room

The gold and silver stripped from the loaded carbon to the pregnant eluate will be recovered by electrowinning onto stainless steel cathodes. The electrowinning circuit will be equipped with two 20-cathode units with 1,000 x 1,000 mm plates, each with a 3800 A rectifier.

Periodically gold and silver sludge will be washed off the cell cathodes and from the bottom of the cells with a hand-held high-pressure washer. The gold-and-silver-bearing sludge draining from the cell will then be filtered, dried, and smelted to doré ingots. Slag will be manually transported to existing slag recovery system.

Carbon Regeneration

The 10 tonnes of stripped carbon will be pumped to carbon regeneration before returning to the CIL tanks. Stripped carbon will be pumped to the stripped carbon-dewatering screen, allowing excess water to be removed prior to the carbon discharging into the carbon-regeneration kiln feed hopper. Dewatering screen undersize will gravitate to the fine-carbon-collection hopper.

Carbon will be withdrawn from the kiln feed hopper by the kiln screw-feeder, and fed directly to the diesel-fired carbon-regeneration kiln, at a rate of 500 kg/h. The carbon will be heated within the horizontal rotary kiln to 650°C to 750°C to remove volatile organic foulants from the carbon surface and restore the carbon activity.

Re-activated carbon exiting the kiln will discharge directly to the carbon quench tank, where it will be cooled. From the quench tank, carbon will be pumped by the regenerated carbon- transfer pump to the carbon sizing screen. Sizing screen oversize will gravitate to CIL Tank 9 with an option to feed CIL Tank 8. Sizing screen undersize will gravitate to the fine- carbon collection hopper. Fresh carbon will be added to the CIL circuit through the carbon quench tank, as required to maintain the carbon inventory in the circuit.

Fine carbon from the carbon collection hopper will be filtered and collected in bags for sale and treatment off site to recover the residual gold on the carbon.

Cyanide Recovery Thickener

Carbon safety screen undersize will flow to a 35 m diameter high-rate cyanide recovery thickener. Slurry will be thickened to 56% solids prior to being pumped to the tailings filtration circuit. Cyanide recovery thickener overflow will report to the heap leach facility or to the future SART plant if required and constructed. Process water make-up will return as heap leach barren solution or SART effluent. The thickener has been sized for full flow rate.

SART Process (Provision)

Various ores at the Los Filos Mine Complex contain elevated levels of cyanide–soluble copper that may lead to relatively high levels of copper in the CIL plant. During the initial years of CIL plant operation, leach solution from the CIL plant will be bled into the Los Filos heap leach pads. The two heap leach pads have a large capacity to absorb the high-copper leach solution. Work completed by Elbow Creek Engineering suggests a SART plant will not be needed at the outset of CIL plant operations in 2024. However, a gradual build-up of copper in the heap leach pads is expected once CIL plant operations begin. It is currently forecast that by 2028 a SART plant may be needed to limit the levels of copper in heap leach solution to <200 mg/L. To address the potential future need for a SART plant, Elbow Creek Engineering and Kestrel Engineering Group developed a SART plant feasibility design and cost estimate.

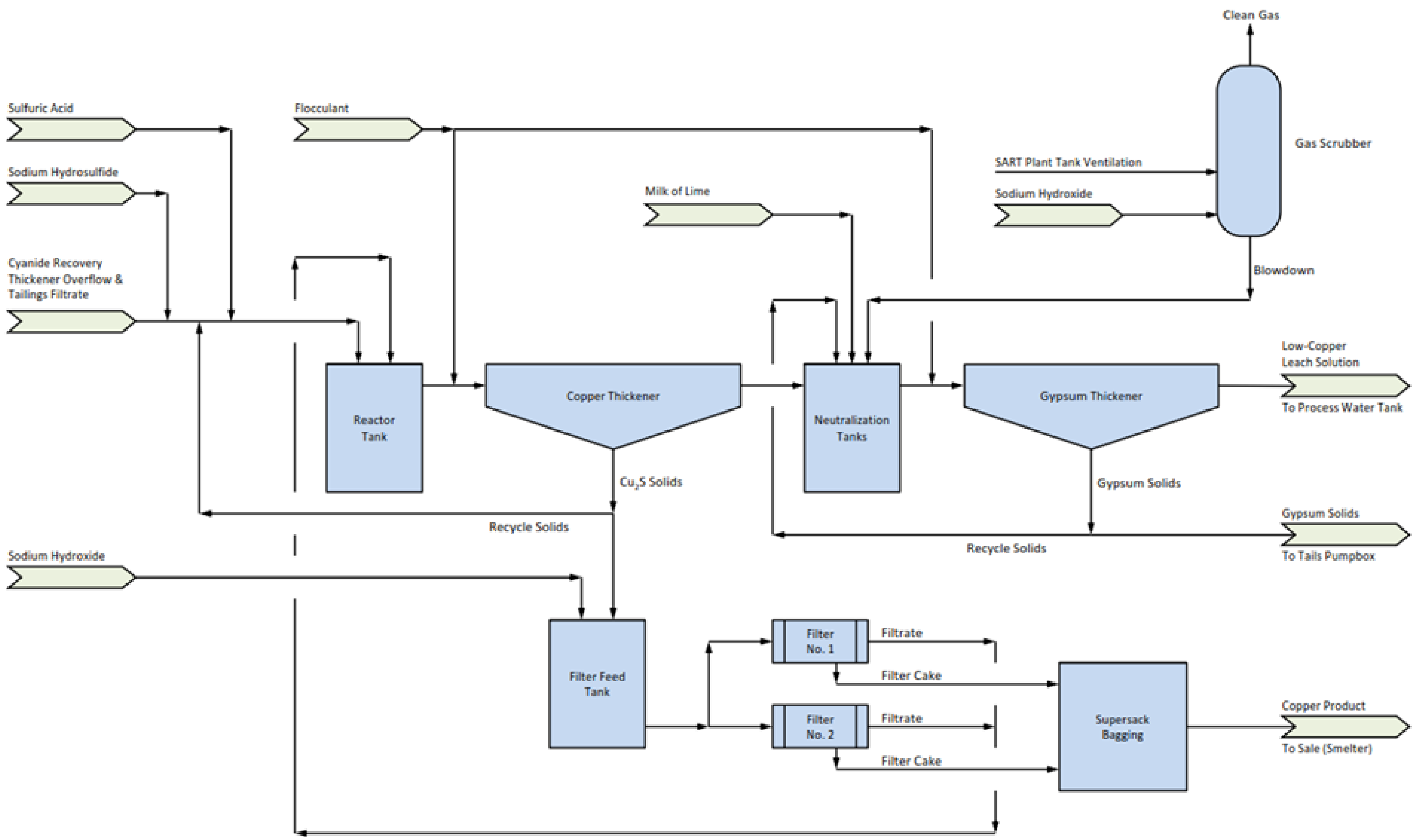
During the first few years of CIL plant operation, various leach solution flows and copper concentrations will be closely monitored, and as necessary, appropriate adjustments to the SART plant design criteria will be made prior to undertaking detailed engineering work for the plant.

The SART plant will remove copper (and other metals) from leach solution as copper–sulphide solids, and these solids will in turn be sold for their contained-metal values. Free cyanide will also be regenerated in the process as a result of copper removal, thereby reducing the overall consumption of sodium cyanide at the site. The SART process is shown on Figure 17-6.

Feed to the SART plant will consist primarily of overflow from the cyanide recovery thickener and the remainder from filtrate from the tailing filters. Excess filtrate will be diverted as a bleed-off to the heap leach operation. The feasibility design was developed for a SART plant feed flow rate of 250 m^3/h.

Sulphuric acid (H_2SO_4) will be injected into the SART plant feed solution to lower the pH to about 4.0, and sodium hydrosulphide (NaHS) will be added to precipitate copper–sulphide solids as synthetic chalcocite (Cu_2S). The overall removal efficiencies for copper, zinc, and silver are expected to be about 89% to 93%. A minor level of gold removal is expected. The copper–sulphide solids will be thickened, then filtered for final dewatering. The copper–sulphide filter cake will be bagged in supersacks, then transported off site for sale. Sales terms for the filter cake are anticipated to include payments for contained copper, gold, silver, and zinc.

Overflow solution from the copper–sulphide thickener will be neutralized to pH 10.5 using lime slurry. Gypsum solids formed during neutralization will be removed from the solution using a thickener, then pumped to the CIL tailings pump box. Treated solution from the SART plant will have a low copper concentration and high free-cyanide concentration; this solution will be recycled as process water in the CIL plant. The copper–sulphide section of the SART plant will have solutions at pH 4.0; at this pH, some degree of hydrogen cyanide (HCN) and hydrogen sulphide (H_2S) off-gassing will occur. To prevent gas releases, associated equipment will be fully enclosed and ventilated to a high-efficiency gas-scrubbing system. Hazardous-gas monitors will be located throughout the plant to ensure a safe working environment. Process equipment containing low-pH liquids will be constructed of stainless steel for corrosion resistance. Acid-resistant concrete coatings will be used in areas where sulphuric acid is handled. All areas of the SART plant will include secondary containment.



Source: Lycopodium

Figure 17-6: SART Process Flowsheet

If a SART plant is determined to be necessary in the future, a sales contract for the SART filter cake will be negotiated. Payments would be expected for the contained copper, gold, silver, and zinc. The estimated filter-cake production rate and metal contents are shown in Table 17-7. The data in Table 17-7 were sourced from mass balances calculated according to planned ore deliveries to the CIL plant and subsequent metal leach extractions.

Table 17-7: Estimated SART Filter Cake Production

Filter Cake Production Parameters	Range
Filter Cake Production (t/a dry basis)	1,200 to 2,360
Moisture Content (wt%)	40 to 50
Copper Content (wt%)	36 to 46
Zinc Content (wt%)	2 to 5
Gold Content (g/t)	1 to 5
Silver Content (g/t)	740 to 1,950

Tailings Dewatering and Dry Stacking

Thickened tailings (thickener underflow) will be pumped through a dedicated pipeline to the filter plant and held in two filter feed tanks, with a total of 6 hours of surge storage capacity, before being fed to the five tailings filters (four on duty, one on standby).

The tailings filters will discharge tailings as a filter cake with approximately 15% moisture. Compressed air will be used to dry the cake to achieve the cake moisture level to make it suitable for cake transport and stacking. Filtrate will be pumped to the heap leach facility.

Filter cake from each filter will discharge onto the corresponding filter discharge conveyor. The existing grasshoppers and radial stacker being used for placement of crushed underground ore will be relocated to the filter plant to receive filtered tailings. The filtered tailings will be stacked on Pad 1 (which is lined and already contains cyanide), then spread with a dozer and compacted to achieve the optimum compaction for the material.

Event Pond

The process plant is designed to operate in compliance with ICMC standards, with zero discharge of high-cyanide-containing process solutions to the local environment. To ensure compliance, the plant has been provided with a geo-synthetically lined event pond designed to contain any foreseeable spillage event. The event pond, combined with the bunded concrete areas within the plant perimeter, is designed to contain the run-off from an extreme storm event occurring simultaneously with the catastrophic failure of the largest slurry-containing vessel within the plant site. Material accumulating in the event pond will be returned periodically to the leach feed distribution box.

Plant Utilities

Mill Water

The 357 m^3 mill water tank will receive water primarily from the pre-leach thickener. This tank services the grinding circuit only, and allows it to operate as a semi-closed water system with very-low cyanide concentrations in solutions, thus minimizing the safety hazards associated with cyanide.

Process Water

The process water system will supply process water to the leach and cyanide recovery thickener areas. Cyanide recovery thickener overflow and barren solution from the barren solution booster station will be pumped to the process-water tank for reuse. Additional make-up water will be from the raw-water tank.

If the SART plant is in operation, gypsum thickener overflow will also report to the process water tank.

The process water tank is approximately 1,100 m^3, which allows for about 3 hours of residence time.

Raw Water and Fire Water

Raw water to the CIL plant is supplied by the existing water system. The raw-water system will be used primarily for the following users:

- Fire water for emergency use
- Gland water and cooling water services
- Reagent preparation
- Process water make-up
- Carbon desorption and intensive leach
- Safety showers and eye wash stations.

The raw and fire-water tank has a total capacity of 590 m^3, with 227 m^3 at the bottom of the tank reserved for fire water. A raw and fire-water tank with 1,000 m^3 capacity will be installed at the filter plant (228 m^3 at the bottom of the tank reserved for fire water).

Gland Water

Gland water will be sourced from the raw- and fire-water tank. The 262 m^3 gland water tank, equivalent to 2.7 hours of residence time, will supply gland water to all the pumps within the processing plant.

Potable Water

Potable water will be sourced from the existing Potable water system. The 74 m^3 Potable water tank will provide Potable water to safety showers and other Potable water users within the processing plant. The Potable water at the filter plant will be supplied by water tanker and stored in an 8 m^3 tank.

High-Pressure Air

Plant air at 700 kPag will be provided by two (duty/standby) high-pressure air compressors, operating in a lead-lag configuration. The entire high-pressure air supply will be dried to avoid the need for a duplicate instrument air system. Dried air will be distributed to the required plant areas for use in air-actuated valves, hose points for tools, and other general applications.

Plant air and instrument air in the filtration area will be provided by two high-pressure air compressors rated to supply air at 1,300 kPa.

Low-Pressure Air

Low-pressure air for providing oxygen to the CIL circuit and the cyanide destruction circuit will be supplied by three air blowers (two on duty, one on standby) and distributed to the leach/CIL and destruction tanks for injection into each tank down the agitator shafts.

LPG

LPG gas for the strip solution heater and the carbon regeneration kiln will be stored in a bulk gas storage facility, with a specialized gas-piping distribution system.

17.4 Reagent Storage and Use

17.4.1 Heap Leach Process

The current methods of reagent supply, storage, and distribution meet operational and safety requirements.

Truck–trailer transports deliver lime and cement daily as dry material, which is unloaded by air activation into designated silos. Caustic soda and hydrochloric acid are delivered separately by tanker trucks specifically designed for these hazardous chemicals.

Sodium cyanide is received daily as a solid in ISO containers, and is dissolved by circulating fresh water through the ISO container and transferring the dissolved cyanide into dedicated storage and process distribution facilities. Cyanide solution is then pumped to the suction side of the heap leach irrigation pumps for distribution on the heap leach pads. The cyanide receiving and mixing facility is separate from the ADR plant in accordance with the International Cyanide Management Code (ICMC).

The Los Filos Mine Complex is a member in good standing of the ICMC for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (Cyanide Code). A detailed audit was conducted for certification in December 2016, and the certification came in 2017. The annual membership fee has been paid for subsequent years and is current as of June 30, 2022.

Other chemicals, such as dust suppressants and anti-scaling compounds, are received in metal drums. Carbon is received in 1-tonne tote bags.

Other chemicals, such as dust suppressants and anti-scaling compounds, are received in metal drums. Carbon is received in 1-tonne tote bags.

17.4.2 Carbon-in-Leach Process

The major reagents used within the CIL process are:

- Lime (90% CaO content) for pH control
- Sodium cyanide for gold dissolution and stripping
- Sodium hydroxide for neutralization, detoxification, and stripping
- Hydrochloric acid (HCl) for carbon acid washing
- Activated carbon for gold adsorption
- Flocculant for thickening.

In addition, fluxes (silica, nitre, and borax) are required for smelting charge preparation, and anti-scalant is used as required to reduce scaling in the process water distribution, carbon wash, and stripping circuits. Sulphamic acid will be used to descale the elution heat exchangers as required.

If the SART plant is in operation in the future, sodium hydrosulphide (NaHS) and sulphuric acid will be required at the CIL plant.

Lime

Lime will be delivered to site in 20-tonne bulk tankers that are pneumatically off-loaded, using a blower, directly to the 120-tonne-capacity lime silo, equivalent to 71 hours consumption. Lime will be withdrawn from the silo by a variable-speed screw feeder and deposited directly onto the SAG mill feed conveyor.

Sodium Cyanide

Sodium cyanide briquettes will be delivered by 18-tonne isotainer truck, each carrying less than one day's consumption. To offload the trucks, the cyanide mixing tank will be partially filled with alkaline process water, and the cyanide dissolved in situ in the isotainers by circulating water from the cyanide mixing tank through the isotainer. After dissolution of the cyanide briquettes, the mixing tank will be topped up with process water to achieve a 20% w/v cyanide concentration.

Once mixing is complete, the 20% w/v cyanide solution will be transferred to the cyanide storage tank and distributed to the CIL circuit through one operating and one standby cyanide–circulation pump.

The area will be serviced by a sump pump. Spillage generated within this area will be pumped to the leach-feed distribution box.

Sodium Hydroxide

Sodium hydroxide pellets (caustic soda or caustic) will be delivered to site in 25 kg bags. These will be lifted into the caustic hopper and broken by the bag breaker. A rotary valve on the caustic hopper will ensure a slow addition of caustic pearls into the mixing and storage tank. Raw water will be added to the tank to make a caustic solution of 20% w/v. A metering pump will be used to deliver caustic solution throughout the plant.

Activated Carbon

Activated carbon will be delivered in 500 kg bulk bags. The carbon is introduced into the carbon quench hopper where it is slurried with water and conditioned to remove the friable edges of the carbon particles and the adhering carbon dust generated in transport. The slurry is pumped over the carbon sizing screen, with the coarse carbon particles added to the CIL circuit and the carbon fines discharged to the carbon-fine collection hopper.

Hydrochloric Acid

Hydrochloric acid will be supplied in 1 m^3 isotainers. A drum pump will transfer the HCL from isotainers to the HCl mixing and storage tank. A centrifugal pump will be used to deliver the HCL to the acid wash-column during acid wash.

The HCl area will be serviced by a sump pump. Spillage generated within this area will be pumped back to the HCl mixing and storage tank.

Flocculant

Powdered flocculant will be delivered to site in 25 kg bags. A vendor-packaged mixing and dosing system will be installed, which will include flocculant storage hopper, screw feeder, blower, wetting head, and mixing tank. Flocculant solution, at 0.25% w/v, will be aged in the flocculant mixing tank for a pre-set period before transfer to the flocculant storage tank for dosing to the thickener.

The flocculant area will be serviced by a sump pump. Spillage generated within this area will be pumped to the thickener feed box.

17.4.3 CIL Process Control System

General Overview

The general control philosophy for the CIL process will be one of a moderate level of automation and central control facilities to allow critical process functions to be carried out with minimal operator intervention. Instrumentation will be provided within the plant to measure and control key process parameters.

The main control room will house two PC-based operator interface terminals (OIT) and a server. These workstations will act as the control system supervisory control and data acquisition (SCADA) terminals. All key process and maintenance parameters will be available for trending and alarming on the process control system (PCS).

The PCS that will be adopted for the plant will be a programmable logic controller (PLC) and SCADA-based system. The PCS will control the process interlocks and control loops for non-packaged equipment. Control-loop set-point changes for non-packaged equipment will be made at the OITs in the control room.

Sampling and Assaying

Existing laboratory facilities will be used for analyzing control and metallurgical accounting samples.

Titration facilities and an on-line analyzer unit will be provided above the CIL tanks to monitor cyanide concentration in CIL process liquors.

Automatic samplers taking shift composite samples from the mill cyclone overflow and CIL tailings streams will provide the primary gold balance for the process plant.

Manual sampling of slurry and carbon in the leach circuit will be used to monitor the leach profile and provide end-of-month gold inventory measurements for metallurgical accounting.

Performance analysis of the existing elution and electrowinning circuits will be as per current procedures.

Basic metallurgical testwork protocols will be established on site to undertake simple bottle roll leach testing. This will be used to monitor current plant performance and the metallurgical properties of pre-production mining samples to ensure that plant performance can be predicted in advance.

17.5 Conclusions and Recommendations

17.5.1 Heap Leach

The QP makes the following conclusions and recommendations regarding the Los Filos heap leach operations:

- Conventional Crushed and ROM ore heap leaching is used to recover gold and silver from open pit and underground ore sources.
- The lack of proper ore agglomeration has resulted in poor heap permeability and poor gold leaching performance in the past.
- Steps have been taken to improve heap leach operating procedures by installing an agglomerating drum and overland conveyor system in mid-2018 to improve ore agglomeration and ore transport and stacking efficiency. In addition, an initiative to install an interliner on top of the current lift on Pad 2 is ongoing, which is expected to reduce cyanide consumption attributed to the low pH in the lower lifts of Pad 2.
- During January 2017 to May 2021, almost 184 koz of recoverable gold inventory were successfully recovered from Pad 1 and Pad 2 by the high-pressure injection and secondary re-leaching efforts.
- Ores from the Bermejal and Guadalupe deposits are expected to contain higher copper and sulphur grades, which may result in higher operating costs due to higher cyanide consumption and lower gold recoveries due to higher total sulphur. Metallurgical testwork programs on the higher copper and sulphur grades regarding cyanide consumption and gold recovery are being performed to understand the impacts.

17.5.2 Carbon-in-Leach

It is the opinion of the QP that the CIL process plant designed around the flowsheet and layout as summarized in this section of the Technical Report is suitable to treat the various ore types and tonnages indicated in the CIL feed schedule in the mine plan.

In 2020, Elbow Creek Engineering carried out an assessment for the requirement for a SART plant. A review of pertinent test programs indicated that a SART plant may be required in the fifth year of the CIL plant operation. During the first few years of the CIL plant operation, it will be important to closely monitor copper levels in solution. The high-cyanide-soluble copper will require operating optimization of the elution to reduce the copper content in the doré ingots.

18 PROJECT INFRASTRUCTURE

Major infrastructure on the Los Filos Mine Complex includes the following:

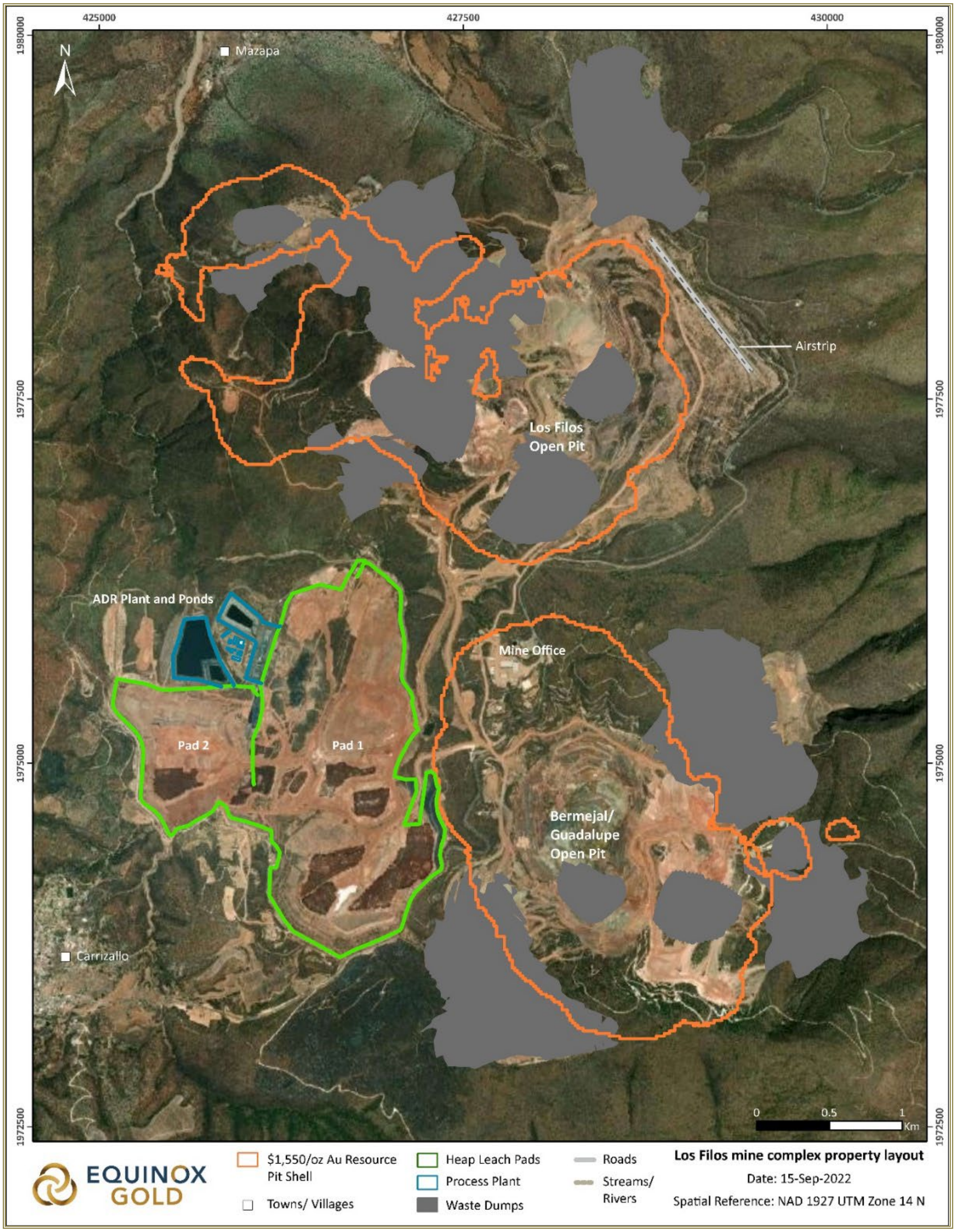
- Three open pits (Los Filos, Bermejal and Guadalupe)
- Three underground mines (North and South Sectors of the Los Filos Underground Mine, and Bermejal Underground)
- Thirteen waste rock dumps, including in-pit waste dumps at Los Filos and Bermejal Open Pits
- Primary and secondary crushing plants (up to 25,000 t/d capacity)
- Overland conveyors
- Agglomerator with cement and lime silos
- Two pregnant solution collection ponds (one for each heap), one recirculation pond, and two contingency water ponds
- ADR plant and gold refinery.

Support facilities on the property include the following:

- Access roads
- Haul roads from mining areas to waste dumps, crusher, and leach pads
- Open pit truck and equipment shop
- Underground equipment shops
- Welding shop
- Warehouse
- Administrative office facilities
- Underground offices (on surface)
- Underground mine dry (change house)
- Underground mine compressors
- Drill core logging and storage facilities
- Metallurgical laboratory
- Fire assay and AA assay laboratory
- Explosive storage facilities
- Power distribution facilities
- Fuel storage facilities
- Water distribution facilities
- Personnel training facilities
- Environmental monitoring facilities
- Airstrip (1,200 m long paved strip).

An aerial view of the Los Filos Mine Complex with its existing infrastructure is shown on Figure 18-1.

Additional infrastructure that is not directly on the Los Filos Mine Complex, but is nearby, includes a power substation, water supply line and pumping stations, and the residential camp.



Source: Equinox Gold.

Figure 18-1: Los Filos Mine Complex Property Layout

18.1 Access Roads and Logistics

Access to the Los Filos Mine Complex is via Federal Highway 95, travelling approximately 240 km south-southwest from Mexico City International Airport to Mezcala (4-hour drive) and from Mezcala via an 18 km paved road to the Mine site (0.5-hour drive).

Los Filos Mine Complex maintains a modern 1,200 m paved private airstrip on the site. Access by air is via Cuernavaca or Toluca Airports, with a 30-minute flight to the Los Filos Mine Complex. Cuernavaca is 115 km south of the Mexico City International Airport via Highway 95 (2 hours), whereas Toluca is west of the Mexico City International Airport, 70 km by road via Highway 15 (1.5 hours).

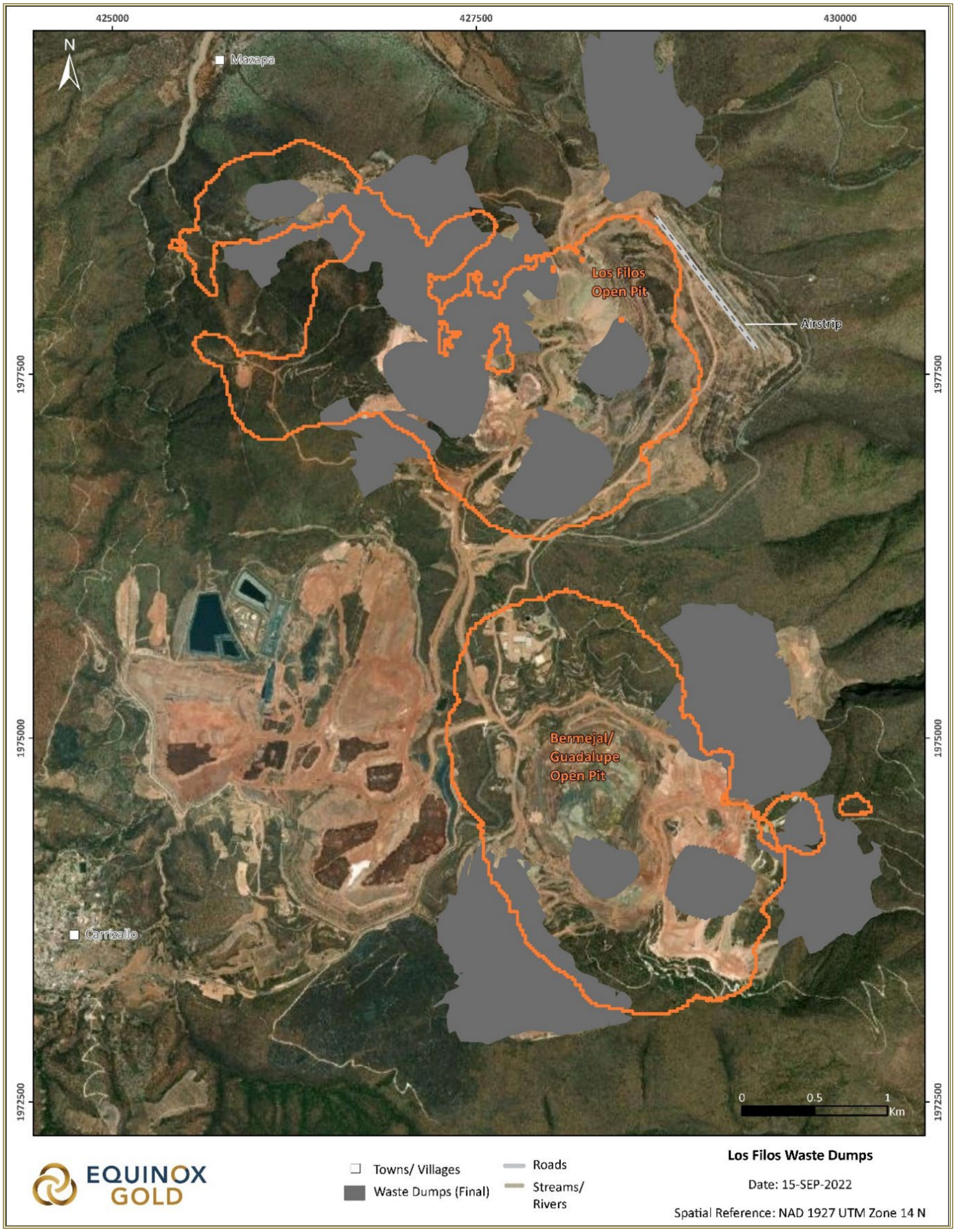
Supplies that are not available locally are typically trucked via Highway 95 to site from major population and industrial centres, such as Mexico City, Cuernavaca, Chilpancingo, and Iguala, or from port cities, such as Acapulco.

18.2 Waste Rock Facilities

In addition to the currently existing waste rock facilities (WRF), a number of new WRFs are proposed for disposal of waste rock from the open pits (Figure 18-2). Some of the proposed facilities will overlap existing WRFs, including in-pit WRFs. A total of 500 Mt of waste rock has already been placed on existing WRFs adjacent to the open pits.

Open pit mining operations are currently scheduled to continue until 2036 based on the current LOM plan, and approximately 802 Mt of waste will be mined from the open pits. The current facilities have a combined waste storage capacity of more than 800 Mt, of which 360 Mt are available near the Bermejal and Guadalupe Open Pits and 522 Mt in the Los Filos Open Pit area. Some existing WRFs have reached their capacities and reclamation activities have commenced. The current infrastructure is sufficient to support mining operations under the LOM plan.

The majority of waste rock generated from the Los Filos Underground and Bermejal Underground operations is used as backfill in the cut-and-fill stopes. The remainder of the waste rock from the underground operations is placed in small waste rock dumps near the portal entrances. Some of this material is being screened and used as aggregate material for CRF and is returned underground.



Source: Equinox Gold.

Figure 18-2: Waste Rock Facilities

18.3 Heap Leach Pads

Heap leach Pads 1 and 2 are currently in operation, each with a separate leachate collection system. Pad 1 has been loaded historically with both crushed and ROM but is presently loaded with only ROM ore. Pad 2 was initially loaded with ROM but is currently being loaded with only crushed ore. Mine trucks deposit ROM ore on Pad 1, and an overland conveyor, mobile “grasshopper” conveyors, and a radial stacker deposit crushed ore on Pad 2. Crushed ore passes through an agglomeration plant prior to deposition on Pad 2.

Pads 1 and 2 are connected, but pregnant solution from each pad reports to its own solution collection pond. A contingency pond is available for each pad for any solution overflow from the pregnant solution ponds caused by excess precipitation from storm events. A recirculation or intermediate pond is available for use for either pad.

