

TECHNICAL REPORT ON THE CORTEZ COMPLEX, LANDER AND EUREKA COUNTIES, STATE OF NEVADA, USA

NI 43-101 TECHNICAL REPORT



Prepared for:

Barrick Gold Corporation

Prepared by:

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Report effective date:

December 31, 2021.

CERTIFICATE OF QUALIFIED PERSON: CRAIG FIDDES

I, Craig Fiddes, SME (RM), as an author of this report entitled “Technical Report on the Cortez Complex, Lander and Eureka Counties, State of Nevada, USA” prepared for Barrick Gold Corporation by Nevada Gold Mines LLC and dated March 18, 2022 with an effective date of December 31, 2021 do hereby certify that:

1. I am the Manager - Resource Modelling with Nevada Gold Mines LLC, Nevada.
2. I am a graduate of the University of Otago, New Zealand, graduating in 1998 with a BSc (Hons) degree in Geology.
3. I am a SME Registered Member, #04197758. I have worked as a geologist and resource modeler for over 20 years since my graduation. My relevant experience for the purpose of the Technical Report is: Over 20 years of mining industry experience, including direct involvement in exploration, geologic interpretation and resource estimation, mine geology and reconciliation (both open pit and underground), compilation and reporting of Mineral Resource and Mineral Reserve estimates, and pre-feasibility and feasibility studies for gold deposits.
4. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) for those sections of the technical report that I am responsible for preparing.
5. I work at the Nevada Gold Mines Elko Business Office, with regular visits to operational sites including the Cortez Complex to oversee resource modeling work and review other activities at site including geologic data collection and modeling, grade control, production, and reconciliation.
6. I am responsible for the following Sections of the Technical Report; 1.1, 1.2, 1.12 - 1.14, 1.18, 1.19, 1.22 - 1.25, 2, 3, 14.1 – 14.7, 14.9 – 14.11, 15.5 – 15.7, 16.5, 19, 22, 23, 24, 25.1, 25.6, 25.7, 25.12, 25.17, 26, and 27.
7. I am not independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had prior involvement with the Cortez Complex since July 2019 in my current role.
9. I have read NI 43-101, and the parts of the Technical Report that I am responsible for have been prepared in compliance with NI 43-101.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 18th day of March, 2022

“signed and stamped”

Craig Fiddes

Craig Fiddes, SME (RM)

CERTIFICATE OF QUALIFIED PERSON: JAY D. OLCOTT

I, Jay D. Olcott, SME (RM), as an author of this report entitled “Technical Report on the Cortez Complex, Lander and Eureka Counties, State of Nevada, USA” prepared for Barrick Gold Corporation by Nevada Gold Mines LLC and dated March 18, 2022 with an effective date of December 31, 2021 do hereby certify that:

1. I am a Geoscientist with Nevada Gold Mines LLC, Nevada.
2. I am a graduate of Brigham Young University, graduating in 2001 with a BSc degree in Geology.
3. I am a SME Registered Member, #4173430. My relevant experience for the purpose of the Technical Report is; over 18 years of mining experience, including ore control, drilling, QA/QC, modeling, reconciliation, mine planning, cost estimation, economic analysis, permitting and environmental studies. I have worked as a geologist for most of my career; including the past 10 years as a Chief Geologist at an underground mine and as a Study Director and Project Manager for both underground and open pit scoping to prefeasibility level projects.
4. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) for those sections of the technical report that I am responsible for preparing.
5. I work at the Nevada Gold Mines Elko Business Office
6. I am responsible for the following Sections of the Technical Report; 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.17, 1.18, 1.19, 1.23, 1.24, 1.25, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16.2.6, 16.3.1.4.8, 16.3.2.5, 17.4, 18, 20, 25.2, 25.3, 25.4, 25.10, 25.11, 26 and 27.
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9. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 18th day of March, 2022

“signed and stamped”

Jay D. Olcott

Jay D. Olcott, SME (RM)

CERTIFICATE OF QUALIFIED PERSON: TIMOTHY WEBBER

I, Timothy Webber, SME (RM), as an author of this report entitled “Technical Report on the Cortez Complex, Lander and Eureka Counties, State of Nevada, USA” prepared for Barrick Gold Corporation by Nevada Gold Mines LLC and dated March 18, 2022 with an effective date of December 31, 2021 do hereby certify that:

1. I am the Mine Manager, Goldrush Underground Operations, with Nevada Gold Mines LLC, Nevada.
2. I am a graduate of the Colorado School of Mines, graduating in 2003 with a BSc in Mining Engineering, and in 2004 with a MSc in Engineering and Technology Management (ETM).
3. I am a SME Registered Member, #4131311. I have worked as a mining engineer for most of my career; including the past 10 years in Chief Mine Engineer/Engineering Superintendent roles for several underground mines. My relevant experience for the purpose of the Technical Report is: Over 17 years of mining industry experience, including direct involvement in mine design, mine scheduling, cost estimation, economic analysis, and optimization; compilation and reporting of Mineral Resource and Mineral Reserve estimates; and pre-feasibility and feasibility studies for gold deposits.
4. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) for those sections of the technical report that I am responsible for preparing.
5. I currently work for Nevada Gold Mines as the Underground Mine Manager for Goldrush. I am on-site most weekdays.
6. I am responsible for the following Sections of the Technical Report; 1.1, 1.2, 1.11, 1.23 – 1.25, 2, 3, 14.8 – 14.11, 15.1, 15.3, 15.5 – 15.7, 16.1, 16.3, 16.5 – 16.8, 21.1 – 21.4, 22, 25.6 – 25.8, 25.13 – 25.17, 26, and 27.
7. I am not independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had prior involvement with the Cortez Complex since February 2021, and I assisted with the NGM internal review of the EOY2020 Reserve and Resource declaration for both Cortez Hills Underground and Goldrush.
9. I have read NI 43-101, and the parts of the Technical Report that I am responsible for have been prepared in compliance with NI 43-101.
10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the sections of the Technical Report that I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated 18th day of March, 2022

“signed”

Timothy Webber

Timothy Webber, SME (RM)

CERTIFICATE OF QUALIFIED PERSON: NATHAN BENNETT

I, Nathan Bennett, SME (RM), as an author of this report entitled “Technical Report on the Cortez Complex, Lander and Eureka Counties, State of Nevada, USA” prepared for Barrick Gold Corporation by Nevada Gold Mines LLC and dated March 18, 2022 with an effective date of December 31, 2021 do hereby certify that:

1. I am the Mine Manager, Cortez Surface Operations, with Nevada Gold Mines LLC, Nevada.
2. I am a graduate of the Colorado School of Mines, graduating in 1997 with a BS in Mining Engineering. I am a graduate of Weber State University, graduating in 2005 with a Masters of Business Administration.
3. I am a SME Registered Member, #4061298. I have worked as a mine engineer for over 20 years since my graduation. My relevant experience for the purpose of the Technical Report is: Over 20 years of mining industry experience, including direct involvement in open pit mine design, economic analysis, mine scheduling and optimization, operations research, compilation and reporting of Mineral Resource and Mineral Reserve estimates, and pre-feasibility and feasibility studies for gold deposits.
4. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) for those sections of the technical report that I am responsible for preparing.
5. I work at the Nevada Gold Mines Elko Cortez Complex, where I manage open pit operations, including mine operations, maintenance, and engineering.
6. I am responsible for the following Sections of the Technical Report; 1.1, 1.2, 1.11, 1.13, 1.15, 1.17, 1.20 – 1.25, 2, 3, 14.8 – 14.11, 15.1, 15.2, 15.4, 15.6, 16.1, 16.2, 16.4 – 16.8, 21.1 – 21.4, 22, 23, 24, 25.1, 25.8, 25.13 - 25.17, 26, and 27.
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Dated 18th day of March, 2022

“signed”

Nathan Bennett

Nathan Bennett, SME (RM)

CERTIFICATE OF QUALIFIED PERSON: JOHN W. LANGHANS JR.

I, John W. Langhans Jr., MMSA (QP), as an author of this report entitled “Technical Report on the Cortez Complex, Lander and Eureka Counties, State of Nevada, USA” prepared for Barrick Gold Corporation by Nevada Gold Mines LLC and dated March 18, 2022 with an effective date of December 31, 2021 do hereby certify that:

1. I am the Technical Specialist, Metallurgy, with Nevada Gold Mines LLC, Nevada.
2. I am a graduate of the University of Nevada, Reno, graduating in 1984 with a BSc degree in Chemical Engineering.
3. I am a MMSA QP, #1563. I have worked as a metallurgist for nearly 38 years since my graduation. My relevant experience for the purpose of the Technical Report includes: Metallurgical testing, research and evaluation, in-depth knowledge of analytical methods, operating data collection and evaluation, plant optimization/modifications, recovery modeling, ounce allocations, and project development and implementation for a variety of gold deposits.
4. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) for those sections of the technical report that I am responsible for preparing.
5. I work at the Nevada Gold Mines Elko Business Office, with regular visits to operational sites including the Cortez Complex to oversee metallurgical testing and evaluation to include recovery modeling of current and future ore sources, and reviewing other activities at site including plant data collection and interpretation with emphasis on recovery performance, analytical methods, and plant modifications.
6. I am responsible for the following Sections of the Technical Report; 1.1, 1.2, 1.10, 1.16, 1.21, 1.23 - 1.25, 2, 3, 13, 17.1 – 17.3, 17.5, 23, 24, 25.5, 25.17, 25.9, 26, and 27.
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Dated 18th day of March, 2022

“signed”

John W. Langhans Jr.

John W Langhans Jr., MMSA (QP)

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Cautionary Statement on Forward-Looking Information

This report contains forward-looking statements. All statements, other than statements of historical fact regarding Nevada Gold Mines LLC, Barrick Gold Corporation, Newmont Corporation, or the Cortez Complex, are forward-looking statements. The words "believe", "expect", "anticipate", "contemplate", "target", "plan", "intend", "project", "continue", "budget", "estimate", "potential", "may", "will", "can", "could" and similar expressions identify forward-looking statements. In particular, this report contains forward looking statements with respect to cash flow forecasts, projected capital, operating and exploration expenditure, targeted cost reductions, mine life and production rates, potential mineralization and metal or mineral recoveries and information pertaining to potential improvements to financial and operating performance and mine life at the Cortez Complex, including the development of the Goldrush and Robertson projects. All forward-looking statements in this report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. Material assumptions regarding forward-looking statements are discussed in this report, where applicable. In addition to such assumptions, the forward-looking statements are inherently subject to significant business, economic and competitive uncertainties and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, but are not limited to: fluctuations in the spot and forward price of commodities (including gold, diesel fuel, natural gas and electricity); the speculative nature of mineral exploration and development; changes in mineral production performance, exploitation and exploration successes; diminishing quantities or grades of reserves; increased costs, delays, suspensions, and technical challenges associated with the construction of capital projects; operating or technical difficulties in connection with mining or development activities, including disruptions in the maintenance or provision of required infrastructure and information technology systems; damage to Nevada Gold Mines LLC's, Barrick Gold Corporation's, or Newmont Corporation's reputation due to the actual or perceived occurrence of any number of events, including negative publicity with respect to the handling of environmental matters or dealings with community groups, whether true or not; risk of loss due to acts of war, terrorism, sabotage and civil disturbances; uncertainty whether the Cortez Complex will meet Nevada Gold Mines LLC's or Barrick Gold Corporation's capital allocation objectives; the impact of global liquidity and credit availability on the timing of cash flows and the values of assets and liabilities based on projected future cash flows; the impact of inflation; fluctuations in the currency markets; changes in interest rates; changes in national and local government legislation, taxation, controls or regulations and/or changes in the administration of laws, policies and practices, expropriation or nationalization of property and political or economic developments in USA; failure to comply with environmental and health and safety laws and regulations; timing of receipt of, or failure to comply with, necessary permits and approvals; non-renewal of key licences by governmental authorities; litigation; contests over title to properties or over access to water, power and other required infrastructure; increased costs and physical risks including extreme weather events and resource shortages, related to climate change; availability and increased costs associated with mining inputs and labor; and risks associated with diseases, epidemics and pandemics, including the effects and potential effects of the global Covid-19 pandemic. In addition, there are risks and hazards associated with the business of mineral exploration, development and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold ore losses (and the risk of inadequate insurance, or inability to obtain insurance, to cover these risks).

Many of these uncertainties and contingencies can affect Nevada Gold Mines LLC's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, Nevada Gold Mines LLC. All of the forward-looking statements made in this report are qualified by these cautionary statements. Nevada Gold Mines LLC and the Qualified Persons who authored this report undertake no obligation to update publicly or otherwise revise any forward-looking statements whether as a result of new information or future events or otherwise, except as may be required by law.

1.0 SUMMARY

1.1 Introduction

Mr. Craig Fiddes, Mr. Jay D. Olcott, Mr. Timothy Webber, Mr. Nathan Bennett and Mr. John W. Langhans Jr. prepared this Technical Report (the Report) for Barrick Gold Corporation (Barrick) on the Cortez Complex (Cortez Complex, Cortez Operations or the Project), in Nevada, USA.

The Project is operated as a joint venture (JV) through Nevada Gold Mines, LLC (NGM). Barrick is the JV operator and owns 61.5%, with Newmont Corporation (Newmont) owning the remaining 38.5% JV interest. On March 10, 2019, Barrick entered into an implementation agreement with Newmont to create a joint venture combining the companies' respective mining operations, assets, reserves and talent in Nevada, USA. This included Barrick's Cortez, Goldstrike, Turquoise Ridge and Goldrush properties (Barrick-Contributed Mines) and Newmont's Carlin, Twin Creeks, Phoenix, Long Canyon and Lone Tree properties (Newmont-Contributed Mines). On July 1, 2019, the transaction closed, establishing NGM, and Barrick began consolidating the operating results, cash flows and net assets of NGM from that date forward.

The Cortez Complex consists of the open pits at Pipeline, Crossroads, and Cortez Pits, the Cortez Hills underground mine, a carbon-in-pulp (CIP) process plant, heap leach pads and heap leach processing plants. Additional infrastructure includes power, tailings, waste, process water, potable water, and communication facilities, offices, and road and rail connections. Development activities are underway on the Goldrush underground deposit.

Mineral Resources are estimated for the Cortez Pits (open pit), Cortez Hills (underground), Crossroads (open pit), Gold Acres (open pit), Goldrush (underground), Robertson (open pit), and Pipeline (open pit) deposits. Mineral Reserves are estimated for the Cortez Hills (underground), Crossroads (open pit), Cortez Pits (open pit), Goldrush (underground) and Pipeline (open pit) deposits. Mineral Resources and Mineral Reserves also include stockpiled material.

1.2 Terms of Reference

The purpose of this report is to support the public disclosure of Mineral Resource and Mineral Reserve estimates at the Cortez Complex as of December 31, 2021.

The Cortez Complex is situated in a jurisdiction that uses United States (US) Customary units. The Report uses metric units unless otherwise specified. The Report uses Canadian English.

Mineral Resources and Mineral Reserves are reported using the confidence categories in the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (May 2014; 2014 CIM Definition Standards) as incorporated by reference in NI 43-101.

1.3 Project Setting

The Cortez Complex is situated approximately 100 km southwest of Elko, Nevada, USA, in Eureka and Lander Counties.

The Cortez Complex is reached by travelling approximately 51 km east from Battle Mountain, Nevada, on US Interstate 80. Alternative access is from Elko, Nevada, approximately 70 km west

to the Beowawe exit, then approximately 56 km south on Nevada State Route 306, which extends southward from US Interstate 80. Both US Interstate 80 and Nevada State Route 306 are paved roads.

The Cortez Complex is also crossed by a network of gravel roads, providing easy access to various portions of the operations. All roads are suitable for all weather conditions; however, in extreme winter conditions, roads may be closed for short periods for snow removal.

The Union Pacific Rail line runs parallel to US Interstate 80 to the north of the operations.

Elko, the closest city to the operations, is serviced by daily commercial airline flights to Salt Lake City, Utah.

The Cortez Complex is situated in the high desert region of the Basin and Range physiographic province. Operations are conducted year-round.

The Cortez Complex is located at elevations between 1,370–2,270 m above mean sea level. In general, vegetation is relatively sparse.

1.4 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

The Cortez Complex covers an area of about 36,096 ha in a total of 5,137 lode, mill site, patented and placer claims located within the Plans of Operations (PoOs) areas.

Lode and mill site claims that are located on public lands are held subject to the paramount title of the federal government. The claims are maintained on an annual basis, and do not expire as long as the maintenance fee payments are timely filed with the Bureau of Land Management (BLM). Patented and fee lands require annual payment of tax assessments to Lander and Eureka Counties. All fees have been timely paid.

Surface rights are either held by NGM outright, or administered by the BLM. There are sufficient surface rights to support the life-of-mine (LOM) plan assumptions for the individual mines within the Cortez Complex.

Water rights have been and are projected to be sufficient to support all future mining activities. NGM also maintains additional consumptive rights with other manners of use that can be made available to the mine operation if deemed necessary.

The PoO is broken up into six distinct royalty regions, with different royalties payable to third-parties on different deposits. Royalty types include gross value royalties, net value royalties, gross smelter return royalties, and net smelter return royalties. Royalty payments vary, as the payments depend upon actual tonnages mined, the amount of gold recovered from that mined material, the deposit being mined, the receiving entity, and the type of royalty.

In connection with the formation of Nevada Gold Mines, each of Barrick and Newmont was granted a 1.5% net smelter returns royalty over the respective properties they contributed to the NGM JV. Each of these “retained royalties” is only payable once the aggregate production from the properties subject to the royalty exceeds the publicly-reported Mineral Resources and Mineral Reserves as of December 31, 2018.

State royalties are also payable.

1.5 History

Prior to Barrick and NGM's Project interest, companies who had interests in the Cortez Operations area included: American Exploration & Mining Co., Cortez JV; ECM, Inc.; Royal Gold Inc., and Placer Dome Inc. Work conducted by these companies included geological mapping, geochemical samples (stream sediment, soil, and rock chip samples), geophysical surveys (airborne and ground), sonic, mud, reverse circulation (RC) and core drilling, metallurgical testwork, Mineral Resource and Mineral Reserve estimates, mining studies and mine operations.

Barrick and NGM have continued exploration and drilling activities, performed metallurgical testwork and undertaken Mineral Resource and Mineral Reserve estimates, mining studies and mine operations.

1.6 Geology and Mineralization

Major mineralization styles within the Cortez Complex are examples of Carlin-style and intrusive related deposits.

The geology of northern Nevada displays a complicated sequence of orogeny and tectonism. Mineralization is hosted in lower Paleozoic sedimentary rocks or associated with Late Jurassic–Eocene intrusions. The majority of the deposits have some structural control, with mineralization commonly associated with the Roberts Mountains thrust. Pervasiveness and intensity of alteration varies both within and between gold deposits, depending on magnitude of the mineralizing system, nature of the host rock, and structural preparation.

Carlin Trend-style mineralization consists primarily of micrometre-sized gold and sulfides disseminated in zones of siliciclastic and decarbonated calcareous rocks and commonly associated with jasperoids. Mineralization is predominantly in the form of oxides, sulfides, or sulfide minerals in carbonaceous rocks, and the ore type determines how and where it is processed. Copper oxide mineralization locally contains minor amounts chalcantite, malachite, chrysocolla, azurite, and lesser cuprite. In hypogene mineralization, chalcopyrite occurs as disseminations and bedded replacements with skarn and silicate minerals, and in conjunction with pyrite.

Intrusive-related mineralization consists primarily of free gold, with particle sizes ranging from 1 µm up to hundreds of micrometres in length. Gold is commonly associated with faults and brecciation but can also be found inside sheeted quartz–sulfide veins. Gold mineralization can be, but is not always, associated with an early retrograde skarn phase consisting of a chlorite–actinolite–pyrrhotite–chalcopyrite–pyrite mineral assemblage. Supergene copper mineralization most commonly consists of malachite, chrysocolla and chalcocite, with rarer digenite and some native copper in gossan zones. Hypogene copper is characterized primarily by chalcopyrite, with very rare bornite noted in historical drill logs.

Exploration potential exists adjacent to many of the deposits, along strike and at depth along favorable mineralized structures and within the favorable host lithologies. NGM continues to actively explore in the immediate and near-mine areas. Multiple opportunities also exist in the district to discover additional mineralization.

1.7 Exploration

The entire district is geologically mapped to varying scales from 1:50,000 to 1:20,000. The carbonate windows are mapped to a greater detail ranging to 1:5,000 scale. Specific targets are typically mapped to 1:1,000 to 1:600 scale, whereas pit wall and underground mapping ranges from 1:20 to 1:100.

Owing to the long mining history of the Cortez Complex area, geochemical soil sampling techniques used for grassroots exploration purposes have been typically superseded by data from drilling and open pit and underground mining. Current exploration combines the use of surface sampling methods (rock chips and soils) along with structural modelling and drilling (down hole geochemistry) to explore for mineralization at depth under cover.

Geophysical methods have been used in the Cortez district since the early 1970s. Geophysical tools were initially primarily regarded as support tools, due to the initial discoveries cropping out on surface, or only having a thin veneer of cover, and the inability of the early methods to directly detect the deposits. Later, geophysical methods were used as a structural mapping and deposit vectoring tool.

Methods adopted included modern airborne and ground magnetics, radiometrics and electromagnetics, gravity, resistivity, and controlled-source audio-frequency telluromagnetics, self-potential and induced-polarization. A trial set of seismic lines were also conducted. Typically, airborne surveys were performed by contract companies, whereas ground surveys were performed by company personnel or contract crews.

1.8 Drilling and Sampling

Drilling in the Cortez Complex database consists of 29,321 drill holes (4,782,250 m). The drill totals and metreage numbers are known to be incomplete, as a significant portion of the drilling completed by companies other than NGM, Barrick, and the former Cortez Joint Venture has not been incorporated in the digital database.

Logging conducted depended on the operator at the time the information was collected, and the drill type. Typically, logging collected information such as lithology, stratigraphy, basic structural data, recovery, alteration, and mineralization. For mining operations, logging could also record metallurgical type, intensity codes for metallurgy and alteration, and geotechnical parameters.

Collar surveys have used optical surveys (1960s through late 1980s), field estimates, Brunton compass and pacing, compass-and-string distance, and most recently the use of laser survey or global positioning system (GPS) measurements.

Determination of the hole trace was historically accomplished in the Cortez Complex open pit mines by projection of the initial collar orientation, using a downhole single-shot or multi-shot film camera (typical for most underground surveys), use of a downhole precession gyroscopic survey tool, or a gyroscopic tool requiring initial orientation with a compass. Current practice includes the use of gyroscopic surveys.

For the underground operations, historically, surveys included magnetic and gyro instruments, but currently a combination of north-seeking and conventional gyros is used.

Grade control drilling in the open pits is performed aiming to minimize geological risk in the orebodies, such that drill hole spacing is determined by risk. For example, where post-mineral

dikes are present, tighter-spaced drilling is required. Resource classification is completed on a domain basis and that classification determines the drill hole spacing. Both core and RC drilling are completed.

In the underground operations, grade control drilling is carried out from drill platforms that drill multiple holes from a single drill station perpendicular to mineralization, or from development drifts located above mineralization.

Sampling is variable by deposit and mineralization style. Mud-rotary and RC drill holes were sampled at 1.5–3 m intervals.

Most drill core from Pipeline and Cortez Hills was sampled and assayed at 3 m intervals, although some drill holes were assayed at 1.5 m or variable geological intervals early in the drilling programs. Since 2004, exploration core holes have been sampled on 3 m intervals in barren rock and on geologically defined intervals up to 1.5 m in mineralization. The Goldrush core programs used nominal 1.5 m intervals in zones of mineralization and an envelope surrounding the mineralization, and nominal 3 m intervals in zones of waste. At Robertson, core was sampled on 1.5 m sample intervals, with sample breaks at lithological, structural and alteration boundaries. Underground core is typically sampled on 1.5 m intervals; however, samples can range from 0.6–1.8 m, depending on lithological or mineralization contacts. Almost all core was sawn in half by a technician, except for underground core where whole core is sampled.

Current open pit practice is to single sample 12 or 15 m blastholes (depending on bench height). Double samples may be taken representing the upper and lower halves (6 or 8 m) of a blasthole when split benching is used for extraction of thinner ore horizons. Underground muck samples are taken with a scoop from muck piles at a rate of about one sample per 90 t.

Standard practice since 1999 has been to collect density samples at 11–12 m intervals in mineralized rock and one sample within 15 m in the hanging wall and footwall. Generally, density samples are taken every 12–15 m, sampling any material that may be mined. Density is primarily determined by the wax coat/water immersion method.

Given the long history of the Cortez Complex, there are numerous laboratories that were used over the Project history. Laboratories were both independent and non-independent. In the earlier stages of Project testwork, the idea of laboratory accreditation had not been invented. In later assay campaigns, accreditations were not typically recorded in the database. Currently, all independent laboratories used for chemical analysis are accredited for selected analytical techniques.

Sample preparation has varied over the 50 years of modern Project history, in line with advancing scientific knowledge, changes in equipment, and operational experience. Currently, sample preparation procedures include drying, crushing and pulverizing. As with sample preparation, analytical methods have changed over the Project history. Current methods include:

- Gold: standard fire assay (FA) with a gravimetric finish on one-assay ton (29.18 g) pulp aliquots; FA and atomic absorption (AA) finish; cyanide leach with an atomic absorption spectroscopy (AAS) finish;
- Carbon and sulfur: LECO;
- Multi-element analyses by aqua regia digestion/inductively coupled plasma-atomic emission spectroscopy (ICP-AES)/ICP-mass spectroscopy (ICP-MS), 51 elements or 48 element analyses by four acid and ICP-AES/ICP-MS.

Prior to the mid-1990s, few companies had rigorous quality assurance and quality control (QA/QC) programs in place. QA/QC had typically consisted, where undertaken, of reanalysis of drill core or other samples when later sampling indicated a potential problem. In the case of the Cortez Complex, QA/QC samples were submitted for RC and core samples from about 1991.

Current procedures include insertion of blanks and certified standard samples into sample streams to the mine and commercial laboratories, check assays of pulp duplicates by commercial laboratories, and assaying of coarse reject duplicates. Since 2006, Barrick and NGM corporate geochemists have inspected the laboratories that undertake analysis and sample preparation for the Cortez Complex.

1.9 Data Verification

Validation checks are performed by NGM operations personnel on data used to support estimation consisting of checks on surveys, collar coordinates, lithology data (cross-checking from photographs), and assay data. Errors noted are rectified in the database prior to data being flagged as approved for use in resource estimation.

Several third-party consultants have performed external data reviews. These external reviews were undertaken in support of acquisitions, support of feasibility-level studies, and in support of technical reports, producing independent assessments of the database quality. No significant problems with the database, sampling protocols, flowsheets, check analysis program, or data storage were noted.

1.10 Metallurgical Testwork

As a result of the approximately 50 year mining and processing history of the Cortez Complex, a significant number of metallurgical studies including laboratory scale and/or pilot plant testwork were completed, and historical operating data are available. The Cortez Complex has used numerous processing methods including carbon-in-leach (CIL) for higher-grade oxide ore, heap leaching for lower-grade oxide ore, roasting for carbonaceous refractory ore, and pressure oxidation (POX) for higher-grade sulfidic ore.

The Cortez Complex has extensive metallurgical testing facilities so much of the testwork is done on site, however, NGM uses external laboratories when specific expertise is needed or when timing dictates that the data are needed sooner than the in-house laboratory can provide it. Testing was conducted by laboratories including McClelland Laboratories Inc. located in Reno, Nevada, USA, (McClelland), FLSmidth in Salt Lake City, Utah, USA (FLSmidth), Hazen Research Inc. located in Golden, Colorado, USA (Hazen), Kappes, Cassiday Associates located in Reno, Nevada, USA, the NGM Goldstrike laboratory located north of Carlin, Nevada, USA (NGM Goldstrike), and AuTec located in Vancouver, British Columbia, Canada (AuTec). McClelland, FLSmidth, Hazen, and AuTec are currently independent of NGM. The NGM Goldstrike laboratory is not independent. The AuTec laboratory was not independent at the time that metallurgical testwork on the Goldrush deposit was performed.

Metallurgical testwork conducted included head characterization, mineralogy, comminution, bottle roll tests, column and direct cyanide leach tests, carbon-in-leach (CIL) tests, flotation, optimization and variability tests, alkaline pressure leach tests, thiosulfate resin in leach, bench and pilot roast, and acid and alkaline autoclaving.

Ore routing is conducted based on cyanide leaching amenability (CNAA) to fire assay (FA) ratio and preg robbing (preg rob) potential. If the AA to FA ratio is >50% and preg rob is <40%, the ore is designated as oxide ore. If the AA to FA ratio is <50% or preg rob is >40%, the ore is designated as refractory. The oxide ore will be routed to the Pipeline Mill or a heap leach pad depending on the gold grade. The refractory ore is routed to NGM's Carlin Complex for processing at one of the roasting facilities or the autoclaving facility.

Samples selected for metallurgical testing during feasibility and development studies were representative of the various styles of mineralization within the different deposits. Samples were selected from a range of locations within the deposits. Sufficient samples were taken, and tests were performed using sufficient sample mass for the respective tests undertaken. Variability assessments are supported by mill production and extensive open pit and underground exposures.

The recovery of gold is a function of the processing method (CIL, heap leaching, roasting, and arsenic concentration for refractory ore) and the lithology of the mineralization being processed. The recoveries used to support Mineral Resource and Mineral Reserve estimates are based on recovery equations that are derived from feasibility studies, metallurgical laboratory testwork, and historical production data.

The recovery estimates include consideration of the head grade, cyanide-soluble gold to fire assay gold ratio, sulfide sulfur concentration, and total organic carbon concentration. In most cases, the estimated and actual gold recoveries correlate well which indicates that the recovery estimates are accurate.

Depending upon the specific processing facility, several processing factors or deleterious elements could have an economic impact on extraction efficiency of a certain ore source, based either on the presence, absence, or concentration of the following constituents in the processing stream: organic carbon, sulfide sulfur, carbonate carbon, arsenic, mercury, antimony, copper. However, under normal ore routing and blending practices at NGM where material from several sites may be processed at one facility, that list of processing factors/deleterious elements is typically not a concern.

1.11 Mineral Resource Estimation

Mineral Resource estimates were prepared for the Pipeline, Crossroads, Cortez Pits, Gold Acres, Robertson, Goldrush, and Cortez Hills deposits.

Geological, structural and alteration interpretations were provided by onsite geologists. Three-dimensional solids and surfaces constructed from these interpretations were used as the basis for defining mineralization domains for each estimate.

Exploratory data analysis was performed by domain on raw data for each element to understand the elemental distributions. Modeled geology, modeled mineralization, and domains were subject to statistical analysis to determine any distinct subsets of the general grade population. Resulting statistics guided decisions made regarding modeling, capping values, estimation parameters, and classification.

Depending on the deposit, mineralization style, and proposed mining method, composites could be regularized to 1.5 m (Cortez Pits), 3 m (Cortez Hills, Gold Acres, Goldrush), or 8 m (Pipeline) intervals. At Cortez Pits, the 1.5 m interval was re-blocked to 6 m for mine planning purposes.

Grade capping was used to limit the influence of high-grade samples, based on, depending on the deposit, analysis of cumulative probability graphs and/or histograms by domain. Individual high-grade samples considered too small to be modeled that fell within the low-grade extremities were handled by limiting their search influence during the low-grade estimation.

Bulk densities were typically assigned as averages. Depending on the deposit, the assignments could vary by mineralized domain, rock formation or unit, and refractory and oxide material.

Variography was performed to provide search ranges for the different estimation domain groups. Search ellipses were based on the ranges modelled in the variograms and preferred orientations of modelled mineralized zones.

Estimation methods varied by deposit:

- Cortez Pits: nested two-pass inverse distance weighting to the second power (ID2) estimation within high grade, low grade, and waste domains. Sample search ellipses were aligned with local mineralization controls;
- Cortez Hills: nested two-pass inverse distance weighting to the third power (ID3) estimation within domains defined by geological controls and sub-domains designated high grade, low grade, or waste. Locally varying anisotropy aligned with nearby mineralization controls was applied to sample search ellipses;
- Gold Acres: multiple pass ID3 estimation within high grade, low grade, and waste domains using search ellipses aligned with nearby mineralization control interpretations;
- Pipeline: nested two-pass ID3 estimation within high-grade, low-grade, and waste domains using search ellipses aligned with nearby mineralization control interpretations;
- Goldrush: ordinary kriged (OK) grade estimation within interpreted mineralization domains. A single pass estimation with dynamic alignment of sample search ellipses with nearby mineralization controls;
- Robertson: nested three-pass ID3 grade estimation was applied within high-grade, low-grade, and waste domains. Locally varying anisotropy aligned sample searches with mineralization controls.

Model validation checks could include: visual comparisons of interpolated gold grades relative to drill hole composite values on sections and plans; review of conformity to drill hole data, continuity, similarity between sections, overlaps, appropriate terminations between holes and into undrilled areas, and minimum mining thicknesses; comparison of alternate estimates including ID2, ID3, inverse distance weighting to the fifth power (ID5), OK; comparison of final estimates with nearest neighbour estimation for bias assessment; and swath plots, to ensure block grades are similar to composite grades based on elevation, northings and eastings.

Resource classification methodology and parameters varied by deposit. Generally, an initial classification based on proximity to nearby data was assigned by block. Subsequent modifications could be made based on relative confidence in the underlying geological interpretation, or other factors affecting the estimates. The application of classification smoothing could be used, through categorical smoothing algorithms or manual adjustments, to minimize isolated volumes of inconsistent classification.

The Cortez Pits, Gold Acres, Robertson, Pipeline and Crossroads deposits are potentially amenable to open pit mining methods. Cortez Hills is currently mined via longhole primary/secondary stope and underhand cut-and-fill mining methods at a minimum width of 5.5 m. Goldrush, for the purposes of determining the mining method for resource estimation, was assumed to be mined by longhole stope mining methods with a minimum width of 5.5 m.

Mineral Resource estimates are reported for each deposit using cut-off grades that were established on a per-deposit basis.

1.12 Mineral Resource Statement

Mineral Resources are reported in Table 1-1 using the 2014 CIM Definition Standards, and have an effective date of December 31, 2021. Mineral Resources are reported using the 2014 CIM Definition Standards. Mineral Resources are reported on a 100% basis. Barrick owns a 61.5% JV interest, with Newmont owning the remaining 38.5% JV interest.

Mineral Resources are reported inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Qualified Person for the estimates is Mr. Craig Fiddes, RM SME, a NGM employee.

Factors that may materially impact the Mineral Resource estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological shape and continuity assumptions; changes to grade estimation methods and parameters; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the input assumptions used to derive the pit shell used to constrain the open pit estimates; changes to the input assumptions used to derive the mineable shapes used to constrain the underground estimates; changes to the marginal cut-off grade assumptions used to constrain the estimates; variations in geotechnical, hydrogeological and mining assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

Table 1-1: Mineral Resource Estimate

	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)
Surface												
<i>Open Pit</i>												
Cortez Pits	—	—	—	8.1	2.02	0.53	8.1	2.02	0.53	2.5	1.2	0.094
Crossroads	0.24	1.88	0.014	59	1.65	3.1	60	1.65	3.2	3.2	0.3	0.033
Gold Acres	—	—	—	0.29	3.33	0.031	0.29	3.33	0.031	5.0	3.0	0.49
Pipeline	—	—	—	8.3	0.54	0.14	8.3	0.54	0.14	1.2	0.6	0.022
Robertson	—	—	—	74	0.56	1.3	74	0.56	1.3	88	0.4	1.1
<i>Open Pit Sub-Total</i>	<i>0.24</i>	<i>1.88</i>	<i>0.014</i>	<i>150</i>	<i>1.07</i>	<i>5.2</i>	<i>150</i>	<i>1.07</i>	<i>5.2</i>	<i>100</i>	<i>0.5</i>	<i>1.8</i>
<i>Stockpile</i>												
Open pit leach	0.0031	0.82	0.000082	—	—	—	0.0031	0.82	0.000082	—	—	—
Open pit mill	1.0	1.15	0.038	—	—	—	1.0	1.15	0.038	—	—	—
Open pit refractory	0.98	2.81	0.089	—	—	—	0.98	2.81	0.089	—	—	—
Underground mill	0.018	11.45	0.0066	—	—	—	0.018	11.45	0.0066	—	—	—
Underground refractory	0.028	9.72	0.0086	—	—	—	0.028	9.72	0.0086	—	—	—
<i>Stockpile Sub-Total</i>	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—
Surface Total	2.3	2.12	0.16	150	1.07	5.2	150	1.09	5.3	100	0.5	1.8
Underground												
Cortez Hills (CHUG)	2.0	8.06	0.51	15	8.20	4.0	17	8.18	4.5	0.78	3.4	0.085
Goldrush				37	7.07	8.5	37	7.07	8.5	24	6.0	4.5
<i>Underground Total</i>	<i>2.0</i>	<i>8.06</i>	<i>0.51</i>	<i>52</i>	<i>7.40</i>	<i>12</i>	<i>54</i>	<i>7.42</i>	<i>13</i>	<i>24</i>	<i>5.9</i>	<i>4.6</i>
Cortez Total	4.3	4.88	0.67	200	2.71	18	210	2.75	18	120	1.6	6.4

Notes to accompany Mineral Resource table for Cortez Complex

1. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee. The estimate has an effective date of 31 December, 2021.
2. Mineral Resources are reported using the 2014 CIM Definition Standards, and are inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
3. Mineral Resources are reported within conceptual open pit shells for Mineral Resources potentially amenable to open pit mining methods and mineable shapes for Mineral Resources potentially amenable to underground mining methods. Mineral Resources that are potentially amenable to open pit mining methods were constrained used the following input parameters: gold price of US\$1,500/oz; gold refining costs ranging from US\$0.17–US\$0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; a mining cost range of US\$1.81–2.43/t mined; variable pit slope angles that range from 20.5–47°; metallurgical recoveries that vary from 62–81%; processing costs that range from US\$2.04–US\$24.42/t processed; general and administrative costs ranging from US\$0.22–US\$2.69/t processed; variable sustaining capital costs of US\$0.04–US\$2.36/t processed; and transportation costs of US\$8.01/t processed. Mineral Resources potentially amenable to open pit mining methods are reported above cut-off grades that vary from 0.14–12.06 g/t Au. Mineral Resources that are potentially amenable to underground mining methods were constrained used the following input parameters: gold price of US\$1,500/oz; gold refining costs ranging from US\$0.17–US\$0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; metallurgical recoveries that range from 84–88.6%; ore mining costs that vary from US\$68.98–US\$97.15/t mined; processing costs that range from US\$10.62–US\$29.28/t processed; variable general and administrative costs from US\$11.19–US\$15.19/t processed; sustaining capital costs that range from US\$5.45–US\$5.47/t processed; and variable transportation costs of US\$17.88–24.31/t. Mineral Resources potentially amenable to underground mining methods are reported above cut-off grades that vary from 2.7–4.13 g/t Au.
4. Mineral Resources are reported on a 100% basis. Barrick's and Newmont's attributable shares of the Mineral Resources are 61.5% and 38.5%, respectively.
5. Numbers may not add up due to rounding. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content. Tonnages are reported as metric units. Gold ounces are estimates of metal contained in tonnages and do not include allowances for processing losses.

1.13 Mineral Reserve Estimation

Mineral Reserves are estimated for three open pit deposits (Cortez Pits, Pipeline, and Crossroads), three underground zones in the Cortez Hills deposit (Middle Zone, Lower Zone, and the Deep South Zone), Goldrush, and surface stockpiles. Mineral Reserves are converted from Measured and Indicated Mineral Resources. Inferred Mineral Resources are set to waste.

1.13.1 Open Pits

The optimized economic pit shells selected for the basis of open pit designs were created using the Whittle 4X software package.

Royalties for the Mineral Reserves to be mined by open pit methods vary by area, metal price, and processing type. The various royalties cover different areas, which are described internally as royalty areas to assess Mineral Reserves for each area. Certain royalties are held by subsidiaries of Barrick, and these royalties are excluded from consideration in the cut-off grade estimation. The royalty is estimated for each of five different areas, and a realized gold price net of the royalty is estimated for use in the cut-off grade calculation. Process and overhead costs for the various processing options were estimated along with recovery. Cut-off grades consider the general and administrative (G&A) costs as part of the process cost. Originally, a cut-off grade of 0.14 Au g/t was used due to the detection limits of the Cortez assay laboratory's fire assay method. An "AA finish" method was developed and implemented in December 2020, allowing lower grades to be evaluated. However, evaluation of a cut-off grade of 0.1 g/t Au found that the low amenabilities rendered that grade uneconomical, so the original cut-off grade of 0.14 g/t Au was not changed.

Dilution and extraction in the open pit Mineral Reserve estimates are addressed by diluting to whole blocks, at a block size that is considered to be representative of the selective mining unit. No further external factors are applied. The open pit design is based upon 100% extraction of the open pit Mineral Reserves.

1.13.2 Underground

1.13.2.1 Cortez Hills

Stope designs are based on:

- Roaster long hole stope: US\$1,200/oz Au for Lower Zone (A, B, and C);
- Roaster cut-and-fill: US\$1,200/oz Au for Middle Zone;
- Oxide long hole stope: US\$1,200/oz Au for Lower Zone D (Deep South).

Design shapes were grouped into two categories: stoping shapes (bulk shapes and associated development for the bulk shape), and cut-and-fill development shapes. Grade, short tons, class (Measured, Indicated, Inferred) and ore type (oxide and refractory) in each individual shape were obtained by interrogation using Vulcan software.

Cut-off grades used in stope reporting included:

- Refractory: 4.6 g/t Au;
- Oxide: 3.4 g/t Au;
- Cut-and-fill: incremental refractory cut-off grade of 3.9 g/t Au;
- Cut-and-fill: incremental oxide cut-off grade of 2.7 g/t Au;
- Stope development: incremental refractory cut-off grade of 3.5 g/t Au;
- Stope development: incremental oxide cut-off grade of 2.3 g/t Au.

A dilution factor of 1% and mining recovery of 95% were applied to the primary stopes, and a dilution factor of 10% and mining recovery of 97% were applied to the secondary stopes. A dilution factor of 3% was used in all top cuts and 5% in bottom cuts.

1.13.2.2 Goldrush

Stopes were created using Stope Optimizer software, and run against a cut-off grade of 3.8 g/t Au (US\$1,200/oz gold cut-off). At present, this cut-off has been applied to the Goldrush deposit.

Estimated mining recovery is 95%, and a 2% dilution factor was applied to grade.

1.14 Mineral Reserve Statement

Mineral Reserves are reported in Table 1-2, using the 2014 CIM Definition Standards with an effective date of December 31, 2021. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee.

Mineral Reserves are reported using the 2014 CIM Definition Standards. Mineral Resources are reported on a 100% basis. Barrick owns a 61.5% JV interest, with Newmont owning the remaining 38.5% JV interest.

Factors that may materially affect the Mineral Reserve estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological shape and continuity assumptions; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the marginal cut-off grade assumptions used to constrain the estimates; geotechnical and design parameter changes impacting dilution and mining recovery factors; potential for lower mill recovery in new mining areas or from long-term stockpiles; fluctuations in commodity price and exchange rates; and mining cost assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

Table 1-2: Mineral Reserve Estimate

	Proven			Probable			Proven + Probable		
	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)
Surface									
<i>Open Pit</i>									
Cortez Pits	—	—	—	4.3	1.85	0.26	4.3	1.85	0.26
Crossroads	0.22	1.90	0.013	56	1.65	3.0	56	1.65	3.0
Pipeline	—	—	—	0.90	1.08	0.031	0.90	1.08	0.031
<i>Open Pit Sub-Total</i>	<i>0.22</i>	<i>1.90</i>	<i>0.013</i>	<i>61</i>	<i>1.66</i>	<i>3.2</i>	<i>61</i>	<i>1.66</i>	<i>3.3</i>
<i>Stockpile</i>									
Open pit leach	0.0031	0.82	0.000082	—	—	—	0.0031	0.82	0.000082
Open pit mill	1.0	1.15	0.038	—	—	—	1.0	1.15	0.038
Open pit refractory	0.98	2.81	0.089	—	—	—	0.98	2.81	0.089
Underground mill	0.018	11.45	0.0066	—	—	—	0.018	11.45	0.0066
Underground refractory	0.028	9.72	0.0086	—	—	—	0.028	9.72	0.0086
<i>Stockpile Sub-Total</i>	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>
Surface Total	2.3	2.13	0.16	61	1.66	3.2	63	1.68	3.4
Underground									
Cortez Hills (CHUG)	1.3	8.57	0.35	9.0	9.55	2.8	10	9.43	3.1
Goldrush	—	—	—	33	7.29	7.8	33	7.29	7.8
Underground Total	1.3	8.57	0.35	42	7.77	11	43	7.79	11
Cortez Total	3.5	4.43	0.50	100	4.16	14	110	4.17	14

Notes to accompany Mineral Reserves table

1. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee. The estimate has an effective date of 31 December, 2021.
2. Mineral Reserves are reported using the 2014 CIM Definition Standards.
3. Mineral Reserves are reported within optimized pit shells for Mineral Reserves to be mined using open pit methods and constraining mineable shapes for Mineral Reserves to be mined using underground methods. Mineral Reserves to be mined using open pit methods used the following input parameters: gold price of US\$1,200/oz; gold refining costs ranging from US\$0.17–0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; a mining cost range of US\$1.81–2.18/t mined; variable pit slope angles that range from 21–51°; metallurgical recoveries that vary from 62–81%; processing costs that range from US\$2.04–US\$24.42/t processed; general and administrative costs ranging from US\$0.22–US\$2.69/t processed; variable sustaining capital costs of US\$0.04–US\$2.36/t processed; and transportation costs of US\$8.01/t processed. Open pit Mineral Reserves are reported above cut-off grades that vary from 0.14–2.06 g/t Au. Mineral Reserves to be mined using underground methods used the following input parameters: gold price of US\$1,200/oz; gold refining costs ranging from US\$0.17–0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; metallurgical recoveries that range from 84–88.6%; ore mining costs that vary from US\$68.98–US\$97.15/t mined; processing costs that range from US\$10.62–US\$29.28/t processed; variable general and administrative costs from US\$11.19–US\$15.19/t processed; sustaining capital costs that range from US\$5.45–US\$5.47/t processed; and variable transportation costs of US\$17.88–24.31/t. Underground Mineral Reserves are reported above cut-off grades that vary from 3.4–5.2 g/t Au.
4. Mineral Reserves are reported on a 100% basis. Barrick's and Newmont's attributable shares of the Mineral Reserves are 61.5% and 38.5%, respectively.
5. Numbers may not add up due to rounding. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content. Tonnages are reported as metric units. Gold ounces are estimates of metal contained in tonnages and do not include allowances for processing losses.

1.15 Mining Methods

1.15.1 Open Pits

The geotechnical model is a compilation of information sourced from geotechnical cell mapping, geological mapping, core logging, and supplementary drilling designed to intersect areas of geotechnical interest, material strength, highwall performance, and hydrological data. NGM undertakes constant monitoring of pit walls through geotechnical cell mapping, geological structure mapping, groundwater monitoring, bench inspections, slope stability, and slope movement analyses.

Hydrological models were created for all active and future mining areas that are monitored and updated based on piezometer data and flow from active pumping wells. This information is used to plan and execute dewatering requirements. Pumping wells are used to dewater the Pipeline Pit and Crossroads bed rock zones. A combination of pumping wells and drains are used to dewater the alluvial zones of the Crossroads Pit. Dewatering infrastructure that remains from the Cortez Hills Pit as well as dewatering infrastructure for the Cortez Hills Underground are used for the mining operations at Cortez Pits.

Based on Mineral Reserves only, open pit ore is mined by a conventional shovel-truck process at the rate of approximately 12.4 Mt/a with a life of mine (LOM) stripping ratio of 6.5:1 (waste to ore ratio). Mining occurs in two separate areas approximately 19 km apart, at Cortez Pits and the Pipeline/Crossroads open pits.

Blasting is required for material extraction and blast patterns are laid out according to material type using rock type designations of hard, average, soft, or a combination of the three. The pit designs vary between single and double bench configurations, from 6.1–15.2 m. The pit limits incorporate geotechnical and hydrological recommendations into final high walls and are designed to include ramps and access to haulage routes to waste rock storage facilities (WRSFs) and processing facilities. All haul roads are designed at a 10% maximum grade and have effective widths for two-way travel for the truck types used in each pit. Contract material movement operations can be used, as needed.

The various open pits are scheduled considering the ore distribution within the deposit, ore grades, and the centralization of activity to the extent possible. Phased pit designs are used for each of the open pit deposits and are designed and sequenced to optimize the economics of the operation and/or provide access to selected ore for blending purposes. Based on Mineral Reserves only, average total daily open pit mine production from the Cortez Complex is estimated to be 389,000 t/d in 2022, an average of 273,000 t/d for 2023–2025, and 74,000 t/d for 2026. All daily average production rates include a combination of ore and waste.

Ore will be sent to the leach ore mill based on cut-off grade and mill capacity to maintain the mill feed. Refractory ore is mined and first stockpiled, then it is shipped to NGM's Carlin Complex, which is approximately 115 km north of Cortez, for processing. Refractory ore trucking is currently subject to permitted tonnage limitations of approximately 2.3 Mt/a. The over-the-highway trucks have an approximate capacity of 36 t per load.

1.15.2 Underground

1.15.2.1 Cortez Hills

The underground mining is mechanized, with large-scale equipment using a combination of cut-and-fill mining with cemented rockfill, and primary and secondary longhole stoping with cemented and uncemented backfill. The Middle Zone is primarily mined through cut-and-fill mining methods. The Lower Zone, including Deep South Zone, is mined through longhole stoping methods.

In the cut-and-fill stopes, headings are cycled using conventional drill/blast/muck/support on a round-by-round basis. Material is loaded into haul trucks and hauled to ore bins. Top-cut headings are typically 5.5 m wide by 4.5 m high and undercut widths vary from 5.5–9.1 m, depending on ground conditions and ore geometry, with 4.5 m heights.

Longhole stopes are being mined using 18.2 m sublevels with a series of primary and secondary longhole stopes. Development will typically be 5.5 m high and the primary and secondary stopes are planned to be 7.6 m wide and 10.7 m wide respectively. Primary stopes will be mined in short sections to maintain stability and each section will be filled with cemented rockfill after mining. Secondary stopes will be mined after primary stopes have been completed. Where the ore zone is more than 18.3 m high, the stopes will be stacked vertically, as needed, to extract the ore. Longholes are planned to be vertical down holes from the upper sublevel.

The Deep South Zone mining plan is based on longhole stoping, with delayed backfill, in a sequence of primary and secondary stopes.

1.15.2.2 Goldrush

The proposed method for mining the majority of the Goldrush deposit is small- to moderate-sized longhole stopes with cemented paste fill. The stopes will be extracted on a transverse primary/secondary system with (where possible), a continuous mining front. The mining direction is not fixed since the geotechnical and geometric conditions vary with each sub-area within the Goldrush complex. Virtually all levels and crosscuts access multiple stopes and will all be mined from east to west.

Due to the mine access infrastructure being located on the western edge of the deposit, all crosscuts will be mined from west to east. Primary stopes will be extracted in a continuous sequence from east to west, top-down (where applicable) and from south to north. Once the second level of primary stopes are extracted and backfilled, extraction of the secondary stopes can commence. The secondary stopes will effectively follow the primary sequence.

Mining is planned as transverse primary–secondary long-hole open stoping, mining top-down under an engineered paste fill. This is a non-entry mining method. Level spacing will be 20 m (floor to floor), stope widths will be primarily 15 m wide.

Stope lengths were determined using the geotechnical models, correlating the Q' (tunnelling quality index for rock mass classification) to the modelled stable stope dimension. As a result, stope lengths range from 15–40 m.

1.16 Recovery Methods

Ore from the Cortez Complex can either be processed on site in the oxide processing facilities or transported to the Carlin Complex for refractory ore treatment.

The Pipeline Mill currently includes crushing, semi-autogenous grind (SAG) mill, ball mill, grind thickener, carbon-in-column (CIC) circuit for the grind thickener overflow solution, CIL circuit, carbon stripping and reactivation circuits, and a refinery to produce gold doré. Plant throughput can reach 16,300 t/d depending on the hardness of the ore being processed. The plant is permitted for an annual average of 4.9 Mt/a.

Low-grade oxide material is leached as run-of-mine (ROM) ore on two prepared double-lined leach pads. Pregnant solution from the leach pads is fed to CIC columns for gold recovery. The loaded carbon from the heap leach operation is transported to the mill for gold recovery in the carbon elution and electrowinning (EW) circuits and the refinery. The carbon is also acid-washed and regenerated at the mill. Make-up solutions come from the mill or mine dewatering wells to account for evaporative losses and ore saturation requirements.

Ores that have a CNA:FA ratio of <50% or preg rob value >40% are transported to Goldstrike or Gold Quarry for processing in the roaster or autoclave. Ore is processed in the roaster followed by a CIL circuit or the autoclave followed by a resin-in-leach (RIL) circuit.

Mill facilities use grinding media, lime, cyanide, and carbon. The roaster requires oxygen, cyanide, lime, antiscalant and sulfur. The autoclave requires oxygen, lime, resin, antiscalant, and thiosulfate.

Water supply for processing operations is sourced, depending on the facility, from well fields, tailings storage facility (TSF) reclaim, storm run-off water, and pit dewatering. Raw and gland water is provided by permitted water wells. Potable water is provided by permitted water wells and supporting treatment and infrastructure facilities.

The current water sources, assuming similar climate conditions to those experienced by the operations in the past, will be sufficient for the LOM plan.

1.17 Project Infrastructure

Current major infrastructure at the Cortez Complex includes:

- Pipeline: one open pit complex; two waste rock storage facilities (WRSFs); two pit backfill areas; the Pipeline Mill for processing mill-grade oxide ore; two heap leach facilities; one tailings impoundment; ancillary and support areas; and dewatering facilities that include infiltration basins;
- Cortez Hills: one open pit; three WRSFs, one heap leach facility; ancillary facilities; dewatering system; freshwater reservoir; and underground mine;
- Cortez: three open pits; three inactive heap leach facilities; one pit backfill area; four WRSFs; one TSF; ancillary facilities; and cross-valley water pipelines to the existing Pipeline infiltration basins and process facilities.

There are no accommodation facilities on site. Personnel reside in adjacent settlements.

Key infrastructure that will be required to support the planned Goldrush mine includes: mine accesses including portals, declines, and inclines; surface dewatering wells and associate pipe and pumping infrastructure; rapid infiltration basins; underground dewatering/pumping infrastructure; backfill plant; ventilation system; and an electrical distribution network. A portion of the infrastructure required for the Goldrush project will be repurposed from the Cortez Hills Open Pit administration complex. The existing Horse Canyon exploration lay down yard will become NGM's main staging area for the Goldrush surface infrastructure and will become the location of the multi-use shop and water treatment plant.

The Cortez Operations currently have two active TSFs, Cells 1–2 and Cell 4. Cell 4 is undergoing construction of the phase 5 expansion, with an estimated completion date of October 2022, which will allow for an ultimate storage capacity of 51 Mt.

Electrical power is obtained from the grid and generated from the Western 102 and TS power plant (which is owned and operated by Nevada Gold Mines) with transmission by NV Energy. Power is purchased on a wholesale basis using dedicated buyers. The current load for the Cortez Complex has a peak of 45 MW. The current transmission line has the capacity for 55 MW, and with the addition of capacitors and switching station, the capacity of the line could be increased to 78 MW, but for any expansion beyond 78 MW, additional transmission capacity will be required.

The Goldrush project is expected to require 18 MW of power, which will be sourced from the Wells Rural Electric Company. The operations will use a new 120-kV transmission line and 13.8-kV distribution system.

1.18 Market Studies and Contracts

No market studies are currently relevant as the Cortez Complex consists of active mining operations producing a readily-saleable commodity in the form of doré. Gold is the principal commodity extracted at the Cortez Complex and is freely traded, at prices that are reported daily by reputable trading facilities such as the London Metals Exchange.

Commodity prices used in Mineral Resource and Mineral Reserve estimates are set by Barrick as the operator of the NGM JV. The current gold price provided for Mineral Reserve estimation is US\$1,200/oz. The gold price used for Mineral Resource estimation is US\$1,500/oz.

Doré produced by the Cortez Complex is refined under contract. The terms contained within the existing sales contracts are typical and consistent with standard industry practices and are similar to contracts for the supply of doré elsewhere in the world.

The largest in-place contracts other than for product sales cover items such as bulk commodities, operational and technical services, mining and process equipment, and administrative support services. Contracts are negotiated and renewed as needed. Contract terms are typical of similar contracts in Nevada that NGM is familiar with.

1.19 Environmental, Permitting and Social Considerations

1.19.1 Environmental Considerations

NGM maintains an ISO 14001-certified Environmental Management System and implements additional operational controls and any prescribed monitoring and reporting requirements. All of these are maintained in compliance with the Environmental Management System.

The regulatory framework for air quality includes state and federal rules, regulations, and standards. The United States Environmental Protection Agency codifies the air quality framework and delegates the Nevada Division of Environmental Protection, Bureau of Air Quality Planning and Air Pollution Control to implement and enforce the state and federal rules, regulations, and standards. The Clean Air Act requires the Environmental Protection Agency to establish the National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. These pollutants are referred to as criteria pollutants and include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter 10 µm diameter or less (PM₁₀), particulate matter 2.5 µm in diameter or less (PM_{2.5}), and sulfur dioxide.

A primary consideration for water management is the protection of surface water and groundwater resources, and the prevention of degradation of waters of the state of Nevada. The primary regulatory instrument for protecting waters of the State from degradation is the Water Pollution Control Permit issued by Nevada Division of Environmental Protection–Bureau of Mining Regulation and Reclamation. This zero-discharge permit adopts the design of an engineered water management system developed by the mine and approved by Nevada Division of Environmental Protection–Bureau of Mining Regulation and Reclamation. The main parts of the system include production wells, conveyance pipelines and channels, storage ponds, and infiltration ponds.

Cultural resource considerations include planning and working within the Programmatic Agreement and Section 106 of the National Historic Preservation Act of 1966. The National Historic Preservation Act requires federal agencies to consider the impact of proposed actions on historic properties and allow an opportunity for the Advisory Council on Historic Preservation to comment on projects before implementation. Cultural resources are defined as any definite location of past human activity identifiable through field survey, historical documentation, and/or oral evidence. Cultural resources include archeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains. Cultural resources have many values and provide data regarding past technologies, settlement patterns, subsistence strategies, and other aspects of history.

Native American traditional values are based on respect, work ethic, spirituality, and quietness. The Western Shoshone's traditional homeland is in relative proximity to the Cortez Mine and Goldrush areas which have been used by the Western Shoshone people for at least 1,200 years. Consultation with the Native American tribes regarding impacts to National Register of Historic Places-eligible prehistoric cultural resource sites is required under Section 106 of the National Historic Preservation Act and is ongoing.

Concerns around eagles are managed under the permit regulations of the Bald and Golden Eagle Protection Act managed by the United States Fish and Wildlife Service. The Bald and Golden Eagle Protection Act prohibits the “take” of bald and golden eagles. Regulations known as the

“Eagle Permitting Rule” allow the United States Fish and Wildlife Service to administer a permit program allowing for the lawful take of eagles and nests.

Wildlife resources including aquatic life, migratory birds, big game, small mammals, special status wildlife species, and Greater Sage Grouse all occur within the mining and mineral exploration areas. In addition, utilities, infrastructure, roads, livestock grazing, dispersed recreation, and wildland fires also occur throughout the areas. Removal of vegetation, dispersal or displacement of local wildlife, and fragmentation of certain wildlife habitats and populations have occurred. The Barrick Bank Enabling agreement provides a mechanism to restore and enhance habitat to benefit Greater Sage Grouse and sagebrush ecosystems and generate credits.

Other environmental considerations for mining and mineral exploration include environmental justice, geology, hazardous waste, land use, noise, grazing, recreation, socioeconomics, soils, transportation, vegetation, visual resources water resources, and wetlands. These resources are inventoried and studied to determine what the impacts from mineral exploration and mining activities will have on the resource.

1.19.2 Closure and Reclamation Planning

The approach to closure and reclamation at the site is codified in both federal and state regulations and codes. In general, the site has to be left in a condition that is physically and chemically stable and does not contribute to unnecessary and undue degradation, conforms to pre-mining land uses, and does not degrade waters of the State. Nevada reclamation laws govern private and public lands in the state via NRS 519A.100. These laws define reclamation as actions that will:

“ . . . shape, stabilize, revegetate or otherwise treat the land in order to return it to a safe, stable condition consistent with the establishment of a productive post-mining use of the land and the safe abandonment of a facility in a manner which ensures the public safety as well the encouragement of techniques which minimize the adverse visual effects.”

The approach of the site’s closure plan is consistent with the Nevada reclamation permit application form that has been determined acceptable to the BLM for their plans of operations in accordance with the Memorandum of Understanding between the BLM, the Nevada Division of Environmental Protection, and the United States Forest Service.

NGM has developed a temporary closure plan, a tentative plan for permanent closure, an interim closure plan, a reclamation plan and reclamation surety estimate, and a plan for monitoring the post-closure stability of the site. Additionally, at least two years prior to the initiation of closure, Barrick must prepare and submit a final permanent closure plan under the terms of the Water Pollution Control Permit and the Nevada Administrative Code (NAC) 445A.447.

The Cortez Complex closure costs are updated each year, with increases or decreases in disturbed areas noted and costed; the current cost for NGM to complete rehabilitation and closure of the mine according to the calculation model is approximately US\$183 million for the entire site.

1.19.3 Permitting Considerations

NGM maintains local, state, and federal permits for the operation of exploration, surface mining and underground mining. These permits include air, water, waste, land, and closure activities.

Additionally, specific locations cultural and native traditional values, flora, and fauna are considered in the permitting process.

Air quality considerations include the minimization of emissions to maintain overall site point source emissions and monitoring. NGM ensures that Nevada's waters are not degraded by operations and that the lands disturbed by mining and exploration are reclaimed to safe and stable conditions to ensure a productive post-mining land use. NGM ensures the safe management of solid and hazardous waste and promotes waste reduction, reuse, and recycling. Risks to the environment and communities are identified and avoided, minimized, or mitigated. Overall, NGM strives to reduce direct and indirect effects and impacts to the environment and neighbouring communities. NGM also maintains an obligation register to track permit monitoring and reporting requirements along with other social and legal obligations. Anticipated permitting application submittal dates and time frames are developed based on life-of-mine and operational required dates.

1.19.4 Social Considerations

NGM is a prominent local business that applies industry best practices when it comes to social and community engagement standards at each operation. Stakeholder engagement activities, community development projects, and local economic development initiatives all contribute to NGM's Social License to Operate.

The Cortez Complex operates on lands traditionally inhabited by the Western Shoshone people. As a result, NGM puts forth an immense amount of effort to demonstrate respect for indigenous cultural resources. These efforts are reflected in the 2020 Collaborative Agreement between NGM and partnering Tribes/Bands, as well as the 2018 Programmatic Agreement that governs the consultation process for exploration and mining activities potentially impacting cultural or historic resources.

Furthermore, in 2021, NGM produced a cultural awareness video and training in collaboration with these Native American partner Tribes. The training highlights the history of the Native American people in the area, the background of the Native American Affairs department and programming, the challenges Native Americans have faced, and the policies and procedures that NGM follows regarding the discovery of cultural artifacts. All NGM employees must complete the training annually. This ensures that the workforce is equipped with critical knowledge pertaining to the Native American people and their way of life.

NGM's Corporate Social Responsibility (CSR) vision is to work together with host communities to leave a sustained positive contribution to the regions in which operations reside. The CSR team continues to focus on long-term engagement and has established well-defined programs that encourage communication and interaction between NGM and host communities. CSR envisions that communities will benefit from increased economic participation and a strong, diversified, local economy. In addition, CSR ensures that NGM will relinquish its land and liability in a manner that is aligned with evolving community expectations and that NGM will be the partner of choice for new opportunities.

1.20 Capital Cost Estimates

The capital costs for the Cortez Complex were developed and revised on an annual basis as part of the budget cycle. The capital costs include ongoing sustaining capital as well as capital for the expansion for some of the facilities. The scope of the capital costs for the mine is appropriate.

Based on only Mineral Reserves, current LOM capital costs for the Cortez Complex are estimated to be US\$2,019.7 M (on a 100% basis). The estimate consists of:

- Sustaining capital: US\$907.3 M;
- Open pit stripping: US\$462.3 M;
- Underground development: US\$604.5 M;
- Capitalized exploration: US\$45.6 M.

The major capital cost for the open pits will be waste stripping; with additional sustaining capital, which consists primarily of equipment replacement capital.

The major capital costs in the underground mines will include underground mine development at Cortez Underground and Goldrush Underground; pre-commercial production capital at Goldrush Underground; and capitalized drilling.

1.21 Operating Cost Estimates

Based on only Mineral Reserves, the total operating cost has been estimated by the Cortez District based on historical costs and assumptions for mining activities over the LOM plan presented in this Report that runs from 2022–2042. The operating costs are appropriate for the mining methods and processing.