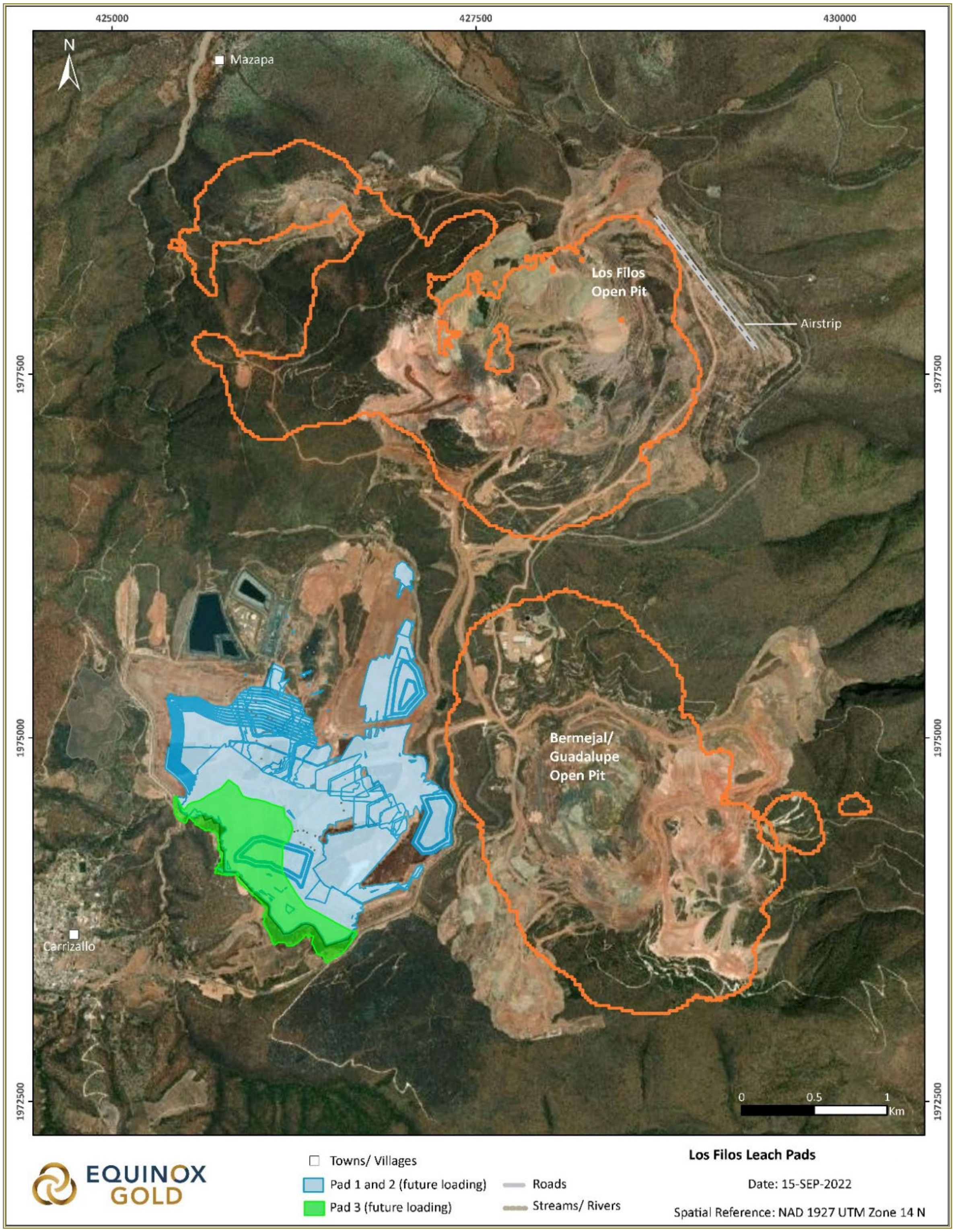
Pads 1 and 2 cover 251.5 ha and 72.1 ha, respectively, for a total of 323.6 ha. As of June 30, 2022, approximately 260 Mt of ore has been stacked on the heap leach pads. The remaining storage capacity on Pads 1 and 2 is 13.4 Mt and 31.6 Mt, respectively, or a total of 45.0 Mt. There is sufficient storage capacity for the LOM crushed ore on Pad 2; however, Pad 1 will not have enough storage capacity to store all the LOM ROM ore.

A third pad (Pad 3) will be constructed to provide additional storage for ROM ore. Pad 3 will be constructed at the southern end of Pad 2 and will connect with Pads 1 and 2. The design storage capacity is 63.5 Mt for a maximum 100 m leach ore stacking height. This new pad will be 54.5 ha and constructed in three phases, starting with the first phase in 2023. Pad 3 will have a geomembrane liner and solution-collection pipe network similar to the designs of Pads 1 and 2. Pregnant leachate solution collected from Pad 3 will be transported to the pregnant solution collection pond for Pad 2.

Stacking of the LOM ore on Pads 1 and 2, and the future Pad 3 are shown on Figure 18-3.

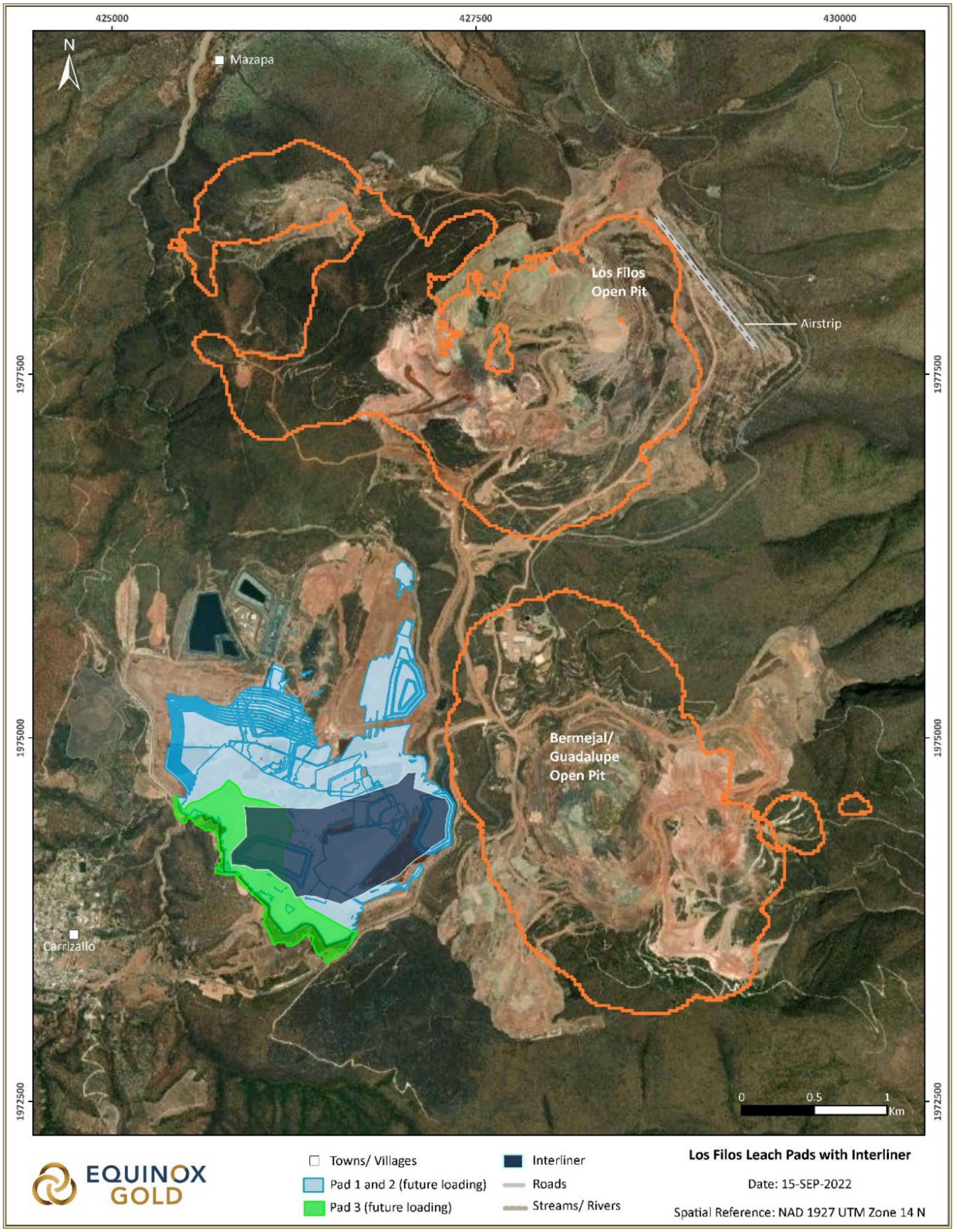
In addition to Pad 3, an “interliner” is proposed to be constructed on top of portions of Pads 1, 2, and 3 once the pads have been filled to their design capacity. The interliner will provide additional storage capacity for ROM ore. The interliner will comprise a geomembrane liner, solution pipe network and drainage layer of crushed gravel. The surface of Pads 1, 2, and 3 will be graded prior to installing the interliner to allow the pregnant solution to drain by gravity to the existing pregnant solution collection ponds for Pad 2. The interliner will allow for ore stacking above the 100 m design criteria for Pads 1 and 2. The interliner will provide approximately 82 Mt of additional storage capacity. An interliner constructed on Pad 2 in 2020 using a similar design. The interliner will be built in two phases, with the first phase required by Q1 2031 and the second by Q4 2032. The location of the interliner is shown on Figure 18-4.

The current and planned heap leach pad infrastructure will be sufficient to support mining operations for the LOM plan.



Source: Equinox Gold.

Figure 18-3: Heap Leach Pads (Existing and Expansions)



Source: Equinox Gold.

Figure 18-4: Heap Leach Pads Interliner (Future)

18.4 Filtered Tailings Storage Facility

Tailings will be generated from fine grinding the various ores during the CIL process. The tailings will be filtered through a series of pressure filter-presses to achieve a high degree of dewatering, with the resultant tailings cake disposed of in a filtered tailings storage facility (FTSF) on the eastern side of Pad 1 and close to the planned tailings filter plant.

A total of 45.7 Mt of tailings will be generated over the LOM. The overall slope of the filtered tailings will be 3H:1V or shallower, to increase stability and facilitate closure and reclamation of the slope face. To manage long-term surface erosion from wind and rain, the slopes of the filtered tailings will be clad with a waste rock shell, which will be progressively raised as the tailings pile is constructed.

The mobile grasshopper conveyors will transport filtered tailings from the tailings filter plant to the deposition area, where a radial stacker will deposit them; this the same type of equipment used for transporting and placing crushed leach ore on the heap leach pads. The filtered tailings will be spread and levelled by a dozer, in horizontal lifts of 0.3 m to 0.5 m thick, and rolled with a vibrating drum sheepsfoot roller to achieve the desired compaction. The tailings will be spread and disked as required to reduce the moisture content prior to compaction, to ensure that the final moisture content is within the specified limits to achieve the desired compaction and density.

During wet periods, compaction of the tailings must be completed immediately after placement, to enhance surface runoff and limit erosion of the tailings surface.

Contact water from the tailings will be collected within the existing lined area of Pad 1. This will allow runoff and any potential seepage through the tailings to be collected and managed the same way as leach solutions are currently managed in the heap leach pads.

As part of site preparation for FTSF construction, irrigation pipes will be buried in the surface of the spent leach material before the filtered tailings are placed on top. This will allow for future irrigation of the leach material for final rinsing, should it be necessary, prior to closure.

The FTSF will be developed in phases, as the entire footprint is not required for initial filtered tailings deposition. The first phase will be prepared by mid-2024 when the CIL plant and tailings filter plant are commissioned.

An infiltration-limiting or oxygen-reducing cover is currently not anticipated for the closure of the FTSF. The final surface will be reclaimed using the same protocol as the heap leach pads.

Preliminary stability analysis confirmed that satisfactory factors of safety can be achieved with the proposed design concept. Further filtered tailings materials testing will be performed to confirm the design criteria of the FTFS.

Seepage from precipitation through the compacted filtered tailings and into the underlying leach ore is expected to be minimal; however, permeability testing of the filtered tailings will be performed to confirm this assumption.

18.5 Water Supply

18.5.1 Water Management Components

The main water management components at the Mine site are fresh make-up water from the intake system at the Mezcala wells; water used in the ADR process plant (including heap leach irrigation); pit operations; other water uses (haul road dust suppression, potable water for the camp, water used at shops, and the concrete plant); diverted clean storm run-off water; and permitted discharges of treated sanitary wastewater.

18.5.2 Current Water Permit and Demand

The water concession permit is currently for 1.2 Mm^3/a of water extraction for industrial and sanitary services. The water requirement for the current operations is estimated at 1.0 Mm^3/a. The usage is 60% for processing open pit and underground operations (including drilling), 30% for road maintenance (dust suppression), and 10% for general services.

The 4.0 Mm^3/a water concession permit for groundwater extraction was granted in 2006, and was renewed in 2016 for another 10 years. The permitted extraction amount was reduced to 1.2 Mm^3/a based on recent usage by Los Filos Mine. An application to increase the water permit to 2.2 Mm^3/a is in process and is expected to be approved.

18.5.3 Water Source and Pumping Infrastructure

The Rio Balsas, a major river in the states of Guerrero and Michoacán, has a length of about 800 km and an average flow of 24,944 m^3/sec. No site-specific study has been conducted regarding the water supply assurance; however, the Rio Balsas is a significant water source, and the Los Filos operations water supply requirements are relatively small compared to the average flow of the river.

Procesos Mineros Metalurgicos S.A. de C.V. designed the fresh water supply and pumping system in 2006 for a pumping flow of 2,800 gpm. Fresh water is taken from the Rio Balsas via multiple inlets that transport water to a concrete storage container adjacent to the river, but at a higher elevation. The structure is identified as a well (*noria*) in the water concession. There are two underground "capture" inlets (tunnels) that extend to the edge and below the river bottom; it is not clear whether the tunnels are constructed in sand and sediments at the bottom of the river, or whether the tunnels are in bedrock. Each of the capture inlets has multiple openings from the main tunnels. There is also an additional perforated concrete structure at a higher elevation than the inlets, which transports river water directly to the well. The elevation of the perforations in the concrete structure are indicated to be approximately at the average river surface elevation.

Fresh water collected in the 30 m deep concrete storage container adjacent to the Rio Balsas is conveyed to the Mine site by four pumping stations, via a 15 km-long pipeline over an elevation gain of 1 km. Pumping Station 1, which is adjacent to the water collection system, contains three pumps, of which one is for back-up. Pumping Station 2, which is close to Pumping Station 1, has a filtration clarification system to remove sediments. An antiscalant is added to the water at Pumping Station 2. Sediments are discharged below the clarifiers, then pumped to a pond at Pumping Station 2. When the pond is full, sediments are transported to a reservoir at the Mine for final disposal. Pumping Stations 3 and 4 are booster stations. From Pumping Stations 1 through 3, water is transported through two 10 inch-diameter pipelines. From Pumping Station 3 to Pumping Station 4, the water is transported through one 14 inch-diameter pipeline.

The pumping capacity of the system is 175 L/sec (>5 Mm^3/a), which is more than required, even for a revision of the permitted amount to 2.2 Mm^3/a. The capacity of individual pumps at each station is listed in Table 18-1.

Table 18-1: Fresh Water Pump Station Details

Station Identifier	No. Pumps	Power		Capacity		Elevation (asl)	
		(kW)	(hp)	(L/sec)	(gpm)	(m)	(ft)
Pump Station 1	3	185	250	88.2	1,400	478	1,570
Pump Station 2	6	300	400	37.8	600	580	1,900
Pump Station 3	3	520	700	88.2	1,400	945	3,100
Pump Station 4	3	520	700	88.2	1,400	1,320	4,330
Storage Tank (Bermejal)	None					1,666	5,460

Fresh water pumped to the Mine is received in Distribution Tank 5, with a 5,000 m^3 capacity.

There are three potable-water treatment facilities. One is next to Distribution Tank 5, a second is at the ADR Plant, and the third at the Mine camp. Site personnel operate the water treatment facilities, and tested every six months to monitor for compliance with Mexican domestic-use water standards.

A site-specific assured water-supply study has not been completed, but the water supply appears to be stable. The Mexican authority, CONAGUA, has classified the local aquifer as available, thus it is believed that the water source will continue to be available for the life of the operations (CONAGUA, 2015).

18.6 Power Supply and Electrical

18.6.1 Existing Infrastructure

Mexico's electric utility, CFE, provides electrical energy to Los Filos, primarily from the 600 MW (megawatt) Caracol hydroelectric station on the Rio Balsas, approximately 50 km downstream of the town of Mezcala.

Power is delivered at 115 kV from the Mezcala main substation 8 km from site to the Los Filos 20 MVA substation (two, 10 MVA General Electric transformers), which is designed to have capacity for an additional 10 MVA transformer to be added for future Mine expansions via an additional bay in the existing substation. Current power consumption averages about 14 MW/a, or about 70% of the existing substation's power capacity, and peaks at 16 to 16.5 MW.

An emergency power plant was constructed during 2008 to provide backup power for the leach solution pumps and the gold refinery. The generators are housed within the ADR plant; there are two redundant CAT diesel generator plants installed (2,500 kVA, 16-cylinder, 13.8 kV output). There is a concrete foundation for a third unit if it becomes necessary.

Details of the other various diesel generators used for emergency loads at the site are provided in Table 18-2.

Table 18-2: Backup Diesel Generators

Name	Size, MW	Year	Make and Model	Load
G1	1.275 (1,593 kVA)	2006	CAT 3516 Generator SR4B	Various mill loads
G2	1.275	2006	CAT 3516 Generator SR4B	Various mill loads
G3	2.0 (2.5 MVA)	2006	CAT 3516 Generator SR4B	Various mill loads
G10 (5819)	1.75	2010	CAT 3516 Generator SR5	Tailings and thickener
G20 (5818)	2	2010	CAT 3516 Generator SR5	Pump house, camp, and administration
G1 Esker	1.825	2012	CAT	Main underground ventilation
G2 Esker	1.825	2012	CAT	Main underground ventilation
G3 Esker	1.825	2012	CAT	Main underground ventilation
G4 Esker	1.825	2012	CAT	Main underground ventilation

18.6.2 New Electrical Infrastructure

To accommodate the new CIL process plant, additional electrical infrastructure is required.

Currently, electricity is provided to Bermejal Underground at 13.8 kV from the existing 115 to 13.8 kV substation, via a 13.8 kV overhead line that has been tapped off the existing power distribution system to the portal at the north end of the Bermejal Open Pit. This line will be used until a new, 115 kV to 13.8 kV substation is commissioned for the planned CIL process plant. Following the commissioning of the new CIL substation, the existing substation will be decommissioned and the mine site will be fed from the new CIL substation.

The new substation will use two redundant 30/40/50 MVA power transformers that will operate independently under normal operating conditions, but will be sized such that each transformer has sufficient capacity to carry the full load of the mine site, to facilitate maintenance or unplanned outages (i.e., equipment failure). The power transformers will be equipped with on-load tap changers (OLTC) to assist with voltage regulation across the site with the increased load. The secondary side of the transformers will be resistively grounded to improve both the reliability and safety of the 13.8 kV power system.

The new CIL plant substation design will be similar to the existing substation, with outdoor bus bar structures and 13.8 kV circuit breakers. The 13.8 kV switchgear will include feeders to service the existing site loads as well as the CIL plant and Bermejal Underground.

The 115 kV transmission line that connects to the existing substation will be extended by approximately 4.5 km to the new CIL substation along the same right-of-way as the existing 13.8 kV transmission lines to the mine site.

18.7 Fuel Supply and Storage

Fuel and gasoline are trucked to site from Iguala, Acapulco, or Cuernavaca, and stored in five 75,000 L diesel tanks and one 40,000 L gasoline tank at the mine site.

18.8 Landfill Waste

Up to 2012, all landfill waste was disposed of in the Mezcala landfill facility. In 2013, Los Filos received authorization from the local municipality to construct a landfill with a 43,365 m^2 footprint. Los Filos subsequently constructed the landfill facility on site for combined Mine and municipal disposal of “Type D” urban solid wastes. The landfill was included in an MIA submitted for site expansion, which was approved in 2012 for 13 years of operation (2012 to 2025). The landfill is designated “Los Filos-Carrizalillo,” since it is used by the Los Filos Mine Complex and the nearby community of Carrizalillo.

The landfill has an HDPE geomembrane liner and a leachate collection system. Wastes are compacted, and a soil cover is placed over the wastes at least weekly. Collected leachate is captured in a vault and pumped to the area of waste disposal, where the leachate is placed on the waste or evaporated.

Designated wastes are separated for recycling and reuse. The design operating life of the landfill is now calculated to be 20 years.

18.9 Camp and Accommodations

A modern camp for housing Mine employees, contractors, and visitors is 9.5 km from the Los Filos Mine Complex and 2.5 km west of Mezcala. The Mine camp is currently able to accommodate 294 persons, and comprises a mixture of four two-storey hotel-style buildings housing 24 persons each, two two-storey hotel-style buildings housing 60 persons each, one two-storey building housing 10 persons, and 22 three-room houses accommodating about 68 persons. The camp is furnished with dining and laundry facilities, visitor offices, meeting rooms, indoor gymnasium, outdoor soccer field, and tennis and basketball courts.

The camp currently exceeds the workforce capacity.

18.10 Communications

Site communications include satellite service and use of VoIP (for telephones) and Internet protocols (for regular computer business and communications). Surface operations, including the open pits, use two-way radio communications and a wireless truck/shovel dispatch system supplied by Modular Mining Systems. The underground mines have a leaky feeder radio communications system.

18.11 Conclusions and Recommendations

The planned WRFs will provide adequate storage capacity for the LOM open pit waste rock, with the underground waste rock being used as backfill or deposited in small piles adjacent to the underground portals. New facilities are proposed, which will partially or completely overlap the existing WRFs and which include the new in-pit WRFs. Detailed stability analyses for these facilities will have to be completed in the next stage of design. These analyses may require foundation characterization and/or waste material characterization.

Waste rock is dumped in accordance with a strict SOP defining safe-dumping practices. Waste rock dumping is a high-risk activity, and careful consideration of the SOP, coupled with routine confirmation by the design engineers, are required on an ongoing basis to ensure safe operations.

Some of the existing WRFs have reached their capacities, and reclamation activities have commenced.

Pad 3 will provide additional storage for 63.5 Mt of ROM ore, and once Pads 1, 2, and 3 have been filled to their design capacity an interliner will be constructed on top of portions of all three, to provide an additional 82 Mt of storage for ROM ore. The interliner will allow for ore stacking above the 100 m maximum heap height design criteria for Pads 1 and 2. The construction of an interliner is the most economical solution to expanding the existing and future heap leach pads to store the current LOM Mineral Reserves.

The current and planned heap leach pad infrastructure will be sufficient to support mining operations for the LOM plan.

The existing lined heap leach facilities will provide ample footprint to accommodate deposition of the CIL tailings in the form of an FTSF, commonly known as dry-stack tailings. The selected location of the FTSF will require minimal preparation prior to use by sharing the existing leach pad liner and solution pipe network. Additional stability analyses based on laboratory characterization of the filtered tailings and a geotechnical foundation investigation program will have to be completed in the next stage of design.

19 MARKET STUDIES AND CONTRACTS

The Los Filos Mine Complex has standard industry contracts for the sale of gold doré and bullion, silver bullion, and carbon fines.

The Mineral Resource estimate is based on commodity prices of $1,550/oz for gold and $18/oz for silver. The Mineral Reserves estimate is based on commodity prices of $1,450/oz for gold and $18/oz for silver.

The Los Filos Mine Complex has existing contracts for the supply of major consumables, including diesel fuel, electricity, cyanide, explosives, cement, and lime.

19.1 Contracts for Sale of Products

19.1.1 Doré Refining and Gold Bullion Sales

The current contract for refining doré from the Los Filos Mine Complex is as follows:

- 0.01% to 0.05% deduction
- 99.95% to 99.99% payable.

The Los Filos Mine Complex currently has a gold bullion sales contract with Asahi Refining USA, Inc. The average selling cost is $5.50/oz.

19.1.2 Silver Bullion Sales

The Company's silver production from the Los Filos Mine Complex is subject to the terms of an agreement with Wheaton Precious Metals Corp. (WPM). Under this agreement, the Company must sell to WPM a minimum of 5.0 Moz of payable silver produced by the Los Filos Mine Complex from August 5, 2010, to the earlier of either the termination of the agreement, or by October 15, 2029, at the lesser of $3.90/oz or at the prevailing market price, subject to an inflationary adjustment. The contract price is revised each year on the anniversary date of the contract, which is $4.53/oz until October 19, 2022. On October 15, 2022, the contract price will be revised to an estimated $4.58/oz for the subsequent one-year period. During the six months ended June 30, 2022, silver revenue equalled less than 0.5% of the Company's total revenue. As of June 30, 2022, 2.1 million payable silver ounces had been sold to WPM under the terms of the agreement.

Once the 5.0 Moz under the agreement have been supplied, any future silver produced from the Los Filos Mine Complex is assumed to be sold at the prevailing market price, estimated to be $18.00/oz.

19.1.3 Carbon Fines Sales

Los Filos Mine Complex has a carbon fines refining agreement with Enviro-Tek Global, LLC. Carbon fines volumes produced are approximately 350 to 650 t/a. Fines must be within a gold grade range of 200 to 1,200 ppm and silver grade range of 2,500 to 7,500 ppm. Payable terms are 95% for both gold and silver. Other deductions and penalties are in line with standard industry terms.

19.2 Commodity Prices

The gold price used for the Mineral Reserve estimate is $1,450/oz; for the Mineral Resources it is $1,550/oz. A silver price of $18/oz was used for both the Mineral Resources and Mineral Reserves. Mineral Resource and Reserve pricing as of June 30, 2022, is provided in Table 19-1.

Table 19-1: Commodity Pricing for Mineral Resources and Mineral Reserves

Commodity	Unit	Mineral Resources	Mineral Reserves
Gold	$/oz	1,550	1,450
Silver Base Price	$/oz	18	18

The economic model uses a gold price of $1,675/oz and a silver price of $4.53/oz that is escalated annually based on the price received under the WPM Contract. Once the 5.0 Moz under the WPM Contract have been supplied, the silver is assumed to be sold at the prevailing market price, estimated to be $18.00/oz.

The New York spot gold price on June 30, 2022 was $1,819/oz and the silver price was $20.75/oz.

19.3 Contracts and Agreements

19.3.1 Fuel Supply Agreement

The Los Filos Mine Complex has a freight-on-board (FOB) sales agreement to purchase fuel from PEMEX Transformación Industrial, S.A. de C.V. (PEMEX). Fuel is trucked from PEMEX stations at Iguala or Acapulco to a service station near the town of Carrizalillo and the open pit maintenance shops. The mine is responsible for supplying and maintaining this service station. Transportation is executed by Transportes Fervic, S.A. de C.V., a transportation company contracted by the mine that has been authorized by PEMEX.

The contract with PEMEX is valid to July 31, 2022, and the contract for fuel supply is valid to January 07, 2023, after which it can be renewed for an additional five years.

19.3.2 Power (Electrical) Supply Agreement

The Los Filos Mine Complex has a sales agreement to purchase electricity and to transmit this electricity with the government utility service, Comisión Federal de Electricidad (CFE).

19.3.3 Cyanide Supply Agreement

The Los Filos Mine Complex has a sales agreement to purchase sodium cyanide from The Chemours Company Mexicana S. de R.L. de C.V. The agreement with Chemours runs until December 31, 2022, and can be extended. The terms are within industry norms for supply of sodium cyanide within Mexico.

19.3.4 Explosives Supply Agreement

Los Filos Mine Complex has an agreement with Explosivos Mexicanos S.A. de C.V. to supply blasting materials. The current agreement runs until December 31, 2022 and is renewed automatically each year.

19.3.5 Cement Supply Agreement

Los Filos Mine Complex has an agreement with SYELSA Construcciones, S.A. de C.V. to supply cement for use in shotcrete for Los Filos Underground, Bermejal Underground, and in agglomeration of the heap leach ore. The current agreement runs until December 31, 2022 and can be extended.

19.3.6 Lime Supply Agreement

Los Filos Mine Complex has an agreement with Calidra de Oriente S.A. de C.V. to supply lime for use in agglomeration of the heap leach ore. The current agreement runs until June 30, 2024 and can be extended.

19.4 Conclusions and Recommendations

- Equinox Gold is able to market the doré produced from the Los Filos Mine Complex and will do so in the future.
- The terms contained within the sales contracts are consistent with standard industry practice and are similar to contracts for the supply of gold doré elsewhere in the world.
- Silver production is sold to WPM through a long-term contract.
- Metal prices for projected revenue have been reviewed by the QP and are appropriate for the commodity and for the mine life.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

The Mexican federal Government department responsible for environmental matters is the Secretary of the Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales [SEMARNAT]), which has seven decentralized sub-departments with varying degrees of authority:

- National Institute of Ecology and Climate Change (Instituto Nacional de Ecología y Cambio Climático [INECC]): responsible for technical and scientific research to inform the design and development of environmental policy and standards, and to support decision making in areas related to ecosystems and climate change.
- Federal Prosecutor for the Protection of the Environment (Procuraduría Federal de Protección al Ambiente [PROFEPA]): responsible for enforcement, public participation, and environmental education.
- National Water Commission (Comisión Nacional del Agua [CONAGUA]): responsible for managing water resources, granting water extraction or water use licenses, and regulating wastewater discharges.
- National Protected Environmental Areas Commission (Comisión Nacional de Áreas Naturales Protegidas [CONANP]): responsible for regulating the designated areas for environmental protection. Mexico currently has 185 protected environmental areas (Áreas Naturales Protegidas [ANP]).
- National Forestry Commission (Comisión Nacional Forestal [CONAFOR]): responsible for developing conservation and restoration activities in forestry, as well as contributing to the formulation of sustainable forestry development policy and programs.
- Safety, Energy and Environment Agency (Agencia de Seguridad, Energía y Ambiente [ASEA]): responsible for ensuring that the hydrocarbon industry complies with environmental protection, social welfare, and economic development goals.
- Mexican Institute of Water Technology (Instituto Mexicano de Tecnología del Agua [IMTA]): responsible for research and technology to contribute to sustainable water management.

SEMARNAT has regional coordinating offices as well as federal delegation offices at the state level.

SEMARNAT and its offices, in conjunction with the decentralized agencies, are responsible for supervising and overseeing the following four main areas:

- Preservation and sustainable development of ecosystems and biological diversity
- Pollution prevention and control
- Hydrological resources integral management
- Climate change.

Mexico's environmental protection system is based on the General Law of Ecological Equilibrium and the Protection of the Environment (Ley General de Equilibrio Ecológico y la Protección al Ambiente [LGEEPA]). Under LGEEPA, numerous regulations and standards for environmental impact assessment, air and water pollution, solid and hazardous waste management, and noise have been issued.

Environmental laws require the filing and approval of an environmental impact statement (Manifestación de Impacto Ambiental [MIA]) for all exploitation work and for exploration work that does not fall within the threshold of a standard issued by the federal government for mining exploration.

Mining companies must obtain a federal environmental license (Integrated Environmental License or Licencia Ambiental Unica [LAU]), which sets out the acceptable limits for air emissions, hazardous waste and water impacts, as well as the environmental impact and risk of the proposed operation.

A change of land use permit (cambio de uso de suelo) is also required when the project is going to remove native vegetation. This permit depends on a detailed study to determine impacts on flora and fauna.

20.1 Environmental Studies

Environmental baseline studies for the Los Filos Mine Complex were prepared to characterize the environmental conditions of the area, including climate, fauna, flora, and hydrology, and were presented in 2005 to SEMARNAT for the original approvals and later expansions (Table 20-1).

Table 20-1: Environmental Baseline Studies

Baseline Studies	Report Author	Date Completed
Los Filos Mine Complex Environmental Impact Studies		
Laboratory analysis results	ALS Environmental	August 2004
Climate data	AIR Sciences INC.	November 2005
Air pollution emissions analysis	AIR Sciences INC.	February 2005
Soil analysis	Terra Quaesstum S.C.	December 2004
Physical environment assessment	Terra Quaesstum S.C.	December 2004
Assessment of possible existence of pre-Hispanic relics (archeology surveys)	Corporación de Servicios Eco Ambientales, S.A. DE C.V.	January 2005
Explosives study	Austin Bacis, S.A. DE C.V.	December 2004
Los Filos Expansion Environmental Impact Studies		
Flora and wildlife surveys	Universidad Nacional Autónoma de México	June 2005
Climate data	ALS Environmental	May 2005
Weather station information	SRK Consulting	July 2005
Air pollution emissions analysis	AIR Sciences INC	September 2005
Soil analysis	Facultad de Estudios Superiores, Iztacala (UNAM)	August 2005
Physical environment assessment	Universidad Nacional Autónoma de México	July 2005
Explosives study	DUFIL, Sistema de Fragmentación de Roca	June 2005
Physical environment assessment	pH Environmental Consulting	March 2007
Climate and landscape study	pH Environmental Consulting	January 2007

The Los Filos Mine Complex is in a rural area of Guerrero State, Mexico, in an area that has a low population density and no protected areas designated by federal, state, or municipal entities. The environmental conditions are summarized in this section.