Costs on a US\$/t basis for total tonnes mined (ore and waste) include:

- Open pit mining costs: range from US\$1.90–2.76/t mined for the remaining open pit mine life;
- Cortez Hills underground mining costs: range from US\$59.71–71.91/t mined for the remaining underground mine life;
- Goldrush underground mining costs: range from US\$61.16–110.68/t mined for the underground mine life.

Processing costs vary by destination facility:

- Gold Quarry roaster: US\$32.59/t processed;
- Goldstrike roaster: US\$19.57/t processed;
- Cortez mill: US\$9.76/t processed;
- Cortez leach: US\$2.25/t processed.

1.22 Economic Analysis

Under NI 43-101, producing issuers may exclude the information required for Section 22 “Economic Analysis” on properties currently in production, unless the technical report includes a material expansion of current production. Barrick is a producing issuer, the Cortez Complex mines are currently in production, and a material expansion is not being planned. NGM has performed an economic analysis of the Cortez Complex using the Mineral Reserve estimates presented in this Report; results confirm that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

1.23 Risks and Opportunities

1.23.1 Risks

The risks associated with the Cortez Complex are generally those expected with open pit and underground mining operations and include the accuracy of the resource model, unexpected geological features that cause geotechnical issues, and/or operational impacts.

Other risks noted include:

- Commodity price increases for key consumables such as diesel, electricity, tires and chemicals would negatively impact the Mineral Reserve and Mineral Resource estimates;
- Labor cost increases or productivity decreases could also impact the Mineral Reserve and Mineral Resource estimates, or impact the economic analysis that supports the Mineral Reserves;
- Geotechnical parameters used in mine planning are based on geotechnical data gathered from exploration drill holes. Unforeseen geotechnical or hydrogeological conditions could affect mine planning, affect capital and operating cost estimates due to mitigation measures that may need to be imposed, and impact the economic analysis that supports the Mineral Reserve estimates;
- The input assumptions to the cut-off grades used to report the Mineral Reserves estimated for the Crossroads open pit include transport costs for that portion of the refractory mineralization that would be sent to the Carlin facilities for treatment. If the transport costs are higher than currently forecast, the cut-off grade may need to be revised for the portion of the refractory material within the mine plan destined for treatment at Carlin. Such a change may result in a minor decrease in the overall LOM cashflow forecasts for the duration of the Crossroads operation;
- The Mineral Resource estimates are sensitive to metal prices. Lower metal prices could require revisions to the Mineral Resource estimates. In March 2022, spot gold prices were closer to \$1,800/oz Au versus the price assumption of \$1,500/oz Au used in the Mineral Resource estimates;
- The Goldrush project will require additional environmental studies to address the management of the golden eagle. An eagle take permit will be required for the proposed Goldrush project. Acquisition of such a permit may require mitigation and/or

offset actions, which could lead to some additional costs. The Environmental Assessment (EA) for the eagle take permit at Goldrush will be underway in early 2022;

- Regulatory approval of the Goldrush project is still pending, and is in the National Environmental Policy Act (NEPA) process. If conditions are imposed by the regulators as a result of this process, this could impact the project schedule and cost estimates;
- On-highway transport of ore or concentrate could be impacted by stricter regulations on the number of trucks that can be used;
- Exceedances of permit conditions have historically occurred at certain of the process facilities. Should such exceedances recur, there could be social and regulatory impacts to operations, mine plans, and the forecast economic analyses;
- The long-term reclamation and closure of the Cortez Complex can be appropriately managed within the estimated closure timeframes and closure cost estimates;
- Political risk from challenges to the current state or federal mining laws for permitting and taxes.

1.23.2 Opportunities

Opportunities include:

- Conversion of some or all of the Measured and Indicated Mineral Resources (that have not been converted to Mineral Reserves) to Mineral Reserves, with appropriate supporting studies;
- Upgrade of some or all of the Inferred Mineral Resources to higher-confidence categories, such that some or all of this material could be used in Mineral Reserve estimation;
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics;
- NGM holds a significant ground package within the Cortez Complex that retains significant exploration potential:
 - Exploration potential around current and historical open pits;
 - Potential for new underground operations proximal to the current Mineral Resource and Mineral Reserve estimates, with the support of additional studies;
- Improved processing efficiencies in the Gold Quarry Roaster (Mill 6) with modifications;
- Mineral Resources are currently estimated for the Robertson project. Conversion of some or all of these Mineral Resources to Mineral Reserves and incorporation into mine planning represent Project upside;
- The 100%-Barrick owned Fourmile property is currently excluded from the NGM JV. Future incorporation of this project into the JV represents upside potential.

1.24 Interpretation and Conclusions

An economic analysis was performed in support of estimation of Mineral Reserves; this indicated a positive cash flow using the assumptions and parameters detailed in this Report.

1.25 Recommendations

NGM has budgeted US\$16.8 million to the Robertson complex for a prefeasibility study, geotechnical drilling and environmental permitting. On completion of this work, there is potential to include Robertson in the current LOM plan.

The QPs concur with the work planned and the estimated budget to complete the study and associated works.

2.0 INTRODUCTION

2.1 Introduction

Mr. Craig Fiddes, Mr. Jay D. Olcott, Mr. Timothy Webber, Mr. Nathan Bennett and Mr. John W. Langhans Jr. prepared this Technical Report (the Report) for Barrick Gold Corporation (Barrick) on the Cortez Complex (Cortez Complex, Cortez Operations or the Project), in Nevada, USA.

The location of the Cortez Complex is shown in Figure 2-1, and the major deposit areas are shown on Figure 2-2.

The Project is operated as a joint venture (JV) through Nevada Gold Mines, LLC (NGM). Barrick is the JV operator and owns 61.5%, with Newmont owning the remaining 38.5% JV interest. On March 10, 2019, Barrick entered into an implementation agreement with Newmont to create a joint venture combining the companies' respective mining operations, assets, reserves and talent in Nevada, USA. This included Barrick's Cortez, Goldstrike, Turquoise Ridge and Goldrush properties (Barrick-Contributed Mines) and Newmont's Carlin, Twin Creeks, Phoenix, Long Canyon and Lone Tree properties (Newmont-Contributed Mines). On July 1, 2019, the transaction closed, establishing NGM, and Barrick began consolidating the operating results, cash flows and net assets of NGM from that date forward.

The Cortez Complex consists of the open pits at Pipeline, Crossroads, and Cortez Pits, the Cortez Hills underground mine, a carbon-in-pulp (CIP) process plant, heap leach pads and heap leach processing plants. Additional infrastructure includes power, tailings, waste, process water, potable water, and communication facilities, offices, and road and rail connections. Development activities are underway on the Goldrush underground deposit.

Mineral Resources are estimated for the Cortez Pits (open pit), Cortez Hills (underground), Crossroads (open pit), Gold Acres (open pit), Goldrush (underground), Robertson (open pit), and Pipeline (open pit) deposits. Mineral Reserves are estimated for the Cortez Hills (underground), Crossroads (open pit), Cortez Pits (open pit), Goldrush (underground) and Pipeline (open pit) deposits. Mineral Resources and Mineral Reserves also include stockpiled material.

2.2 Terms of Reference

The purpose of this Report is to support public disclosure of Mineral Resource and Mineral Reserve estimates at the Cortez Complex as of December 31, 2021 in the following Barrick disclosure documents:

- The Barrick annual information form for the year ended December 31, 2021, dated March 18, 2022.
- The Barrick news release dated March 18, 2022.

The Cortez Complex is situated in a jurisdiction that uses United States (US) Customary units. The Report uses metric units unless otherwise specified.

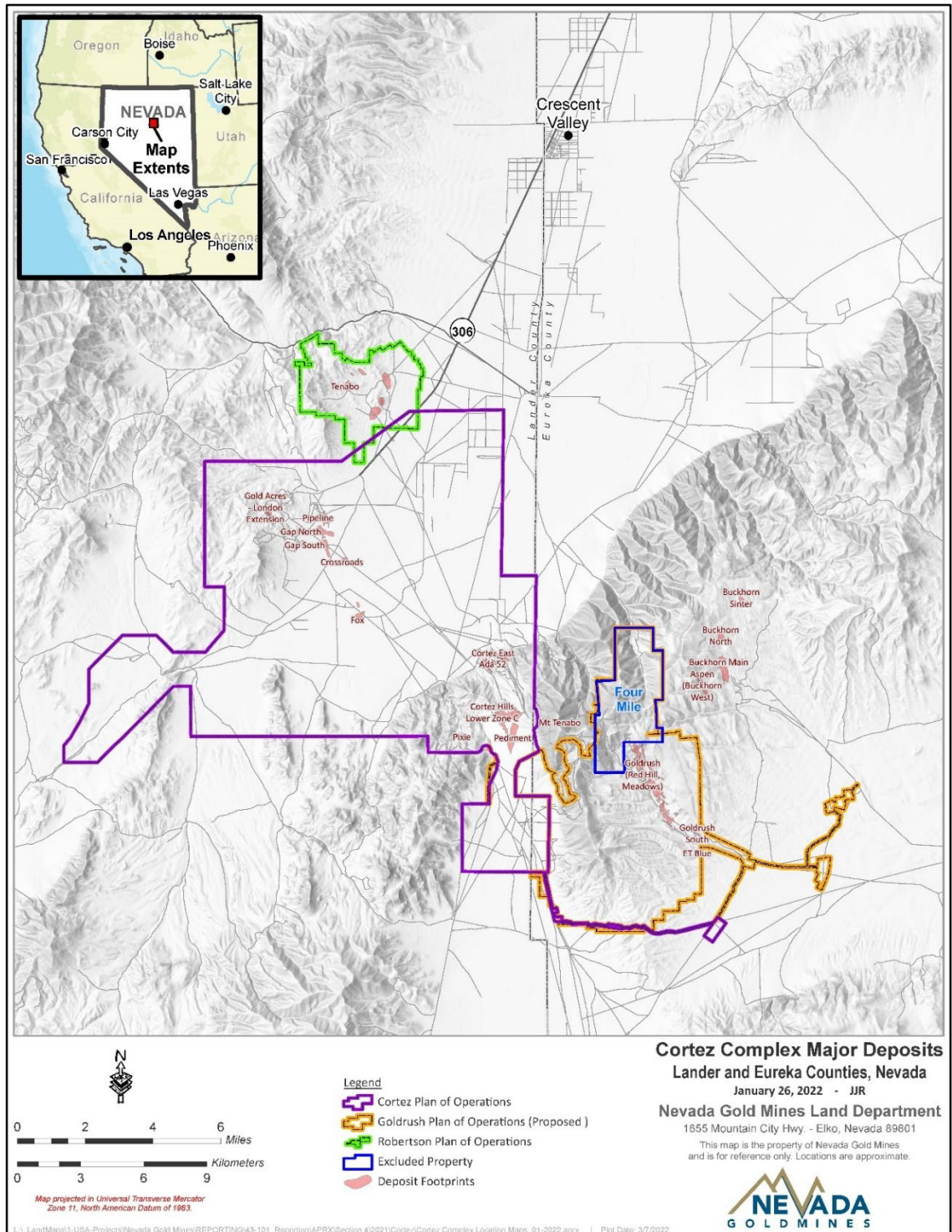
The Report uses Canadian English.

Figure 2-1: Project Location Plan



Note: Figure prepared by NGM, 2021.

Figure 2-2: Cortez Operations, Major Deposits



Note: Figure prepared by NGM, 2022.

Mineral Resources and Mineral Reserves are reported using the confidence categories in the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (May 2014; 2014 CIM Definition Standards) as incorporated by reference in NI 43-101.

2.3 Qualified Persons

This Report has been prepared by the following NGM Qualified Persons (QPs):

- Mr. Craig Fiddes, RM SME, Manager, Resource Modeling;
- Mr. Jay D. Olcott, RM SME, Project Manager;
- Mr. Timothy Webber, RM SME, Mine Manager Underground;
- Mr. Nathan Bennett, RM SME, Mine Manager Open Pit;
- Mr. John W. Langhans Jr., MMSA QP, Technical Specialist, Metallurgy.

2.4 Site Visits and Scope of Personal Inspection

Mr. Craig Fiddes has worked for Nevada Gold Mines since July 2019 as Manager – Resource Modeling based in Elko, Nevada. Responsibilities include technical direction and oversight of Resource Modeling for NGM, and compilation of Reserve and Resource estimates. Previously Mr. Fiddes was employed by Newmont Mining Corporation, based at Carlin from June 2013 through July 2019, and primarily responsible for resource modeling at numerous deposits in Northern Nevada. In his current role Mr. Fiddes regularly visits the NGM operations (including processing facilities, open pit, and underground operations), and is involved in review of site operations planning and performance reviews. In his most recent visit to the Cortez Complex, on September 15, 2021, Mr. Fiddes reviewed geological models and resource estimates for the Cortez Hills underground, Robertson, and Goldrush deposits. While at site, Mr. Fiddes also provided guidance on development of Grade Control models at the Goldrush project, and discussed performance of test mining and processing activities under way for that project.

Mr. Jay Olcott has worked for Nevada Gold Mines since July 2019. He is currently a Geoscientist based in Elko, Nevada and is responsible for assisting with project development and site reviews. In his current role, Mr. Olcott regularly visits the NGM operations (including processing facilities, open pit and underground operations, and growth projects) and reviews geology performance. Mr. Olcott visited the Cortez complex numerous times during the year with his most recent Cortez visit on December 7th, 2021. Mr. Olcott reviewed drilling methodologies including survey controls, logging and sampling procedures, QA/QC data verifications and geological modelling with each of the Cortez Project Geologists. He also visited the Cortez Pipeline core shed to verify sample handling procedures, blanks and certified reference materials storage, insertions and sample security. Mr. Olcott also conducted several surface and underground drill inspections at Cortez during 2021. Previously, Mr. Olcott worked at the Barrick Goldstrike underground mine as a Senior Geologist from 2003 to 2010; and at Newmont as a Chief Geologist in the Carlin Portal Mines and as an early-stage project Study Director from 2010 until the formation of the NGM JV.

Mr. Timothy Webber has worked for Nevada Gold Mines since July 2019, and has been at the Cortez complex since February 2021. He is currently the Mine Manager, Goldrush Underground Operations, and has the overall responsibility for all aspects of the Goldrush underground operations, including maintenance, engineering, and mine production. This responsibility extends to the development of mine plans, production scheduling, equipment usage, cost estimates, and the execution of those plans. Previously, Mr. Webber worked for Newmont since 2005 at the Carlin Underground operations (including the Carlin Portal Mines and Leeville) as the Chief Mine Engineer; and, after the formation of the NGM JV, at the Goldstrike Underground operations as the Engineering Superintendent.

Mr. Nathan Bennett has worked for Nevada Gold Mines since July 2019, and has been at the Cortez complex since July 2021. He is currently the Mine Manager, Surface Operations, and has the overall responsibility for all aspects of the surface operations, including maintenance, engineering, and mine production. This responsibility extends to the development of mine plans, production scheduling, equipment usage, cost estimates, and the execution of those plans. Previously, Mr. Bennett worked for Newmont since 2006 at the Carlin operations where he participated in technical mine designs, strategic planning, open pit mine optimization, and financial modeling in various roles such as Engineering superintendent and Operations superintendent.

Mr. John Langhans, Technical Specialist, Metallurgy for NGM visits the Cortez Operations on a routine basis. The most recent formal visit was on Tuesday, December 7, 2021 during which time geochemical, analytical, and metallurgical information associated with R & R declarations were reviewed. Mr. Langhans has served as metallurgist for the Goldrush, Fourmile, and Robertson projects, as well as providing metallurgical guidance for the Cortez Pits project from the time frame of 2017 through current. Prior involvement with the Cortez Operations included testing, coordination of toll processing/ounce allocations, and review of metallurgical recoveries of Cortez ore sources at the refractory processing facilities at the Goldstrike Operation, as Superintendent of Metallurgical Services, Goldstrike. A detailed review of the Cortez Pipeline Mill has been conducted as part of a strategic evaluation of roasting and flotation technology applications in the past couple of years.

2.5 Effective Dates

There are a number of effective dates pertinent to the Report, as follows:

- Effective date of the Mineral Resource estimates: December 31, 2021;
- Effective date of the Mineral Reserve estimates: December 31, 2021;

The overall Report effective date is taken to be December 31, 2021; and is based on the effective date of the Mineral Reserve estimates.

2.6 Information Sources and References

This Report is based, in part, on internal company reports, maps, published government reports and public information, as listed in Section 27 of this Report.

The following NGM employees contributed to various aspects of the Report under the supervision of the QPs, or the QPs held discussions with these employees in their areas of expertise:

- Mr. Gabriel Adogla, Underground Geology Superintendent, 28 years of mining experience, 2.5 years of experience with the Project;
- Mr. Rodrigo Aviles, Senior Metallurgist, six years of mining experience, three years of experience with the project;
- Mr. Duncan Bradford. General Manager Cortez & Goldrush, 32 years mining experience, one year of experience with the Project;
- Mr. Jackson Brown, Electrical Engineering Technician, 10 years of experience with the Project;
- Mr. Eric Burch, Environmental Superintendent, nine years mining experience, four years of experience on the Project;
- Ms. Tasha Caple, Land Manager, 18 years of experience with the Project;
- Mr. Mark Cash, Underground Mining Engineering Superintendent, 11 years mining experience, three years of experience with the Project;
- Ms. Heather Dahlman, Open Pit Mining Engineering Superintendent, 11 years of experience with the Project;
- Mr. Shaun DeBray, Senior Dewatering Engineer, 18 years of experience with the Project;
- Ms. Amanda Dutton, Senior Underground Hydrogeologist, 10 years of experience with the Project;
- Ms. Monica Elordi, Supply and Commercial Manager, 29 years supply chain experience, seven months of experience with the Project;
- Ms. Sierra Graham, Cortez Chief Financial Officer, 12 years of mining experience, four years of experience with the Project;
- Mr. Devin Harbke, Manager Environmental and Dewatering, 22 years of mining experience, one year of experience with the Project;
- Mr. Clint Kleeb, Accountant II, six years of experience, one year of experience with the Project;
- Mr. Vincent Lamin Bonzumah, Underground Geotechnical Superintendent, nine years of experience with the Project;
- Ms. Stacey Leclerc, Resource Geology Superintendent, 19 years of experience in exploration geology and resource estimation, two months of experience with the Project;

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- Mr. Robert Malloy, Database Administration Lead, 34 years of mining experience, six years of experience with the Project;
 - Mr. Matthew Mann, Senior Growth Geologist, five years of experience with the Project;
 - Ms. Melissa McMullen, Senior Stockpile Geologist, 10 years of experience with the Project;
 - Ms. Khatlyn Micheli, Senior Landman, two years of experience with the Project;
 - Ms. Mikayla Morfin, Open Pit Senior Geotechnical Engineer, 10 years of experience with the Project;
 - Mr. John Muir, Growth Geology Superintendent, 11 years of experience with the Project;
 - Mr. Isaac Oduro, Underground Geology Superintendent, one year of experience with the Project;
 - Mr. Dustin Peters, Senior Open Pit Hydrogeologist, 10 years of experience with the Project;
 - Ms. Amy Race, Water Resources Manager, 12 years hydrogeology experience, five years of experience with the Project;
 - Mr. Luke Rader, Mill Metallurgist, three years of experience with the Project;
 - Mr. John Renas, GIS Specialist, two years of experience with the Project;
 - Ms. Jeanette Romeo, RP for Tailings and Heap Leach/Compliance, 33 years of mining experience, 10 years of experience with the Project;
 - Mr. Josh Sovie, Surface Geology Superintendent, 10 years of experience with the Project;
 - Mr. John Spring, Mineral Resource Manager, 14 years of mining geology experience, three months of experience with the Project;
 - Mr. Shane Stradling, Underground Geology Superintendent, 14 years of mining geology, experience, one month of experience with the Project;
 - Ms. Carly Stroker, Process Manager, 13 years of mining experience and seven years of experience with the Project;
 - Mr. Keith Testerman, District Geologist, Exploration, 28 years of mine geology and exploration experience, nine years of experience with the Project;
 - Ms. Abby Thunehorst, Process Technical Services Superintendent, nine years of metallurgy experience and six years of experience with the project;
 - Mr. James Thuringer, Open Pit Senior Long Range Engineer, eight years of mining experience, three years of experience with the Project;
 - Ms. Anne Wang, Heap Leach Metallurgist, four years of metallurgy experience and three years of experience with the Project;
 - Ms. Kim Wolf, Permitting, 14 years of experience with the Project;
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- Ms. Alissa Wood, Head of Communities and Corporate Affairs, 10 years of Nevada Corporate Social Responsibility experience;
 - Mr. Zach Zastoupil, Underground Mining Engineering Superintendent, nine years of experience with the Project.

2.7 Previous Technical Reports

Barrick has previously filed the following technical reports on the Project:

- Miranda, H., Altman, K.A., Geusebroek, P., Valliant, W.W. and Bergen, R.D., 2019: Technical Report on the Cortez Joint Venture Operations, Lander and Eureka Counties, State of Nevada, U.S.A.: report prepared by Roscoe Postle Associates Inc. for Barrick Gold Corporation, dated 22 March, 2019;
- Altman, K.A., Bergen, R.D., Collins, S.E., Moore, C.M., and Valliant, W.W., 2016: Technical Report on the Cortez Operations, State of Nevada, U.S.A., NI 43-101 report: report prepared by Roscoe Postle Associates Inc. for Barrick Gold Corporation, dated 21 March, 2016);
- Bergen, R.D., Gareau, M.B., and Altman, K.A., 2012: Technical Report on the Cortez Joint Venture Operations, Lander and Eureka Counties, State of Nevada, U.S.A.: report prepared by Roscoe Postle Associates Inc. for Barrick Gold Corporation, dated 16 March, 2012.

3.0 RELIANCE ON OTHER EXPERTS

This section is not relevant to this Report.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Introduction

The Cortez Complex is situated approximately 100 km southwest of Elko, Nevada, USA, in Eureka and Lander Counties.

The Project centroid is at 527007.17 east, 4451450.13 north, using UTM NAD83 Zone 11N co-ordinates.

4.2 Property and Title in Nevada

Information in this sub-section has been compiled from Papke et al., (2019).

4.2.1 Mineral Title

Federal (30 USC and 43 CFR) and Nevada (NRS 517) laws concerning mining claims on Federal land are based on an 1872 Federal law titled “An Act to Promote the Development of Mineral Resources of the United States.” Mining claim procedures still are based on this law, but the original scope of the law has been reduced by several legislative changes.

The Mineral Leasing Act of 1920 (30 USC Chapter 3A) provided for leasing of some non-metallic materials; and the Multiple Mineral Development Act of 1954 (30 USC Chapter 12) allowed simultaneous use of public land for mining under the mining laws and for lease operation under the mineral leasing laws. Additionally, the Multiple Surface Use Act of 1955 (30 USC 611-615) made “common variety” materials non-locatable; the Geothermal Steam Act of 1970 (30 USC Chapter 23) provided for leasing of geothermal resources; and the Federal Land Policy and Management Act of 1976 (the “BLM Organic Act,” 43 USC Chapter 35) granted the Secretary of the Interior broad authority to manage public lands. Most details regarding procedures for locating claims on Federal lands have been left to individual states, providing that state laws do not conflict with Federal laws (30 USC 28; 43 CFR 3831.1).

Mineral deposits are located either by lode or placer claims (43 CFR 3840). The locator must decide whether a lode or placer claim should be used for a given material; the decision is not always easy but is critical. A lode claim is void if used to acquire a placer deposit, and a placer claim is void if used for a lode deposit. The 1872 Federal law requires a lode claim for “veins or lodes of quartz or other rock in place” (30 USC 26; 43 CFR 3841.1), and a placer claim for all “forms of deposit, excepting veins of quartz or other rock in place” (30 USC 35). The maximum size of a lode claim is 1,500 ft (457 m) in length and 600 ft (183 m) in width, whereas an individual or company can locate a placer claim as much as 20 acres (8 ha) in area.

Claims may be patented or unpatented. A patented claim is a lode or placer claim or mill site for which a patent has been issued by the Federal Government, whereas an unpatented claim means a lode or placer claim, tunnel right or mill site located under the Federal (30 USC) act, for which a patent has not been issued.

4.2.2 Surface Rights

About 85% of the land in Nevada is controlled by the Federal Government; most of this land is administered by the US Bureau of Land Management (BLM), the US Forest Service (USFS), the US Department of Energy, or the US Department of Defense. Much of the land controlled by the BLM and the USFS is open to prospecting and claim location.

Bureau of Land Management regulations regarding surface disturbance and reclamation require that a notice be submitted to the appropriate BLM Field Office for exploration activities in which five acres or fewer are proposed for disturbance (43 CFR 3809.1-1 through 3809.1-4). A Plan of Operations (PoO) is needed for all mining and processing activities, plus all activities exceeding five acres of proposed disturbance. A PoO is also needed for any bulk sampling in which 1,000 or more tons of presumed mineralized material are proposed for removal (43 CFR 3802.1 through 3802.6, 3809.11, 3809.21). The BLM also requires the posting of bonds for reclamation for any surface disturbance caused by more than casual use (43 CFR 3809.500 through 3809.560). The USFS has regulations regarding land disturbance in forest lands (36 CFR Subpart A). Both agencies also have regulations pertaining to land disturbance in proposed wilderness areas.

4.2.3 Water Rights

In the State of Nevada, “the water of all sources of water supply within the boundaries of the State whether above or beneath the surface of the ground, belongs to the public” (NRS 533.025). Furthermore, “except as otherwise provided in NRS 533.027 and 534.065, any person who wishes to appropriate any of the public waters, or to change the place of diversion, manner of use or place of use of water already appropriated, shall, before performing any work in connection with such appropriation, change in place of diversion or change in manner or place of use, apply to the State Engineer for a permit to do so” (NRS 533.325).

4.2.4 State Royalties

The state of Nevada imposes a 5% net proceeds tax on the value of all minerals severed in the State. This tax is calculated and paid based on a prescribed net income formula.

A Nevada Mining Education excise tax, AB 495, became effective on July 2021, and is based on gold and silver gross revenue and is calculated as follows:

- First US\$20 M of gross revenue: exempt;
- >US\$20 M to US\$150 M of gross revenue: taxed at a flat rate of 0.75%;
- >US\$150 M of gross revenue: taxes at a flat rate of 1.1%.

4.2.5 Environmental Regulations

All surface management activities, including reclamation, must comply with all pertinent Federal laws and regulations, and all applicable State environmental laws and regulations.

Exploration activities conducted under a Plan of Operations are required to comply with the National Environmental Policy Act (NEPA). Generally, NEPA compliance for exploration

activity is through the development of an Environmental Assessment (EA), although depending on the significance of impacts determined to occur, an Environmental Impact Statement (EIS) may be required.

The fundamental requirement, implemented in 43 CFR 3809, is that all hard-rock mining under a PoO or Notice on the public lands must prevent unnecessary or undue degradation. The PoO and any modifications to the approved PoO must meet the requirement to prevent unnecessary or undue degradation.

Authorization to allow the release of effluents into the environment must be in compliance with the Clean Water Act, Safe Drinking Water Act, Endangered Species Act, other applicable Federal and State environmental laws, consistent with BLM's multiple-use responsibilities under the Federal Land Policy and Management Act and fully reviewed in the appropriate NEPA document.

The primary State agency regulating exploration and mining activities is the Nevada Division of Environmental Protection–Bureau of Mining Regulation and Reclamation. The Bureau of Mining Regulation and Reclamation has regulatory authority for issuing reclamation permits and water pollution control permits for mining projects located on private and federally managed lands.

4.3 Project Ownership

NGM is a JV between Barrick and Newmont. Barrick is the JV operator and owns 61.5%, with Newmont owning the remaining 38.5%. The JV area of interest (AOI) covers a significant portion of northern Nevada (Figure 4-1). The AOI includes the Cortez Complex area.

4.4 Mineral Tenure

The Cortez Complex covers an area of approximately 36,096 ha in a total of 5,137 claims located within the PoO area:

- Lode claims: 4,409 claims covering 34,360.67 ha;
- Millsite claims: 555 claims covering 1,030.01 ha;
- Patented claims: 171 claims covering 576.43 ha;
- Placer claims: 2 claims, covering 129.5 ha.

The Cortez PoO location is shown in Figure 4-2. The claims located within the PoO are shown in Figure 4-3 to Figure 4-9. The proposed Goldrush PoO boundary is provided in Figure 4-10, and the locations of the claims within the boundary in Figure 4-11. The Robertson exploration PoO is shown in Figure 4-12, and the claims within that boundary are shown in Figure 4-13. The figures also show the locations of any fee property.

All mining leases and subleases are managed and reviewed on a monthly basis by the NGM Land Department and all payments and commitments are paid as required by the specific agreements.

Figure 4-1: Joint Venture Area of Influence

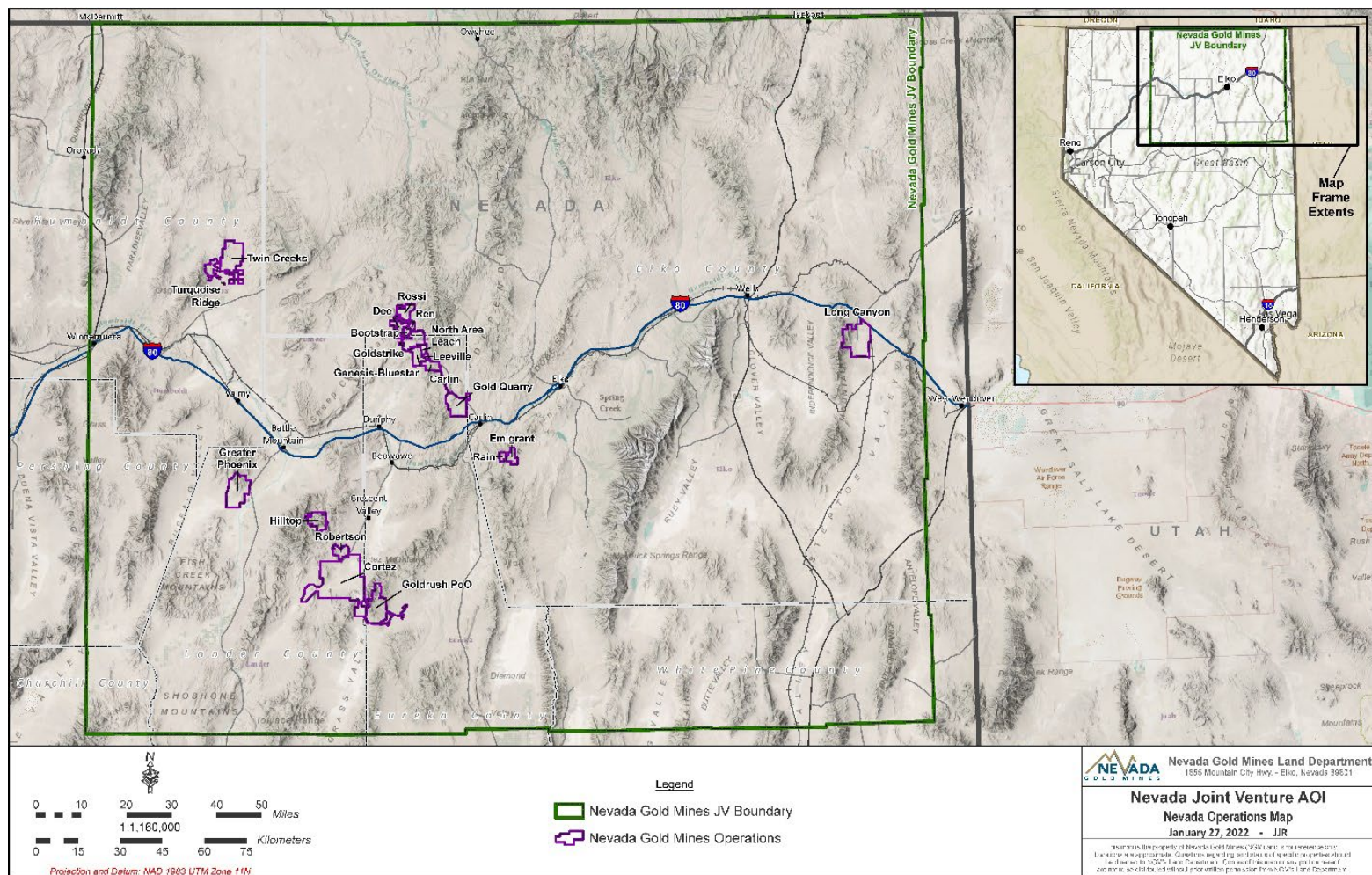
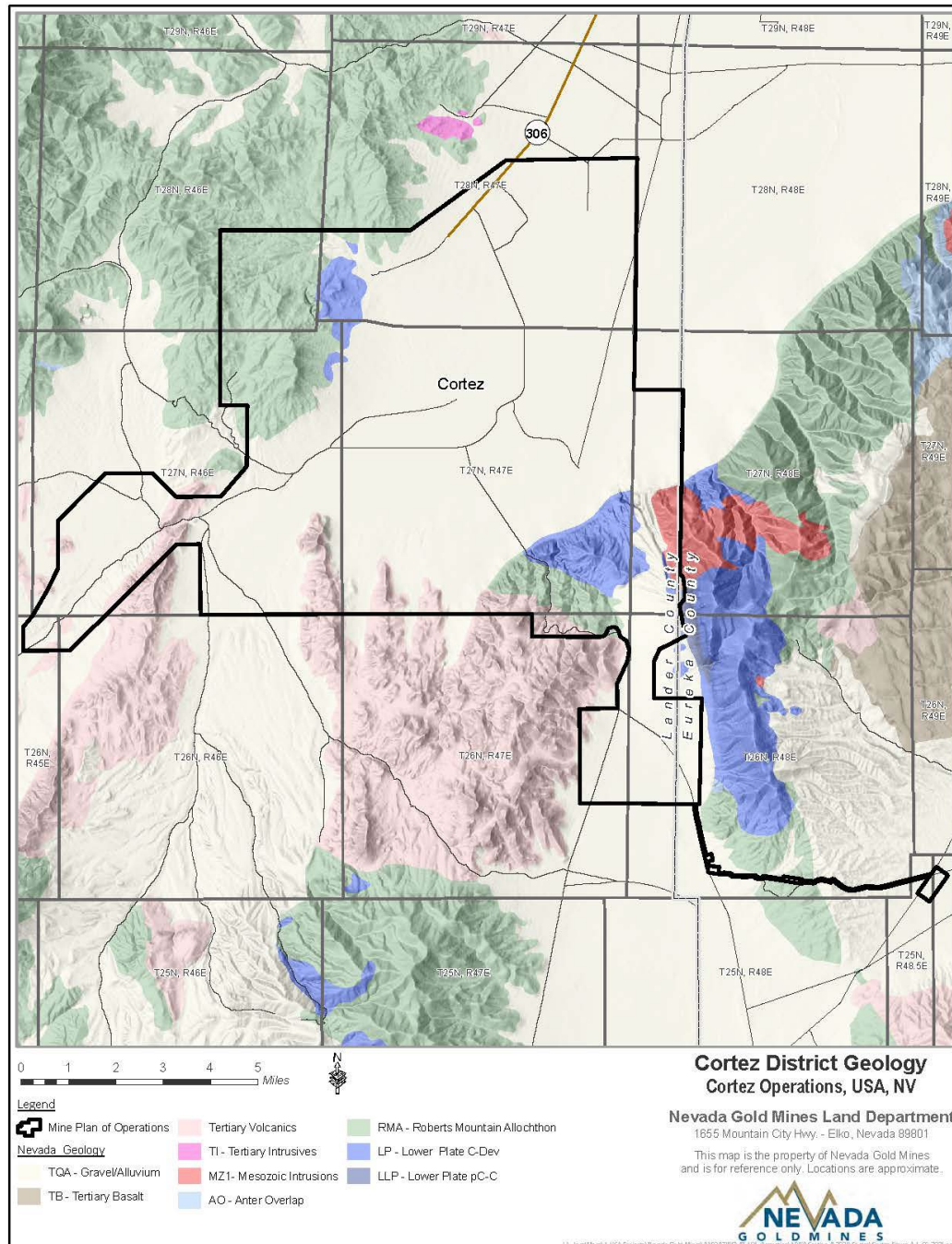
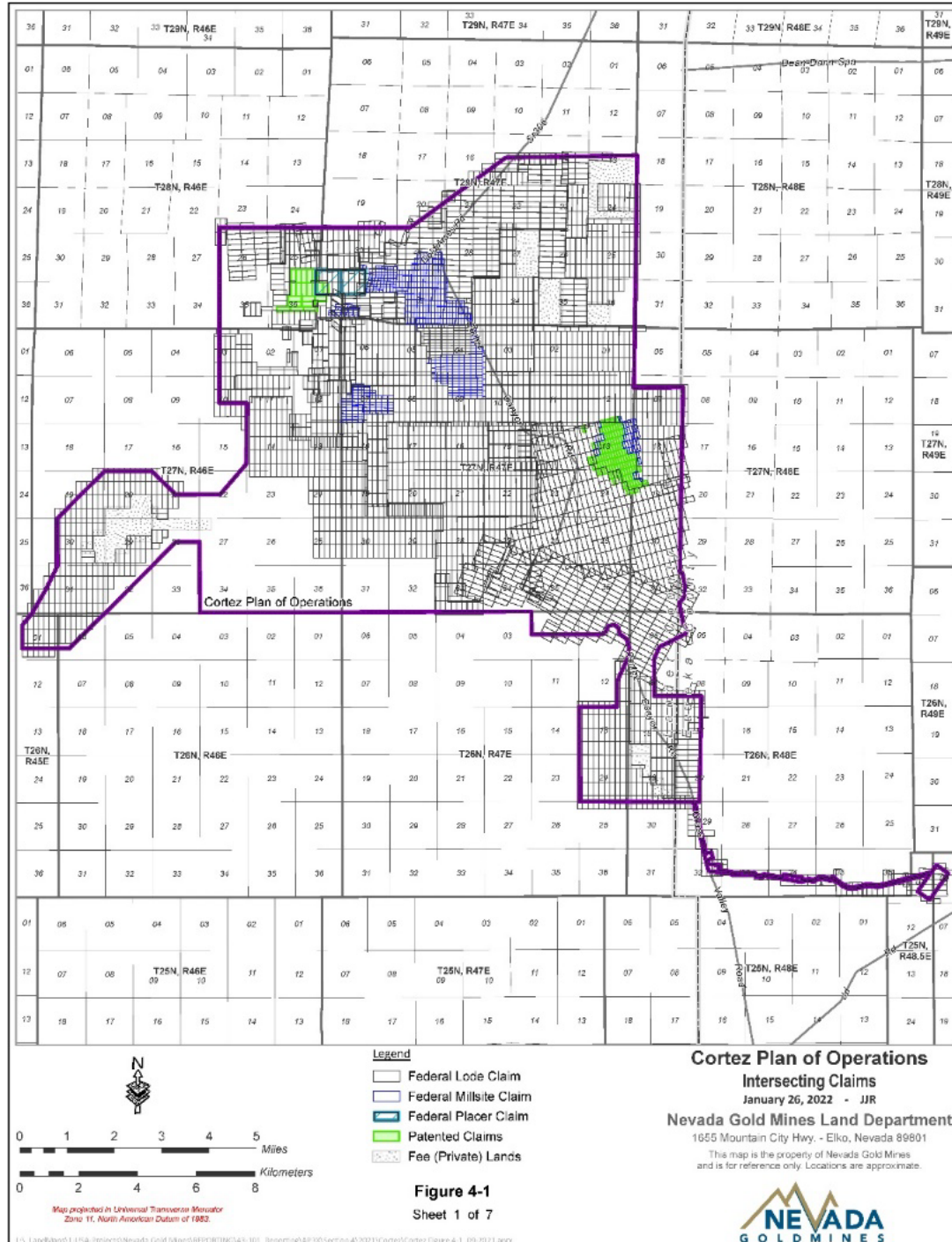


Figure 4-2: Cortez PoO Boundary



Note: Figure prepared by NGM, 2022.

Figure 4-3: Mineral Claims Within Cortez PoO Boundary, Sheet 1 of 7



Note: Figure prepared by NGM, 2022.

Cortez Plan of Operations
Intersecting Claims
 January 26, 2022 - JR

Nevada Gold Mines Land Department
 1655 Mountain City Hwy. - Elko, Nevada 89801

This map is the property of Nevada Gold Mines and is for reference only. Locations are approximate.

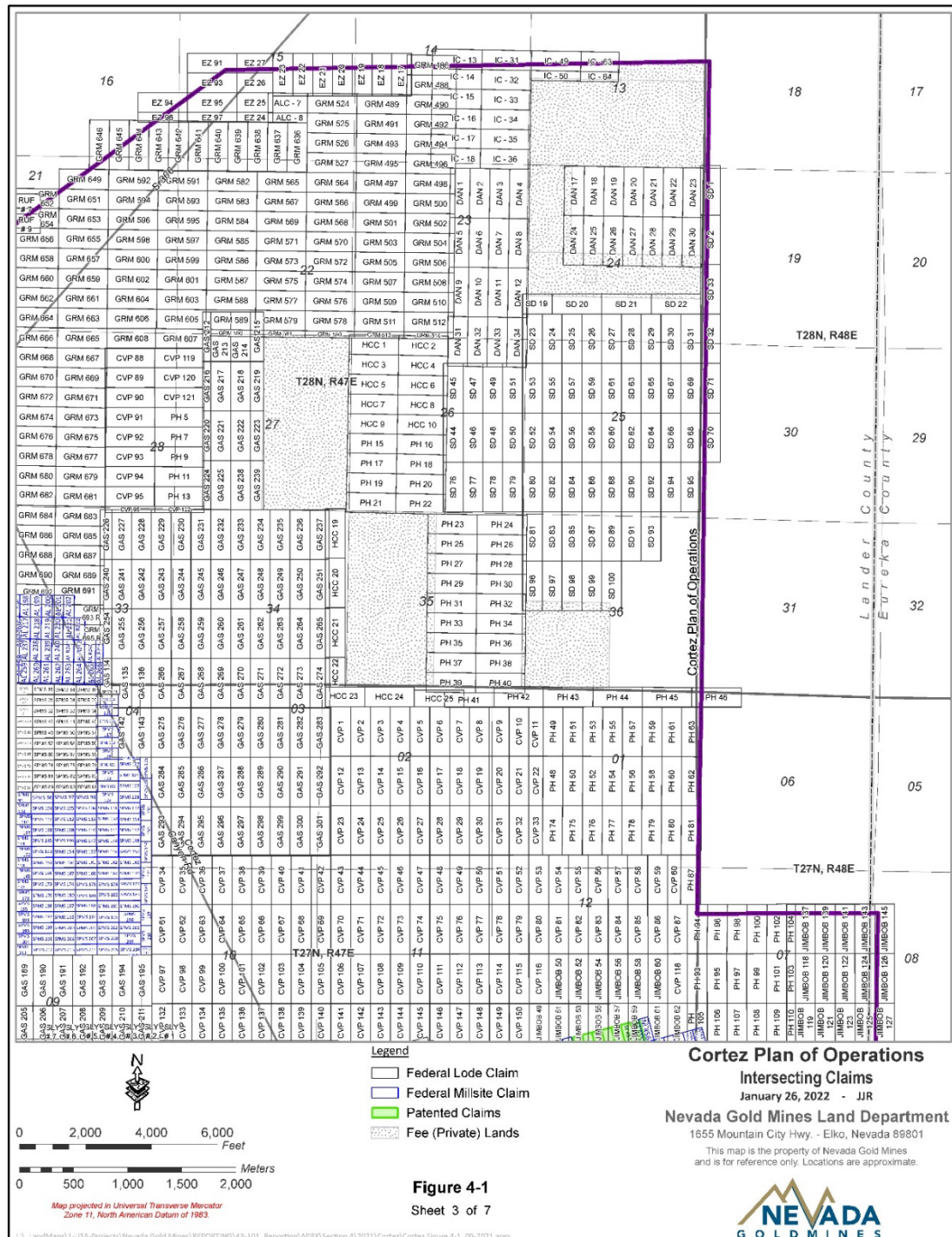
Legend

- Federal Lode Claim
- Federal Millsite Claim
- Federal Placer Claim
- Patented Claims
- Fee (Private) Lands

Figure 4-1
Sheet 2 of 7

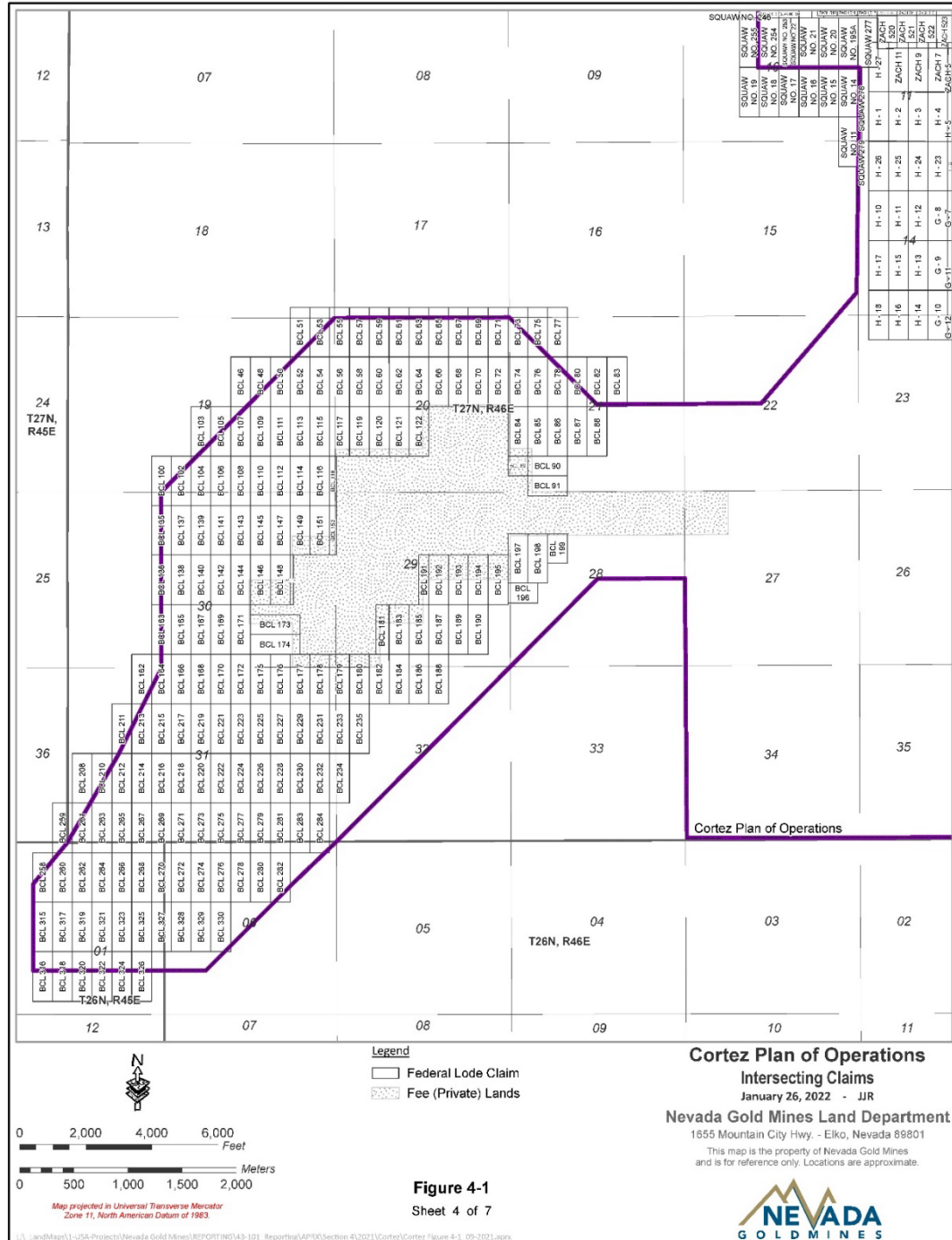
Note: Figure prepared by NGM, 2022.

Figure 4-5: Mineral Claims Within Cortez PoO Boundary, Sheet 3 of 7



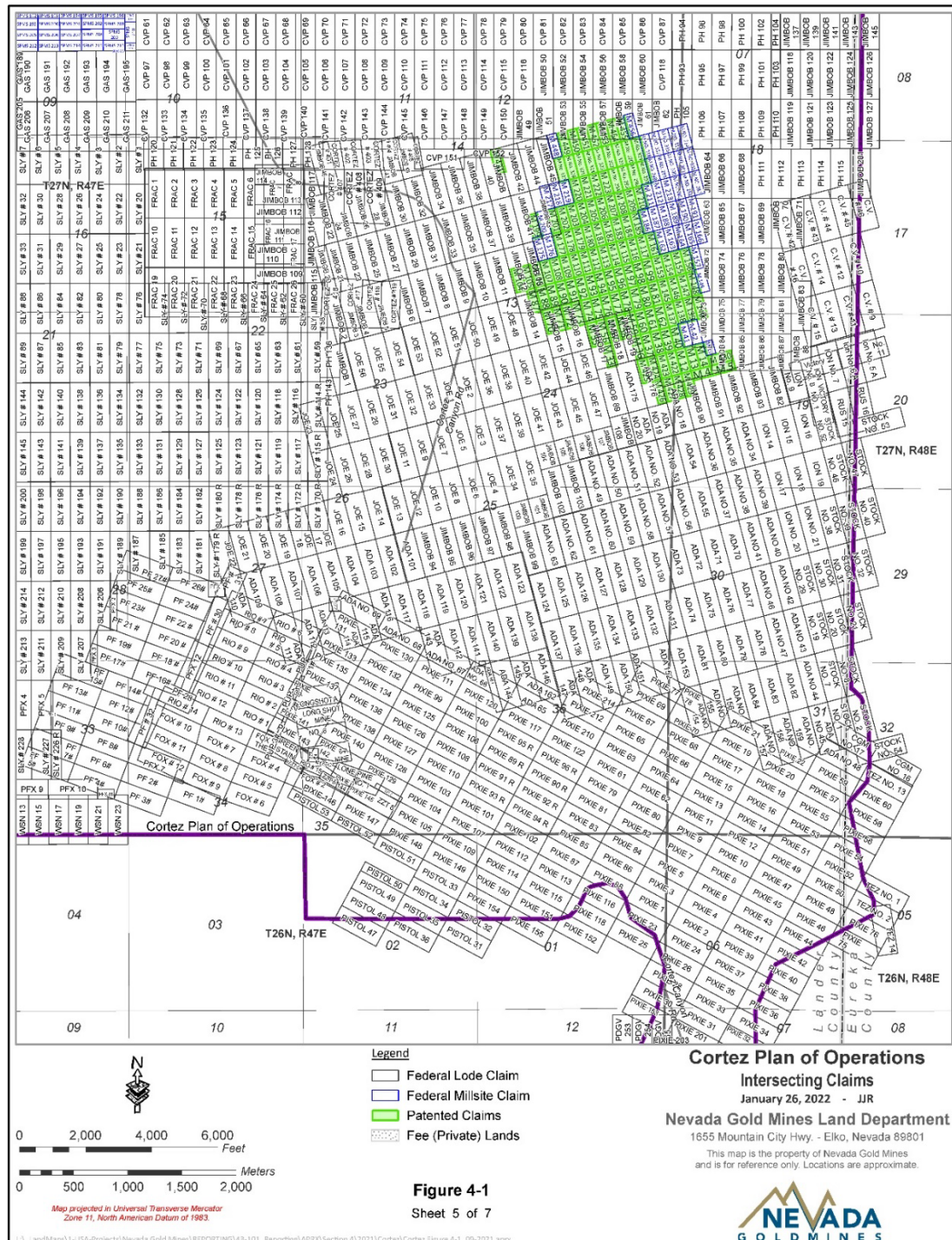
Note: Figure prepared by NGM, 2022.

Figure 4-6: Mineral Claims Within Cortez PoO Boundary, Sheet 4 of 7



Note: Figure prepared by NGM, 2022.

Figure 4-7: Mineral Claims Within Cortez PoO Boundary, Sheet 5 of 7

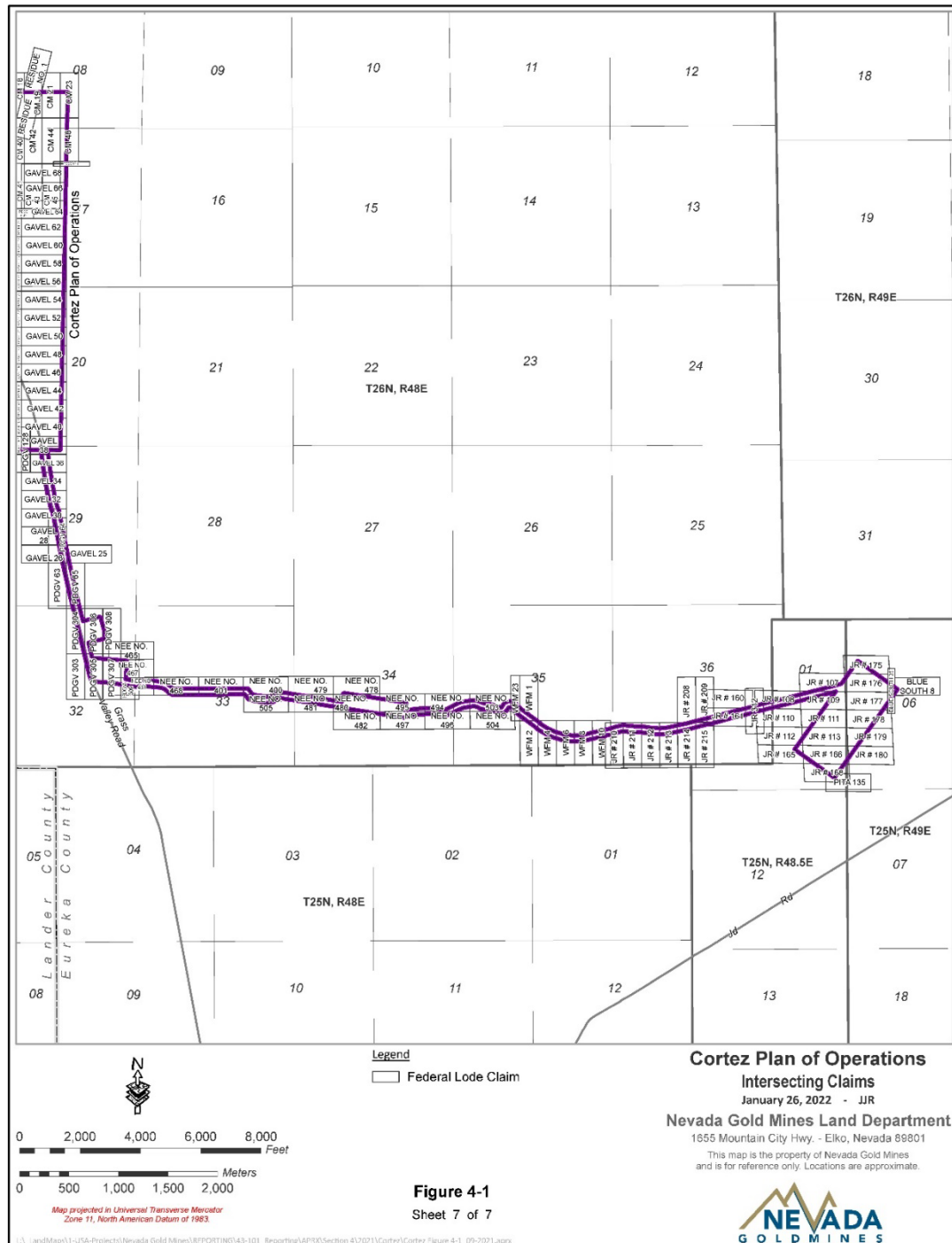


Note: Figure prepared by NGM, 2022.

Figure 4-1
Sheet 6 of 7

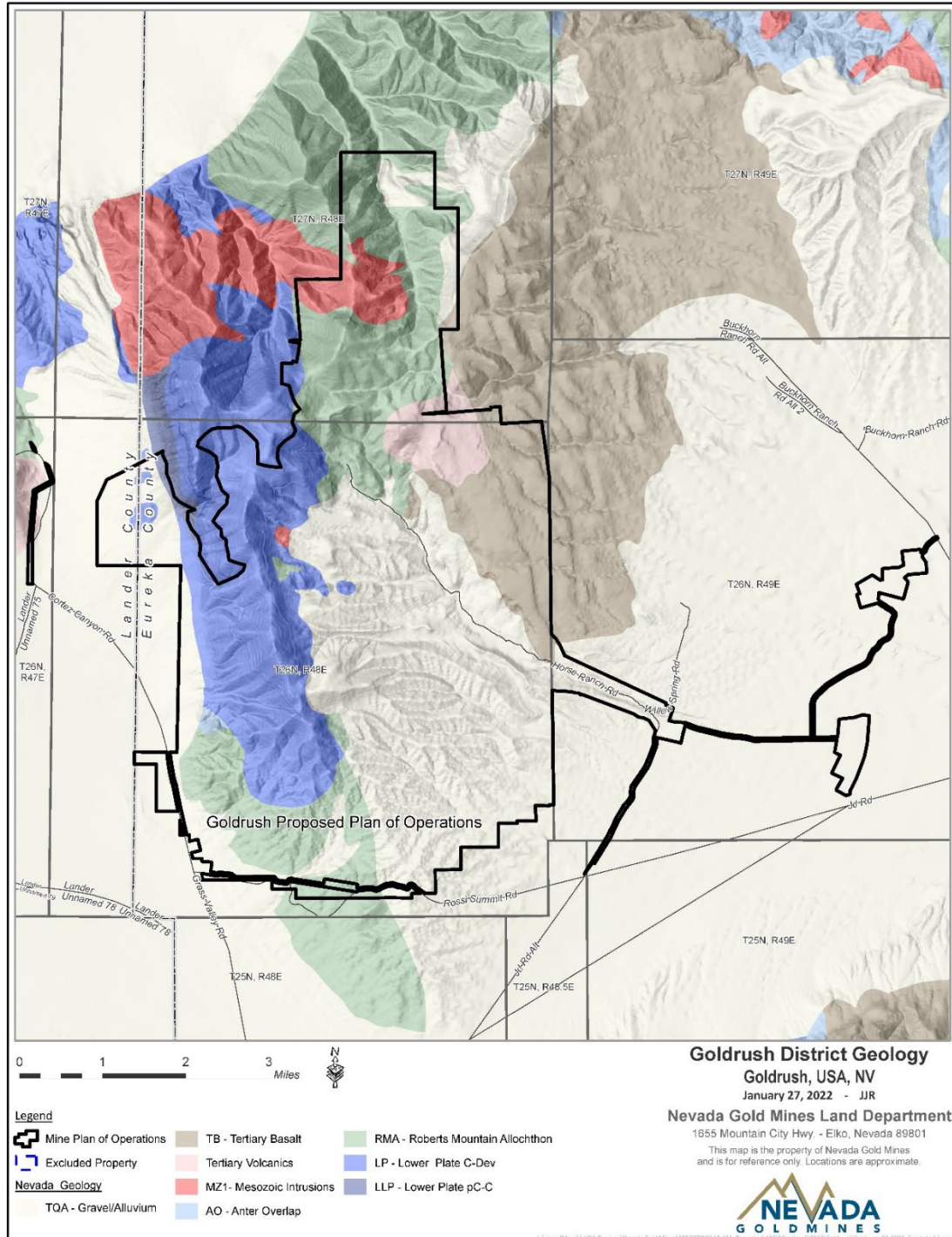
March 2022

Figure 4-9: Mineral Claims Within Cortez PoO Boundary, Sheet 7 of 7



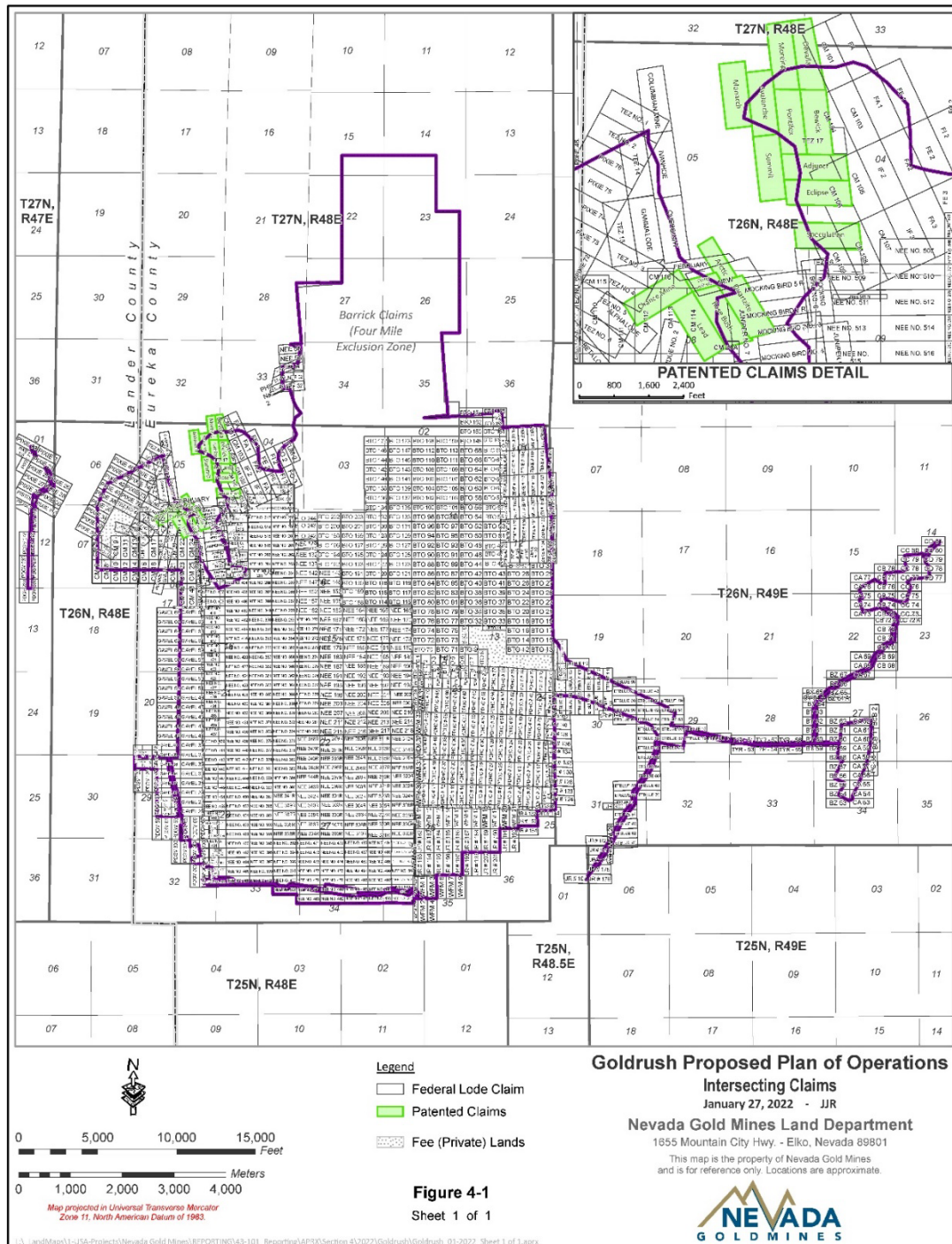
Note: Figure prepared by NGM, 2022.