20.1.1 Climate

The Los Filos Mine Complex is in a tropical arid zone. Average annual temperature ranges are approximately 18°C to 26°C. The area is characterized by distinct dry and wet seasons. Climate conditions during the wet season (June through September) are hot and humid. Guerrero is a zone that can be affected by tropical storms and hurricanes.

Climate trends were recently evaluated using the Mine site's weather station data. The mean annual precipitation measured at the site from 2006 to 2021 is 884 mm/a. Based on the temperature data obtained from official sources, the mean annual temperature in the area is 24.6°C. Mean annual pan evaporation is 1,900 mm/a.

The prevailing winds are north-northwest, although the mountains can occasionally cause local changes in wind direction.

20.1.2 Soils

Soils were classified to understand the genesis of soils in relation to the soil-forming factors. This information is used to understand regions best suited for grazing livestock and farming.

Soils at the site include phaeozem (typically soft and with abundant organic material and nutrients), fluvisol calcareous (poorly developed soils composed of materials deposited by water), rendzina (thin soils with high clay content and abundant in organic material), lithosol (shallow rocky soils), regosol luvisol (poorly developed soils with little organic matter, very similar to parent rock), and luvisol chromatic (reddish- or yellow-colored, with high clay content).

The clay soils can be a benefit in the future should the closure activities require low permeability materials.

20.1.3 Seismicity

The site is in the high-risk Seismic Zone C per the National Seismic Service of the National Autonomous University of Mexico (Universidad Nacional Autónoma de México). There are no active faults within the Los Filos Mine Complex property.

20.1.4 Mining Wastes

The Los Filos Mine Complex generates waste rock and spent leach ore as part of the operations.

Geochemistry studies have been carried out to determine whether special management of waste rock is required to prevent potential future environmental impacts. Testwork included acid base accounting (ABA), multi-element assays, meteoric water mobility procedure (MWMP), and humidity cell tests.

The results of existing geochemical characterization programs consistently demonstrate that the majority of the waste rock from the open pits comprises net neutralizing material with limited sulphide content. The reason for this is primarily the carbonate host rock for both deposits. Locally, the waste from the Bermejal Open Pit can consist of sulphide-bearing material that shows the potential for acid generation and is managed appropriately, typically by being blended with neutralizing waste in the WRFs or within the in-pit waste dumps. Based on the current mine plan, up to 10% sulphide-bearing material is anticipated to be encountered within the Los Filos Open Pit and the Los Filos Underground operations.

Arsenic and antimony are likely to be mobilized under the circum-neutral to moderately alkaline conditions. All waste rock lithologies show the potential for arsenic release, and the carbonate rock, which comprises the majority of waste rock from the Los Filos and Bermejal Open Pits, shows the additional potential for antimony release.

These findings are supported by the results of the ongoing water quality monitoring data, which show that runoff waters associated with the waste rock dumps and pit walls are circum-neutral, but with consistently elevated levels of arsenic and antimony. These elevated levels were also found in baseline water quality studies prior to starting operations, suggesting current operations have had minimal impact on water quality.

The spent leach ore has been subject to characterization to determine the potential for environmental impacts (Leagold, 2018). A preliminary baseline study in 2005 was carried out on five residue samples from column leach tests from low-grade ROM ore and medium-grade (crushed) ores. The results indicate that the spent ore is net-neutralizing and has a low sulphide content. The short-term kinetic test, MWMP, indicated that the leachate pH is alkaline. Arsenic concentrations in the MWMP results were within the permissible limits. The spent ore was subsequently considered to be nonhazardous. A second phase of testwork was conducted in 2015 on ten samples that yielded similar results to the baseline study. All constituents in the MWMP extract were within the permissible limits. The spent ore samples were classified as non-hazardous.

20.1.5 Hydrology

The hydrologic conditions have been characterized based primarily on the CONAGUA regional reports for surface water basins and aquifers. The only permanent surface water body near the site is the Rio Balsas. The water in the Rio Balsas has a high sediment content and contains high concentrations of total aluminum, total iron, total manganese, and total lead. The dissolved metal concentrations are very low. Naturally occurring springs (or very shallow groundwater) were also identified in the current area of the heap leach pads. A gravity-flow dewatering system (i.e., underdrains) was installed to reduce the hydraulic head (i.e., pressure buildup) beneath the heap leach pads.

Limited hydrogeologic data were available during the baseline studies. There are three locations with groundwater depth data (two wells near the community of Mazapa and a spring east of the operating Los Filos Open Pit). Samples of water collected from Noria La Pileta, Noria Cachuananche, and the spring La Agüita had high concentrations of total and dissolved arsenic. The two springs near Carrizalillo had high concentrations of metals and total suspended solids. All water resources in the area had high concentrations of fecal coliform (Desarrollos Mineros San Luis, S.A. de C.V., 2014).

20.1.6 Flora

Field surveys were carried out on the Los Filos Mine Complex property to identify the vegetation types and to characterize the ecology. According to the surveys conducted for environmental permits for the Mine's expansion, there are multiple types of vegetation: deciduous tropical forest (with elements of secondary vegetation), sub-deciduous tropical forest, thorn forest, xerophytic scrub, oak forest, pine forest, and mesophyll mountain forest. The major types of vegetation present are typical of tropical deciduous forest, oak forest, and agricultural areas. Human activities have converted some areas from native vegetation to agriculture and pasture land. The area is considered to be of low sensitivity, due to the previous usages.

The flora studies reported 50 families, 103 genera, and 128 species, with the largest number of species in the families of Leguminosae, Asteraceae (15), Euphobiaceae (9), Burseraceae (8), Anacardiaceae (5), Bromeliaceae (4), Fagaceae (4), Graminae (3), Malpighiaceae (3), Moraceae (3), and Orchidaeceae (3). The most abundant species were grasses (43), bushes (36), and trees (34). Five plant species of commercial interest were identified on the Mine property.

A total of 255 plant species has been identified near the Los Filos Mine Complex property in the different environmental impact studies conducted. Of these, three species are protected under Mexican Standard NOM-059-SEMARNAT-2001 and all are outside of the mining disturbance areas. These protected species are:

- A hardwood tree species (*Syderoxylon capiri*), which is a threatened species encountered from Panama to Mexico
- A laurel tree (*Litsea glaucescens*) in danger of extinction
- A short cylindrical cactus species (*Mammillaria albilanata*) that is subject to special protection.

20.1.7 Fauna

Fieldwork was carried out on the Mine property to characterize the biodiversity of the Mine area. During the surveys performed for environmental permits for the Mine's expansion, there were 98 species of vertebrates, classified in 50 families, 88 genera, and a total of 670 individuals. There were 4 amphibian species encountered, 52 species of birds logged, and 25 species of mammals detected.

Field studies conducted for environmental impact assessments in different years have identified the following 18 species that have special conservation status according to the Mexican standard NOM-059-SEMARNAT-2001:

- In danger of extinction: *Leopardus wiedii* (margay), *Leptotila verreauxi* (white-tipped dove), and *Turdus rufopalliatus* (Rufous-backed thrush)
- Threatened: *Boa constrictor* (Mexican boa constrictor), *Lampropeltis triangulum* (milk snake), *Ctenosaura pectinate* (Mexican spiny-tailed iguana), *Coluber mentovarius* (neotropical whip snake), *Otus seductus* (Balsas screech owl), *Turdus infuscatus* (black thrush), *Heloderma horridum* (Mexican beaded lizard), *Herpailurus yagouaroundi* (jaguarundi), *Melanotis caerulescens* (blue mockingbird), *Penelope purpurascens* (crested guan), and *Leptonycteris curasoae* (lesser long-nosed bat).

- Special Protection: *Crotalus simus* (Central American rattlesnake), *Tantilla rubra* (Veracruz black-headed snake), *Buteo Jamaicensis* (red-tail hawk), and *Myadestes occidentalis* (brown-backed solitaire).

The Los Filos Mine Complex property lies on a migratory route for two bird species: la paloma de ala blanca (the white-winged pigeon) and la huilota (dove).

20.1.8 Comment on Environmental Status

There are no known environmental issues that could materially impact the Los Filos Mine Complex and its ability to continue operations or to declare Mineral Resources or Mineral Reserves.

There are no known environmental issues that could materially impact the facilities or activities, which includes the development and operation of the Bermejal Underground mine, the construction and operation of the CIL plant, the installation of the new electrical substation and associated power and water infrastructure.

20.2 Permitting

20.2.1 Permitting Agencies and Permitting Process

Guidance for the federal environmental requirements, including conservation of soils, water quality, flora, fauna, noise emissions, air quality, and hazardous waste management, derives primarily from the General Law for the Prevention and Integral Management of Waste (Ley General para la Prevención y Gestión Integral de los Residuos [LGEEPA]), and the National Water Law (Ley de Aguas Nacionales [LAN]). Article 28 of the LGEEPA specifies that SEMARNAT must issue prior approval to parties intending to develop a mine and mineral processing plant.

On June 7, 2013, the Federal Law of Environmental Liability (Ley Federal de Responsabilidad Ambiental) was enacted. According to this law, any person or entity that by its action or omission, directly or indirectly, causes damage to the environment will be liable and obliged to repair the damage, or to pay compensation in the event the repair is not possible. This liability is in addition to penalties imposed under any other judicial, administrative, or criminal proceeding.

Environmental permitting in the Mexican mining industry is mainly administered by SEMARNAT, which establishes the minimum standards for environmental compliance. SEMARNAT has set regulatory standards for air emissions, discharges, biodiversity, noise, mining wastes, tailings, hazardous wastes, and soils. The regulatory standards apply to construction and operation activities.

Three main SEMARNAT permits are required prior to construction and development of a mining project. An Environmental Impact Assessment (EIA), or Manifestación de Impacto Ambiental (MIA), must be filed with SEMARNAT for its evaluation and, if applicable, further approval by SEMARNAT through the issuance of an environmental impact authorization. In addition, the General Law of Sustainable Forestry Development (Ley General de Desarrollo Forestal Sustentable), indicates that SEMARNAT must grant authorizations for land use changes to industrial purposes. An application for Change of Land Use (Cambio de Uso de Suelo Forestal), must be accompanied by a technical study that supports the environmental permit application (Estudio Técnico Justificativo [ETJ). In cases requiring a change in forestry land use, a Land Use Environmental Impact Assessment is also required.

Mining projects must also include a risk analysis for the use of regulated substances, and an accident prevention program, which are reviewed and authorized by an inter-ministerial governmental body.

Once the MIA is submitted for review, the government publishes an announcement to allow for public review of the proposed project. If the government receives requests, a formal public hearing will be conducted. The government also requires that the mining company publish announcements in the local newspapers to provide an opportunity for public comment. Government review, comment, and approval of the environmental permit documents are estimated to be completed in three to six months; however, it should be noted that permitting can be delayed with requests for information or for political reasons.

Following the main approvals and receipt of the Change of Land Use authorization, there will be a number of permits to acquire from various federal agencies. The LAN provides authority to CONAGUA to issue water extraction and discharge concessions and specifies certain requirements to be met by applicants. Key permits include an archaeological release letter that is required from the National Institute of Anthropology and History (Instituto Nacional de Antropología e Historia [INAH]), an explosives permit that is required from the Ministry of Defense (Secretaría de la Defensa Nacional [SEDENA]) before construction begins, and CONAGUA must grant a water discharge and usage permit.

SEMARNAT will issue a project-specific LAU when the agency approves the project operations, which states the operational conditions and requirements to be met. A construction permit will be required from the local municipality. Other local permits regarding non-hazardous waste handling, municipal safety, operating authorizations may also be required. The permitting process requires that the mining company has acquired the necessary surface titles, rights, and agreements for the land to be used for the project.

Hazardous wastes from the mining industry are highly regulated, and specific handling requirements must be met once they are generated, such as a hazardous waste generation documentation, log books, and handling manifests. Hazardous waste storage areas must comply with federal requirements.

20.2.2 Existing Permits

The existing operational permits for Los Filos Mine Complex were granted based on the environmental impact assessments and land-use change technical submittals. The authorizations included approval of mitigation measures proposed by Desarrollos Mineros San Luis, S.A. de C.V. (DMSL) in compensation of potential environmental impacts and a monitoring program to identify any impacts from operations. The agency resolutions to authorize operations and the key existing permits are listed in Table 20-2. DMSL holds the appropriate permits under local, state, and federal laws to allow the current mining operations.

Table 20-2: Key Permits for Los Filos Mine Complex

Project	Requirement	Document id	Published
Los Filos Mine Project, first stage, lineal type services supply (rural road rehabilitation, lying of power line for electric sub-transmission and water pipes).	Environmental Impact Statement (MIA)	S.G.P.A/DGIRA/DEI/2917.04	November 18, 2004
Los Filos mining exploitation project.	Environmental Impact Statement (MIA)	S.G.P.A.-DGIRA.-DEI.1410.05	May 26, 2005
Project expansion of Los Filos mining exploitation, Eduardo Neri Municipality, Guerrero State.	Environmental Impact Statement (MIA)	S.G.P.A.-DGIRA.-DEI.0086.06	January 24, 2006
Los Filos, Mezcala Airstrip Project, Eduardo Neri Municipality, Guerrero State.	Environmental Impact Statement (MIA)	S.G.P.A.-DGIRA.DG.5511	July 21, 2011
Los Filos mine unit-expansion of productive capacity	Environmental Impact Statement (MIA)	S.G.P.A.-/D.G.I.R.A/DG/2867	April 16, 2012
Clay borrow bank	Environmental Impact Statement (MIA)	DFG.SGPARN-UGA-DIRA/00549/2015	July 3, 2015
San Pablo Sur exploration Project	Environmental Impact Statement (MIA)	DFG.SGPARN-UGA-DIRA/00899/2015	November 25, 2015
Construction of two ramps in Bermejal pit “Portal 3” and Portal 1B”	Modification of Environmental Impact Statement	S.G.P.A.-/D.G.I.R.A/DG/0091	January 4, 2017
Construction of a ramp and a switchyard in Bermejal underground	Modification of Environmental Impact Statement	S.G.P.A.-/D.G.I.R.A/DG/4039	June 7, 2017
Relocation of agglomerator and construction of new concrete plant	Modification of Environmental Impact Statement	S.G.P.A.-/D.G.I.R.A/DG/6854	September 14, 2017
Surface extension of Los Filos open pit and relocation of explosives store facilities	Modification of Environmental Impact Statement	SGPA/DGIRA/DG/02938	April 20, 2018
Guadalupe open pit	Environmental Impact Statement (MIA)	DFG-SGPARN-UGA/00146/2018	March 21, 2018
CIL Plant, Bermejal Underground mine and FTSF 1 and 2	Environmental Impact Statement (MIA)	SGPA/DGIRA/DG/06394	August 29, 2018
Authorization of land use change in forestry land for Los Filos Mine Project, first stage, consisting in lineal type services supply	Land use change in forestry land	DFG.SGPARN.02.018/05	February 18, 2005
Authorization of land use change in forestry land for Los Filos Mine Project	Land use change in forestry land	DFG.02.03.284/05	July 7, 2005
Authorization of land use change in forestry land for the extension of Los Filos Mine Project	Land use change in forestry land	DFG.02.03.2006/06	March 9, 2006
Los Filos mine unit-expansion of productive capacity	Land use change in forestry land	DFG.UARRN.135/2012	May 29, 2012
San Pablo Sur exploration Project	Land use change in forestry land	132.SGPARN.UARNN.1764/2015	December 18, 2015
Guadalupe open pit	Land use change in forestry land	GRO.UARRN.0889/2019	September 9, 2019
Mine unit operation	Integrated Environmental License (LAU)	DFG-UGA-DGIMAR/066/09	March 13, 2009
Mine unit operation	Integrated Environmental License update	DFG-UGA-DGIMAR/041/13	March 21, 2013
Mine unit operation	Integrated Environmental License update	GRO-UGA-DGIMAR/404/2018	December 14, 2018
Mine unit operation	Accident Prevention Program (PPA)	DGGIMAR.710/008514	November 5, 2009
Mine unit operation	Accident Prevention Program update	DGIMAR.710/005860	July 25, 2013
Mine unit operation	Accident Prevention Program update	DGGIMAR.710/0005444	July 10, 2019
Mine unit operation	Special and urban solid waste management plan	SEMAREN/JEFATURA/051/2018	March 21, 2018
Mine unit operation	Modification of registration as Hazardous waste generator	DFG-UGA-DGIMAR/182/2017	August 2, 2017

Project	Requirement	Document id	Published
Waste oil recycling for the making of ANFO	Hazardous waste recycling	DGGIMAR.710/001382	February 29, 2008
Mine unit operation	Registration of Hazardous waste management plan	DGGIMAR.710/002625	March 14, 2016
Mine unit operation	Modification of the registration of Hazardous waste management plan	DGGIMAR.710/0002160	March 14, 2018
Mine unit operation	Registration of mine waste management plan	DGGIMAR.710/0007137	August 31, 2017
Mine unit operation	Modification of the registration of mine waste management plan	DGGIMAR.710/0006583	August 15, 2019
Surface water exploitation	Title deed 04GRO103696/18FADL16	04GRO103696/18FADL16	August 31, 2016
Underground water exploitation and discharge permit	Title deed 04GRO115667/18ISDL16	04GRO115667/18ISDL16	July 15, 2016
Underground water exploitation and discharge permit	Increase volume of water. Modification of Title deed 04GRO115667/18ISDL16	in evaluation	

DMSL has been recertified under the International Cyanide Management Institute's certification program, which is a voluntary program to demonstrate commitment to the safe, responsible use of cyanide. The signatory companies demonstrate compliance through third-party, independent audits based on nine codified principles related to cyanide handling and usage. DMSL became a signatory in 2007 and received its original certification in 2010. DMSL has been recertified, according to the Cyanide Code requirements in 2014, 2017, 2019 and 2022. The most recent recertification audit was conducted in January 2022 with a full-compliance result, and the certificate was issued on June 14, 2022. Los Filos Mine Complex, under the name of DMSL as operating company of Equinox Gold Corp., is a member in good standing of the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (Cyanide Code).

20.2.3 Additional Permits Required for Expansion

Additional permits required for the Mine's expansion projects that have either been obtained or are in the process of being obtained are shown in Table 20-3.

Table 20-3: Additional Permits Required for the Expansion

Permit Description	Permit Number	Status
Bermejal Underground mine portal and development	S.G.P.A./DGIRA/DG.00091 and S.G.P.A./DGIRA/DG.04039	Obtained
Environmental permit for the construction and operation of a CIL Plant	S.G.P.A./DGIRA/DG/06394	Obtained
Installation of a 40 MW electrical substation	N/A – included in Permit S.G.P.A./DGIRA/DG/06394	Obtained, however permit modification required for location change.
115 kV high voltage power transmission line extension	N/A – included in Permit S.G.P.A./DGIRA/DG/06394	Obtained, however permit modification required for additional extension.
Environmental permit for the filtered tailings storage facility	N/A – included in Permit S.G.P.A./DGIRA/DG/06394	Obtained, however permit modification required for location change.
Additional electrical power requirement	N/A	Approved in principle; however, the application is to be resubmitted to CENACE once the timing for the additional power has been established.
EIA – Guadalupe phase of the Bermejal Open Pit	DFG-SGPARN-UGA-00146-2018	Obtained
Land Use Change—Guadalupe phase of the Bermejal Open Pit	N/A	Obtained
Increase in Water Usage	N/A	In process – application submitted May 2, 2018

DMSL submitted studies for an MIA permit to construct and operate a development decline ramp for the exploration of the Bermejal Underground deposit. The permit was conditionally granted by the government authority in January 2017, with the requirement to submit an economic technical study to update the amount of the reclamation financial bond. The study submitted by DMSL was accepted on April 26, 2019 (authorization number SGPA/DGIRA/DG/03269).

An environmental permit (MIA) application was submitted in 2018 for the CIL plant and associated infrastructure. This infrastructure included a 40 MW power substation with redundant 30/40/50 MVA transformers adjacent to the CIL plant, and an extension of the existing 115 kVA transmission line that connects the current substation to the Mezcala substation.

The MIA permit for the CIL plant and associated electrical infrastructure was granted in August 2018 and 2021. Subsequently, the electrical substation was relocated to a new location and the powerline was extended beyond the current area of operations to the new substation location. Therefore, an application to modify the current permit will need to be submitted.

For the filtered tailings disposal from the CIL plant, DMSL applied for an MIA permit to construct and operate an FTSF. Two alternatives were submitted: one at the north end of heap leach Pad 1 and another at the south end of Pads 1 and 2. The MIA permit was granted in 2018; however, the volume and preferred location of the filtered tailings storage area was subsequently modified. Therefore, the current permit will need to be modified accordingly.

Additional power will be required to operate the CIL plant. The Mine's current capacity of its existing electrical substation is 20 MW to satisfy a demand of up to 14 MW peak demand. The CIL plant will consume additional energy beyond the capacity of the existing substation; therefore, a larger, 40 MW substation is proposed to provide electrical energy to the entire Mine. An application was made to CENACE for the additional energy required, and CENACE completed a study to confirm energy availability and electrical infrastructure upgrades. However, the study must be updated once a final decision to advance the CIL plant is made.

DMSL signed a land-access agreement with the community of Xochipala for the Guadalupe Open Pit in June 2019. Subsequently, the land-use change permit has been obtained; however, permission for the clearance of archeological sites is expected to be obtained after archeologists conduct and finalize salvage activities.

Water usage for the Los Filos Mine Complex is currently 1.0 Mm^3/a and the permit allows for 1.2 Mm^3 of extraction. An application to increase the water permit to 2.2 Mm^3 is in process and is expected to be approved.

20.3 Permit Compliance

The SEMARNAT branch PROFEPA (the environmental attorney general) enforces compliance with environmental laws and regulations. The Los Filos Mine Complex expansion environmental permits state that DMSL must maintain a log and evidence of the monitoring activities. Compliance reports that present the results and observations of the flora, fauna, water, air, and noise monitoring, plus the soil restoration and conservation program, are provided annually to SEMARNAT and PROFEPA. These reports include the results and analysis of the environmental management and monitoring program. Reports are also provided to CONAGUA on water exploitation and sanitation wastewater discharge test results.

The following pending permitting issues are in the process of resolution with the relevant authorities:

- DMSL has received clearances for 53 of the 58 possible archaeological sites identified in the baseline studies. There are five sites restricted from mining operations.
- DMSL is applying for a new wastewater discharge permit for the employee camp facilities, as the previous permit has expired. DMSL submitted the application on September 13, 2022.

20.4 Environmental Monitoring

Mexican laws require mandatory monitoring programs that are implemented under SEMARNAT. The environmental management system and environmental and social management plans were developed in accordance with the appropriate Mexican regulations. The following monitoring programs have been established at the Los Filos Mine Complex: groundwater quality, surface water quality, air quality, perimeter noise, faunal registry, floral species rescue record, nursery plant production, soils, and cleared surface restoration registry. Most monitoring is carried out every six months or annually, with the exception of groundwater quality, which is monitored quarterly. DMSL has voluntarily established a number of routine sampling locations that are not required under its permits, and uses those results for its own assessment of environmental performance or as part of the demonstration of environmental protection required for its voluntary certifications. Los Filos Mine Complex personnel log and track incidents related to environmental, health, safety, social performance (i.e., community relations), and security.

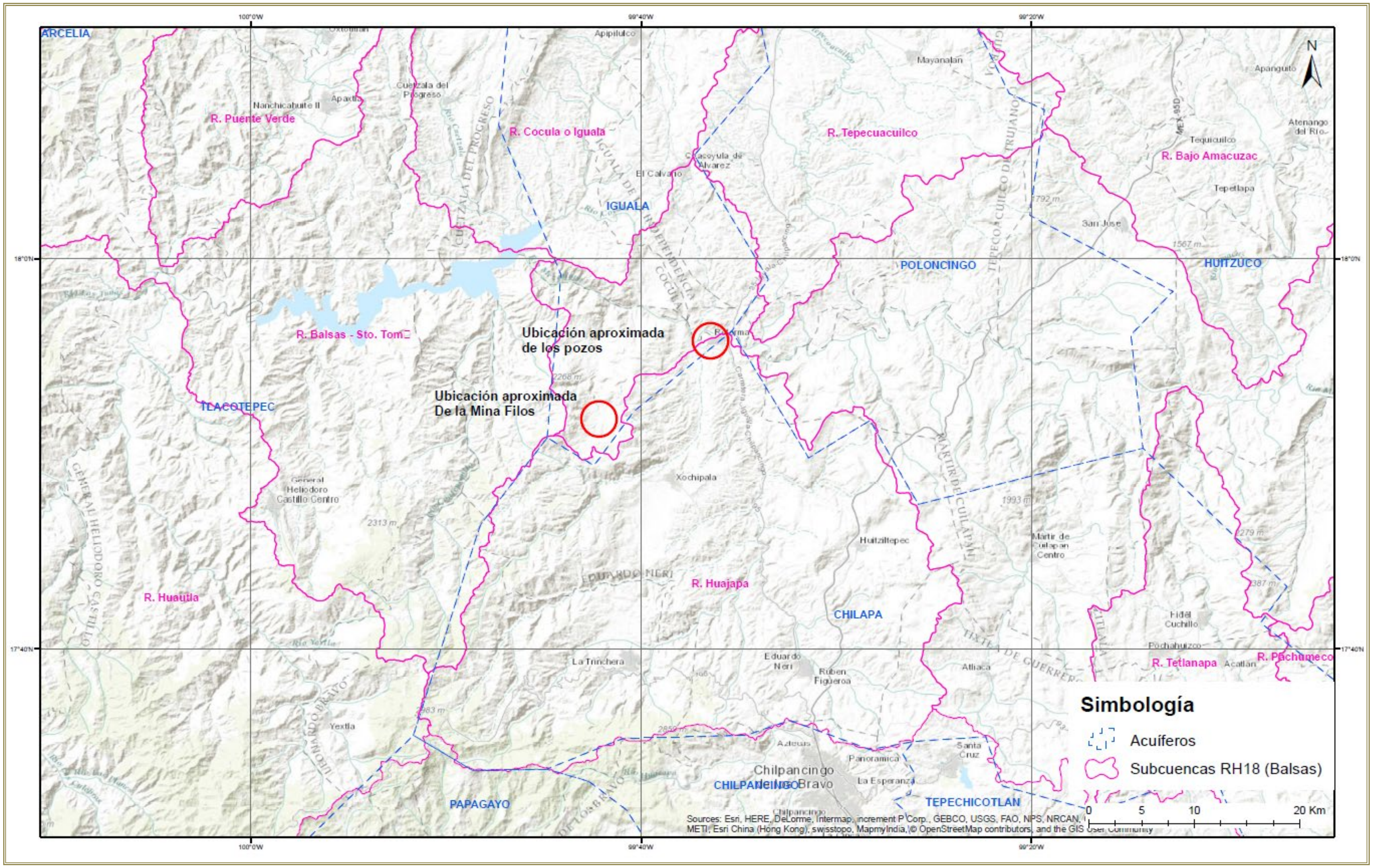
20.4.1 Surface Water

CONAGUA is the technical department of SEMARNAT that is responsible for oversight of Mexico's water resources. CONAGUA has structured the surface-water resources into 13 administrative hydrological regions. The Los Filos Mine Complex is in the CONAGUA-designated Hydrologic Region 18 in the Rio Balsas (Balsas River) basin and middle Balsas sub-region (Figure 20-1). The Rio Balsas basin covers 22.7% of the total area of the State of Guerrero. According to the Chilpancingo Charter of Surface Water, the Los Filos Mine Complex lies within Basin B, watershed A2129 (2,129 km²) and watershed D1336 (1,336 km²).

The Rio Balsas is the only perennial surface watercourse in the vicinity of the Los Filos Mine Complex and is approximately 5 km from the property's northern boundary. The Rio Balsas drains an area of 46,530 km² to Mezcala station, in the town of Mezcala. The most important tributaries in the area are the Xochipala and Mazapa seasonal streams, both of which join the Rio Balsas on its southern margin.

Los Filos Mine Complex operations are in a small, approximately 60 km² watershed bounded by the Los Filos watershed to the east, the La Lagunilla hill to the north, the Azul and El Ocotal hills to the west, and the El Cedral hill to the southeast. Within this watershed, the main watercourse is the shallow Carrizalillo stream, a seasonally flowing stream whose headwater is 1 to 2 km south of the town of Carrizalillo and which flows northward to become part of the Mazapa seasonal stream. The surface-water runoff from the northern and western areas of the Los Filos Mine Complex site flows to the Mazapa stream.

Surface runoff collected in water diversion channels around the heap leach pads, the ADR plant, Los Filos Underground areas, and the Los Filos Open Pit west WRF drains into the Mazapa stream. Water from the Mazapa stream is mainly used for livestock.



Source: Equinox Gold.

Figure 20-1: Locations of Regional Hydrologic Basins and Aquifers Designated by CONAGUA

Surface runoff originating from the WRFs east of the Los Filos and Bermejal Open Pits drains into Cuautepetl Canyon, which is about 8 km west of the Xochipala seasonal stream. The Xochipala stream flows seasonally and intermittently toward the north and is a tributary of the Rio Balsas. This stream remains, except during storm events.

A small area in the northern section of the Los Filos Mine Complex property drains into Tepegolol Canyon, which leads directly to the Rio Balsas, about 3 km downstream of the town of Mezcala. Surface water flows from Tepegolol Canyon only during severe storm events.

20.4.2 Groundwater

CONAGUA has designated 653 aquifers as part of the groundwater resources management system. CONAGUA is responsible for defining each aquifer and for estimating the water availability in the system. Los Filos Mine Complex is at the southern tip of the Iguala Aquifer, which covers a surface area of 2,356 km² (Figure 20-1).

The information on the Iguala Aquifer (CONAGUA, 2015) claims that the water is extracted from main aquifers that are associated with rivers and do not have hydrogeological continuity along the rivers. Recharge occurs from surface infiltration, or from subsurface interflow through permeable soils along the topographic gradients. CONAGUA has calculated that the aquifer has available water for new water concessions at a volume of 13,732,928 m³ annually.

The phreatic surface of groundwater is reported to be at a lower elevation than the final depth of the open pits and current underground operations. No water elevation data in the area were available in CONAGUA (2015).

Typically, the open pits and the underground mines are dry, except during the rainy season. Surface water exfiltrates rapidly enough that operations are not halted due to excess water, except during strong storms, when there is excess seepage into the underground workings and into the open pits from surface-water runoff and direct precipitation. Dewatering is not required for the underground mine operations and is not planned.

Groundwater seepage occurs in one area of the Los Filos Open Pit. The water is temporarily diverted to a retention pond in the pit, then pumped out of the pit and allowed to flow as surface-water runoff.

Groundwater was not encountered in any of the exploration boreholes, which were drilled to depths of 300 m and more in the pit areas. Limestone is the dominant rock type in the area, which in many areas where the rock is exposed appears to be highly fractured, with vugs and dry solution cavities reported in drill logs. These features were also observed at surface in some locations—with karst dissolution cavities within carbonate rocks. The RC drilling logs indicate that the entire section of limestone encountered during exploration drilling was very dry, and only very limited water was encountered within the intrusive rocks. Los Filos Mine Complex geologists have observed that the limestone and skarn are both very dry, and within the underground workings there is seepage only from precipitation infiltration or drill water.

From a regional perspective, groundwater likely discharges to Rio Balsas, which flows to the north of the Mine property. Based on regional topography, it appears that most of the Mine area drains to the gully (arroyo) that passes adjacent to the Mazapa village, which then enters Rio Balsas about 10 km west of the town of Mezcala. The remainder of the Mine property's groundwater appears to drain eastward toward a large ephemeral stream that is a tributary to Rio Balsas. Recharge probably occurs as infiltration during the rainy season, which lasts from June through September. A formal hydrogeologic study has not been conducted, although a review of hydrogeologic conditions is planned.

Natural springs occur where Pad 1 and 2 were constructed. The pads were designed with a subsurface under-drain system to dewater beneath the two pads. Both pads have their own sub-drains, and both systems convey water via pipelines to outlets at a concrete-lined vault in Cañada 23. The vault has a separate outlet that conveys water to the arroyo and eventually into the Mazapa seasonal stream.

Pad 1 has a second system that conveys water back onto the pad. The Pad 1 sub-drain system has a sampling port at the toe of the installation to allow for water quality monitoring. The Pad 2 sub-drain system water quality is sampled at the concrete-lined vault. Volumes of water pumped to Pad 1 and to the vault in Cañada 23 are metered.

20.4.3 Water Monitoring

Prevention and mitigation measures to protect surface water and groundwater quality include surface erosion controls around the facilities. Clean stormwater is transported in concrete-lined channels around the heap leach facilities, whereas impacted stormwater is directed to the heap leach facility ponds.

The water monitoring program includes surface water, runoff water from WRFs and within the open pit, groundwater, potable water, process water, and wastewater. The site has a written water quality monitoring plan that specifies the locations, laboratory parameters, and frequency of monitoring to meet Mexican regulations, which enables an assessment of natural variations, and allows for the detection of potential impacts from operations. The program includes quality control samples.