Figure 4-10: Goldrush Proposed PoO Boundary



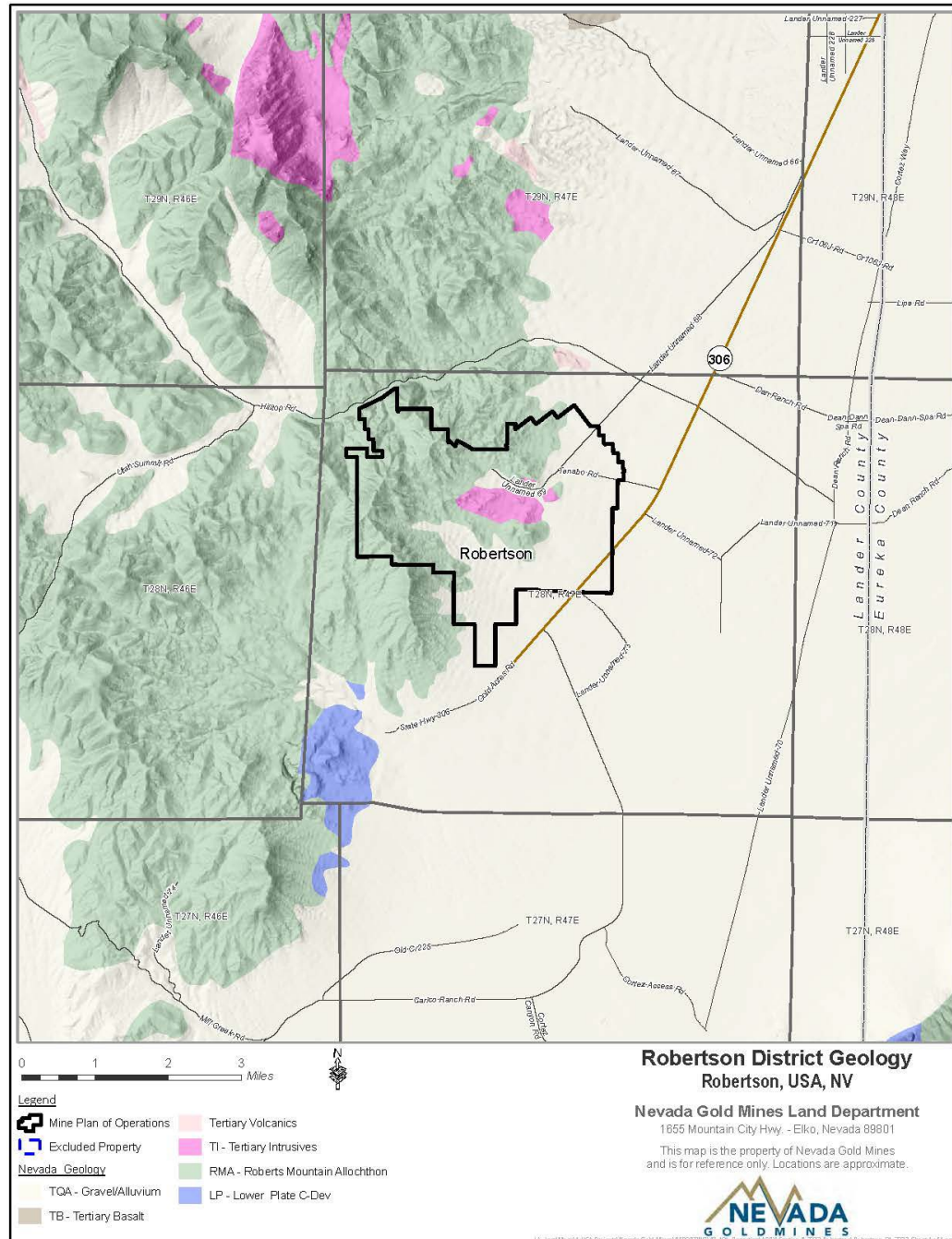
Note: Figure prepared by NGM, 2022.

Figure 4-11: Mineral Claims Within Proposed Goldrush PoO Boundary



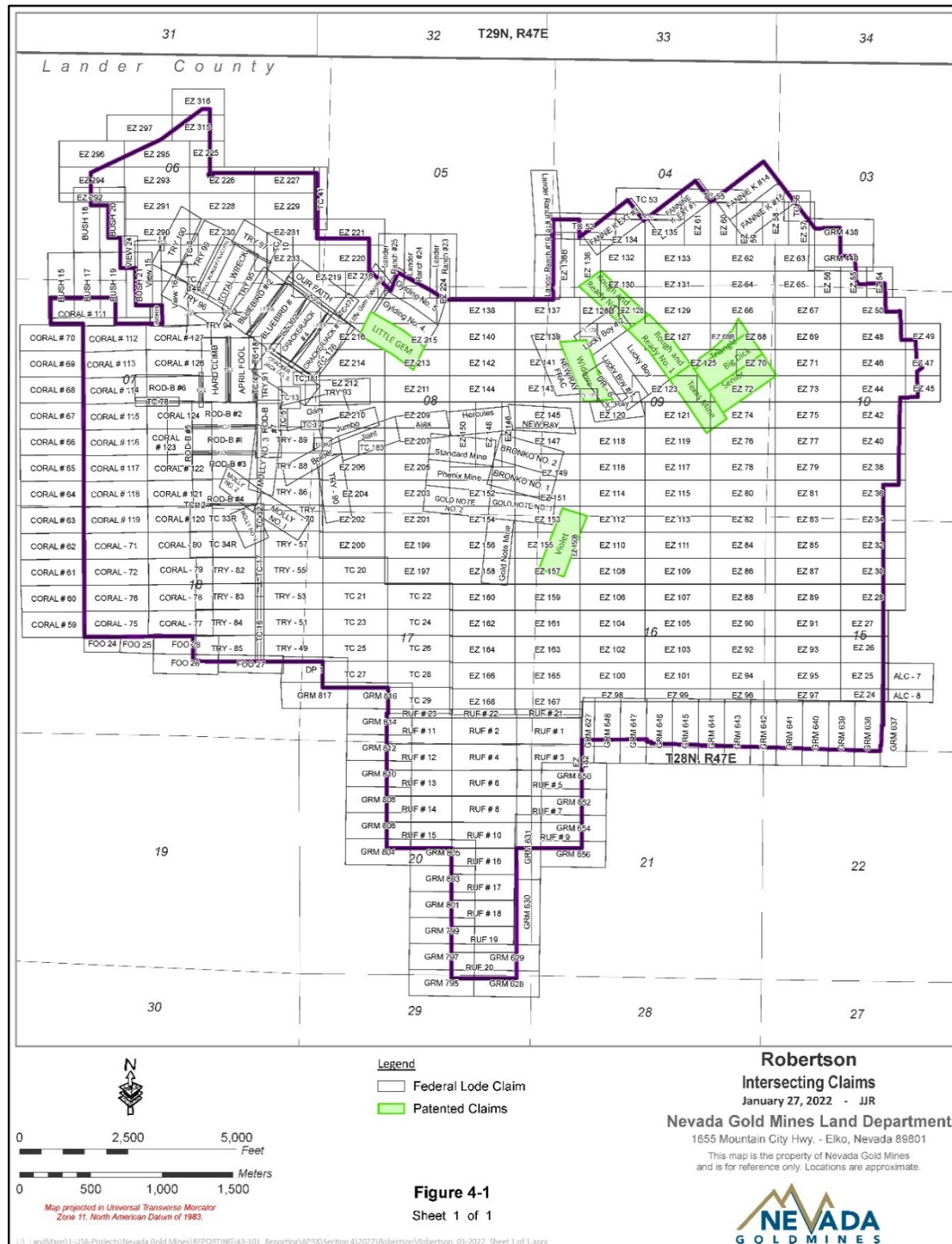
Note: Figure prepared by NGM, 2022.

Figure 4-12: Robertson Exploration PoO Boundary



Note: Figure prepared by NGM, 2022.

Figure 4-13: Mineral Claims Within The Robertson Exploration PoO Boundary



Note: Figure prepared by NGM, 2022.

Lode and mill site claims that are located on public lands are held subject to the paramount title of the federal government. The claims are maintained on an annual basis, and do not expire if the maintenance fee payments are timely filed with the BLM. Patented and fee lands require annual payment of tax assessments to Lander and Eureka Counties. All fees have been timely paid.

4.5 Surface Rights

Surface rights are either held by NGM outright, or administered by the BLM. There are sufficient surface rights in place or planned to be acquired to support the life-of-mine (LOM) plan assumptions for the individual mines within the Cortez Complex.

As noted in Section 4.2, a PoO must be completed as part of the permitting process for hard rock mining in Nevada providing both state and federal regulators with a description of the operations, facilities, and a plan of production for the life of the operation.

4.6 Water Rights

The Cortez Mine operates in the Crescent Valley (Basin 054), Grass Valley (Basin 138), and Pine Valley (053) hydrographic basins and maintains a combination of approximately 430 surface and underground water rights allowing manners of use including mining, milling, dewatering, irrigation, environmental, stock watering, quasi-municipal, and domestic uses. These rights are further divided into consumptive and non-consumptive permits, with non-consumptive permits being used solely for dewatering purposes in which water is extracted from the immediate vicinity of the mine workings and reinfiltreated to the local aquifers via rapid infiltration basins. The consumptive and non-consumptive mining, milling, and dewatering duties for each of the hydrographic basins in which the Cortez Mine operates are as follows:

- Crescent Valley (Basin 054):
 - Consumptive duty: 6,512,000 m³/a as mining and milling; (7,897 AFA) 9,741,000 cubic metres per annum as mining water sent to irrigation at the NGM-owned Dean Ranch;
 - Non-consumptive Duty: 88,571,000 m³/a;
- Grass Valley (Basin 138):
 - Consumptive duty: 2,384,000 m³/a during active mining; 7,935,000 m³/a after the cessation of mining activity;
 - Non-consumptive duty: there is no non-consumptive mining, milling, or dewatering duty associated with Grass Valley;
- Pine Valley (Basin 053):
 - Consumptive duty: 4,107,000 m³/a;
 - Non-consumptive duty: 13,931,000 m³/a.

While these water rights have been and are projected to be sufficient to support all future mining activities, NGM also maintains additional consumptive rights with other manners of use that can be made available to the mine operation if deemed necessary.

4.7 Royalties and Encumbrances

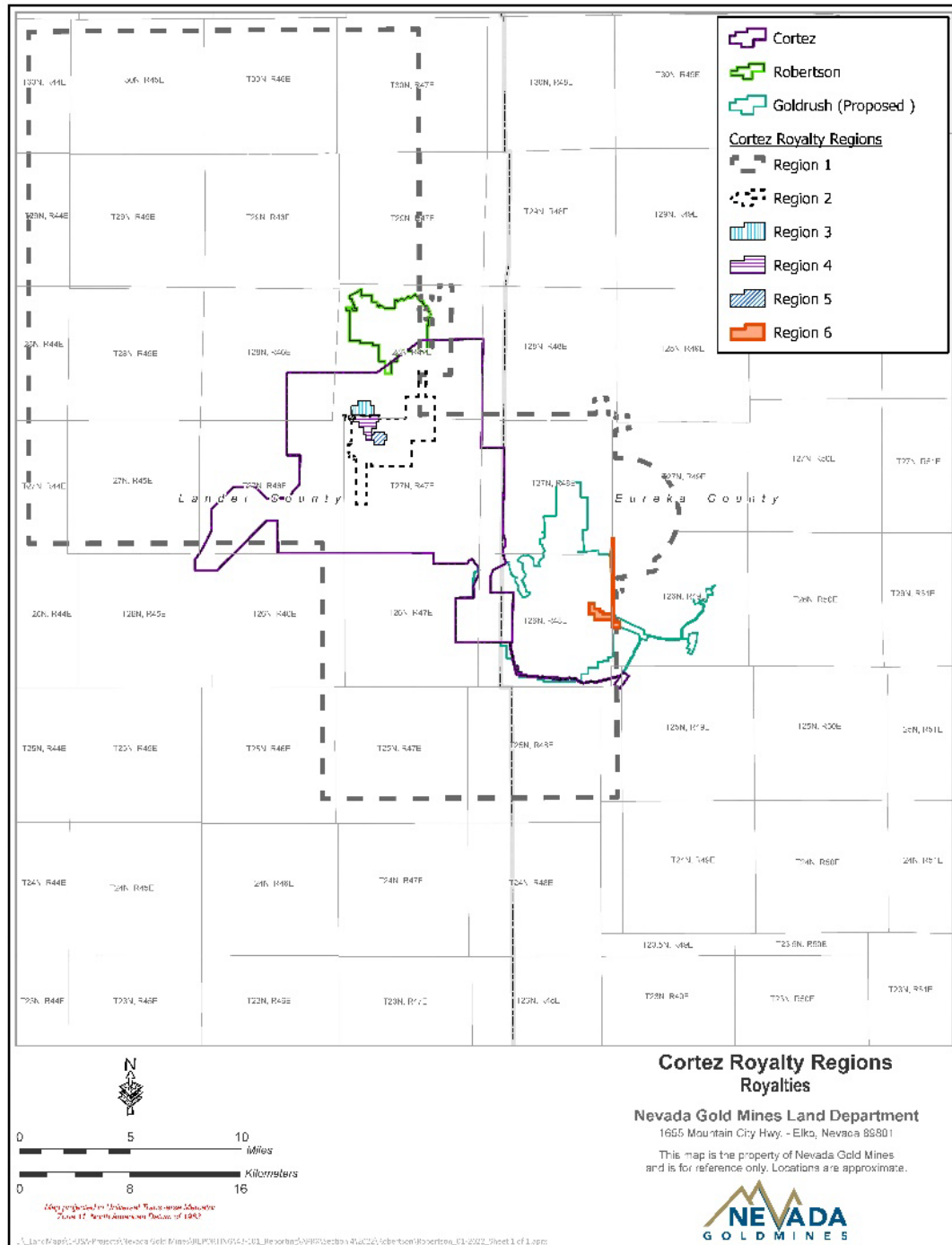
4.7.1 Claims Royalties

The Cortez Complex is subject to a number of royalties. The PoO is broken up into six distinct royalty regions (Figure 4-14). Region 1 currently encompasses all the existing pits/underground mining operations. Region 2 covers portions of the Gap, Crossroads, and South Pipeline pits. Region 3 is over the Pipeline pit. Region 4 is within the South Pipeline pit, and region 5 is within the Crossroads pit. Region 6 is currently being defined as up to the southern extent of Goldrush. Should Robertson be brought into production, it will fall within Region 1 and additional regions will be created to make allowances for royalties specific to that project.

The Cortez District is or will be subject to the following royalties:

- Idaho Mining Corporation: gross smelter return royalty of 1.2859% on all production from Regions 1 and 6, and a gross smelter return royalty of 0.6890% on all production from Regions 2–5;
- Royal Gold Inc. (Royal Gold): gross smelter return royalty of 0.7125% on all production from Regions 2–4, a gross smelter return royalty of 5.0000% on production from Regions 2–5, a net value royalty of 3.7500% on production from Regions 2, 4, and 5, a net value royalty of 1.2500% on production from Regions 2 and 4 to be settled in kind, a net value royalty of 0.8546% on production from Region 5 to be settled in kind, and a net value royalty of 1.0000% on all production from Region 6;
- Rio Tinto: gross value royalty of 1.2000% from Regions 1–6 once the production of 15 million ounces of gold and equivalent silver has been achieved at gold prices greater than \$900/oz. Royalty payments are expected to be triggered during the latter half of 2022;
- Mary J Steiner: net value royalty of 0.4167% on all production from Region 6;
- Nomad Royalty Company (Nomad): Nomad purchased a royalty from Coral Resources in 2020. This is a net smelter return royalty on a sliding scale of 1–2.25% on all Robertson claims except for the Lucky Boy claims;
- Tenabo Gold Mining Co.: net smelter return royalty of 8% on 13 claims at Robertson. This royalty has a US\$2.0 million royalty cap and a US\$12,000 per year advanced royalty payment. A total of US\$1.1 million remains to be paid; and
- Billie Filippini: gross value royalty of 3% on the Lucky Boy claims at Robertson.

Figure 4-14: Royalty Regions



Note: Figure prepared by NGM, 2022.

4.7.2 NGM Royalty

In connection with the formation of Nevada Gold Mines, each of Barrick and Newmont was granted a 1.5% net smelter returns royalty over the respective properties they contributed to the NGM JV.

For the properties contributed by Barrick, the 1.5% net smelter returns royalty is payable on all gold produced from these properties after approximately 47,301,000 ounces of gold have been produced from the properties from and after July 1, 2019. For the properties contributed by Newmont, the 1.5% net smelter returns royalty is payable on all gold produced from these properties after approximately 36,220,000 ounces of gold have been produced from the properties from and after July 1, 2019, and (ii) a separate and independent net smelter returns royalty on all copper produced from the properties after approximately 1,520,000,000 pounds of copper have been produced from these properties from and after July 1, 2019.

Each of these “retained royalties” is only payable once the aggregate production from the properties subject to the royalty exceeds the publicly-reported Mineral Resources and Mineral Reserves as of December 31, 2018.

4.7.3 State Royalties

State royalties are discussed in Section 4.2.4.

4.8 Property Agreements

A number of agreements exist with different parties, and these are monitored using a land management database. The data managed includes contractual obligations, leases, associated payments, parties to agreements, and locations and details of the properties that the agreements cover. All mining leases and subleases are managed and reviewed on a monthly basis and all payments and commitments are paid as required by the specific agreements. The database covers both monetary obligations such as lease payments and non-monetary obligations such as third-party required reporting, work commitments, taxes, and contract expiry dates. The agreements that NGM has with third parties on the Cortez Complex are monitored using this database.

Agreements, including rights-of-way, patent claims and applications, mining leases, and property exchanges, are summarized in Table 4-1.

4.9 Permitting Considerations

Permitting for the Cortez Complex is discussed in Section 20.

Table 4-1: Agreements, Easements, and Royalties by Area

Area	Agreement or Lease	Easements/Rights of Way	Royalties
Cortez	13	7	12
Robertson	5	1	5
Goldrush	10	1	11

4.10 Environmental Considerations

Environmental considerations and monitoring programs for the Cortez Complex are discussed in Section 20.

There are environmental liabilities associated with the mining and processing activities. In order to minimize these environmental liabilities, NGM has secured all required environmental permits and conducts work in compliance with these permits. Additionally, NGM endeavors to comply with all applicable legal and other obligations.

4.11 Social Considerations

Social considerations for the Cortez Complex operations are discussed in Section 20.

4.12 QP Comments on “Item 4; Property Description and Location”

In the opinion of the QPs, the following conclusions are appropriate:

- Information from NGM’s legal and tenure experts supports that the mining tenure held is valid and is sufficient to support declaration of Mineral Resources and Mineral Reserves;
- Information from NGM’s legal and tenure experts supports that the required surface rights are held to allow surface and underground mining activities and construction of infrastructure to support those operations;
- Annual fee payments have been paid to the relevant regulatory authorities as required;
- Claims royalties are payable to a number of parties. Royalty rates are variable, depending on the deposit and receiving entity.
- Claims contributed by Barrick and Newmont are subject to a 1.5% net smelter returns royalty over the respective properties they contributed. Each of these “retained royalties” is only payable once the aggregate production from the properties subject to the royalty exceeds the publicly-reported Mineral Resources and Mineral Reserves as of December 31, 2018.

- The State of Nevada imposes a 5% net proceeds tax on the value of all minerals severed in the State;
- The State of Nevada Education funding tax, AB495, imposes a tax on gross revenue;
- Exploration activities to date have been conducted within the appropriate regulatory frameworks;
- Existing mining activities are supported under the current permits held by NGM (see Section 20);
- Additional PoOs will be required in support of planned activities at Goldrush. Future activities at Robertson would also require permitting.

To the extent known to the QP, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Project.

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

5.1 Accessibility

The Cortez Complex is reached by travelling approximately 32 mi east from Battle Mountain, Nevada, on US Interstate 80. Alternative access is from Elko, Nevada, approximately 45 mi west to the Beowawe exit, then approximately 35 mi south on Nevada State Route 306, which extends southward from US Interstate 80. Both US Interstate 80 and Nevada State Route 306 are paved roads.

The Cortez Complex is also crossed by a network of gravel roads, providing easy access to various portions of the operations. All roads are suitable for all weather conditions; however, in extreme winter conditions, roads may be closed for short periods for snow removal.

The Union Pacific Rail line runs parallel to US Interstate 80 to the north of the operations. Elko, the closest city to the operations, is serviced by daily commercial airline flights to Salt Lake City, Utah.

5.2 Climate

The Cortez Complex is situated in the high desert region of the Basin and Range physiographic province. Precipitation averages 15 cm per year, and is primarily derived from snow and summer thunderstorms. Summers are generally warm and winters are generally mild; however, overnight freezing conditions are common during winter. The mean annual temperature is 10°C and temperatures can range from a low of -39°C to highs of about 40°C.

Operations are conducted year-round.

5.3 Local Resources and Infrastructure

The Cortez Complex is located in a major mining region and local resources including labor, water, power, natural gas, and local infrastructure for transportation of supplies are well established. Mining has been an active industry in northern Nevada for more than 150 years. Elko (pop. 20,300) is a local hub for mining operations in northern Nevada and services necessary for mining operations are readily available. The majority of the NGM workforce lives in Elko, Carlin (pop. 2,400), Spring Creek (pop. 12,400), and Battle Mountain (pop. 3,600).

Currently, the major infrastructure for the Cortez Complex includes:

- Underground and open pit mine workings and associated facilities including mine ramps, conveyors, cemented rockfill plants, ventilation raises, maintenance shops, and mobile equipment fleets;

- Processing plants, heap leach facilities, and associated facilities such as laboratories, ore stockpiles, waste rock storage facilities (WRSFs), coarse ore storage, tailings storage facilities (TSFs), workshops, and warehouses;
- Facilities providing basic infrastructure to the mine, including administrative office complexes and associated facilities, electric power, water treatment and supply, sewage treatment, road and rail access;

More detail on the site infrastructure is provided in Section 18.

5.4 Physiography

The Cortez Complex is situated within the Great Basin, a part of the Basin and Range geological province. This environment is a high desert where there is relatively little precipitation.

The Cortez Complex is located at elevations between 1,370–2,270 metres above sea level (masl).

Vegetation consists primarily of shrubs and grasses, such as sagebrush, rabbitbrush, cheatgrass, and grama. Juniper trees, pinion pine, mountain mahogany, and a variety of grasses are also present. In general, vegetation is relatively sparse. The valley floor is sparsely vegetated while the mountain slopes have small pinion pine and juniper trees.

5.5 Seismicity

The Cortez Complex is located within a region classified by the United States Geological Survey (USGS) as having a moderate earthquake hazard. There is a 2.0% chance that an earthquake with a peak ground acceleration of 20–30% of gravity would occur within a 50-year period.

5.6 QP Comments on “Item 5; Accessibility, Climate, Local Resources, Infrastructure, And Physiography”

In the opinion of the QP, declaration of Mineral Resources and Mineral Reserves are supported by the following findings:

- The existing and planned infrastructure, availability of staff, existing power, water, and communications facilities, and methods whereby goods can be transported to the mining operations are well-established and well-understood by NGM given the decades of experience that Barrick and Newmont have from their previous mining operations in the Cortez Complex, and Carlin Trend;
- Within NGM's ground holdings, there is sufficient area to allow for the operation of all required project infrastructure, and sufficient room remains if expansions to the existing infrastructure are required;
- Mining operations are conducted year-round.

Surface rights to support current and planned mining operations is discussed in Section 4.5.

6.0 HISTORY

6.1 Exploration and Development History

Historical mining and exploration activity from 1862–1960 included small underground and surface gold mines.

A summary of the deposit discovery and development programs conducted over the life of the Cortez Complex to date is provided in Table 6-1. A summary of the mine operating periods is included as Table 6-2.

6.2 Production

Production records for the early mining operations are not well documented. The initial Hilltop mining phase, from 1915–1951, had approximate production of 18,000 ounces of gold, 360,000 ounces of silver, and subordinate amounts of lead, copper, and antimony.

Mining at Gold Acres started as an underground operation in 1935 and became an open pit operation after 1942, and was mined until 1961. Recovered ounces were not well documented; however, about US\$10 million in gold and silver is reported to have been extracted during that time.

Production for the period 1969 to 2021 is provided in Table 6-3:

- Production from 1969 to 2005 is total production, reported on a 100% basis, sourced from Barrick's corporate annual reports;
- Production from April to December 2006, 2007, and January to February 2008 is the Barrick interest only, at 60% of production. Barrick production at 100% is included from March 2008 to 2018;
- Production from the NGM JV is reported for 2019–2021.

Table 6-1: Exploration and Development History

Year	Operator	Comment
1862	Unknown	Silver mineralization discovered in quartzite at the western base of Mount Tenabo
1860s	Unknown	Discovered Hilltop deposit
1915–1951	Unknown	Underground mining at Hilltop
1920s	Unknown	Discovered Gold Acres deposit
1935–1960	Unknown	Mining at Gold Acres
1959	American Exploration & Mining Co. (AMEX)	Wholly owned US subsidiary of Placer Development Ltd. (subsequently Placer Dome Inc. (Placer Dome)) Lease-option agreement on the properties of the Cortez Metals Co. Explored mine workings and surrounding area.
1963	AMEX	Joint venture with Idaho Mining Corp
1964	AMEX	Formed the Cortez Joint Venture (Cortez JV) with the added participation of the Bunker Hill Co., Vernon F. Taylor, Jr., and Webb Resources Inc.
1966	USGS	Noted anomalous gold in altered outcrops at the base of the Cortez Range
	Cortez JV	Discovered Cortez deposit
1969	Cortez JV	Exploration drilling in Gold Acres area Construction of Cortez Mill No. 1
1976	Cortez JV	Discovered Horse Canyon deposits
1987	ECM, Inc. (ECM)	Overstaked Cortez JV placer claims with lode claims in Pipeline South area; leased claims to Royal Gold Inc. (Royal Gold)
	Royal Gold/Cortez JV	Formed the Royal/Cortez Joint Venture to resolve claim conflict
1987–1988	Cortez JV	Drilled Red Hill prospect, located southeast of the Horse Canyon deposits
1987–1989	Royal Gold	Conducted geophysical surveys and drilling programs, identifying low-grade gold mineralization
1990	Royal Gold	Addition of roasting circuit to Cortez Mill No. 1
1991	Cortez JV	Royal/Cortez Joint Venture terminated. Cortez JV leased Pipeline South area directly from ECM

Year	Operator	Comment
		Discovered Pipeline and Gap deposits
1996	Cortez JV	Construction of Cortez Mill No. 2 Used geochemical and geophysical surveys to guide deep reverse circulation (RC) drilling, initially focusing on an area immediately west of the Cortez Fault
1998	Cortez JV	Discovered Crossroads and Pediment deposits
1999	Cortez JV	Cortez Mill No. 1 placed on care and maintenance
2000	Cortez JV	Recommended drilling in Horse Canyon area, after identifying Wenban Limestone, a favourable mineralization host.
2002	Cortez JV	Discovered Cortez Hills deposit
2004	Cortez JV	Discovered Cortez Hills Lower Zone
2006	Barrick	Acquired Placer Dome, obtained 60% interest in Cortez JV
2008	Barrick	Initial mineral resource estimate at Red Hill. Commenced operations at Cortez–Pediment Acquired a 100% interest in Cortez JV by buying out remaining 40% interest held by Rio Tinto plc (Rio Tinto)
2009– 2015	Barrick	Drill campaigns established continuity of mineralization between Red Hill and what was initially named Goldrush (now referred to as the Meadow Domain) approximately 1.5 miles to the south
2016	Barrick	Acquisition of Robertson
2019	Barrick/Newmont	Established NGM JV
2021	NGM	Bulk sampling at Goldrush; completion of updated feasibility study at Goldrush.

Table 6-2: Operations History

Deposit	Duration	Note
Cortez Pits	1969–1972; 1988–1993	F-Canyon, Cortez, and Ada 52 pits
Gold Acres	1973–1976 (mining); 1976–1983 (treatment of stockpiles and dumps); 1987–1996 (mining)	South and North pits
Horse Canyon	1984–1987	North, South, South Extension pits
Crescent	1994–1997	Now part of Pipeline open pit
Pipeline	1997–2010, 2013–present	Phases 1–9, Phase 10
Cortez Hills	Cortez Hills underground (CHUG): 2008–present Cortez Hills open pit (CHOP): ore production 2009–2020	Underground production started in 2008. Open pit construction started in December 2008. First ore from CHOP produced in 2009.
Cortez–Pediment	2012–2017	Southern extent of CHOP

Table 6-3: Production History, 1969-2021

Year	Gold (000 oz)	Year	Gold (000 oz)	Year	Gold (000 oz)
1969	166	1990	54	2011	1,421
1970	209	1991	58	2012	1,370
1971	120	1992	77	2013	1,337
1972	190	1993	67	2014	901
1973	76	1994	70	2015	999
1974	104	1995	111	2016	1,058
1975	74	1996	161	2017	1,447
1976	28	1997	407	2018	1,265
1977	2	1998	1,138	2019	963
1978	2	1999	1,328	2020	799
1979	2	2000	1,010	2021	828
1980	8	2001	1,188		
1981	21	2002	1,082		
1982	25	2003	1,065		
1983	47	2004	1,052		
1984	49	2005	904		
1985	56	2006	427		
1986	62	2007	323		
1987	51	2008	428		
1988	42	2009	518		
1989	40	2010	1,140		

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

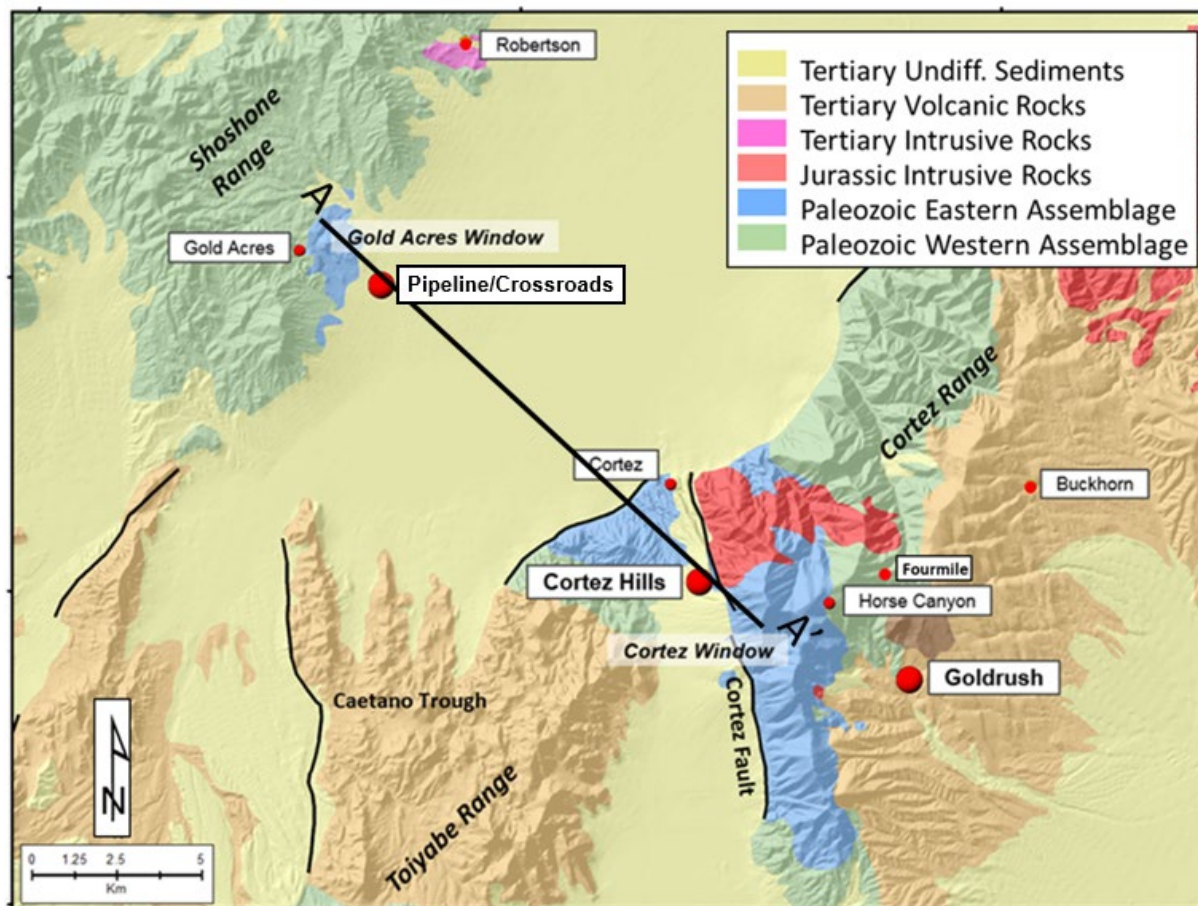
The geology of northern Nevada displays a complicated sequence of orogeny and tectonism, summarized from oldest to youngest (Stewart (1980) and Jory (2002)):

- Lower Paleozoic: From the Cambrian to Early Mississippian, the northern portion of Nevada was situated along a stable paleo-continental margin. A westward-thickening, prism-shaped sedimentary package was deposited from the outer margins of the paleo-continental shelf into an adjacent oceanic basin. The western sedimentary package predominantly consisted of siliciclastic rocks whereas the eastern portion of the sedimentary package consisted primarily of silty carbonate rocks;
- Late Devonian-Early Mississippian: Compressional tectonism associated with the Late Devonian to Middle Mississippian Antler Orogeny resulted in regional-scale folding and east-directed imbricate thrusting of the westernmost siliciclastic package (allochthonous upper plate) over the eastern carbonate package (autochthonous lower plate) along the Roberts Mountains Thrust. The accreted mass formed the Antler highlands. Erosion of the highlands during the Middle Mississippian to Early Pennsylvanian shed an easterly-directed overlap assemblage of clastic rocks;
- Mesozoic: Late Paleozoic tectonism during Early to Middle Pennsylvanian time (Humboldt Orogeny) was followed by deposition of shelf carbonate sequences during the Middle Mississippian to Early Pennsylvanian. A third period of resumed uplift and folding, possibly related to the Early Triassic Sonoma Orogeny, was followed by the Early Cretaceous Sevier Orogeny, a period of eastward-directed folding and thrusting. These uplifts were accommodated by the development of north–northwest-striking faults and associated north–northwest-trending upright folds;
- Late Jurassic: Late/post-Elko Orogeny plutonism included emplacement of the granodiorite stocks, dikes, and contact metamorphism;
- Eocene: Extension and magmatism with coeval main-stage (36–40 Ma) gold mineralization. Emplacement during the Tertiary of felsic to intermediate dikes and associated small epizonal intrusions; some associated volcanism;
- Miocene: 14–20 Ma basin-and-range extension occurred with north–south faulting, deposition of Carlin Formation volcanoclastic sediments in basins, and exposure of lower Paleozoic rocks.

The orogenic and tectonic events formed broad amplitude, northerly-plunging anticlines within carbonate assemblage rocks that are now preserved in uplifted tectonic windows. The Gold Acres window is in the west of the Project area and the Cortez window is in the east.

A regional geology plan is included as Figure 7-1.

Figure 7-1: Regional Geology Plan



Note: Figure prepared by NGM, 2021. The cross-section indicated by section line A-A' is provided as Figure 7-2.

7.2 Local Geology

7.2.1 Lithologies

A simplified geological cross-section of the Cortez Complex area is provided as Figure 7-2. A generalized stratigraphic column is included as Figure 7-3 for the Cortez area and in Figure 7-4 for the Robertson area. Gold deposits of the Cortez Complex are hosted by lower Paleozoic sedimentary rocks as shown in Table 7-1.

The Gold Acres window on the eastern flank of the Shoshone Range is buried to the east beneath the alluvial fill of Crescent Valley, is assumed to be offset by the Crescent Fault located on the south side of the valley near the Cortez Mine. South of the Crescent Fault is the Cortez window that is interpreted to be a continuation of the Gold Acres window. The Cortez window is an approximately 3–5 km wide, north–south-trending zone that extends from the margin of the Crescent Valley near the Cortez Mine to the south through the Cortez Hills area. All the Cortez Complex gold deposits discovered to date occur either within, or proximal to, these tectonic windows.

7.2.2 Structure

Most of the largest gold deposits within the Cortez Complex are proximal to the Roberts Mountain Thrust at the base of the allochthonous upper plate.

The stratigraphy is cut by a series of north–northwest, northwest, northeast, and north–northeast-striking high- and low-angle faults with extensive fracturing, brecciation, and folding. These faults both control and displace mineralization, with evidence for both dip-slip and oblique-slip displacements. Jurassic and Tertiary intrusive rocks utilized both high and low-angle faults as they intruded the Paleozoic section.

Cenozoic Basin-and-Range deformation most likely reactivated most faults in the area.

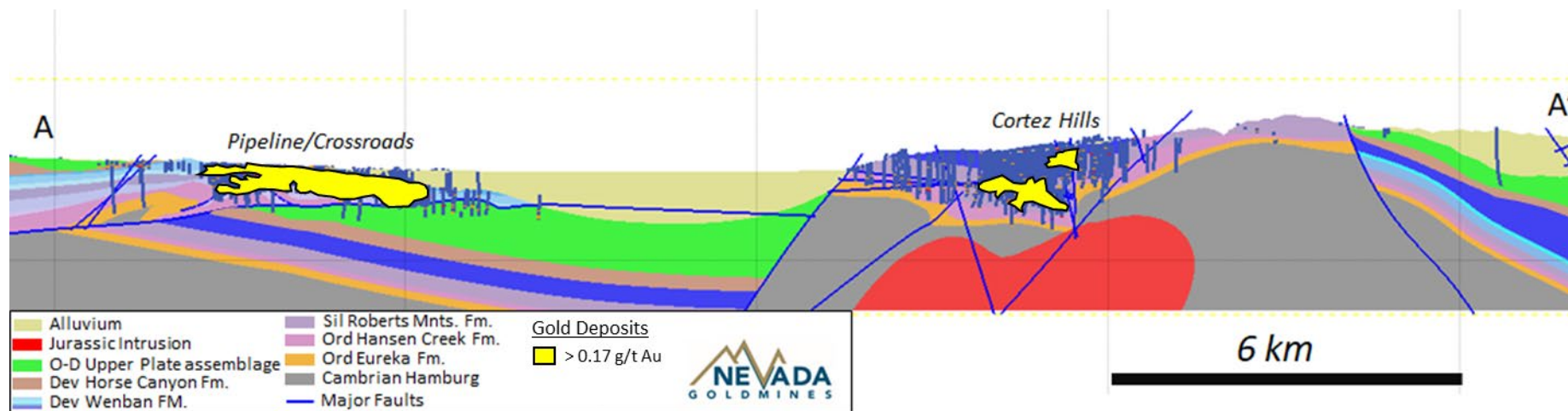
7.2.3 Weathering

Weathering has affected those deposits that are exposed on surface, resulting in oxide ores, which overlie the refractory sulfides. Weathering extends to about 60 m depth at Cortez.

7.2.4 Alteration

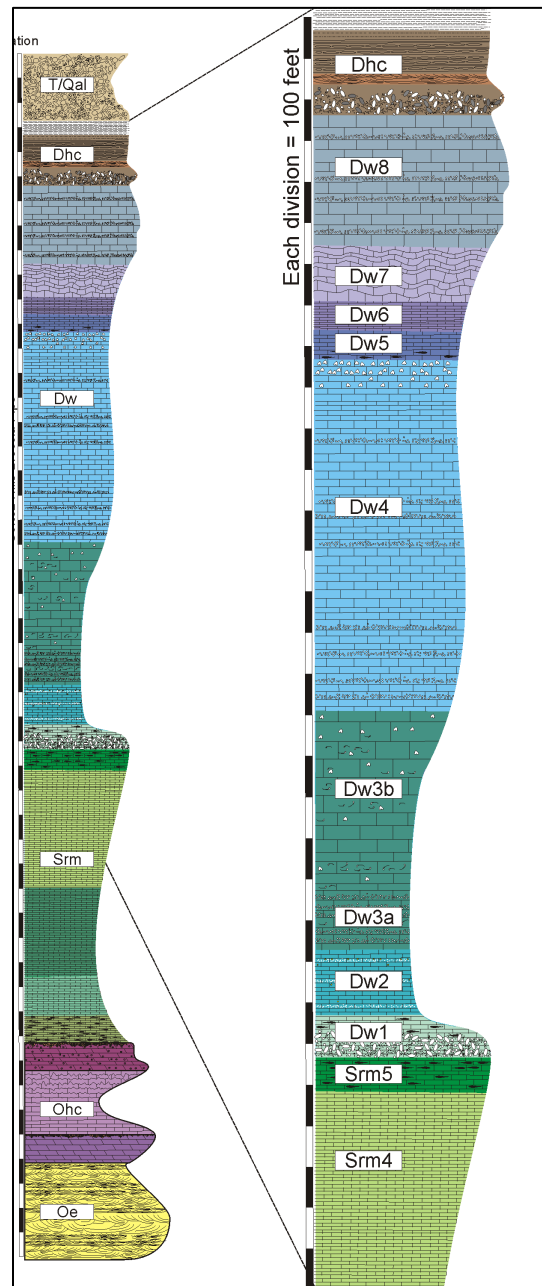
Replacement and breccia mineralization styles may be associated with decalcification and clay alteration, dissolution breccias, silicification, development of silicified or jasperoidal breccias, cataclastic breccias and disseminated replacement in Jurassic dikes. The alteration styles can occur together, can zone outwards from faults, and can occur singly, preferentially affecting stratigraphic horizons lateral to faults.

Figure 7-2: Regional Geological Cross-Section, Pipeline–Cortez Hills



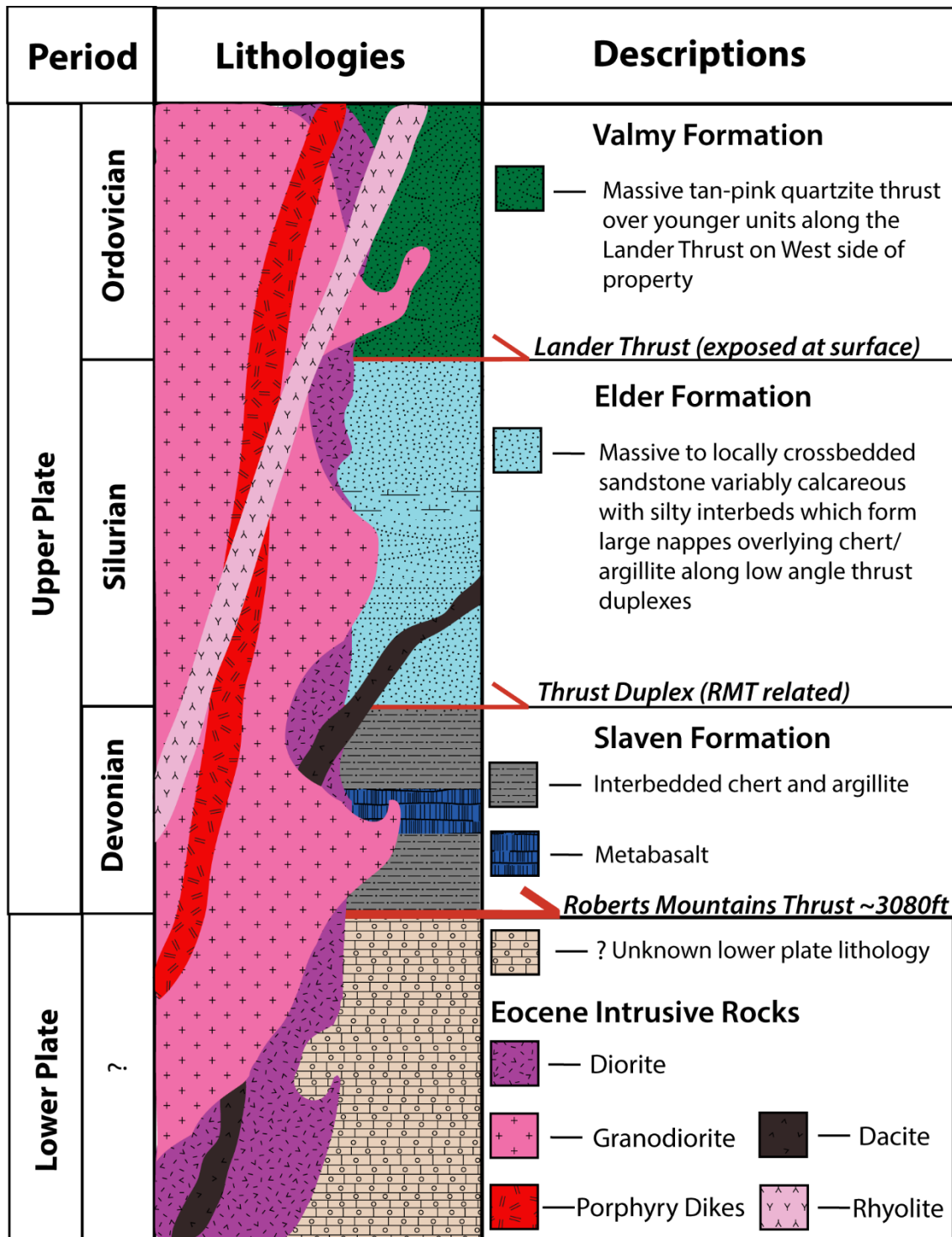
Note: Figure prepared by NGM, 2021. The location line of section line A–A' is shown in Figure 7-1.

Figure 7-3: Stratigraphic Column, Cortez Area



Note: Figure prepared by NGM, 2021. T/Qual = Tertiary/Quaternary alluvium; Dhc = Horse Canyon Formation; Dw = Wenban Formation; Srm = Roberts Mountain Formation; Ohc = Hanson Creek Formation, Oe = Eureka Formation. Numbers within formations refer to chronological formation subdivisions, e.g. Srm5 = the fifth lithological unit within the Roberts Mountain Formation. 100 ft as shown in scale = approximately 30.5 m.

Figure 7-4: Generalized Tectono-Stratigraphic Column, Robertson



Note: Figure prepared by NGM, 2021. 3,080 ft = approximately 939 m.

Table 7-1: Stratigraphic Table

Assemblage	Age	Formation	Abbreviation	Description	Mineralization Host
Eastern (autochthonous lower plate)	Devonian	Horse Canyon Formation (Rodeo Creek Formation equivalent)	Dhc	Siltstone, mudstone, chert and argillite	Pipeline, South Pipeline, and Crossroads Gap Cortez Hills
	Early Devonian	Wenban Formation	Dw	Limestone	Pipeline, South Pipeline, and Crossroads Gap Cortez Hills Gold Acres Toiyabe
	Silurian-Devonian	Roberts Mountains Formation	Srm	Silty, fossiliferous, and laminated limestones; sedimentary breccias	Pipeline, South Pipeline, and Crossroads Gap Cortez Hills Gold Acres Toiyabe
	Ordovician	Hanson Creek Formation	Ohc	Dolomite and silty limestone	NW Deeps
	Ordovician	Eureka Formation	Oe	Quartzite	—
	Cambrian	Hamburg Dolomite	Ch	Limestones and dolomites	—
Western (allochthonous upper plate)	Devonian	Slaven Formation	Ds	Chert with occasional thin interbeds of carbonaceous shale and limestone	Gold Acres, Robertson, Toiyabe

Assemblage	Age	Formation	Abbreviation	Description	Mineralization Host
	Silurian	Fourmile Canyon Formation	Sf	Chert, siltstone, argillite, and shale with a few thin beds of sandstone	—
	Silurian	Elder Formation	Se	Feldspathic silty sandstone, with interbeds of siltstone, tuffaceous shale, and thin chert	Robertson
	Ordovician	Valmy Formation	Ov	Massive quartzite and sandstone interbedded with chert, shale, siltstone, greenstone, and minor limestone	Hilltop Gold Acres
	Ordovician	Vinini Formation	Ovi	Bedded chert and interbedded quartzite and shale, alternating carbonaceous shale and quartz siltstone, and irregularly interbedded shale, siltstone, sandstone, and limestone, and tholeiitic volcanic rocks	—
Intrusive	Pliocene–Pleistocene	Dikes	Tri	Rhyolite	—
	Eocene	Porphyry	—	—	Hilltop Robertson
	Tertiary	Dikes and sills	—	Dacite and rhyodacite	—
	Jurassic–Cretaceous	Dikes	Tgr	Felsic and mafic intrusions	—
	Cretaceous	Gold Acres Stock	Tri	—	—
	Jurassic	Mill Canyon Stock	JKi	Biotite–quartz monzonite	—
Extrusive/volcaniclastic	Pliocene–Pleistocene	Flows	Ki	Rhyolite	—
	Pliocene	Flows	—	Basalt	—
	Oligocene	Caetano Tuff	Jgr	Water laid rhyolitic tuffs, together with lesser amounts of andesitic tuff, sandstone and conglomerate	—

Pervasiveness and intensity of alteration varies both within and between gold deposits, depending on magnitude of the mineralizing system, nature of the host rock, and structural preparation.

7.2.5 Mineralization

The favored host rocks for gold mineralization are the Wenban Formation, followed by the Horse Canyon, Roberts Mountain, and Hanson Creek Formations. Mineralization reflects an interplay between structural and lithological ore controls in which hydrothermal solutions from intrusions moved to favorable porous decalcified limestone.

Mineralization consists primarily of submicrometre- to micrometre-sized gold particles, very fine sulfide grains, and gold in solid solution in pyrite. Gold mineralization occurs disseminated throughout the host rock matrix in zones of silicified and decarbonatized, argillized, silty calcareous rocks, and associated jasperoids. Gold may occur around limonite pseudomorphs of authigenic pyrite and arsenopyrite.

Major ore minerals include native gold, pyrite, arsenopyrite, stibnite, realgar, orpiment, cinnabar, fluorite, barite, and rare thallium minerals.

Gangue minerals typically comprise fine-grained quartz, barite, clay minerals, carbonaceous matter, and late-stage calcite veins.

Gold in oxidized ore is present as native gold. In unoxidized ores, gold occurs as fine-grained particles in pyrite, as coatings on pyrite grains and as sparse <1 µm grains locked in hydrothermal quartz.

7.3 Deposit Descriptions

The main deposits in the Cortez Complex are discussed in the following sub-sections, in alphabetical order.

7.3.1 Cortez

The original Cortez deposit is mined out. The Cortez NW Deep deposit is a continuation of the mineralization that was mined in the Cortez pit.

7.3.1.1 Deposit Dimensions

Cortez mineralization occurs approximately between elevations 1,630–1,240 m, is approximately 400 m wide northeast–southwest by 1,219 m long northwest–southeast, and ranges in thickness from approximately 90–455 m.

7.3.1.2 Deposit Setting

Mineralization is hosted within the Roberts Mountains Formation and the Hanson Creek Formation.

A series of north–northwest trending and northeast trending faults cut the lithologies, with mineralization forming where these faults intersect shallow east-dipping thrust breccia zones (thrust duplexes).

Most of the Cortez NW Deep higher-grade gold mineralization (<3.43 g/t Au) occurs in two zones lying between the 1,280–1,325 m elevations beneath the old Cortez open pit floor. One zone consists of an oxidized and strongly altered thrust zone within the Roberts Mountains Formation and the other is an unoxidized, sulfide-bearing thrust zone at the top of the Hanson Creek Formation.

Numerous Oligocene, post-mineralization, quartz porphyry dikes and sills intrude the deposit.

The primary alteration style is silicification, which forms massive fault fill, bedding replacements after decalcification and occurs as micro-veinlets.

Oxidation is pervasive at the 1,430 m elevation.

7.3.1.3 Mineralization

Mineralization becomes dominantly refractory at about 1,280–1,325 m elevation.

Breccia gold mineralization is hosted in hydrothermally brecciated and fractured rocks that are spatially associated with the WSW dipping faults and attendant structures. Altered, matrix-supported breccia bodies contain the highest gold grades and are surrounded by “crackle” breccias and highly-fractured rock with moderate gold grades continuing outwards to less-fractured rocks with lower grades. Most of the Breccia mineralization dips moderately southwest enveloping the west–southwest-dipping faults.

Figure 7-5 shows a geology plan for the Cortez deposit, and Figure 7-6 is a cross-section through the deposit.

7.3.2 Cortez Hills

The Cortez Hills Complex consists of two in-situ and connected Carlin-type orebodies with differing geometries and an exotic satellite deposit (Pediment deposit) that was eroded and re-deposited adjacent to the sub-cropping Cortez Hills orebody. The Pediment deposit and the open pit portion of Cortez Hills are mined out.

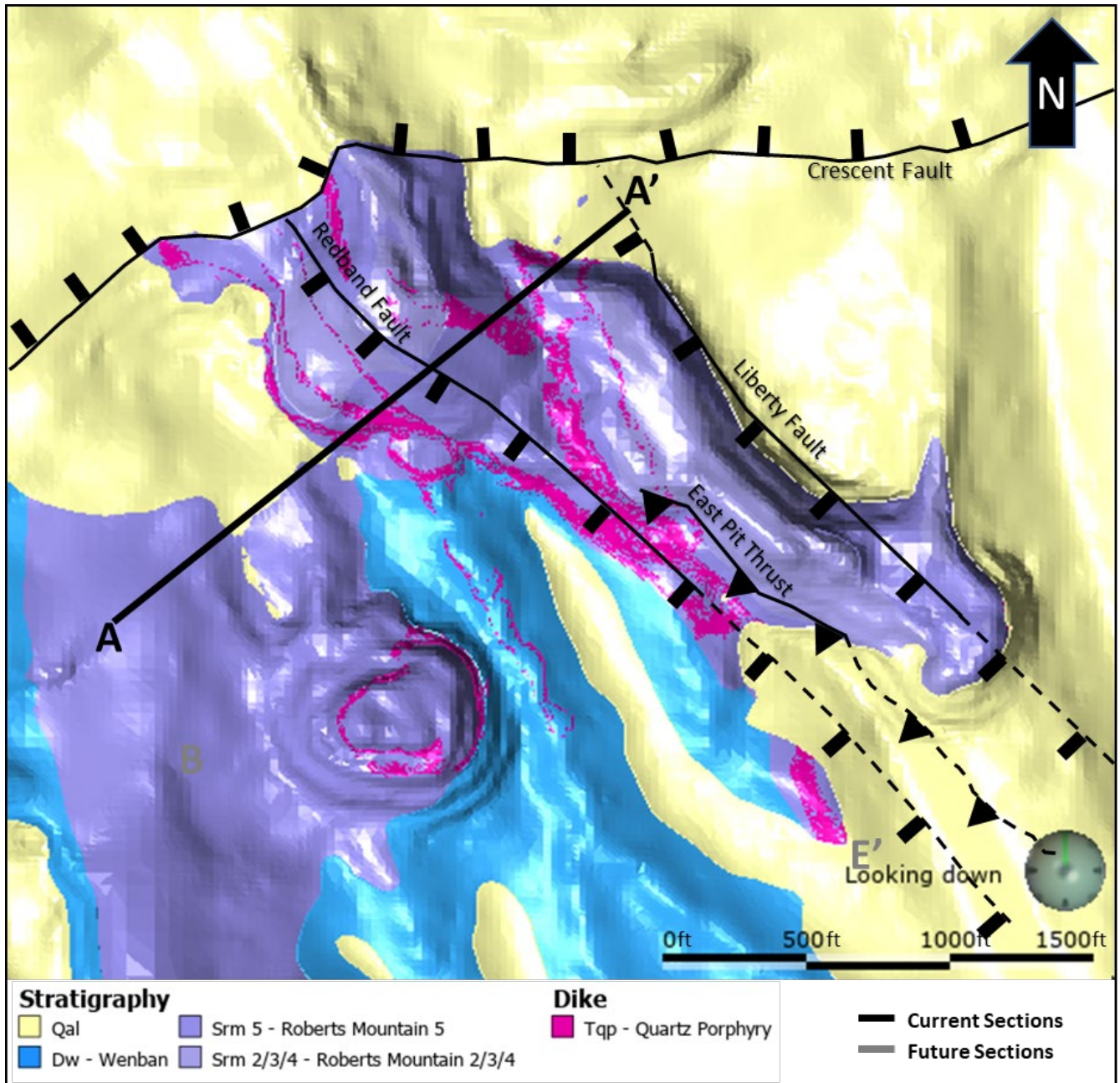
The underground portion of the Cortez Hills deposit consists of the Breccia Zone, the Middle Zone and the Lower Zone (subdivided into Lower Zone A, B, C and D).

7.3.2.1 Deposit Dimensions

The conical-shaped Breccia Zone mineralization extends from a near surface elevation of 1,783–1,240 m, terminating just east of the Middle Zone. It is approximately 300 m wide with a northwest trend, and varies in width from 75–580 m.

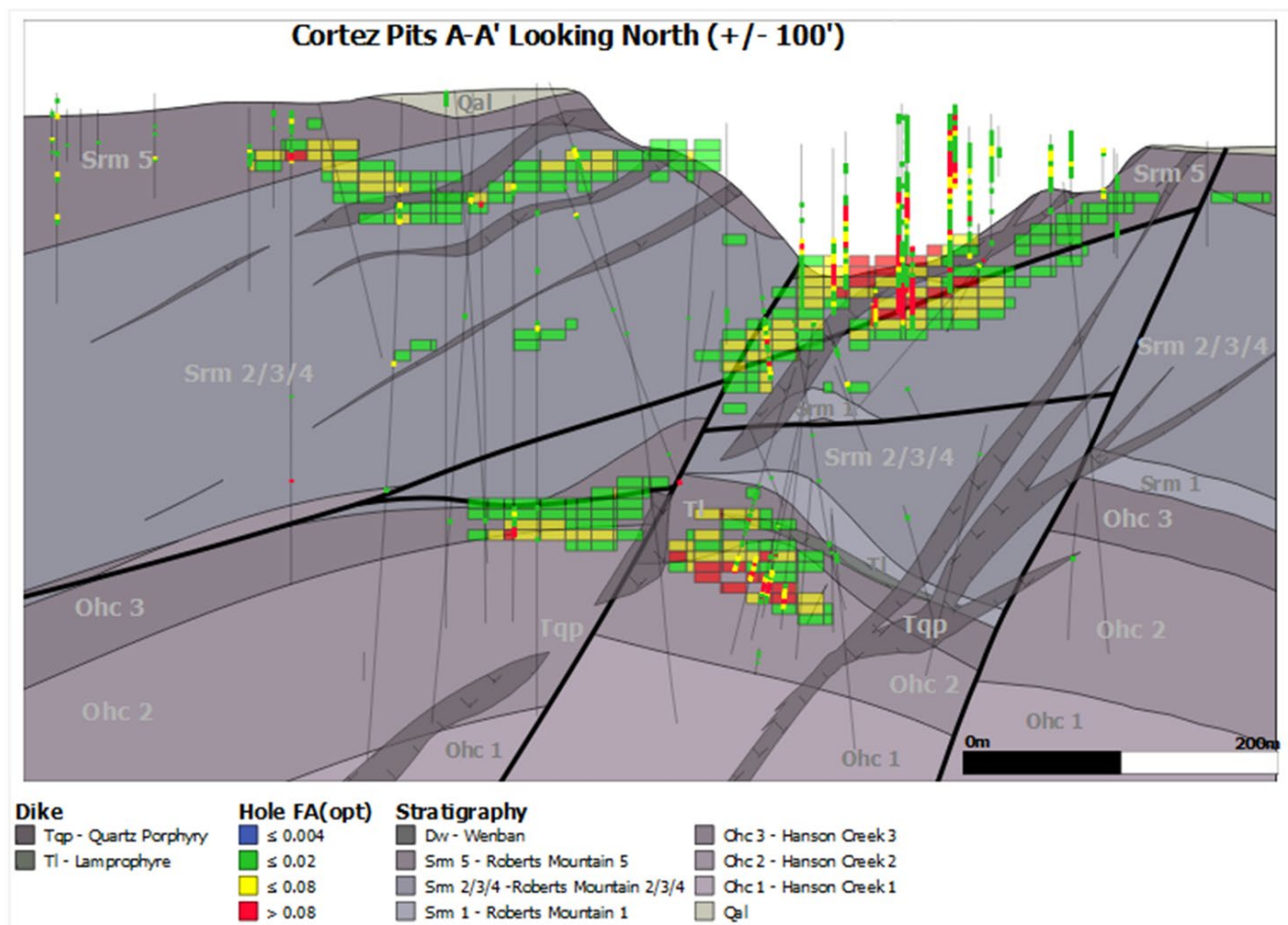
The Middle Zone occurs between elevations 1,318–1,166 m, is approximately 550 m wide northwest–southeast by 400 m long northeast–southwest, and ranges in thickness from 3–80 m.

Figure 7-5: Geology Plan, Cortez



Note: Figure prepared by NGM, 2021. Note: 500 ft = 152 m approximately.

Figure 7-6: Cross-section Showing Drilling in Relation to Mineralization, Cortez



Note: Figure prepared by NGM, 2021.

The Lower Zone lies at an elevation of 1,298 m to the northwest and 933 m to the southeast, extends 1,310 m northwest–southeast, varies in width from 440 m in the north to 150 m in the south, and ranges in thickness from 20–80 m. An emerging area below Lower Zones C and D has mineralization extending to 759 m elevation along the Hanson Fault.

Both the Middle and Lower Zones are open to the northwest and southeast.

The Pediment deposit covered an area of 900 m x 180 m, ranged in elevation from 1,785–1,615 m, and was about 75 m thick.

7.3.2.2 Deposit Setting

The Breccia Zone mineralization in the Cortez Hills deposit is hosted in the Wenban and Horse Canyon Formations. The Voodoo fault, a southwest-dipping fault complex controls the location of gold mineralization hosted in breccias.

At depth, mineralization in the Middle and Lower Zones is also hosted by the Roberts Mountain and Hanson Creek Formations. The host stratigraphy has been deformed by thrust faulting leading to both folding and fracturing. The Lower Zone has a distinct northwest–southeast trend in the Roberts Mountain and Hanson Creek Formations that is interpreted as the crest of a plunging antiform. The Lower Zone mineralization is localized along the north–northwest-trending intersection of a complex low angle structural zone, the Ponderosa fault zone, and a steeply west-dipping, north–northwest-striking dike swarm.

Mineralization is associated with the Hanson Fault and its splays in an emerging part of the lower zone below the Ponderosa Fault.

The Pediment deposit was a landslide deposit derived from an in situ, sediment-hosted deposit, and was covered by non-mineralized colluvium.

Post-mineral quartz porphyry dikes and sills intrude the Cortez Hills deposits. A northwest-trending swarm of steeply dipping dikes defines the limits between the Middle and Lower Zones.

Gold is associated with zones of decarbonatization and local silicification. Mineralization can also be associated with zones of calcite veining.

7.3.2.3 Mineralization

Breccia gold mineralization is hosted in hydrothermally brecciated and fractured rocks that are spatially associated with the Voodoo Fault and its attendant structures. Altered, matrix-supported breccia bodies contain the highest gold grades and are surrounded by “crackle” breccias and highly fractured rock with moderate gold grades continuing outwards to less-fractured rocks with lower grades. Most of the Breccia mineralization dips moderately southwest enveloping the Voodoo Fault.

Mineralization within the Middle and Lower Zones lies at depth to the west and southwest of the Breccia Zone, occurring as tabular, sub-horizontal to shallow dipping zones.

Mineralization in the Lower Zone is typically refractory in the north, transitioning to dominantly oxide as the zone plunges deeper to the south.

Figure 7-7 shows a geology plan for the Cortez deposit, Figure 7-8 is a cross-section through the deposit, and Figure 7-9 shows the locations of the major mineralized zones in the underground operations.

7.3.3 Crossroads

7.3.3.1 Deposit Dimensions

Crossroads is to the south of, and along strike with, the Pipeline deposit, but is at a greater depth, consistent with the south–southeasterly dip of the host formations into the basin.

The deposit has dimensions of 1,700 m by 500 m along strike and extends from about 1,320 m to 890 m in elevation above sea level.

7.3.3.2 Deposit Setting

The Crossroads deposit consists of two mineralized zones: an upper stratiform zone along the Horse Canyon–Wenban Formation contact and a deeper zone controlled by an east–northeast-striking, west dipping (20° to 25°) structural zone that cuts across stratigraphy.

Mineralization is controlled by a set of primary low-angle structures that dip shallowly to the SW and by second-order relays between these thrusts. These faults functioned to concentrate fluids in chemically- and structurally-susceptible facies in the Horse Canyon, Wenban, and Roberts Mountain formations. Mineralized zones are characterized by decalcification and intense fracturing or shattering, with the oxidized zone being primarily dependent upon elevation. Oxidation extends to depths in excess of 400 m from surface.

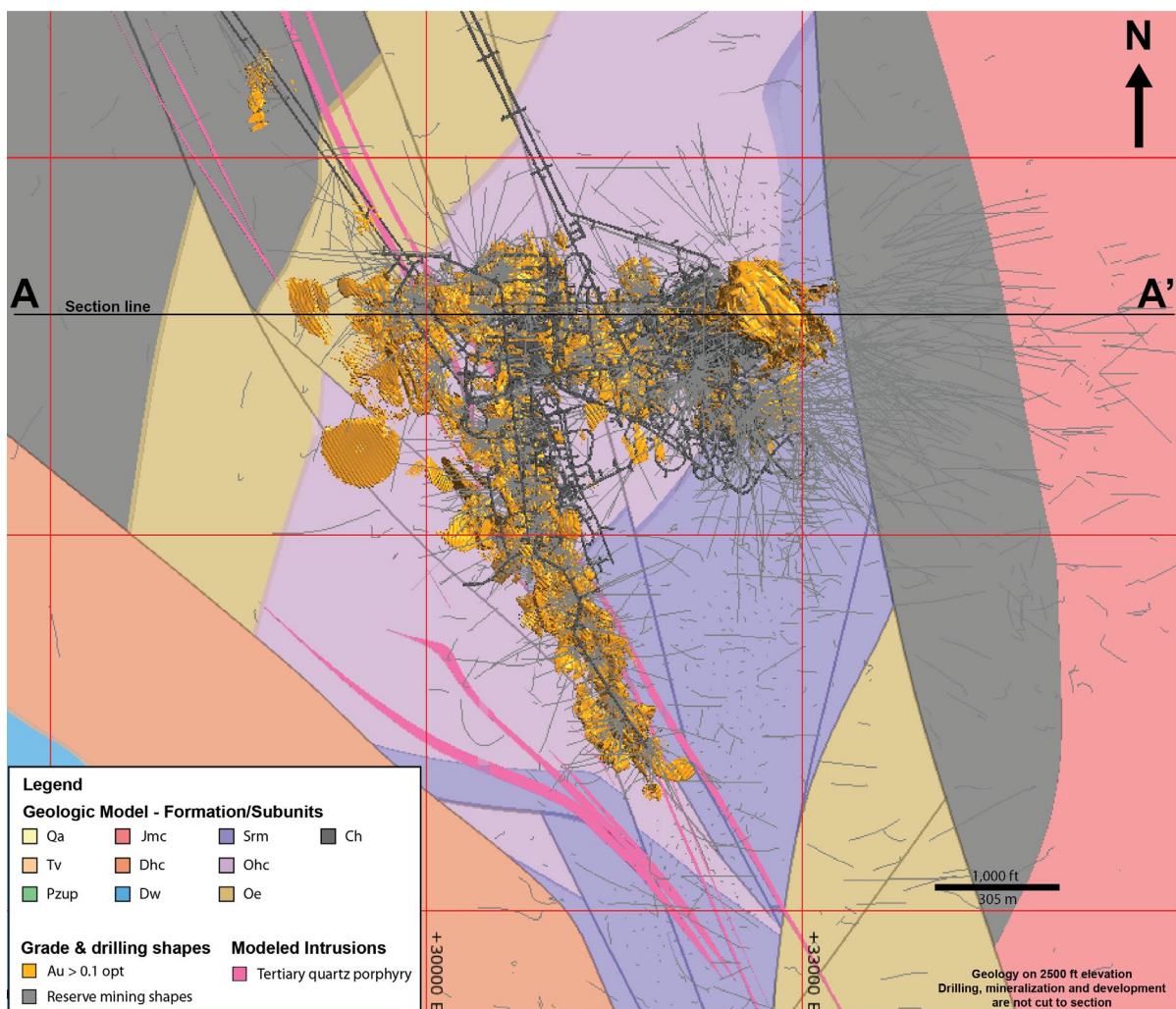
Alluvial cover ranges from 96–235 m over the Crossroads deposit.

7.3.3.3 Mineralization

Gold mineralization is associated with anomalous arsenic, antimony, and thallium. Gold occurs in solid solution within arsenian rims on hydrothermal pyrite in primary ore, and as sub-micron sized free gold particles in ores which have been oxidized. Common gangue minerals include pyrite, abundant calcite, oxide and arsenate minerals, as well as clays.

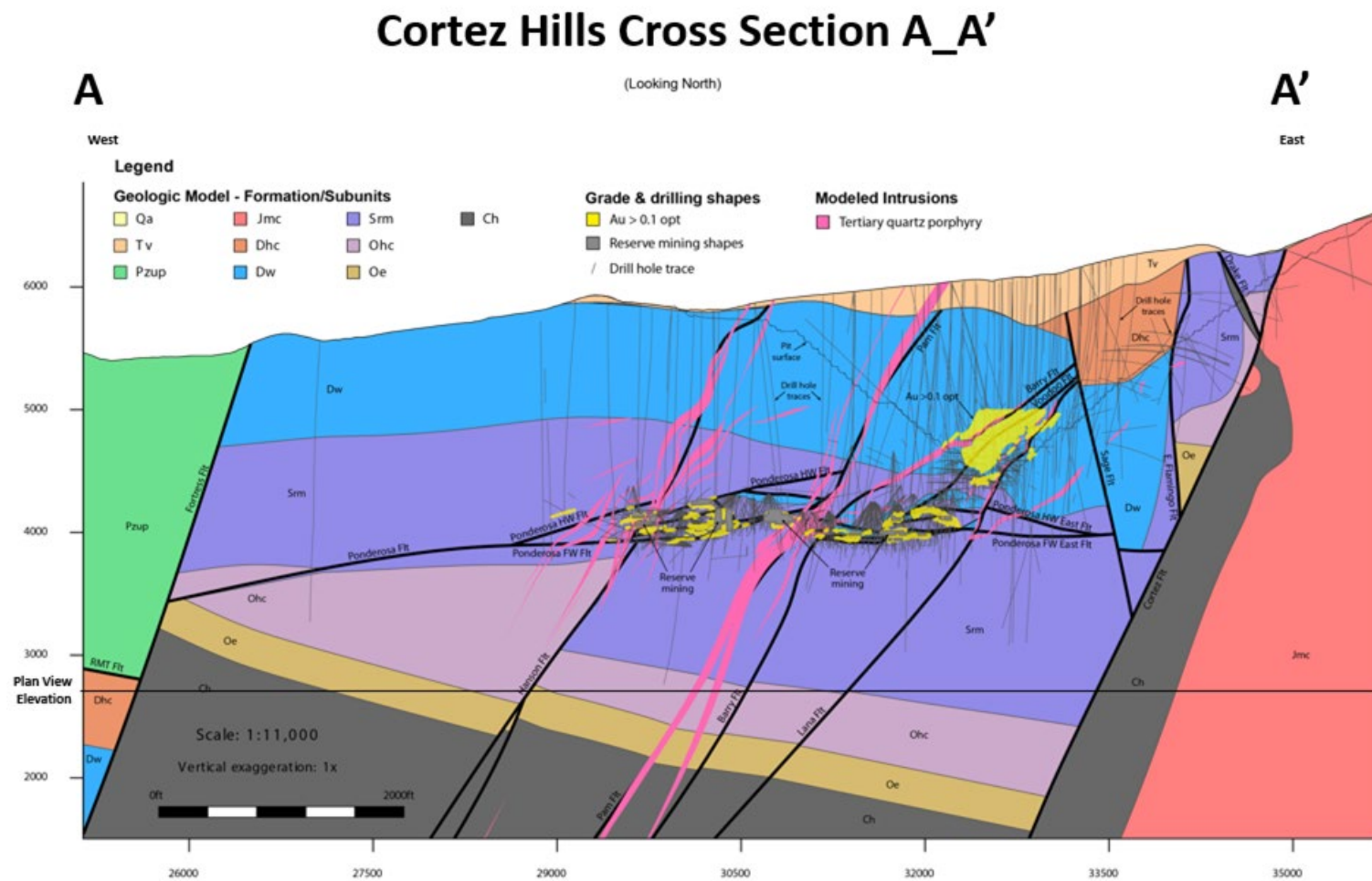
Figure 7-10 shows a geology plan for the Crossroads deposit, and Figure 7-11 shows the final pit outline in relation to the ore-controlling structures. Figure 7-12 is a cross-section showing the orientation of the mineralization in relation to the drilling.

Figure 7-7: Geology Plan, Cortez Hills



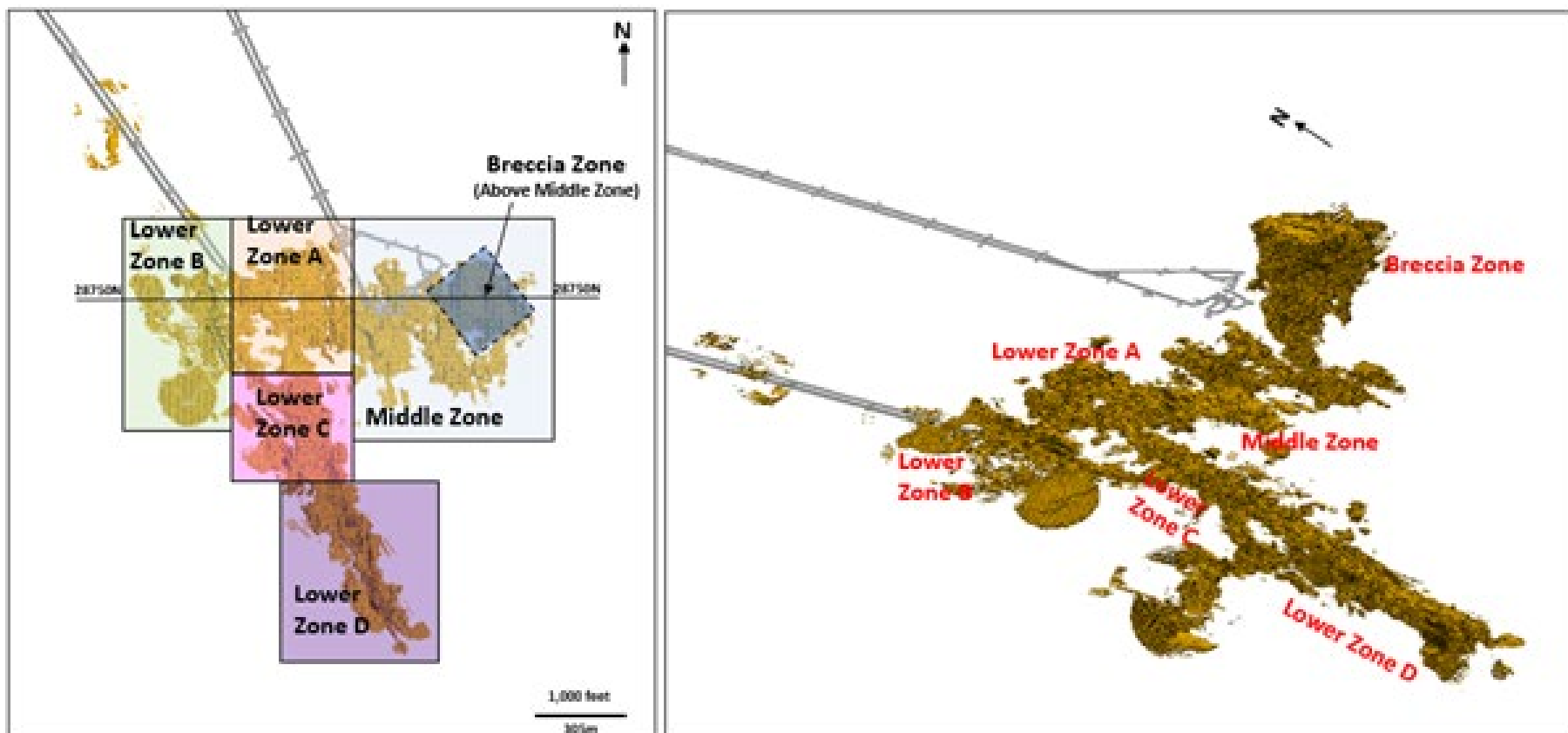
Note: Figure prepared by NGM, 2021. Figure shows geology at the 762 m elevation with drill hole traces, underground development and mineralization.

Figure 7-8: Cross-section Showing Drilling in Relation to Mineralization, Cortez Hills



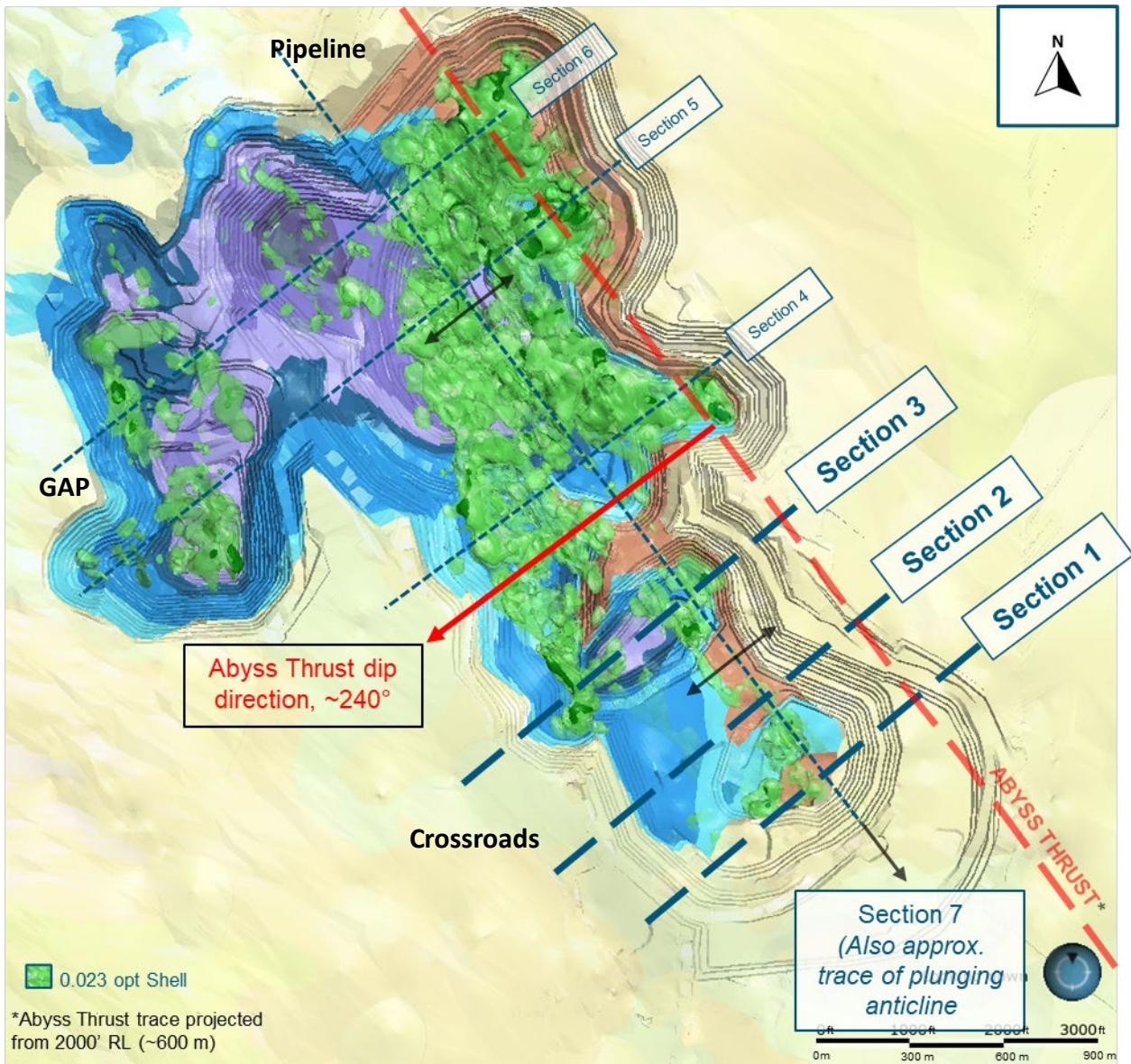
Note: Figure prepared by NGM, 2021. Figure shows geological formations, pit outline, and mineralization.

Figure 7-9: Plan and Isometric Views, Underground Mineralization, Cortez Hills



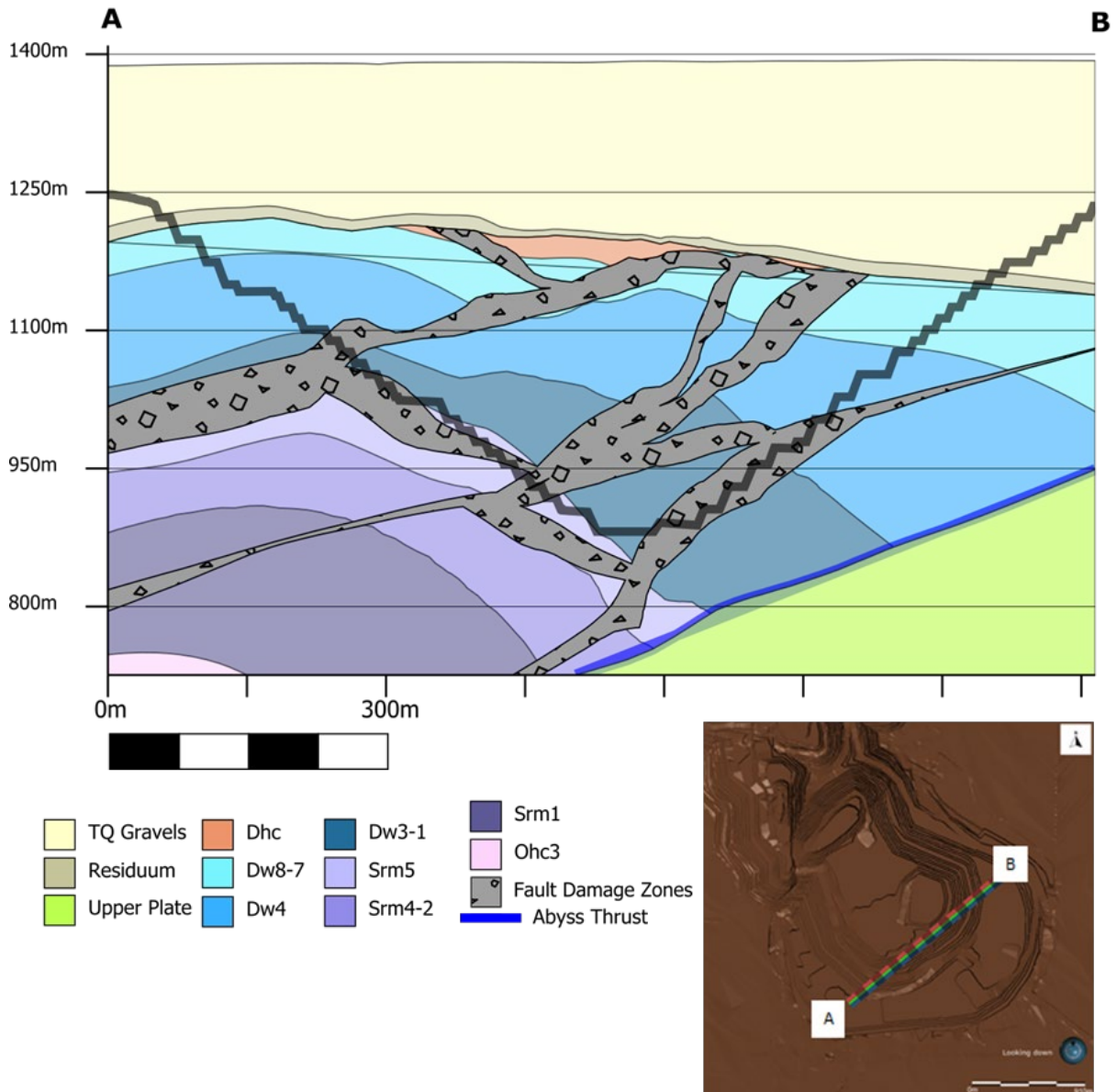
Note: Figure prepared by NGM, 2021. Figure shows the major mineralized zones.

Figure 7-10: Geology Plan, Crossroads



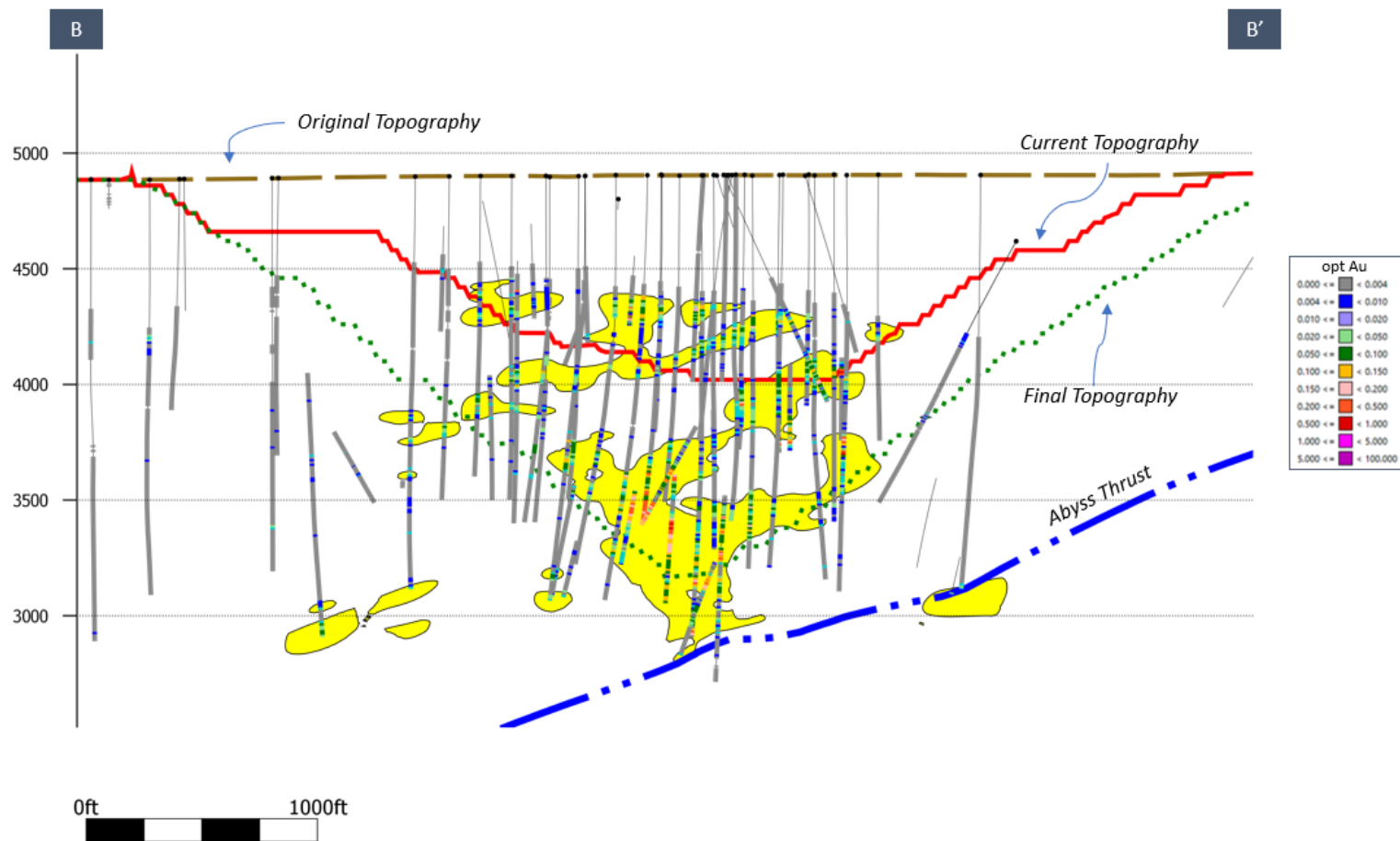
Note: Figure prepared by NGM, 2021. Type Section 1 line is the location of Figure 7-11.

Figure 7-11: Cross-section Showing Pit Outline in Relation to Mineralization, Crossroads



Note: Figure prepared by NGM, 2021. Section line is shown on Figure 7-10 as Type Section 1.

Figure 7-12: Cross-Section, Crossroads



Note: Figure prepared by NGM, 2021. Figure is oriented southwest-northeast, and cut perpendicular to the Abyss thrust.

7.3.4 Gold Acres

7.3.4.1 Deposit Dimensions

The Gold Acres deposit lies just to the north-west of the Pipeline Open Pit, in an exposed window of the upper plate of the Roberts Mountain Thrust.

The deposit has dimensions of 450 m by 900 m along strike and extends from approximately 1,650 m to about 1,430 m in elevation above sea level.

7.3.4.2 Deposit Setting

Mineralization is primarily hosted in silty limestones of the Roberts Mountains Formation, with lesser mineralization developed in the Slaven Chert and Valmy Formation. The units are intruded by an Early Cretaceous granite centred approximately 1.6 km to the southwest of the deposit, based on a magnetic high, and by Tertiary quartz porphyry dikes.

The controlling structure on the mineralization is an imbricate shear associated with the Roberts Mountain Thrust. Northeast trending normal faults appear to have influenced the distribution of alteration and mineralization.

Alteration includes carbon enrichment, silicification, argillization, and oxidation. Two skarn zones have developed above and below the imbricate shear.

7.3.4.3 Mineralization

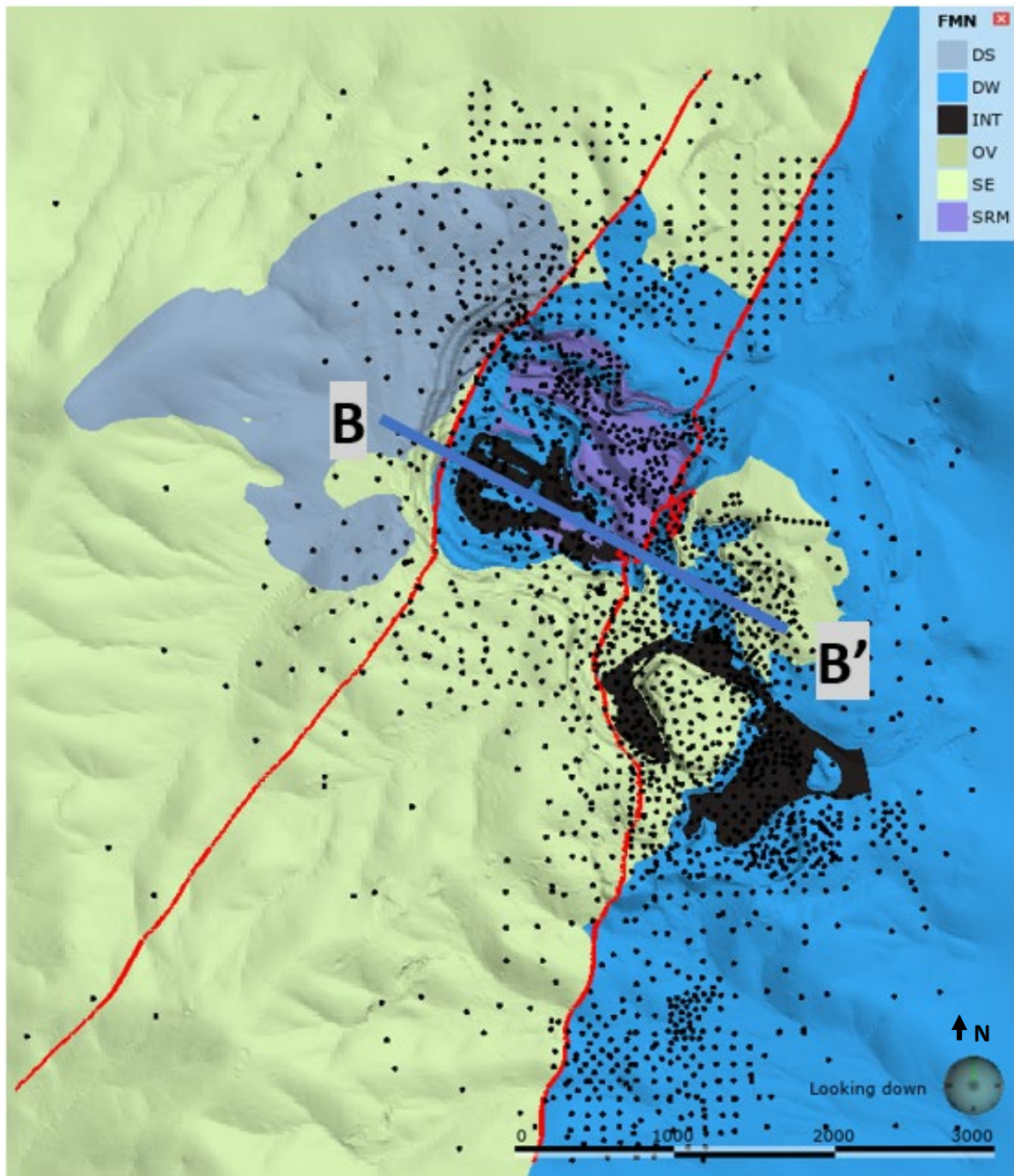
Two mineralizing phases are recognized. The first consists of skarn calc-silicates and sulfide assemblages; the second comprises gold mineralization within the imbricate fault zone. Some gold was also deposited in the high angle structures and along the Roberts Mountains Thrust above the imbricate fault zone.

Gold is present as disseminated submicroscopic particles.

Gangue minerals include pyrite, calcite, quartz, melanterite, azurite, jarosite, realgar and various base metal sulfides and calc-silicate minerals related to the skarns.

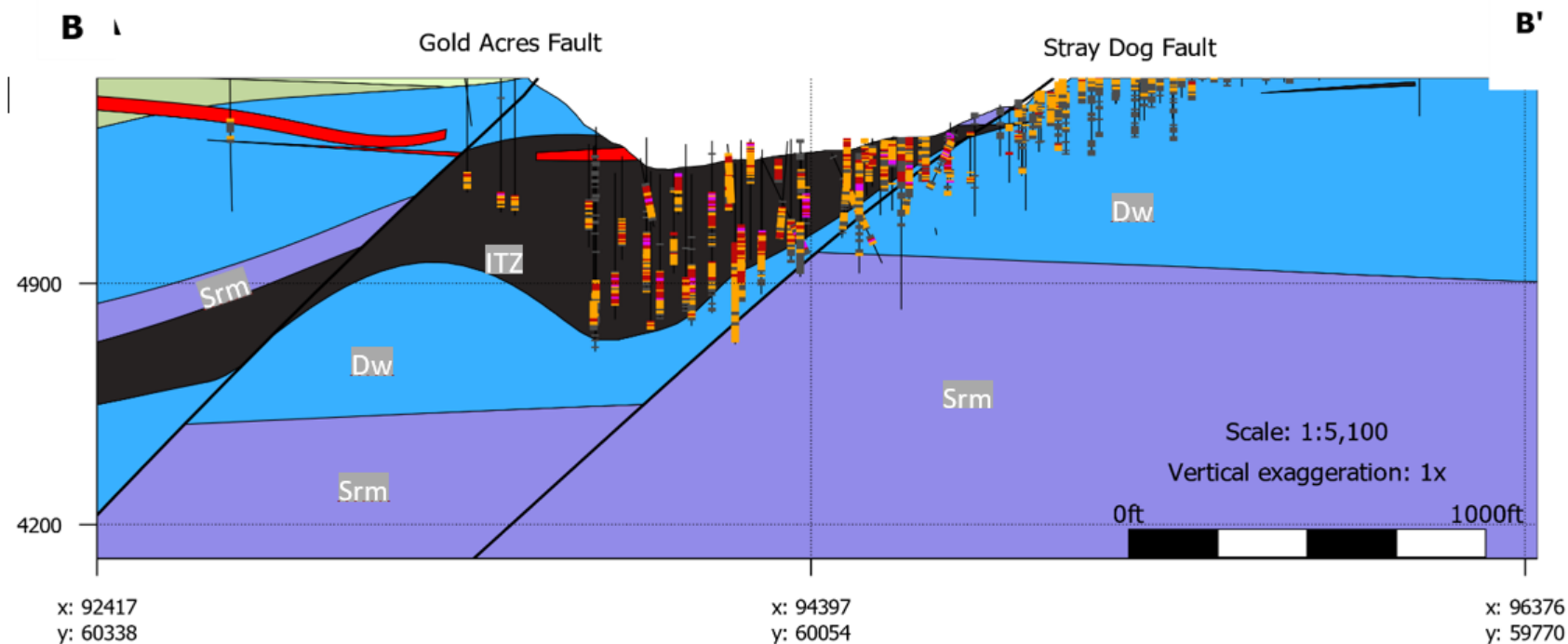
Figure 7-13 shows a geology plan for the Gold Acres deposit, and Figure 7-14 is a cross-section through the deposit.

Figure 7-13: Gold Acres Geology Plan



Note: Figure prepared by NGM, 2021. DS = Slaven Formation; DW = Wenban Formation; INT = intrusive ; OV = Valmy Formation; SE = Elder Formation; SRM = Roberts Mountain Formation. Section line B–B' is shown in Figure 7-14.

Figure 7-14: Gold Acres Cross-section Showing Drilling in Relation to Mineralization



Note: Figure prepared by NGM, 2021. DW = Wenban Formation; ITZ = imbricate thrust zone; SRM = Roberts Mountain Formation. Location of section line shown in Figure 7-13.

7.3.5 Goldrush

7.3.5.1 Deposit Dimensions

Exploration currently reveals that the deposit has a maximum thickness of 76 m, a width of about 425 m, and extends along strike for approximately 5,275 m. The deepest significant intercept is currently at 1,435 masl. The Goldrush system remains open to the north into Fourmile, to the southeast, and in multiple directions in the Ken Balleweg (KB) Domain.

7.3.5.2 Deposit Setting

Exploration to date shows that mineralization at Goldrush is primarily stratigraphically controlled, occurring within subunit 5 of the middle Wenban Formation and to a lesser extent along the contact between the Horse Canyon and Wenban formations.

Mineralization is associated with low-angle thrust faults and their related hanging wall antiforms that typically concentrate gold along fold hinges and/or east-dipping limbs. Gold occurs within extensive zones of decarbonatization and silicification within the Devonian rocks.

The system is marked by a large stratiform silicified and sulfidized breccia horizon from 15–70 m thick that extends more than 7,000 m on a north–northwesterly strike.

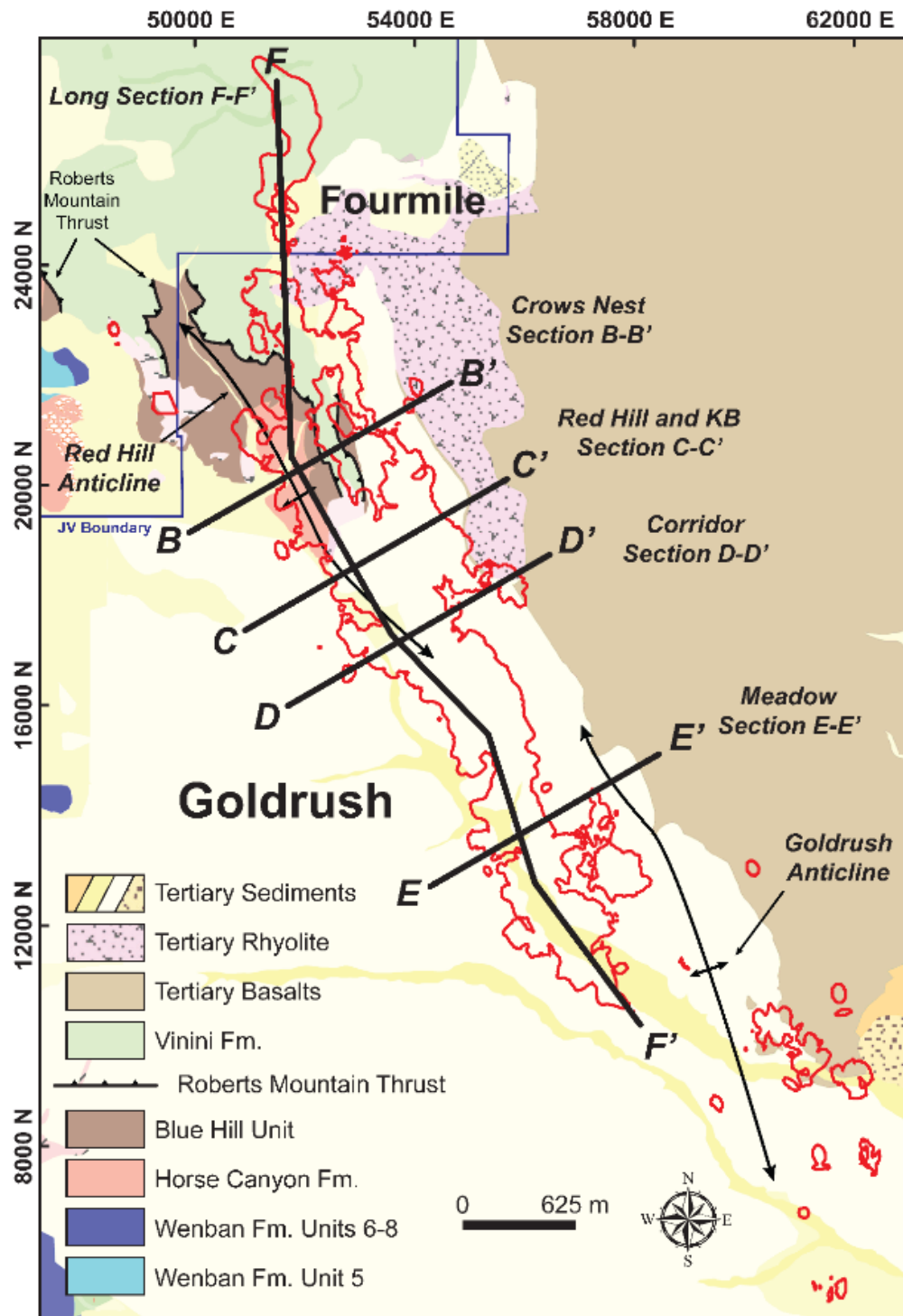
7.3.5.3 Mineralization

The main gold-bearing mineral is micrometre-sized arsenian pyrite that occurs as individual grains or as rims on pre-existing pyrite. Mineralization is primarily double-refractory and highly preg-robbing with both sulfides and active carbon present in the orebody. Mineralization exhibits low Ag:Au ratios with enrichment in arsenic, antimony, mercury, and thallium, and low base metal contents.

Seven mineralized domains are defined, from north to south, Crow's Nest, Red Hill, KB North, KB South, 3½, Ranch, and Meadow.

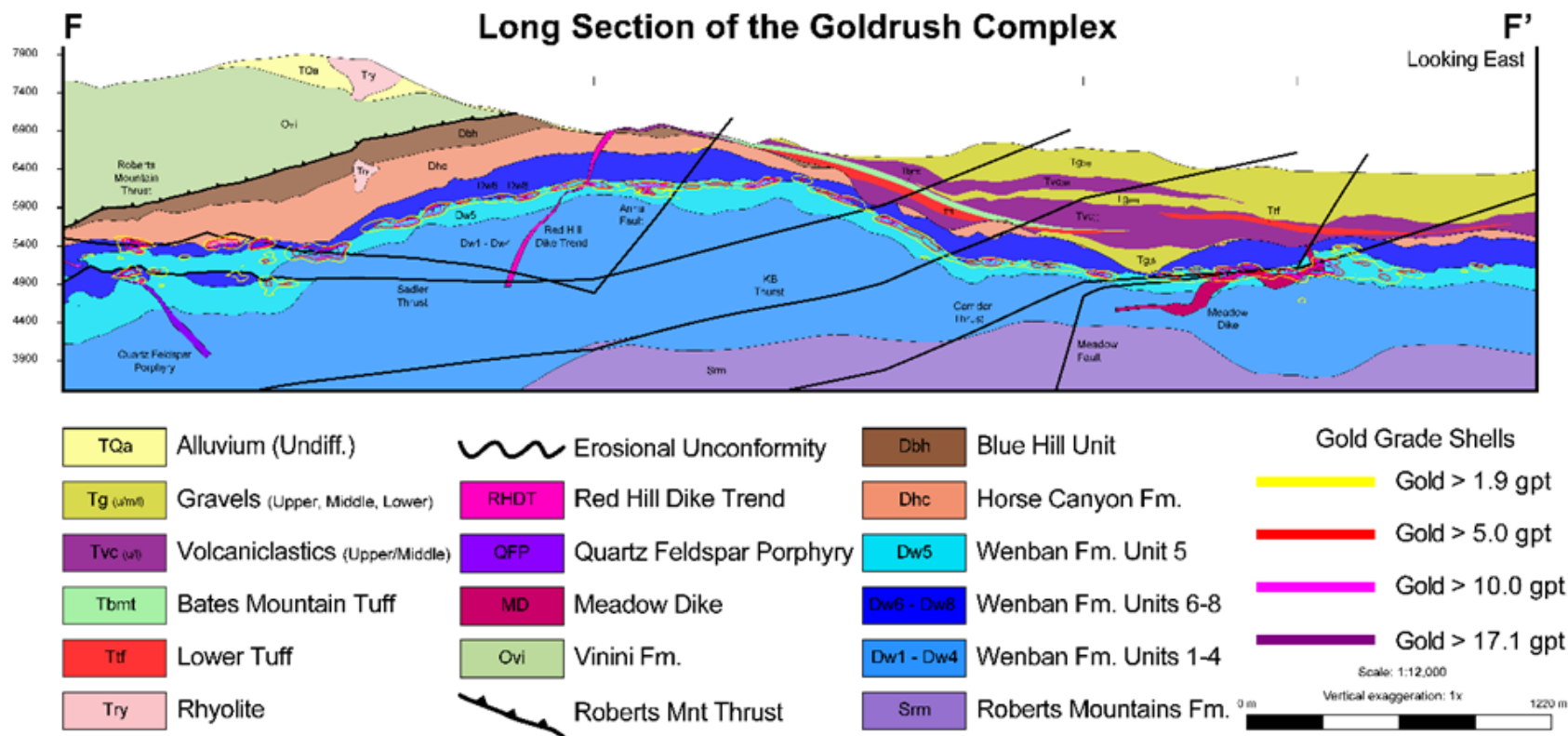
A geology plan is provided in Figure 7-15. A long section is included as Figure 7-16. An example cross-section for the Crow's Nest area is provided in Figure 7-17. A type section for the Goldrush area is provided in Figure 7-18.

Figure 7-15: Geology Plan, Goldrush



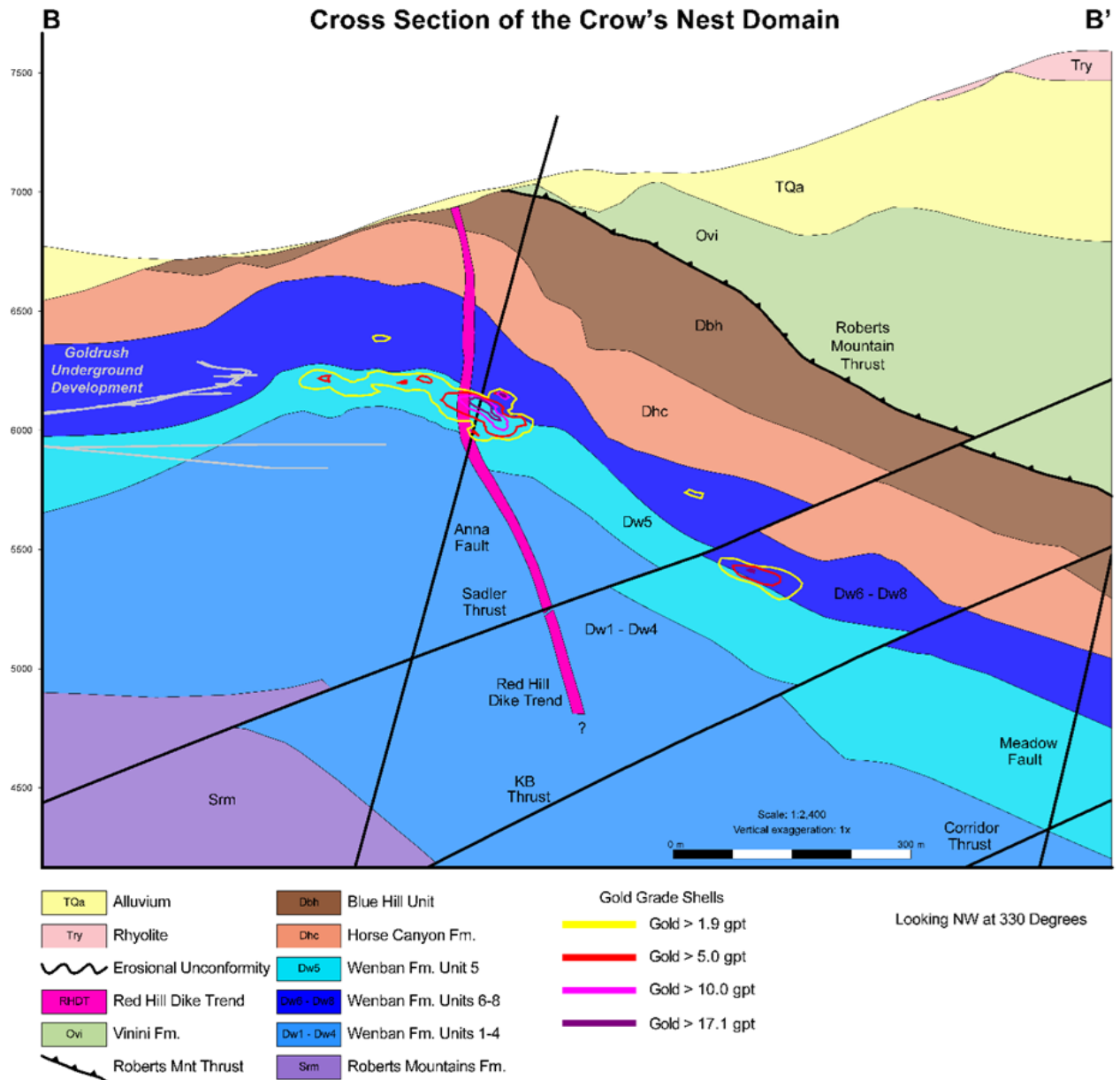
Note: Figure prepared by NGM, 2021. Section line F-F' is the location of Figure 7-16. Section line B-B' is the location of Figure 7-17. Red polygons show footprint of mineralization.

Figure 7-16: Long Section Showing Drilling in Relation to Mineralization, Fourmile–Goldrush



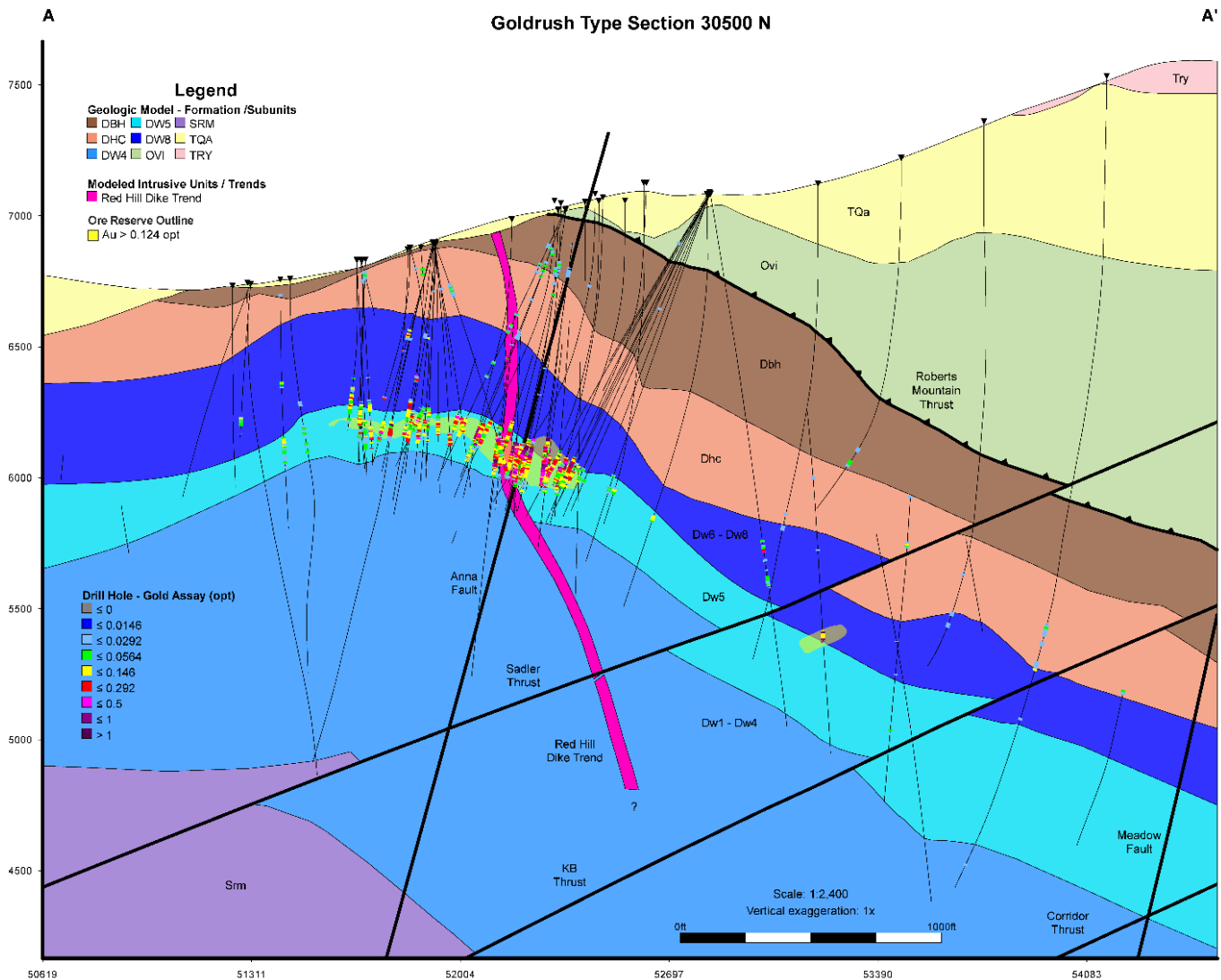
Note: Figure prepared by NGM, 2021. Section corresponds to line F-F' on Figure 7-15.

Figure 7-17: Cross-section Showing Mineralization Distribution, Goldrush Crow's Nest Domain



Note: Figure prepared by Nevada Gold Mines, 2021. Section is line B-B' on Figure 7-15.

Figure 7-18: Goldrush Type Section



Note: Figure prepared by Nevada Gold Mines, 2021.

7.3.6 Pipeline

7.3.6.1 Deposit Dimensions

The main Pipeline deposit is a 15–90 m thick, tabular zone lying at about 150–180 m beneath the surface. The deposit dips at a low angle to the east and extends over an area of 230 m north–south by 460 m east–west. Drilling indicates the deposit extends to at least 427 m depth.

South Pipeline consists of two zones, a shallow zone starting at 20–46 m depth and a deep zone starting at 300 m. The shallow zone occupies an area of approximately 550 m by 610 m, north and east respectively, and exhibits both low-angle and high-angle structural controls on gold distribution. The deep zone occupies an area 60 m north–south by 180+ m east–west, is up to 76 m thick and is more closely associated with high-angle structures. Drill depths average 300 m, although drill holes up to 427 m are not uncommon in the centre of the deposit where mineralization ranges from 120 m to over 300 m thick. Drilling indicates the deposit extends to at least 400 m depth.

7.3.6.2 Deposit Setting

Mineralization is hosted in the Wenban Formation (thin- to thick-bedded, carbonate turbidites, debris flows, micrites, and silty limestones), Horse Canyon Formation (thin-bedded, planar-laminated calcareous siltstones, mudstones, inter-bedded chert, and silicified siltstones) and Roberts Mountain Formation (planar laminated, silty limestones). The highest and most continuous gold grades occur in the interbedded cherts and silicified turbidites of the Horse Canyon Formation and in the Wenban Formation either where capped by the Horse Canyon Formation or in areas of more intense decarbonitization. Host formations have been thickened and repeated by low-angle thrust faulting. The majority of the mineralization is tabular and stratiform with a shallow easterly dip.

The Pipeline deposits are interpreted to have formed on the easterly limb of a domed feature or anticline formed by the intrusion of the Gold Acres stock. The primary mineralization-controlling feature is a low-angle shear zone, which ranges in thickness from <3 to >150 m. The shear zone is sheared, shattered and brecciated. Higher gold grades occur along the intersection of a north–northwest-trending fault, the Pipeline fault, with the northeasterly-trending Fence fault.

Alteration consists of oxidation, decalcification, weak contact metamorphism, argillization, silicification and carbonization. Alteration types can overlap, and can form in any combination.

Alluvial cover is absent in the northwest but thickens up to 137 m in the eastern Pipeline pit area.

7.3.6.3 Mineralization

Within the Pipeline deposit, gold is hosted in both sheared and unsheared rocks, and in association with all alteration types. Gold occurs in association with silica, pyrite, hematite, and illitic or sericitic matrix material. Gold grains are coarser in open spaces and in fracture fillings, and finer-grained when associated with silica, pyrite and hematite.

At South Pipeline, microscopic gold is commonly associated with silica, in replaced matrix and quartz veinlets, and in association with limonite after pyrite.

A geology plan was provided as Figure 7-19. A geology section is provided in Figure 7-20 and a mineralization section is included as Figure 7-21. Figure 7-22 is a section showing the orientation of the drilling in relation to the mineralization.

7.3.7 Robertson

7.3.7.1 Deposit Dimensions

The deposit is about 2285 m long, 910 m wide, and approximately 400 m thick. The deposit has been drill tested to about 420 m depth.

7.3.7.2 Deposit Setting

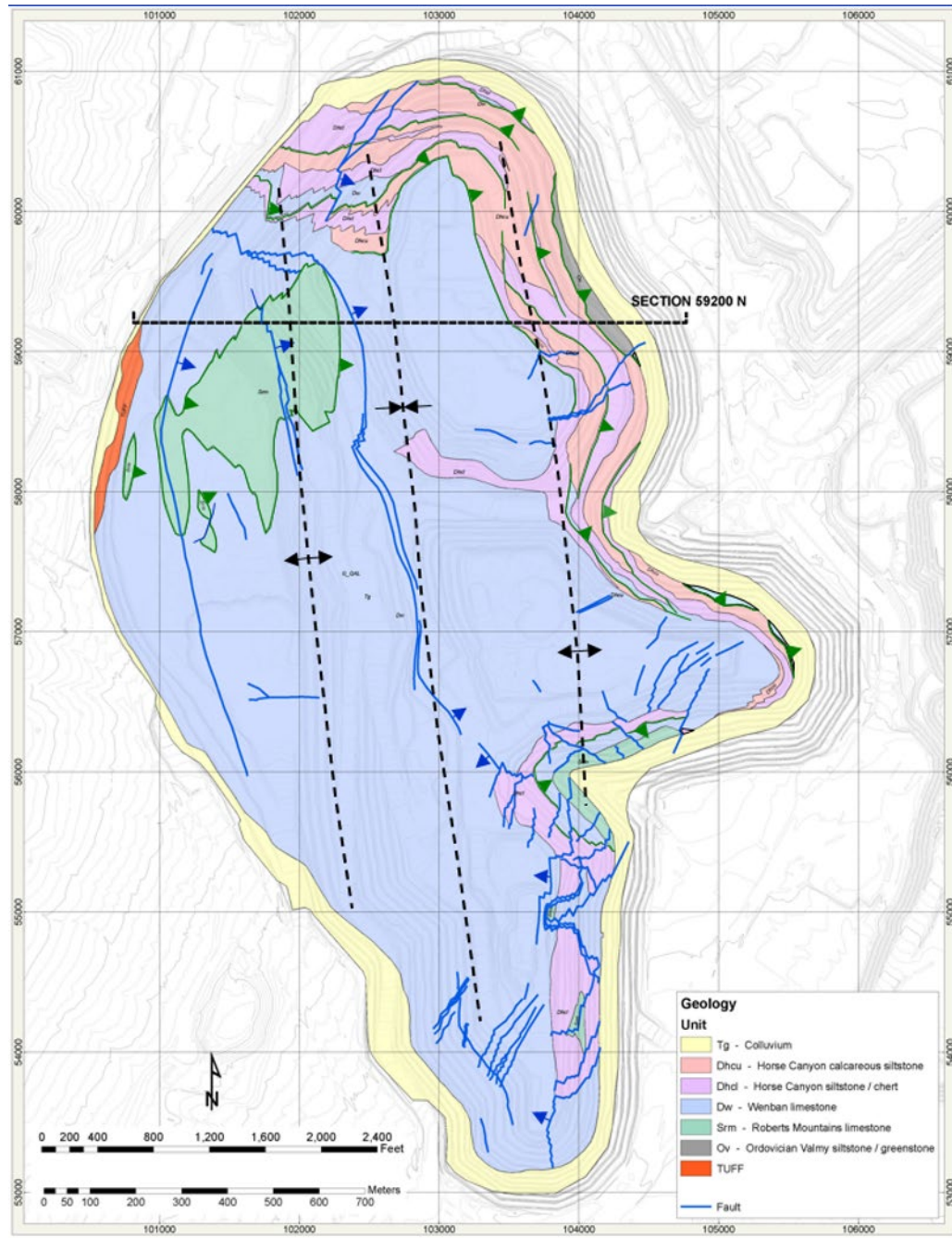
Robertson is an igneous related gold system. Gold mineralization is found in Upper Plate siliciclastics of the Devonian Slaven and Silurian Elder formations, as well as inside Eocene intermediate composition igneous rocks, primarily diorite and granodiorite. Mineralization is primarily concentrated around the Tenabo Stock in three main areas: Gold Pan in the northwest, Porphyry in the east to northeast, and Altenburg Hill in the southeast. Gold mineralization overprints an initial contact metamorphic hornfels event and a subsequent chalcopyrite–pyrrhotite–pyrite–chlorite–actinolite skarn event.

A series of later-staged phyllic and propylitic alterations are present, primarily altering later faults, fractures and late-stage feldspar porphyry dykes.

Mineralization at Gold Pan can be separated into two zones: Gold Pan and 39A, which represent one gold depositional event but in two different host lithologies in the Slaven Formation. Mineralization at Gold Pan is controlled by a gently northeast-dipping metabasalt strata, which is preferentially altered to a biotite hornfels, with skarn alteration overprinting the hornfels. Mineralization at 39A is controlled by the 39A structure, a bedding sub-parallel thrust that is also gently northeast dipping. The 39A structure is preferentially skarn-altered, with gold most strongly present at and under the 39A structure.

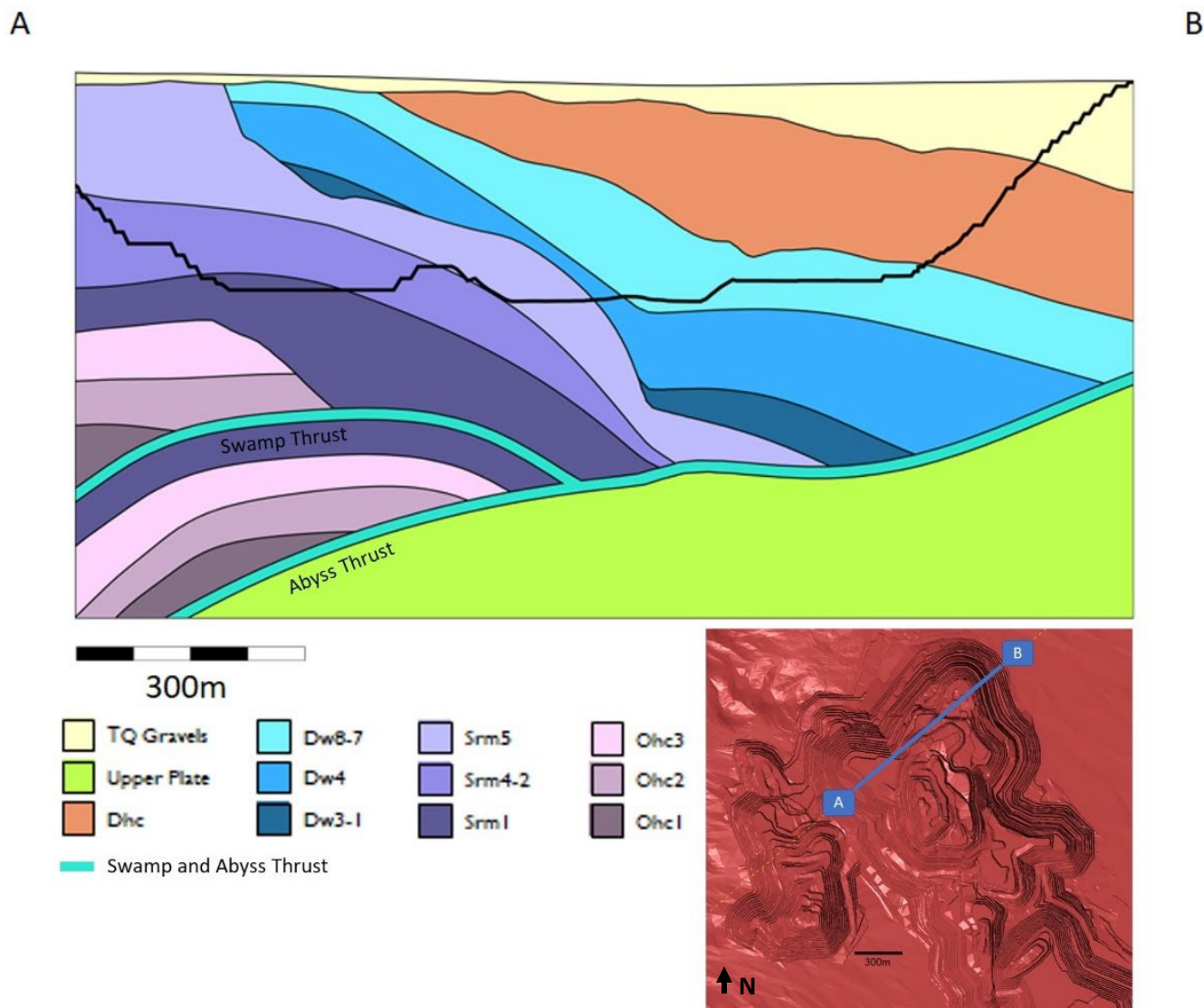
Gold mineralization at Porphyry is found primarily in the Elder Formation, with lesser amounts present in the Slaven Formation, as well as the Eocene-aged Tenabo stock, a polyphase diorite and granodiorite intrusive stock. In the Elder Formation, and to a lesser extent the diorite, gold deposition is controlled by the endoskarn fault series, a series of north–south striking, moderately west-dipping faults. Inside the endoskarn, the initial hornfels and retrograde skarn events have been overprinted by the gold event, with gold mineralization strongest in and in near proximity of the structures and becoming more diffuse further away from the structures. Mineralization in the granodiorite at Porphyry is controlled by a series of shallowly west-dipping structures present inside the stock.

Figure 7-19: Geology Plan, Pipeline



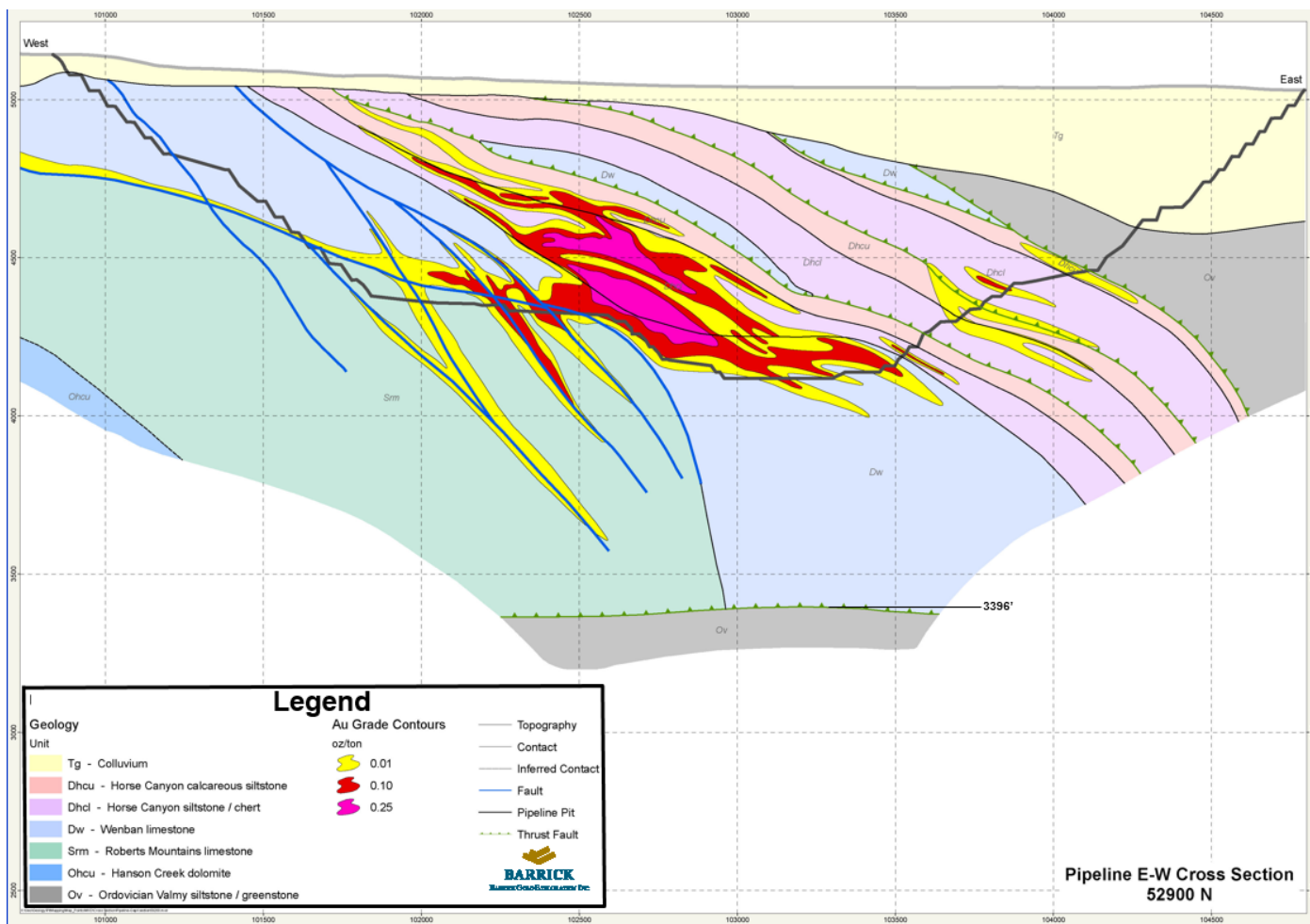
Note: Figure prepared by NGM, 2021.