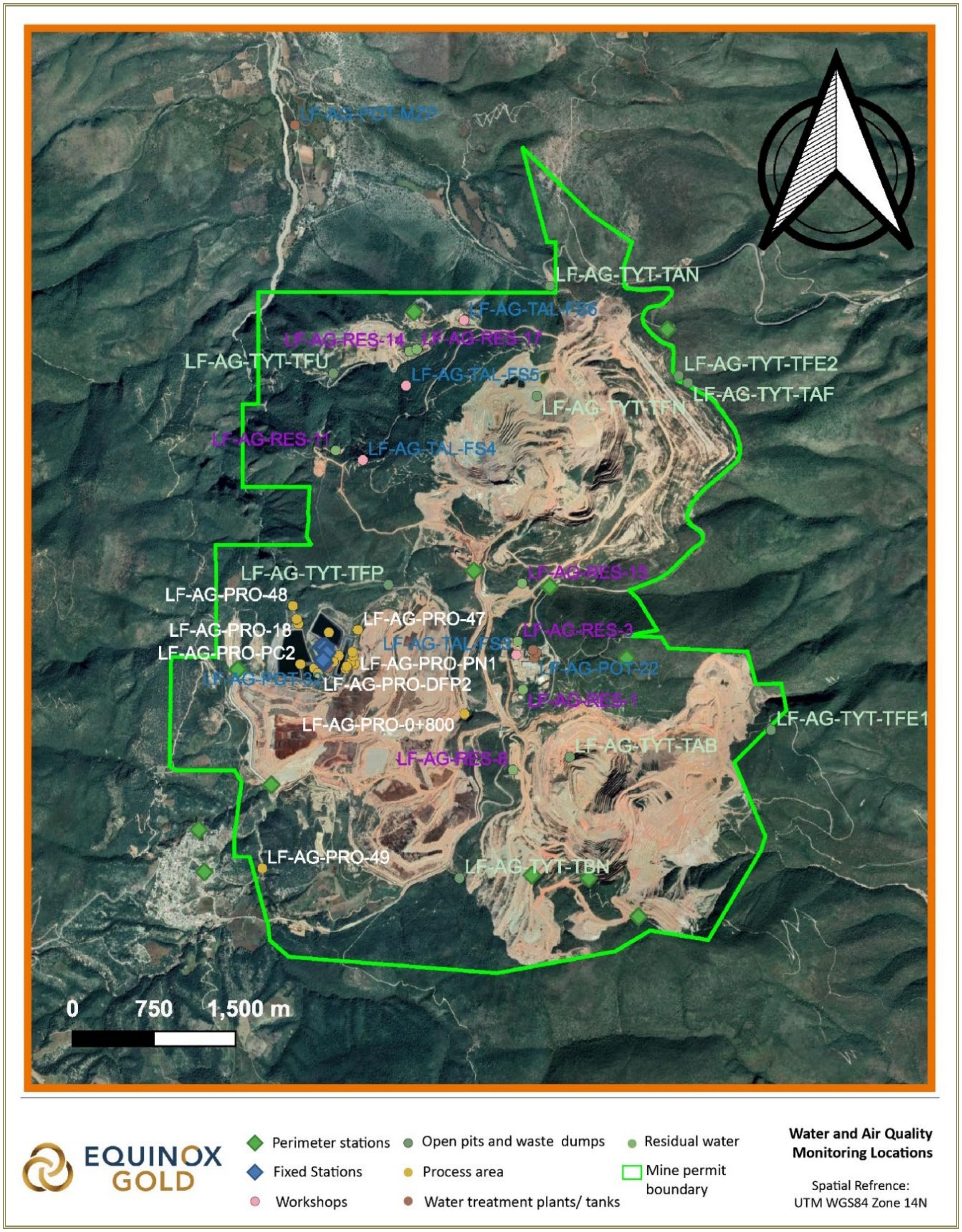
Results of the program show that runoff waters for the pit walls and WRFs are circum-neutral (pH from 6 to 9) with measurable alkalinity (10 to 309 mg/L). Arsenic is frequently detected in the runoff waters, with concentrations of total arsenic from 0.03 to 4.12 mg/L and concentrations of dissolved arsenic from 0.02 to 0.37 mg/L. In addition, concentrations of total iron, manganese, and aluminum are frequently detected, with measured concentrations of 0.03 to 180 mg/L iron, 0.001 to 41.6 mg/L manganese, and 0.005 to 392 mg/L aluminum. These monitoring results are consistent with the findings of the various characterization programs, which indicate that the waste rock and pit walls are likely to be net neutralizing, but will leach arsenic and antimony under the circum-neutral to moderately alkaline pH conditions. Baseline studies show arsenic and antimony are naturally occurring in the groundwater.

The wastewater discharges from the sanitation treatment systems showed results out of norm for nitrogen in 2022; corrective actions were taken and results received in August 2022 are within the norm. Contact water (pluvial) in one waste rock deposit showed one result out of norm for arsenic, but subsequent tests were within the norm.

The Los Filos Mine Complex currently has two groundwater monitoring wells that comply with the Mexican environmental requirements for heap leach facilities. One well (LF-AG-PRO-49) is upstream of the heap leach pads in a canyon close to the community of Carrizalillo, and the other (LF-AG-PRO-

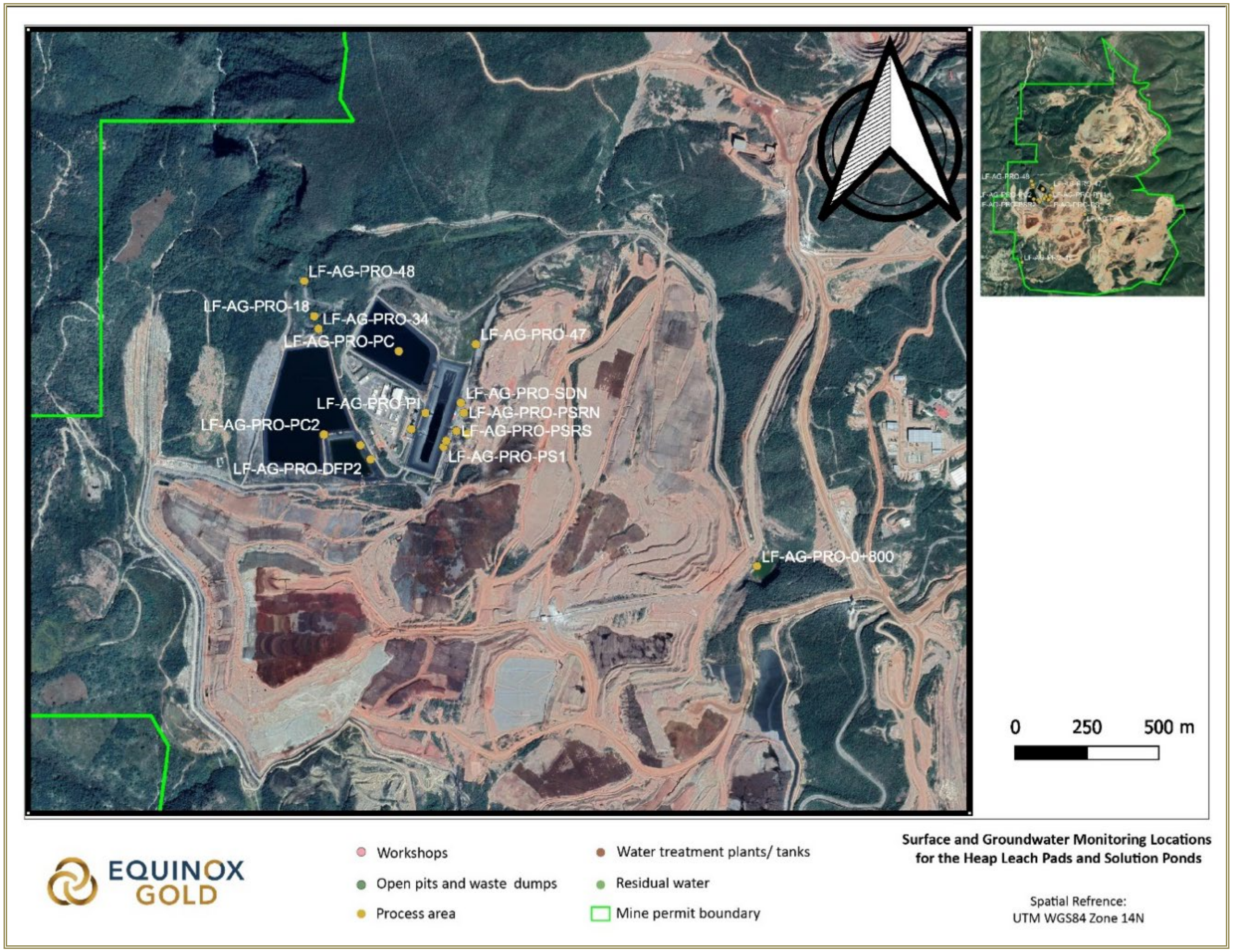
48) is approximately 400 m downstream of the heap leach pads, in Cañada 23. Each well was drilled and a PVC casing installed to allow for water sampling and water depth level measurements. LF-AG-PRO-49 was constructed to a depth of 50 m below ground surface and was dry. LF-AG-PRO-48 was also constructed to a depth of 50 m below ground surface, but groundwater was encountered at an approximate depth of 32 m (Pozos as Wells report, Golder, 2013). Occasional groundwater well exceedances have been observed, but are investigated, and corrective measures are put in place as required.

The water monitoring locations are shown on Figure 20-2; well locations are shown on Figure 20-3.



Source: Equinox Gold.

Figure 20-2: Water and Air Quality Monitoring Locations



Source: Equinox Gold.

Figure 20-3: Surface Water and Groundwater Monitoring Locations for Heap Leach Pads and Solution Ponds

20.4.4 Air and Noise

Dust generated from mining operations is controlled by spraying water on the haul roads. To ensure compliance with Mexican air quality regulations, air quality monitoring is done at fixed point sources and at points around the mine site perimeter. Los Filos Mine Complex personnel conduct monitoring of total suspended particles, particles less than 10 µm in diameter, and particulates less than 2.5 mm in diameter at the site perimeters. At fixed point sources, sampling is conducted for carbon monoxide, nitrogen oxides, mercury, and particulates. Emissions are reported annually to SEMARNAT in the operating report (Cédula de Operación Anual).

Noise caused by operating machinery is mitigated where possible, and worker hearing protection is required in high-noise areas. Machinery is subject to routine maintenance to reduce noise levels. Noise is monitored at the DMSL offices, Carrizalillo, and Mazapa. Air monitoring locations are shown on Figure 22-2.

20.4.5 Flora

DMSL has addressed vegetation impacts as part of the permitting process. Protected species were recovered and relocated during site construction. In addition, organic topsoil was recovered during clearing and is stored as stockpiles for reuse in reclamation. A plant nursery is used to grow native species as part of the ongoing reforestation activities that are conducted throughout the mine site, specifically on waste rock dumps. The plants issued from the nursery will also be used in the closure and reclamation phase in the future.

20.4.6 Fauna

DMSL has a written monitoring plan for the cyanide facilities to identify risks to wildlife, document the type and number of animals encountered, and prevent impacts to wildlife. The following four areas were identified as having a potential risk to wildlife: the heap leach facilities, the toe of the heap leach pads, the leachate-solution collection ponds, and other ponds that contain cyanide. Wildlife monitoring associated with the cyanide usage facilities is conducted daily at the heap leach pads if there is ponding of barren solution on the pads; otherwise, it is conducted weekly. Monitoring at the ponds is conducted daily if the weak acid dissociable (WAD) cyanide concentrations are 50 mg/L or greater, or if the copper concentration is 30 mg/L or greater; otherwise, the monitoring at the ponds is completed monthly. For other water bodies that may occur due to ponding or rainfall, the monitoring is conducted monthly if the WAD cyanide is above 50 mg/L and weekly if less than 50 mg/L.

DMSL has implemented measures to restrict wildlife and livestock access to the areas of cyanide usage. At the heap leach pads, DMSL has procedures to prevent ponding, which could endanger wildlife due to drowning or ingestion of solutions containing cyanide. The perimeter of the heap leach pads and ponds is protected by a combination of barbed-wire and cyclone fencing. The cyclone fence has a concrete pad in some areas. Los Filos Mine Complex personnel maintain monitoring data.

In addition to the monitoring plan developed for SEMARNAT, Los Filos has a written Wildlife Rescue, Handling, and Relocation Plan (Desarrollos Mineros San Luis, S.A. de C.V., 2015) and a Biodiversity Action Plan (Desarrollos Mineros San Luis, S.A. de C.V., 2021). Both plans cover the entire mine site and include methods for relocating amphibians, reptiles, mammals, and birds.

20.4.7 Sewage

Wastewater discharges are produced at seven permitted sites (sanitation facilities, kitchens, laundry, and cafeterias). The wastewater is transported to secondary treatment plants that remove settleable solids, and a biological process is in place to remove dissolved and suspended organic compounds. The systems include activated sludge, grids, sandcatchers, pumping casings, primary settlers, aerobic and anaerobic rectors, clarifiers, and shock tanks.

20.4.8 Mining Wastes

A Waste Rock Management Plan was prepared in 2016 and submitted to SEMARNAT as part of a compliance action (Leagold, 2018), and approval was received in August 2017 (12-PMM-I-0165-2017). A spent leach ore monitoring program for the heap leach pads was developed in 2016 to comply with Mexican regulatory requirements (Leagold, 2018).

20.4.9 Hazardous and Regulated Wastes

Typical hazardous and regulated wastes produced at the site are water contaminated with hydrocarbons, used oil and grease, containers that stored hazardous substances, waste antifreeze, and expired medications. The wastes are reported annually to SEMARNAT in the operating report (Cédula de Operación Anual). Wastes are characterized per the Mexican hazardous waste criteria and handled by a third-party contractor, with the exception of some waste generated at the laboratory (such as the cupolas), which are disposed of in the heap leach area.

20.5 Mine Closure

A closure and reclamation plan was prepared for the Los Filos Mine Complex (DMSL, 2017). The plan incorporates international best practices, including the following:

- World Bank Environment, Health and Safety Guidelines Mining and Milling—Open Pit
- Draft International Finance Corporation (IFC) Environmental, Health and Safety Guidelines—Mining
- Being a member in good standing of the Cyanide Code.

The key objectives of the reclamation and closure plan include the following:

- Minimizing erosion damage
- Protecting surface and groundwater resources through control of water run-off
- Establishing physical and chemical stability of the site and its facilities
- Ensuring all cyanide and process chemicals are safely removed from the site at closure, and equipment is properly decontaminated and decommissioned
- Cleaning and detoxifying all facilities and equipment used in the storage, conveyance, use, and handling of cyanide and other process chemicals in accordance with international practice

- Establishing surface soil conditions conducive to regenerating a stable plant community through stripping, stockpiling, and reapplying soil material or applying waste rock suitable as growth medium
- Repopulating disturbed areas with a diverse, self-perpetuating mix of plant species to establish long-term productive plant communities compatible with existing land uses
- Maintaining public safety by stabilizing or limiting access to landforms that could constitute a public hazard.

The Closure and Reclamation Plan is updated every three years. The current plan is conceptual and contains discussions of possible closure options, without detailed specifications. SRK Consulting prepared technical studies for completion in 2017 to advance the closure planning process; however, a comprehensive new closure plan has not yet been prepared. SRK's work included geochemistry studies of waste rock and spent leach ore with a prediction of future metals leaching potential, update of the Water Quality Monitoring Plan, preparing a site-wide water balance, updating the existing Waste Rock Management Plan, preparing a closure landform design, and predictive modelling of soil cover performance. An assessment of the final drain-down of the heap leach was also commissioned, but this work was stopped when ownership of the project transitioned to Leagold, and has not yet been resumed by Equinox Gold.

The conceptual closure costs were calculated in 2017 using the standard reclamation cost estimator (SRCE) model that was developed for the State of Nevada, U.S.A. The closure cost spending schedule was updated for the current LOM and reflects anticipated expenditures prior to closure, during decommissioning, and during the post-closure monitoring and maintenance period.

Current closure costs are estimated at $50.9 million, as shown in Table 20-4. The closure costs do not include the planned CIL plant, FTSF, new electrical substation, high-voltage transmission line extension, or the fully developed Bermejal Underground projects. These costs were estimated to include legal and constructive obligations to reclaim the site to safe and stable conditions, and minimize environmental impacts. Site closure costs are funded by allocating a percentage of sales revenue to closure activities.

Table 20-4: Summary of Estimated Closure Costs

Item	Subtotal ($M)
Earthworks and Recontouring	18.9
Revegetation/Stabilization	0.2
Detoxification / Water Treatment / Disposal of Wastes	6.9
Structure, Equipment, and Facility Removal / Miscellaneous	2.4
Monitoring	0.6
Construction Management and Support	3.5
Closure Planning, G&A, and Human Resources	10.4
Subtotal	42.9
Indirect Costs	3.3
Subtotal including Indirect Costs	46.3
Contingency (10%)	4.6
Total	**50.9**

Bonding requirements under Mexican regulatory requirements have been met for the current operations. Current environmental liabilities are those normally associated with active underground and open pit mining operations that feed a heap leach facility.

20.6 Social and Community Impact

Prior to the start of operations, a social baseline study was completed to determine the socio-economic characteristics of the local population and to assess the perceptions and views of the residents regarding mining and the company. The primary communities near the Los Filos Mine Complex are Mazapa, Mezcala, Xochipala, and Carrizalillo. According to the National 2020 Census, there are about 53,000 inhabitants within the local municipality of Eduardo Neri, of which about 154 persons live in Mazapa, 5,654 persons live in Mezcala, 3,444 persons live in Xochipala, and 1,533 persons live in Carrizalillo. The villages of Xochipala, Mazapa, Mezcala, and Carrizalillo are all communal organizations under Mexico's agrarian law. Carrizalillo is an ejido, Mazapa is part of "Bienes Comunales" of Mezcala, and Xochipala is also defined as "Bienes Comunales." Both Ejidos and Bienes Comunales are agrarian units that are registered with Mexico's National Agrarian Registry. Both units have communal ownership of the land. The community has control of the land, although the community can grant ejido members property rights for individual parcels. The ejido of Carrizalillo was formed in 1937, with a land grant of 1,000 ha. Mezcala received a land grant of 10,616 ha in 1954, while Xochipala received 26,014 ha in 1957.

20.6.1 Baseline Social Studies

A baseline social survey was conducted in 2004 in Mezcala and in 2005 in Carrizalillo. The baseline studies were updated with new surveys conducted by a third-party (Consultoria Especializada) during 2015 in Carrizalillo, Mazapa, and Mezcala. The surveys gathered data on demographics, economics, education, cultural activities, health, infrastructure, work, leisure time activities, and access to services. Interviews were made house to house, plus observations in the field.

The survey of Mezcala in 2004 indicated that 20% of the population financially supported the other 80%, which were primarily housewives and children. There were very few professionals. Of the population considered working age, most of the male population had completed a secondary school education (that is, 9th grade) and about half of the female population had completed a secondary school education. At the time of the survey, about 16% were working for DMSL. The survey indicated the population had modest homes. The survey observed that the community did not practice adequate garbage disposal. The feedback on the Los Filos Mine Complex was minimal because it was not well known. In the survey of Carrizalillo, 63% of the population financially supported the other 37%. The feedback was predominantly favorable to the operation of the Los Filos Mine Complex. The primary economic activities of the region are agriculture, livestock, and mining. The main products are mescal and swine. In Mezcala, fishing and tobacco production are also important.

The 2015 updated surveys indicated a higher percentage of youths to adults due to a high birthrate and migration away from the area due to security concerns. About 50% of the population in Carrizalillo is less than 20 years old. Of the working age population, about 64% of the household heads work as Los Filos employees. In Mazapa, about 72% work in mining (for the Los Filos Mine Complex and Torex Gold). In Mezcala, about 38% work for Los Filos Mine Complex and 14% are employed by contractors to the Mine.

The 2015 survey has noted the following improvements in standard of living.

- Access to plumbing increased from about 9% to 81%, and the housing with hard floors (not dirt) increased from 5% to 75% in Carrizalillo.
- Improvement of roads from unpaved to paved.
- All housing in Mazapa has plumbing and sanitation service. The percentage of houses with hard floors rose from 4% to 88%.
- Improved literacy.
- Access to health care.
- Social Risks.

20.6.2 Social Development Agreement

DMSL has a collaborative agreement for social development that provides contributions to the communities in the amount of approximately $3 million annually. Under the collaborative agreement, DMSL makes the following contributions:

- A landfill that is used by the community of Carrizalillo
- Repairs to community facilities and infrastructure
- Education scholarships
- Assistance for disadvantaged members of local communities
- Environmental restoration and waste-collection projects funding
- Employment of local providers in Mezcala and Carrizalillo who provide services to the Los Filos Mine Complex
- Support for community health care services
- Support for culture and traditions.

In 2020, production was shut down due to a 103-day work stoppage related to a dispute with the ejido of Carrizalillo on their social collaboration agreement. Negotiations took place to modify the existing agreement. DMSL continues working to regain trust between the company and the communities.

20.6.3 Social Performance

DMSL has made contributions to health, infrastructure, education, culture, and sports in the local communities. Local businesses contract to provide water trucks, ore haulage trucks, other material hauling trucks, uniforms, waste collection, heavy equipment rental, transportation, potable water, kitchen services, portable sanitation facilities, facility maintenance, general supplies, and temporary labour. Community engagement and development programs are ongoing.

DMSL was recognized by the Mexican Mining Chamber for its commitment to the environment and community in 2015. Los Filos Mine Complex underwent a gap assessment per the Voluntary Principles on Security and Human Rights program in 2015 and 2016. The Los Filos Mine Complex received positive results from both assessments. In 2021, a Human Rights Assessment was conducted that identified areas of potential risks; these risks have been integrated into the Los Filos Mine Complex risk-management system.

20.6.4 Security

Security continues to be a concern in Mexico, particularly in the southern states, such as Guerrero, which are used by the cartels for drug transport and production. The southern states have seen a fragmentation of organized crime groups and there is competition between these criminal groups.

Security issues in the area have been reported in local, national, and international news outlets, including an incident where four local DMSL employees were kidnapped outside the Los Filos Mine Complex property in the town of Carrizalillo on March 6, 2015, and three of the victims were killed. At the time of the incident, the employees were not on company business and the incident was determined to be unrelated to their employment at DMSL.

Government attention has been most focused on security in the State of Guerrero, particularly after 43 student teachers disappeared in Ayotzinapa, Guerrero, in 2014. In general, the federal Government is supportive of mining as a means for economic development that will mitigate poverty and reduce crime.

In the State of Guerrero, mining is the second most important economic activity. One of the strategic objectives in the state development plan for the years 2022–2027, is to strengthen the mining industry through the State Council of Mines. The plan specifically named Los Filos and El Límon-Guajes as the two most important producing mines in the State of Guerrero (Gobierno del Estado de Guerrero, 2022). The plan stated public security as its primary challenge and priority. The state's strategy to improve security is to promote police development and intelligence, to fight corruption, and to foster citizen participation (Gobierno del Estado de Guerrero, 2022).

20.6.5 Management of Security

Site security staff conduct risk assessments at least annually, and more often when conditions warrant. The risk analysis determines the mitigation actions that are included in the annual action plan of the security team.

To mitigate security impacts to the operations, DMSL has written security guidelines that focus on company assets and personnel working at the Mine. Internal procedures require all incidents to be logged and classified per a risk matrix. The risk categories are reputation, fraud and corruption, regulatory and legal, occupational health and safety, asset security, environmental, community relations, financial, cash flow, Mineral Reserve ounces, Mineral Reserve model, and production ounces. Each incident is categorized according to the risk categories and probability.

The Los Filos Mine Complex has operated consistently for more than thirteen years without material impacts to operations from the security environment surrounding the site.

20.7 Conclusions and Recommendations

Adequate baseline studies have been carried out for the expansion projects, and the existing operations are being performed with all appropriate permits and approvals in hand. A rigorous environmental monitoring program is continuously carried out, which confirms that there are no material concerns pertaining to non-compliance.

The MIA permit for the Guadalupe phase of the Bermejal Open Pit is approved.

The MIA permit for the CIL plant and filtered tailings storage have been approved; however, the final location for storage of the filtered tailings on Pad 1 has been modified, and therefore the permit must be updated prior to initiating tailings deposition.

The MIA permit for the new electrical substation and extension of the high voltage transmission line have been approved; however, the relocation of the substation and the subsequent extension of the transmission line will require the permit to be updated.

The MIA permit for the new Pad 3 expansion has been approved; however, permitting of the vertical expansion of Pads 1, 2 and 3 with the interliner must be submitted for approval.

The review of the electrical interconnection requirements and the confirmation of energy supply to support the CIL plant was completed with CENACE; however, the studies must be updated once a final decision to advance the CIL plant is made.

The existing closure and reclamation plan is conceptual and addresses all existing facilities. The current estimated closure liability of $50.9 million is based on the existing facilities at the end of 2021, and as such is exclusive of the proposed CIL plant, FTSF, new electrical substation and transmission line extension, Pad 3, and the Pads 1 and 2 interliner. The closure and reclamation plan will have to be expanded to include closure methods of these future projects once they are built.

Security instability in the State of Guerrero and in the local mine area remains a concern, and could cause temporary closure of operations or disruptions in services. This security risk may also impact the ability of the company to contract and retain skilled, experienced employees.

The Qualified Person is not aware of any significant risk or uncertainty that may materially affect the reliability or confidence in the Mineral Resource or Mineral Reserve estimates or project economic outcomes due to the environmental permits. Risks that may impact current or future operations have been identified to include the following:

- Guadalupe Open Pit will require clearance from INAH of three archeological ruins identified in the area. A further study and salvage program is expected to be carried out in 2023.
- Renegotiation of land access to community property in 2024 and 2025 with the communities of Mezcala and Carrizalillo, respectively.

Continued access to properties not owned by DMSL is a potential risk. In particular, ejidos may have frequent changes in the directors, and new management may want to renegotiate existing agreements. As part of the Los Filos Mine Complex activities, DMSL reduces potential risk to exploration and mining through long-term surface access agreements and proactive communications.

21 CAPITAL AND OPERATING COSTS

The LOM CAPEX and OPEX have an effective date of June 30, 2022. All costs are in US dollars.

CAPEX and OPEX were estimated by Equinox Gold, Lycopodium, AMC, and Paul M. Sterling based on a combination of quotes, estimates based on historical performance at the mine, historical and in-house databases and first principles.

The LOM capital costs (CAPEX) estimate is $1,067 million. This figure includes $718 million for non-sustaining capital, and $349 million for sustaining capital, as shown in Table 21-1.

Table 21-1: Summary Estimate of LOM Capital Costs

Item	Non-Sustaining Capital Costs ($M)	Sustaining Capital Costs ($M)	Total Capital Costs ($M)
Open Pit Mobile Equipment and Workshop Upgrade	125	133	255
Los Filos Open Pit—Capitalized Stripping	112	-	112
Bermejal Open Pit—Capitalized Stripping	77	-	77
Guadalupe Open Pit—Capitalized Stripping	-	44	44
Los Filos Underground	-	16	16
Bermejal Underground	35	70	106
CIL Plant	318	0	318
Heap Leach Pad Expansion	-	86	86
Closure and Reclamation	51	-	51
Total	**718**	**349**	**1,067**

Note: Numbers may not sum due to rounding.

The total LOM operating costs (OPEX) are estimated at $4,015 million, as shown in Table 21-2. Approximately 83% of the LOM OPEX is related to mining and processing, and the remainder is attributable to community, land access, and G&A.

Table 21-2: Summary Estimate of LOM Operating Costs

Cost Item	LOM	
	($M)	(%)
Mining (Open Pit and Underground)	2,072	52
Open Pit	1,118	28
Underground	954	24
Processing	1,288	32
G&A, Community, and Land Access	655	16
Total	**4,015**	**100**

Note: Numbers may not sum due to rounding.

21.1 Capital Cost Estimate

The categorization of costs as CAPEX was based on the nature of the costs and not on the timing of their occurrence, except for Bermejal Underground.

21.1.1 Open Pit Mining

Mobile equipment CAPEX was estimated based on 2022 quotes obtained from equipment manufacturers. Estimated equipment capital for open pit mining includes additional haul trucks, shovels and other ancillary equipment required to operate the open pit throughout the LOM. Miscellaneous CAPEX includes mining software, survey equipment, and dispatch equipment purchases.

Six of the open pit workshop bays will have to be modified to accommodate the larger haul trucks; costs associated with the modifications have been estimated at $3 million.

The LOM open pit non-sustaining capital total is $124.9 million, as shown in Table 21-3. The LOM open pit sustaining capital total is $133.1 million, as shown in Table 21-4.

Table 21-3: LOM Open Pit Mining Non-Sustaining Capital Cost Estimate ($M)

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	LOM
Shovels	-	21.7	-	7.2	-	-	-	-	-	-	-	-	-	-	-	28.9
Trucks	-	35.6	4.0	7.9	11.9	11.9	11.9	-	-	-	-	-	-	-	-	83.1
Drills	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5
Track Dozers	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
Water Trucks	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
Tire Handler	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
Rockbreaker	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
Backhoe	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4
Fuel/Lube Truck	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
Lighting Plant	0.4	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
Light Vehicle	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
Workshop	-	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
Subtotal	**4.3**	**63.2**	**4.0**	**15.1**	**11.9**	**11.9**	**11.9**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**122.2**
Miscellaneous	1.2	0.5	-	0.1	0.1	0.2	0.1	-	0.0	0.1	-	0.3	0.1	0.1	-	2.8
Total	**5.5**	**63.7**	**4.0**	**15.3**	**12.0**	**12.0**	**12.0**	**-**	**0.0**	**0.1**	**-**	**0.3**	**0.1**	**0.1**	**-**	**124.9**

Note: Numbers may not sum due to rounding.

Table 21-4: LOM Open Pit Mining Sustaining Capital Cost Estimate ($M)

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	LOM
Loaders	-	-	-	-	-	-	-	-	7.2	-	-	-	-	-	-	7.2
Shovels	-	21.7	-	7.2	-	-	-	-	-	-	-	-	-	-	-	28.9
Trucks	-	35.6	4.0	7.9	11.9	11.9	11.9	-	-	-	-	-	-	-	-	83.1
Drills	-	-	-	-	-	-	-	-	-	-	-	7.6	2.5	-	-	10.2
Track Dozers	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	1.0
Fuel/Lube Trucks	-	-	-	-	-	-	-	-	-	0.4	-	-	-	-	-	0.4
Lighting Plants	-	-	-	0.2	0.1	0.1	-	0.2	0.2	0	0.2	0.2	-	0.1	-	1.4
Light Vehicles	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	1.0
Total	-	**57.3**	**4.0**	**15.3**	**12.0**	**12.0**	**11.9**	**0.2**	**8.4**	**0.4**	**0.2**	**7.8**	**2.5**	**1.1**	**-**	**133.1**

Note: Numbers may not sum due to rounding.

A portion of the major waste-stripping costs was capitalized. If the waste stripping volume in a quarter period is above the waste-stripping level at the overall LOM average strip ratio for each mining area of Los Filos, Bermejal and Guadalupe Open Pits, then it is considered as capitalized stripping. A summary of the costs capitalized is shown in Table 21-5.

Table 21-5: Capitalized Waste-Stripping Costs

Capitalized Waste Costs	LOM ($M)
LFOP	112.1
BOP	77.5
GOP	44.2
Total Capitalized Waste Movement Costs	**233.7**

Note: Numbers may not sum due to rounding.

21.1.2 Los Filos Underground Mining

Estimated sustaining capital for Los Filos Underground is related to ramp, horizontal and vertical development, rebuilds and major component replacements, ventilation, and safety-related infrastructure. As shown in Table 21-6, the sustaining capital is $15.5 million for the LOM (2022 to 2025). No capacity additions are required for the mining fleet. Also, no contingencies were added due to the short remaining mine life.

Table 21-6: Los Filos Underground Sustaining Capital Cost Estimate

Category	LOM ($M)
Ramp Development	9.7
Horizontal Development	4.4
Vertical Development	1.4
Total	**15.5**

Note: Numbers may not sum due to rounding.

21.1.3 Bermejal Underground Mining

AMC estimated the capital requirement for Bermejal Underground related to ventilation and safety infrastructure. LOM total CAPEX including contingencies is estimated at $105.8 million, as summarized in Table 21-7.

Table 21-7: LOM Bermejal Underground Capital Cost Estimate Summary

Mining Capital Costs	Initial ($M)	Sustaining ($M)	LOM Total ($M)
Underground Infrastructure	9.8	4.3	14.1
Capital Development	25.7	66.0	91.7
Grand Total Mining Capital Cost (including Contingency)	**35.5**	**70.3**	**105.8**

Note: Numbers may not sum due to rounding.

Mining Mobile Equipment

The Bermejal Underground mobile equipment requirements for the mine were estimated based on first-principles productivity calculations, and the mine development and production schedules. The mobile equipment requirements estimate is discussed in Section 16. No mobile equipment purchase is envisioned for the owner, as the contactor will provide all the necessary mobile equipment to meet production demands.