Figure 7-20: Cross-section Showing Geology, Pipeline



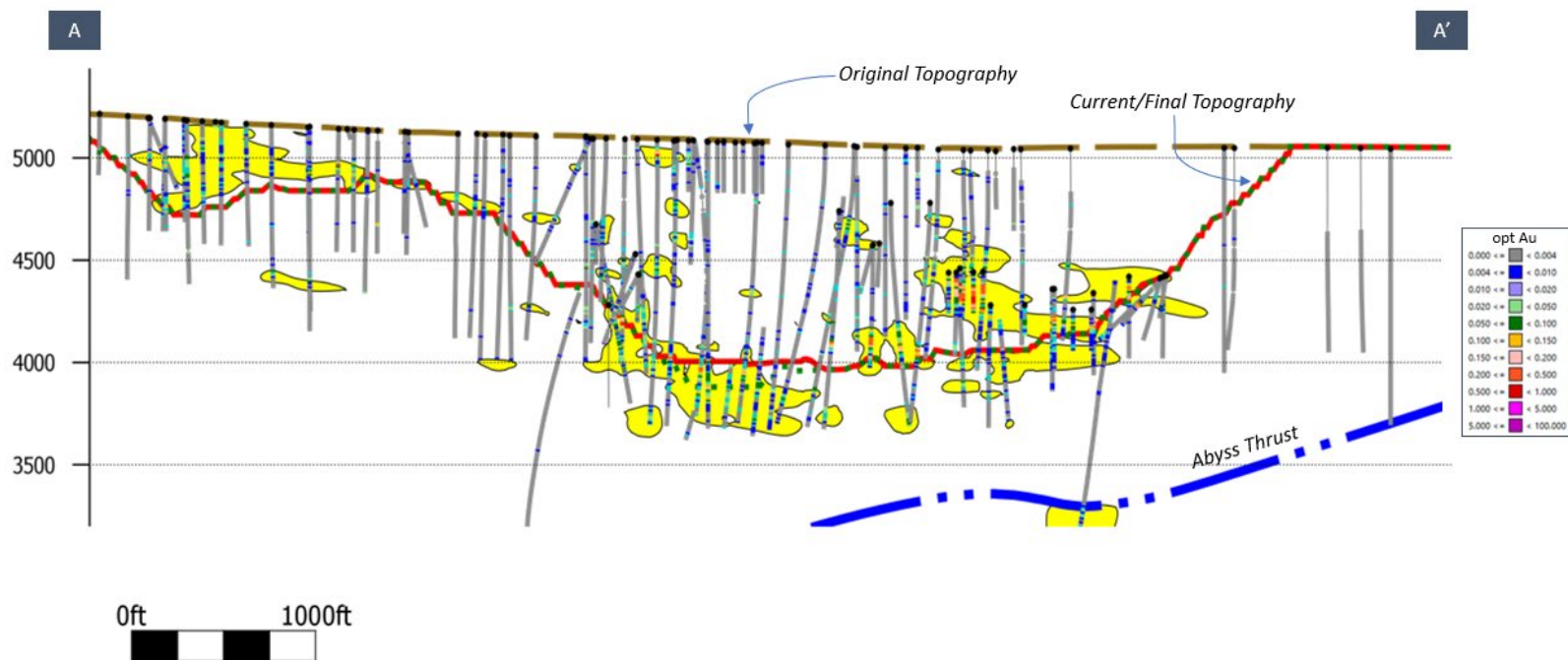
Note: Figure prepared by NGM, 2021. West-east cross section, looking northwest.

Figure 7-21: Cross-section Showing Drilling in Relation to Mineralization, Pipeline



Note: Figure prepared by NGM, 2021.

Figure 7-22: Cross-Section, Pipeline



Note: Figure prepared by NGM, 2021. Figure is oriented southwest-northeast, and cut perpendicular to the Abyss thrust.

Gold mineralization at Altenburg Hill is present in the Elder Formation and the granodiorite phase of the Tenabo stock. Mineralization in the Elder Formation is controlled by a series of bedding sub-parallel granodiorite dyke emplacements, the majority of which dip shallowly to the east-northeast. Mineralization is also partially controlled by a series of roughly east-west- and northwest-southeast-striking high-angle faults, which cross both the Elder Formation and the granodiorite.

7.3.7.3 Mineralization

Gold itself is associated with bismuth and tellurium, and is commonly found in association with arsenopyrite and loellingite (FeAsS). Gold at Robertson is present as native gold, with minor electrum, and all gold present is free-milling.

A geology plan was provided as Figure 7-23. A long section is included as Figure 7-24.

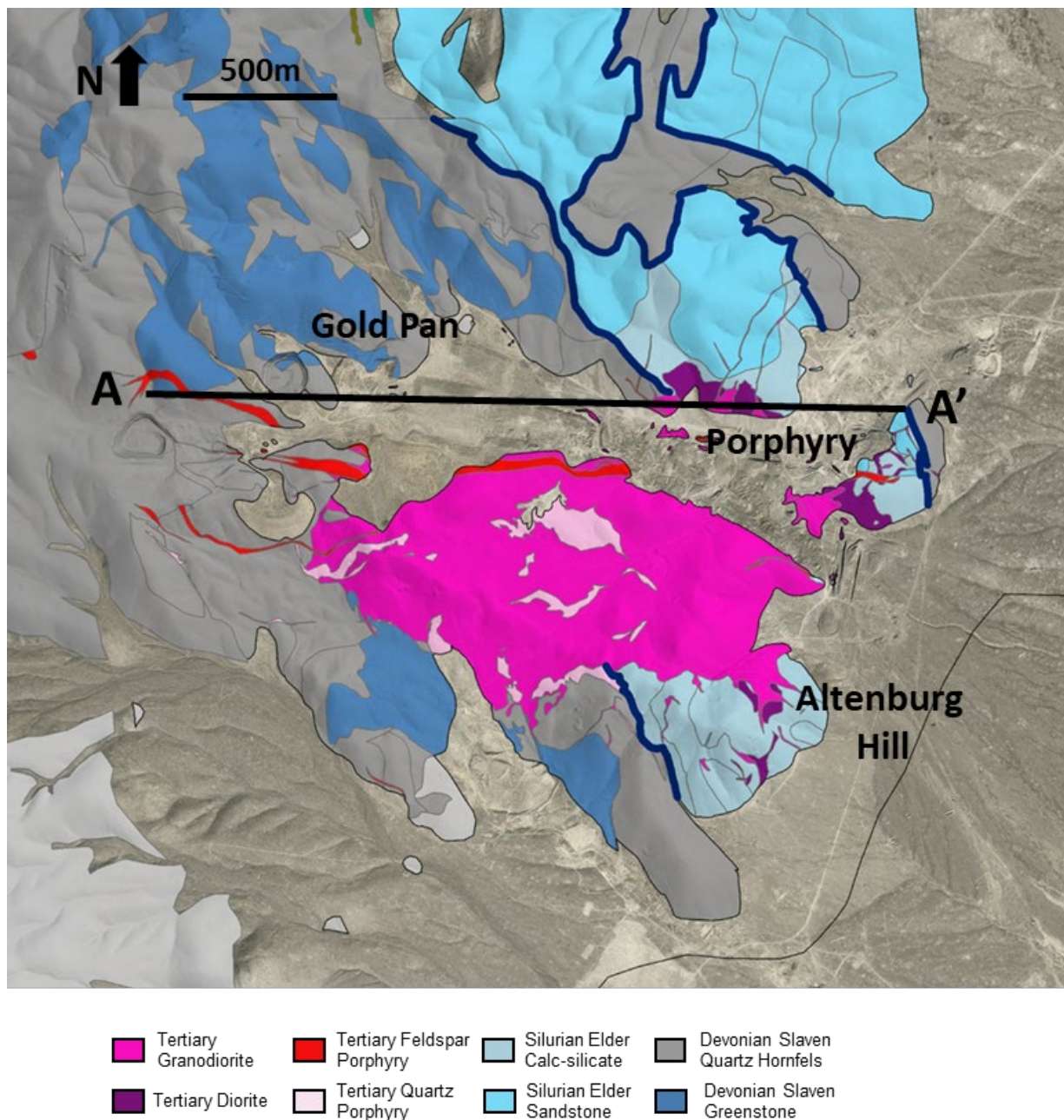
7.4 Prospects/Exploration Targets

The Project exploration potential is discussed in Section 9.6.

7.5 QP Comments on “Item 7: Geological Setting and Mineralization”

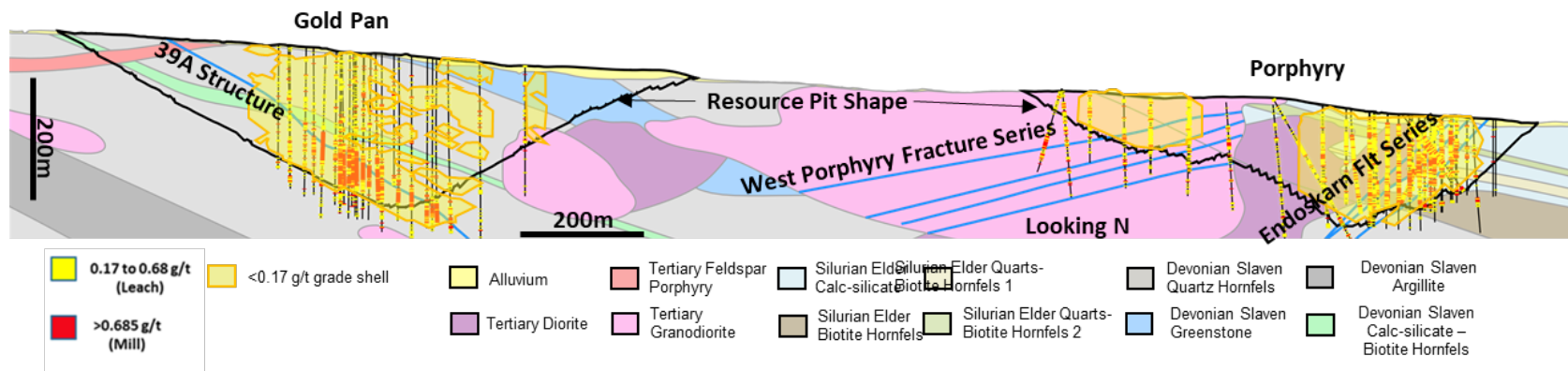
The understanding of the Project geology and mineralization is sufficient to support Mineral Resource and Mineral Reserve estimation and mine planning.

Figure 7-23: Geology Plan, Robertson



Note: Figure prepared by NGM, 2021.

Figure 7-24: Cross-section Showing Geology and Mineralization, Robertson



Note: Figure prepared by NGM, 2021.

8.0 DEPOSIT TYPES

8.1 Overview

8.1.1 Carlin-Type Mineralization

The major deposit type within the Cortez Complex area is the Carlin-type. The Carlin deposit, situated about 50 miles north–northeast of the Cortez Complex, forms the type locality.

Host rocks are most commonly thinly-bedded silty or argillaceous carbonaceous limestone or dolomite, commonly with carbonaceous shale. Although less mineralized, non-carbonate siliciclastic and rare metavolcanic rocks can locally host gold that reaches economic grades. Felsic plutons and dikes may also be mineralized at some deposits. Deposits typically have a tabular shape, are stratabound, localized at contacts between contrasting lithologies, but can also be discordant or breccia-related.

Mineralization consists primarily of micrometre-sized gold and sulfide grains disseminated in zones of siliciclastic and decarbonated calcareous rocks and are commonly associated with jasperoids. Major ore minerals include native gold, pyrite, arsenopyrite, stibnite, realgar, orpiment, cinnabar, fluorite, barite, and rare thallium minerals. Gangue minerals typically comprise fine-grained quartz, barite, clay minerals, carbonaceous matter, and late-stage calcite veins.

Current models attribute the genesis of the deposits to:

- Epizonal plutons that contributed heat and possibly fluids and metals;
- Meteoric fluid circulation resulting from crustal extension and widespread magmatism;
- Metamorphic fluids, possibly with a magmatic contribution, from deep or mid-crustal levels;
- Upper crustal orogenic-gold processes within an extensional tectonic regime.

8.1.2 Intrusive-Related Mineralization

A secondary deposit model that is applicable to the Cortez Complex is an intrusion-related gold model. Primary examples of intrusion-related gold deposits include the Fort Knox and Pogo deposits in Alaska.

Intrusion-related gold systems are associated with a reduced, commonly ilmenite bearing, intermediate to felsic composition pluton. Gold-bearing fluids are igneous in origin. Common alteration facies include potassic, phyllic and propylitic alterations, with skarn alteration frequently observed. Host rocks include the formative intrusion, along with surrounding country rock. Gold mineralization is commonly hosted in sheeted veins, tensional zones, as replacements and in structurally damaged and brecciated fault zones.

Intrusion-related gold mineralization can be both as native gold and more rarely “invisible” gold, or gold found within sulfides. Geochemically, intrusion-related gold mineralization is closely associated with bismuth, tellurium and arsenic, with less common associations with tungsten and molybdenum. Common ore minerals found in intrusion-related deposits include arsenopyrite, loellingite, pyrrhotite, chalcopyrite, pyrite and bismuth-tellurium minerals. Gangue minerals include chlorite, actinolite, tremolite, quartz, clay minerals, calcite and rare barite.

8.2 QP Comments on “Item 8: Deposit Types”

In the opinion of the QP, the understanding of the Carlin deposit type was appropriate in guiding initial exploration activities and remains applicable for current exploration programs in the areas considered prospective for Carlin-type deposits.

The intrusive-related deposit model is appropriate for areas with igneous intrusions, as the Robertson deposits are considered to be examples of intrusion-related gold mineralization.

Two other deposit types have been mined in the area, but are not considered as high-priority exploration targets. These include the landslide-derived mineralization at the Pediment deposit, still the only known example of its type in the Cortez Complex area, and epithermal mineralization at the historic Buckhorn mine.

9.0 EXPLORATION

9.1 Overview

Modern exploration commenced along the Battle Mountain–Eureka Trend in the 1960s, and has been nearly continuous since that time. Exploration in the Cortez district has been undertaken by NGM, and Barrick and its predecessor companies such as the Cortez JV. Work completed included mapping, various geochemical and geophysical surveys, pitting, trenching, petrographic, and mineralogy studies, and various types of drilling.

Many of the targets being investigated are partially or totally concealed by younger overburden and Tertiary rock cover or by allochthonous Upper Plate Paleozoic siliclastic rocks. Geophysical surveys are used to help map buried bedrock features.

9.2 Grids and Surveys

There are three mine grids in use at the Cortez Complex. In 2008, Apex Surveying and Mapping documented the Cortez Hills Mine Grid and Pipeline Mine Grid, and tied the Truncated Universal Transverse Mercator (TUTM) Mine Grid to NAD83 UTM Zone 11T.

9.3 Geological Mapping

Pre-mine geological mapping was completed in eastern Nevada by geologists from the United States Geological Survey (USGS) and previous operators. From 1961 to date, NGM has surface-mapped the NGM ground holdings at various scales, ranging from pit wall to district scale.

The entire district is geologically mapped to varying scales from 1:20,000 to 1:50,000. The carbonate windows are mapped to a greater detail ranging to 1:5,000 scale. Specific targets are typically mapped to 1:600 to 1:1,000 scale, whereas pit wall and underground mapping range from 1:20 to 1:100 scales.

9.4 Geochemical Sampling

Owing to the long mining history of the Cortez Complex area, geochemical sampling techniques used for grassroots exploration purposes have been typically superseded by data from drilling and open pit and underground mining. Current exploration combines the use of surface sampling methods (rock chips and soils) along with structural modelling and drilling (down hole geochemistry) to explore for mineralization at depth under cover.

However, some minor geochemical sampling has been conducted at:

- Fourmile area, north of the Mill Canyon stock (a 100%-owned Barrick property), 50–100 samples;
- Northwest of the historic Horse Canyon Pits, 50 samples;

- Between Pipeline and Robertson, 50–100 samples;
- Gold Acres West, 50 samples;
- Robertson, 50–100 samples.

Samples have been submitted for analysis, with results and interpretations pending at the Report effective date.

9.5 Geophysics

Locations of geophysical survey lines are shown in Figure 9-1.

Geophysical methods have been used in the Cortez district since the early 1970s. Geophysical tools were initially primarily regarded as support tools, due to the initial discoveries cropping out on surface, or only having a thin veneer of cover, and the inability of the early methods to directly detect the deposits. Later, geophysical methods were used as a structural mapping and deposit vectoring tool.

Methods adopted included modern airborne and ground magnetics, radiometrics and electromagnetics (EM), gravity, resistivity, and controlled-source audio-frequency telluromagnetics (CSAMT), self-potential (SP) and induced-polarization (IP). A trial set of seismic lines were also conducted. Typically, airborne surveys were performed by contract companies, whereas ground surveys were performed by company personnel or contract crews.

Between 1960–2008, reflective seismic surveys were conducted within the district to help with interpretation and resolution of structural and stratigraphic complexities. The surveys showed seismic reflectors in various formations within the carbonate package, intrusive contacts, folding and low-angle structures. Some surveys were performed by external companies in the course of petroleum exploration; others in particular during the 2000s, were conducted by Barrick or the Cortez JV prior to the formation of the NGM JV.

An aerial flyover is performed every year by Aero-graphics under the direction of the Cortez Open Pit Survey Department.

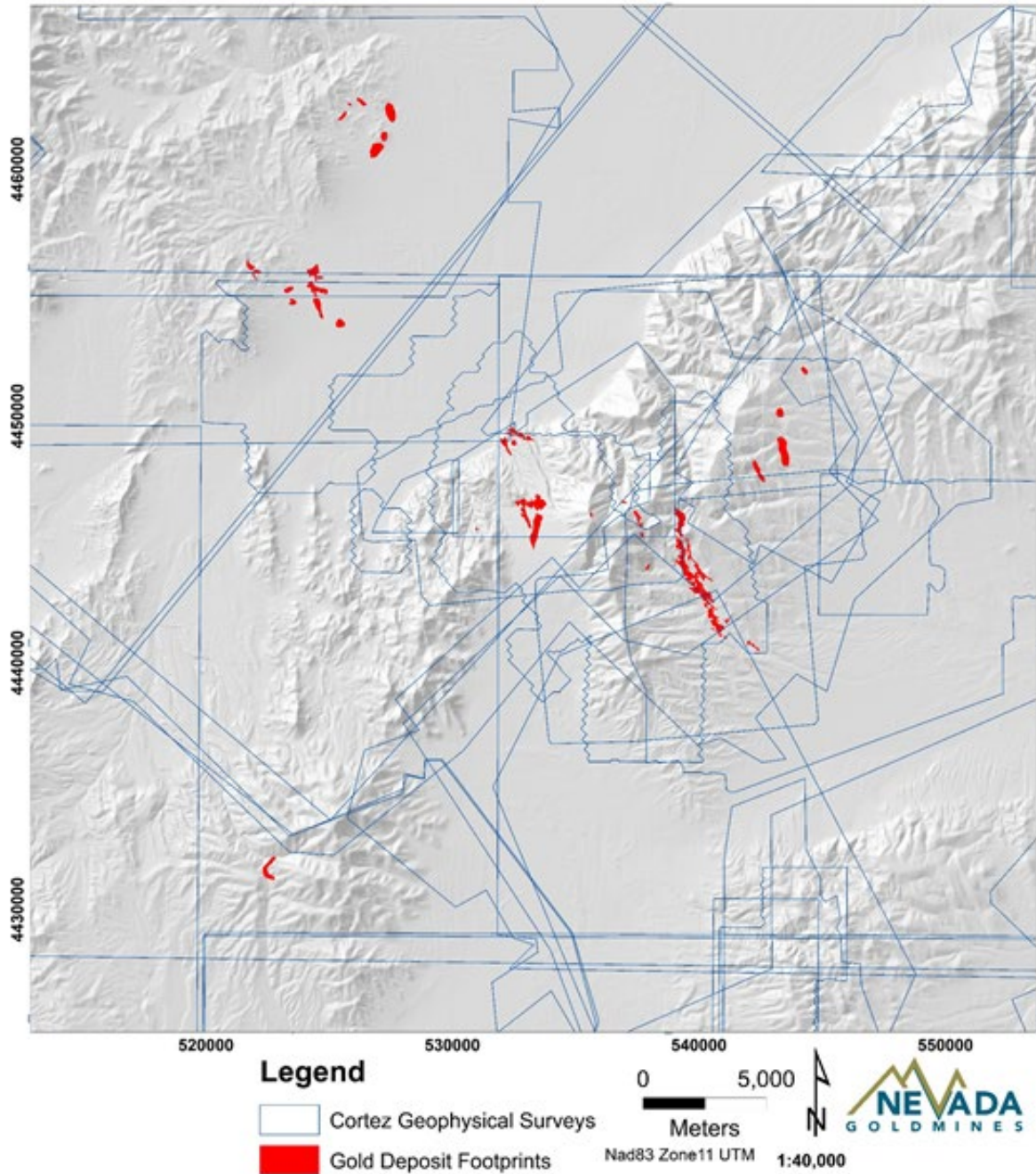
9.6 Petrology, Mineralogy, and Research Studies

A number of petrological, mineralogical, microscopy and fluid inclusion studies have been completed on the deposits within the Project area.

Petrological and mineralogical studies have primarily been completed to quantify mineralization for use in designing appropriate process routes for the Carlin-style mineralization.

Microscopy studies were performed to analyze clay and chlorite components of mill feed. Modal analysis studies were performed on various mineralization types to determine mineral species locking and appropriate grind sizes.

Figure 9-1: Location Plan, Geophysical Surveys



Note: Figure prepared by NGM, 2021.

Lithogeochemical studies, including fluid inclusion, age dating, gold characterization, and alteration studies have been undertaken.

A number of research theses have been completed in the district on various aspects of geology and mineralization.

9.7 Exploration Potential

Multiple opportunities exist in the district to expand known deposits and discover additional mineralization in the following deposits that have estimated Mineral Resources:

- Robertson
- Gold Acres
- Cortez Hills Underground (CHUG)
- Goldrush
- Fourmile (100% Barrick-owned property)

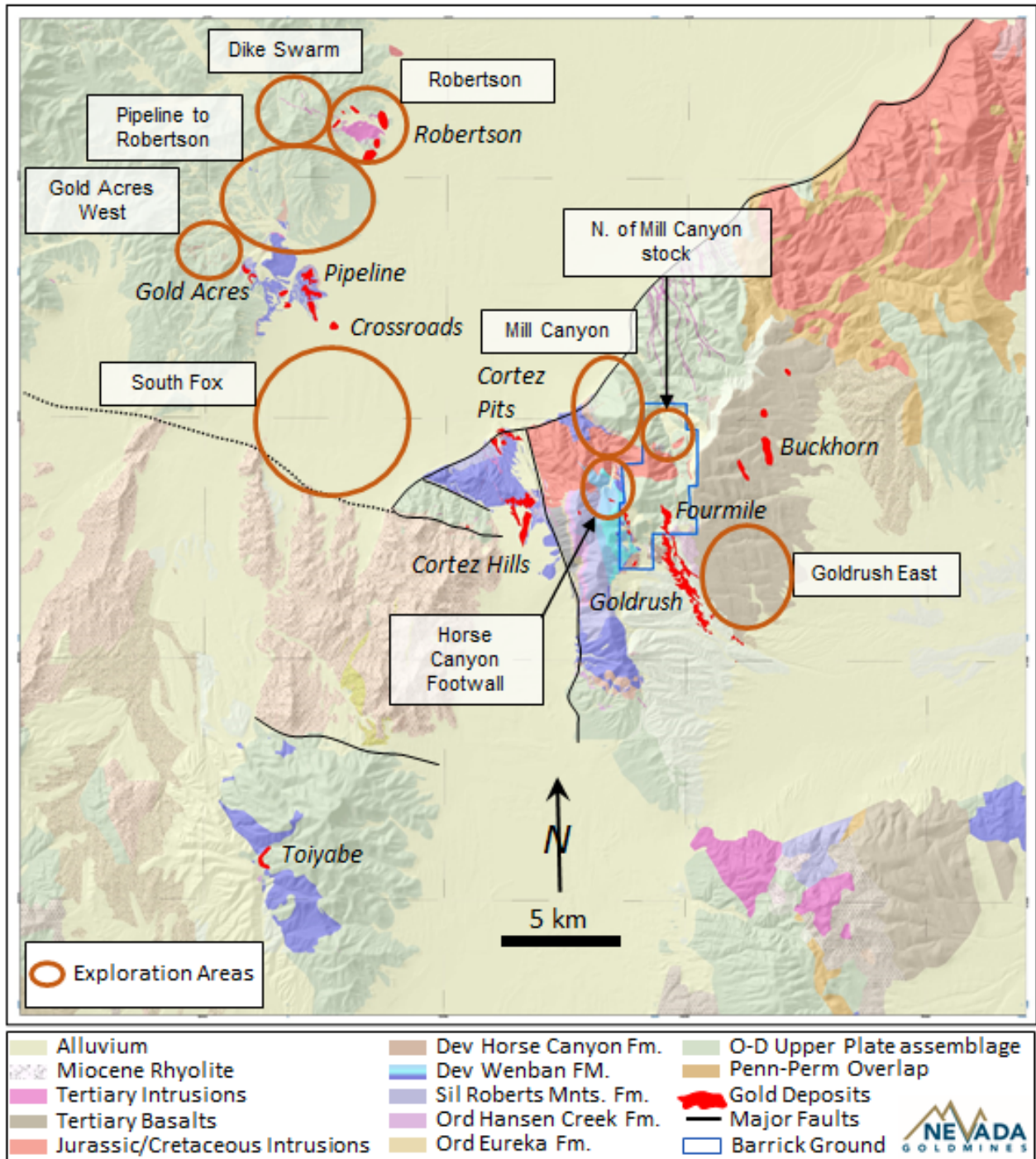
Areas in the Cortez Complex area that are prospective and warrant additional exploration effort include (Figure 9-2):

- North of Mill Canyon Stock (100%-owned Barrick property);
- Goldrush East;
- Horse Canyon Footwall;
- Mill Canyon;
- South Fox;
- Gold Acres West;
- Pipeline to Robertson;
- Robertson;
- Dike Swarm.

9.8 QP Comments on “Item 9: Exploration”

Exploration programs to date have identified numerous deposits within the area of the Cortez Complex. Multiple opportunities exist in the district to expand known deposits and discover additional mineralization.

Figure 9-2: Exploration Prospective Areas



Note: Figure prepared by NGM, 2021.

10.0 DRILLING

10.1 Introduction

Drilling in the Cortez Complex database consists of 22,822 drill holes (4,109,019 m). Drilling in the database is summarized in Table 10-1 and drill collar locations shown in Figure 10-1. The drill totals and metreage numbers are known to be incomplete, as a significant portion of the drilling completed by companies other than NGM, Barrick, and the former Cortez Joint Venture has not been incorporated in the digital database.

Some duplicate hole counts are possible due to surface and underground data extraction areas that overlap or where holes that were drilled with a reverse circulation (RC) pre-collar and a core tail are counted as two drill types. However, the QPs have determined this is not material for estimation purposes, since flagging of drill data, blocks and mine engineering efforts prevent double counting of ounces.

Surface drilling is initially carried out on a 122 m square pattern, closing in the next stage to a 61 m grid. In-fill drilling is done on a five-spot pattern, resulting in an average hole spacing of 43 m. At Pipeline, “x-shaped” patterns of more closely spaced holes were drilled to provide information for gold grade variography; this may locally decrease the hole spacing to approximately 21 m.

Underground mineralization is drilled to a nominal 61 m spacing from surface, then underground drilling is conducted to reduce spacing to a nominal 31 m or less for conversion of Mineral Resources to Mineral Reserves. Prior to production, additional underground drilling may be completed as needed, to close up the spacing to between 7.5–15 m for final mine designs.

Drilling that is used to support Mineral Resource estimation is summarized in Table 10-2. Drill collar location plans are provided for the deposits with current Mineral Resource estimates in Figure 10-2 to Figure 10-5.

10.2 Drill Methods

Over the history of the Cortez Complex, a number of different drilling techniques have been employed:

- RC/cubex;
- Core;
- Air rotary;
- Mud rotary.

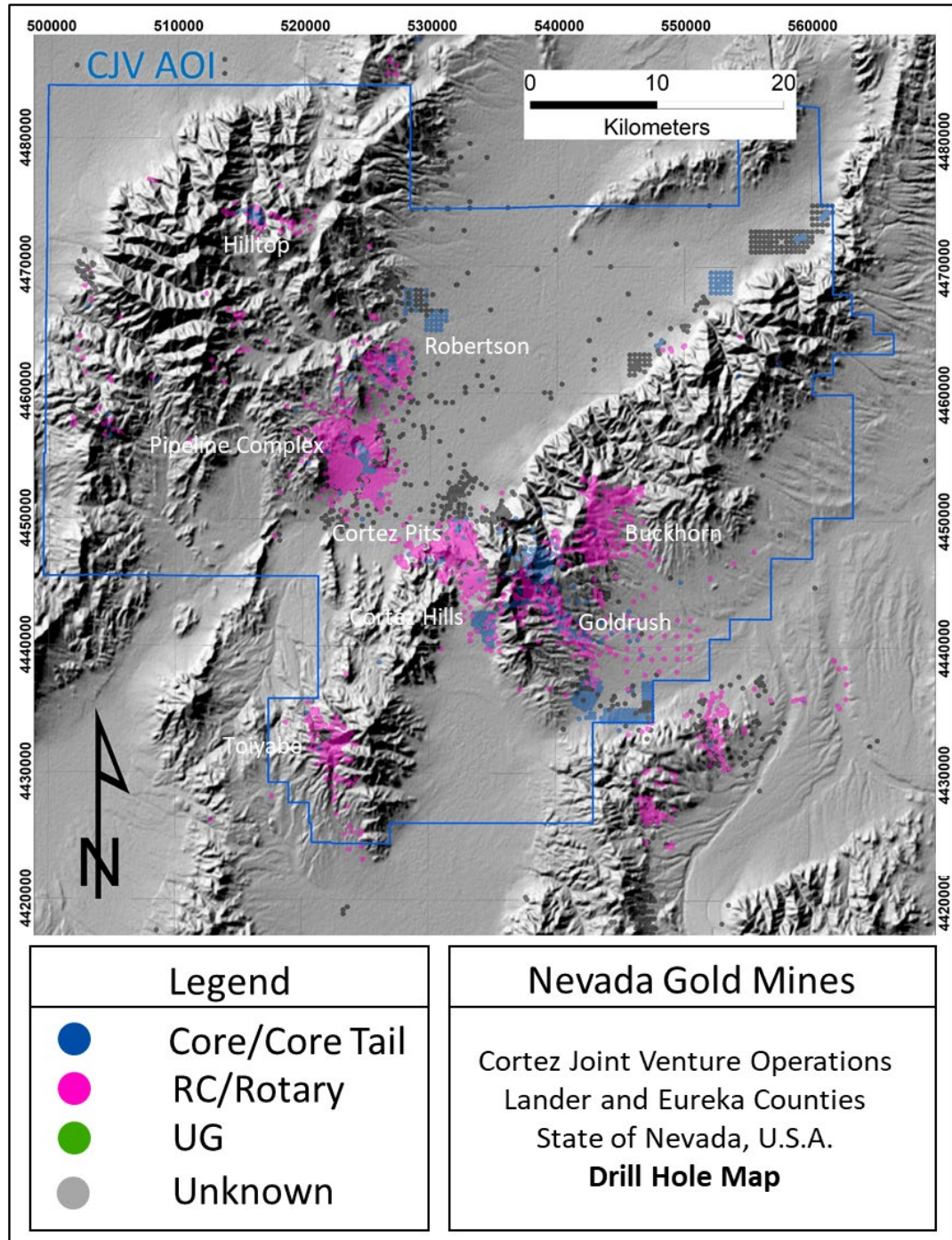
Drilling fluids used during coring include water-based mud systems with bentonite (clay) and inorganic polymer added. Drilling muds are also employed in mud conventional and RC drilling.

Table 10-1: Project Drill Summary Table

Drill Type	Number of Drill Holes	Drilled Feet (Mft)	Drilled Metres (Mm)
Air rotary	170	36,592	11,153
Core	3,259	1,848,861	563,533
Mud rotary	146	105,681	32,212
Reverse circulation and cubex	18,674	9,488,670	2,892,147
Other*	3,029	2,001,229	609,975
Total	22,822	13,481,032	4,109,019

Note: *Other includes holes that have an RC pre-collar and a core tail. The designation also includes drill hole records where the drill type was not recorded. Drill footages and metreages have been rounded, and totals may not sum.

Figure 10-1: Project Drill Collar Location Plan

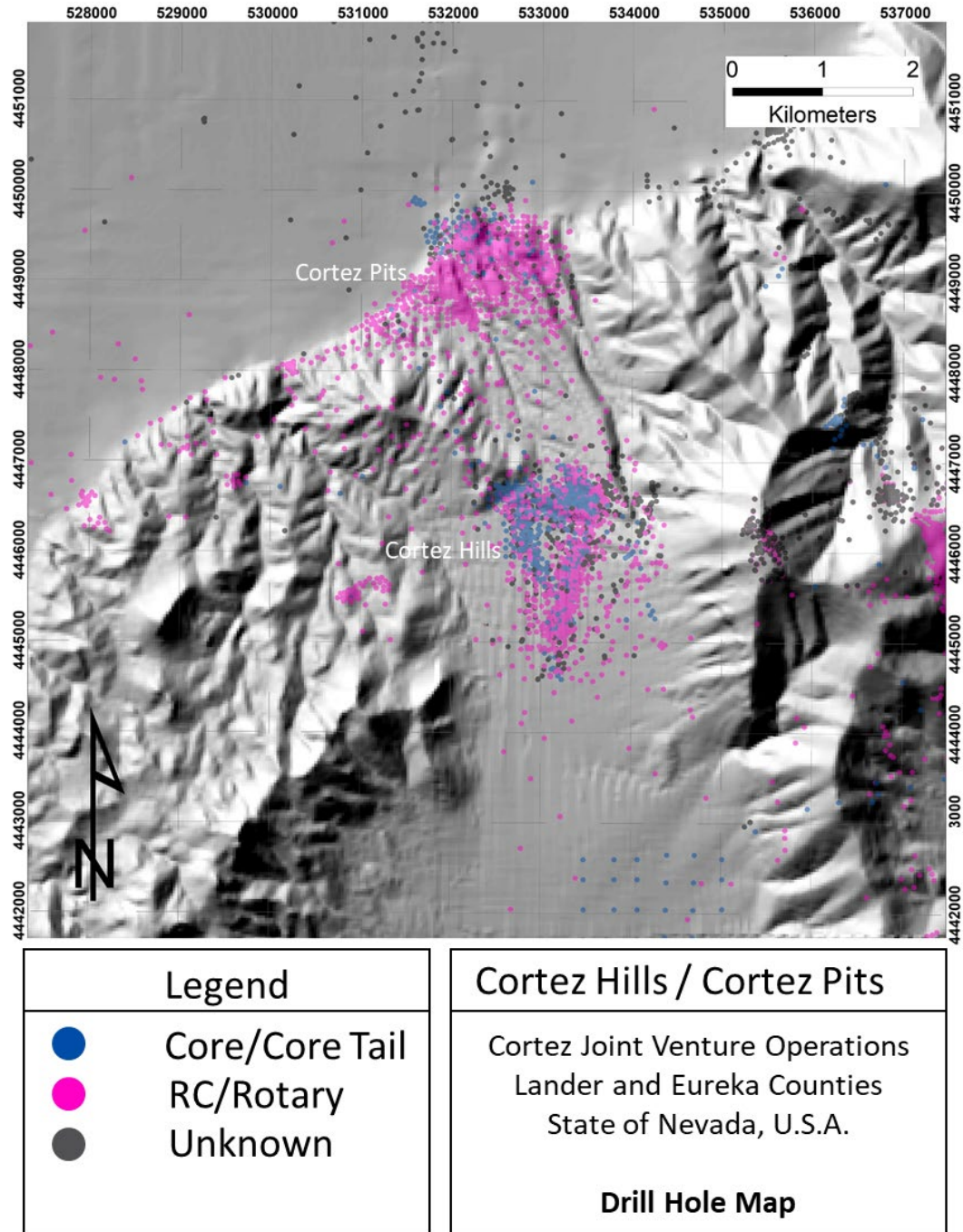


Note: Figure prepared by NGM, 2021.

Table 10-2: Drilling Used in Mineral Resource Estimation

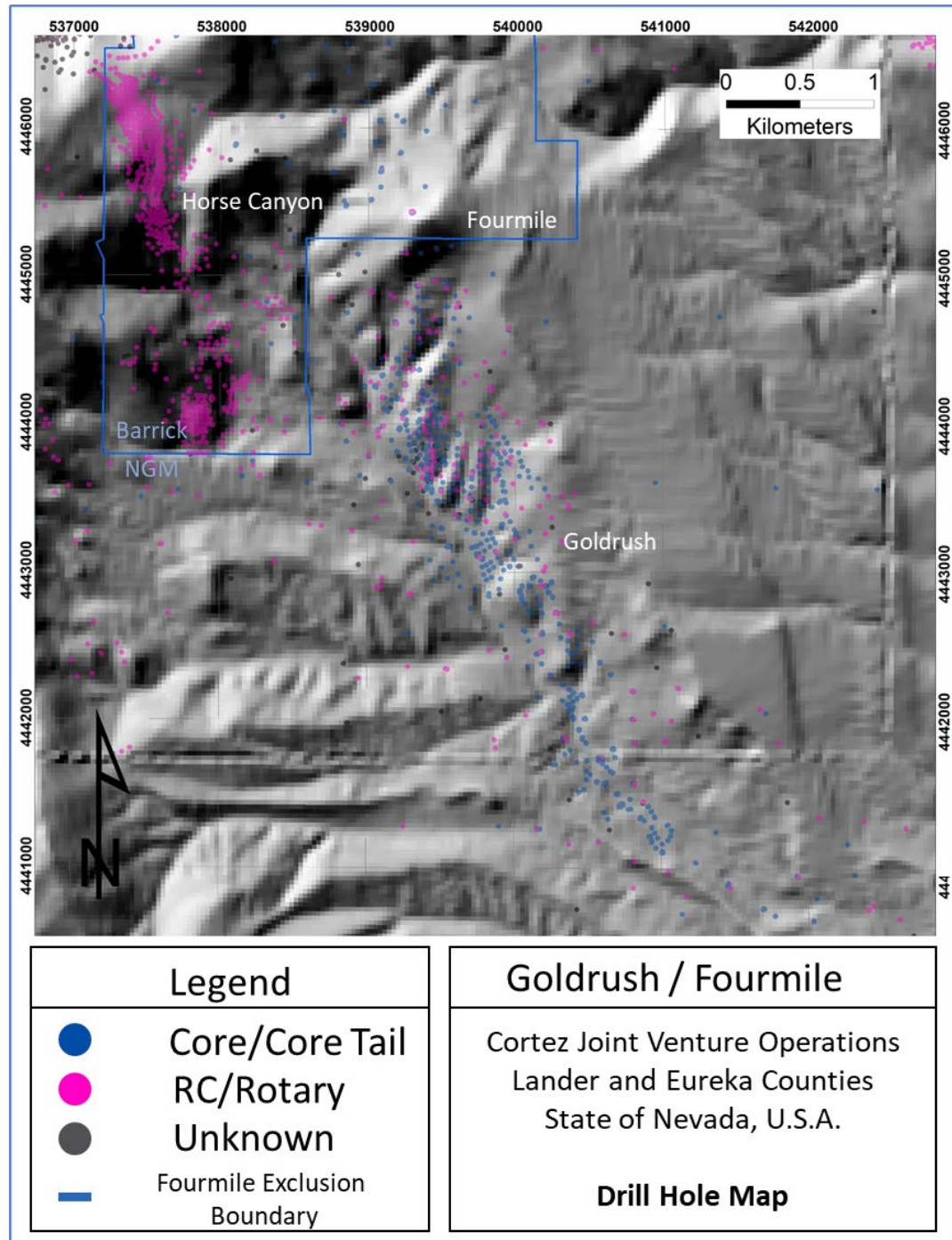
Deposit/Area	Drill Type	Number of Drill Holes	Drilled Footage (ft)	Drilled Metreage (m)
Cortez Hills	Core	1875	761,677	232,159.0
	Other	301	234,326	71,422.4
	RC	2852	2,158,837	658,013.5
	Total	5028	3,154,839	961,594.9
Cortez Pits	Core	116	69,132	21,071.3
	Other	85	45,387	13,834.0
	RC	2039	680,000	207,263.8
	Total	2240	794,518	242,169.1
Goldrush	Core	470	518,092	157,914.5
	Mud rotary	61	73,458	22,390.0
	Other	735	661,116	201,508.1
	RC	2290	1,353,400	412,516.3
	Total	3556	2,606,066	794,328.9
Pipeline	Core	144	75,572	23,034.2
	Mud rotary	9	900	274.3
	Other	1367	749,945	228,583.2
	RC	3477	2303146	701,999.0
	Total	4997	3,129,563	953,890.8
Robertson	Air rotary	170	36,592	11,153.2
	Core	348	214,744	65,453.9
	Mud rotary	63	17,870	5,446.8
	Other	40	9,848	3,001.5
	RC	972	480,443	146,438.9
	Total	1593	759,496	231,494.3
Other ("on-LOM projects)	Core	306	209,645	63,899.9
	Mud rotary	13	13,453	4,100.5
	Other	501	300,608	91,625.3
	RC	7044	2,512,844	765,915.0
	Total	7864	3,036,551	925,540.6

Figure 10-2: Drill Collar Location Plan, Cortez Hills–Cortez Pits



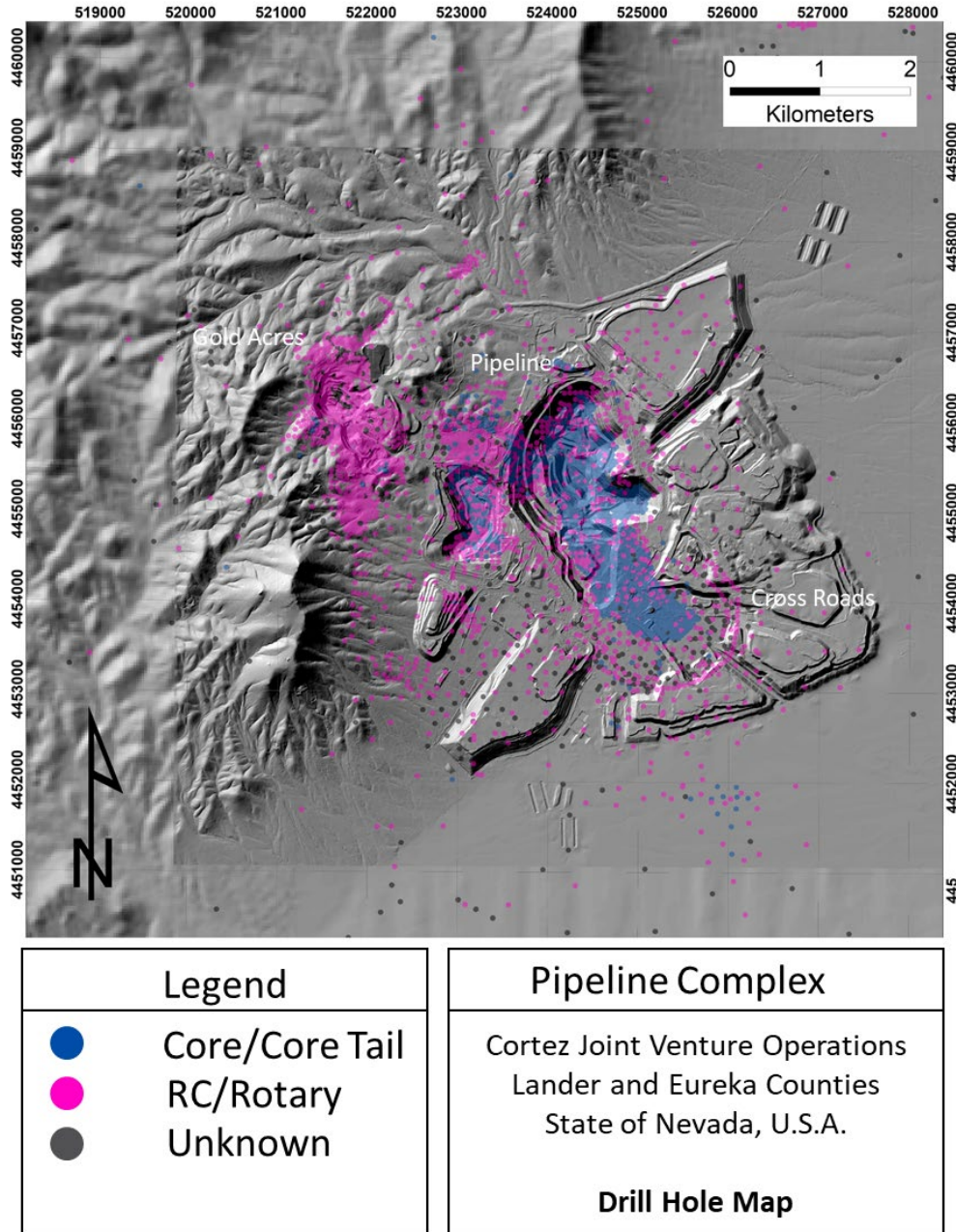
Note: Figure prepared by NGM, 2021.

Figure 10-3: Drill Collar Location Plan, Goldrush



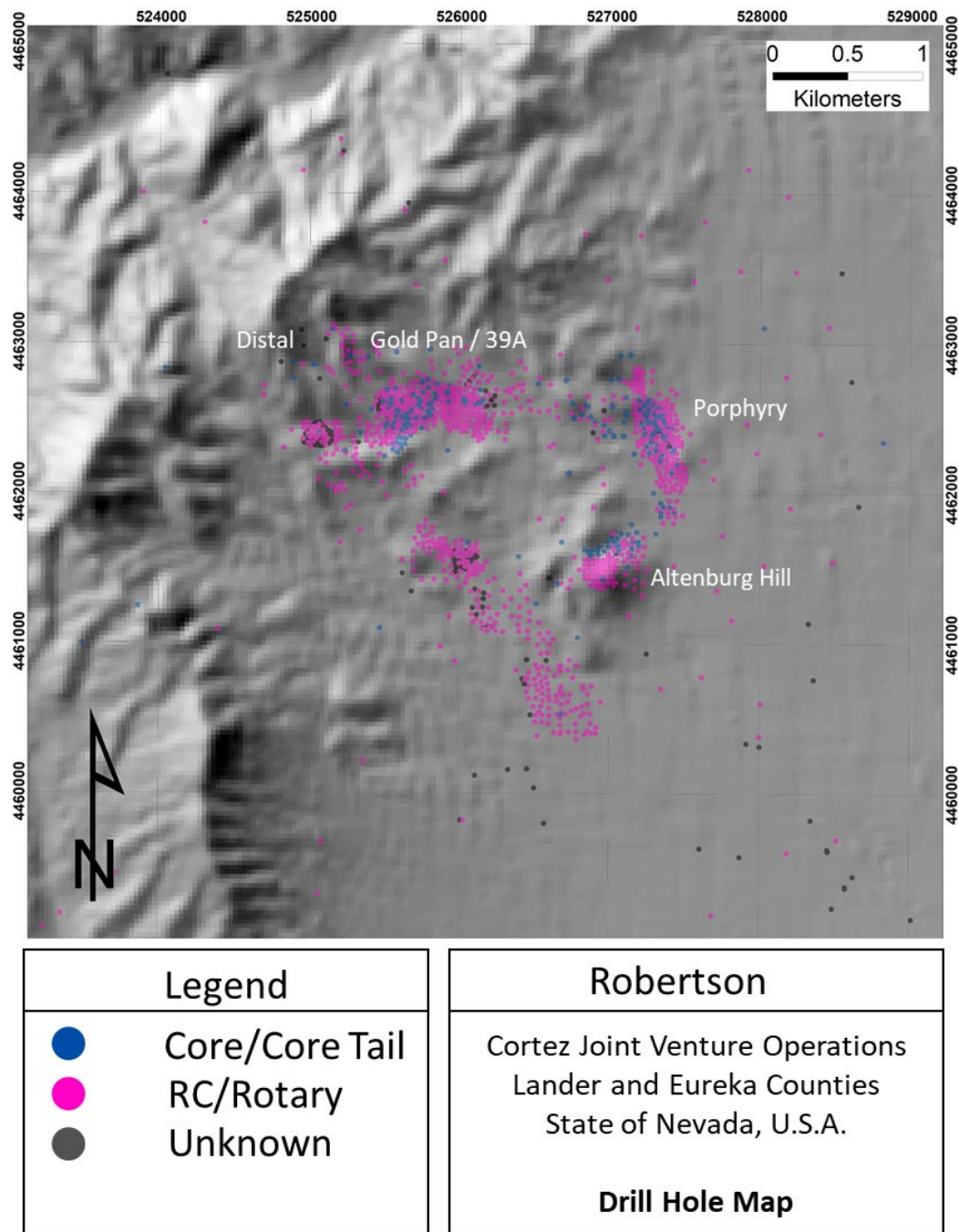
Note: Figure prepared by NGM, 2021.

Figure 10-4: Drill Collar Location Plan, Pipeline



Note: Figure prepared by NGM, 2021.

Figure 10-5: Drill Collar Location Plan, Robertson



Note: Figure prepared by NGM, 2021.

10.2.1 Surface Air and Mud Drilling Methods

Mud rotary drill holes range in diameter from 15 cm. to 23 cm. Mud-rotary drills have been used to drill relatively thick sections of alluvium over the Crossroads deposit or in areas being condemned for waste rock storage facilities (WRSFs) and processing facilities. Core tools were used to complete the bedrock sections of these holes.

Limited information remains on the drilling, logging, and sampling methodology for hole types that were drilled prior to the mid-1990s. Mud drilling has not been used in recent years. No mud drilling is used in support of Mineral Resources or Mineral Reserves.

10.2.2 Surface Reverse Circulation Drilling Methods

RC drilling is occasionally used during the initial phases of exploration, condemnation drilling, and to pre-collar core holes through intervals of overburden and unaltered cap rocks. Auxiliary compressors are used to increase the effectiveness of the down-hole hammers.

RC drill rigs are either truck-mounted or track-mounted. RC holes range in diameter from 11.4–17.8 cm. Diameters of 6.5 cm and 17.15 cm are currently used for exploration. Depths to which RC drilling is used depend on water table depths and the depth of mining activities in the region. Since 1980, RC has been typically used for 180–1,100 m holes. RC pneumatic hammers are used up to approximately 550 m depending on water inflow.

Drill bits are standard carbide-buttoned hammer bits (dry drilling conditions) and carbide-buttoned tri-cone (rock) bits (wet drilling conditions). Tri-cone rock bits are used at depths below the working depth of hammer bits.

Current practice is for RC holes encountering mineralization to be bracketed on four sides by core holes, increasing the density of core holes in mineralized zones. RC pre-collar holes are cased with appropriately sized casing and core drilling is continued through mineralization and footwall rocks.

10.2.3 Underground Reverse Circulation Drilling

RC drilling is predominantly used in “de-risk” drilling programs but is sometimes used to supplement resource development core drilling in areas where the target is shallow. RC hole lengths are usually planned to be <200 m to avoid significant deviation. Historically, the hole inclinations have been between + 70° and -90°. More recently, the geology team has stopped drilling steep up-holes.

10.2.4 Surface Core Drilling

Core sizes for wire-line core drilling are typically HQ (6.35 cm diameter) for resource development drilling. Occasionally, core holes are reduced from HQ size to NQ (4.76 cm) size in difficult drilling conditions. Surface metallurgical core includes HQ and PQ-3 (8.3 cm) sizes. PQ core (8.5 cm)

is used in alluvium to collect geotechnical data or where larger samples are required for nugget mineralization, such as at Robertson.

10.2.5 Underground Core Drilling

Core drilling was carried out from underground drill platforms with the availability and location of platforms determining the orientation of the drill holes. Core sizes for wire-line core drilling are typically HQ. Occasionally, core holes are reduced from HQ to NQ in difficult drilling conditions. Long core holes that are expected to go through multiple intervals with bad ground conditions are started with PQ core to allow for two possible core size reductions subsequently. The Breccia Zone holes were drilled from the hanging wall side of the deposit. The Middle and Lower Zone holes were drilled from development drifts located directly above mineralization. The Middle Zone was drilled with HQ at 15–23 m centres, with follow-up infill drilling where required to 7.6 m centres using HQ core.

Lower Zone was initially drilled from development drifts located above mineralization, which allowed for near vertical HQ core. Lower Zone A was initially drilled with HQ at 15–23 m centres, Lower Zone C was initially drilled with HQ at 15–23 m centres, and Lower Zone D was drilled with HQ at 23–30. m centres.

10.3 Logging Procedures

10.3.1 RC

Chip samples of each RC interval are collected and stored in plastic chip trays for geological logging. Each chip tray contains 20 compartments where a compartment represents approximately 1.5–3 m of drilling. The logging form is set up to record stratigraphic formation, rock type, rock textural characteristics, veining, significant minerals, alteration, and estimated sulfide, carbonate, and carbon content. Completed logs are entered into a master database.

10.3.2 Core

Drill core is washed and photographed prior to logging. Core is digitally photographed wet, except in cases of exceptionally poor rock quality. Older film photographs have been scanned and electronically archived both on the local Cortez server as well as on the Imago photo storage system.

Currently, core holes are quick-logged as the hole progresses. Detailed logging is done when the hole is completed. During detailed logging, altered/mineralized intervals may be prioritized to expedite assay returns and to guide adjustment of subsequent holes where necessary.

Core is logged by a geologist for geological and geotechnical elements. Prior to 2004, logging was either done on paper and then entered into a computer or entered directly into a computer and was verified by Placer Dome software with text and graphics capability. After review by geologists, corrected logs were reprinted and electronically merged into the master database by a computer administrator. After the implementation of an acQuire SQL Server database in 2004,

logging was changed to an acQuire data input form. This requires selection of attributes from a prescribed list, avoiding entry of non-standard symbols or qualifiers. The computerized geological logging format allows for recording mineralogy, structure, texture, alteration, rock type, colour, brightness, lightness, grain size, sorting, sphericity, shape, degree of decalcification, and carbon content.

Comprehensive geological geotechnical logging procedures were developed for drill core. Geotechnical logging is completed on core using industry standards as directed by the project geologist or geotechnical engineer. NGM maintains a written protocol for drill core logging and sampling.

Samples from core drilling are taken from the core tube and placed into coated cardboard boxes. Intact core may be broken to make it fit into the box slots. Core boxes are transported from the drill site to the Pipeline logging shed.

Core is measured and checked against run footage blocks and box labels for accuracy and sequence. Out of place core is reorganized and/or driller's footage blocks are relabeled as needed.

For surface core holes, digital logging protocols require the use of a standardized set of pull-down fields for structure, lithology (formation and rock type), metallurgical type, intensity codes for metallurgy and alteration, and geotechnical parameters such as rock quality designation (RQD) and number of fractures per foot. Comments can be added to the drill log at the geologist's discretion.

For underground operations, core is digitally logged for lithology, stratigraphy, basic structural data, recovery, alteration, and mineralization. Core is further scrutinized for detailed structural information such as faults and bedding angles as well as rock mass rating. Stope test holes are logged as required.

Prior to the implementation of digital logging, the project geologist directly typed the hand-written logging information into the database. No validation or double data-entry checks were employed at the time. Hardcopy logs that were used prior to the inception of the electronic logging are archived in files, labelled, and stored, or scanned and saved to network locations.

10.4 Recovery

10.4.1 RC

Prior to 1991, RC sample weights were not routinely digitized or added to the general drill hole database. Wet drilling conditions for RC holes prohibit measurements of sample weights and, as a result, recovery of RC materials cannot be calculated.

10.4.2 Core

Core runs of 1.5–3 m feet are typical in waste rock zones, but the shattered and broken nature of the Pipeline shear zone usually results in shorter runs.

In general, core drilling practices at Pipeline, Crossroads, Robertson, the Cortez Pits (NW Deeps), Cortez Hills, and Goldrush ensure a relatively high core recovery. Core recovery is sufficient to provide representative samples of sediment-hosted and intrusive-related gold deposits. Prior to 1991, core recovery values were not routinely digitized or added to the general drill hole database.

Core recoveries are maximized by use of triple-tube core barrels, face-discharge bits, and special drilling mud. Core recovery averaged 93% for 314 holes used in the Pipeline and South Pipeline feasibility studies. The median core recovery for the Cortez Hills and Goldrush deposits were 96% and 94%, respectively. Run lengths are reduced in bad ground areas to optimize recoveries.

10.5 Collar Surveys

10.5.1 RC

Collar grid coordinates were determined by optical surveys (1960s through late 1980s), field estimates, Brunton compass and pacing, compass-and-string distance, and most recently the use of laser survey or global positioning system (GPS) measurements. Since 1998, a Trimble GPS system has been used, which has 1 cm (0.4 inch) accuracy. From 1985 through 1998, a Topcon total station instrument was used, which was accurate to within five seconds of a degree. Drill hole collars were historically marked in the field using polyvinyl chloride (PVC) pipe. This practice ceased in the mid-1990s and NGM now employs painted laths or wire with brass ID tags that are cemented into the hole collar. Painted laths typically last about two to three years.

Drill collars are generally surveyed at the end of a drilling program unless requested sooner after the drill rig has moved off the drill pad. When a drill hole is abandoned, the collars are tagged with the hole IDs for easy identification during collar surveys by the mine surveyors. Surveys by the mine surveyors are transferred electronically from the GPS/total station to the computer of the appropriate project geologist who validates the data and then emails the data to the site database administrator to load into the acQuire database. Contracted certified surveyors are used for the Goldrush and Robertson project areas and their surveys are emailed to and loaded by the database administrator into the database. In either case, the collar survey in the database is validated by the appropriate geologist. Drill hole locations are field checked by either geologists or support staff, plotted on maps, and visually checked for reasonableness in the database.

10.5.2 Core

Historically, planned drill hole collar locations for underground drill holes were marked up by mine survey personnel using a Trimble total station instrument to determine the location of every hole and to establish front- and back-sites for all angle holes. More recently, the underground drill services personnel and drillers are provided with drill plans that detail the collar locations and the drillers collar the holes as close to the plan specifications as practicable.

Drillers use a north-seeking Reflex azimuth aligner to ensure proper setup. When an underground drill hole is abandoned, the collars are tagged with the hole IDs for easy identification.

Collar surveys are done by the mine surveyors using total stations. Planned surface drill hole collar locations are marked up by geologists or survey personnel using a Trimble GPS to determine the location of each hole. Historically, geologists or survey personnel also established front- and back-sites for azimuth, but currently, the azimuth is established by drill contractors using Reflex azimuth aligners. After drilling, surveyors pick up the final collar coordinates using a Trimble GPS.

10.6 Downhole Surveys

10.6.1 RC

Determination of the hole trace was historically accomplished in the Cortez Complex open pit mines by projection of the initial collar orientation, using a downhole single-shot or multi-shot film camera (typical for most underground surveys), use of a downhole precession gyroscopic survey tool, or a gyroscopic tool requiring initial orientation with a compass.

Current practice includes the use of gyroscopic surveys; with results being transmitted electronically and loaded to the database using pre-set software. Gyroscopic surveys are normally reported at 7.5 m or 15 m intervals.

10.6.2 Core

Downhole surveys are performed on all drill holes completed at the Cortez Complex. Historically, surveys included magnetic and gyro instruments, but currently a combination of conventional and north-seeking gyros are used. In underground operations, surveys are conducted by the drillers during the drilling process every 30 m for conventional gyros. At final depth, survey shots are taken every 3 m in and out for north-seeking gyros when adverse ground conditions are encountered. For drilling from surface, holes are surveyed with a recording north-seeking gyro by International Directional Services LLC (IDS) at or near final depth. Readings are taken every 15 m downhole.

Downhole surveying is done by drilling contractors using Boart Longyear Trushot, Reflex EZ-Trac, or Conventional Gyro instruments. These tools have built-in quality assurance and quality control (QA/QC) protocols and drill holes are resurveyed if there is a failure. A copy of the survey data is routinely plotted and compared with planned drill traces using Vulcan software. The data are also checked for appropriateness of survey intervals (frequency down the hole) and units of measurement, before being approved for upload. Survey points are transferred into the acQuire database primarily through Reflex Hub Data Management software, although the conventional gyro measurements are manually recorded and transcribed into the database. For a limited number of holes where ground conditions such as caving restrict access for the survey instrument, downhole surveys are incomplete. Drilling contractors use a Reflex azimuth aligner to set up on holes.

10.7 Geotechnical and Hydrological Drilling

Geotechnical drill holes have been drilled to provide data for the geotechnical design recommendations for open pits and to support mining operations. Geotechnical core holes consist of core drilling with the core placed into splits and geotechnically logged at the drill rig. Samples are taken during logging for laboratory testing. The core is boxed and sent to the core shed for geological logging. Both downhole and televiwer surveys are completed on all surface geotechnical drill holes. Data collected from televiwer surveys are reconciled against logging data for surface geotechnical holes.

Hydrological drilling is primarily conducted to collect water level data. Boreholes are either completed as an open standpipe, where water levels can be taken directly and more often, or the boreholes are abandoned with vibrating wire piezometers grouted in place.

Certain boreholes are subjected to extensive hydrological testing and downhole logging to establish aquifer parameters: injection (slug) tests, spinner tests, step tests, packer tests, short-term/long-term pumping tests, video logs and geophysical logs. These tests/logs are analyzed using classical hydrology methods. Some of the aquifers are in fractured bedrock and therefore, fracture-flow controlled. In-situ testing is relied upon more heavily than laboratory testing; however, in some of the alluvial aquifers, additional logging/laboratory testing of sonic cores is performed. The laboratory tests are completed to establish a detailed log using the Unified Soil Classification System (USC). Laboratory tests commonly include determinations for moisture content, Atterberg limit, grain size distribution, specific gravity, and permeability (flex-wall permeability tests).

10.8 Metallurgical Drilling

Metallurgical drill testing is completed in collaboration with Mineral Resource and Mineral Reserve drilling and not run as individual drilling programs. Metallurgists collaborate with the drill program managers to review the drill programs and targets for each project. This can include review of the anticipated lithologies, rock types, and mineralized zones that will be intercepted to determine where metallurgical samples should be collected. The metallurgists coordinate with the project geologists to ensure the geologists can collect the type of samples necessary for the particular type of metallurgical testing (e.g., whole or halved core, coarse rejects, pulps).

10.9 Grade Control

10.9.1 Surface

Grade control drilling is performed aiming to minimize geological risk in the orebodies, such that drill hole spacing is determined by risk. For example, where post-mineral dikes are present, tighter-spaced drilling is required. Resource classification is completed on a domain basis and that classification determines the drill hole spacing. Both core and RC drilling are completed.

Drill spacing used for grade control varies by deposit and lithologies. Drill spacing in alluvium is frequently 9.4 x 11 m, and in bedrock can vary from 4.9 x 4.9 m to 6.7 x 7.6 m.

10.9.2 Underground

Core and RC drilling are used to “de-risk” ore blocks underground. Although drill spacing depends on the risk being addressed, drill holes are typically spaced at about 15 m but can be as close as 9 m. The depth of the hole, closeness to infrastructure and historical deviations in the area are among the considerations for selecting between RC and core.

Drilling orientations depend on available platforms. Drilling is typically oblique to the dip and strike of the mineralization. Drilling is sub-horizontal around the Breccia Zone, and moderately to steeply inclined around the Middle and Lower Zones, due to the location of drill platforms and mineralization geometry.

No de-risk or grade control drilling was completed at the time of creating the Goldrush resource model. Future de-risk hole spacing is planned to be at about 15 m.

10.10 Sample Length/True Thickness

Sample lengths are determined more by geological changes in the core than the orientation of the drill hole relative to the mineralization.

Example sections showing the orientation of the drilling to the mineralization are provided in Figure 7-6, Figure 7-8, Figure 7-9, Figure 7-11, Figure 7-12, Figure 7-14, Figure 7-16, Figure 7-17, Figure 7-20, Figure 7-22, and Figure 7-24.

10.11 QP Comments on “Item 10: Drilling”

In the opinion of the QP, the quantity and quality of lithological, geotechnical, collar and downhole survey data collected in the drill programs are sufficient to support Mineral Resource and Mineral Reserve estimation:

- Drill hole orientations are appropriate to the orientation of the mineralization;
- Drilling is normally perpendicular to the strike of the mineralization, but depending on the dip of the drill hole, and the dip of the mineralization, drill intercept widths are typically greater than true widths;
- There are no known drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the results;
- Core logging meets industry standards for gold exploration;
- Geotechnical logging of drill core meets industry standards for mining operations;
- Collar surveys have been performed using industry-standard instrumentation and procedures;
- Downhole surveys have been performed using industry-standard instrumentation and procedures.

Example cross-sections showing the relationship of the drilling to the mineralization were included in Section 7.3.

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 Sampling Methods

11.1.1 Air-Rotary and Mud-Rotary Drill Sampling

Sampling was carried out at 1.5–3 m intervals. Early (mid-1980s) rotary air sampling may have been accomplished in dry conditions using non-porous plastic bags. Sample numbers were assigned using sample ticket books.

11.1.2 RC Drill Sampling

RC sampling is performed by the drillers in 1.5 m intervals for Gold Acres drilling and in the initial 1991 drilling at Pipeline. By late 1991, RC samples at Pipeline were collected on 3 m intervals per the protocol for Cortez Hills. Since 2017, all RC drilling samples are collected on 1.5 m intervals with the exception of condemnation drilling programs still sampled on 3 m intervals. Samples are wet-split and dried at the rig, and are then picked up at the drill sites by geological technicians.

Drilling is almost always carried out with water injection. Drilling below elevations ranging from 1,524–1,737 m at Cortez Hills is below the water table.

11.1.3 Core Sampling

Most drill core from Pipeline and Cortez Hills was sampled and assayed at 3 m intervals, though several holes were assayed at 1.5 m or variable geological intervals early in the drilling programs. Since 2004, exploration core holes have been sampled on 3 m intervals in barren rock and on geologically-defined intervals up to 1.5 m in mineralization. The Goldrush core programs used nominal 1.5 m intervals in zones of mineralization and an envelope surrounding the mineralization, and nominal 3 m intervals in zones of waste.

Underground core and surface de-risk/mine exploration drill holes are sampled on 1.5 m intervals; however, samples could range from 0.6–1.8 m to facilitate respecting lithological or mineralization contacts. Surface drilling sample lengths can be extended to 3 m in known zones of waste.

Almost all core was sawn in half by a technician. Underground de-risk core is sawn or whole core sampled as needed. A hydraulic splitter was used for extremely hard rock to maintain acceptable production rates. Any fragmented core that was less than one inch in diameter was split through a riffle splitter. One-half of the core or a riffle split was placed back in the original core box.

11.1.4 Blasthole Sampling

Current open pit practice is to single sample the 12 or 15 m blastholes (depending on bench height). Double samples may be taken representing the top and bottom halves (6 or 8 m) of a

blasthole when split benching is used for more economic extraction of thinner mineralized horizons.

A representative sample of blast hole drill cuttings is collected by placing a 15 cm diameter, 30cm tall vertical cylinder near the drill hole and inside the rig dust rubber curtain. Approximately 3–3.5 kg of material is collected. The sample number records the location and uses a bar-coded tag.

Blast hole sample results are used for open pit mine grade control; however, the results are not used to support Mineral Resource and Mineral Reserve estimates.

11.1.5 Underground Sampling

Samples are taken either from the face or from the muck bay if the face is not safe to sample. Muck samples are taken every as regular scoops at set intervals from the muck pile of a given round. The sampling equates to approximately one sample per 91 t. The muck sample is placed in 30 cm by 45 cm bar-coded bags and represents approximately 9 kg of material.

Bulk muck from longhole stopes or benches is sampled from the blast hole sample cones. Each row of blast cone samples is composited into one assay. The combination of all composited row assays is weighted and averaged together based on the ratio of total row holes lengths to total row hole lengths for the entire stope. This grade is then assigned to all tons coming out of that given stope.

Underground muck and blasthole sample results are used for mine grade control (i.e., material routing on a round-by-round basis) but are not used to support Mineral Resource and Mineral Reserve estimates.

11.1.6 Geotechnical Sampling

Samples are taken from both soil and rock at different intervals for laboratory testing. Soil samples are tested for density, specific gravity, mechanical sieve, hydrometer, clay size fraction, Atterberg limits, moisture content, strength, permeability, US classification and consolidation. Rock samples are tested for strength, density, and hardness. Soil infill and fault gouge samples collected from rock units were tested for density, mechanical sieve, hydrometer, clay size fraction, Atterberg limits, and Unified Soil Classification System classification and consolidation. The information is compiled into a database to determine geotechnical design sectors.

11.2 Density Determinations

Whole core sampling for bulk density measurement was initiated in April 1992 at the Pipeline deposit and density was determined from a total of 467 ore and waste samples. Standard practice since 1999 has been to collect samples at 10.7–12.2 m intervals in mineralized rock and one sample within 15.2 m in the hanging wall and footwall. Current best practice is taking density samples every 10.7–12.2 m in both mineralized and unmineralized rock to obtain accurate densities of any material that may be mined.

Density is primarily determined by the wax coat/water immersion method. There are five other methods, which have been used in the past and may be used on occasion, depending on the situation:

- Fragment displacement (lacquer-coated fragments are immersed in water);
- Core displacement (lacquer-coated core is immersed in water);
- Core axis length and diameter is measured and applied to dry weight of sample;
- Plastic sleeve (poor quality core in PVC pipe is wrapped and immersed in water);
- Buoyancy (competent core is wrapped in cellophane and immersed in water).

Density ranges by deposit are presented in Table 11-1.

11.3 Analytical and Test Laboratories

Prior to 2000, the mine laboratories at Mill No. 1 (Laboratory No. 1) and Mill No. 2 (Laboratory No. 2) prepared and assayed the majority of exploration samples, principally those for Pipeline, Crossroads, and Cortez NW Deep (Cortez Pits). Laboratory No. 1 was located at the old Cortez Mine facility and closed in 1997. Laboratory No. 2 was constructed in 1997 and is currently operating at the Pipeline process facility.

Several commercial laboratories, independent of the Cortez Complex, were used for assaying or check assaying since 1991, including Rocky Mountain Geochemical Laboratory, American Assay Laboratories (Sparks, Nevada), ALS Chemex (now ALS), Barringer Laboratories (now Inspectorate) in Reno, Nevada, and Monitor Geochemical Laboratory (Elko, Nevada). Samples were sent in the past to the Placer Dome Research Centre, which was not independent.

ALS has been the primary independent commercial laboratory. The majority of core and RC samples for the Cortez Complex were prepared by the ALS Global Geochemistry Analytical Laboratory in Reno, Nevada, USA (ALS Reno), and assayed by the ALS Global Geochemistry Analytical Laboratory in Vancouver, British Columbia, Canada (ALS Vancouver) or at ALS Reno. These laboratories are ISO/IEC 17025:2005 and ISO 9001:2015 accredited for selected sample preparation and analytical techniques.

Since 2005, all exploration assaying, as well as underground assaying for development drilling at Cortez Hills, supplementary drilling at Pipeline and Crossroads, and delineation drilling at Goldrush, has been performed by ALS. In 2021, some underground RC samples were initially assayed by the mine internal laboratories, after which 5% of the samples were submitted for re-assayed by ALS to confirm the accuracy of the internal laboratory results.

The Cortez mine laboratory is neither independent nor ISO-accredited and has been principally used for mine-related grade control samples and processing analysis.

Table 11-1: Density Table

Area	Holes in Project	% Holes With Density	% Footage with Density	Count Analyses	Mean (t/m ³)	Median (t/m ³)	Min (t/m ³)	Max (t/m ³)	Variation	Standard Deviation
Cortez Hills	5,517	28.19	0.13	14416	2.52	2.61	1.25	3.47	0.06	0.24
Cortez Pits	2,334	1.89	0.02	457	2.48	2.52	1.29	2.91	0.06	0.24
Goldrush	3,157	20.08	0.08	5498	2.45	2.54	1.28	3.38	0.07	0.26
Pipeline	8,598	5.89	0.02	3244	2.51	2.55	1.27	3.45	0.08	0.29
Robertson	1,715	3.38	0.02	393	2.62	2.63	2.12	3.34	0.02	0.13
Total	21,321	13.12	0.07	24008	2.50	2.58	1.28	3.43	0.06	0.25

11.4 Sample Preparation

Historical sample preparation procedures evolved over time, but were typically the same for the independent commercial laboratories and Cortez Mine laboratories. Initially, samples were crushed to -10 mesh, then pulverized to 100% passing 150 mesh. The coarse-crush protocol was changed to 80% passing 10 mesh in late 1992, and between 1992–1997, it was changed to 95% passing 6 mesh. In 1998, the crushing protocol was changed to crushing to minus ¼ inch, then pulverizing to 95% passing 8 mesh.

Sample preparation for the Robertson samples varies from the general Cortez sample preparation so as to better account for the free gold found at Robertson. Robertson samples are sent through an initial crush, with 90% passing at 2 mm, followed by a 1 kg rotary split. This split is then pulverized to 90% passing 75 µm. A 250 g pulp is then selected, with a 30 g assay charge for the final fire assay.

The current mine laboratory protocol is to crush to a 30–45% passing 10 mesh and then pulverize to >89% passing 200 mesh. The current ALS protocol consists of crushing to >70% minus 2 mm, and pulverizing to >85% passing 75 µm.

11.5 Analysis

There are 19 laboratories that are tracked in acQuire plus some unknown legacy laboratories that have been used by the Cortez Complex. Analyses include digests by aqua regia, cyanide, sulfuric, three, four, or five acid digests and measured by weight, atomic absorption, mass spectrometry, X-ray fluorescence (XRF), colorimetric, fire assay, and LECO carbon-sulfur methods. A laboratory summary is presented in Table 11-2.

Additional assay and digest methods, as recorded in the databases of the 1960s, were typically used for exploration or other specialized purposes such as gas sampling, and were not consistently carried out. They include sulfuric acid, aqua regia, and cyanide digests, and gravimetric, total copper, neutron activation analysis, X-ray diffraction (XRD), and XRF analytical methods.

Table 11-2: Analytical Laboratories

Laboratory Abbreviation	Laboratory	Number of Samples	Number of Analyses	Sample Preparation/ Analysis
AAL	American Assay Laboratories	42,201	474,585	Four-acid; aqua regia; cyanide; Cold Vapor Hg; Density; fire assay; ferric sulfate; sulfuric acid; nitric acid–fluorine–perchlorate–boric acid; LECO, preg-rob; unknown
ACM	Acme Analytical Laboratories. Purchased by Bureau Veritas Minerals in 2012	1,509	51,876	Aqua regia
ALS	ALS Chemex. Formed from the merger of ALS Australia and Chemex North America.	1,053,719	21,038,344	Four-acid; acid; aqua regia; cyanide; carbonate–nitrate fusion; colorimetry; Cold Vapor Hg; Density; fire assay; fusion; sulfuric acid; hydrochloric acid; hydrochloride–potassium chloride; hydrochloride–potassium chlorate; nitric acid–potassium chlorate; nitric acid–bromine; hot hydrochloric–nitric acids; instrumentation neutron activation analysis; isotope; LECO; lithium borate; LOI, NA, ammonium acetate; preg-rob; roast; unknown; XRF
ASR	ASR	4,833	6,614	Cyanide; fire assay; preg-rob
BGR	Barringer	15,325	53,268	Aqua regia; cyanide; fire assay; LECO; unknown
BON	Bondar Clegg Acquired by ALS Chemex in 2001 and ceased to do business under the Bondar Clegg name	1,363	5,086	Four-acid; cyanide; fire assay; fusion; LECO; unknown
CAS	CAS	268	340	Cyanide; fire assay
CGM	Cortez Gold Mine Laboratory	148,582	357,352	Cyanide; Cold Vapor Hg; fire assay; hydrochloric acid; LECO, sodium carbonate; preg-rob; XRF
GSM	Goldstrike Laboratory	39,870	341,516	aqua regia; bleach; cyanide; Cold Vapor Hg; Density; fire assay; hydrochloric acid; LECO; sodium carbonate; preg-rob; unknown; XRF

Laboratory Abbreviation	Laboratory	Number of Samples	Number of Analyses	Sample Preparation/ Analysis
HML	Hunter Mining Laboratory	262	524	Fire assay
IAC	Inspectorate America Corporation. Purchased by Bureau Veritas Minerals in 2012	17,764	355,018	Four-acid; aqua regia; cyanide; Cold Vapor Hg; fire assay; sulfuric acid; LECO; preg-rob; unknown
JCL	Jerritt Canyon Laboratory	543	2,172	LECO
MON	Monitor Laboratory	13,148	15,098	aqua regia, cyanide; colorimetry; fire assay; LECO, preg-rob; unknown
NGC	Gold Quarry Laboratory	822	10,378	aqua regia, cyanide; Density; fire assay; hydrochloric acid; LECO; preg-rob, Roast; unknown; XRF
RMG	Rocky Mountain Geochemistry	91,459	176,099	Four-acid; aqua regia; cyanide; colorimetry; CV; fire assay; preg-rob; unknown
SCI	SciAps; handheld pXRF and LIBS	332	11,940	Laser, pXRF, pXRFe
SFG	Santa Fe Pacific Gold	33,087	269,274	Cyanide; fire assay; LECO; unknown
SGS	SGS Minerals Services	4,680	74,901	Four-acid; aqua regia; cyanide; CV; fire assay; LECO; NA; preg-rob; unknown
UNK	Unknown	584,929	1,124,771	Four-acid; aqua regia; bleach; cyanide; Cold Vapor Hg; Density; fire assay; fusion; LECO, lithium borate; preg-rob; roast; unknown
UVR	UVR	2,254	2,449	Cyanide; fire assay; preg-rob

The Cortez mine laboratory fire assay samples are processed at ½ assay ton (15 g) gold. The Cortez laboratory has the ability to process 1 assay ton (30 g) gold or specialty amounts; however, this decreases the volume of samples that can be accepted and increases the turnaround time.

Fire assay samples undergo aqua regia digestion and are analyzed by atomic absorption (AA), which has a detection limit of 0.05 g/t Au. Gravimetric analysis is performed on samples grading over 15 g/t Au and on any samples requesting gravimetric analysis specifically. The detection limit for gravimetric analysis is 0.086 g/t Au. Additional FAs are added when a sample does not meet specified requirements. Duplicate fire assays can be completed if requested. If only a fire assay is done with no other analysis, a duplicate fire assay is performed (the duplicate must be within 10% of original or it is re-done).

In 2004, ALS assayed Cortez Hills samples by FA with an AA finish, using a 30 g pulp aliquot. All samples reporting >3.43 g/t Au on the initial assay were re-assayed by FA with gravimetric finish. Cyanide leach gold assays were performed for initial FAs >0.27 g/t Au. A cold cyanide shake leach, analyzed by AA, was performed if the initial fire assay was >0.5 g/t Au. If the initial fire assay was >1.37 g/t Au and <5.14 g/t Au, a “preg-rob” test was performed by combining 10 g of pulp with 20 mL of a 1.71 g/t Au cyanide solution and agitating for 8–10 mins, then analyzing by AA. Samples with a cyanide soluble (AA)/FA ratio of <0.3 are routinely assayed for sulfur and total carbon in a LECO furnace. The current practice is to FA, AA, and test for preg-rob on all intervals within pre-selected zones. More selective triggers apply in unmineralized zones.

Completed assays include:

- Gold analyses: gold assay (0.005–10 ppm) by 30 g FA/AA analysis (Au-AA23 procedure);
- Au (0.03–50 ppm by cyanide leach, atomic absorption spectroscopy (AAS)), 30 g nominal weight (Au-AA13 procedure);
- Gold by FA and gravimetric finish, 30 g nominal weight, range 0.05–1,000 ppm Au (Au-GRA21 procedure);
- Multi-element analyses by aqua regia digestion/inductively coupled plasma-atomic emission spectroscopy (ICP-AES)/ICP-mass spectroscopy (ICP-MS), 51 elements or 48 element analyses by four acid and ICP-AES/ICP-MS (ME-MS41 procedure or ME-MS61m procedure, respectively).

Preg-rob and LECO analyses are run on pre-selected zones within the Goldrush deposit. The current practice is to assay first, and then choose intervals to run preg-rob and LECO analyses on original sample intervals within the mineralized zones and in a 15 m envelope surrounding mineralization.

The majority of the drill holes in the Cortez Complex area have had multi-element geochemical sampling. Prior to 2013, multi-element sampling was completed via aqua regia digestion. After 2013, all multi-element sampling was analyzed at ALS using four-acid digestion with an ICP-MS finish for 48 elements.

11.6 Quality Assurance and Quality Control

11.6.1 Introduction

Prior to the mid-1990s, few companies had rigorous QA/QC programs in place. QA/QC had typically consisted, where undertaken, of reanalysis of drill core or other samples when later sampling indicated a potential problem.

QA/QC for sampling, sample preparation, and assaying has evolved within the Cortez Complex since 1991. Current procedures include insertion of blanks and certified standard samples into sample streams to the mine and commercial laboratories, check assays of pulp duplicates by commercial laboratories, and assaying of coarse reject duplicates. Since 2006, NGM corporate geochemists have inspected the laboratories that undertake analysis and sample preparation for the Cortez Complex.

NGM's QA/QC practices for exploration consist of a minimum of one standard reference material (standard), one blank, and one duplicate introduced per batch of 20 samples to the sample stream resulting in 10% quality control samples.

Underground grade control drilling involves insertion of one standard and one control blank for every 30 samples; however, because whole core is often sampled there is limited opportunity for duplicate samples.

Current Robertson QA/QC involves the insertion of matrix-matched standards and blanks at a 5% insertion rate. Pulp duplicates and coarse duplicates are also inserted at a rate of 5%.

The on-site laboratory runs its own internal QA/QC program that uses commercially prepared and purchased standards of various grades. The laboratory is organized such that quality control samples are inserted automatically. Different grades of standards are used and run with underground, open pit, and mill process samples.

11.6.2 Standards

Standards were originally made from stockpile materials at the Cortez mine. Since 2006, either commercially-available standards from Rocklabs or standards made from bulk samples sent from NGM's Nevada operations to CDN Resource Laboratories Ltd for round robin analysis were used. Approximately 20 standards are currently in use.

Standards for Robertson are purchased from OREAS, with standards selected from gold deposits with similar sulfides and host rocks.

Standard samples are inserted into the sample stream at a ratio of 1:30 for surface exploration and approximately 1:20 for open pit and underground production samples. A failure is declared when the same standard exceeds two consecutive ± 2 standard deviation (SD) warnings or when an individual result exceeds ± 3 SD from the expected result. The geologist in charge is notified when a standard failure occurs. The geologist then determines if the failure can be accepted, e.g., located in an unmineralized zone or a verified standard swap. If the geologist determines the result cannot be accepted, the laboratory is requested to re-run the failing batch.

11.6.3 Blanks

Prior to 2006, blank material was made from un-mineralized drill core from Gold Acres, waste rock from the Cortez Pits, or alluvial gravel taken from a pit near the Gold Acres haul road. Since 2006, landscape marble has been the material used to make blank samples for QA/QC for the Cortez Complex.

The following criteria are used to evaluate analytical results received for blank samples:

- Assay result <0.069 g/t Au = pass;
- Pass limit is extended by 1% carryover from surrounding samples;
- Assay result ≥ 0.069 g/t Au = failure.

The geologist in charge is notified when a blank failure occurs. The geologist then determines if the failure can be accepted, e.g., the blank sample has been accidentally switched with a CRM or non-QA/QC sample, or the sample is located in a known waste area away from mineralization. If the geologist determines the result cannot be accepted the laboratory is requested to re-run the failing batch.

11.6.4 Duplicates

Duplicates of coarse rejects from RC samples were historically submitted at the rate of one in 30 samples. Between 2016 and 2018, duplicates of coarse rejects from core samples were limited; however, this practice was re-implemented in 2019 with updated QA/QC best practices requiring the insertion of field, coarse, and pulp duplicates.

The updated standard for duplicates is as follows. The minimum duplicate insertion rate for RC drilling is three duplicates in every 40 samples (7.5%), consisting of field duplicates inserted at a rate of one in every 20 samples and pulp duplicates inserted at a rate of one in every 40 samples. The minimum duplicate insertion rate for core drilling is one duplicate in every 20 samples (5%), consisting of coarse duplicates inserted at a rate of one in every 40 samples and pulp duplicates inserted at the rate of one in every 40 samples.

For core that is being split before assay, field duplicates may also be inserted, but the insertion rate, if any, is project specific as determined by the site QP.

11.6.5 Check Assays

Historically, 2% of the Cortez original sample pulps were sent for independent check assays. Using the original assay results from the primary laboratory as a guide, the geologist selected the pulps to be submitted for check assay. The selected pulp suite was representative of the ore types present in the samples, and included high-grade, low-grade, and waste material. A large number of commercial laboratories were used in the past but the number has been reduced to SGS-Canada for drill sample checks, and ALS, Rocky Mountain Geochemical Laboratory, American Assay Laboratory, Inspectorate, and Monitor Geochemical Laboratory for samples originally processed by the mine laboratory.

In 2015, growth, resource conversion, and infill drilling at the Cortez Complex discontinued the use of outside check samples; however, exploration drilling in the district continued a robust check assay program (submitting samples at 5% check rate) to an offsite umpire laboratory.

In 2021, the practice of submitting assay samples at a 5% check rate was re-implemented for growth, resource conversion, and infill drilling. Sample submission for check assays is at the rate of one in 20 samples in individual projects with the intention of becoming standard for all projects.

Results of such historical check assays were mixed with assays prior to 1997 showing no significant bias, while assays between 1997 and 1999 showed greater differences. Check assays on samples primarily from the Cortez Hills deposit submitted to Rocky Mountain Geochemical and American Analytical laboratories in 2000 to 2003 show little variability, with most results being within $\pm 10\%$. A 2021 check assay review was underway as at the Report effective date.

11.6.6 Screen Assays

Screen check assaying is not done at Cortez. Previous testwork determined that coarse gold has not been an analytical issue to date, given the disseminated distribution and very fine-grained character of the gold mineralization.

Screen checks have been implemented at the Robertson project and the protocol will be assessed to determine if it is beneficial.

11.7 Databases

11.7.1 Exploration and Drill Data

The Cortez technical database is being managed by the acQuire system implemented in 2004, replacing an earlier database system. Exploration data from a variety of sources are imported into acQuire using a variety of techniques and procedures to check the integrity of the data entered. Data that were collected prior to the introduction of digital logging have been subject to validation, using built-in program triggers that automatically checked data upon upload to the database. Since the mid-1990s, geological data have been validated by software routines and uploaded directly into the database. Analytical data are uploaded from digital sources. Survey data is uploaded by the project geologist from digital survey files. Verification is performed on all digitally collected data upon upload to the main database, and includes checks on surveys, collar coordinates, lithology data, and assay data.

The Cortez drilling data was merged with the NGM drilling database during November 2020 and the Cortez drilling database was archived.

Since 2009, Cortez Hills and Pipeline Complex blasthole data and Cortez Hills underground drilling data have also been imported into acQuire.

11.7.2 Database Security

Database security and integrity are accomplished by restricting access and user level permissions that are set by the Database Manager. Once data entry and validation are completed for a drill hole, access is locked. There are procedures for updates that retain all the original information and prioritize use of the updates.

Digital backup copies of the geological logs are stored offsite. All hardcopy logs that were used prior to the inception of digital logging are archived in files, labelled, and stored in the exploration or mine geology offices.

11.7.3 Density

Density data and its metadata (weights, measurements, and analysis methods) are stored in the acQuire database as assay data from the core samples selected by a geologist. The data are provided in a spreadsheet by the in-house Cortez Process Metallurgical Laboratory to the acQuire database administrator. The data and its metadata are then imported into the acQuire database. No checks have been run on the densities at this time but are planned. Steps are now in place to approve the data by the stakeholder. Densities are directly available in Leapfrog and exported in CSV files which are examined by the resource modelers and available for examination by the geologists.

11.7.4 Geotechnical

11.7.5 Open Pit

Surface geotechnical data are collected during drill programs starting with core logging that occurs at the drill rig on paper. Geomechanical and core orientation sheets are scanned and saved on the geotechnical network. Geomechanical data are entered and saved on spreadsheets with copies distributed to geotechnical design consultants and the site geotechnical team. The geomechanical data are entered into the acQuire database for use in geotechnical models. Downhole televiewer data are collected with the site geotechnical team performing data reconciliation. Reconciled data are stored on the geotechnical network and shared with the geotechnical design consultants. Laboratory testing samples are collected at the drill rig during logging and sent off for testing. Results for geotechnical laboratory testing are documented on spreadsheets that are compiled by the geotechnical design consultants and distributed to the site team once complete.

11.7.6 Underground

Core retrieved from underground drilling is logged by site geologists/contract loggers for geotechnical parameters. These parameters are inputted directly into the acQuire database and used in the determination of rock mass classification. Acoustic tele-viewer (ATV) data are used on selected holes to record minor discontinuity data. All core is processed at a surface core shed

where logging, sampling and photographing is conducted. Samples are sent to designated rock mechanic laboratories for testing as needed.

11.8 Sample Security

Grade control samples from operations are managed by employees of the Cortez mining operation and its drill contractors, while exploration samples are managed by Barrick exploration personnel and its contractors. Prior to 2008, the chain-of-custody was managed by Cortez JV staff and their contractors.

Blast hole samples are delivered directly from the open pits to the Cortez mine laboratory. Underground muck samples are dropped off at sample tables located throughout the underground workings where sample technicians retrieve them up and bring them to surface.

Blast hole samples for bulk muck are sampled by sample technicians, and then brought to surface. These are then brought to the sample room at the F-Canyon Office block. Underground RC and core samples are brought to surface by contract drillers then left and checked into the sample office on surface.

Sample security relies on the samples being either always in custody of Cortez personnel or stored in the locked on-site preparation facility or stored in a secure area prior to pick-up by ALS Laboratory personnel or delivery to the on-site Cortez laboratory. A unique and independent sample number is used for each sample with dispatch-submittal sheets and database entries used to track the progress of samples and to ensure that all samples are received by the laboratory.

Unique and independent sample numbers and sample tags are used in all cases. Sample dispatch and submittal sheets are used to check and track samples through the system. Sample information is entered into the computer database to track the samples and record results.

11.9 Sample Storage

RC chip trays are stored in a central warehouse facility on site. Until the 1970s, representative RC chips were glued to boards as hole records; however, none have survived.

The retained core is stored on site. Barrick exploration has a core storage facility, which contains drilling for the site, located near the Pipeline administration office. Other sample storage areas include the East Pit at Cortez, and the Gold Acres Pit. Older core for mined-out portions of the deposits has been skeletonized to reduce storage.

Sample rejects are retained, but stored outside where they degrade after two to three years.

11.10 QP Comments on “Item 11: Sample Preparation, Analyses, and Security”

The QPs consider that the sampling, sample preparation and analytical methods are acceptable, meet industry-standard practice, and are adequate for Mineral Resource and Mineral Reserve estimation and mine planning purposes:

- Data are collected following NGM-approved sampling protocols;
- Sampling has been done in accordance with industry standard practices;
- Sample intervals of 1.5–3 m for RC, and intervals varying from 0.6–3 m for core drilling, broken at lithological and mineralization changes, are typical of sample intervals used for Carlin-style gold mineralization in the industry, and are considered to be representative of the true thicknesses of mineralization;
- There are monthly submissions of QA/QC samples and reporting;
- Sample preparation for samples that support Mineral Resource estimation is adequate. The preparation procedure is in line with industry-standard methods for Carlin-style and intrusive related gold deposits;
- Drill sampling has been adequately spaced to first define, then infill, gold anomalies to produce the prospect-scale and deposit-scale drill data;
- A QA/QC program comprising blank, standard and duplicate samples has been in place for most areas since the 1990s. The QA/QC submission rate meets industry-accepted standards of insertion rates;
- Data that were collected prior to the introduction of digital logging have been subject to validation, using in-built program triggers that automatically checked data on upload to the database;
- Verification is performed on all digitally collected data on upload to the main database, and includes checks on surveys, collar co-ordinates, lithology data, and assay data. The checks are appropriate, and consistent with industry standards;
- Sample security has relied upon the fact that the samples were always attended or located in sample preparation facility with security presence. Chain-of-custody procedures consist of sample submittal forms that are sent to the laboratory with sample shipments to make certain that all samples are received by the laboratory; and
- Current sample storage procedures and storage areas are consistent with industry standards.

12.0 DATA VERIFICATION

12.1 Internal Data Verification

12.1.1 Data Reviews

Assay data verification performed during data upload is discussed in Section 11.7.

The relevant project geologists individually review and sign off (accept/reject) on the stored collar coordinates, downhole surveys, economic metals, and other resource modeled parameters for the drilling programs for which they are responsible.

A modelling geologist also must review and verify the collar survey, downhole survey, and geological logging before the data are used in resource modelling. Missing data, failure to survey, and use of planned data must be noted and such data inclusion in the resource model is at the discretion of the geologist. However, many of the drill holes with missing or wrong data are rejected at this stage and do not support Mineral Resource and Mineral Reserve estimates.

12.1.2 Bias Evaluations

In 2003, an in-house study was carried out to determine the causes of historical biases between resource estimates based on exploration drilling, mine production based on blast hole models, and mill production. Bias adjustment factors were developed, however, by 2006 most of the affected areas had been mined out. Remaining data were evaluated on a hole-by-hole basis and where a downhole contamination or bias issue occurred it was noted. The drill hole in question was flagged and was not used to support Mineral Resource or Mineral Reserve estimates. No bias adjustment factors for assay data have been used since 2007.

12.1.3 RC Contamination Reviews

An in-house study, triggered by downhole contamination noted in at least three RC drill holes, was undertaken in July 2004 to compare results from RC and core holes used in the Cortez Hills resource estimate. Core versus RC twin data were reviewed and resources were estimated separately based on only RC data and on only core data for comparison.

Additional core drilling at Cortez Hills since 2004 has since replaced the three contaminated holes along with additional RC drill holes with suspected contamination. Subsequent drilling programs for mine exploration and infill over the life of the Cortez Hills open pit were completed with core. The intervals with suspected contamination were rejected for resource estimation purposes.

12.1.4 Sampling Reviews

NGM reviewed the use of a pie sampler versus the cylinder sampler and found no significant difference in assays between the methods for 1,900 blast holes. The cylinder sampler was retained.

12.2 External Data Verification

External data verification was undertaken by a number of third-party firms from 2004–2018. The QP reviewed the results of these external reviews.

AMEC E&C Services Inc. reviewed the Cortez Hills drill database in 2004 and 2005, checking lithological and analytical data and database integrity. Data were found to be suitable to support Mineral Resource estimation.

Roscoe Postle Associates (RPA) undertook reviews of the database as part of audit review reports and in support of technical reports on the Project as follows:

- July 2010: the software system GEMS was used to validate the drill hole database using software routines that trap errors and potential problems. GEMS validation routines found some downhole survey records lacking collar zeros and several cases of zero intervals, most at the end of lithology files/tables. None of these minor errors have an impact on resource estimation;
- January 2012: review focused on the databases supporting the June 30, 2011 Mineral Resource and Mineral Reserve estimates for the Cortez Hills Complex open pit, underground, and Lower Zone models. Vulcan database validity routines found no errors with out-of-range values, or from-to intervals, and that sample lengths and assays values were within reasonable limits. With a few minor exceptions, drill hole collars were found to be within the area limits of the model. A spot-check comparison of the supplied resource databases against original documents for collar surveys, downhole surveys, and laboratory assay certificates showed no material issues;
- May 2015: looked for overlapping sample intervals, empty database tables, and visually anomalous survey records. A spot-check comparison of the supplied resource databases against original documents for laboratory assay certificates was conducted. No material issues were noted.
- 2019 NI 43-101 technical report: No material issues with the database were noted.

Mine Technical Services Ltd (MTS) undertook a database review in 2018. For data from 2013–2018, the audit analyzed 71% of the 2013–2018 collar information, 13.8% of the downhole survey data, 18% of the FA assay data. MTS performed high-level checks on lithology and density measurements. MTS also recommended the mine surveyors implement improvements to the collar certificate information and procedures, including additional information about base stations, instrumentation and refinements to drill hole exclusion criteria for future estimates. MTS concluded that collar, downhole survey, and assay information in the database were generally adequate to support Mineral Resource and Mineral Reserve estimation and mine planning.

12.3 QP's Personal Verification

The QP (Mr. Olcott), personally visited the Cortez Hills underground and the Crossroads, Pipeline, Gold Acres and Robertson open pit projects several times during 2021. A review of the data for the Goldrush and Cortez Hills underground deposits, the Crossroads, Pipeline and Gold Acres

open pit deposits and the Robertson project was completed with the responsible project geologists and database manager. The review included:

- Drill hole planning and location methodology including surveys;
- Review of logging procedures;
- Review of sample intervals and that samples respected geological and mineralization changes;
- Checks that the mineralized intercept occurred where expected in the drill hole such that there was no accidental drill hole number switches for drill holes drilled from the same pad;
- Results of QA/QC data verification.

These reviews supported that the collar locations, downhole surveys and assay data are of adequate quality for Mineral Resource and Mineral Reserve estimates.

12.4 Comments on Data Verification

The checks performed by NGM staff, including the continuous QA/QC checks conducted by the database administrator and Project geologists on the assay data and geological data, plus the visits to the preparation and assay laboratories are in line with or above industry standards for data verification. These checks have identified no material issues with the data or the Project database. No unannounced laboratory visits have occurred in the past two years due to Covid-19 considerations.

External reviews were performed by external consultants, with no material issues with the data or the Project database identified. Issues that were raised by the reviewers were addressed post the review period. The QP reviewed the results of these external reviews.

As part of his data verification, the QP reviewed drill hole planning, logging procedures, sampling methods, sample intervals, and verified QA/QC data.

As a result of the data verification, the QP concludes that the Project data and database are acceptable for use in Mineral Resource and Mineral Reserve estimation and can be used to support mine planning.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

As a result of the approximately 50 year mining and processing history of the Cortez Complex, a significant number of metallurgical studies including laboratory scale and/or pilot plant testwork have been completed, and historical operating data are available. The Cortez Complex has used numerous processing methods including carbon-in-leach (CIL) for higher-grade oxide ore, heap leaching for lower-grade oxide ore, roasting for carbonaceous refractory ore, and pressure oxidation (POX) for higher-grade sulfidic ore. Mill No. 1, which included CIL and a roaster, was placed on care and maintenance at the end of October 1999. The roaster has been inactive since 1995 and has been demolished. Mill No. 2, also referred to as the Pipeline Mill, was constructed in 1997, and is operational.

13.2 Metallurgical Testwork

13.2.1 Overview

The Cortez Complex has extensive metallurgical testing facilities so much of the testwork is done on site; however, NGM uses external laboratories when specific expertise is needed or when timing dictates that the data are needed sooner than the in-house laboratory can provide it.

Testing was conducted by laboratories including McClelland Laboratories Inc. located in Reno, Nevada, USA, (McClelland), FLSmidth in Salt Lake City, Utah, USA (FLSmidth), Hazen Research Inc. located in Golden, Colorado, USA (Hazen), Kappes, Cassiday Associates located in Reno, Nevada, USA, the NGM Goldstrike laboratory located north of Carlin, Nevada, USA (NGM Goldstrike), and AuTec located in Vancouver, British Columbia, Canada (AuTec). McClelland, FLSmidth, Hazen, and AuTec are currently independent of NGM. The NGM Goldstrike laboratory is not independent. The AuTec laboratory was not independent at the time that metallurgical testwork on the Goldrush deposit was performed. Metallurgical testwork laboratories are not accredited for metallurgical testwork performed; however, they may have accreditations for chemical analyses.

Metallurgical testing of new ore types confirmed the selected processing unit operations and has provided data to estimate capital and operating costs and gold recovery. Test data were also generated to determine the expected performance in Mill No. 2 as new Mineral Reserves have been estimated and included in the LOM plans.

Ore routing is conducted based on cyanide leaching amenability (CNAA) to fire assay (FA) ratio and preg robbing percentage. If the AA to FA ratio is >50% and the preg rob percentage is <40%, the ore is designated as oxide ore. If the AA to FA ratio is <50% or the preg robbing percentage is >40%, the ore is designated as refractory. The oxide ore will be routed to the Pipeline Mill or a heap leach pad depending on the gold grade. The refractory ore is routed to the Carlin refractory facilities.

Ore routing rules for any future production from Robertson are expected to vary from those used historically at the Pipeline Mill and will likely be based on grade. This will be evaluated continually using actual production data and is subject to change.

13.2.2 Cortez Hills Underground

The Cortez Complex will continue processing Cortez Hills Underground material through the LOM. Currently, mining is finishing up in the Middle Zone and moving into the Lower Zone/Deep South. As the majority of historical test work was done on Middle Zone material, testwork during 2021 focused on the Lower Zone/Deep South area.

Drilling core samples were selected from various future mining zones with a focus on updating/validating recovery curves for oxide material. Tests include gold fire assays, cyanide soluble gold analyses, carbon and sulfur speciation, preg-rob assays, and bottle rolls with virgin and plant carbon. This testwork started in 2020 and was completed in 2021. Testwork planned for 2022 is centred around homogeneity (size fraction analysis) of Cortez Hills underground material to support sampling procedures.

AuTec completed optimization and variability testing using samples from the Deep South Zone of Cortez Hills Underground. McClelland also completed column leach tests using the oxide samples from the Deep South Zone. The results of the testing program were used to support Mineral Reserve estimates. 80 samples were used to create eight composite samples that were used for the optimization testing. Variability testing was also conducted using the 80 samples.

Comminution testing for 60 samples estimated that the majority of the samples were moderately hard ($A \times b < 40$), but a few samples were exceptionally soft ($A \times b > 300$) with respect to semi-autogenous grinding (SAG) milling. Bond work index (BWi) tests were conducted on seven of the composite samples at a closing size of 105 μm . The average BWi was 12.5 kWh/t. The comminution test results indicate that the grinding characteristics of Deep South samples are similar to the ore mined at Cortez Hills.

A series of tests were conducted using the optimization samples to complete the following tests:

- Column leach tests;
- Direct cyanide leach (DCN);
- CIL tests;
- Bench-top roaster followed by CIL (BTR-CIL);
- Bench-top alkaline pressure leach tests followed by CIL (BTALK-CIL);
- Bench-top alkaline pressure leach tests followed by thiosulfate resin in leach (TCM) (BTALK-TCM).

Summary results show that the Deep South oxide samples were amenable to direct CIL leaching with an average gold recovery of 89%. Most of these samples were also relatively amenable (avg 76.9% Au) to heap leach processing, with the exception of sample V4. Roast oxidation followed

by standard CIL leaching of the gold was the preferred method for the refractory samples. The results are summarized in Table 13-1.

13.2.3 Cortez Hills Open Pit

In 2017, the mill recovery for the Cortez Hills open pit ore dropped due to increased sulfide concentration and an increase in the ore hardness. A total of 35 bottle roll tests were conducted to evaluate the change. The test, plant, and block model data from ore control were evaluated, and the recovery model was updated and the ore routing criteria were revised based on sulfide concentration and gold head grade (Barrick Cortez, 2018).

Additional testwork was completed on Cortez Hills Open Pit oxide material in 2019 to update recovery curve assumptions. The Goldstrike Metallurgical Laboratory evaluated 28 composites. Testwork completed included carbon and sulfur analysis, direct cyanidation, standard bottle roll, preg rob analysis, and silica encapsulation. This testwork confirmed the negative recovery impact of sulfide concentration in the oxide mill and showed no evidence of silica encapsulation.

Mining of Cortez Hills Open Pit was completed in May 2019 and the only additional testwork planned will be on remaining stockpiles for future routing and may include head analysis, bottle rolls, bench-top alkaline pressure leach, bench-top autoclave, and bench-top roaster testing.

13.2.4 Cortez Pits

Cortez Pits ore is planned to start processing through the mill in the second half of 2022. Testwork was completed on pulp reject samples during 2020 to help characterize and fill in the resource model for the Cortez Pits deposit. This testwork included gold fire assays, cyanide soluble gold analyses, carbon and sulfur speciation, and preg-rob assays. Results were uploaded into the database as they were made available, and the information was used in the resource model, helping to better define boundaries for the refractory/oxide transitional zones.

A bulk sampling testwork program started in Q1 2021 and is expected to be completed by mid-2022. Additional bulk test work will be undertaken on heap leach ore in Q3 2022. For the bulk sampling program, both mill and heap leach samples will include gold fire assays, cyanide soluble gold analyses, carbon and sulfur speciation, preg-rob assays, and bottle rolls. For mill grade mineralization, BWi tests were included. Heap leach tests include column leach, environmental, physical, chemical, and hydraulic characterization. The drilling test work program includes all the above test work mentioned for the bulk sampling program as well as a deportment study and bench-scale autoclave and roast/CIL tests on refractory material.

Table 13-1: Testwork Results, Deep South Zone

Sample	Ore Type	Au (oz/st)	Au (g/t)	DCN (%)	CIL (%)	BTR-CIL (%)	BTALK-CIL (%)	BTALK-TCM (%)	Column Tests
V1	Oxide	0.238	8.16	67.2	87.4	84.9	81.5	68.4	76.5
V2	Oxide	0.598	20.5	82.6	88.1	88.7	88.2	42.2	71.5
V3	Oxide	0.683	23.4	83.3	91.2	91.2	89.1	26.8	77.6
V4	Oxide	0.680	23.3	63.6	88.1	88.1	76.0	30.2	47.0
V5	Oxide	0.187	6.4	82.4	89.1	89.1	89.3	28.7	84.4
V6	Oxide	0.225	7.7	77.8	89.9	89.9	88.1	36.9	74.4
V7	Refractory	0.436	14.9	12.3	15.7	91.2	83.2	82.6	—
V8	Refractory	0.256	8.8	32.3	85.9	85.9	89.9	89.5	—
Minimum		0.187	6.4	12.4	15.7	84.9	76.0	26.8	47.0
Maximum		0.683	23.4	84.0	91.8	91.2	89.9	89.5	84.4
Average		0.418	14.3	63.1	72.6	88.6	85.6	50.7	76.9

13.2.5 Pipeline—Crossroads

Pipeline mining began in 1995 and has since been processed using a variety of methods, including heap leaching, oxide milling, roasting, and autoclaving. Plant data is available from the difference processing methods and is used in throughput and gold recovery modelling.

McClelland evaluated oxide samples to determine the amenability to cyanide leaching (McClelland, 2016). McClelland received 1,814 kg of split drill core samples. From the sample material, 56 variability intervals were composited to represent benches of the mine. Head analyses and bottle roll tests were conducted on these samples. Of the 56 samples, only five demonstrated a potential for preg-robbing.

Subsequently, the interval samples were composited to form 15 composites that were used for bottle roll tests and column leach tests. The bottle roll tests were conducted at particle sizes of 80% passing (P80) 10 mesh (i.e., 1.7 mm) and 150 mesh (i.e., 105 µm). Optimization tests were conducted to evaluate various cyanide concentrations and particle sizes. The column leach tests were conducted at two particle sizes (i.e., P80 19 mm and P100 25.4 mm).

The results showed that 45 of the 56 variability samples were amenable to direct cyanide leaching at P80 1.7 mm with only one composite showing preg-robbing tendencies (i.e., carbonaceous material in the samples that adsorbs gold from the leach solutions rendering it non-recoverable) at the coarser particle size. The 10 interval samples with lower gold recoveries displayed preg-robbing behaviour in direct cyanide leach tests.

All variability samples were amenable to milling/CIL recovery at P80 105 µm. At this particle size, gold leaching was rapid and completed in two to six hours. The optimization testing showed that

recovery increased slightly with smaller grind sizes, cyanide consumption was unchanged at the smaller grind size but increased at higher cyanide concentrations, and lime consumption was not sensitive to grind size or cyanide concentration. Materials showing preg-robbing characteristics in the P80 1.7 mm tests displayed significant increase in recovery at a finer grind.

All but one of the column leach tests was amenable to cyanide leaching at P80 19 mm. Gold recovery varied from 60–82.4% in 65 to 71 days. Leaching was rapid, with the majority of the gold extracted in 20–30 days. The tests showed low cyanide and lime consumptions and good permeability.

AuTec received 72 refractory samples to evaluate processing options (AuTec, 2016). One sample was used for a JK rotary breakage test, and the remaining 71 samples were composited to produce four master composite samples. Several additional samples were also received via McClelland. Head characterization, comminution, mineralogy, and metallurgical testing was conducted using the samples. Metallurgical tests consisted of bench-top roaster–CIL tests, bench-top alkaline pressure leach–CIL tests, and bench-top alkaline pressure leach–thiosulfate resin in leach tests. Roasting followed by CIL resulted in the higher gold recoveries, likely due to high oxidation of preg-robbing carbonaceous material. Pressure oxidation followed by CIL or thiosulfate leaching resulted in significantly lower recovery, likely due to lack of carbonaceous material oxidation. Feed size did not appear to have a significant impact to recovery. Results are shown in Table 13-2.

The Cortez operations started mining and processing Crossroads material in 2019 as an extension of the Pipeline pit, and additional characterization work was considered to be required. Through initial testwork and processing of Crossroads mineralization, it was found that each of the host geological formations had unique processing parameters.

Testwork to help fill in the resource model for the Crossroads deposit was performed on pulp reject samples and was completed in 2020. This testwork included gold fire assays, cyanide soluble gold analyses, carbon and sulfur speciation, and preg-rob assays. Results were uploaded into the database as they were made available, and the information was then used in the resource model, helping to better define boundaries for the refractory/oxide transitional zones.

Testwork based on the 2019–2020 infill drilling program started in 2020. This program focused more on geometallurgical testwork. For both mill and heap leach samples, the program consisted of gold fire assays, cyanide soluble gold analyses, carbon and sulfur speciation, preg-rob assays, and bottle rolls. BWi tests were performed on all mill samples. Heap leach tests included column leach tests, environmental, physical, chemical, and hydraulic characterization.

Results were used to update operational parameters for throughput per formation and ultimate recovery for heap leach. These were adjusted in the input parameters for the metal plan as well. Currently, a metallurgical testwork program for 2022 infill drilling is under review. The program would potentially include test work for the oxide mill, heap leach, and refractory.

A grinding survey was conducted in January 2020 on the different geological formations as a drop in throughput was observed for Crossroads material starting in 2019. The grinding survey results indicated that blending material from the geological formations would lead to better overall throughput. This was implemented in operations as well as the metal planning input parameters. A follow up grinding survey will be conducted on the different Crossroads formations in 2022.

Table 13-2: AuTec Recoveries, Crossroads

Test Type	Gold Recovery (%)		
	Minimum	Maximum	Average
BRT-CIL	78.8	94.6	89.5
BTALK-CIL	1.5	81.9	29.9
BTALK-TCM	38.8	79.7	58.2

Bottle rolls were conducted from 2019–2020 on composite plant samples for Crossroads material to build an updated recovery curve. Recovery deviated from the original model at high and low grades and was updated accordingly in the metal plan. The recovery curves are currently under review with additional plant and laboratory data from 2021.

Heap leach specific testwork was performed on bulk run-of-mine (ROM) ore samples in 2019-2020 to better understand processing challenges per formation. This set included column leach, environmental, physical, chemical, hydraulic, and formation blending testwork. An update in heap leaching parameters was made operationally and in metal planning. Specifically, alluvium, was found to be much finer material with low permeability leading to lower application drip rates, longer leach times, and material segregation of alluvium leach to the top portions of the pads. Blending testwork was also conducted to see if that would alleviate potential permeability challenges associated with the alluvium. Results showed that permeability increases when alluvium is blended with the other formations. Alluvium is being segregated on the pad versus blending due to operational constraints.

Additional bulk test work started in 2021 for heap leach ROM ore will continue into 2022. This test work will focus on providing further guidance on recovery, fragmentation, and other operational processing parameters by geological formation. This set will include column leach, chemical, physical, and hydraulic test work.

13.2.6 Goldrush

Two prior phases of extensive metallurgical testing have been performed on samples from each of the ore domains at Goldrush. Bench testing included evaluation of autoclave and roast processing of the refractory ore, grind evaluation relative to gold recovery, scoping flotation, physical testing (BW_i and abrasion index), and general mineralogy. Two pilot roast campaigns were also completed on composited samples. Overall results suggested that the ore at the Goldrush project was generally amenable to roast processing simulated using the Goldstrike roaster parameters, and gold recoveries were in line with the Goldstrike gold recovery prediction model.

Sample selection for the 2021 feasibility study (the 2021 FS) testing program was based on spatial representation, filling in visual gaps from historical testing programs, rock type, and mining zone/geological domain representation, and including a variety of samples with different ore routing characterization (autoclave, roast). The mineralization characterization along the strike of

the deposit is shown in Figure 13-1. Most of the Goldrush deposit contains typical double refractory roast-type ore (gold locked in sulfides and organic preg-robbing carbon present). Two possible exceptions are the KB North and Meadow East domains, which although these domains still have a mixture, seem to visually contain a significant amount of typical autoclave ore.

A total of 98 approximately 9 m individual samples were tested and a series of master composites based on ore characterization were generated, including an acid autoclave master, alkaline autoclave master, normal roast master, and high arsenic roast master composites. A weight-averaged overall master composite for the Goldrush deposit was also generated for the metallurgical testing program.

Metallurgical testwork included bench top roasting followed by CIL cyanidation, acid and alkaline autoclaving followed by CIL cyanidation, flotation, direct CIL cyanidation, as well as mineralogy, physical and analytical testwork. Two pilot roast test campaigns using the Gold Quarry roast conditions were conducted. All sample preparation, head analysis, mineralogy, physical, flotation, and autoclave testing was completed at FLSmidth. Bench and pilot scale roast tests were completed at Hazen. Several bulk tests were performed starting at the end of 2021 through both the Gold Quarry roasters and the Goldstrike roasters to confirm viability of processing this ore through the plants. Processing of trial stopes supported bench and pilot testwork and is planned to continue in 2022.

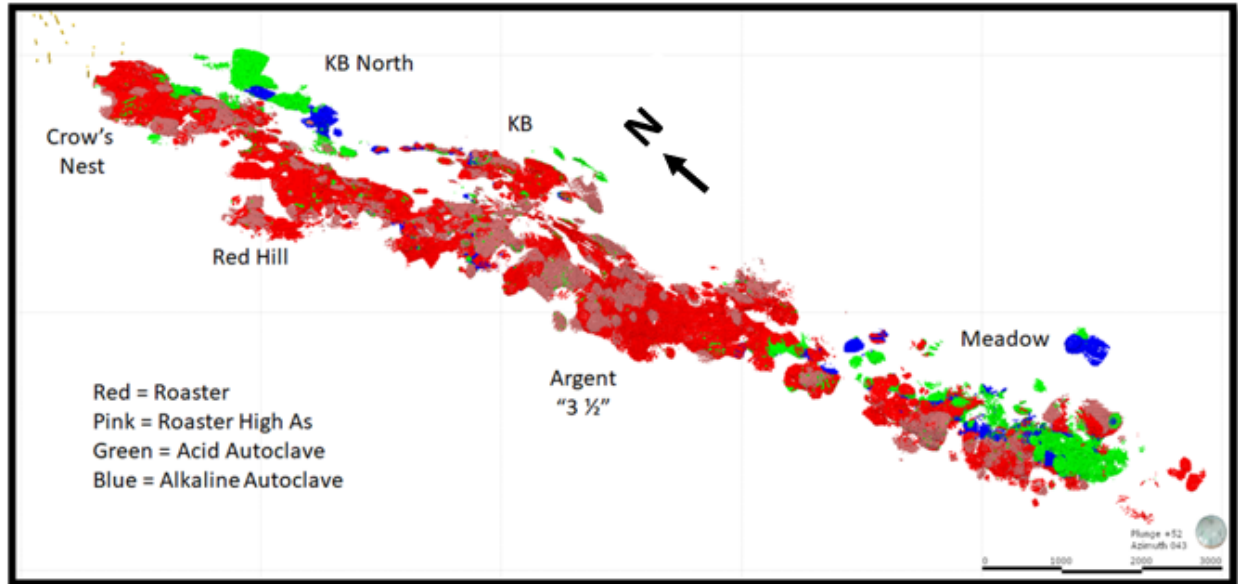
Mineralogy indicated that the ore zones consist mainly of silicified breccia, decalcified limestone, dolomite, and host rock. Host rock consisted mainly of micrite, silty micrite, and limestone. Intrusive, quartz porphyry, and siltstone are also found within the ore zones. Both arsenic and mercury are present in the ore in manageable levels. Mineralogical analysis has indicated that arsenic levels are significantly lower than refractory ore zones at Cortez Hills Underground. Neither element is expected to present technical issues in processing, marketing, product handling, or tailings storage.

Goldrush ore hardness is quite variable over the entire deposit, ranging from very soft to very hard, from 3.6–27.8 kWh/t and averaging 17.7 kWh/t in the 2021 FS testwork. There was no correlation of ore hardness with ore characterization or by mining zone; however, there was a strong correlation with rock type. The silicified breccia is the most competent rock in the orebody with higher overall BWi values than the other rock types.

Abrasion index results mirrored those of the BWi; data showed primarily a bimodal distribution. The range of values was from 0.0041 to 0.9366 g and averaged 0.4029 g, indicative of medium to hard abrasiveness. No specific trend was observed in the abrasion index values based on ore characterization but was once again strongly related to rock type. The silicified breccia rock unit will generate the highest wear rates for steel media and liner wear in the crushing/grinding circuits.

Conventional flotation testwork was completed on four Goldrush master composites. Grind versus recovery (sulfide and gold) flotation rougher kinetic testing was conducted on each of the four samples. Target grinds were 150 µm, 120 µm, and 74 µm. Rougher flotation gold recoveries were highest at the finest grinds. Flotation kinetics were quite slow, ranging from 20–30 min, based on microscopic examination of the float tailings.

Figure 13-1: Ore Characterization Map, Goldrush



Note: Figure prepared by Nevada Gold Mines, 2021.

Three of the four individual master composites showed improved gold and sulfide sulfur recoveries with increased mass pulls. Only the roast master composite showed very little improvement with increased mass pull. Overall results showed a relatively poor response to conventional flotation, similar to those observed in the historical work. Some preliminary flotation testing using nitrogen during both the grind and the float step to minimize pyrite oxidation is currently under way and has shown promise with respect to both improved gold and sulfide sulfur recoveries at reasonable mass pulls.

A total of 50 individual samples and two master composites (acid and alkaline autoclave) were evaluated for amenability to autoclave oxidation followed by standard CIL recovery of the gold. Sulfide oxidations were in line with typical results for both acidic and alkaline samples. Alkaline oxidations ran in the 50–70% range, while those in an acidic pressure oxidation ranged from 80–mid-90%. Gold recoveries were quite variable and typically the lower recoveries were a result of the presence of organic carbon or relatively poor sulfide oxidations. A comparison of CIL recoveries at 24 hours versus 48 hours showed no improvement with the longer leach times.

Bench-scale testwork data were compared to a predictive model used at the Goldstrike autoclave facility while it was operating using a CIL gold recovery circuit. The acidic category of samples showed a relatively even split of some points above and some below the predicted curve at head grades below 10 ppm. As the head grades increased above about 10 ppm, all of the points fell below the curve, reflecting a tendency of the organic carbon content to increase with head grades.

A total of 65 individual samples, all four of the ore characterization master composites, two additional roast pilot composites (one normal roast and the other high arsenic), and the overall Goldrush master composite were evaluated for amenability to roast oxidation followed by standard CIL recovery of the gold. Generally, all Goldrush samples showed a relatively high gold recovery in the bench-scale roast tests, with most of the data points lying above the predicted gold recovery curve. The overall average gold recovery in the bench-scale roast test program was 3.87% above predicted with gold recovery ranging from 57.0–97.7%. Since bench-scale roast gold recoveries are generally 1–2% higher than actual plant performance (as measured at Goldstrike), the bench-scale roast results are generally expected to translate to an actual plant recovery on par with the Goldstrike prediction model. Relatively poor sulfide or organic carbon oxidations are associated with the lower gold recovery responses in most cases. Both sulfide and organic carbon oxidations in the bench-scale roast tests were typically high, averaging 96.7% and 86.7%, respectively.

Pilot-scale fluidized bed roast tests were conducted on a total of five different composites, including two that were prepared with samples exclusively from the Goldrush Main area and representing a normal roast composite (GR1) and a high arsenic roast composite (GR2), as well as three other master composites with samples from any of the geological domains included: the normal roast master composite, high arsenic roast master composite, and the overall Goldrush master composite. Gold recoveries from both the pilot and the bench-scale roast tests compared well with the Goldstrike predictive model. The average pilot plant gold recovery was 0.80% above predicted, while the bench-scale roast results were 1.65% above predicted.

A total of 19 samples from the Goldrush deposit with varying ore characteristics were evaluated for gold recovery using a head-to-head comparison of autoclave and roast processing methods. Results showed that roast oxidation of the samples generally led to improved gold recoveries over those observed from autoclave processing. The average recovery difference was 6.03%.

Given the relatively better overall performance of roast/CIL testing compared to the autoclave/CIL in combination with the expected high mining costs associated with segregated mining, full oxidation roasting/CIL processing is the recommended method of processing the Goldrush ores. Both the Goldstrike and the Gold Quarry roasters are capable of generating high gold recoveries for the Goldrush ores and processing is anticipated at both facilities.

13.2.7 Robertson

Mill grade mineralized materials are currently proposed for processing through the Pipeline Mill, while leach grade mineralization will be processed on site in a new heap leach facility. Although some of the Robertson mineralization types contain sulfides, the gold is free milling and is not in solid solution or encapsulated by the sulfides. However, most samples, are crush/grind sensitive.

Several phases of metallurgical testing have been conducted or are currently underway. Initial testing targeted the Gold Pan area since this contained the greatest amount of mill grade material and had the least amount of historical (pre-acquisition) testing. Testing was performed on both mill and leach grade materials, with all samples being selected based on spatial representation, lithology, gold grade, AA:FA ratio, sulfur, copper, bismuth, and tellurium content. Mill grade testing including physical characterization (BW_i, abrasion index, JK drop test) and cyanidation

amenability tests at different grinds. Kinetic leach information was also determined. Both gravity concentration and flotation options were also evaluated.

Leach grade samples were evaluated in both bottle rolls at 10 mesh, and in column tests at $\frac{3}{4}$ inch and $\frac{3}{8}$ inch crush sizes. Results generally show improved gold recoveries at finer crush sizes. Column leached tails were submitted for load/permeability tests to evaluate stack heights up to approximately 76 m. None of the samples tested to date have been found to require agglomeration, due to the nature of the mineralized material and relatively low clay content.

Evaluation of the Altenburg Hill samples was completed on both mill and leach grade mineralization. Testing covered the same parameters as for Gold Pan, other than flotation and gravity testing of mill grade mill feed material, as the sulfide content of the Altenburg Hill samples was low. A total of seven mill grade composites were evaluated and were selected based on the same criteria that were used for Gold Pan samples. Since leach grade testing included evaluation of 5.08 cm, 1.91 cm, and 0.95 cm crush sizes, whole PQ core was used for these series of tests. Two specific metallurgical holes were drilled to supply the material for these column and bottle roll tests.

A total of four leach grade composites were identified for the testing program, including three classified as oxide ($SS < 0.30\%$) and one that was mixed ($0.30 < SS\% < 0.50$). No sulfide category ($SS > 0.50\%$) of leach grade mineralization was available within these metallurgical core samples. Mill grade mineralization showed similar results as were found for the Gold Pan samples. Leach grade oxide ores showed a somewhat lower gold recovery and continued sensitivity to crush size as compared to the Gold Pan samples.

Column testing of Porphyry leach grade samples was completed, but final results are pending. Leach grade testing of Porphyry samples was conducted at 5.08 cm, 1.91 cm, and 0.95 cm crush sizes, requiring the use of whole PQ core. Three specific metallurgical holes were drilled to supply the material for these column and bottle roll tests. A total of six leach grade composites were identified for the testing program; four were classified as oxide ($SS < 0.30\%$), one was mixed ($0.30 < SS\% < 0.50$), and one was classified as sulfide ($SS > 0.50\%$). Interim results suggest a continued sensitivity to crush size for both types of mineralized material (oxide and sulfide), and some samples with a higher cyanide soluble copper content required increasing the cyanide strength to maintain gold leach rates.

Based on the gold recovery sensitivity of most Robertson leach grade mineralization to conventional crush size, a program was initiated in 2021 to evaluate high pressure grind roll (HPGR) crushing of leach grade mineralization from all three proposed pit areas. Fresh mineralization samples were not available from the Altenburg Hill area, so recently-completed column leached residue at the 5.08 cm crush size was used for the evaluation. A total of six column tests on all four of the Altenburg Hill samples are underway. Both fresh mineralization samples and column leached residues (5.08 cm) were used from the Porphyry area. Four column tests on the fresh oxide and sulfide mineralization from Porphyry along with four additional column tests on recently completed column leached residues of both mineralization types are underway.

Three specific metallurgical holes were drilled to supply the material for additional column leach testing of Gold Pan. Since early testing of Gold Pan leach grade mineralization did not evaluate a larger conventional crush size, current testing is in progress using a conventional crush at

5.08 cm, 1.91 cm, and 0.95 cm crush sizes. These are being compared to both single pass and edge recycle HPGR crushed samples. A direct comparison of HPGR (6 mm) versus conventional tertiary crush (0.95 cm) column test results is planned.

Future metallurgical work is planned to be completed on select mill grade samples from Porphyry, HPGR evaluation of fresh leach grade samples from Altenburg Hill, initial evaluation of satellite Robertson deposits, optimization testing, and HPGR processing option for mill grade mineralization.

Gold recoveries achieved in the testing programs to date have been used in updating gold recovery models for use in the metal plans and preliminary financial analyses. All mill grade mineralization responded favorably to simulated processing at the Pipeline Mill using standard grind/CIL methods. Flotation of the sulfide-containing mill grade mineralization yielded favorable results but introduced an unnecessary step (and cost) in the process, and did not result in achieving better overall gold recoveries. Leach grade mineralization showed a mixed response in the testing programs, but generally showed significantly improved gold recovery with a finer crush size.

13.3 Metallurgical Variability

Samples selected for metallurgical testing during feasibility and development studies were representative of the various styles of mineralization within the different deposits. Samples were selected from a range of locations within the deposits. Sufficient samples were taken, and tests were performed using sufficient sample mass for the respective tests undertaken.

Variability assessments are supported by mill production and extensive open pit and underground exposures.

13.4 Recovery Estimates

The recovery of gold is a function of the processing method (CIL, heap leaching, roasting, and arsenic concentration for refractory ore) and the lithology of the mineralization being processed. The recoveries used to support Mineral Resource and Mineral Reserve estimates are based on recovery equations that are derived from feasibility studies, metallurgical laboratory test work, and historical production data.

The recovery estimates include consideration of the head grade, cyanide-soluble gold to fire assay gold ratio, sulfide sulfur concentration, total organic carbon concentration, preg robbing percentage, arsenic concentration, and silica concentration. In most cases, the estimated and actual gold recoveries correlate well which indicates that the recovery estimates are accurate.

Recovery forecasts are provided in Table 13-3 (oxide mill), Table 13-4 (heap leach), Table 13-5 (Goldstrike roaster), and Table 13-6 (Gold Quarry roaster). Oxide mill and roaster forecast recoveries average 85.3% and 89.0%, respectively, over the LOM.

Table 13-3: Oxide Mill Recoveries

Ore Type	Divisions	Recovery Equation	Source
Cortez Hills underground	Middle and Lower Zone	$\% \text{ Rec} = 27.6 \text{ AAFA} - 42.5 \text{ S2S} + 68.4$	100 bottle roll tests (June 2015 to April 2017)
	Deep South	$\% \text{ Rec} = 27.6(\text{AAFA}) - 42.5(\text{S2S}) + 68.4$	
Pipeline/South Pipeline/Gap	High grade >0.045 opt	$\% \text{ Rec} = 61 + 16 (\text{AAFA}) + 32 (\text{HG})$	2019 test work and 2014 plant recovery and metallurgical laboratory work. 2020 plant data
	High grade ≤0.045 opt	$\% \text{ Rec} = (0.14 \cdot \ln(\text{HG}) + 1.33) \cdot (69 + 17(\text{AAFA}) + 0.39(\text{HG})) + 1.8$	
Crossroads	High grade >0.045opt	$\% \text{ Rec} = 61 + 16 (\text{AAFA}) + 32 (\text{HG})$	2016, 2018, and 2019 Crossroads test work and plant recovery
	High grade ≤0.045 opt	$\% \text{ Rec} = (0.14 \cdot \ln(\text{HG}) + 1.33) \cdot (69 + 17(\text{AAFA}) + 0.39(\text{HG})) + 1.8$	2019–2020 metallurgical laboratory work
Robertson	Oxide	$\% \text{ Rec} = 98 \cdot \text{HG} / (0.0015 + \text{HG})$	Growth group metallurgical testing
	Oxide Sulfide (OS), HG ≥ 0.120	$\% \text{ Rec} = 95.8 - 16.1 \cdot \text{EXP}(-9.596 \cdot \text{HG})$	Growth group metallurgical testing
	Oxide Sulfide (OS), HG < 0.120	$\% \text{ Rec} = 93 \cdot \text{HG} / (0.003 + \text{HG})$	Growth group metallurgical testing

Note that head grade values in above table are in US Standard units (ounce per short ton).

Table 13-4: Heap Leach Recoveries

Open Pit	Recovery Estimate (% Au)
Pipeline	62
Crossroads	65
Cortez Pits	75
Gold Acres	55
Robertson Altenburg Hill Oxide w/ HPGR	68
Robertson Altenburg Hill Sulfide w/ HPGR	56
Robertson Gold Pan Oxide w/ HPGR	77
Robertson Gold Pan Sulfide w/ HPGR	53
Robertson Porphyry Oxide w/ HPGR	77
Robertson Porphyry Sulfide w/ HPGR	64
Gold Skarn	62
South Gap	55

Table 13-5: Goldstrike Roaster Recoveries

Deposit	Recovery Equation
Cortez Hills open pit, Cortez Hills underground, Pipeline, Cortez Pits, Gold Acres, Crossroads, Goldrush	$\%Rec = ((92.027536 - 37.35906 * EXP(-12.94386 * [Contained Grade])) / 100.0) + [Arsenic Impact]$ $As Impact (>1200 ppm) = -0.0000004 * As * As - 0.0005 * AS + 1.176$

Note: the above equations include head grades in ounces per short ton and arsenic in ppm.