Mine Development

Mine development costs were estimated using actual contractor rates. A first-principles model was used to check the validity of the contractor's costs. Total capital development costs, which includes a contingency of 10%, were estimated to be $91.7 million. The breakdown of the mine development costs for the Bermejal Underground LOM is provided in Table 21-8.

Table 21-8: LOM Bermejal Underground Mine Development Cost Estimate

Category	Initial ($M)	Sustaining ($M)	LOM Total ($M)
Ramp Development	20.3	20.8	41.2
Horizontal Development	4.6	41.0	45.6
Vertical Development	0.7	4.2	5.0
Total (including Contingency)	**25.7**	**66.0**	**91.7**

Note: Numbers may not sum due to rounding.

Mine Infrastructure

Mine infrastructure costs were estimated using Q2 2022 budgetary quotes. The breakdown of the infrastructure costs is summarized in Table 21-9.

Table 21-9: LOM Bermejal Underground Infrastructure Capital Cost Estimate

Category	Initial ($M)	Sustaining ($M)	LOM Total ($M)
West Portal	0.2	-	0.2
Electrical	6.7	-	6.7
Communications	0.1	-	0.1
Refuge Chambers	0.1	0.2	0.4
Explosives Magazines	0.0	-	0.0
Maintenance Shop	1.2	-	1.2
Ventilation	0.0	2.8	2.8
Mine Dewatering	0.5	0.9	1.4
Subtotal	**8.9**	**3.9**	**12.8**
Contingency	0.9	0.4	1.3
Total	**9.8**	**4.3**	**14.1**

Note: Numbers may not sum due to rounding.

21.1.4 Processing

Heap Leach Processing

The capital and sustaining costs for constructing the new heap leach Pad 3 is estimated at $41.4 million, including a 20% contingency, and will be built in three phases, in 2023, 2025, and 2027. An additional $10.2 million of cost will be incurred to replace the existing mobile conveyors in 2023 and 2024, and radial stacker on Pad 2, as the existing equipment will be used for CIL filtered tailings deposition. The existing booster pump station for Pad 1 and 2 will be relocated in 2024 to a higher elevation on Pad 1 and require approximately $4.0 million. Constructing the interliner on Pads 1, 2, and 3 will require $30.3 million, including a 20% contingency, in 2030 and 2032.

The capital estimate is summarized in Table 21-10 by area.

Table 21-10: Capital Estimate Summary for Heap Leach Facilities

Description	Cost ($M)
Pad 3	41.4
Mobile Stacking Equipment Replacement	10.2
Booster Pump Station Relocation	4.0
Interliner (on Pads 1, 2 and 3)	30.3
Total	**85.9**

Carbon-in-Leach Processing

Basis of Estimate

The base date of the CAPEX estimate is Q2 2022. The CIL plant project is assumed to be executed within the time frame shown in the execution schedule provided in Section 24, Figure 24-1. The CAPEX estimate is based on an execution strategy using an engineering, procurement, and construction management (EPCM) implementation approach, as described in Section 24.

CAPEX Summary

Equinox Gold compiled and updated the CAPEX estimate for the CIL plant and ancillary facilities. The CAPEX estimate reflects the project scope as described in Section 17.3 of this Technical Report.

The capital estimate is summarized in Table 21-11 by area.

Table 21-11: CIL Capital Estimate Summary by Area (Q2 2022)

Area Description	Cost ($M)
Construction Indirects	22.3
Treatment Plant	127.9
Reagents & Plant Services	17.3
Infrastructure	4.1
Management Costs	25.2
Owners Project Costs	38.7
Subtotal	235.5
Contingency	34.2
Escalation	48.2
Total	**318.0**

CAPEX Development

In 2021, Lycopodium provided CAPEX estimation for a CIL plant to process 8,000 t/d, with design provisions to allow for an anticipated expansion to 10,000 t/d. The CAPEX estimate was based on Q4 2020 pricing and is deemed to have an overall accuracy of ±15%. The CAPEX estimate conformed to Association for the Advancement of Cost Engineering International (AACEI) Class 3 estimate standards. The various elements of the project estimate were subject to internal peer review by Lycopodium and were reviewed for scope and accuracy at that time.

To develop the CIL plant CAPEX estimate for 8,000 t/d and expandable to 10,000 t/d, engineering lists, general arrangement drawings, and a 3-D layout model were produced with sufficient detail to measure the engineering quantities for earthworks, concrete, steelwork, mechanical, and electrical for the process plant and associated infrastructure.

Unit rates that reflected Q4 2020 prices in Mexico were established for bulk materials, capital equipment, and labour via an extensive budget quotation request (BQR) process. Labour rates from the market were benchmarked against in-house labour rates and indirect cost modelling to ensure adherence to the current projects market. The rates used in the estimate were reviewed and deemed to reflect the Q4 2020 market conditions. Budget pricing for equipment and infrastructure facilities was obtained from suitable and reputable suppliers and contractors.

In 2022, further work by Equinox Gold identified that overall project financials would be improved if the CIL plant was initially built for a 10,000 t/d throughput. Lycopodium was re-engaged to confirm engineering and equipment requirements for 10,000 t/d and provide information for Equinox Gold's CAPEX estimate. Lycopodium updated process design criteria, flowsheets, engineering lists, general arrangement drawings, and a 3-D layout model was updated to measure the additional engineering quantities for earthworks, concrete, steelwork, mechanical, and electrical for the process plant and associated infrastructure.

As a result, a revised CAPEX estimate for 10,000 t/d was updated and reviewed internally by Equinox Gold.

Management Costs

Management costs included front-end engineering costs, EPCM, and commissioning costs. Equinox Gold increased the EPCM cost from $17 million to $25 million, representing an increase from 12% to 18% of direct project costs.

Owner's Costs

Owner's costs include the following:

- Owner's preliminary and general costs
- Working capital
- CIL plant and filtered tailings haul road modifications
- CIL plant ROM ore pad preparation
- First fills (grinding media, lubricants, fuel, and reagents)
- Opening stocks
- Plant mobile equipment
- Insurance, stores stock, and commissioning spares
- Equipment vendor representative costs
- Operator training costs for the process plant.

Equinox Gold added the following ancillary work items to the Owner's cost for the following project infrastructure (as described in Section 18.7):

- Modifications to the existing Mezcala substation
- New electrical substation for the CIL plant and mine operations
- 115 kV transmission line extension to the new electrical substation.

Allowances, Contingency, and Escalation

Equinox Gold reviewed the CAPEX estimate and added additional growth allowances for mechanical equipment, platework, and electrical equipment based on Equinox Gold's recent construction experience at the Greenstone project in Canada.

Contingency was applied to each line item of the CAPEX estimate based on the level of confidence in the item cost basis. The resultant contingency for the CIL plant CAPEX estimate is 14.5% before taxes, duties, and escalation.

Equinox Gold applied escalation to update Q4 2020 pricing to Q2 2022 to account for the significant inflation that has persisted through this period. The Mexican National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía [INEGI]) consumer price index for the construction and industrial industries was reviewed and applied by Equinox Gold per commodity. Escalation ranges from 8% for labour to 27% for construction materials; overall escalation is 18.2%.

Exclusions

The following items are specifically excluded from the CAPEX estimate:

- Permits and licences
- Project sunk costs
- Exchange rate variations
- Government taxes and duties
- Project insurance
- Potential upgrade of the existing fresh water supply pipeline and pumping system.

21.2 Operating Cost Estimate

21.2.1 Open Pit Mining

The estimated mining costs for the open pits were developed from a detailed first principles model and verified relative to the average 2020–2022 actual mining costs (Table 21-12), with adjustments in future periods for changing haul profiles to the waste rock dumps and the three ore processing destinations (Crushed heap leach, ROM heap leach, and CIL plant).

Table 21-12: Average Actual Open Pit Mining Costs for 2020–2022

Open Pits	Unit	2020	2021	YTD (June 30, 2022)
Bermejal–Guadalupe	$/t mined	1.57	1.40	1.85
Los Filos	$/t mined	NA	1.56	1.37

The mined tonnage and grade for the open pits is presented based on its destination in Table 21-13.

Table 21-13: LOM Distribution of Open Pit Mined Tonnages

Destination	Los Filos		Bermejal		Guadalupe		Total	
	(Mt)	(%)	(Mt)	(%)	(Mt)	(%)	(Mt)	(%)
Crushed Heap Leach	22.9	4	0.2	0	1.5	1	24.6	3
ROM Heap Leach	68.8	11	37.2	16	15.2	13	121.2	12
CIL Plant	20.7	3	10.9	5	3.1	3	34.8	4
Waste Rock Dumps	521.2	82	179.5	79	101.0	84	801.7	82
Capitalized Waste	87.5	14	55.5	24	31.1	26	174.1	18
Operating Waste	433.7	68	124.0	54	69.9	58	627.6	64
Total	**633.7**	**100**	**227.9**	**100**	**120.8**	**100**	**982.3**	**100**

Note: Numbers may not sum due to rounding.

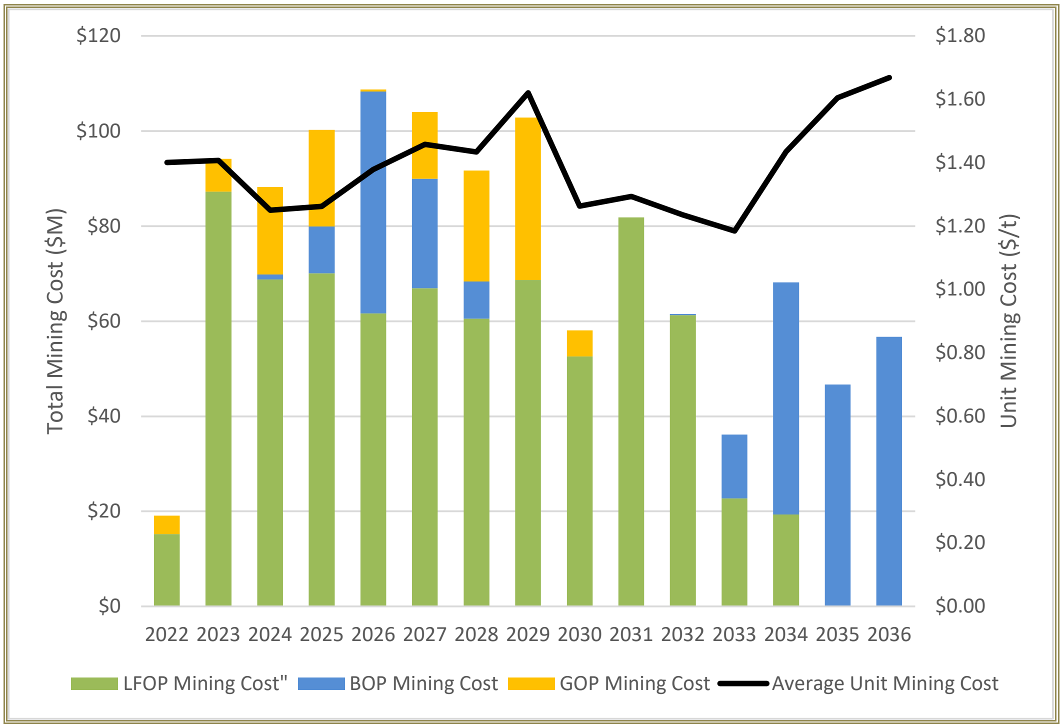
The estimated LOM total open pit mining costs excluding the capitalized waste are $1,118 million, and the estimated LOM average unit mining cost is $1.38/t mined. The estimated LOM mining costs for each of the three open pits are presented in Table 21-14.

Table 21-14: LOM Estimated Open Pit Mining Costs

Category	Los Filos		Bermejal		Guadalupe		Total	
	($M)	($/t)	($M)	($/t)	($M)	($/t)	($M)	($/t)
Ore Mining	153.5	1.37	72.0	1.49	27.4	1.38	252.9	1.37
Waste Rock Mining	695.5	1.33	259.9	1.45	143.7	1.42	1,099.1	1.37
Capitalized Waste	112.1	1.28	77.5	1.39	44.2	1.42	233.7	1.34
Operating Waste	583.4	1.35	182.4	1.47	99.5	1.42	865.3	1.38
Total (including capitalized waste)	**849.1**	**1.34**	**331.8**	**1.46**	**171.1**	**1.42**	**1,351.9**	**1.38**
Total (excluding capitalized waste)	**736.9**	**1.35**	**254.3**	**1.48**	**126.9**	**1.41**	**1,118.2**	**1.38**

Note: Numbers may not sum due to rounding.

Figure 21-1 shows how the estimated total and average unit mining costs fluctuate over time. These cost fluctuations from year to year are caused by changes in total mined tonnes and changing haul profiles.



Note: Excludes capital waste stripping.

Source: AMC (2022).

Figure 21-1: Estimated Open Pit Mining Costs by Year

21.2.2 Los Filos Underground Mining

A contractor currently operates Los Filos Underground. Go-forward estimated mining costs are based on the average 2021 actual mining costs in the Nukay/Peninsular zones (refer to Table 21-15).

Table 21-15: Average Actual Los Filos Underground Mining Costs for 2020–2022

	Unit	2020	2021	January 1 to June 30, 2022
LFUG North	$/t mined	75.40	86.95	96.63

Table 21-16 shows the average unit mining costs for the Los Filos Underground Mineral Reserves using overhand drift-and-fill (OHDAF) and LHOS mining methods. As of June 30, 2022, approximately 96% of the deposit is mined by OHDAF, and 4% by LHOS.

Total LOM OPEX for Los Filos Underground is estimated at $89.2 million.

Table 21-16: Estimated Los Filos Underground Mining Unit Operating Costs ($/t ore mined)

Category	Overhand Drift-and-Fill	Longhole Open Stoping	LOM Weighted Average
Ore mined	32.52	23.45	32.14
Indirect Mine	2.48	2.48	2.48
Maintenance	13.44	13.44	13.44
Technical Services	1.77	1.77	1.77
Backfill (Uncemented Rockfill)	0.39	0.39	0.39
Labour	22.65	12.46	22.23
Total	**73.25**	**53.99**	**72.45**

Note: Numbers may not sum due to rounding.

21.2.3 Bermejal Underground Mining

Bermejal Underground is currently operated by a contractor and will continue to be contractor-operated throughout the LOM. The OPEX was estimated using actual costs from Los Filos Underground (Table 21-15), with higher cost adjustments for the ground support and backfill due to poorer ground at Bermejal Underground. AMC also assumed cost reductions based on optimizing the cement content in the CRF and support requirements, as well as from achieving higher production rates to reach approximately 1 Mt per year. A detailed first principles costing model was used to check the validity of the actual costs, which came in within 10% difference. Bermejal Underground unit OPEX for OHDAF and UHDAF are presented in Table 21-17. Approximately 89% of the Bermejal deposit is mined by OHDAF, while the remaining 11% is mined using UHDAF.

Total LOM OPEX for Bermejal Underground is estimated to be $864 million.

Table 21-17: Estimated Bermejal Underground Mining Unit Operating Costs ($/t ore)

Category	Overhand Drift-and-Fill	Underhand Drift-and-Fill	LOM Weighted Average
Ore Mined	55.37	61.65	56.06
Indirect Mine	1.57	1.57	1.57
Maintenance	6.95	6.95	6.95
Technical Services	0.34	0.34	0.34
Backfill (Uncemented Rockfill)	7.00	11.90	7.53
Labour	3.61	3.61	3.61
Total	**74.84**	**86.01**	**76.06**

Note: Numbers may not sum due to rounding.

21.2.4 Heap Leach OPEX Processing

Paul M. Sterling has provided an estimate of heap leach OPEX over a range of copper concentrations reflective of the future ore. Lycopodium developed OPEX for the proposed CIL processing plant in accordance with typical industry standards.

Heap Leach Facility

The OPEX for heap leaching Crushed and ROM were compiled for 2019, 2021, and Q1–Q2 2022. The 2020 information was disregarded, as the operation was significantly disrupted due to a nationally mandated shutdown of mining operations in Mexico due to the onset of the Covid-19 pandemic, as well as four months of a community blockade. Q4 of 2019 was disregarded from the data source for Crushed ore since contract crushing was being performed, which increased the total crushing costs above that normally observed at Los Filos, and minimal ROM was being mined due to waste stripping in the Guadalupe Open Pit.

The average Crushed ore OPEX was derived from the average cost per tonne of ore for each period stated above, and the result is shown in Table 21-18. The average Crushed ore OPEX is $9.27/t of ore including the cyanide cost, or $6.24/t of ore without the cyanide cost included. The LOM used the 2019 base cost of $6.03/t of ore, which is supported by the 2021 and 2022 actual data.

The average ROM OPEX was derived from the average cost per tonne of ore for each period stated above, and the result is shown in Table 21-19. The average ROM OPEX is $3.51/t of ore including the cyanide cost and $2.10/t of ore excluding the cyanide cost.

The LOM model used the 2019 base cost of $2.25/t of ore which is also in line with the 2021 and 2022 actual data.

Table 21-18: Summary of Crushed Ore Heap Leach Operating Costs (Q1–Q3 2019, 2021 & Q1–Q2 2022) ($/t)

Cost Item	2019 (Q1–Q3)	2021	2022 (Q1–Q2)	Average
Crushing	1.18	1.23	1.10	1.17
Lime	0.52	0.62	0.52	0.55
Cement	0.85	0.71	0.86	0.81
ADR	0.60	0.38	0.56	0.51
Leaching	1.55	2.16	1.17	1.63
Cyanide	3.19	2.47	3.42	3.03
Indirects	0.25	0.32	0.50	0.35
Smelting	0.12	0.08	0.09	0.10
Maintenance	0.97	1.11	1.30	1.12
Total	**9.22**	**9.08**	**9.50**	**9.27**
Average Tonnes	**403,280**	**326,528**	**181,848**	**181,848**
Base Cost without Cyanide	**6.03**	**6.61**	**6.08**	**6.24**

Table 21-19: Summary of ROM Ore Heap Leach Operating Costs (Q1–Q3 2019) ($/t)

Cost Item	Average	2021	2022 (Q1–Q2)	Average
Lime	0.43	0.35	0.38	0.39
ADR	0.37	0.12	0.44	0.31
Leaching	0.93	0.72	0.94	0.86
Cyanide	1.36	0.91	1.94	1.41
Indirects	0.15	0.11	0.39	0.22
Smelting	0.07	0.03	0.07	0.06
Maintenance	0.30	0.11	0.38	0.26
Total	**3.62**	**2.36**	**4.54**	**3.51**
Avg Tonnes	**405,034**	**487,279**	**328,626**	**406,979**
Base Cost without Cyanide	**2.25**	**1.45**	**2.60**	**2.10**

Initiatives have been undertaken to improve heap leach operating practices and reduce process OPEX. These initiatives have included:

- Installing a geomembrane liner on a previous surface of Pad 2 to prevent pregnant leach solution originating from higher lifts of leach ore from percolating through the lower lifts. The lower lifts have pH levels below 9.0 that contribute to high cyanide consumption through the conversion of free cyanide to HCN which can then volatilize from the heap.
- Implementing a 60-day primary leach cycle followed by a 60-day secondary leach cycle for Crushed ore. The free cyanide percolating through the upper lifts from the primary leach cycle then leaches the gold in the lower lifts as a secondary leach cycle. Performing this procedure reduces overall cyanide consumption and increases the gold grade in the pregnant leach solution.
- Reducing the leach cycle time for ROM from 150 days to 90 days over a two-year period. The reduced cycle times are expected to save power from solution pumping and reduce ADR processing costs.
- An interliner comprising a geomembrane liner and new solution-collection pipework will be installed primarily on Pad 1 (ROM) to increase the overall heap height by up to 100 m, for a total height of 200 m. The interliner will intercept pregnant solution and prevent it from percolating through the entire height of the leach pads, thus reducing cyanide losses in these lower lifts through consumption by other metals.

Table 21-20 provides a summary of projected heap leach OPEX reductions projected by Equinox Gold as these initiatives become fully implemented. By 2025, Crushed ore heap leach OPEX are projected to be $7.76/t and ROM heap leach OPEX are projected at $2.85/t.

Table 21-20: Summary of Projected Heap Leach Unit Operating Cost (LOM)

Year	Crushed Ore ($/t)	ROM Ore ($/t)
2023	9.37	3.51
2024	8.72	3.17
2025-LOM	7.76	2.85

Heap Leach Operating Costs Versus Copper Grade

Reported OPEX is relevant to ore processed from current mining operations in which the copper content of the ore is typically less that 0.3% Cu. In the future, mining operations are scheduled to mine ore from the Bermejal and Guadalupe Open Pits and Bermejal Underground ore sources that contain significantly higher copper grades, which are expected to increase sodium cyanide consumption and overall process OPEX.

The results of KSM's (2021) LOM metallurgical test program conducted on heap leach and CIL yearly test composites for Los Filos and Bermejal Underground, and Los Filos, Bermejal and Guadalupe Open Pits, which represented the first four years of heap leach and CIL operation, were included with existing data to create revised OPEX formulas. The LOM metallurgical test program results are discussed in detail in Section 13.

The Qualified Person has reviewed available metallurgical testwork and has prepared an estimate of OPEX that is likely to be incurred when heap leaching Los Filos and Bermejal Underground, and Los Filos, Bermejal and Guadalupe Open Pit ore sources.

Los Filos Open Pit and Underground Heap Leach Operating Costs

The LOM metallurgical test program results for Los Filos Open Pit and Underground heap leach yearly test composites were included with existing results, and a revised formula was created. The revised OPEX formula is as follows:

- Los Filos Open Pit and Underground Crushed OPEX formula: BCRCST+1.63*CNCST
- Los Filos Open Pit ROM OPEX formula: BUCRCST+0.7*CNCST.

The formulas contain a base-case cost in $/t of ore for Crushed or ROM (BCRCST or BUCRCST) added to the cyanide consumption (fixed constant) that is multiplied by the cyanide cost (CNCST). The formula allows flexibility for calculating future LOM models when the base cost changes or the cyanide cost changes.

The variables, BCRCST, BUCRCST and CNCST are used in all OPEX formulas for Bermejal Open Pit and Underground and Guadalupe Open Pit discussed below.

Bermejal and Guadalupe Open Pits Heap Leach Operating Costs

The LOM metallurgical test program results for Bermejal and Guadalupe Open Pits heap leach yearly test composites were included with existing results and a revised formula was created.

It has been established that sodium cyanide consumption increases as the soluble copper content of the ore increases. A linear regression of sodium cyanide consumption versus copper grade is shown in Figure 21-2, and resulted in the following relationship for sodium cyanide consumption versus Cu_T% in the Bermejal and Guadalupe Open Pit ores:

- Bermejal Open Pit sodium cyanide consumption (kg/t): $4.8682*\%Cu_T + 0.2512$
- Guadalupe Open Pit sodium cyanide consumption (kg/t): $2.893*\%Cu_T + 0.3597$.

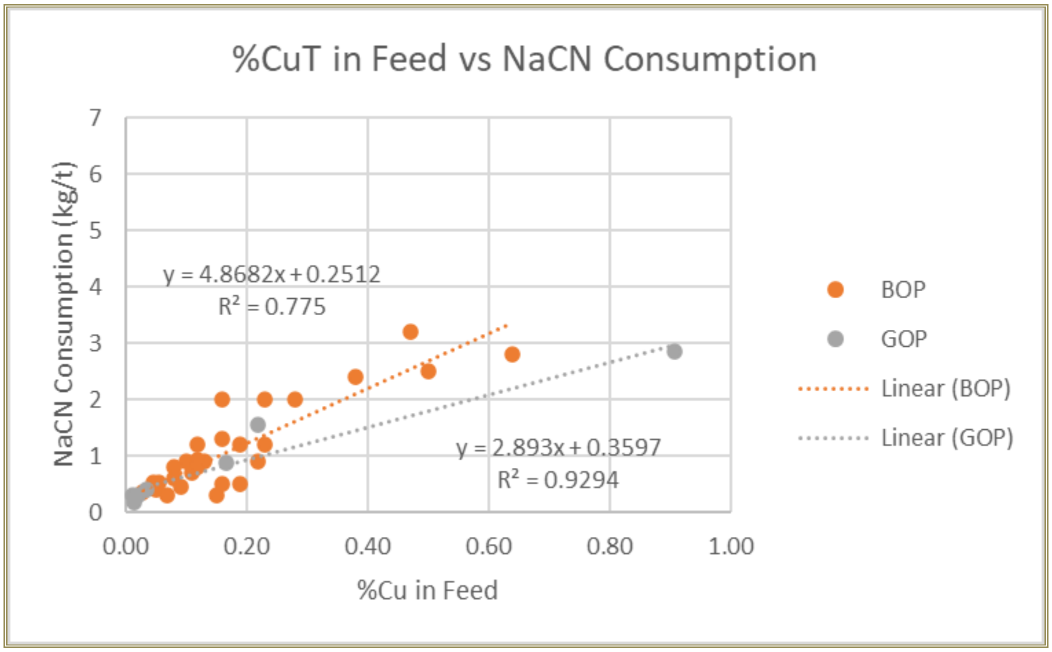


Figure 21-2: ***Bermejal and Guadalupe Open Pits Sodium Cyanide Consumption vs. %Cu$_T$ in the Ore***

This relationship has been used to estimate the Crushed and ROM heap leaching OPEX for copper grades over the range 0.3% to 1.0% Cu. This estimate is based on estimated heap leach OPEX commencing in 2025 after the heap leach improvement initiatives have been fully implemented.

The Los Filos Open Pit OPEX formulas derived the minimum cyanide consumption for Crushed and ROM at 1.63 and 0.7 kg NaCN/t of ore respectively. As a result, the minimum cyanide consumptions for Los Filos Open Pit Crushed and ROM were added to the Bermejal and Guadalupe Open Pit cyanide consumption formula constants. The resultant OPEX was derived for Bermejal and Guadalupe Open Pits:

- Bermejal Open Pit Crushed OPEX formula: (4.8682*%Cu$_T$ +1.8812)*CNCST+BCRCST
- Bermejal Open Pit ROM OPEX formula: (4.8682*%Cu$_T$ +0.9512)*CNCST+BUCRCST
- Guadalupe Open Pit Crushed OPEX formula: (2.893*%Cu$_T$ +1.9897)*CNCST+BCRCST
- Guadalupe Open Pit ROM OPEX formula: (2.893*%Cu$_T$ +1.0597)*CNCST+BUCRCST

The Qualified Person notes that the 2022 LOM production schedule reviewed showed that the Bermejal Open Pit total copper values in the ROM do not exceed 0.3% total copper in any of the production years. As a result, the OPEX formula derived for the Bermejal Open Pit ore source will calculate the OPEX equal to the base-case cost. The Guadalupe Open Pit ROM reported LOM total copper values less than 0.20% and the same result for Bermejal Open Pit ROM applies.

The %Cu$_T$ in the LOM production schedule 2022 for Guadalupe Open Pit Crushed ore ranged from 0.16% to 0.62%. The %Cu$_T$ in the Bermejal Open Pit Crushed ore ranged from 0.33% to 1.00% in the final years of open pit mining and will have an effect on the OPEX due to increased cyanide consumption from soluble copper.

The impact on OPEX at higher %Cu_T is shown in Table 21-21.

Table 21-21: Heap Leach Operating Cost ($/t) versus %$Cu_T$ in Bermejal and Guadalupe Open Pit Ores

	%Cu_T					
Ore Source	0.00	0.10	0.30	0.50	0.70	1.00
Guadalupe Open Plt Crushed ($/t)	9.91	10.47	11.60	12.73	13.86	15.55
Bermejal Open Pit Crushed ($/t)	9.70	10.65	12.55	14.44	16.34	19.19

The Qualified Person notes that the higher copper grades expected in Bermejal and Guadalupe Open Pits will increase the copper concentration in the resulting PLS, which will likely present operational problems during gold recovery from the PLS in the ADR plant. As such, it may be necessary to evaluate process methodologies for dealing with the anticipated increase of copper in the PLS when processing Guadalupe Open Pit ore. There are processes, such as the SART process (sulphidization-acidification-recirculation and thickening), which is used in industry for this purpose, and can serve to offset the cost of processing ore with high copper grades by producing a marketable copper sulphide product by extracting copper from the CIL processing circuit and regenerating cyanide for recirculation back to the process.

Elbow Creek Engineering was engaged in 2020 to perform an assessment pertaining to the impact that copper reporting to the PLS solution would have on gold recovery on carbon. The assessment included when a SART plant may be required. The assessment concluded that copper could reach concentrations in 2028 that could impact the gold recovery, based on the LOM production schedule. The findings allow the Los Filos Mine Complex personnel time to monitor the copper concentrations in the PLS and prepare in advance for a SART installation after the CIL plant has been built and commissioned. The design of the CIL plant has included the provision to add the SART plant at a future time; however, the capital cost of the SART plant has not been included in this study.

Bermejal Underground Heap Leach Operating Cost

An OPEX formula was derived for Bermejal Underground for the initial years of ore reporting to heap leach before the CIL plant is commissioned; once commissioned, all underground ore will be processed through the CIL plant. The cyanide consumption versus %Cu_T in the ore is shown on Figure 21-3.

The Los Filos Open Pit OPEX formulas derived the minimum cyanide consumption for Crushed at 1.63 kg NaCN/t of ore. As a result, the minimum cyanide consumptions for Los Filos Open Pit Crushed were added to the Bermejal Underground cyanide consumption formula constant. The resultant OPEX derived for Bermejal Underground is as follows:

- Bermejal Underground Crushed OPEX formula: (4.6696*%Cu+1*7502) *CNCST+BCRCST

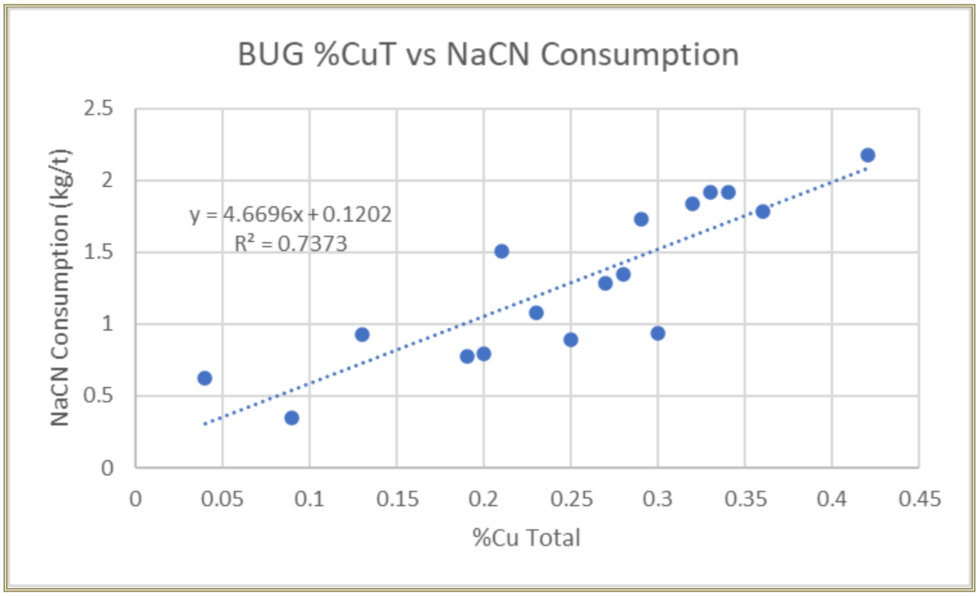


Figure 21-3: Bermejal Underground Sodium Cyanide Consumption vs. %Cu$_T$ in the Ore

21.2.5 CIL OPEX Processing

Carbon-in-Leach Plant

The CIL plant OPEX has been developed based on a design processing rate of 3.65 Mt/a (or 10,000 t/d) of ore. The plant will normally operate 24 hours/day, 365 days/a, with a 75.0% (6,570 h/a) utilization of crushing plant and 91.3% (8,000 h/a) utilization of milling, CIL, and rest of the plant.

The OPEX estimate has been compiled from a variety of sources and is based on LOM 'typical' plant feed.

All costs are based on the Q4 2020 pricing escalated to Q2 2022, and other consumables and reagents are based on Q2 2022 prices. The process plant OPEX for the CIL facilities is summarized in Table 21-22 and Table 21-23.

Table 21-22: CIL Plant Operating Cost

Cost Centre	Process Operating Cost	
	($M/a)	($/t Ore)
Operating Consumables		
Crushing Plant	0.13	0.04
Milling Plant	5.17	1.42
Gravity and Intensive Cyanidation Unit	0.14	0.04
CIL Excluding Cyanide	2.39	0.65
Cyanide for Leaching	15.66	4.29
Thickening and Filtration	1.97	0.54
ADR	1.82	0.50
Miscellaneous	0.26	0.07
Subtotal Consumables	27.54	7.55
Plant Maintenance	2.42	0.66
Laboratory (Plant)	0.32	0.09
Power	11.42	3.13
Labour (Plant Operations & Maintenance)	6.67	1.83
Subtotal Other	20.83	5.71
Total Plant	48.37	13.25
Total Plant Excluding Cyanide	32.71	8.96

The process OPEX has been developed in accordance with industry practice for feasibility studies for gold ore processing plants.