Table 13-6: Gold Quarry Roaster Recoveries

Deposit	Recovery (%)
Cortez Hills Open Pit	83.6
Cortez Hills Underground	87.6
Gold Acres	86.4
Goldrush	GS Roaster Curve - 1.0 (at 550°C) GS Roaster Curve + 1.0 (at 595°C)
Pipeline	86.4
Crossroads	86.4
Cortez Pits	86.4

Note: *Time Variable Adjustments. GSR: +0.2% 2023-LOM; GQR: +1.3% for LOM

Both historical and the current testing programs show that roasting followed by CIL cyanidation of the Goldrush double refractory ore exhibits the highest overall gold recoveries. The recovery factor for Goldrush processed at the Gold Quarry Roaster depends upon the temperature profile: -1% if using the normal low temperature, and +1% if targeting the high temperature. The average LOM forecast recovery for the Goldrush double refractory ores is 89.5%.

13.5 Deleterious Elements

Depending upon the specific processing facility, several processing factors or deleterious elements could have an economic impact on extraction efficiency of a certain ore source, based either on the presence, absence, or concentration of the following constituents in the processing stream: organic carbon, sulfide sulfur, carbonate carbon, arsenic, mercury, antimony, copper. However, under normal ore routing and blending practices at NGM where material from several sites may be processed at one facility, the above list of constituents is typically not a concern.

Mercury is a particular environmental concern and is closely monitored. Ores containing significant amounts of mercury are processed in a manner to best control potential emissions by blending with lower mercury-containing ores and using the mercury recovery processes at both

roasting facilities and elutions circuits. Mercury and arsenic pose hazards to the health of employees, and personal protective equipment requirements and engineering designs are in place to limit exposure. Employees with potential exposure are subject to routine health monitoring to ensure that levels remain below the regulatory limits.

Other deleterious elements such as copper and iron may require an increase in reagent consumptions while elements such as organic carbon and sulfide sulfur must be balanced within the feed blend for proper fuel value during the roasting process.

13.6 QP Comments on “Item 13: Mineral Processing and Metallurgical Testwork”

Metallurgical testwork completed for the deposits was appropriate to establish optimal processing routes for the different ore types encountered at Cortez.

Historical process data demonstrates that the metallurgical recovery models have been reliable. In cases where there has been a noted deviation, additional bench and plant testing has been successful in generating updated models to better reflect current plant performance.

The metallurgical testing data available for ore scheduled to be processed in the LOM plan indicates that the models and methods used for estimating metallurgical performance will continue to be successful.

14.0 MINERAL RESOURCE ESTIMATES

14.1 Introduction

Mineral Resource estimates were prepared for the Pipeline, Crossroads, Cortez Pits, Gold Acres, Robertson, Cortez Hills Underground, and Goldrush deposits. Database closeout dates for the estimates that informed the resource models included:

- Cortez Pits: June 24, 2021;
- Cortez Hills Underground: July 14, 2021;
- Gold Acres: June 15, 2008;
- Pipeline: October 5, 2020;
- Crossroads: April 22, 2021;
- Goldrush: June 25, 2020;
- Robertson: April 28, 2021.

Details of the Mineral Resource estimation for each area are described in the sub-sections that follow.

14.2 Cortez Pits

The Cortez Pits area was previously mined between 1969–1973. Mineralization remaining at depth, which is an extension of the mineralization mined in the Cortez pit, has a Mineral Resource estimated assuming open pit mining methods.

14.2.1 Geological Modelling

A total of 3,126 surface drill holes support the geological model. Models were created in Leapfrog Geo using a combination of surface mapping, formation, alteration, and structural drill hole logging, televiewer structural data, and elemental or metallurgical assay analysis.

High-grade mineralization solids (mzones) were created considering the underlying geological controls represented in the geological model, presence and strength of trace elements (As, Hg, Sb, and Th) as well as continuity of gold mineralization of sufficient grade and thickness to support the intended mining methods. Solids/locally-varying anisotropy (LVA) estimation controls were created using Vulcan such that hanging wall and footwall surfaces provide a basis for directional controls on mineral estimation as well as the limiting volumes of high-grade mineralization.

Mineralization solids were assigned unique numeric codes and flagged back to drill holes in the Vulcan Isis drill hole database.

A Vulcan block model was constructed and flagged to reflect the underlying geological model. A block size of 12 x 12 x 3 m was used, with 1.5 x 1.5 x 1.5 m sub-blocks to honor geological features.

14.2.2 Domains

At the Cortez Pits project, six domains were selected for the estimation process workflow (Figure 14-1). Domain 1 (Upper Bass Pond) and Domain 2 (Lower Bass Pond) consist of bedrock units found in the Wenban (Dw) and Roberts Mountain formations (Srm). Domain 1 is located at surface of Bass Pond and Ada Pit (historically-mined pits) and Domain 2 is located just below Domain 1. Domain 1 consists of shallow dipping, low-grade mineralization while Domain 2 consists of steeper dipping, higher-grade mineralized zones. Domain 3 (Northwest Deeps) is hosted in the Hanson Creek formation (Ohc) below Bass Pond, and comprises mostly high-grade, refractory mineralization types that are enriched with sulfides. Domain 4 (East Pit) is located to the east of Bass Pond and is found in overturned beds of mostly Wenban and Roberts Mountain formations. The ore is generally higher-grade oxide-mill mineralized zones with some areas of leach in East Pit.

Jurassic–Cretaceous dikes are mineralized and are flagged in as hard boundaries into the composite database and were estimated as if they were a mineralized zone. Quartz porphyry dikes are non-mineralized and were flagged in the model as hard boundaries with null grade values.

Within each of these geological domains, an inverse distance weighting to the second power (ID2) estimate was undertaken using indicators at thresholds of 0.34 g/t Au and 3.43 g/t Au to define final gold estimation domains for high grade, low grade and waste. These estimates used locally varying anisotropic searches aligned with local mineralization interpretations to ensure that the underlying geology was reflected in the final estimation domaining.

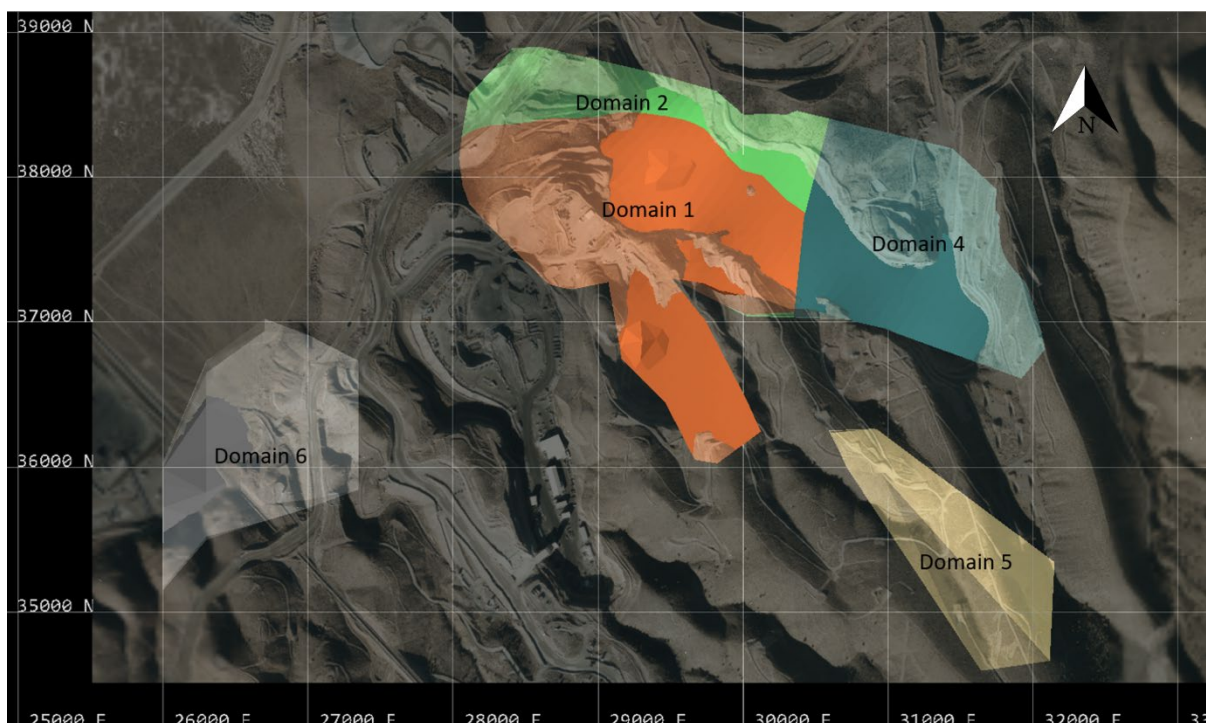
14.2.3 Exploratory Data Analysis

Exploratory data analysis (EDA) was completed using Microsoft Excel and Snowden Supervisor v8.14 software. Basic histograms, cumulative distribution plots, probability plots, scatter plots, mean and variance plots, cumulative metal charts, boxplots and variograms were used to collect information on statistical distributions.

14.2.4 Composites

Compositing for all gold and geochemical assays was based on a 1.5 m sample length. The mineralization at Cortez Pits is pod-like, in addition to being very high grade in certain areas. Although mining is assumed to be conducted at a 6 m bench, the composite and block sizes were retained at the 1.5 m length to preserve grade resolution and prevent dilution of high grade. The 1.5 m model was then re-blocked into a 6 m block length model for the engineers and mine planners to use. After compositing was done, capping statistics were performed on the gold composite.

Figure 14-1: Estimation Domains, Cortez Pits



Note: Figure prepared by NGM, 2021.

Gold composites were broken on intervals at any modeled formation, domain, or mineralized zone. Majority fields were also recorded at these sample breaks. Geochemical composites were created for carbonate, total carbon, sulfide sulfur, arsenic, mercury and antimony. A straight composite method was used to composite density data. In each of the geochemical and density cases, gold was brought into the databases breaking/recording majority intervals on two different assay table breakdowns, where the first table contained gold and mineralized zone, and the second recorded formation and domain. Composites were also created for density data. In each of the geochemical and density cases, gold was brought into the databases breaking/recording majority intervals on two different assay table breakdowns, where the first table contained gold and mineralized zone, and the second recorded formation and domain.

14.2.5 Grade Capping/Outlier Restriction

All capping was done post-compositing and was completed by analyzing cumulative probability graphs by domain. The general strategy was to cap around the highest jump/gap up where data trended away from a best fit line. Capping was used for gold, carbonate, total carbon and sulfide sulfur. Depending on domain, gold values ranged from no caps imposed to a cap of 48.0 g/t Au.

Arsenic, mercury and antimony were all left uncapped for health and contamination related reasons. However, the assay values were checked for any erroneous data or overlimit values.

14.2.6 Density Assignment

Density data are applied to modeled geological formations. The data are further split into waste (<0.14 g/t Au) and mineralization (>0.14 g/t Au) categories for each modeled formation that yields an average value. Density values for backfill and alluvium data are sourced from a truck tonnage study completed at Crossroads.

14.2.7 Variography

All variography was performed using Snowden Supervisor and was separated by domains. Domains 1 and 2 (Upper & Lower Bass Pond) were grouped together due to similar data types and proximity in location; all other domains were analyzed individually. Experimental variograms were calculated and modeled for each domain and the variogram model ranges were used to inform estimation sample searches and resource classification strategies.

14.2.8 Estimation/Interpolation Methods

Wireframe surfaces were constructed to reflect the various controls on mineralization within the block model volume. These controls could include lithological contacts, dikes, and faults or shear zones depending on the geological understanding of local mineralization controls across the deposit. A database recording orientation of local mineralization controls was then used to apply locally varying anisotropy to the sample search ellipses during block grade estimation. Gold estimation used a two-pass estimation with ID2 as the estimation method. For the major and semi-major directions, the first pass used a shorter search distance (based on the interpreted variography), and the second pass used a longer search distance (to maximize estimated blocks in the volume of interest). For both passes, the minor direction used a default value of 9 m. The first pass used a minimum sample count of four and a maximum of six, while the second pass used a minimum sample count of two and a maximum of six. Values for the quartz porphyry dike were not estimated for gold values.

14.2.9 Block Model Validation

Model validation checks included:

- Visual comparisons of estimated block grades relative to drill hole composite values and interpreted geology on sections and plans to ensure geological controls on mineralization are honored;
- Comparison of ID2 and nearest neighbour estimates to ensure no significant global bias is present in estimates;
- Swath plots were created to ensure block grades exhibit similar trends to composite grades based on elevation, northings and eastings.

14.2.10 Confidence Classifications

Resource classification was based on drill spacing derived from primary direction variograms by domain. A total of 80% of the sill in the primary direction of the variogram was the nominal drill spacing required for Indicated, and 90% of the sill was the drill hole spacing required for Inferred. The local drill spacing for each block was estimated using the average distance to the nearest three drill holes for Indicated Mineral Resources, and to the nearest two drill holes for Inferred Mineral Resources.

14.3 Cortez Hills

The Cortez Hills Breccia, Middle, and Lower Zones, and the Deep South extension of the Lower Zone are projected to be mined by underground mining methods. Open pit mining of the Breccia Zone at Cortez Hills was completed in 2020.

14.3.1 Geological Modelling

Geological, structural and alteration interpretations were provided by onsite geologists. Three-dimensional solids and surfaces constructed from these interpretations were used as the basis for defining mineralization domains.

14.3.2 Domains

A series of estimation domain wireframes were built using grade breaks derived from statistical analysis of gold distributions, in conjunction with structural and alteration elements derived from geological logs and core photographs.

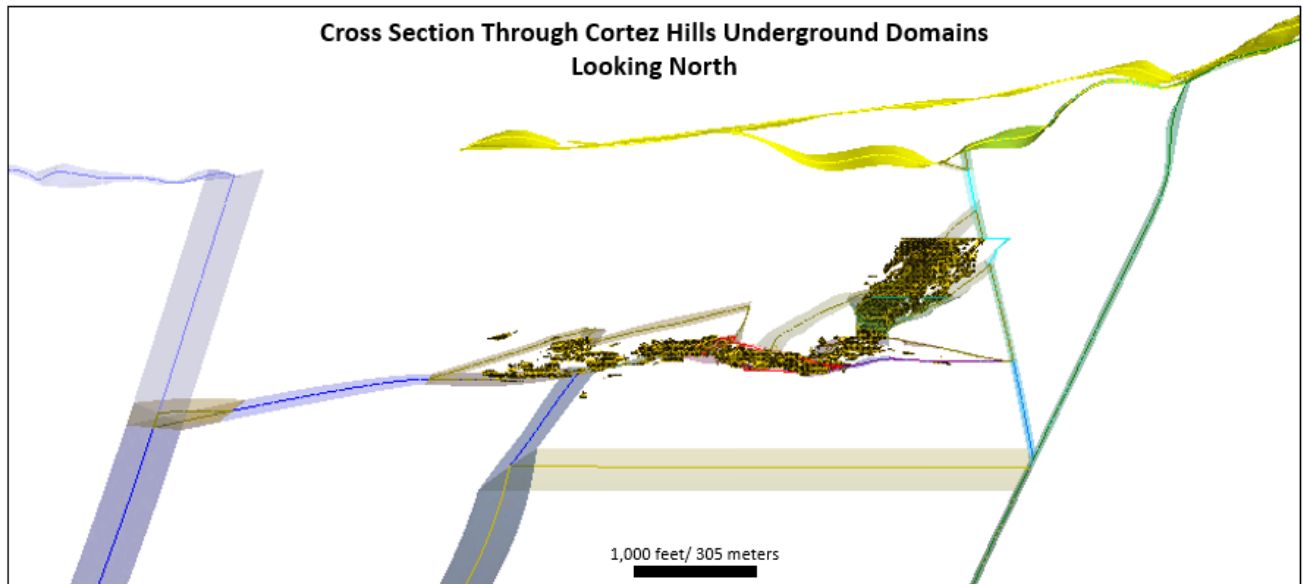
All of the mineralized domain wireframes (mzones) were bounded by a sub-economic grade domain wireframe to provide dilution grades for mine planning. Wireframes representing barren, post-mineralization dikes and sills were modelled, and cross-cut the mineralization domain wireframes.

The domains are shown in Figure 14-2.

14.3.3 Exploratory Data Analysis

Exploratory data analysis was performed by domain using Vulcan Data Analyzer, Microsoft Excel, and Supervisor on the raw data for each element to understand the elemental distributions. Following compositing, further statistical analysis was used to evaluate grade distributions for estimation domaining, and estimation parameter selection.

Figure 14-2: Cortez Hills



Note: Figure prepared by NGM, 2021.

14.3.4 Composites

Assays were composited down hole at 3 m lengths. This composite length was chosen to allow for the higher resolution grade interpolation needed for underground mine planning and is close to the accepted selective mining unit (SMU) for underground. Intervals with poor recovery that could not be sampled were excluded from the compositing routine and estimation, as were selected drill holes identified by the on-site team as having poor location, sampling, or drilling angle to mineralized structures. Compositing was run by stopping and restarting at dike contacts. Assay lengths were distributed within each domain to prevent the formation of residual composites.

14.3.5 Grade Capping/Outlier Restriction

Capping analysis was completed using 3 m composites for each estimation domain by inspection of a cumulative normal probability plot. Capping grades identified the breaks in probability chart by considering percentage of metal removed by the capping and coefficient of variation changes after capping. Capping ranged from 13.7 g/t Au in the Lower Zone within the low-grade gold indicator shell to 343 g/t Au in the Breccia Zone within the high-grade gold indicator shell.

14.3.6 Density Assignment

Density domains were defined as the combination of regions (Breccia, Middle and Lower Zones), gold indicator shells and formations. The dike material was considered as a separate domain from other domains. Bulk density values were determined from average tonnage factors in each domain. Statistical analysis was performed using Vulcan Data Analyzer to obtain the average tonnage factor value. Lower and upper outliers in each domain were identified from probability plots and were excluded from the average calculation. Average density values from each domain were assigned to the blocks within a corresponding domain. Bulk density values ranged from 2.33–2.69 t/m³.

14.3.7 Variography

Directional variograms were developed for gold and used to establish search distances equal to lag at 80% and 90% of the total sill variance range for the different estimation domain groups. In most cases, data from multiple domains was interpreted together in a group. Search ellipses were based on the ranges modelled in the variograms and preferred orientations of modelled mineralized zones.

14.3.8 Estimation/Interpolation Methods

Grade estimation was done separately within the high-grade gold indicator shell (3.43 g/t Au cut-off) and low-grade gold indicator shell (0.34 g/t Au cut-off). Estimation was completed using a two-pass run and inverse distance weighting to the third power (ID3) with the short search radius in the first run and longer search radius in the second run. A locally varying anisotropy technique was used in both the first and second estimation passes where search ellipsoids in each block were controlled by the nearest surface of faults, formation contacts or mineralization control. ID3 was selected based on previous model performance compared to grade control. In the first pass estimation, search radii of approximately 36.6 m, 33.5 m and 39.6 m were used in the Breccia, Middle and Lower Zones, respectively with a minimum of four samples required. Search radii in this first estimation were defined by major variogram ranges at 80% of the sill in each zone. In the second pass estimation, search radii of approximately 96 m, 96 m, and 106.7 m were used in the Breccia, Middle and Lower Zones, respectively with a minimum of two samples required. Search radii in this first estimation were defined by 1.5 times the major variogram ranges at 90% of the sill in each zone.

14.3.9 Block Model Validation

Block model validations including visual review, global bias check, swath plots analysis and stope reconciliation were performed. Visual review was done by displaying estimated block grades and drill hole data using the same colour scheme, against the interpreted mineralization controls and stepping through on section, this visual check indicated that the block grades were consistent with drill hole data and the directional control surfaces.

Global bias check was done by comparing tonnage, grade and ounces between estimated and nearest neighbour grades within mineralized zones. These comparisons indicated that there was no significant bias in the estimation results.

Swath plots were generated for elevation, easting and northing directions, and confirmed that trends in the underlying data were adequately represented in the estimates.

14.3.10 Confidence Classifications

Resource classification was completed based on drill spacing and number of drill holes used to estimate the block. Drill spacing was converted from average distance of a block to the nearest three drill holes (three-hole distance) or the nearest two drill holes (two-hole distance). The three-hole distance was calculated by running an estimation using a minimum of three samples, a maximum of three samples, a maximum of one sample per drill hole, and storing the anisotropic average distance as a desired variable. Similarly, the two-hole distance was calculated by running an estimation using a minimum of two samples, a maximum of two samples, a maximum of one sample per drill hole, and storing the anisotropic distance. Drill spacings were obtained by dividing the three-hole distance and two-hole distance by 0.7, assuming a squared grid for the drill holes.

In the Middle and Lower Zones, a block was classified as a Measured resource if its three-hole drill spacing was ≤ 9 m and was estimated using three drill holes or more.

A block was classified as Indicated if its three-hole drill spacing was between 9–34 m for the Middle Zone, or 9–43 m for the Lower Zone. Other than drill spacing, a minimum of three drill holes was required to estimate a block for the Indicated resource category.

A block was classified as Inferred if its two-hole drill spacing was between 34–64 m for the Middle Zone, or 43–73 m for the Lower Zone. Blocks within the Inferred resource category could be estimated using two drill holes.

The three-hole drill spacing criteria for the Indicated resource category was defined by the variogram range at 80% of the sill. The two-hole drill spacing criteria for the Inferred resource category was defined by the variogram range at 90% of the sill.

The data-spacing based classification was reviewed and confirmed in the context of confidence in the underlying geological interpretations.

14.4 Gold Acres

14.4.1 Geological Modelling

A total of 1,506 drill holes (approximately 130,365 m) and 73,388 assays are in the database; the database for Gold Acres has not changed since mid-2008.

Geology wireframe surfaces and solids were modelled; however, visual review of the models for the lower skarn, Roberts Mountain Thrust, and Gold Acres Fault suggest that they are not relevant as controls for mineralization. The 2008 resource estimate does not include a “Carbon” or “Refractory” model since the refractory nature of the deposit could not be predicted geologically or metallurgically at the time.

A three-dimensional 6 x 6 x 3 m block model was created, which were estimated using 3 m composites. Following grade estimation, the 6 x 6 x 3 m blocks were re-blocked up to a 12 x 12 x 6 m model to better represent mining on 6 m benches.

14.4.2 Domains

Three domains were created:

- Domain 1: High grade trending along a fold axis bearing 305°;
- Domain 2: East dipping mineralization (-15°) bearing 340°;
- Domain 3: Shallowly dipping mineralization striking 340°, varying in dip direction from eastward in the south, to westward north of section 60,250 N.

14.4.3 Exploratory Data Analysis

Basic statistics and histograms were calculated with Excel and examined to understand the grade distribution and evaluate the capping strategy.

14.4.4 Composites

Capped assays were composited downhole at 3 m lengths.

14.4.5 Grade Capping/Outlier Restriction

Grade distribution statistics show a grade capping level of 17.1 g/t Au is appropriate. Nine samples were capped in the drill hole database.

14.4.6 Density Assignment

Bulk densities were assigned using average values (Table 14-1).

14.4.7 Variography

Variograms were modeled and used to define search ranges for use in grade estimation. The spatial continuity was also used to develop the confidence classification strategy.

Table 14-1: Bulk Density Values, Gold Acres

Rock Type	Tonnage Factor (ft³/st)	Bulk Density (st/ft³)	Bulk Density (t/m³)
Skarn	11.49	0.087	2.79
Dumps, backfill	16	0.0625	2.00
All other rocks	13	0.0769	2.46

14.4.8 Estimation/Interpolation Methods

The composites in the drill hole database were flagged at a gold indicator threshold of 0.51 g/t Au. The composites were interpolated using orientations in line with the individual domains. Composites within the block model volume defined by the indicator model (greater than or equal to 50% probability of 0.51 g/t Au grade) were back flagged in the composite database.

Grade interpolation for Gold Acres was carried out in multiple passes using ID3 inside and outside the indicator model. Search ellipse distances corresponding to 80% and 90% of sill ranges from an omni-directional correlogram defined the second and fourth passes, which were each followed by a pass defined by a smaller search ellipse, and with fewer composite restrictions. Additionally, a nearest neighbour interpolation was performed on gold grades for the purposes of block model validation using a 76 x 76 x 15 m search ellipse, estimating 33% of blocks in the model. Mined-out blocks were coded above the topographic surface and WRSFs were flagged.

14.4.9 Block Model Validation

Block grades were compared to composites by visual inspection of vertical sections. Gold block grade statistics and distributions were compared to composite grade statistics and distributions for ≥ 0.34 g/t Au.

14.4.10 Confidence Classifications

The Measured component of the Mineral Resource is applied to blocks directly intersected by drill holes used for the estimates, essentially a box search. Indicated Mineral Resources are defined as those out to a range at 80% of the sill and Inferred Mineral Resources at the range of 90% of the variogram sill. Blocks not meeting the above criteria are unclassified. Resulting resources were examined for amenability to development and mining and downgraded where applicable.

14.5 Pipeline

14.5.1 Geological Modelling

A total of 3,370 drill holes (approximately 923,692 m) and 279,120 assays are in the database. Of those, 2,407 drill holes (approximately 575,411 m) and 159,752 assays are fully approved for use in the Pipeline resource estimate.

Three-dimensional wireframe surfaces were constructed by NGM personnel in 2021, representing alluvium-bedrock contact, rock formations, and structures. Three-dimensional wireframe surfaces representing alteration were constructed in 2010 by Rangefront Consulting, LLC (Goss, 2010) using Mira Geoscience GoCad Mining Suite. The final surfaces were created considering, in order of importance:

- 1:1,000 scale geological mapping in the Shoshone Range;
- 1:50 scale mapping in Pipeline, Gold Acres London extension, and Old Gold Acres pit;
- 27 geological cross sections covering the Pipeline Complex at a scale of 1:100;
- Geological logs, based on drill holes completed during or after 2004;
- Downhole, multi-element geochemistry in conjunction with analyses from a Niton portable XRF unit;
- Geophysical interpretations.

Surfaces were triangulated using sub-parallel cross sectional line work, which were modified to fit with surface mapping, intersecting cross sections, drill hole data and/or the results of geophysical interpretations. Snapping to drill hole intercepts was performed on sections with reliable results, but not drill holes between sections. The work was completed using the Mira Geoscience GoCad Mining Suite and the resultant geological interpretation was used to flag formation and alteration contacts in the block model and inform the interpolation design.

In addition to formation and alteration, topography and area wireframe surfaces and solids were used to define boundaries and mineralization controls within the Pipeline Complex block model. The Pipeline and Crossroads deposits are separated by the east high-wall fault in the southern end of the Pipeline Pit. The Pipeline and Crossroads areas were treated individually during the estimation process.

The Pipeline open pit complex, exclusive of Crossroads, used a Vulcan tetra modelling technique using trends based solely on stratigraphy. Unfold surfaces were based on the 2010 geological model.

At Crossroads, stratigraphic and structural controls were used as directions to guide the high and low grade indicators, along with gold and multi-element estimations. Triangulated surfaces were converted into a drill hole database, where each facet has a unique orientation and is represented as a "sample". This database is estimated into blocks, controlling the effect of each surface by inverse distance power and sample count.

A 6 x 6 x 7.5 m block model was developed over the Pipeline Complex using Vulcan software. Following estimation of variables, the model was re-blocked to 12 x 12 x 15 m to conform to bench height for mine design purposes.

14.5.2 Domains

The Pipeline Complex is divided into three regions, or seven domains based on the mineralization location, geology and grade population. The Crossroads model area was not removed from the Pipeline region for the purposes of the current model, but in the future is planned to be modeled independently. The regions are shown in Figure 14-3.

14.5.3 Exploratory Data Analysis

All exploratory data analysis was completed using Microsoft Excel and Snowden Supervisor v8.14 software. Basic histograms, cumulative distribution plots, probability plots, scatter plots, mean and variance plots, cumulative metal charts, boxplots and variograms were used to collect information on statistical distributions.

14.5.4 Composites

Capped assays were composited using downhole 7.6 m lengths. Composites honored domain boundaries, and were distributed to prevent the formation of residual composites.

Where drill holes were completed in mineralization (≥ 0.10 g/t Au), and at depth were poorly supported by surrounding drill hole information, an additional 6 m composite was added manually to the end of the hole at a near-zero (0.003 g/t Au) grade to prevent the extension of gold below the depth of drilling. A total of 397 drill holes were modified.

Intervals with poor recovery that could not be sampled were excluded from the compositing routine and estimation, as were selected drill holes identified by the onsite team as having poor location, sampling, or drilling angle to mineralized structures. Unsampled intervals were assigned a background grade of 0.03 g/t Au.

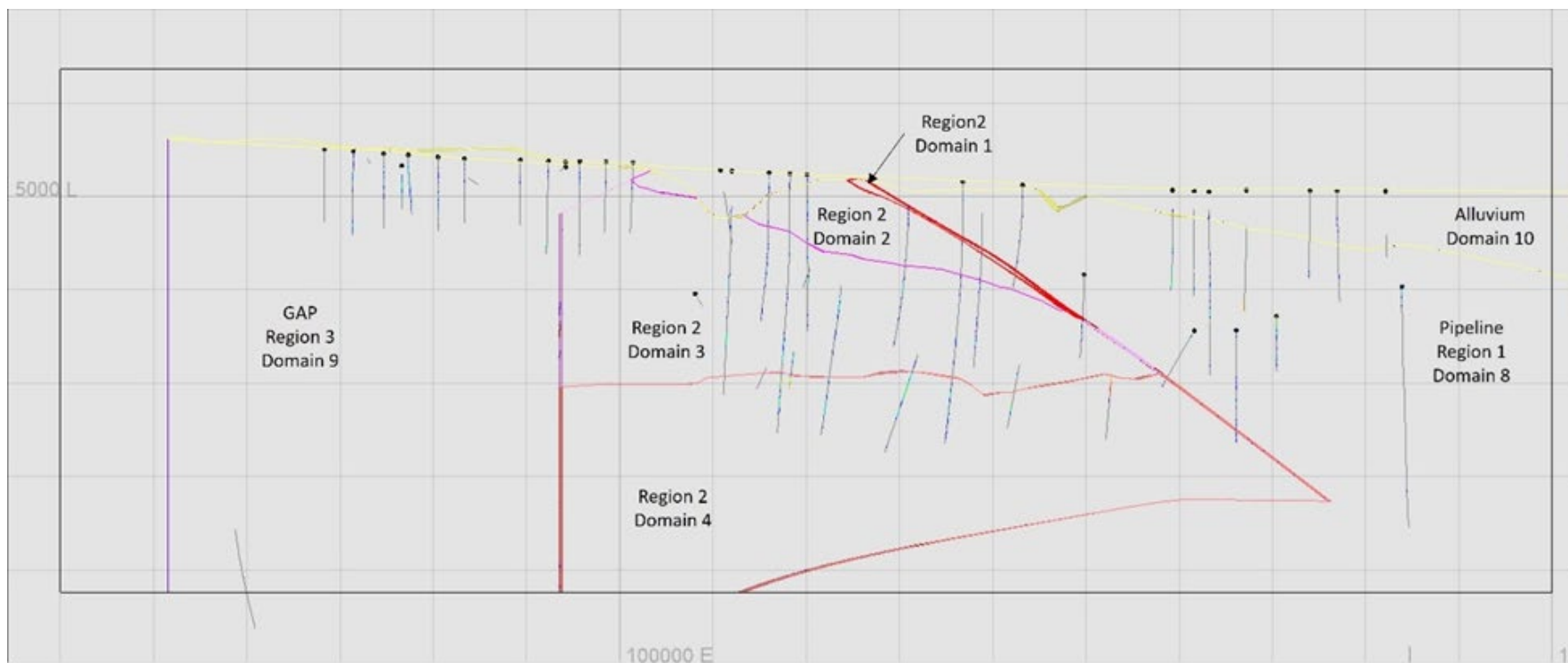
14.5.5 Grade Capping/Outlier Restriction

Flagged raw gold assays were capped for outliers based on examination of cumulative probability plots and histograms.

14.5.6 Density Assignment

Bulk density values were assigned to the rock unit formations and alteration types. Bulk density values ranged from 1.83–1.99 t/m³ in alluvium and dumps to 2.11–2.92 t/m³ in host lithologies, shears and skarns.

Figure 14-3: Modelled Domains, Pipeline



Note: Figure prepared by NGM, 2021.

14.5.7 Variography

Normalized, omni-directional variograms were modeled over the low-grade domains for each of the Gap, Crossroads and Pipeline deposits. The models for each of the areas are identical, however, the values derived from the variography for informing search ellipse parameters are based on the raw data.

Variograms of the blast hole data at Pipeline and Gap were also modelled.

14.5.8 Estimation/Interpolation Methods

Inverse distance squared (ID2) interpolation was used for the estimation of high- and low-grade indicators to classify each block within each of the areas at the Pipeline Complex as high- or low-grade, and, in the case of Pipeline, as dominated by stratigraphical or structural controls on mineralization.

A low-grade gold indicator was assigned at a threshold of 0.07 g/t Au, in all areas. High-grade gold indicators were assigned at thresholds of 1.71 g/t Au, 3.43 g/t Au, and 3.43 g/t Au for Gap (now merged with Pipeline), Crossroads, and Pipeline, respectively.

Indicators were estimated into unique high-grade stratigraphical and low-grade stratigraphic and structural indicator block variables at Pipeline/Gap and Crossroads, and into high- and low-grade stratigraphically-controlled indicator block variables at Pipeline. Stratigraphical high- and low-grade indicator estimation runs employed a search ellipse of 122 x 122 m, and was variable in the z-direction, oriented parallel to the unfolded surfaces of each mineralized formation: Wenban Formation within the Horse Canyon Formation, Roberts Mountain Formation, Hanson Creek Formation, and alluvium.

Structural search ellipse dimensions for Pipeline/Gap and Crossroads were 122 x 122 x 18 m and limited to the Roberts Mountain Formation and Wenban Formation at Pipeline/Gap and to the Wenban Formation at Crossroads.

A minimum and maximum of five and 13 composites, respectively, for each indicator variable was used. The number of composites per drill hole was limited to two, which in tandem with composite restrictions, forced contribution from three drill holes to estimate an indicator value for a block.

Following estimation, mineralization control was ranked at Pipeline/Gap and Crossroads based on the outcome of the low-grade indicators. Where the stratigraphically-control indicator in the low-grade threshold yielded a higher probability value than the structurally-controlled indicator, it was ranked as the dominant control. All other blocks were assumed to be structurally controlled.

The results of the indicator estimation and mineralization control ranking as well as the modelled formation and alteration codes were back-flagged from the block model to the original drill hole database to accommodate data selection for grade interpolation.

Gold was interpolated into high- and low-grade indicator areas individually for each formation within Pipeline, Gap and Crossroads using a five pass ID3 estimation approach, and incorporating mineralization control at Gap and Crossroads. The first pass employed a box

search equal to the block size. Search ellipse dimensions were set to the lag distance at 80% and 90% of the variogram sill for each area for the second and fourth passes, respectively, which were each followed by a pass using a smaller search ellipse with less composite restrictions. As with the indicator estimation, blocks flagged as dominated by stratigraphical mineralization control employed Vulcan's tetramesh unfolding. Grade estimations incorporating structural control were limited to the Wenban Formation at Crossroads and to the Wenban and Roberts Mountain Formations at Gap.

Select composite weights were manually assigned to allow limited influence of composite groups (grade and mineralization control) across domain boundaries. For example, low-grade, stratigraphically-controlled composites were assigned a weight of 0.25 in the high-grade domain at Gap, and a weight of 0.1 at Pipeline and Crossroads.

Cyanide leach gold and carbon were also estimated for use in material-type definition in conjunction with geology, alteration, and area flags. Nearest neighbour interpolation was run in parallel to ID3 for fire assay gold for validation purposes.

Where areas over the Pipeline Complex were mined and backfilled with waste, the model grades, and densities were updated to reflect this.

14.5.9 Block Model Validation

Model validation checks included:

- Examination of the interpolation scripts and comparison to the interpolation plan;
- Visual comparisons of interpolated gold grades relative to drill hole composite values on sections and plans;
- For Pipeline, results of the estimation were compared to the blast hole block model;
- Comparison of block model grades and gold assays using histograms and cumulative frequency plots;
- Comparison of the ID3 estimation to the nearest neighbour estimation model;
- Local trends in the grade estimates were reviewed using swath plots.

The block model was found to be globally unbiased and demonstrated good correlation between the different estimation methods and different supports.

14.5.10 Confidence Classifications

The Measured Mineral Resource classification is assigned to blocks directly intersected by drill holes used in the interpolation, and estimated during the initial box search. Indicated Mineral Resources are those blocks estimated in the second or third pass, equal to a maximum distance range of 80% of the variogram sill. Inferred Mineral Resources are those blocks estimated in the two final passes, where the search ellipse dimensions are equal to, or smaller than, a distance range of 90% of the variogram sill for each area. A classification script updated the block model to reclassify isolated blocks of Indicated resources as Inferred.

Subsequent to grade estimation, the Pipeline Complex block model was re-blocked to 12 x 12 x 12 m for use in mine planning. Mine staff perform a model comparison after each re-block to confirm that the total ounces are correct, and a bias is not introduced. The original and re-block models are also compared visually in section with block texts and inquiries. Grade variables were averaged into the larger block size and weighted by density; all other variables were assigned based on majority.

14.6 Goldrush

14.6.1 Geological Modelling

A total of 1,421 surface drill holes support the estimate. Models were created in Leapfrog Geo using a combination of surface mapping, formation, alteration, and structural drill hole logging, televiewer structural data, and elemental or metallurgical assay analysis.

High-grade mineralization solids were created considering the underlying geological controls represented in the geological model, presence and strength of trace elements (As, Hg, Sb, and Th) as well as continuity of gold mineralization of sufficient grade and thickness to support the intended mining methods. Solids were created using the Leapfrog Geo vein modeling tool such that hanging wall and foot wall surfaces provide a basis for directional controls on mineral estimation as well as the limiting volumes of high-grade mineralization.

Mineralization solids were assigned unique numeric codes, sub-blocked into the block model, and flagged back to drill holes in the Vulcan Isis drill hole database.

14.6.2 Domains

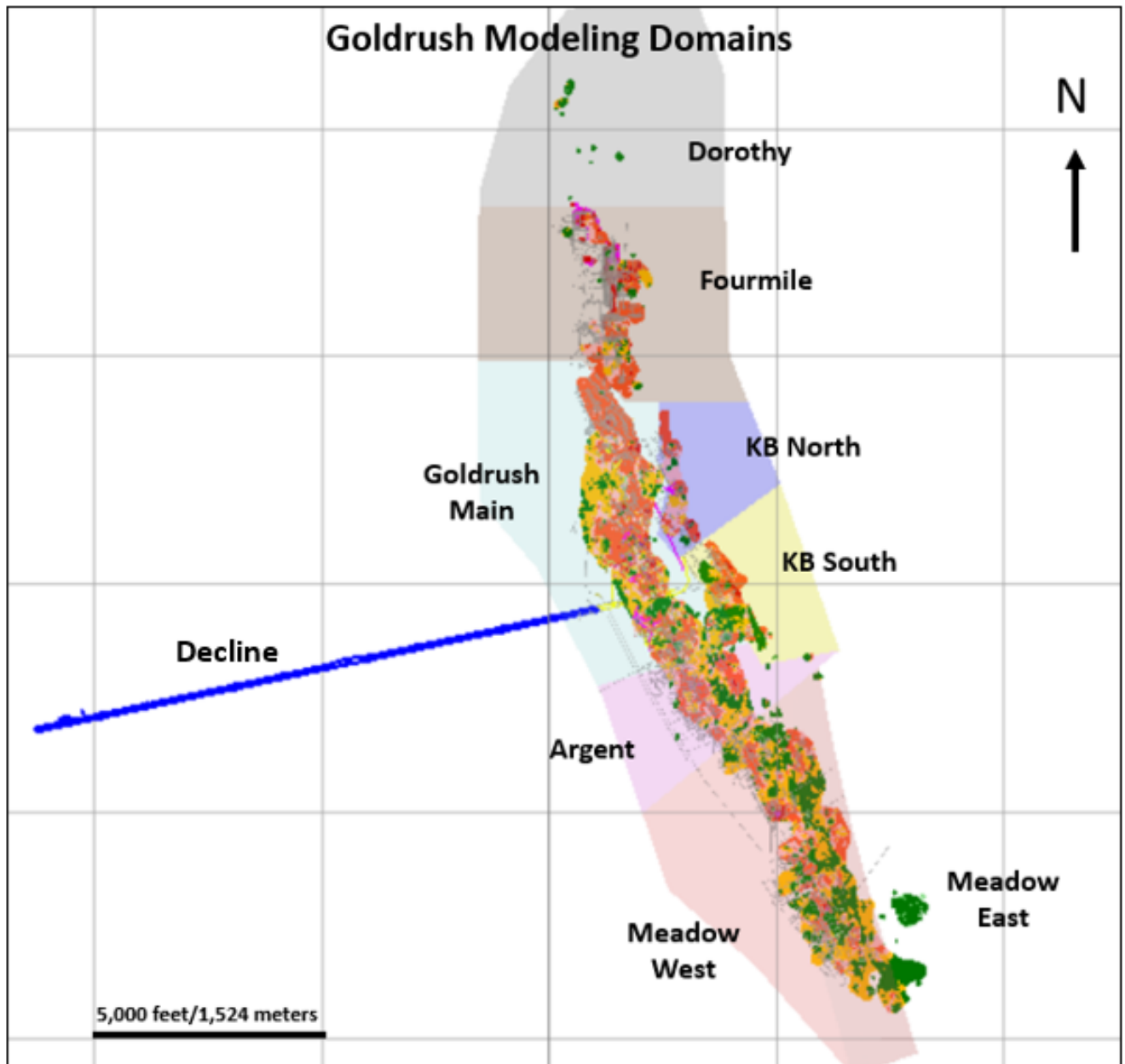
Model domains are set based on distinct geological characteristics that define sample populations and varying risk considerations from orebody geometry, metallurgical behaviour, and state of geological understanding. Mining methodology, handling and processing, and health and human safety are among the domaining considerations in addition to estimation purposes. A figure showing the domains is provided in Figure 14-4.

14.6.3 Exploratory Data Analysis

The drill hole database was analyzed on raw and composited assay data. Modeled geology, modeled mineralization, and domains were subject to statistical analysis to determine any distinct subsets of the general grade population. Resulting statistics guided decisions made regarding modeling, capping values, estimation parameters, and classification.

The target grade for mineralization solid interpretation corresponded to the general population observed in preliminary exploratory data analysis and the economic thresholds beyond which mining and processing were not considered viable by cut-off grade studies.

Figure 14-4: Goldrush Modelling Domains



Note: Figure prepared by NGM, 2021.

Internal dilution was incorporated where mineralized bodies were interpreted to be continuous as opposed to using a strict numerical threshold. Allowing for a portion of dilution aligned with the grade that will be realized at the time of mining. A hard boundary between high- and low-grade material was used, which is supported by direct observation of drill hole assay patterns and contact profile analysis.

14.6.4 Composites

All samples were composited to 3 m lengths.

14.6.5 Grade Capping/Outlier Restriction

The mineralization displayed very few high-grade outliers. Capping was applied within modeled high-grade regions. Individual high-grade samples considered too small to be modeled that fell within the low-grade extremities were handled by limiting their search influence during the low-grade estimation. Search limiting outliers in the low-grade regions retained the spot grade for targeting without risking over-estimation over longer ranges.

14.6.6 Density Assignment

Average density values were calculated for each combination of lithology and alteration and were assigned to the corresponding model blocks.

14.6.7 Variography

Snowden Supervisor software was used to construct variograms, corresponding to high-grade and low-grade regions of the model where controls on mineralization were known to vary and have an impact of the range of continuity of grade.

14.6.8 Estimation/Interpolation Methods

Due to the strike extent of the Goldrush deposit, parent blocks with a size of 9 x 9 x 6 m were first created spanning the entirety of the block model. A perimeter around the modeled mineralization solids of approximately 48 m was used to sub-block the model to a 3 x 3 x 3 m block size that was needed to capture sufficient detail for underground mine design. The mineralized solids were sub-blocked into the model within the detailed region allowing for a minimum size of 0.75 x 0.75 x 0.6 m along the edges to capture detail and to accommodate for compatibility with future models that will be depleted with mine solids.

Grade estimation was completed using OK. Check models were constructed using ID2, ID3 and nearest neighbour methods. Sample weighting were chosen based on modeled variograms and a detailed locally variable anisotropy model that was calculated into the blocks prior to estimation. Through all estimations, the search regions extend 305 m, 305 m and 61 m in the major, semi-major, and minor ranges respectively. Estimations generally used 4–6 minimum composites and 12 maximum composites, but with a maximum of 2–3 composites per drill hole in the mineralized areas. In areas outside of anticipated mineralization, the

minimum number of composites increased to a minimum of 12, with a maximum of 24 and a maximum of four composites per drill hole.

14.6.9 Block Model Validation

Model validation checks included:

- Visual comparisons of interpolated gold grades relative to drill hole composite values on sections and plans;
- Comparison of the volume of interpreted mineralization solids against the volume of the corresponding estimated blocks in the model;
- Comparison of the OK, ID2 and ID3 estimations against the declustered mean of the nearest neighbour estimate;
- Evaluation of change-of-support.

The block model was found to be globally unbiased and demonstrated good correlation between the different estimation methods and different supports.

14.6.10 Confidence Classifications

Classification of the Mineral Resource estimate for the Goldrush project used a combination of the data quality and availability, geological interpretation, interpreted continuity of potentially mineable grades, and expected variances based on a single block kriging study that accounted for data spacing, tonnage rates, and mining methods. The parameters considered resulted in a set of nominal drill spacing ranges for Measured, Indicated and Inferred Mineral Resources, based on three drill holes being required to classify Measured and Indicated and 2–3 drill holes required to classify Inferred. The drill spacing distances required to classify a block varied by the domain (Table 14-2).

14.7 Robertson

14.7.1 Geological Modelling

A total of 903 holes were drilled over approximately 172,326 m including 28,561 composites, which are included as approved data in the resource model. The geological model was created from surface mapping, drilling data and geophysical surveys. The geological model was created in the Leapfrog Geo modelling software. Primary components of the geological model are the igneous model, the litho-structural model and the alteration model. All models were created from drilling data, including primary lithology, alteration, mineralogy and veins, as well as through geochemical analyses of surface data and drilling data, geophysical analyses, downhole visual and acoustic televiewer surveys, and surface mapping of primary lithologies, alteration and structures.

Table 14-2: Drill Hole Spacings, Resource Classification, Goldrush

Class	Criteria	Goldrush Main	Argent	Meadow East	Meadow West	KB North/South
Measured	Nominal spacing range	0–15.2 m	0–15.2 m	0–13.7 m	0–12.2 m	0–10.7 m
	Number of drill holes	3	3	3	3	3
Indicated	Nominal spacing range	15.2–48.8 m	15.2–51.8 m	13.7–48.8 m	12.2–41.2 m	10.7–27.4 m
	Number of drill holes	3	3	3	3	3
Inferred	Nominal spacing range	48.8–76.2 m	51.8–77.7 m	48.8–76.2 m	41.2–61.0 m	27.4–42.7 m
	Number of drill holes	2–3	2–3	2–3	2–3	2–3

Mineralization controlling structures were created by characterizing fault and fractures through a combination of televiewer analyses, geochemical analyses and primary logging observations, with a focus on drill hole-to-drill hole correlation. Mineralization controlling alteration boundaries were created through a combination of primary mineralogic and alteration logging as well as through geochemical analyses. All mineralization controls were created in Leapfrog Geo as meshes, and subsequently exported into Vulcan to provide directional controls for gold estimation.

14.7.2 Domains

Estimation domains at Robertson were created by delineating the primary mineralization controls for each area and by lithology. A domain was created for mineralization inside the granodiorite. Further domains were created to delineate mineralization controlled by modelled fracture and fault series and alteration domains.

14.7.3 Exploratory Data Analysis

Exploratory data analysis was completed using Microsoft Excel and Snowden Supervisor v8.14 software. Basic histograms, cumulative distribution plots, probability plots, scatter plots, mean and variance plots, cumulative metal charts, boxplots and variograms were used to collect information on statistical distributions.

14.7.4 Composites

Capped assays were composited using downhole 6 m lengths. Composites honoured domain boundaries, and were distributed to prevent the formation of residual composites.

Where drill holes were completed in mineralization (≥ 0.10 g/t Au), and at depth were poorly supported by surrounding drill hole information, an additional 6 m composite was added

manually to the end of the hole at a near-zero (0.0034 g/t Au) grade to prevent the extension of gold grades below the depth of drilling.

14.7.5 Grade Capping/Outlier Restriction

Evaluation of high grade outliers was undertaken during EDA. Capping analysis was by estimation domains, and was applied to the raw data prior to compositing.

14.7.6 Density Assignment

Density data were evaluated and assigned in the block model by lithology and alteration. Blocks above topography were flagged to ensure density was not assigned to those blocks.

14.7.7 Variography

Variograms were modeled for the main Au domains, with the results used to define estimation sample search ranges. Normal scores variograms were modeled, and these were used in a single block kriging drill spacing study.

14.7.8 Block Model

The Robertson block model was constructed using Vulcan with regular 12 x 12 m blocks at 6 m high to reflect proposed open-pit mining resolution, and was aligned north-south. To minimize file size, blocks were only included within reasonable proximity of the mineralization. Topography was transformed upwards 30 m to define a volume of air for correct density assignment while also limiting the vertical block extents. Lateral extents for block construction were defined by a wireframe.

14.7.9 Estimation/Interpolation Methods

A first-pass indicator estimation was used to define high grade, low grade, and waste domains within each region at Robertson. Anisotropic search regions were used, aligned with local mineralization controls. Grade estimation within each domain used ID3. A two pass estimation was used, with the second pass relaxing sample selection criteria in order to complete grade estimates in the block model extremities. No capping was applied to the composite data (the raw data was capped prior to compositing), and no distance restriction on high grades was applied.

14.7.10 Block Model Validation

Block model results were validated using visual review against input data and geological controls on section and in three-dimensions. Statistical validation (global, by domain) was used to ensure no material bias was present in the estimates when compared with the input data.

14.7.11 Confidence Classifications

Confidence in the block estimates for Robertson was flagged by block in the model. Initial classification was based on nominal local data spacing as determined from a geostatistical drill spacing study, followed by an assessment of uncertainty driven by factors beyond data spacing. The distance to the nearest three drill holes was recorded for each block in the model, and used to calculate the nominal local data spacing for flagging blocks which could be considered for Indicated Mineral Resource classification. The distance to the nearest two drill holes was used in a similar fashion to determine which blocks may be considered for Inferred Mineral Resources.

Using these methods, the nominal drill spacing requirements range from 39.6–50.3 m for Indicated Mineral Resources and from 59.4–76.2 m for Inferred Mineral Resources.

Following classification using the nominal drill spacing, the Vulcan categorical smoothing algorithm was used to smooth out the classification scheme, removing isolated blocks and small clusters. A final step was to visually review the classification coding to ensure that the underlying uncertainty due to factors such as geological interpretations was adequately reflected. Additional adjustments were made as required.

14.8 Reasonable Prospects of Eventual Economic Extraction

14.8.1 Cortez Pits

Cortez open pit operations use conventional truck and shovels with conventional drill and blast techniques followed by load and haul. Material anticipated to be routed to processing facilities are drilled and blasted on 12 m and mined on 6 m benches, while waste material will be drilled, blasted and mined on 12 m benches. When mining ore, benches will be mined on 6 m intervals, but double stacked to create 12 m highwall walls. Mining costs are as outlined in the cut-off parameters outlined in Table 14-3.

14.8.2 Cortez Hills

Cortez Hills underground operations use two mining methods for extraction: long hole stoping and underhand cut-and-fill. The Lower Zone orebodies are primarily long hole stoping where the Middle Zone orebodies use a cut-and-fill mining method. Mined material is removed from the mine using the conveyor system that transports to surface from the underground material handling system. Void space is then filled with cemented rock fill (CRF) mixed in an underground batch plant. The Cortez Hills underground cut-off grade parameters are outlined in Table 14-4.

Table 14-3: Cut-off Grade Input Criteria, Cortez

Deposit	Description	Units	Ore Type		
			Oxide	Mill	Refractory
Cortez Pits	Gold price	US\$/oz	1,500	1,500	1,500
	Gold refining cost	US\$/oz	0.46	0.46	0.17
	Gold payable	%	99.90	99.90	99.90
	Recovery	%	55	74	70
	Mining cost	US\$/t mined	1.81	1.81	1.81
	Process operating cost	US\$/t processed	2.25	9.77	26.92
	G&A cost	US\$/t processed	0.24	1.07	2.97
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	Sub-total operating and sustaining capital cost (w/o mining)	US\$/t processed	2.54	11.68	41.31
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.0029	0.037	0.002
	Cut-off grade (metric units)	g/t Au	0.0994	1.27	0.069
Gold Acres	Gold price	US\$/oz	1,500	1,500	1,500
	Gold refining cost	US\$/oz	0.46	0.46	0.17
	Gold payable	%	99.90	99.90	99.90
	Recovery	%	65	65	71
	Mining cost	US\$/t mined	2.43	2.43	2.43
	Process operating cost	US\$/t processed	2.25	9.77	26.92
	G&A cost	US\$/t processed	0.24	1.07	2.97
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	Sub-total operating and sustaining capital cost (w/o mining)	US\$/t processed	2.54	11.68	41.31
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.003	0.032	0.003
	Cut-off grade (metric units)	g/t Au	0.103	1.10	0.103
Crossroads	Gold price	US\$/oz	1,500	1,500	1,500
	Gold refining cost	US\$/oz	0.46	0.46	0.17
	Gold payable	%	99.90	99.90	99.90
	Recovery	%	62	62	71
	Mining cost	US\$/t mined	2.18	2.18	2.18
	Process operating cost	US\$/t processed	2.25	9.77	26.92

Deposit	Description	Units	Ore Type		
			Oxide	Mill	Refractory
	G&A cost	US\$/t processed	0.24	1.07	2.97
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	Sub-total operating and sustaining capital cost (w/o mining)	US\$/t processed	2.54	11.68	41.31
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.0027	0.046	0.005
	Cut-off grade (metric units)	g/t Au	0.093	1.58	0.17
Pipeline	Gold price	US\$/oz	1,500	1,500	1,500
	Gold refining cost	US\$/oz	0.46	0.46	0.17
	Gold payable	%	99.90	99.90	99.90
	Recovery	%	75	75	70
	Mining cost	US\$/t mined	1.81	1.81	1.81
	Process operating cost	US\$/t processed	2.25	9.77	26.92
	G&A cost	US\$/t processed	0.24	1.07	2.97
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	Sub-total operating and sustaining capital cost (w/o mining)	US\$/t processed	2.54	11.68	41.31
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.004	0.046	0.009
	Cut-off grade (metric units)	g/t Au	0.137	1.58	0.304
Robertson	Gold price	US\$/oz	1,500	1,500	—
	Gold refining cost	US\$/oz	0.46	0.46	—
	Gold payable	%	99.99	99.99	—
	Recovery	%	45	88	—
	Mining costs	US\$/t mined	1.85	1.85	—
	Process operating cost	US\$/t processed	3.52	13.27	—
	G&A cost	US\$/t processed	0.39	1.46	—
	Sustaining capital	US\$/t processed	0.15	0.89	—
	Transportation cost	US\$/t processed	-	1.1	—
	Sub-total operating and sustaining capital cost (w/o mining)	US\$/t	4.06	16.72	—
	Royalty	%	1.29	1.29	—
	Cut-off grade (us customary units)	oz/st Au	0.007	0.032	—
	Cut-off grade (metric units)	g/t Au	0.24	1.10	—

Note: cut-off grades are calculated in US customary units.

Table 14-4: Cut-off Grade Input Criteria, Cortez Hills Underground

Mining Method	Unit Cost (\$/ore ton)	Units	Oxide	Roaster
Cut-and-fill	Gold price	US\$/oz	1,500	1,500
	Recovery	%	84	85
	Mining operating cost	US\$/st	97.15	97.15
	G&A mining operating cost	US\$/st	11.66	11.66
	Process operating cost	US\$/st	10.62	29.40
	G&A processing operating cost	US\$/st	1.28	3.53
	Transportation operating costs	US\$/st	—	17.88
	Total operating cost	US\$/st	120.70	159.61
	Sustaining capital (underground)	US\$/st	5.45	5.45
	Sustaining capital (process)	US\$/st	—	—
	External refining	US\$/oz	0.57	0.57
	Royalties	US\$/oz	41.40	41.40
	Cut-off grade (us customary units)	oz/st Au	3.2	4.1
	Cut-off grade (metric units)	g/t Au	0.094	0.120
Longhole stope	Gold price	US\$/oz	1,500	1,500
	Recovery	%	84	85
	Mining operating cost	US\$/st	79.30	79.30
	G&A mining operating cost	US\$/st	9.51	9.51
	Process operating cost	US\$/st	10.62	29.40
	G&A processing operating cost	US\$/st	1.28	1.28
	Transportation operating costs	US\$/st	—	17.88
	Total operating cost	US\$/st	100.71	137.37
	Sustaining capital (underground)	US\$/st	5.45	5.45
	Sustaining capital (process)	US\$/st	—	—
	External refining	US\$/oz	0.57	0.57
	Royalties	US\$/oz	41.40	41.40
	Cut-off grade (us customary units)	oz/st Au	0.079	0.104
	Cut-off grade (metric units)	g/t Au	2.7	3.6

Note: cut-off grades are calculated in US customary units.

Table 14-5: Cut-off Grade Input Criteria, Goldrush

Mining Method	Parameter	Unit Cost (\$/ton mineralization)	Roaster
Longhole stope	Gold price	US\$/oz	1,500
	Recovery	%	88.6
	Mining operating cost	US\$/t	68.98
	Process operating cost	US\$/t	29.18
	G&A operating cost	US\$/t	11.14
	Transportation costs	US\$/t	24.31
	Total operating cost	US\$/t	133.61
	Sustaining capital (underground) (included in mining operating cost)	US\$/t	5.47
	Sustaining capital (process) (included in process operating cost)	US\$/t	—
	Royalties	US\$/oz	52.35
	Cut-off grade (us customary units)	oz/st Au	0.099
	Cut-off grade (metric units)	g/t Au	3.4

Note: cut-off grades are calculated in US customary units.

14.8.3 Gold Acres

Gold Acres will be in alignment with Cortez open pit operations, using conventional truck and shovels with conventional drill and blast techniques followed by load and haul. Material will be drilled and blasted on 12 m and mined on 12 m benches. All mineralized material is anticipated to be roast mineralization, which is currently planned to be shipped to the Carlin Complex processing facilities. Mining costs are as outlined in the cut-off parameters outlined in Table 14-3.

14.8.4 Pipeline

The Pipeline complex includes the Pipeline 10 pit and the Crossroads pit. The Pipeline 10 pit is being mined on 15 m benches, which are double benched in some segments of the pit to create 30.5 m benches based on geotechnical recommendations. All oxide ore is processed on site at the Pipeline Mill or at the Area 30 leach facility. The Crossroads pit is mined on 12 m benches in the alluvium. Bench heights in the bedrock vary between 12 m and 24 m benches based on geotechnical recommendations. All oxide mineralization is processed on site at the Pipeline Mill or Area 30 leach facility, and refractory material is shipped to the Carlin process facilities. Cortez open pit operations use conventional truck and shovels with conventional drill and blast techniques followed by load and haul. Mining costs are as outlined in the cut-off parameters provided in Table 14-3.

14.8.5 Robertson

Robertson is proposed to be in alignment with Cortez open pit operations using conventional truck and shovels with conventional drill and blast techniques followed by load and haul. Material will be drilled and blasted on 12 m and mined on 12 m benches. All mineralization is anticipated to be oxide, and is currently planned to be processed at the Pipeline Mill or on a future leach pad that will be constructed at the Robertson complex. Assumed mining costs are included in Table 14-3.

14.8.6 Goldrush

The primary method of extraction at the Goldrush mine is longhole open stoping. The basic mining unit is a stope with the dimensions of 15 m (width) by 15 m (strike length) by 20 m (height). Broken material is hauled from the mine using Sandvik 663 haul trucks out of the mine declines. Void space is then filled with CRF. A paste plant is expected to be constructed to provide backfill. The Goldrush underground cut-off grade parameters are outlined in Table 14-5.

14.9 Mineral Resource Statement

Mineral Resources are reported using the 2014 CIM Definition Standards, and have an effective date of 31 December, 2021.

Mineral Resources are reported inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Qualified Person for the estimates is Mr. Craig Fiddes, RM SME, an NGM employee.

Mineral Resource estimates are provided in Table 14-6.

Table 14-6: Measured, Indicated, and Inferred Mineral Resource Statement, Cortez Complex

	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)
Surface												
<i>Open Pit</i>												
Cortez Pits	—	—	—	8.1	2.02	0.53	8.1	2.02	0.53	2.5	1.2	0.094
Crossroads	0.24	1.88	0.014	59	1.65	3.1	60	1.65	3.2	3.2	0.3	0.033
Gold Acres	—	—	—	0.29	3.33	0.031	0.29	3.33	0.031	5.0	3.0	0.49
Pipeline	—	—	—	8.3	0.54	0.14	8.3	0.54	0.14	1.2	0.6	0.022
Robertson	—	—	—	74	0.56	1.3	74	0.56	1.3	88	0.4	1.1
<i>Open Pit Sub-Total</i>	<i>0.24</i>	<i>1.88</i>	<i>0.014</i>	<i>150</i>	<i>1.07</i>	<i>5.2</i>	<i>150</i>	<i>1.07</i>	<i>5.2</i>	<i>100</i>	<i>0.5</i>	<i>1.8</i>
<i>Stockpile</i>												
Open Pit Leach	0.0031	0.82	0.000082	—	—	—	0.0031	0.82	0.000082	—	—	—
Open Pit Mill	1.0	1.15	0.038	—	—	—	1.0	1.15	0.038	—	—	—
Open Pit Refractory	0.98	2.81	0.089	—	—	—	0.98	2.81	0.089	—	—	—
Underground Mill	0.018	11.45	0.0066	—	—	—	0.018	11.45	0.0066	—	—	—
Underground Refractory	0.028	9.72	0.0086	—	—	—	0.028	9.72	0.0086	—	—	—
<i>Stockpile Sub-Total</i>	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—
Surface Total	2.3	2.12	0.16	150	1.07	5.2	150	1.09	5.3	100	0.5	1.8
Underground												
Cortez Hills (CHUG)	2.0	8.06	0.51	15	8.20	4.0	17	8.18	4.5	0.78	3.4	0.085
Goldrush				37	7.07	8.5	37	7.07	8.5	24	6.0	4.5
<i>Underground Total</i>	<i>2.0</i>	<i>8.06</i>	<i>0.51</i>	<i>52</i>	<i>7.40</i>	<i>12</i>	<i>54</i>	<i>7.42</i>	<i>13</i>	<i>24</i>	<i>5.9</i>	<i>4.6</i>
Cortez Total	4.3	4.88	0.67	200	2.71	18	210	2.75	18	120	1.6	6.4

Notes to accompany Mineral Resource table for Cortez Complex

1. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee. The estimate has an effective date of 31 December, 2021.
2. Mineral Resources are reported using the 2014 CIM Definition Standards, and are inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
3. Mineral Resources are reported within conceptual open pit shells for Mineral Resources potentially amenable to open pit mining methods and mineable shapes for Mineral Resources potentially amenable to underground mining methods. Mineral Resources that are potentially amenable to open pit mining methods were constrained used the following input parameters: gold price of US\$1,500/oz; gold refining costs ranging from US\$0.17–US\$0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; a mining cost range of US\$1.81–2.43/t mined; variable pit slope angles that range from 20.5–47°; metallurgical recoveries that vary from 62–81%; processing costs that range from US\$2.04–US\$24.42/t processed; general and administrative costs ranging from US\$0.22–US\$2.69/t processed; variable sustaining capital costs of US\$0.04–US\$2.36/t processed; and transportation costs of US\$8.01/t processed. Mineral Resources potentially amenable to open pit mining methods are reported above cut-off grades that vary from 0.14–2.06 g/t Au. Mineral Resources that are potentially amenable to underground mining methods were constrained used the following input parameters: gold price of US\$1,500/oz; gold refining costs ranging from US\$0.17–US\$0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; metallurgical recoveries that range from 84–88.6%; ore mining costs that vary from US\$68.98–US\$97.15/t mined; processing costs that range from US\$10.62–US\$29.28/t processed; variable general and administrative costs from US\$11.19–US\$15.19/t processed; sustaining capital costs that range from US\$5.45–US\$5.47/t processed; and variable transportation costs of US\$17.88–24.31/t. Mineral Resources potentially amenable to underground mining methods are reported above cut-off grades that vary from 2.7–4.13 g/t Au.
4. Mineral Resources are reported on a 100% basis. Barrick's and Newmont's attributable shares of the Mineral Resources are 61.5% and 38.5%, respectively.
5. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content. Tonnages are reported as metric units. Gold ounces are estimates of metal contained in tonnages and do not include allowances for processing losses.