Quantities and cost data were compiled from a variety of sources including:

- Metallurgical testwork
- Consumable prices from suppliers
- Advice from Equinox Gold on the short-term cyanide price of $3,000/t (2022-2024) and long-term cyanide price of $1,954/t (2025 to end of mine life), which is based on historical cyanide prices and not the current cyanide price
- Lycopodium data and estimating methodologies
- Orway Minerals Consultants (OMC) comminution circuit modelling
- First principles calculations.

The OPEX estimate includes the following major categories as discussed below:

- Operating consumables
- Plant maintenance costs
- Power
- Labour (operation and maintenance)
- Laboratory costs.

Operating Consumables

The consumables category includes reagents, diesel fuel, and operating consumables such as mill liners, grinding media, cyclone parts, screen panels, crusher and mill lubricants, and tailings filter consumables. It excludes general maintenance consumables such as equipment spare parts and pump wear parts.

Consumption rates and pricing for consumables and reagents are summarized by processing area and section. The rates have been estimated based on the following:

- Comminution consumables (mill liners and grinding media) were predicted by OMC based on the ore Bond abrasion index values and the mill power consumption.
- Reagent consumptions were derived from laboratory testwork values and adjusted, where deemed necessary, for plant operating practice. For minor items, such as gold room fluxes, reagent consumption rates were based on first principles calculations, Lycopodium's experience, or generally accepted practice within the industry.
- Liquid gas propane usage for the elution circuit heater and carbon regeneration kiln are based on equipment vendor information.
- Diesel fuel consumption for the mobile equipment is based on standard equipment consumption rates and expected equipment utilization. A diesel price of $0.89/l was used in the estimate.
- Reagents prices were used from Equinox Gold's existing heap leach operation or from Lycopodium's costs database.
- The smelting furnace will be of the induction type, and its energy costs are hence carried within the power cost center.

Table 21-23: Base CIL Plant Consumables Cost by Major Area

Area	Cost ($M/a)	Cost ($/t Ore)
Crushing	0.14	0.04
Milling	5.17	1.42
Gravity and Intensive Cyanidation Unit	0.14	0.04
CIL Excluding Cyanide	2.39	0.65
Cyanide for Leaching	15.66	4.29
Thickening and Filtration	1.97	0.54
ADR Plant	1.82	0.50
Miscellaneous	0.26	0.07
Total	**27.55**	**7.55**

Unit costs of reagents and consumables used for the OPEX estimation are shown in Table 21-24.

Table 21-24: Reagent and Consumable Unit Cost

Category	Value[1] ($/t)
Sodium Cyanide—NaCN	1,950
Lime—90% CaO	163
Sodium Hydroxide—NaOH	603
Hydrochloric Acid—33%	321
Flocculant	4,400
Activated Carbon	4,490

Note: [1] Prices include delivery.

Maintenance

Maintenance costs, excluding labour and consumable costs, were estimated by applying factors (between 2% and 3%) to the mechanical equipment supply cost in each area of the plant. The factors applied are based on industry norms and Lycopodium's experience on similar projects. Crusher and filter wear parts are included in the consumables estimate. The maintenance costs are summarized by area in Table 21-25.

Table 21-25: Process Plant Maintenance Cost

Area	Maintenance Cost ($M/a)	Maintenance Cost ($/t ore)
Process Plant	2.03	0.56
Reagents & Services	0.10	0.03
Mobile Equipment	0.22	0.06
Maintenance General	0.07	0.02
Miscellaneous	0.01	0.00
Total	**2.43**	**0.66**

Power

The plant site electricity consumption is estimated based on the installed motor size of individual items of equipment, excluding standby equipment, and adjusted by efficiency, load, and utilization factors to arrive at the annual average power draw. This is then multiplied by total hours operated per annum and the electricity price to obtain the power cost.

The overall average plant power consumption is estimated at 14,266 kW. The estimated installed (connected) power and peak continuous draw are 25,861 kW and 17,218 kW, respectively.

A unit price of $0.10/kWh was applied as provided by Equinox Gold. The power cost by area is shown in Table 21-26.

Table 21-26: Process Plant Power Cost by Plant Area

Area	Cost ($M/a)	Cost ($/t Ore)
Area 120—Feed Preparation	0.10	0.03
Area 130—Milling and Classification	6.87	2.09
Area 140—Screening and Thickening	0.21	0.07
Area 160—Leaching	0.86	0.24
Area 170—Acid Wash/Elution/Carbon Regeneration	0.09	0.03
Area 180—Tailings Handling	1.29	0.43
Area 210—Reagents Area	0.00	0.00
Area 220—Water Services	0.21	0.06
Area 230—Plant Services	0.00	0.00
Area 240—Air Services	0.00	0.11
Area 250—Plant Fuel Storage and Distribution	0.00	0.00
Area 261—Electrical Services—Lighting and Small Power	0.00	0.05
Area 370—Buildings	0.00	0.01
Total	**9.63**	**3.13**

Labour

The process plant operating and maintenance labour costs were estimated based on labour required for a brownfield project (i.e., expansion of existing operation). Existing management, operating, and maintenance labour will support the CIL operating and maintenance teams. Labour rates are based on Equinox Gold's existing labour cost structures. Table 21-27 summarizes the total plant labour by each department.

Table 21-27: Plant Labour Summary

Sub-Department	Number of Employee
Management	2
Metallurgy	6
Laboratory / Sample Preparation	5
Operations	71
Maintenance	30
Total	**114**

The labour rates were developed based on the following rotations as per existing plant:

- Professional and skilled employees: 5 days on, 2 days off.
- Operating and maintenance staff: 12 hour shifts on 4-days-on, 4-days-off rotation.

The costs include all overheads, including allowances, overtime payments, bonus, leave, medical, and Government taxes and levies. Table 21-28 summarizes the process plant labour costs.

Table 21-28: Process Plant Labour Cost

Category	People	Total Labour Cost ($M/a)	Unit Cost ($/t ore)
Operations and Maintenance	114	6.67	1.83

Laboratory and Assay Costs

Process laboratory and assay costs are based on undertaking some sample preparation, solution assays, and titrations at the CIL plant, and commercial costs for solids and solutions for fire assay and chemical analyses.

The costs used were $6.00/sample (for fire assay) and $95.00/sample (for bullion assay) based on approximately 17,872 assays per year; the total estimated annual cost is $316,954 or $0.09/t ore.

Qualifications and Exclusions

The OPEX estimate includes all direct costs associated with the CIL plant, from crushing gold doré production.

The estimate has the following exclusion and qualifications:

- All sunk costs
- ROM and dead stockpile re-handling costs
- Government monitoring and compliance costs
- All general and administration costs
- Gold-refining costs
- Bullion transport costs, including insurance and security staff for bullion transport
- Bullion marketing costs
- Tailings transport and storage costs
- Tailings dust suppression costs
- Cyanide destruction costs (destruction not required)
- Rehabilitation or closure costs
- Union fees
- First fill and opening consumables stocks are captured in the CAPEX.

CIL Operating Cost by Ore Type

The copper content of the ore, and to a lesser extent the sulphur content, is critical to the CIL OPEX as they impact the cyanide and lime consumptions. Formulas were developed to estimate OPEX based on the CIL feed copper concentration. Table 21-29 shows the formulas based on ore type that were applied to the mine schedule to modify the basic OPEX estimate.

Table 21-29: Operating Cost Base Formula Based on Copper %

Ore Type	OPEX Formula[1]
BOP CIL	=(8.0185*%Cu+0.9323)*CNST+BCST
LFUG CIL	=IF(%Cu<0.1,0.28,2.4722*%Cu+0.0328)*CNST+BCST
BUG CIL	=IF(%Cu>=0.25,8.653*%Cu+0.103,1.55)*CNST+BCST
GOP CIL	=(3*%Cu+1.6329)*CNST+BCST
LFOP CIL	=(1.19*CNST)+BCST

Note: [1] CNCST = cyanide price = \$1.95/t, \$163/t lime and a base case OPEX BCST = \$8.99/t.

As the scheduled plant feed is low in sulphur, it was found unnecessary to correct the OPEX for sulphur content.

21.2.6 Waste Management

Filtered tailings from the CIL process will be deposited on the eastern side of Pad 1 and on top of leached ROM ore. Since the filtered tailings will use the existing geomembrane liner and solution pipe network already installed for Pad 1, the preparation cost of the filtered tailings area is minimal, and only requires minor surface grading prior to installing new drip lines on the top surface of the leached ROM ore for any future rinsing requirement for closure. Tailings will be transported to the deposition area via mobile conveyors and distributed via a radial stacker using existing equipment from Pad 2. The cost of replacing this equipment for Pad 2 is included in the heap leach pad sustaining capital. Once deposited, tailings will be spread with a dozer and then be compacted with a vibratory drum roller. Operating costs for spreading and compacting are \$0.37/t of tailings (SRK, 2019).

21.2.7 General and Administrative

General and administrative costs were estimated and supplied by Equinox Gold based on 2022 levels of spending with a 5% expected improvement from 2021 forwards as a consequence of cost-savings initiatives.

21.2.8 Current Operations Workforce

The workforce at the Los Filos Mine Complex is typically around 1,500 employees and contractors. The current number of personnel at the Mine as of June 30, 2022, was 1,507 employees (Table 21-30), which includes contractors working in the Los Filos Underground and Bermejal Underground mines. Non-union personnel fill administration and supervisory roles. Other roles, including maintenance, operators, and process plant personnel, are filled with union personnel or contractors. The underground and open pit operations personnel and ADR plant personnel operate on two shifts per day.

Table 21-30: Quantity of Mine Personnel

Mine Personnel Type	No. of Personnel
Non-Union Personnel—Open Pits	19
Non-Union Personnel—Los Filos Underground	14
Non-Union Personnel—Bermejal Underground	7
Non-Union Personnel—Process	24
Non-Union Personal G&A	189
Total Non-Union Personnel	**253**
Union Personnel—Open Pits	244
Union Personnel—Los Filos Underground	150
Union Personnel—Bermejal Underground	54
Union Personnel—Process	64
Total Union Personnel	**512**
Contractors—Open Pits	78
Contractors—Los Filos Underground	308
Contractors—Bermejal Underground	356
Total Contractors	**742**
Total Mine Personnel at Los Filos (June 30, 2022)	**1,507**

21.3 Interpretation and Conclusions

21.3.1 Open Pit Mining Operations

- Estimated capital for open pit mining includes additional haul trucks, shovels and other ancillary equipment required to operate the open pit throughout the LOM. The LOM non-sustaining capital total is $125 million, the LOM sustaining capital total is $133 million, and the capitalized waste-stripping cost is $234 million.
- The estimated mine OPEX for the open pits was developed with a detailed first principles model and verified relative to the average 2021 actual mining costs, with adjustments in future periods for changing haul profiles to the waste rock dumps and the three ore processing destinations (Crushed heap leach, ROM heap leach and CIL).
- The estimated LOM total mine OPEX for the open pit reserves is $1,118 million, and the estimated LOM average unit mining cost is $1.38/t mined.
- It is the QP's opinion that the CAPEX and OPEX developed for open pit mining are appropriate for converting Mineral Resources to Mineral Reserves.

21.3.2 Underground Mining Operations

Los Filos Underground

- Estimated sustaining capital for Los Filos Underground is related to ramp construction, horizontal and vertical development, which includes equipment rebuilds and major component replacements, ventilation, and safety. The sustaining capital is $15.5 million (2022 to 2025). No capacity additions are required for the mining fleet.

- The estimated mining costs are based on the average 2021 actual mining costs.
- The estimated LOM total mine OPEX is $89.2 million, and the estimated LOM average unit mining cost is $72.45/t ore.
- It is the QP's opinion that the CAPEX and OPEX developed for Los Filos Underground are appropriate for the conversion of Mineral Resources to Mineral Reserves.

Bermejal Underground

- The CAPEX is estimated to be $106 million for the underground development and infrastructure.
- The OPEX for Bermejal Underground was estimated using actual costs from Los Filos Underground with higher cost adjustments for the ground support and backfill due to poorer ground conditions than those encountered in the Los Filos Underground. The estimated LOM OPEX is $864 million, and the estimated LOM average unit mining cost is $76.06/t ore.
- It is the QP's opinion that the CAPEX and OPEX developed for Bermejal Underground are appropriate for converting Mineral Resources to Mineral Reserves.

21.4 Conclusions and Recommendations

21.4.1 Capital Cost Estimate CIL

It is the opinion of the QP that the capital costs developed for the CIL plant are sufficient to support a feasibility level study, however it is recommended to update the capital cost line items and conduct a price revalidation to both vendors for equipment packages and budget quotation requests to contractors in the future and prior to the execution of the project to reflect changes in local and international market conditions.

21.4.2 Operating Cost Estimate CIL

The QP makes the following conclusions regarding the CIL plant operating cost estimate:

- The base case costs (without cyanide costs) used in the LOM model processing formulas for CIL were based on 2022 reagent prices and grinding media prices. Historical energy and fuel costs were used in the derivation of the base case cost.
- OPEX costs formulas used before in 2018 for the CIL were updated based on the results of metallurgical test programs completed in 2021.

21.4.3 Operating Cost Estimate Heap Leach

The QP makes the following conclusions regarding the heap leach operating cost estimate:

- The Base costs (without cyanide cost) used in the LOM model processing OPEX formulas for Crushed and ROM ore were confirmed by actual operating costs for 2021 and (Q1-Q2) 2022.
- OPEX cost formulas used prior to 2018 for Crushed and ROM were reviewed and updated based on results from metallurgical test programs completed after 2018.

22 ECONOMIC ANALYSIS

Although Equinox Gold is a producing issuer and, therefore, is not required under NI 43-101 to include an economic analysis of the current Los Filos Mine Complex for the purposes of this section of this Technical Report, the QPs consider it reasonable to include a summary-level analysis to illustrate the potential economic impact of the construction and operation of a 10,000 t/d CIL processing plant.

Once commissioned, the CIL plant shall render ore economic that might not have been considered economic using the current heap leaching process, such as ore in higher strip ratio open pits or ore containing detrimental levels of copper and sulphur.

The Los Filos Mine Complex expansion project shows strong economic viability in the context of an overall operation of the current heap leach facilities and the addition of a CIL plant. The after-tax net present value, using a discount rate of 5% (NPV_5) of the cash flow of the entire project, is estimated at $625 million at the base case gold price of $1,675/oz.

The initial capital outlay associated with the CIL plant is estimated at $318 million. High-level economic analyses show that the addition of the CIL plant, compared to a heap leach-only scenario, contributes positively to the overall cash flow and NPV of the Los Filos Mine Complex, and adds approximately four years of mine life and over 1.1 Moz of gold produced.

The mine schedule features high grades with projected ounces production averaging over 360 koz per year between 2025 and 2030. The high margins potentially achievable during this period drive significant value. A summary of the economic analysis results using a gold price of $1,675/oz is shown in Table 22-1 Table 1-11 and key project outcomes in Table 22-2.

Table 22-1: Summary of Economic Analysis

Category	LOM ($M)
Total Net Revenue (Gold and Silver)	6,774
Total Mining Operating Costs (Underground and Open Pit)	2,072
Total HL Processing Operating Costs	702
Total CIL Processing Operating Costs	585
Land Payment and General and Administrative Operating Costs	655
Total Operating Costs	4,015
Operating Cash Flow	2,759
Total Non-Sustaining Capital Costs (including $318 M for CIL plant construction)	718
Total Sustaining Capital Costs	349
Total Capital Costs	1,067
Total Working Capital	7
Pre-Tax Cash Flow	**1,699**
Pre-Tax NPV (5%)	**1,107**
Income Tax	491
Mining Duty	216
Post-Tax Net Cash Flow	**993**
Post-Tax NPV (5%)	**625**
IRR (%)	**26.4**
Payback Period (Years)	**2.5**
Cash Cost per Ounce ($/oz)	**981**
AISC per Ounce ($/oz)	**1,081**

Note: Numbers may not sum due to rounding.

Table 22-2: Project Key Outcome Summary

Parameter	Unit	Value
Total Gold Proven and Probable Mineral Reserves*	Moz	5.3
Total Gold Production	Moz	4.0
Total Silver Production	Moz	11.8
Total Open Pit Material Mined (Ore + Waste)	Mt	982
Total Open Pit Ore Mined	Mt	181
Open Pit, Average Mined Gold Grade	g/t	0.65
Total Underground Ore Mined	Mt	12.6
Underground, Average Mined Gold Grade	g/t	3.94
Total Ore Tonnes Processed	Mt	193

Note: *Total gold metal contained is quoted from a consolidated Mineral Reserves statement for Los Filos Mine Complex (Table 15-1).

22.1 Methodology

The economic analysis was performed using a discounted cash flow model developed using Microsoft Excel. The model is a strict cash flow model that does not estimate intermediate stocks and cost of goods sold nor attempt to "match" expenditure and revenue for the purposes of deriving accounting measures such as profit or earnings. The cash flow model uses 2022 US dollars ($) and nominal mid-period monthly discounting at a base case discount rate of 5%.

22.2 Technical-Economic Model Parameters

A number of inputs form the basis for the technical-economic model. Mine schedule and costs associated with all open pit mining and Bermejal Underground were provided by AMC whereas the mine schedule and costs for Los Filos Underground were developed and provided by Equinox Gold. Operating and capital costs for processing and infrastructure were provided by Equinox Gold, Paul M. Sterling and Lycopodium. Metallurgical recoveries were developed by Paul M. Sterling and Lycopodium and applied separately to the technical-economic model.

The technical-economic model uses a gold price of $1,675/oz applied to the Mineral Reserve estimated at a gold price of $1,450/oz Au. A sensitivity analysis has been provided to illustrate the impact of gold price on the economic results of the project.

Mexican peso denominated costs were converted to United States dollars using an exchange rate of 20:1 (MXN:US).

Details to support the technical-economic model are provided in the various sections elsewhere in this Technical Report, including Mineral Processing (Section 13), Mineral Resource Estimates (Section 14), Mineral Reserve Estimates (Section 15), Mining Methods (Section 16), Recovery Methods (Section 17), Project Infrastructure (Section 18) and Capital and Operating Cost Estimates (Section 21).

22.3 Mine Development and Production Plans

Site-wide production was modelled from the open pit and underground mines. The LOM tonnage for each of the mines is summarized in Table 22-3.

Detailed production schedules for the open pit and underground mines are shown in Table 22-4 and Table 22-5, respectively. Ore production schedule with a breakdown by mine is shown on Figure 22-1. Annual processing production schedule and precious metal production are shown in Table 22-6 and Figure 22-2, respectively.

Table 22-3: LOM Mine Production Summaries

Production Summary	LOM Ore Quantity (Mt)	Grade (g/t Au)	Grade (g/t Ag)
Los Filos Open Pit	112.4	0.62	4.6
Bermejal Open Pit	48.4	0.57	7.8
Guadalupe Open Pit	19.8	0.98	9.6
Los Filos Underground	1.2	3.50	17.4
Bermejal Underground	11.4	3.99	18.9
Total	**193.2**	**0.86**	**6.9**

Note: Numbers may not sum due to rounding.

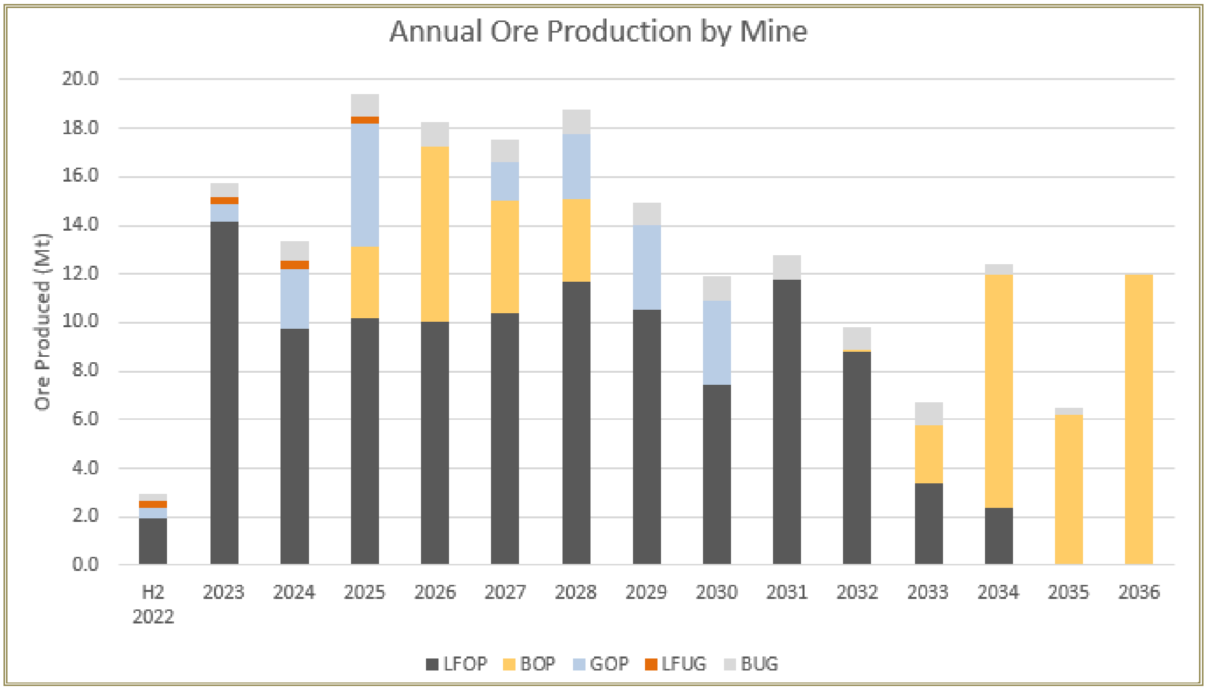
Table 22-4: Annual Open Pit Production Schedule

	Unit	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Los Filos Open Pit (LFOP)																	
Total Material Moved	kt	**633,676**	22,105	68,976	71,402	62,284	44,687	45,931	42,196	42,353	57,101	63,230	51,191	35,209	27,010	-	-
Total Waste Moved	kt	**521,245**	20,181	54,855	61,643	52,083	34,638	35,558	30,518	31,841	49,684	51,437	42,390	31,803	24,612	-	-
Total Ore Mined	kt	**112,431**	1,924	14,120	9,759	10,201	10,049	10,373	11,678	10,513	7,417	11,793	8,801	3,406	2,398	-	-
Stripping Ratio	w:o	**4.6**	10.5	3.9	6.3	5.1	3.4	3.4	2.6	3.0	6.7	4.4	4.8	9.3	10.3	-	-
Au Grade—Ore Mined	g/t	**0.62**	0.43	0.53	0.52	0.58	0.84	0.64	0.49	0.58	0.50	0.63	0.81	1.09	0.73	-	-
Contained Gold—Ore Mined	koz	**2,249**	27	241	164	190	270	213	185	197	120	237	230	119	56	-	-
Bermejal Open Pit (BOP)																	
Total Material Moved	kt	**227,865**	-	-	838	9,155	37,843	15,770	5,454	-	-	-	10,015	27,247	33,989	53,548	34,005
Total Waste Moved	kt	**179,485**	-	-	838	6,184	30,647	11,149	2,015	-	-	-	9,975	24,850	24,423	47,369	22,036
Total Ore Mined	kt	**48,380**	-	-	-	2,970	7,196	4,621	3,439	-	-	-	41	2,397	9,567	6,180	11,969
Stripping Ratio	w:o	**3.7**	-	-	-	2.1	4.3	2.4	0.6	-	-	-	245.4	10.4	2.6	7.7	1.8
Au Grade—Ore Mined	g/t	**0.57**	-	-	-	0.43	0.32	0.39	0.57	-	-	-	0.29	0.60	0.58	0.64	0.76
Contained Gold—Ore Mined	koz	**883**	-	-	-	41	74	58	64	-	-	-	0	47	178	128	294
Guadalupe Open Pit (GOP)																	
Total Material Moved	kt	**120,809**	5,659	9,151	15,741	16,063	285	15,931	31,691	22,111	4,179	-	-	-	-	-	-
Total Waste Moved	kt	**100,991**	5,197	8,379	13,327	11,058	285	14,352	29,020	18,652	719	-	-	-	-	-	-
Total Ore Mined	kt	**19,819**	461	771	2,414	5,005	-	1,579	2,671	3,459	3,460	-	-	-	-	-	-
Stripping Ratio	w:o	**5.1**	11.3	10.9	5.5	2.2	-	9.1	10.9	5.4	0.2	-	-	-	-	-	-
Au Grade—Ore Mined	g/t	**0.98**	1.05	0.74	0.86	1.04	-	0.31	0.57	1.34	1.29	-	-	-	-	-	-
Contained Gold—Ore Mined	koz	**626**	16	18	67	168	-	16	49	149	144	-	-	-	-	-	-
Total Open Pit																	
Total Material Moved	kt	**982,350**	27,764	78,127	87,981	87,502	82,815	77,632	79,341	64,464	61,280	63,230	61,206	62,457	60,999	53,548	34,005
Total Waste Moved	kt	**801,721**	25,379	63,235	75,808	69,326	65,571	61,059	61,553	50,493	50,403	51,437	52,364	56,653	49,034	47,369	22,036
Total Ore Mined	kt	**180,629**	2,385	14,892	12,172	18,176	17,245	16,573	17,788	13,971	10,877	11,793	8,842	5,803	11,965	6,180	11,969
Stripping Ratio	w:o	**4.4**	10.6	4.2	6.2	3.8	3.8	3.7	3.5	3.6	4.6	4.4	5.9	9.8	4.1	7.7	1.8
Au Grade—Ore Mined	g/t	**0.65**	0.55	0.55	0.59	0.68	0.63	0.54	0.52	0.77	0.75	0.63	0.79	0.89	0.61	0.70	0.77
Contained Gold—Ore Mined	koz	**3,758**	42	259	231	398	344	287	297	346	263	237	230	166	234	128	294

Table 22-5: Annual Underground Mine Production Schedule

	Unit	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Los Filos Underground (LFUG)																	
Total Ore Mined	kt	**1,231**	257	296	401	277	-	-	-	-	-	-	-	-	-	-	-
Au Grade	g/t	**3.50**	3.60	3.25	3.64	3.47	-	-	-	-	-	-	-	-	-	-	-
Contained Gold	koz	**138**	30	31	47	31	-	-	-	-	-	-	-	-	-	-	-
Bermejal Underground (BUG)																	
Total Ore Mined	kt	**11,366**	299	568	793	999	999	999	1,002	999	999	999	1,002	904	430	347	25
Au Grade	g/t	**3.99**	2.85	2.94	3.49	4.79	4.64	5.07	4.68	4.39	4.09	3.74	3.29	3.32	2.84	3.00	2.79
Contained Gold	koz	**1,457**	27	54	89	154	149	163	151	141	131	120	106	97	39	34	2
Total Underground																	
Total Ore Mined	kt	**12,597**	557	864	1,194	1,276	999	999	1,002	999	999	999	1,002	904	430	347	25
Au Grade—Ore Mined	g/t	**3.94**	3.20	3.05	3.54	4.51	4.64	5.07	4.68	4.39	4.09	3.74	3.29	3.32	2.84	3.00	2.79
Contained Gold	koz	**1,596**	57	85	136	185	149	163	151	141	131	120	106	97	39	34	2

Note: Numbers may not sum due to rounding.



Source: AMC

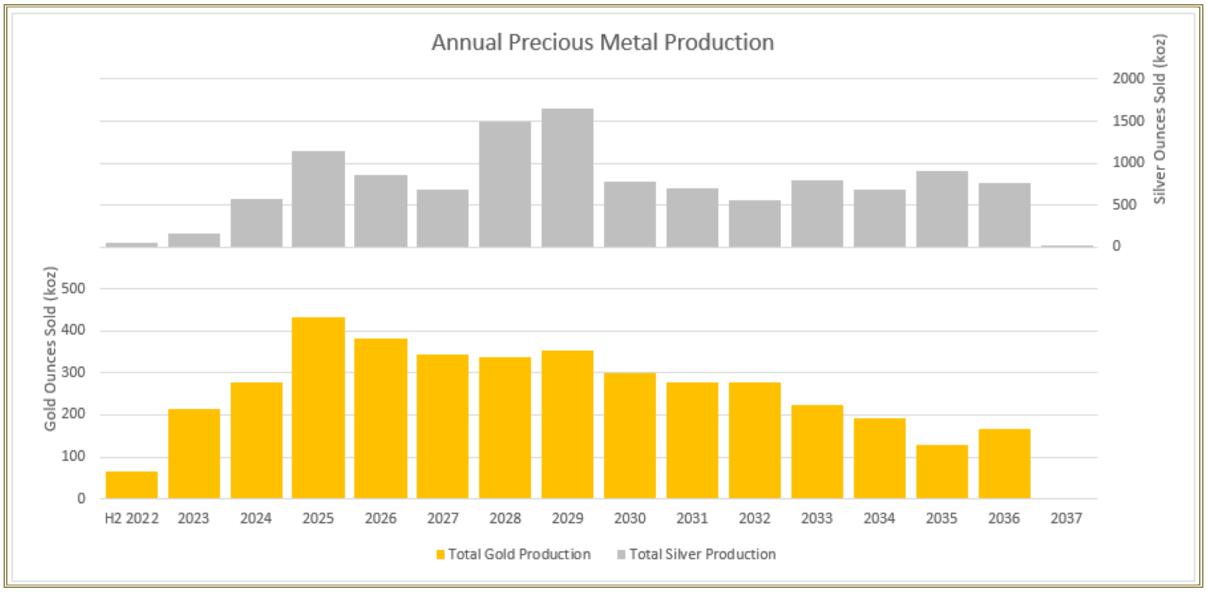
Note: H2 2022 represents Q3 and Q4 2022

Figure 22-1: Ore Production Schedule by Mine

Table 22-6: Annual Processing Production Schedule

Item	Unit	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Heap Leach																	
Total Ore Processed	kt	**147,510**	2,942	15,755	11,488	15,763	14,595	13,923	15,138	11,321	8,227	9,143	6,192	3,057	8,745	2,877	8,344
Au Grade—Ore Processed	g/t	**0.47**	1.05	0.68	0.48	0.44	0.39	0.36	0.36	0.59	0.47	0.42	0.41	0.28	0.39	0.24	0.57
Au Recovery	%	**55.1%**	68.3%	62.0%	60.1%	55.2%	56.1%	52.4%	55.6%	51.9%	51.5%	54.7%	58.3%	52.7%	46.5%	36.5%	42.0%
Ag grade—Ore Processed	*g/t*	***4.75***	*4.20*	*3.10*	*2.96*	*4.56*	*3.85*	*3.70*	*6.27*	*11.05*	*3.36*	*3.54*	*2.20*	*2.66*	*5.48*	*7.43*	*6.60*
Ag Recovery	*%*	***10.3%***	*12.2%*	*10.6%*	*10.7%*	*10.7%*	*10.4%*	*10.3%*	*10.3%*	*9.8%*	*10.3%*	*9.9%*	*10.0%*	*10.5%*	*10.9%*	*7.9%*	*11.0%*
CIL																	
Total Ore Processed	kt	**45,716**	0	0	1,877	3,689	3,649	3,649	3,652	3,649	3,649	3,649	3,652	3,650	3,650	3,650	3,650
Au Grade—Ore Processed	g/t	**2.13**	0.00	0.00	3.14	3.04	2.67	2.47	2.31	2.31	2.30	2.00	2.17	2.00	1.39	1.19	1.23
Au Recovery	%	**87.8%**	0.0%	0.0%	89.8%	86.2%	90.0%	90.0%	88.6%	89.4%	87.1%	90.0%	90.0%	88.9%	85.7%	85.7%	71.1%
Ag Grade—Ore Processed	g/t	**13.6**	0.0	0.0	16.5	17.1	10.6	8.2	20.2	21.4	12.6	9.7	8.3	13.3	10.2	17.9	12.6
Ag Recovery	%	**47.4%**	0.0%	0.0%	46.5%	44.8%	53.3%	53.3%	49.8%	50.4%	45.4%	52.7%	53.0%	48.9%	44.2%	40.6%	39.3%
Total Metal Production																	
Total Gold Production	koz	**3,975**	66	213	277	434	383	345	338	354	300	279	277	224	191	128	166
Total Silver Production	koz	**11,830**	44	167	580	1,148	855	686	1,489	1,657	774	701	560	793	691	911	770

Note: Numbers may not sum due to rounding.



Source: AMC.

Note: H2 2022 represents Q3 and Q4 2022

Figure 22-2: Precious Metal Production Schedule

22.4 Revenue

The contained metals mined and processed in the technical-economic model are based on the integrated mine plan. Recovery factors were then applied to determine recovered gold and silver which form the basis of revenue calculations. Discussion of the recoveries can be found in Section 17. The LOM revenues are summarised in Table 22-7.

Table 22-7: LOM Gold and Silver Production and Revenue Estimates

Description	Unit	LOM Total
Heap Leach Gold Production	Moz	1.22
CIL Plant Gold Production	Moz	2.75
Total Gold Production	**Moz**	**3.97**
Heap Leach Silver Production	Moz	2.33
CIL Silver Production	Moz	9.50
Total Silver Production	**Moz**	**11.83**
Gold Revenue	$M	6,657
Silver Revenue	$M	172

Notes: Numbers may not sum due to rounding.
Gold revenue based on $1,675/oz. Silver revenue based on an annually escalating silver value until the silver purchase agreement with Wheaton Precious Metals Corp. is repaid and then $18/oz afterwards.

22.4.1 Silver Stream Agreement

The Company’s silver production from the Los Filos Mine Complex is subject to the terms of an agreement (the “Silver Purchase Agreement”) with Wheaton Precious Metals Corp. (WPM). Under this agreement, the remaining obligation of the Company is to sell 2.9 million payable silver ounces produced by the Los Filos Mine Complex from June 30, 2022 to the earlier of the termination of the agreement or October 15, 2029 to WPM at the lesser of a "Fixed Price" or the prevailing market price, subject to an inflationary adjustment. The Fixed Price is revised each year on the anniversary date of the contract and is currently $4.53/oz until October 15, 2022.

As the streaming arrangement is external to the Mexican entity, Mexican corporate income tax is assessed on the assumption that all silver is sold at market prices, and that the adjustment to the streaming prices is done on a post-tax basis from the perspective of the project. Consideration of the taxation implications of the streaming arrangements are not within the scope of this study.

22.5 Treatment and Refining Charges and Freight and Transportation

Treatment charges and refining charges (TCRC) were estimated based on rates reflecting the current and historical costs at the mine. They are a small cost relative to overall project cash flows and were forecast as averaging $5.50/oz of payable gold and $0.05/oz of payable silver. The LOM total TCRC was estimated as $22 million.

22.6 Cost Estimates

22.6.1 Capital Costs

Capital costs were estimated using a combination of first principles models, quotes and estimates from previous quotes obtained by the operating mines as detailed in Section 21. The costs were imported to the technical-economic model from an integrated cost model that aggregated the capital cost estimates from the various sources.

The LOM capital costs are summarized in Table 21-1.

22.6.2 Capitalized Stripping

For the purposes of tax calculation and for categorization in terms of unit costs, a portion of the major waste stripping costs was capitalized. The criteria for capitalization was for a waste stripping volume above the waste stripping level of the overall LOM average strip ratio for each pit. A summary of the costs capitalized is shown in Table 22-8. In the technical-economic model the $44.2 million of capitalized stripping for Guadalupe Open Pit has been categorized as sustaining capital while the pit pushbacks for Los Filos and Bermejal Open Pits have been categorized as non-sustaining capital.

Table 22-8: Capitalized Waste-Stripping Costs ($M)

Capitalized Waste Costs	LOM
Los Filos Open Pit	112.1
Bermejal Open Pit	77.5
Guadalupe Open Pit	44.2
Total Capitalized Waste Movement Costs	**233.7**

Note: Numbers may not sum due to rounding.

22.6.3 Operating Costs

Operating costs were estimated using a combination of first-principles cost models and estimates based on information from the operating mines as detailed in Section 21.

The LOM operating unit costs are shown in Table 22-9.

Table 22-9: Operating Cost Summary

Operating Costs	Unit Costs ($/t)	Basis
Open Pit Mining	1.38	per tonne mined
Los Filos Underground Mining	72.45	per tonne of ore mined
Bermejal Underground Mining	76.06	per tonne of ore mined
Heap Leach Processing	4.76	Per tonne of heap leach ore processed
CIL Processing	12.81	per tonne of CIL ore processed
Land Payments and General and Administrative Costs	3.39	per tonne of total ore processed
Total Average Operating Cost	**20.78**	**per tonne of total ore processed**

Note: Numbers may not sum due to rounding.

22.6.4 Closure Costs

Closure costs were supplied to the economic analysis from a separate estimate. For the purpose of cash flow modelling, the expenditure on closure and reclamation was assumed to be undertaken in the year following cessation of production. The total estimate for closure and remediation is $50.9 million.

22.7 Taxes and Royalties

The economic model uses the corporate taxes, depreciation, and royalties discussed below.

Corporate Tax

- Corporate tax rate of 30%.
- A special mining duty of 7.5% is applied on EBITDA.
- A beginning balance of tax-loss carry forwards that could be used as deductions offsetting taxable income is assumed to be $95.8 million as of June 30, 2022.

Taxation Depreciation

- The treatment of depreciation and company taxes are based on the understanding of current Mexican tax law.
- An opening balance for historical depreciation related to past capital expenditures that could be used as deductions offsetting taxable income is assumed to be $252.3 million as of June 30, 2022.
- A provision was made for depreciation using a straight-line method for a period of 10 years for capital costs.

Government Royalties

- The Government of Mexico is entitled to a 0.5% royalty on gold and silver sales, without any deductions.

22.8 Project Economics

22.8.1 Financial Metrics

The financial results of the project are summarized in Table 22-10 and Table 22-11. The annual cash flows are summarized in Table 22-12.

Table 22-10: Project Key Outcome Summary

Parameter	Unit	Value
Total Gold Proven and Probable Mineral Reserves*	**Moz**	**5.4**
Total Gold Production	**Moz**	**4.0**
Total Silver Production	**Moz**	**11.8**
Total Open Pit Material Mined (Ore + Waste)	**Mt**	**982**
Total Open Pit Ore Mined	**Mt**	**181**
Open Pit, Average Mined Gold Grade	g/t	0.65
Total Underground Ore Mined	**Mt**	**12.6**
Underground, Average Mined Gold Grade	g/t	3.94
Total Ore Tonnes Processed	**Mt**	**193**

Note: Total gold metal contained is quoted from a consolidated Mineral Reserves statement for Los Filos Mine Complex (Table 15-1).

Table 22-11: Project LOM Cash Flow Summary

Category	LOM ($M)
Total Net Revenue (Gold and Silver)	**6,774**
Total Mining Operating Costs (Underground and Open Pit)	**2,072**
Total HL Processing Operating Costs	**702**
Total CIL Processing Operating Costs	**585**
Land Payment and General and Administrative Operating Costs	655
Total Operating Costs	**4,015**
Operating Cash Flow	2,759
Total Non-Sustaining Capital Costs	718
Total Sustaining Capital Costs	349
Total Capital Costs	1,067
Total Working Capital	7
Pre-Tax Cash Flow	**1,699**
Pre-tax NPV (5%)	**1,107**
Income Tax	491
Mining Duty	216
Post-Tax Net Cash Flow	**993**
Post-Tax NPV (5%)	**625**
IRR (%)	**26.4**
Payback Period (Years)	**2.5**
Cash Cost per Ounce ($/oz)	**981**
AISC per Ounce ($/oz)	**1,081**

Note: Numbers may not sum due to rounding.

The Los Filos Mine Complex project shows strong economic viability in the context of an overall operation of the current heap leach facilities and the additional of the 10,000 t/d CIL plant. The after-tax NPV_5 of the cash flow of the entire project is estimated at $625 million at the base case gold price of $1,675/oz with an IRR estimated at 26.4%. The payback period was estimated at 2.5 years, when using the commissioning of the CIL plant as start date.

Table 22-12: Annual Cash Flow Summary ($M) at $1,675/oz Gold Price

	Unit	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Gross Revenue	$M	**6,658**	110	357	464	726	642	577	567	594	502	467	464	375	320	215	278	1
Less: Royalties	$M	**-34**	-1	-2	-2	-4	-3	-3	-3	-3	-3	-2	-2	-2	-2	-1	-1	0
Less: Refining and Transport	$M	**-22**	0	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	0
Plus: Silver Credits	$M	**172**	0	1	3	5	4	10	27	30	14	13	10	14	12	16	14	0
Net Revenue	**$M**	**6,774**	**110**	**355**	**463**	**726**	**641**	**583**	**588**	**618**	**512**	**475**	**470**	**386**	**329**	**229**	**289**	**1**
Mining, Open Pit	$M	**-1,118**	-19	-94	-88	-100	-109	-104	-92	-103	-58	-82	-62	-36	-68	-47	-57	0
Mining, Underground	$M	**-954**	-41	-65	-90	-96	-76	-76	-76	-76	-76	-76	-76	-69	-33	-26	-2	0
Processing	$M	**-1,288**	-25	-97	-92	-121	-106	-99	-111	-92	-86	-87	-77	-57	-83	-66	-91	0
Site G&A, Community, and Land Access	$M	**-655**	-26	-53	-53	-51	-45	-44	-44	-44	-44	-43	-43	-41	-41	-40	-40	-4
Total Operating Costs	**$M**	**-4,015**	**-111**	**-308**	**-323**	**-369**	**-336**	**-323**	**-323**	**-314**	**-264**	**-287**	**-257**	**-203**	**-225**	**-179**	**-189**	**-4**
Operating Cash Flow	$M	**2,759**	-1	47	140	357	305	260	265	304	248	188	212	183	104	50	100	-3
Sustaining Capital	$M	**-349**	-9	-90	-34	-40	-22	-45	-49	-6	-30	-3	-10	-9	-3	-1	0	0
Non-Sustaining Capital	$M	**-718**	-90	-342	-39	-25	-17	-12	-12	0	-19	0	-14	-38	-19	-39	0	-51
Working Capital	$M	**7**	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Project Cash Flow Pre-Tax	**$M**	**1,699**	**-93**	**-385**	**68**	**291**	**266**	**202**	**204**	**298**	**199**	**185**	**189**	**136**	**82**	**10**	**100**	**-53**
Special Mining Duties / Withholding Taxes	$M	**-706**	0	0	-5	-12	-105	-90	-68	-67	-81	-59	-39	-51	-56	-31	-11	-32
Net Cash Flow	**$M**	**993**	**-93**	**-385**	**63**	**280**	**161**	**113**	**136**	**231**	**117**	**126**	**150**	**85**	**27**	**-21**	**90**	**-85**
Cash Cost	**$/oz**	**981**	**1,698**	**1,456**	**1,168**	**853**	**879**	**922**	**890**	**818**	**848**	**1,001**	**908**	**858**	**1,129**	**1,284**	**1,070**	**--**
AISC	**$/oz**	**1,081**	**1,828**	**1,877**	**1,290**	**945**	**936**	**1,053**	**1,036**	**834**	**947**	**1,011**	**943**	**896**	**1,142**	**1,292**	**1,070**	**--**

Note: Numbers may not sum due to rounding.
2037 revenue is from completion of final leach cycle from ore deposited on the heap leach pads in 2036.

22.8.2 Sensitivity Analyses

Table 22-13 shows the results of single-factor simple sensitivity analysis. It reports the overall project NPV_5 in response to variances in operating costs, capital costs and gold price. For the purposes of the analysis, the underlying mine and processing strategy remained unchanged. In reality, plans would be altered to respond to different-than-expected eventualities in terms of prices and/or costs, thus mitigating downside risk and providing opportunities to capitalize on upside eventualities.

Table 22-14 presents the changes in NPV_5 based on different gold prices, from the $1,450/oz Mineral Reserve price to $1,900/oz. Figure 21-3 shows a single factor sensitivity diagram. This figure shows that the project is most sensitive to gold price, followed by operating costs and then capital costs.

Table 22-13: Post-Tax Project NPV Sensitivity Table

Sensitivity Factor	NPV ($M)		
	Operating Costs	**Capital Costs**	**Gold Price**
-15%	920	755	172
-10%	822	712	323
-5%	724	668	474
0%	**625**	**625**	**625**
5%	526	582	776
10%	427	538	926
15%	328	495	1,076

Table 22-14 Post-Tax Project Sensitivity to Gold Price

Gold Price ($)	NPV ($M)
1,450	219
1,525	354
1,575	445
1,625	535
1,675	**625**
1,725	715
1,775	805
1,825	895
1,900	1,029

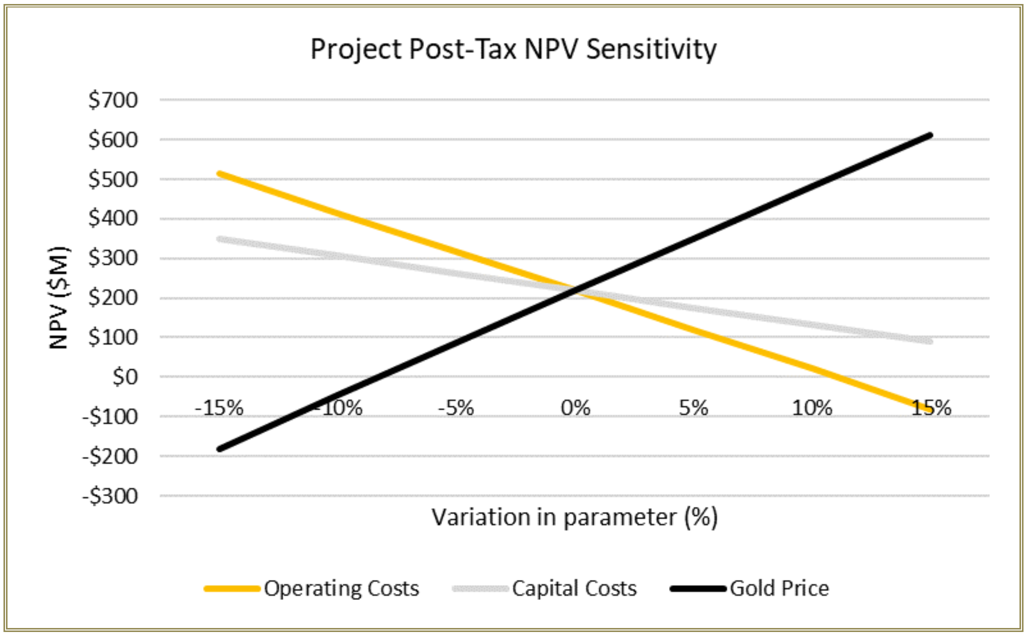


Figure 22-3: Single Factor Sensitivity Spider Chart

22.9 CIL and Heap Leach vs. Heap Leach-Only Scenarios

A high-level financial analysis was undertaken to determine the incremental value created by the operation of the CIL plant. To undertake this analysis, an alternative strategic mine plan based on a reduced mining inventory was produced considering a heap leach-only operation as a possible processing destination. A discounted cash flow was modelled using the relevant revenues and costs.

This heap leach only scenario (refer to Section 16) resulted in a lower NPV and mine life compared to the combined heap leach and CIL scenario presented in this Technical Report. The addition of the CIL plant is therefore demonstrated to have positive cash flows and NPV on the basis of the current assumptions.

22.10 Conclusions and Recommendations

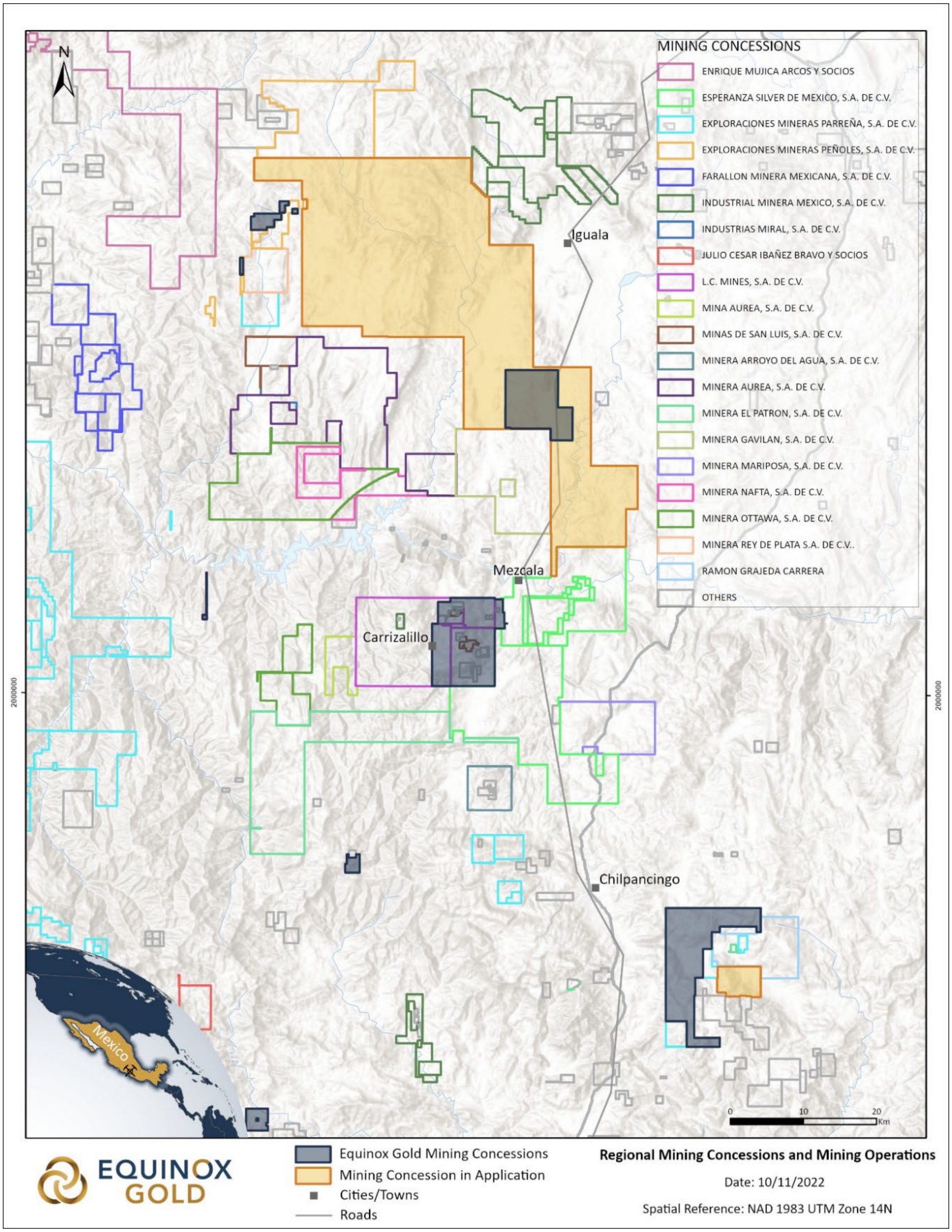
The overall Los Filos Mine Complex expansion strategy is feasible on the basis of the analysis undertaken. The forecast input parameters and ongoing performance should be subject to periodic review, and any significant deviation from the assumptions used in this study should be considered as potentially requiring a review of the investment and operating strategy.

23 ADJACENT PROPERTIES

The Los Filos Mine Complex property is located in the Guerrero Gold Belt near other mines, advanced projects, and properties belonging to Torex Gold (El Limon–Los Guajes Mine), Argonaut Gold (Ana Paula Project), Altaley (Campo Morado Mine), Agnico Eagle (Magnetita and Las Calles properties), Osisko Mining, and Guerrero Ventures. Concessions held by public and private companies in the region are shown on Figure 23-1.

There are 42 concessions held by DMSL; 30 of these concessions constitute the Los Filos Mine Complex property, and the other 12 concessions are regional exploration properties.

The Guerrero Gold Belt is a northwest trending series of Tertiary intrusives within a carbonate package. Gold oxide and sulphide skarn mineralization is associated with hornfels and skarn alteration at the contacts between intrusives and carbonate rocks. This type of mineralization is present in the various deposits on the Los Filos Mine Complex property and at Torex Gold's El Limon–Los Guajes mine and other nearby prospects.



Source: Equinox Gold.

Figure 23-1: Regional Mining Concessions and Mining Operations

24 OTHER RELEVANT DATA AND INFORMATION

The CIL plant project and capital estimate is based on an execution strategy using an EPCM implementation approach. Equinox Gold will engage an experienced EPCM firm (the Engineer) to provide services for the construction of the CIL plant and associated infrastructure.

The Engineer will complete the engineering and procurement from its base office, as well as prepare and award contract packages for the site works. It is likely that the site contracts will be awarded as horizontal packages for earthworks; civils (concrete); field-erected tankage; structural, mechanical, and piping (SMP) installation; and electrical and instrumentation (E&I) supply and installation.

Equinox Gold may contract specialist consultants to address specific elements of the CIL construction; this may include geotechnical and interconnecting and expanding the high-voltage power supply network to the power grid feeding the site.

The Engineer and the specialist consultants will interact on the implementation and management of the overall project as part of an integrated team with Equinox Gold. Effective, efficient, and timely communication between the entire project team will be crucial for the successful completion of the Project. An essential goal will be attaining the best safety record possible. To accomplish this, all contractors and involved personnel will adhere to defined safety objectives and standards developed by Equinox Gold and the Engineer. These will include all appropriate safety requirements specified by acts and regulations in Guerrero State, Mexico.

The Engineer will put in place a site team and effective project management and control procedures to monitor and control budget, schedule, and working practices across all contractors on the site. The Engineer’s team will likely be a mix of expatriates and Mexican nationals. The Engineer will adopt the most appropriate approach, on Equinox's behalf, to ensure the shortest possible construction period is achieved without risking the quality of the work, the cost, or site safety.

In conjunction with operations personnel from Equinox Gold, the Engineer will provide commissioning services to bring the project into operation in a controlled and timely manner. The Engineer will manage the commissioning process up to the introduction of ore and process materials into the circuit, at which time the Equinox Gold operating team will take over, with the Engineer providing support as required.

Equinox Gold will develop and implement an operational readiness plan leveraging its existing facilities and personnel on site. The Engineer will supervise initial commissioning runs to prove that the plant performs in accordance with the specified design and performance criteria, and to provide such additional supervision and expertise as is required to rectify any defects, thereby to enable the plant to operate at its specified parameters.

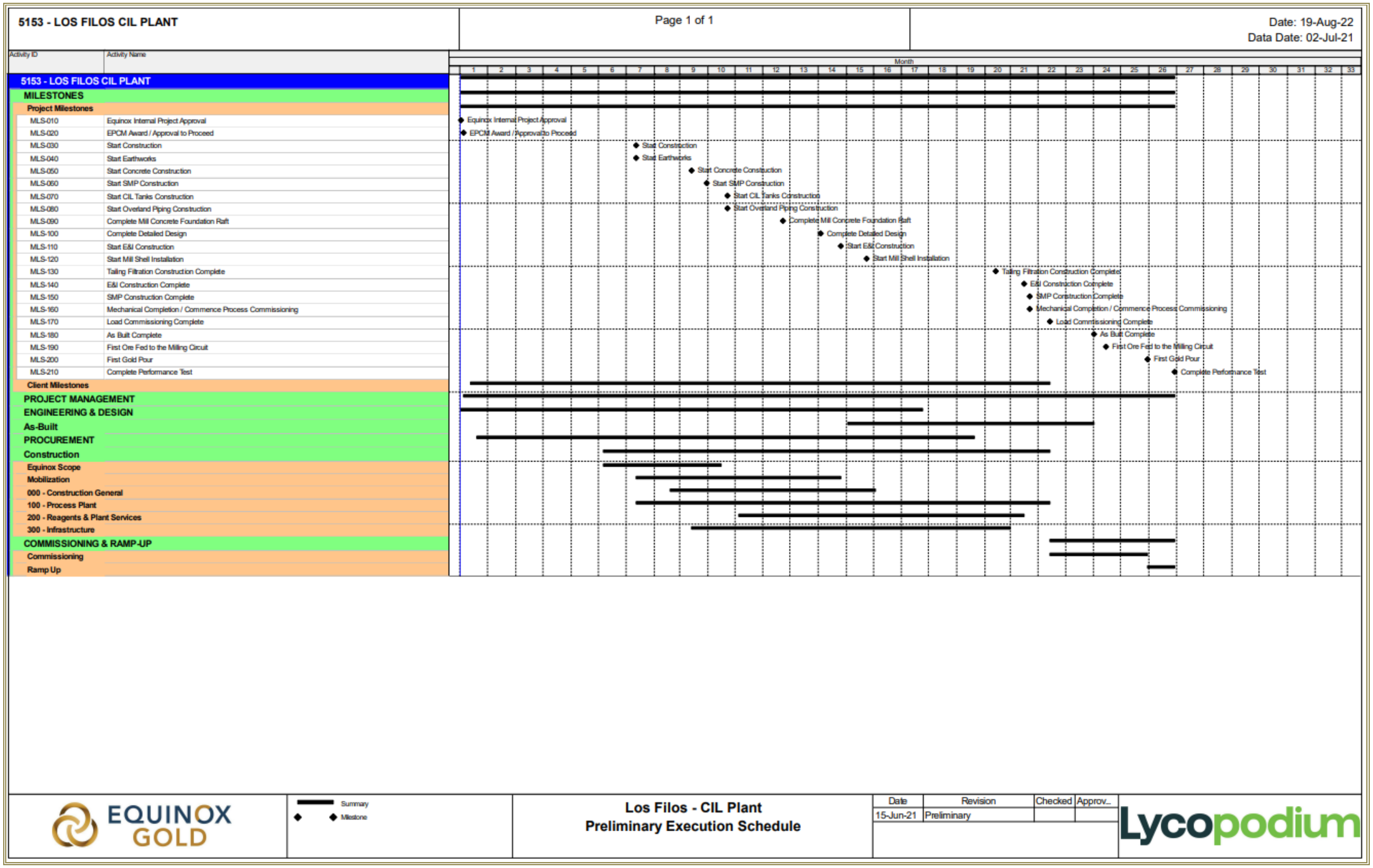
At the completion of all construction and commissioning activities, the Engineer will provide a handover certificate, "as built" documentation, and a close-out report, reflecting the fact that the CIL plant and infrastructure are complete, have been commissioned, and are fully functional and ready to operate.

A preliminary execution schedule for the EPCM scope has been prepared and is provided in summary form on Figure 24-1.

The project critical path is the milling area for the procurement, fabrication, and installation of the SAG and ball mills. Priority will be given for the tailings filter presses and the SAG and ball mills packages since they are long-lead time items and part of the project's critical path.

The schedule developed for the study is based on fabrication durations indicated by Mexican national and international vendors during the request for budget pricing exercise, and an allowance has been made for accelerating works or shortening delivery times, which may be achieved when competitive tendering is underway.

It is anticipated that first gold to the new CIL plant could be achieved in Month 24. It should be noted, however, that constructability reviews will be in place with the objective of compressing the schedule where and when it would be possible.



Source: Lycopodium.

Figure 24-1: Summary of CIL Plant Construction Schedule

24.1 Conclusions and Recommendations

The execution strategy for the construction of the CIL plant on which this Technical Report is based is that of a conventional EPCM approach that is appropriate for the project scope and location. The baseline schedule will be based on executing the project considering the front-end engineering and design (FEED), current feasibility study updates, the recommendations of award for procurement of the 12 long-lead and key equipment packages, a price and delivery time revalidation for the long-lead equipment packages along with placing their orders from the commencement of the EPCM phase.

The approximately 24-month preliminary schedule developed for detailed design, construction, and commissioning of the plant is based on realistic past performance parameters for a project of this size and scope, which can be achieved with the assistance of a competent EPCM engineering firm.

However, at the time of completing this Technical Report Equinox Gold has not made a construction decision for the CIL plant. Once a construction decision has been made, the construction schedule will be adjusted from that point forward, and opportunities to accelerate the schedule will be investigated. Any delays to the start of construction are likely to negatively impact the project value.

25 INTERPRETATION AND CONCLUSIONS

25.1 Interpretation

The Los Filos Mine Complex has a projected mine life of 14.5 years (2022 to 2036, inclusive) based on the construction of the CIL plant, and is expected to produce an average of 274 koz Au per year over this period based on 4.0 Moz of recoverable gold from Proven and Probable Mineral Reserves of 5.4 Moz contained gold as of June 30, 2022 (Table 15-1).

25.2 Conclusions

The following conclusions on the various aspects of the Los Filos Mine Complex are direct extracts from the relevant sections of the Technical Report.

25.2.1 Property Title, Land Access, Permitting

- Property title and ownership are in good standing and expiration dates extend beyond the current mine life.
- Surface land agreements are in place and are negotiated regularly.
- All permits for current operations are in place.
- Pending permitting issues are being managed and/or are in the process of resolution. These issues pose minimal risk to operations.

25.2.2 Mineral Resources and Mineral Reserves

Mineral Resources

Mineral Resource estimates presented in this report represent the global Mineral Resources at the Los Filos Mine Complex as of June 30, 2022. Los Filos mine and Equinox Gold personnel prepared the Mineral Resources estimates. The Qualified Person is Ali Shahkar (P.Eng.), Director of Mineral Resources for Equinox Gold. Mineral Resources that are not Mineral Reserves do not have a demonstrated economic viability.

Mineral Resources for Los Filos Mine Complex as of June 30, 2022 (exclusive of Mineral Reserves), using a gold price of $1,550/oz and silver price of $18/oz, are as follows:

- 325.3 Mt of mineralized material at an average grade of 0.75 g/t Au, containing 7.9 Moz Au in Measured and Indicated classifications
- 135.9 Mt of mineralized material at an average grade of 0.74 g/t Au containing 3.2 Moz Au in Inferred classification.

There are no known environmental, permitting, socioeconomic, legal, title, taxation, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

Mineral Reserves

- Mineral Reserves are reported in accordance with NI 43-101.
- Mineral Reserves were estimated using a gold price of $1,450/oz Au, a silver price of $18/oz Ag, and an effective date of June 30, 2022.
- Los Filos Mine Complex Mineral Reserves are composed of Proven and Probable open pit Mineral Reserves of 180.6 Mt at an average grade of 0.65 g/t Au containing 3.8 Moz Au, and Proven and Probable underground Mineral Reserves of 12.6 Mt at an average grade of 3.9 g/t Au, containing 1.6 Moz Au. Combined Proven and Probable Mineral Reserves are 193.2 Mt at a grade of 0.87 g/t Au and contained 5.4 Moz Au.
- The Qualified Persons consider the current Mineral Reserve estimate to be prepared according to CIM (2014) Definition Standards and acceptable for mine planning and production scheduling purposes.

25.2.3 Metallurgical Testwork

Heap Leach Facility

In the QP's opinion, the metallurgical testwork provides reliable gold extraction data that support the declaration of Mineral Resources and Mineral Reserves:

- Tests were performed on samples that were representative of each ore type.
- Testwork has been comprehensive and appropriate for selecting the optimal process technology.
- Heap leaching process conditions, including reagent additions, were appropriately determined to optimize field operation parameters.
- Some areas of the Bermejal and Guadalupe Open Pits and Bermejal Underground deposits contain high sulphur and copper levels. Gold recovery has been found to decrease with increasing sulphur levels in the ore, and sodium cyanide consumption in the heap leach process has been found to increase with increasing copper levels in the ore.
- LOM confirmation testwork has been completed and confirms recoveries for Los Filos Open Pit and Underground to be those derived by the Simon Hille predicted recovery model. Recovery formulas for Bermejal and Guadalupe Open Pits and Bermejal Underground were revised based on the confirmation test program.
- Recovery factors estimated for the heap leaching process are based on appropriate metallurgical testwork, and these have been confirmed by recent production data.

Carbon-in-Leach

It is QP's opinion that the CIL metallurgical testwork provides sufficient and reliable ore characterization and gold extraction data to support a feasibility-level study.

- The variability comminution testwork is adequate to support the comminution circuit design.

- The available testwork clearly indicates the impact of cyanide-soluble copper on reagent consumption. The data yield a reliable OPEX model, applied in optimizing the mining schedule, along with the gold extraction model.
- There is sufficient testwork and other data to support the gold and silver recovery estimates used for all ores scheduled to be fed to the proposed CIL plant.

25.2.4 Open Pit Mining Operations

- Open pit mining commenced at the Los Filos Mine Complex in 2005. Orebody characteristics, geotechnical conditions, and open pit mining productivities are well understood.
- Collectively, the open pits are expected to produce 180.6 Mt of ore (34,100 t/d ore on average) during the Q3 2022 to Q4 2036 period. Total material movement (ore plus waste) is expected to average 185.6 kt/d.
- Estimated capital for open pit mining includes additional haul trucks, shovels and other ancillary equipment required to operate the open pit throughout the LOM. The LOM non-sustaining capital total is $125 million, the LOM sustaining capital total is $133 million, and the capitalized waste-stripping cost is $234 million.
- The estimated mine OPEX for the open pits was developed with a detailed first principles model and verified relative to the average 2021 actual mining costs, with adjustments in future periods for changing haul profiles to the waste rock dumps and the three ore processing destinations (Crushed heap leach, ROM heap leach and CIL).
- The estimated LOM total mine OPEX for the open pit reserves is $1,118 million, and the estimated LOM average unit mining cost is $1.38/t mined.

It is the QP's opinion that the CAPEX and OPEX developed for open pit mining are appropriate for converting Mineral Resources to Mineral Reserves.

25.2.5 Underground Mining Operations

Los Filos Underground

- The Los Filos Underground mine is a mature mining operation with well understood ore body characteristics, geotechnical conditions, and mining productivities.
- OHCAF and OHDAF are proven mining methods at Los Filos Underground. Both methods offer a high degree of ore selectivity and minimize dilution.
- The mine is expected to produce approximately 1.2 Mt of ore (960 t/d) over its remaining life (Q3 2022 to Q4 2025).
- Estimated sustaining capital for Los Filos Underground is related to ramp construction, horizontal and vertical development, which includes equipment rebuilds and major component replacements, ventilation, and safety. The sustaining capital is $15.5 million (2022 to 2025). No capacity additions are required for the mining fleet.
- The estimated mining costs are based on the average 2021 actual mining costs.

- The estimated LOM total mine OPEX is $89.2 million, and the estimated LOM average unit mining cost is $72.45/t ore.
- It is the QP's opinion that the CAPEX and OPEX developed for Los Filos Underground are appropriate for the conversion of Mineral Resources to Mineral Reserves.

Bermejal Underground

- Bermejal Underground should be developed primarily with OHDAF to extract 91% of the Mineral Reserves, and the remainder with UHDAF; both are highly selective and flexible mining methods.
- CRF is an industry-proven backfill material that has been used in Los Filos Underground and other mines employing underhand mining techniques.
- The Bermejal Underground deposit is estimated to produce approximately 1.0 Mt/a (2,740 t/d) during steady-state production (2025 to 2032).
- Annual gold production averages 139,500 oz/a, delivered during steady-state production (2025 to 2032). A peak of 163,000 oz of gold is planned to be delivered in 2027.
- Production and development productivity rates are a function of expected ground conditions and the associated ground support regime employed, among other factors.
- The CAPEX is estimated to be $106 million for the underground development and infrastructure.
- The OPEX for Bermejal Underground was estimated using actual costs from Los Filos Underground with higher cost adjustments for the ground support and backfill due to poorer ground conditions than those encountered in the Los Filos Underground. The estimated LOM OPEX is $864 million, and the estimated LOM average unit mining cost is $76.06/t ore.
- It is the QP's opinion that the CAPEX and OPEX developed for Bermejal Underground are appropriate for converting Mineral Resources to Mineral Reserves.

25.2.6 Recovery Methods

Heap Leach

- Conventional Crushed and ROM ore heap leaching is currently used to recover gold and silver from open pit and underground ore sources.
- Installing an agglomerating drum and overland conveyor system in mid-2018 has improved ore agglomeration, ore transport and stacking efficiency, and has led to an increase in gold recovery.
- Installing an interliner within Pad 2 has reduced cyanide consumption in the fresh Crushed ore by preventing pregnant solution from flowing through the low pH of the lower lifts of Crushed ore.
- During the January 2017 to May 2021 period, approximately 184 koz of recoverable gold inventory was recovered from Pad 1 and Pad 2 by following a high-pressure injection, re-handling, and secondary re-leaching process.
- Heap leach OPEX is based on actual costs reported by Equinox Gold for Q1–Q3 2019, 2021 and Q1–Q2 2022. The projected reductions in OPEX are based on initiatives that Equinox Gold is currently implementing.

Carbon-in-Leach

- It is the QP's opinion that the CIL process plant flowsheet and layout designs are suitable for treating the various ore types and tonnages indicated in the CIL feed schedule of the LOM plan, with the caveats being that the ore feed to the CIL plant be blended to avoid extremes in material hardness or high cyanide-soluble copper content.
- It is the QP's opinion that the CAPEX and OPEX developed for the CIL plant have been derived to a sufficient level of accuracy to support a feasibility-level study.

25.2.7 General and Administrative Costs

- General and Administrative costs were estimated and supplied by the Los Filos Mine Complex site personnel and were based on 2021 levels of spending, with a 5% expected improvement from 2022 onward as a consequence of cost-savings initiatives.

25.2.8 Mine Complex Infrastructure

Waste Rock Facilities

- The planned WRFs will provide adequate storage capacity for the LOM open pit waste rock, with the underground waste rock being used primarily as backfill or deposited in small piles adjacent to the underground portals. New facilities are proposed, which will partially or completely overlap the existing WRFs and which include the new in-pit WRFs. Detailed stability analyses for these facilities will have to be completed in the next stage of design. These analyses may require foundation characterization and/or waste material characterization.
- Waste rock is dumped in accordance with a strict Standard Operating Procedures defining safe-dumping practices. Waste rock dumping is a high-risk activity, and careful consideration of the Standard Operating Procedures, coupled with routine confirmation by the design engineers, are required on an ongoing basis to ensure safe operations.
- Some of the currently existing WRFs reached their storage capacity and reclamation activities have commenced.

Heap Leach Pad Expansions

- Pad 3 will provide additional storage for 63.5 Mt of ROM ore, and once Pads 1, 2, and 3 have been filled to their design capacity an interliner will be constructed on top of portions of all three, to provide an additional 82 Mt of storage for ROM ore. The interliner will allow for ore stacking above the 100 m maximum heap height design criteria for Pads 1 and 2. The construction of an interliner is the most economical solution to expanding the existing and future heap leach pads to store the current LOM Mineral Reserves.
- The current and planned heap leach pad infrastructure will be sufficient to support mining operations for the LOM plan.

Filtered Tailings Storage Facility

- The existing lined heap leach facilities will provide ample footprint to accommodate deposition of the CIL tailings in the form of an FTSF, commonly known as dry-stack tailings. The selected location of the FTSF will require minimal preparation prior to use by sharing the existing leach pad liner and solution pipe network. Additional stability analyses based on laboratory characterization of the filtered tailings and a geotechnical foundation investigation program will have to be completed in the next stage of design.

25.2.9 Market Studies and Contracts

- Equinox Gold is able to market the doré produced from the Los Filos Mine Complex and will do so in the future.
- The terms contained within the sales contracts are consistent with standard industry practice and are similar to contracts for the supply of gold doré elsewhere in the world.
- Silver production is sold to Wheaton Precious Metals through a long-term contract.
- Metal prices for projected revenue have been reviewed and are appropriate for the commodity and for the mine life projections.

25.2.10 Environmental Permits

Adequate baseline studies have been carried out for the expansion projects, and the existing operations are being performed with all appropriate permits and approvals in hand. A rigorous environmental monitoring program is continuously carried out, which confirms that there are no material concerns pertaining to non-compliance.

25.2.11 Economic Analysis

The overall project execution strategy is feasible on the basis of the analysis undertaken. The forecast input parameters and ongoing performance should be subject to periodic review, and any significant deviation from the assumptions used in this study should be considered as potentially requiring a review of the investment and operating strategy.

25.2.12 CIL Execution Strategy

The execution strategy for the construction of the CIL plant on which this Technical Report is based is that of a conventional EPCM approach that is appropriate for the project scope and location. The baseline schedule will be based on executing the project considering the front-end engineering and design, current feasibility study updates, the recommendations of award for procurement of the 12 long-lead and key equipment packages, a price and delivery time revalidation for the long-lead equipment packages along with placing their orders from the commencement of the EPCM phase.

The approximately 24-month preliminary schedule developed for detailed design, construction, and commissioning of the plant is based on realistic past performance parameters for a project of this size and scope, which can be achieved with the assistance of a competent EPCM engineering firm.

25.3 Key Risks

A range of project risk areas related to environmental, social, permitting, health and safety, technical, construction, financial, and others are assessed to provide a risk level perspective for the Project.

Risk treatment plans will be developed for the project risks to reduce the risks probability of occurring and potential impact to an acceptable or practical level. Certain risk mitigation activities were completed during the feasibility phase, while others will be planned and actioned for the project execution (i.e., engineering, construction, commissioning), operations or closure phases as appropriate.

Various standard engineering risk assessment processes will be undertaken during the detailed engineering of the project execution. Health and safety risk assessment processes will be implemented for the construction phase.

The QP is of the opinion that there are not currently evident risks and uncertainties that could potentially affect the ability to perform the work recommended in this report.

25.3.1 Geology

The estimation of Mineral Resources is not without risks; several factors, such as additional drilling and sampling, may affect the geological interpretation, the conceptual pit shells, or the underground mining assumptions. Other factors that may have an impact, either positive or negative, on the estimated Mineral Resources include the following:

- Gold and silver price assumptions
- Changes in interpretations of lithological, mineralization, or geometallurgical domains
- Pit slope angles for the open pits or geotechnical assumptions for underground stope designs
- Changes to the methodology used to assign densities in the resource models
- Changes to the assumptions used to generate the gold cut-off grades for resource declaration
- Changes in the parameters used for grade estimation
- Changes to the classification criteria used.

25.3.2 Geotechnical

Open Pit

- Time-dependent rock mass-fatigue may be a significant factor in bench to inter-ramp scale stability of weaker rock.
- Increased pore-pressures within the relatively ‘tight’ altered rock mass associated with the mineralization may trigger overall-scale slope instabilities.
- Convoluted pit shapes with convex slopes in weak rock have an increased risk of instability.

Los Filos Underground

- The design criteria for the Los Filos Underground operations is well established and based on operational experience and knowledge of the geological and geotechnical conditions.
- OHCAF is used in narrow areas with typical sections of 3.5 m wide and 4.0 m high.
- OHDAF is used in the wider areas with typical drift dimension of 3.5 m wide and 4.0 m high.
- LHOS is used in targeted areas of vertical orebody continuity with good rock conditions. Stopes are typically 12 to 16 m high from back to floor.

- The geotechnical design for Los Filos Underground has followed a less formal, but proactive approach to rock mechanics, which has allowed for mining of several ore bodies in adverse ground conditions.
- For OHCAF and OHDAF mining methods, cemented rock fill is placed in all production excavations requiring mining below or adjacent mining, whereas unconsolidated rock fill is used to backfill stopes where there is no adjacent mining (vertical exposure) or undercutting (horizontal or undercut exposure) required.

Bermejal Underground

- CNI's (2018) rock mass classification assessment indicates that ground conditions in Bermejal Underground are highly variable, ranging from extremely poor to good.
- Typical rock mass conditions are poor to very poor, as commonly observed in highly altered and mineralized Oxide and altered Intrusive (including both the granodiorite intrusive and sill).
- The rock quality of the mineralized zones for Bermejal Underground is generally weaker than the mineralized zone at Los Filos Underground.
- OHDAF is selected as the primary mining method at Bermejal Underground, which is planned to be used to extract 91% of the Mineral Reserves, and UHDAF is selected to reduce the risk of mining in the highly altered and very poor mineralized Oxide domain.
- Ground support design for Bermejal Underground is based on ground control experience gained at Los Filos Underground, with modifications to reflect the actual practice at site.

25.3.3 Processing

- Future heap leach performance is based on process improvements currently being implemented. However, there is a risk that these initiatives may not fully achieve their desired objectives.

25.3.4 Surface Infrastructure and Closure

- The new WRFs proposed were designed based on geometric requirements to accommodate the waste rock from the open pits. Neither waste rock design analysis nor any foundation or waste material characterization have been completed. These characterization studies and engineering analyses are required prior to proceeding with waste rock dumping outside of the current design extents.
- The filtered tailings storage facility was designed based on geometric requirements for storage capacity to accommodate the volume of tailings to be produced. The engineering analysis completed in support of the design is based on historical borehole records and analogous soil strength properties from unrelated investigations as well as general geotechnical tailings characteristics.

25.3.5 Environmental, Social, and Permitting

- Geochemical characterization of the new waste rock and filtered tailings has not been done, but this needs to be carried out to confirm whether additional closure and reclamation requirements are needed.

- The current closure liability estimate does not include: the fully developed Bermejal Underground; the proposed CIL plant and ancillary electrical facilities, FTSF, and Pad 3; or the additional leach ore storage on Pads 1, 2 and 3 from the future heap leach pad interliner.
- The MIA permit for the CIL plant, filtered tailings storage and new electrical substation has been approved; however, the final location for storage of the filtered tailings on Pad 1 and location for the electrical substation have been modified and therefore the permit will require updating. The MIA permit for the Guadalupe phase of the Bermejal Open Pit has been approved. The permit for the new Pad 3 expansion has been approved; however, the vertical expansion of Pads 1 and 2 with the interliner has not yet been submitted for permitting. With most of the required approvals in place, the majority of the expansion projects can start shortly after Equinox Gold makes its final investment decision.
- Security instability in the State of Guerrero and in the local mine area remains a concern and could cause temporary closure of operations or disruptions in services. This security risk may also impact the ability of the company to contract and retain skilled, experienced employees.
- Continued access to properties not owned by DMSL remain a potential risk.

25.3.6 CIL Plant Construction

At this stage Equinox Gold has not made a construction decision; delays in starting construction will negatively impact the value generated by the Project.

26 RECOMMENDATIONS

Numerous improvement initiatives have already been implemented at the Los Filos Mine Complex in the past years, including many of the recommendations that were presented in the previous technical report, (*Independent Technical Report for the Los Filos Mine Complex, Mexico, March 2019)*.

The following recommendations on the various aspects of the Los Filos Mine Complex are direct extracts from the relevant sections of the Technical Report.

26.1 Mineral Resources

- Variograms should be further refined. Given the geometry of the deposits, better variograms can be developed by further sub-domaining sectors with different orientations.
- Controls on grade distribution within the larger geologic domains, such as the granodiorite, should be further investigated and modelled either by developing grade shells or further refining the dynamic anisotropy directions and search ellipse parameters used during interpolation.
- Interpolation domains for other important elements, such as sulphur, should be examined and, if necessary, separate domains (such as grade shells) developed for their estimations.
- There should be separate variogram models for sulphur and interpolation by Ordinary Kriging.

26.2 Sample Preparation, Analyses and Security

- Insert pulp and reject duplicates, in addition to field duplicates. Duplicates should not be inserted routinely, but should be representative of key grade thresholds, such as stockpile cut-off grades and those of Mineral Resources and Mineral Reserves.
- Sample batches should not be failed based on duplicates, as these values can represent the inherent grade variability of the deposit.
- Adjust CRM failure criteria based on single laboratory statistics to gain separate measures of accuracy and precision.

26.3 Open Pit Mining

- During operation, segregation of the existing Cat 785 fleet and the future Komatsu 730E fleet should be a priority to maximize the benefit of the faster Komatsu 730E fleet.
- New waste rock facilities are proposed, which will partially or completely overlap the existing facilities, including the in-pit WRFs. Detailed stability analyses for these facilities will have to be completed in the next stages of design. These analyses may require foundation or waste material characterization.
- Metallurgical recovery and OPEX for each mined block will be variable depending on rock type, sulphur grade, copper grade, and processing destination. For this reason, daily ore control decisions

(e.g., selecting the optimal processing destination) should be guided by a mining software determination of the maximum profit for each block rather than by a fixed cut-off grade.

- Effects of the specific energy of the ore delivered to the CIL plant should be monitored and measured during the early years of CIL operation to quantify impacts of high percentages of Bermejal Open Pit ore delivered at the end of mine life.

26.4 Underground Mining

26.4.1 Los Filos Underground

- Because mining operations are expected to conclude at Los Filos Underground in 2025 based on the currently defined Mineral Reserves, AMC recommends that Equinox Gold undertake further drilling to identify any potential ore-body extensions, or new, nearby ore bodies that could be accessed efficiently from the existing underground workings.

26.4.2 Bermejal Underground

- The Bermejal Underground mine design is based on two main declines from surface in the LOM plan. To meet the projected ramp-up of production, the second decline should commence development as soon as possible.
- The second decline is required as soon as possible, to provide adequate ventilation for the mine throughout the LOM plan, as well as second egress.
- A suitable mining contractor should be selected as soon as possible to meet the rapid development requirements of meeting the LOM plan production targets.
- Formalize a training package outlining the UHDAF mining method process, operating practices, QA/QC procedures, and operating parameters.
- Formalize a grade-control and sampling program that will provide key inputs to mine planning.
- Panels should be mined initially at minimum widths, then gradually widened as ground conditions are better understood.
- Further validation work is required to ensure productivity estimates are achievable.
- Ensure the various ground-support regimes are integrated into the planning process and ground control program.
- Formalize a mine planning process that covers both short-, medium-, and long-term planning horizons.
- Revise and optimize ground support standards for improving ground control practice and productivity, and for a reduction of operation costs.
- Optimize CRF strength design for cost reduction.
- The underground infrastructure assessment was based on the geotechnical block model rather than geotechnical data from selected drill holes. The underground workshop layout and support

design are based on general ground conditions. A site-specific assessment and ground support design will be required.

26.5 Heap Leach

- Investigate the opportunity of performing secondary leaching test programs through on-site column leach testwork and actual stacking applications on Pad 2. The purpose would be to show that free cyanide percolating through the upper lift of stacked ore can be used to leach the residual gold in the lower lift. The results should also report the cyanide savings and the reduction in OPEX.
- Investigate other leaching aids (i.e., glycine) to assist in recoveries and reduce cyanide consumption.
- Ores from the Bermejal and Guadalupe deposits are expected to contain higher copper and sulphur grades, which may result in higher OPEX due to higher cyanide consumption and lower gold recoveries due to higher total sulphur. Metallurgical testwork programs are already being performed to understand the impacts of the higher copper and sulphur grades with respect to cyanide consumption and gold recovery.

26.6 Carbon-in-Leach

- The CIL blend averages 31% for Los Filos Open Pit ore in the first six years of the mine plan, and the contribution of this ore could increase in the later years of mine life. Comminution ore characterisation testwork should be done on variability samples from this pit to confirm the SAG mill and ball sizes. Testwork program could cost up to $50,000.
- In 2020, Elbow Creek Engineering carried out an assessment for the requirement for a SART plant. A review of pertinent test programs indicated that a SART plant may be required in the fifth year of the CIL plant operation. During the first few years of the CIL plant operation, it will be important to closely monitor copper levels in solution. The high cyanide-soluble copper will require operating optimization of the elution to reduce the copper content in the doré ingots.
- Perform modelling and simulation of competitive adsorption of gold, silver, copper, and zinc onto activated carbon. The purpose of this modelling and simulation would be to determine the required carbon movement rate and to determine the deportment of silver, copper, and zinc onto the loaded carbon. This would also yield dissolved gold concentration estimates in the CIL tailings that are needed to design the downstream SART operation, if it is required in the future.
- Testwork currently available indicates variability in gold extraction of open pit ores at high feed sulphur-grades greater than 1%. Current practice is to restrict ore placement on the heap leach pads with a sulphur content greater than 1%. However, testwork indicates that higher sulphur-level material could be economically treated in the CIL circuit. Additional sampling and bottle roll testwork should be carried out on various non-in situ materials that could be suitable for adding to the CIL feed schedule to confirm the head grades and gold and silver recoveries.
- It is the opinion of the Qualified Person that the CAPEX developed for the CIL plant are sufficient to support a feasibility-level study; however, price revalidation must be conducted for

equipment packages and BQRs during the detailed engineering phase to reflect changes in local and international market conditions. For this work, consulting support services could cost up to $300,000.

26.7 Heap Leach Pad Expansions

- The detailed design of Pad 3 should be initiated by Q1 2023 to determine the optimized construction phase sequence to provide sufficient ROM ore leaching capacity, while minimizing the construction cost for Phase 1. For this work, consulting support services, geotechnical drilling, and laboratory testwork could cost up to $700,000.
- Geotechnical foundation drilling, materials testing, and additional engineering effort should be implemented in the required areas of Pad 1 to further advance the design of the interliner. For this work, consulting support services, geotechnical drilling, and laboratory testwork could cost up to $300,000.

26.8 Filtered Tailings Storage Facility

- The design of the filtered tailings storage facility should be advanced with material testing of the filtered tailings to confirm the design criteria, including compaction and permeability testing, as well as updating stability and seepage analyses based on the results of the material testing. For this work, consulting support services and laboratory testwork could cost up to $200,000.

26.9 Environmental Permits

- The MIA permit for the CIL plant and filtered tailings storage have been approved; however, the final location for storage of the filtered tailings on Pad 1 has been modified, and therefore the permit must be updated prior to initiating tailings deposition.
- The MIA permit for the new electrical substation and extension of the high voltage transmission line have been approved; however, the relocation of the substation and the subsequent extension of the transmission line will require the permit to be updated. Consulting support services could cost up to $100,000.
- The review of the electrical interconnection requirements and the confirmation of energy supply to support the CIL plant was completed with CENACE; however, the studies must be updated once a final decision to advance the CIL plant is made. The update to the studies will require approximately $150,000 for CENACE and third-party consulting services.
- The MIA permit for the new Pad 3 expansion has been approved; however, permitting of the vertical expansion of Pads 1, 2 and 3 with the interliner must be submitted for approval.

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28 DATE AND SIGNATURE PAGE

This Technical Report titled *National Instrument (NI) 43-101 Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, dated October 19, 2022, with an effective date of June 20, 2022, was prepared and signed by the following authors:

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October 19, 2022
Dated at Vancouver, B.C.

Original Signed and Sealed
Travis O'Farrell, P.Eng.
Equinox Gold Corp.

October 19, 2022
Dated at Vancouver, B.C.

Original Signed and Sealed
Glenn Bezuidenhout, FSAIMM
Lycopodium Minerals Canada Ltd.

October 19, 2022
Dated at Vancouver, B.C.

Original Signed and Sealed
Paul Sterling, P.Eng.

October 19, 2022
Dated at Vancouver, B.C.

Original Signed and Sealed
Riley Devlin, P.Eng.
Struthers Technical Solutions Ltd.

29 CERTIFICATE OF QUALIFIED PERSONS

29.1 Gary Methven, P.Eng.

I, Gary Methven, P.Eng., of Vancouver, British Columbia, do hereby certify that:

1. I am currently employed as a Principal Mining Engineer and Underground Manager with AMC Mining Consultants (Canada) Ltd. with an office at Suite 202, 200 Granville Street, Vancouver, British Columbia, V6C 1S4.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I graduated from the University of Witwatersrand in Johannesburg, South Africa with a Bachelor of Science degree in Mining Engineering in 1993. I am a registered member in good standing with Engineers and Geoscientists British Columbia (License #180019), a member of Registered Professional Engineers of Queensland (License #06839), and a member of the Australian Institute of Mining and Metallurgy. I have experience in narrow-vein gold deposits, flat and steeply dipping, bulk and selective mining methods for base metals, mine infrastructure, design and planning, mine production and financial evaluation, reserve estimation, technical reviews, feasibility and pre-feasibility studies, project and construction management, contracts management and cost estimation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Los Filos Mine Complex from February 28 to March 4, 2022 for five days.
6. I am responsible for parts of Sections 21.1.2, 21.1.3, 21.2.2, 21.2.3, and 21.3.2 of the Technical Report.
7. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Gary Methven, P.Eng.

29.2 Paul Salmenmaki, P.Eng.

I, Paul Salmenmaki, P.Eng., of Vancouver, British Columbia, do hereby certify that:

1. I am currently employed as a Principal Mining Engineer with AMC Mining Consultants (Canada) Ltd. with an office at Suite 202, 200 Granville Street, Vancouver, British Columbia, V6C 1S4.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the “Technical Report”) prepared for Equinox Gold Corporation (the “Issuer”).
3. I am a graduate of Laurentian University in Sudbury, Canada (Bachelor of Applied Science in Mining Engineering in 1998). I am a member in good standing of the Engineers and Geoscientists British Columbia (ID #181438) the Professional Engineers Ontario (License #100012945). I have experience in underground copper-nickel mines, industrial minerals, narrow vein precious metal deposits, bulk mining methods for base metals, mine infrastructure, mine design and planning, mine production and financial evaluation, reserve estimation, technical reviews, all levels of studies from scoping to feasibility, project, and construction management.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Los Filos Mine Complex.
6. I am responsible for Sections 15.5, 16.1.2, 16.1.4, 16.3, 16.4.1, 16.4.2, 16.4.3, 16.4.8, 16.4.9, 16.5.1, 16.5.2, 16.6.2, 16.6.3, 16.7.1 and 16.7.2 of the Technical Report.
7. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Paul Salmenmaki, P.Eng.

29.3 Mo Molavi, P.Eng.

I, Mo Molavi, P.Eng., of Vancouver, British Columbia, do hereby certify that:

1. I am currently employed as a Director / Mining Services Manager / Principal Mining Engineer with AMC Mining Consultants (Canada) Ltd. with an office at Suite 202, 200 Granville Street, Vancouver, British Columbia, V6C 1S4.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I am a graduate from Laurentian University in Sudbury, Canada (Bachelor of Engineering in 1979) and McGill University of Montreal, Canada (Master of Engineering in Rock Mechanics and Mining Methods in 1987). I am a registered member in good standing of the Association of Professional Engineers and Geoscientists of Saskatchewan (License #5646), the Engineers and Geoscientists British Columbia (License #37594), and a Member of the Canadian Institute of Mining, Metallurgy and Petroleum. I have worked as a Mining Engineer for a total of 43 years since my graduation from university and have relevant experience in project management, feasibility studies, and technical report preparations for mining projects.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Los Filos Mine Complex.
6. I am responsible for Sections 16.4.4 to 16.4.7 of the Technical Report.
7. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Mo Molavi, P.Eng.

29.4 Eugene Tucker, P.Eng.

I, Eugene Tucker, P.Eng., of Vancouver, British Columbia, do hereby certify that:

1. I am currently employed as a Principal Mining Engineer and Open Pit Manager with AMC Mining Consultants (Canada) Ltd. with an office at Suite 202, 200 Granville Street, Vancouver, British Columbia, V6C 1S4.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the “Technical Report”) prepared for Equinox Gold Corporation (the “Issuer”).
3. I am a graduate of the University of Alberta in Edmonton, Canada (Bachelor of Science degree in Engineering in 1996 and Master of Engineering in 1999). I am a registered member in good standing with Engineers and Geoscientists British Columbia (License #30131) and Association of Professional Engineers and Geoscientists of Alberta (License #60027). I have worked as a Mining Engineer for a total of 25 years and have relevant experience in open pit mining of gold, base metals and coal, design and planning, mine production and financial evaluation, reserve estimation, technical reviews, feasibility and pre-feasibility studies, project and construction management, contracts management and cost estimation.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Los Filos Mine Complex.
6. I am responsible for Sections 15.1–15.4, 15.6, 15.7, 16.1.1, 16.1.3, 16.2, 16.5.3, 16.6.1, 16.7.3, 21.1.1, 21.2.1 and 21.3.1 of the Technical Report.
7. I am independent of the Issuer and any related companies as described in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report;
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Eugene Tucker, P.Eng.

29.5 Kelly Boychuk, P.Eng., MBA

I, Kelly Boychuk, P.Eng., MBA, of Vancouver, British Columbia, do hereby certify that:

1. I am currently employed as a Senior Vice President—Technical Services with Equinox Gold Corp. with an office at Suite 1501, 700 West Pender St, Vancouver, BC, V6C 1G8, Canada.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I am a graduate of the University of British Columbia in Vancouver, Canada (Bachelors of Applied Science in Geological Engineering in 1990 and Masters of Business Administration in 2002). I am a member in good standing of the Association of Engineers and Geoscientists BC (License #109920). I have 32 years of experience as a geotechnical engineer primarily in the mining industry.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Los Filos Mine Complex since March 2017 and most recently from August 22 to 26, 2021 for four days.
6. I am responsible for Sections 1, 2, 3, 18.1 to 18.5, 18.7 to 18.11, 19, 20, 21.2.6 to 21.2.8, 22, 23, 24, 25, 26, and 27 of the Technical Report.
7. I am not independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have had prior involvement with the property that is the subject of the Technical Report; Independent Technical Report for Los Filos Gold Mine, Guerrero State, Mexico (dated March 2019).
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Kelly Boychuk, P.Eng., MBA

29.6 Ali Shahkar, P.Eng.

I, Ali Shahkar, P.Eng., of Sechelt, BC, do hereby certify that:

1. I am currently employed as a Director of Mineral Resources with Equinox Gold Corp. with an office at Suite 1501, 700 West Pender St, Vancouver, BC, V6C 1G8, Canada.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the “Technical Report”) prepared for Equinox Gold Corporation (the “Issuer”).
3. I am a graduate of University of British Colombia in Vancouver, Canada (Bachelors of Applied Science in 1995). I am a member in good standing of the Association of EGBC (License #28980). I have 27 years of experience as a geologist in mineral exploration and mining, with the last 19 years specifically in resource estimation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I have visited the Los Filos Mine Complex five times during 2021 and 2022 for a total of 21 days, with the last visit from August 15 to 19, 2022 for five days.
6. I am responsible for Sections 4 to 12, and 14 of the Technical Report.
7. I am not independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Ali Shahkar, P.Eng.

29.7 Travis O'Farrell, P.Eng.

I, Travis O'Farrell, P. Eng., of Vancouver, BC, do hereby certify that:

1. I am currently employed as a project engineer with Equinox Gold Corp. with an office at Suite 1501, 700 West Pender St, Vancouver, BC, V6C 1G8, Canada.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I am a graduate of McGill University in Montreal, Canada (Bachelors of Chemical Engineer in 2010). I am a member in good standing of the Association of EGBC (License #46026). I have 12 years of experience as a mineral processing engineer in the mining industry, with the last 8 years specifically in similar processes.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Los Filos Mine Complex from June 22 to June 28 2022 for seven days.
6. I am responsible for Section 21.1.4 and 21.4.1 of the Technical Report.
7. I am not independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Travis O'Farrell, P.Eng.

29.8 Glenn Bezuidenhout, Nat Dip, (Ex Met), FSAIMM

I, Glenn Bezuidenhout, Nat Dip, (Ex Met), FSAIMM, of Johnnesburg, South Africa, do hereby certify that:

1. I am currently employed as a Senior Process Consultant with Lycopodium Minerals Canada Ltd. with an office at Suite 400, 5060 Spectrum Way, Mississauga, ON, L4W 5N5, Canada (telephone +1-905-206-2600).
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the “Technical Report”) prepared for Equinox Gold Corporation (the “Issuer”).
3. I am a graduate of Witwatersrand, Technicon in Johnannesburg, South Africa (National Diploma in Extractive Metallurgy 1979). I am Fellow of the South African Institute of Mining and Metallurgy (License FSAIMM nr 705704). My relevant experience for the purpose of this Technical Report is as follows:
   - 30 years of engineering involvement on 18 mineral processing and mining projects and 13 years’ operations experience.
   - Seven continuous years of gold operational experience in South Africa including refractory ore processing in Barberton and conventional CIL and heap leaching on the Witwatersrand.
   - Since 2012 gold study experience in Central and West Africa as a process consultant on Essase, Obitan, Ahafo South in Ghana, New Liberty and Dugbe in Liberia, Kibali in the DRC, Yaramoko in Burkina Faso, Kalana and Fekola in Mali, including B2 Gold's Otjikoto Gold Plant in Namibia (2013).
   - Gold project experience as a lead process engineer and commissioning manager on the Perseus Edikan Project in Ghana (2011) and the Aureus New Liberty Gold Project in Liberia (2015).
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Los Filos Mine Complex.
6. I am responsible for Sections 17.3, 17.4.2, 17.4.3, 17.5.2, 21.2.5 and 21.4.2 of the Technical Report.
7. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Glenn Bezuidenhout, Nat Dip, (Ex Met), FSAIMM

29.9 Paul Sterling, P.Eng.

I, Paul Sterling, Professional Engineer, of Summerland, British Columbia, do hereby certify that:

1. I am currently employed as a Metallurgical Engineering Consultant with an office at 12812 Schaeffer Crescent, Summerland, British Columbia, Canada.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*, with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I am a graduate of the University of British Columbia located in Vancouver, Canada (Bachelors degree in Applied Science (BASc) in Chemical Engineering in 1984). I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (License # 18560). My Experience includes the following:
   - 2021 to Present: Consulting Metallurgist to Imperial Metals Corporation, Vancouver, B.C.
   - 2020 to Present: Consulting Metallurgist to Equinox Gold Corporation, Vancouver, B.C.
   - 2017 to 2020: Consulting Metallurgist to Leagold Mining Corporation, Vancouver, B.C.
   - 2016 to 2017: Consulting Metallurgist Northern Empire Inc., Vancouver, B.C.
   - 2006 to 2016: Corporate Metallurgist—Imperial Metals Corp., Vancouver, B.C.
   - 2001 to 2006: Consulting Metallurgical Engineer, Summerland, B.C.
   - 1998 to 2001: Consulting Metallurgical Engineer, Reno, Nevada
   - 1993 to 1998: Kappes, Cassiday and Associates, Reno, Nevada
   - 1991 to 1993: MK Gold, Yuma, Arizona
   - 1990 to 1991: Chief Metallurgist, Bethlehem Resources Corp., Toronto, ON
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the site on a once per month schedule since April 2017 to March 2020. My last visit occurred: August 22 to August 26, 2021 for four days.
6. I am responsible for Sections 13, 17.1, 17.2, 17.4.1, 17.5.1, 21.2.4, and 21.4.3 of the Technical Report.
7. I am not independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Paul Sterling, P.Eng.

29.10 Riley Devlin, P.Eng.

I, Riley Devlin, P.Eng., of Penticton, British Columbia, do hereby certify that:

1. I am currently employed as an Electrical Engineer with Struthers Technical Solutions Ltd. with an office at 3-1101 Main Street, Penticton, British Columbia.
2. This certificate applies to the technical report titled *Updated Technical Report for the Los Filos Mine Complex, Guerrero State, Mexico*" with an effective date of June 30, 2022, (the "Technical Report") prepared for Equinox Gold Corporation (the "Issuer").
3. I am a graduate of the University of British Columbia in Vancouver, Canada (Bachelors of Applied Science in 2002) and have practiced my profession continuously since November 2002. I am a member in good standing of the Association of Engineers and Geoscientists of British Columbia (License #34248) and the Association of Professional Engineers and Geoscientists Saskatchewan. My relevant experience includes the design, construction and commissioning of industrial power systems for underground and open pit mines.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Los Filos Mine Complex from April 23 to 26, 2018 for three days.
6. I am responsible for Section 18.6 of the Technical Report.
7. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. As of the effective date of the Technical Report and the date of this certificate, to the best of my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: June 30, 2022
Signing Date: October 19, 2022

Original Signed and Sealed

Riley Devlin, P.Eng.