14.10 Factors That May Materially Affect the Mineral Resource Estimate

Factors that may materially impact the Mineral Resource estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological shape and continuity assumptions; changes to grade estimation methods and parameters; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the input assumptions used to derive the pit shell used to constrain the open pit estimates; changes to the input assumptions used to derive the mineable shapes used to constrain the underground estimates; changes to the marginal cut-off grade assumptions used to constrain the estimates; variations in geotechnical, hydrogeological and mining assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

14.11 QP Comments on “Item 14: Mineral Resource Estimates”

The QP is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors that could materially affect the Mineral Resource estimates that are not discussed in this Report.

15.0 MINERAL RESERVE ESTIMATES

15.1 Introduction

Mineral Reserves are estimated for three open pit deposits (Cortez Pits, Pipeline, and Crossroads), three underground zones in the Cortez Hills deposit (Middle Zone, Lower Zone, and the Deep South Zone), Goldrush, and surface stockpiles.

Mineral Reserves are converted from Measured and Indicated Mineral Resources. Inferred Mineral Resources are set to waste.

15.2 Open Pit Mineral Reserves

15.2.1 Estimation Procedure

The optimized economic pit shells selected for the basis of open pit designs were created using the Whittle 4X software package. Input parameters to the Lerchs–Grossmann pit shells are summarized in Table 15-1.

15.2.2 Cut-off Grade

Royalties for the Mineral Reserves to be mined by open pit methods vary by area, metal price, and processing type. The various royalties cover different areas, which are described internally as royalty areas to assess Mineral Reserves for each area. Certain royalties are held by subsidiaries of Barrick, and these royalties are excluded from consideration in the cut-off grade estimation. The royalty is estimated for each of five different areas (Cortez Pits, Pipeline, Crossroads, Cortez Hills Underground and Goldrush), and a realized gold price net of the royalty is estimated for use in the cut-off grade calculation.

Process and overhead costs for the various processing options were estimated along with recovery. Cut-off grades do not include mining costs. Cut-off grades consider the general and administration (G&A) costs as part of the process cost. Since 0.14 g/t Au is the lowest limit detectable in the assay laboratory, the heap leach cut-off grade was set to 0.14 g/t Au.

Inputs to the cut-off calculation include:

- A gold price of US\$1,200/oz;
- The applicable Cortez Mine royalty payments;
- The process operating costs and on-site (and off-site) metal recoveries by material type, applicable or selected process method, and orebody.

The cut-off grades used to constrain the estimate, and the input parameters used to derive those cut-offs are provided in Table 15-2.

Table 15-1: Pit Shell Input Parameters

Deposit	Item	Unit	Parameter
Crossroads	Block dimensions	ft	40 x 40 x 40
		m	12.2 x 12.2 x 12.2
	Origin coordinates		97000, 48980, 2900
	Mining cost adjustment factor formula		Bedrock If $Z > 4940$ $2.6193 * (0.2672 + (Z \times 0.00012))$; Bedrock If $Z \leq 4940$ $2.6193 * (1.7248 - (Z \times 0.00017))$ Fill If $Z > 4940$ $2.3836 * (0.2672 + (Z \times 0.00012))$; Fill If $Z \leq 4940$ $2.3836 * (1.7248 - (Z \times 0.00017))$ Alluvium If $Z > 4940$ $2.6075 * (0.2672 + (Z \times 0.00012))$; Alluvium If $Z \leq 4940$ $2.6075 * (1.7248 - (Z \times 0.00017))$
	Slope by sector	°	20.5, 25, 32, 33, 34, 35, 36.5, 37, 37.5, 38, 40
	Gold price	US\$/oz	1,200
	Gold selling cost	US\$/oz	0.38
	Gold payable	%	99.9
	Royalty	%	9.2
	Recovery leach	%	65.0
	Recovery mill	%	If $Au \leq 0.045$ oz/t = $((0.14 * \ln(Au) + 1.33) * (69 + 17 * aa_fa + 0.39 * Au) + 1.8)$; If $Au > 0.045$ oz/t = $(61 + 16 * aa_fa + 32 * Au)$
	Recovery refractory	%	$92.027536 - (37.35906 \times \text{EXP}((-12.94386) \times Au))$
	Leach cost + sustaining capital + G&A	US\$/st processed	$2.04 + 0.040 + 0.2244$
	Mill cost + sustaining capital + G&A	US\$/st processed	$8.86 + 0.770 + 0.9746$
	Refractory cost + sustaining capital + G&A + transportation	US\$/st processed	$23.47849498 + 2.3595526 + 2.580570997 + 8.012757$
Pipeline	Block dimensions	ft	40 x 40 x 50
		m	12.2 x 12.2 x 15.2
	Origin coordinates		97000, 49500, 2880
	Mining cost adjustment factor formula		Bedrock If $Z > 5280$ $2.4078 * (0.0654 + (Z \times 0.00013))$; Bedrock If $Z \leq 5280$ $2.4078 * (1.7519 - (Z \times 0.00019))$ Fill If $Z > 5280$ $2.2022 * (0.0654 + (Z \times 0.00013))$; Fill If $Z \leq 5280$ $2.2022 * (1.7519 - (Z \times 0.00019))$ Alluvium If $Z > 5280$ $2.3957 * (0.0654 + (Z \times 0.00013))$; Alluvium If $Z \leq 5280$ $2.3957 * (1.7519 - (Z \times 0.00019))$
	Slope by sector	°	36, 43, 44

Deposit	Item	Unit	Parameter
	Gold price	US\$/oz	1,200
	Gold selling cost	US\$/oz	0.38
	Gold payable	%	99.9
	Royalty	%	7.46
	Recovery leach	%	62.0
	Recovery mill	%	If Au ≤ 0.045 oz/t = ((0.14 * ln(Au) + 1.33) * (69 + 17 * aa_fa + 0.39 * Au) + 1.8); If Au > 0.045 oz/t = (61 + 16 * aa_fa + 32 * Au)
	Recovery refractory	%	92.027536 - (37.35906 x EXP((-12.94386) x Au))
	Leach cost + sustaining capital + G&A	US\$/st processed	2.04 + 0.040 + 0.2244
	Mill cost + sustaining capital + G&A	US\$/st processed	8.86 + 0.770 + 0.9746
	Refractory cost + sustaining capital + G&A + transportation	US\$/st processed	23.47849498 + 2.3595526 + 2.580570997 + 8.012757
Cortez Pits	Block dimensions	ft	40 x 40 x 50
		m	12.2 x 12.2 x 15.2
	Origin coordinates		38393.1, -1944965.99, -116.58
	Mining cost adjustment factor formula		if Z > 4860 (.0001495283*4860) + 0.233896345 if => (-.000208865*4860) + 1.975687704
	Slope by sector	°	21,36,38,39,44,45,46,47
	Gold price	US\$/oz	1,200
	Gold selling cost	US\$/oz	0.38
	Gold payable	%	99.9
	Royalty	%	3.416
	Recovery leach	%	75%
	Recovery mill	%	If Au => .004 oz/t ((8.36 * whit_au) - (9.78 / aa_fa) + 96.4)/100
	Recovery refractory	%	(92.027536 - 37.35906*EXP((-12.94386)*whit_au))/100
	Leach cost + sustaining capital + G&A	US\$/st processed	2.04 + 0.040 + 0.2244
	Mill cost + sustaining capital + G&A	US\$/st processed	8.86 + 0.770 + 0.9746
	Refractory cost + sustaining capital + G&A + transportation	US\$/st processed	23.47849498 + 2.3595526 + 2.580570997 + 8.012757

Note: input parameters are in US customary units.

Table 15-2: Cut-off Grades and Input Parameters, Crossroads and Pipeline

Deposit	Description	Units	Ore Type		
			Oxide	Mill	Refractory
Crossroads	Gold price	US\$/oz	1,200	1,200	1,200
	Gold selling cost	US\$/oz	0.38	0.38	0.38
	Gold payable	%	99.9	99.9	99.9
	Recovery	%	62	81	73
	Mining cost	US\$/st mined	2.20	2.20	2.20
	Process operating cost	US\$/st processed	2.04	8.86	24.42
	G&A cost	US\$/st processed	0.22	0.97	2.69
	Sustaining capital	US\$/st processed	0.04	0.77	2.36
	Transportation cost	US\$/st processed	—	—	8.01
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/st processed</i>	2.30	10.60	37.48
	Mining cost	US\$/t mined	2.43	2.43	2.43
	Process operating cost	US\$/t processed	2.25	9.77	26.91
	G&A cost	US\$/t processed	0.25	1.07	2.96
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/t processed</i>	2.54	11.69	41.30
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.004	0.04	0.051
	Cut-off grade (metric units)	g/t Au	0.14	1.37	1.75
Pipeline	Gold price	US\$/oz	1,200	1,200	1,200
	Gold selling cost	US\$/oz	0.38	0.38	0.38
	Gold payable	%	99.9	99.9	99.9
	Recovery	%	62	74	76
	Mining cost	US\$/st mined	1.98	1.98	1.98
	Process operating cost	US\$/st processed	2.04	8.86	24.42
	G&A cost	US\$/st processed	0.25	1.07	2.96
	Sustaining capital	US\$/st processed	0.04	0.85	2.60
	Transportation cost	US\$/st processed	—	—	8.03
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/st processed</i>	2.33	10.78	38.01
	Mining cost	US\$/t mined	2.18	2.18	2.18
	Process operating cost	US\$/t processed	2.25	9.77	26.91
	G&A cost	US\$/t processed	0.28	1.18	3.26

Deposit	Description	Units	Ore Type		
			Oxide	Mill	Refractory
	Sustaining capital	US\$/t processed	0.04	0.94	2.87
	Transportation cost	US\$/t processed	-	-	8.85
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/t processed</i>	2.57	11.89	41.89
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st	0.004	0.057	0.06
	Cut-off grade (metric units)	g/t	0.14	1.95	2.06
Cortez Pits	Gold price	US\$/oz	1,200	1,200	1,200
	Gold selling cost	US\$/oz	0.38	0.38	0.38
	Gold payable	%	99.9	99.9	99.9
	Recovery	%	75%	88%	86.9%
	Mining cost	US\$/st mined	1.64	1.64	1.64
	Process operating cost	US\$/st processed	2.04	8.86	23.48
	G&A cost	US\$/st processed	0.22	0.97	2.58
	Sustaining capital	US\$/st processed	0.04	0.77	2.36
	Transportation cost	US\$/st processed	—	—	8.01
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/st processed</i>	2.30	10.60	36.43
	Mining cost	US\$/t mined	1.81	1.81	1.81
	Process operating cost	US\$/t processed	2.25	9.77	25.88
	G&A cost	US\$/t processed	0.25	1.07	2.84
	Sustaining capital	US\$/t processed	0.04	0.85	2.60
	Transportation cost	US\$/t processed	—	—	8.83
	<i>Sub-Total Operating and Sustaining Capital Cost (without mining)</i>	<i>US\$/t processed</i>	2.54	11.69	40.15
	Royalty	%	10.09	10.09	10.09
	Cut-off grade (US customary units)	oz/st Au	0.004	0.040	0.06
	Cut-off grade (metric units)	g/t Au	0.137	1.37	2.06

Note: US\$/st = US dollars per US customary ton; US\$/t = US dollars per metric tonne. Cut-off grades are calculated in US customary units.

15.2.3 Dilution and Mining Recovery

Dilution and extraction in the open pit Mineral Reserve estimates are addressed by diluting to whole blocks, at a block size that is considered to be representative of the selective mining unit. No further external factors are applied. The open pit design is based upon 100% extraction of the open pit Mineral Reserves.

15.3 Underground Mineral Reserves

15.3.1 Cortez Hills

15.3.1.1 Estimation Procedure

The Middle Zone is being mined using cut-and-fill methods in most areas and some longhole stoping. The Lower Zone is mined using primarily longhole stoping. The Deep South Zone is being mined using longhole stoping methods.

15.3.1.2 Cut-off Grade

Royalties are estimated as 1.29% Idaho royalty, US\$14.40/oz Rio Tinto royalty, and a 0.96% rate for the Nevada Mining Education Tax (Nevada Legislation AB495). The first payment under AB495 is expected in April 2022. Mining costs, process costs, and process recoveries were estimated for the mining methods to determine the cut-off grade. Two different processing options are available for ore from the underground mine.

The cut-off grade estimation is based on:

- A gold price of US\$1,200/oz;
- The applicable Cortez Mine royalty payments; and
- The process operating costs and on-site (and off-site) metal recoveries by material type, applicable or selected process method, and mining method.

The cut-off grades used to constrain the estimate, and the input parameters used to derive those cut-offs is provided in Table 15-3.

15.3.1.3 Dilution and Mining Recovery

The cut-and-fill stopes include a dilution tonnage of 5% at zero grade to account for ore handling dilution plus cemented rock fill dilution of 3% on primary levels, 5% on secondary levels, and 10% on the bottom levels.

The longhole stopes include a recovery factor, 95% for primary stopes and 97% for secondary stopes. Cemented rock fill dilution is also included, 1% for primary stopes and 10% for secondary stopes.

The Mineral Reserves have an extraction factor of 100%.

Table 15-3: Cut-off Grades and Input Parameters, Cortez Hills Underground

Mining Method	Parameter	Unit	Oxide	Roaster
Cut-and-fill	Gold price	US\$/oz	1,200	1,200
	Recovery	%	84	85
	Mining operating cost	US\$/t	97.15	97.15
	Process operating cost	US\$/t	10.62	29.40
	G&A operating cost	US\$/t	12.94	15.19
	Transportation costs	US\$/t	—	17.88
	Total operating cost	US\$/t	120.70	159.62
	Sustaining capital (underground)	US\$/t	5.45	5.45
	Sustaining capital (process) (included in operating)	US\$/t	—	—
	Royalties	\$/oz	41.40	41.40
	BCOG (US customary units)	oz/st Au	0.118	0.152
	BCOG (metric units)	g/t Au	4.05	5.21
Longhole stope	Gold price	US\$/oz	1,200	1,200
	Recovery	%	84	85
	Mining operating cost	US\$/t	79.3	79.3
	Process operating cost	US\$/t	10.62	29.40
	G&A operating cost	US\$/t	10.79	13.04
	Transportation costs	US\$/t	—	17.88
	Total operating cost	US\$/t	100.71	139.62
	Sustaining capital (underground)	US\$/t	5.45	5.45
	Sustaining capital (process) (included in operating)	US\$/t	—	—
	Royalties	US\$/oz	41.40	41.40
	BCOG (US customary units)	oz/st Au	0.099	0.133
	BCOG (metric units)	g/t Au	3.39	4.56

Note: BCOG = break-even cut-off grade. Tonnage units shown in US customary units (st).

15.3.2 Goldrush

15.3.2.1 Estimation Procedure

Estimates were undertaken by Piran Mining UK Ltd using Deswik mine planning software. The primary mining method was assumed to be sub-level open stoping in a top-down mining sequence.

15.3.2.2 Cut-off Grade

The break-even cut-off grade for Goldrush reserves is 4.0 g/t Au as detailed in Table 15-4.

The cut-off grade estimation is based on:

- A gold price of US\$1,200/oz;
- LOM average metallurgical recovery of 88.6%;
- The royalty payments for the two royalty regions applicable to Goldrush:
 - Region 1 = 2.4859% NSR royalty
 - Region 6 = 3.6959% NSR royalty;
- Operating and sustaining capital costs from the feasibility study completed in 2021

Table 15-4: Cut-off Grades and Input Parameters, Goldrush

Mining Method	Parameter	Unit	Roaster
Longhole stope	Gold price	US\$/oz	1,200
	Recovery	%	88.6
	Mining operating cost	US\$/t	68.98
	Process operating cost	US\$/t	29.18
	G&A operating cost	US\$/t	11.14
	Transportation costs	US\$/t	24.31
	Total operating cost	US\$/t	133.61
	Sustaining capital (underground)	US\$/t	1.71
	Sustaining capital (process) (included in process operating costs)	US\$/t	—
	Royalties	US\$/oz	19.76
	BCOG (US customary units)	oz/st Au	0.117
	BCOG (metric units)	g/t Au	4.0

Note: cut-off grades are calculated in US customary units.

15.3.2.3 Dilution and Mining Recovery

Dilution included application of external and internal planned dilution.

A mining recovery factor of 95% was applied to all stope tonnes. The planned dilution included:

- Hanging wall planned dilution = 0.76 m
- Footwall planned dilution = 0.61 m.

15.4 Stockpiles

All Cortez material is mined to one of 24 open pit stockpiles or 17 underground stockpiles (on surface). These stockpiles are stored on various ore pads around site, including the “PLOR”, “RFD”, “LVL5”, “Quads”, “MN2M”, “CHOR”, Canyon Dump and “NWRP” pads. Both oxide and refractory material are actively stockpiled, with the economic refractory material being shipped to either Goldstrike or Gold Quarry for processing. Cortez stockpiles are also maintained as needed at the Goldstrike Roaster stockpile pad and the Gold Quarry Roaster stockpile pad.

Running stockpiles tonnages are calculated daily by adding any freshly mined or rehandled (from another stockpile) material, then subtracting any processed or rehandled material removed from the pile. These numbers are reported by the fleet management system. Tonnages are corrected to surveyed volumes weekly or monthly depending on survey frequency and stockpile activity.

Gold ounces are tracked similarly, with the expected ounce value being listed along with a diluted ounce value based on how the ore blocks were mined.

This information is also carried through the fleet management system with every truck loading having a majority block ID, gold grade and constituents. Geochemical/metallurgical constituents (cyanide soluble gold, preg rob index, sulfide sulfur, organic carbon, and carbonate) are tracked alongside ounces. These values are applied to the stockpile inventories when creating rolling metal production forecasts.

Annual assessments of the data quality and confidence of reported the stockpile inventories are conducted using a standard set of criteria. These assessments highlight the risk to ounce production in each stockpile and helps to justify drilling these piles with a sonic rig for high quality data. Drill programs are planned at a 15 m or 18 m grid with samples every 0.6 m. These samples are then used to define the stockpile base (if unknown), provide updated constituents and updated ounce inventory. Any adjustments to contained ounces are made during the end of month reporting cycle.

15.5 Mineral Reserve Statement

Mineral Reserves are reported in Table 15-5 using the 2014 CIM Definition Standards with an effective date of December 31, 2021. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee.

Table 15-5: Mineral Reserves Statement

	Proven			Probable			Proven + Probable		
	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)	Tonnes (Mt)	Grade (g/t)	Contained Au (Moz)
Surface									
<i>Open Pit</i>									
Cortez Pits	—	—	—	4.3	1.85	0.26	4.3	1.85	0.26
Crossroads	0.22	1.90	0.013	56	1.65	3.0	56	1.65	3.0
Pipeline	—	—	—	0.90	1.08	0.031	0.90	1.08	0.031
<i>Open Pit Sub-Total</i>	<i>0.22</i>	<i>1.90</i>	<i>0.013</i>	<i>61</i>	<i>1.66</i>	<i>3.2</i>	<i>61</i>	<i>1.66</i>	<i>3.3</i>
<i>Stockpile</i>									
Open Pit Leach	0.0031	0.82	0.000082	—	—	—	0.0031	0.82	0.000082
Open Pit Mill	1.0	1.15	0.038	—	—	—	1.0	1.15	0.038
Open Pit Refractory	0.98	2.81	0.089	—	—	—	0.98	2.81	0.089
Underground Mill	0.018	11.45	0.0066	—	—	—	0.018	11.45	0.0066
Underground Refractory	0.028	9.72	0.0086	—	—	—	0.028	9.72	0.0086
<i>Stockpile Sub-Total</i>	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>	—	—	—	<i>2.1</i>	<i>2.15</i>	<i>0.14</i>
Surface Total	2.3	2.13	0.16	61	1.66	3.2	63	1.68	3.4
Underground									
Cortez Hills (CHUG)	1.3	8.57	0.35	9.0	9.55	2.8	10	9.43	3.1
Goldrush	—	—	—	33	7.29	7.8	33	7.29	7.8
Underground Total	1.3	8.57	0.35	42	7.77	11	43	7.79	11
Cortez Total	3.5	4.43	0.50	100	4.16	14	110	4.17	14

Notes to accompany Mineral Reserves table

1. The Qualified Person for the estimate is Mr. Craig Fiddes, RM SME, a NGM employee. The estimate has an effective date of 31 December, 2021.
2. Mineral Reserves are reported using the 2014 CIM Definition Standards.
3. Mineral Reserves are reported within optimized pit shells for Mineral Reserves to be mined using open pit methods and constraining mineable shapes for Mineral Reserves to be mined using underground methods. Mineral Reserves to be mined using open pit methods used the following input parameters: gold price of US\$1,200/oz; gold refining costs ranging from US\$0.17–0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; a mining cost range of US\$1.81–2.18/t mined; variable pit slope angles that range from 20.5–47°; metallurgical recoveries that vary from 62–81%; processing costs that range from US\$2.04–US\$24.42/t processed; general and administrative costs ranging from US\$0.22–US\$2.69/t processed; variable sustaining capital costs of US\$0.04–US\$2.36/t processed; and transportation costs of US\$8.01/t processed. Open pit Mineral Reserves are reported above cut-off grades that vary from 0.14–2.06 g/t Au. Mineral Reserves to be mined using underground methods used the following input parameters: gold price of US\$1,200/oz; gold refining costs ranging from US\$0.17–0.57/oz; payable gold assumption of 99.9%, a royalty range of 1.29–10.65%; metallurgical recoveries that range from 84–88.6%; ore mining costs that vary from US\$68.98–US\$97.15/t mined; processing costs that range from US\$10.62–US\$29.28/t processed; variable general and administrative costs from US\$11.19–US\$15.19/t processed; sustaining capital costs that range from US\$5.45–US\$5.47/t processed; and variable transportation costs of US\$17.88–24.31/t. Underground Mineral Reserves are reported above cut-off grades that vary from 3.4–5.2 g/t Au.
4. Mineral Reserves are reported on a 100% basis. Barrick's and Newmont's attributable shares of the Mineral Reserves are 61.5% and 38.5%, respectively.
5. Rounding as required by reporting guidelines may result in apparent differences between tonnes, grade and contained metal content. Tonnages are reported as metric units. Gold ounces are estimates of metal contained in tonnages and do not include allowances for processing losses.

15.6 Factors That May Materially Affect the Mineral Reserve Estimates

Factors that may materially affect the Mineral Reserve estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological shape and continuity assumptions; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the marginal cut-off grade assumptions used to constrain the estimates; geotechnical and design parameter changes impacting dilution and mining recovery factors; potential for lower mill recovery in new mining areas or from long-term stockpiles; fluctuations in commodity price and exchange rates; and mining cost assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

15.7 QP Comments on “Item 15: Mineral Reserve Estimates”

The QP is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Resource estimates that are not discussed in this Report.

16.0 MINING METHODS

16.1 Overview

The Cortez Complex consists of both open pit and underground mines. Open pit mines consist of Pipeline, Crossroads, and Cortez pits, while underground operations consists of Cortez Hills Underground, and Goldrush Underground operations.

Open pit mining is conducted using conventional open pit techniques and equipment. Based on Mineral Reserves only, open pit mining operations will continue through 2026 which will include the Pipeline/Crossroads and Cortez Pits complexes.

Cortez Hills Underground is mined using longhole open stoping and drift-and-fill mining methods. Based on Mineral Reserves only, mining is expected to continue through 2030.

Goldrush will be mined using underground mining methods, primarily longhole open stoping. Initial test stopes were mined in the fourth quarter of 2021. Based on Mineral Reserves only, it is expected that mining will continue through 2042.

The operations at Cortez are well established, systems are in place and the mine is reasonably staffed to the correct levels.

16.2 Open Pit

Site layout plans for each of Pipeline and Cortez–Cortez Hills are included as Figure 16-1 and Figure 16-2 respectively. Capitalized stripping is required at the Crossroads pit, taking place through 2024.

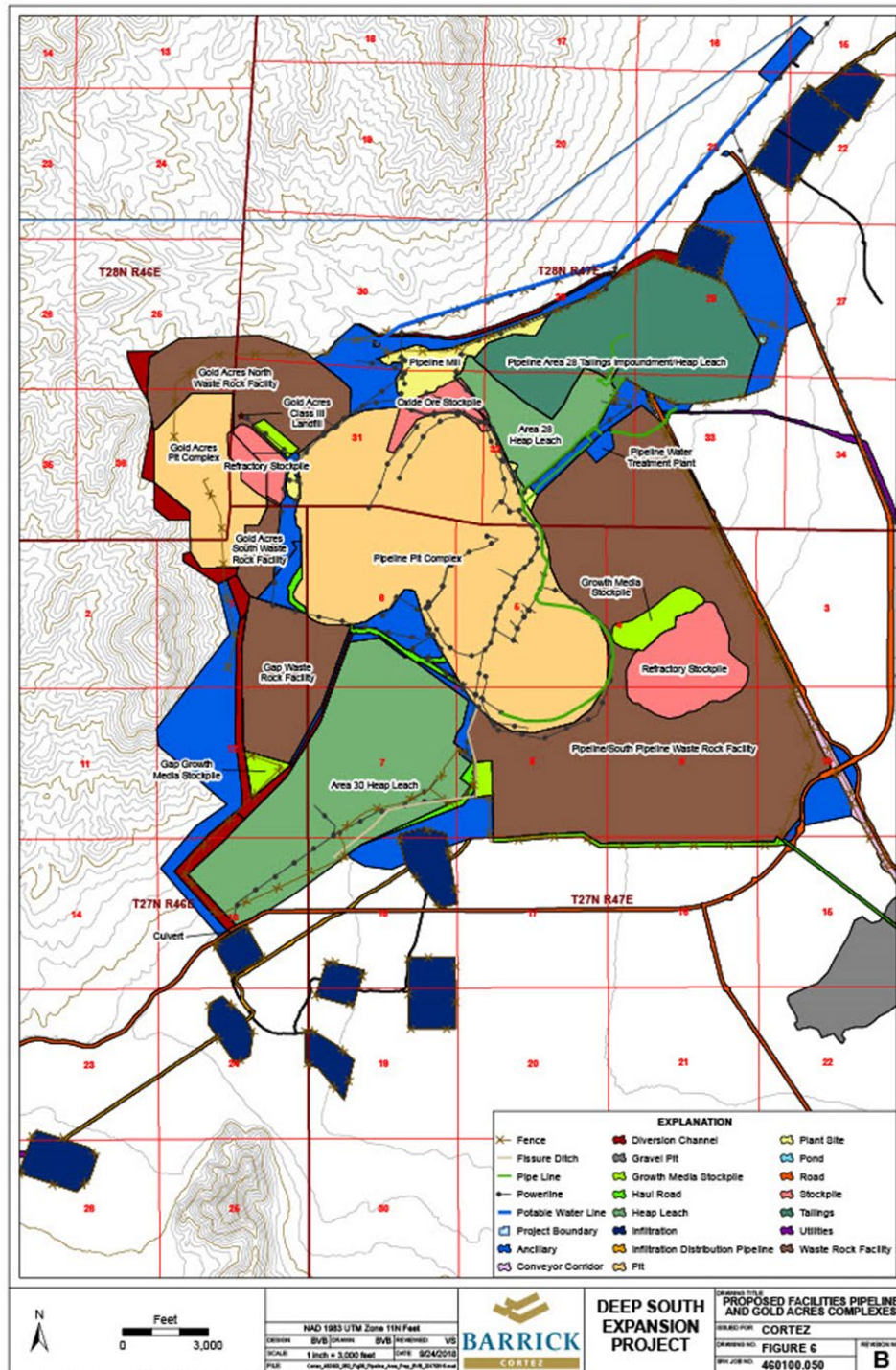
16.2.1 Geotechnical Considerations

The geotechnical model is a compilation of information sourced from geotechnical cell mapping, geological mapping, core logging, and supplementary drilling designed to intersect areas of geotechnical interest, material strength, highwall performance, and hydrological data. Material strength estimates for the Cortez deposits are derived from:

- Historic and current material strength testing programs conducted by various consultants;
- Core logging by NGM and external consultant geologists and geotechnical engineers from drill holes located in and around the deposits;
- Back-analysis of historical failures in similar rock types.

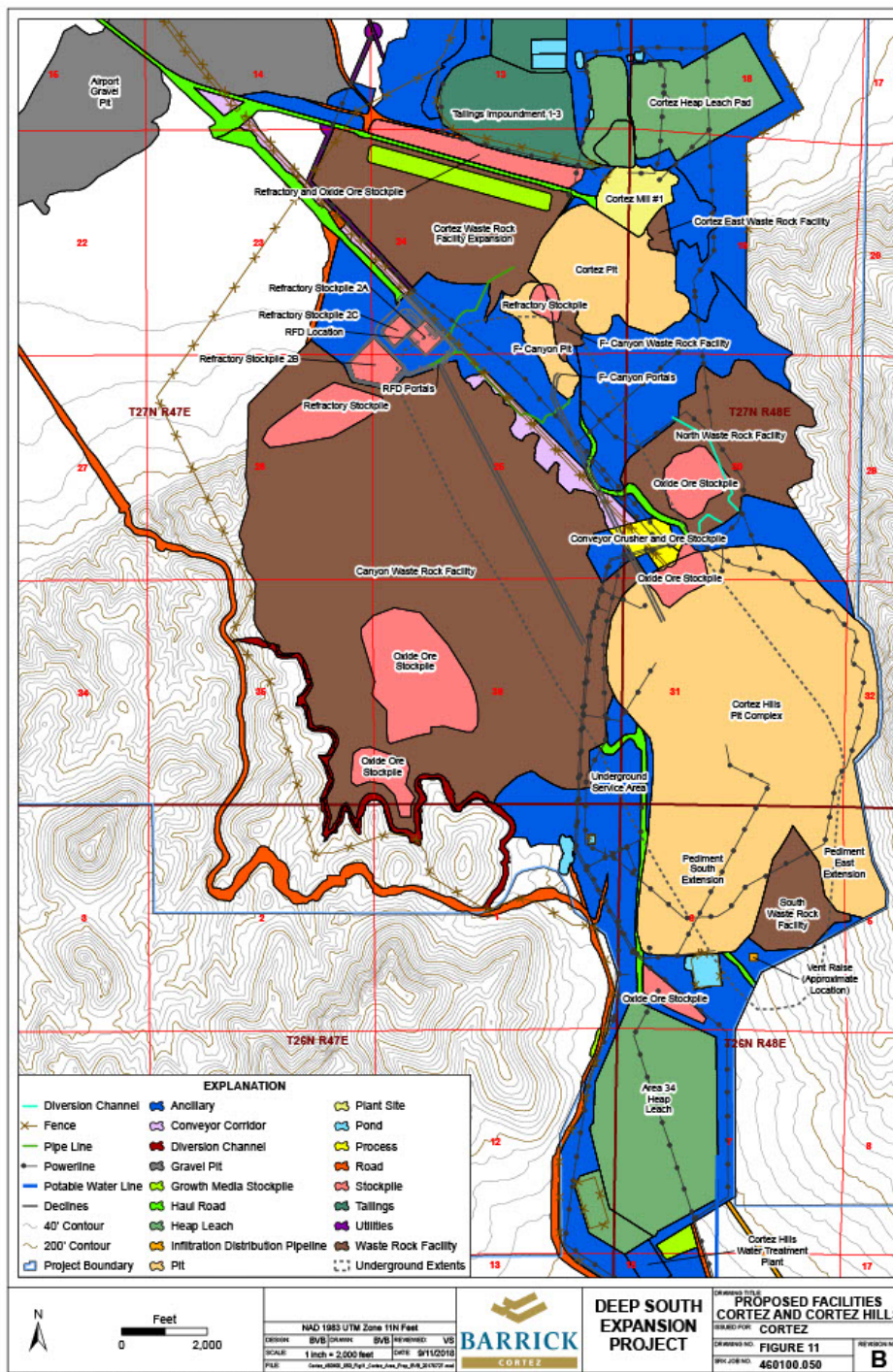
Piteau Associates Engineering, Ltd. (Piteau) conducted extensive geotechnical studies on the Pipeline, South Pipeline, Crossroads, and Gap deposits.

Figure 16-1: Site Layout Plan, Pipeline Area



Note: figure prepared by Barrick, 2018.

Figure 16-2: Site Layout Plan, Cortez and Cortez Hills Area



Note: figure prepared by Barrick, 2018.

Pit design parameters for each of the deposit areas planned to be mined by open pit methods are provided in Figure 16-3 to Figure 16-5.

NGM undertakes constant monitoring of pit walls through geotechnical cell mapping, geological structure mapping, groundwater monitoring, bench inspections, slope stability, and slope movement analyses.

16.2.2 Hydrological Considerations

Dewatering is a priority for the Pipeline and Crossroads open pit operations. At the Pipeline Pit, there are a series of dewatering wells around the perimeter of the pit. These dewatering wells discharge water, which is used for operations, and are finally discharged to ground rapid infiltration basins (RIBs) up to an annual average of 137 m³/min. The NDEP permits limit maximum daily infiltration to the RIBs at 142 m³/min in Crescent Valley, 32 m³/min in Grass Valley and 8.7 m³/min in Pine Valley. NGM has a dewatering model to predict the rate of dewatering and for planning well locations.

16.2.3 Mining Method

Open pit ore is mined by a conventional shovel-truck process at the rate of approximately 12.4 Mt/a with a LOM stripping ratio of 6.5:1 (waste to ore ratio). Mining occurs in two separate areas approximately 19 km apart, at the Cortez Pits, and the Pipeline/Crossroads open pits.

Mining at Cortez Hills has been completed, and the ramp between the Pediment open pit and Cortez Hills remains to ensure completion of Buttress.

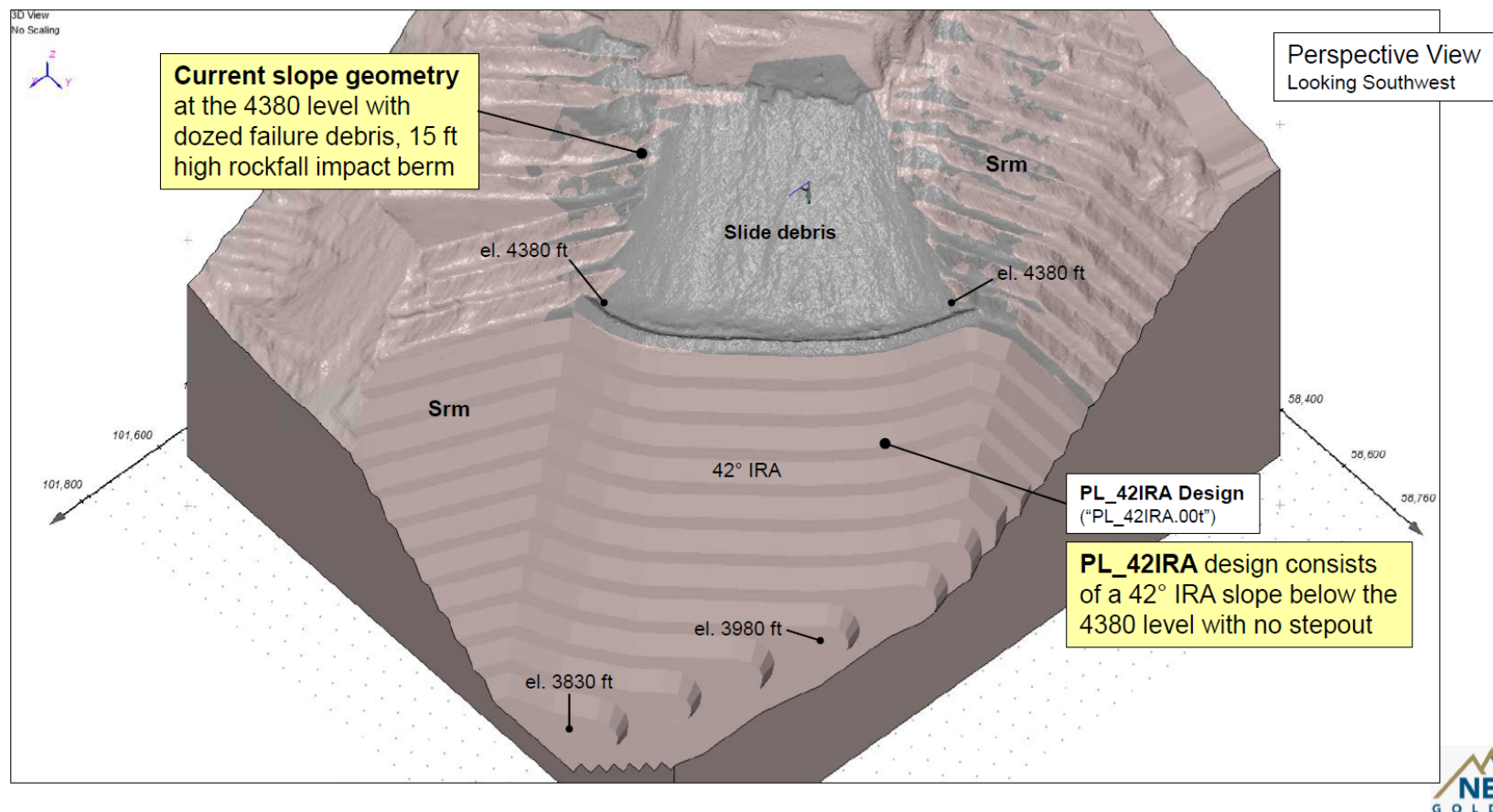
16.2.4 Mine Design

The following design criteria are used for the Pipeline and Crossroads open pits:

- Pipeline: 15 m bench height;
- Crossroads: 12 m bench height with 24 m double benching in favorable rock formations;
- Alluvium inter-ramp wall slope angle varying from 35–42°;
- Fresh rock inter-ramp wall slope angles ranging from 37–45° depending on material type and wall orientation;
- Bench face angles ranging from 65–70° depending on material type;
- 10% maximum haul road grade;
- 36.6 m wide haul roads.

Figure 16-3: Pit Design Recommendations, Pipeline

SVSLOPE Model – PL 42° IRA Design Geometry



Note: Figure prepared by NGM, 2021. IRA = inter-ramp angle

Figure 16-4: Pit Design Sector Locations, Crossroads

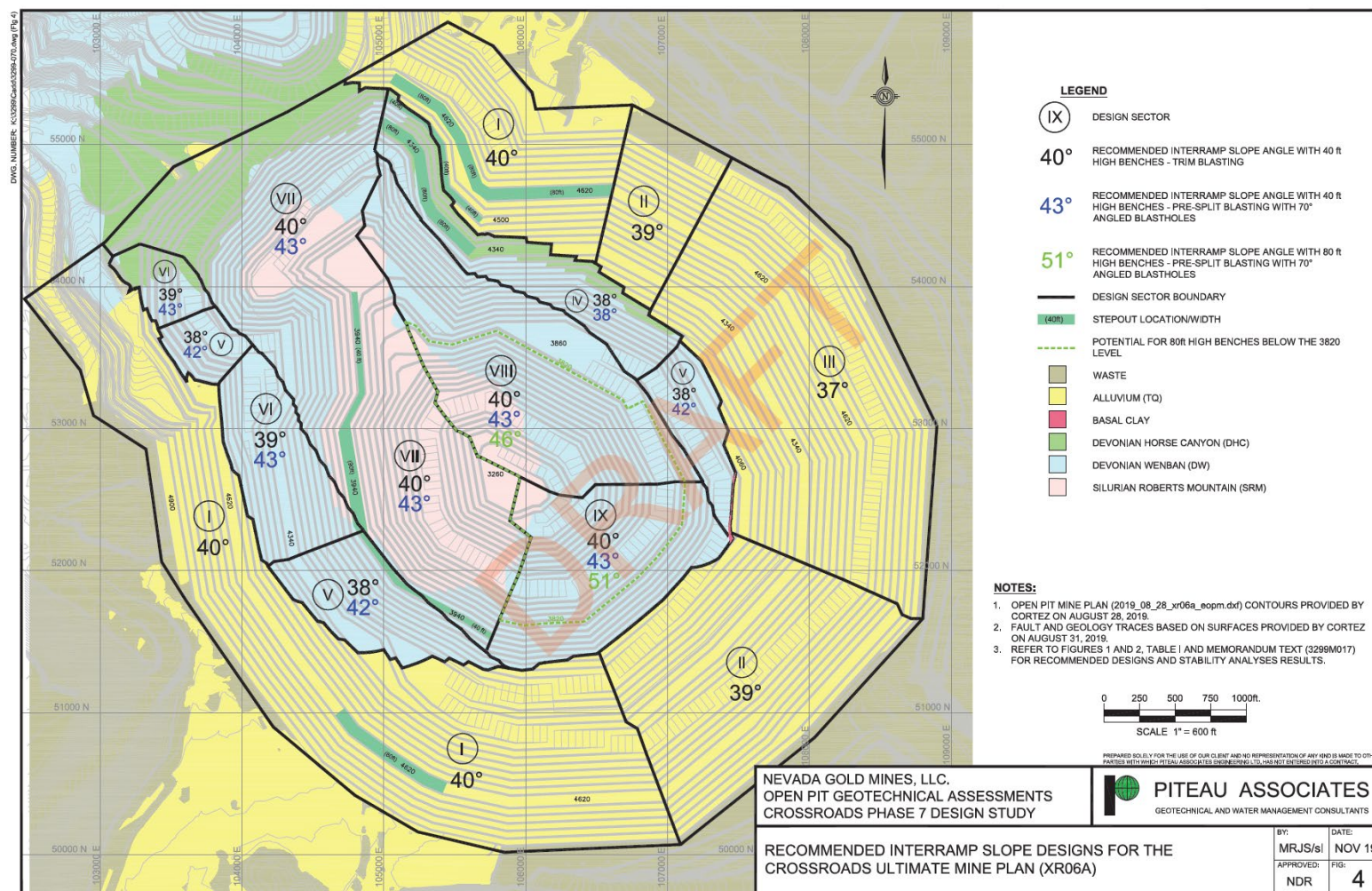
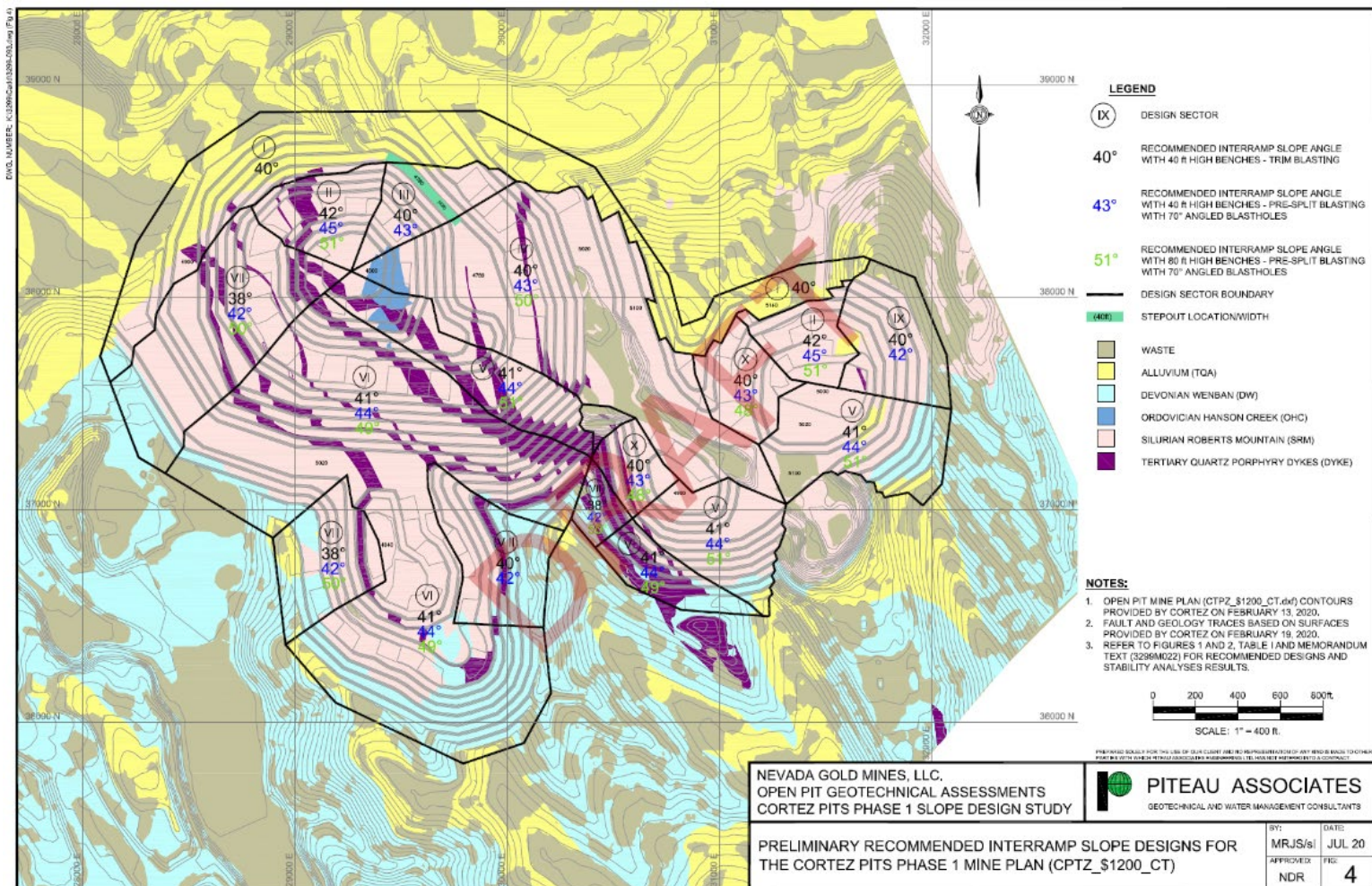


Figure 16-5: Pit Design Sector Locations, Cortez Pits



The open pit mining plan for a given pit is developed by setting up haulage strings by pit, by location in the pit, by pit phase, and by delivery point. With the application of truck speeds, Cycle times are estimated based on truck speeds, and truck availability is used to estimate and schedule the total haulage capacity. The same procedure is used to generate the equipment replacement and retirement schedule.

The Crossroads open pit operations will cease in 2026, at which stage the pit will be 1485 m long, 1,645 m wide, and 535 m deep. Three phases remain to be mined, XR04, XR05, and XR06. A final pit layout plan is provided in Figure 16-6.

The Pipeline open pit has one phase remaining, PL10. PL10 at completion will be 835 m long, 720 m wide, and 365 m deep. PL10 will be depleted in 2022. A final pit layout plan is provided in Figure 16-7.

Cortez Pits will be mined out in 2024, after three years of active mining. There are two remaining phases, CP01 and CP02. CP01/CP02 will be 915 m long, 915 m wide, and 365 m deep. A final pit layout plan is provided in Figure 16-8.

16.2.5 Production Plan

The various open pits are scheduled considering the ore and waste quantities, ore grades, and the centralization of activity to the extent possible. Average total daily open pit mine production from the Cortez Complex is estimated to be 389,000 t/d in 2022, an average of 273,000 t/d for 2023–2025, and 74,000 t/d for the year 2026. All daily average production rates include a combination of ore and waste.

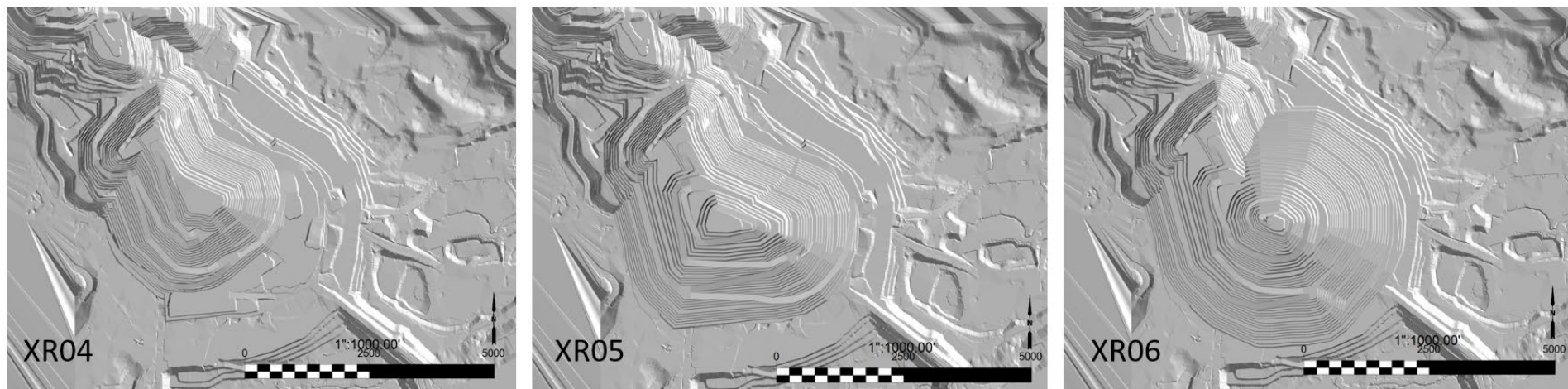
Oxide ore will be sent to the mill based on cut-off grade and mill capacity to maintain the mill feed. Refractory ore is mined and first stockpiled, then it is shipped to NGM's Carlin Complex, which is approximately 110 km north of Cortez, for processing. Refractory ore trucking is currently subject to permitted tonnage limitations of approximately 2.3 Mt/a. The over-the-highway trucks have an approximate capacity of 36 t per load.

The open pit mine plan is summarized in Table 16-1.

16.2.6 Grade Control

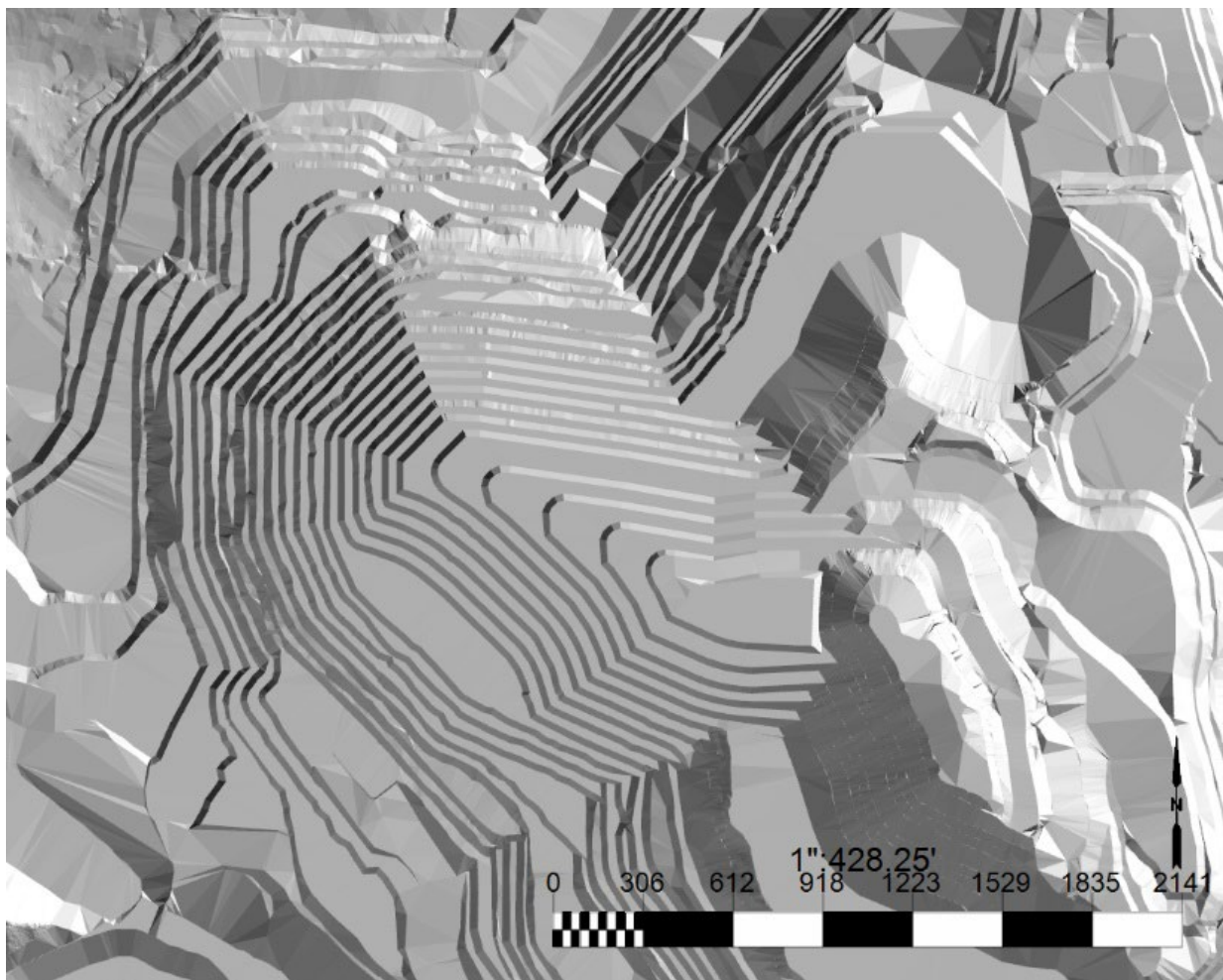
Open pit grade control uses blast hole assays sampled by the production drill rigs, formation solids flagged into the resource model, block size for selective mining unit (SMU) dimensions, depending on the piece of equipment being used, formation density flagged into the resource model and overall estimation parameters referenced from the resource model to interpolate blocks for mining. The current interpolation method used for blast hole assays is ID2.

Figure 16-6: Final Pit Layout Plan, Crossroads



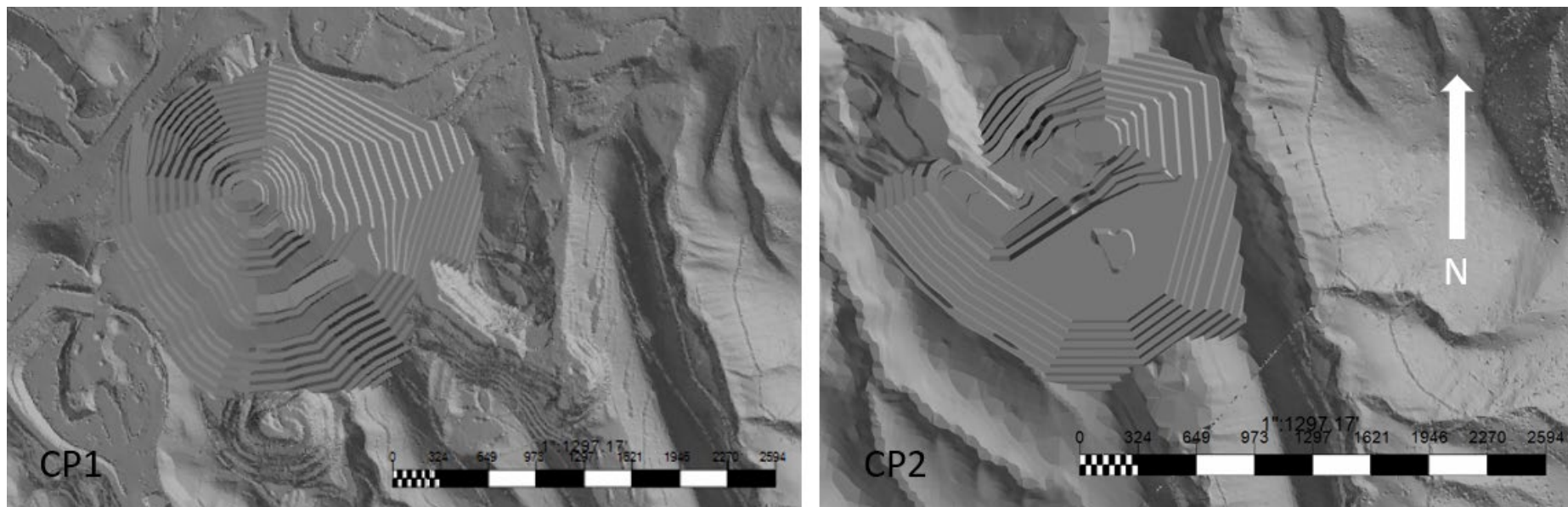
Note: Figure prepared by NGM, 2021.

Figure 16-7: Final Pit Layout Plan, Pipeline



Note: Figure prepared by NGM, 2021.

Figure 16-8: Final Pit Layout Plan, Cortez Pits



Note: Figure prepared by NGM, 2021.

Table 16-1: Production Plan, Open Pit

Year	Total Tons Mined (st x 1,000)	Total Tonnes Mined (t x 1,000)	Tons Per Day (st)	Tonnes Per Day (t)	Tons of Ore (st x 1,000)	Tonnes of Ore (t x 1,000)	Grade (oz/st Au)	Grade (g/t Au)	Contained Gold (oz)	Tons Waste (st x 1,000)	Tons Waste (t x 1,000)	Stripping Ratio
2022	156,829	142,273	429,668	389,788	15,755	14,293	0.03	1.03	519,000	141,074	127,980	8.95
2023	153,261	139,036	419,894	380,921	25,294	22,946	0.03	1.03	800,000	127,967	116,090	5.06
2024	124,310	112,772	340,575	308,964	5,823	5,283	0.06	2.06	336,000	118,486	107,489	20.3
2025	52,427	47,561	143,635	130,303	9,739	8,835	0.03	1.03	353,000	42,687	38,725	4.38
2026	29,998	27,214	82,186	74,558	12,375	11,226	0.11	3.77	1,381,500	17,622	15,986	1.42
Totals	516,825	468,856	—	—	68,987	62,584	0.05	1.71	3,389,500	447,838	406,272	6.49

A combination of geological information, mill performance, assay and metallurgical results from blastholes, and field interpretations dictate routing criteria of mined material, via these grade blocks. These grade blocks can be influenced by mill processing capabilities, such as throughput, overall grade of block, recovery, sulfide/gold relationship and gold encapsulation (Si or S), or level of refractory material. Shovel mining directions, SMUs and availability of material are all considered when blocking out material.

16.3 Underground Mining

16.3.1 Cortez Hills

16.3.1.1 Geotechnical Considerations

16.3.1.1.1 Overview

SRK Consulting (Canada) Inc. (SRK) completed a geotechnical assessment of the Middle and Lower Zones in 2011, based on data collected over a period of seven years. The Lower Zone is an elongated, tabular, shallowly-dipping body located within the plane of a low-angle thrust complex that is divided into three geotechnical domains. Ground conditions outside the plane of the thrust complex are expected to be good to excellent, with rock mass rating (RMR) over 75. Within the complex echelon thrust (known as the Ponderosa Fault), which hosts the bulk of mineralization, geotechnical conditions worsen, with RMRs less than 55.

Complex anastomosing faults with heavy decalcification and volume loss in the ore contribute to poor RMR and RQD. The clay-altered margins of post-ore dikes have RMRs in the 35–45 range and below; however, they are generally narrow (<3 m true thickness). The dikes themselves may create aquitards and small-volume perched aquifers, complicating geotechnical conditions. Complete dewatering of the mineable zones will be critical to successful operations.

The geotechnical conditions in the Middle and Lower Zones were evaluated using an assessment of drill core from geological and geotechnical drilling programs. SRK created a geotechnical block model for the Breccia, Middle, and Lower Zones, and attempted a correlation between the drill hole geotechnical data and the observed ground conditions in the Breccia Zone. This correlation was extrapolated to the Middle and Lower Zones.

The geotechnical block model is considered viable for parameter estimation through the Breccia and Middle zones, and northern portions of the Lower Zone (north of approximately 28300N). Confidence level decreases and estimation risk increases in the southern portions of the Lower Zone as drill hole spacing increases.

Given the limited drill hole coverage in the Lower Zone (and therefore risks to confidence levels), the rock mass evaluation considered each pod as an individual entity based solely on the drill holes intersecting each pod. A re-evaluation of the geotechnical data is not considered necessary for the planned cut-and fill mining methods. Man-entry opening span designs were empirically assessed and determined to be 5.0–7.5 m in fair rock and <3 m in poor rock.

Longhole stoping opportunities were assessed to develop guidelines for longhole stoping mining methods for mining the Lower Zone. The generally weak rock mass, depth, and structure appear to significantly limit longhole stope dimensions. Stability numbers generally plot in the lower range of the database where the stable transition zone is wide, and therefore uncertain. Maximum hydraulic radii (HR) for stope configurations are generally <5 m for most stope surfaces, but still carry significant failure risks, which equates to small stopes.

Stope pillars were analyzed by tributary area methods using the Obert pillar formula (Obert and Duvall 1967). A range of pillar configurations at various extraction ratios was examined, with results showing that pillar load/extraction dominate stability more than pillar geometry. Stability issues appear at approximately 50% extraction, regardless of pillar geometry. SRK cautioned that in poor rock conditions, the problem appears at even lower extraction, approximately 20–25%, and further indicates that a longhole stoping mining method in these ground conditions is unsuitable. While this is the most conservative position, orebodies with similar rock conditions have been successfully mined using longhole stoping mining methods in northern Nevada.

16.3.1.1.2 Middle and Lower Zones

In the early planning stages for the Middle Zone, longhole stoping was considered and was coupled with plans for increased mine production. However, not all areas of the Middle Zone are considered to be thick enough for the application of a longhole stoping method. The Lower Zone is now planned to be mined by longhole stoping.

The ground conditions in the ore zones are poor and the CRF is more competent than the ore. This is the reason for the choice of mining method and the use of CRF. Rock conditions in the host rock are fair to good.

The standard ground support regime includes the use of shotcrete and 2.4 m long Swellex bolts with 3.7 m Swellex bolts used in intersections. Mesh is used as required. Other support designs are specific to areas where additional support is considered necessary.

16.3.1.1.3 Deep South Zone

A review of the setting for the Deep South Zone was completed in 2015–2016 by third-party consultants, MDEng. MDEng broke down the deposit into three broad geotechnical domains that accounted for the relative distribution of the gold mineralization and the dikes system: the Dike Hanging Wall (Dike HW), imbricated within dikes (within dikes) and the Dike Footwall but in the hanging wall of the Ponderosa Fault (Dike FW).

Ground conditions were interpreted to vary from fair to good with mean RMRs ranging from 42–66. Q' values are rated as very good, as a measure of ground condition. A gradual deterioration of ground conditions was observed towards the south into the Dike FW domain. Stope sizing was assessed for Deep South using the Matthews/Potvin Stability Graph Analysis method (Potvin, 1988). Recommended stope sizes, assuming 23 m stope height (18 m level spacing) stope sizing included:

- Primary stopes:
 - Width = 7.6 m;

- Length = 15.2 m for supported backs
- Secondary stopes:
 - Width = 10.7 m
 - Length = 36.6 m for supported backs.

The underground development for the Deep South Zone will consist of a main ramp and production level accesses spaced vertically every 18 m. While the main ramp is located in the footwall of the Ponderosa fault, all the secondary development for accessing the stopes in production must cross the Ponderosa fault from the east. Infrastructure will be placed in the “Ramp” geotechnical domain, that is formed by Roberts Mountain Formation rocks, and has been minimally investigated as it has been outside the exploration area of interest. Two geotechnical core holes were drilled and logged into this domain; these core holes showed a fair to very good rock mass, hard limestone, and dikes with RMRs between 60 and 80, but with localized fractured intervals in both dikes and limestone and even fewer intervals with altered/soft rock.

A high level inspection of RMR suggested that fair to poor ground conditions can typically be expected within the Ponderosa fault zone.

The area is in a structurally complex zone, where high and low angles faults and dike filled faults occur. Geological interpretations are limited in this area but are sufficient to recognize possible splays of the Ponderosa Fault, such as the Bugsby Fault, near the south end of the Deep South Zone. Conditions of sympathetic features such as the Bugsby Fault are undetermined. As the ramp is sited between these faults, more drilling throughout the far south is required.

A three-dimensional, mine-scale numerical stress model was developed for the estimation of expected redistribution of mine induced stress over the LOM. The numerical modelling results focus on the impact to permanent infrastructure and stope extraction sequencing considerations for the effective management of stress redistribution over the LOM. Permanent infrastructure is located beyond the influence of mine-induced stress; however, level development (haulage drives and cross-cuts) will be subjected to stress loading and susceptible to difficult mining. It is expected that stress loading will be most commonly recognized as rib squeezing; however, failure mechanisms may vary depending on local stress tensors and geological controls (e.g., structural features).

Cross-cut development must cross the Ponderosa Fault on several levels. Numerical models predict that as stopes are extracted, shearing will occur on the Ponderosa Fault. Development through the fault zone is unavoidable and localized loading of ground support during stope extraction should be expected.

The regions influenced by stress loading will vary over the life of mine, and it is reasonable to expect that the associated risks can be mitigated by strategic sequencing and just-in-time development to minimize rehabilitation needs.

Ground support is likely to consist of one or more of the following:

- 2.4 m-long resin grouted bolts or inflated bolts with screen mesh;
- Bolts and screen plus two inches of shotcrete over the screen;

- Shotcrete, then bolts and mesh then shotcrete over mesh (conditional on intrusive intercepts).

16.3.1.2 Hydrological Considerations

16.3.1.2.1 General

There are two mine dewatering lines and a major pump station at the foot of the main declines. The underground mine pumping system in the F Canyon declines has a capacity of 22.7 m³/min based upon the initial mine design. The active mining areas of the mine have been dewatered by a combination of surface and underground methods and the mine workings are generally dry.

In the Middle Zone, horizontal drain holes are drilled into the planned stope A-cuts before mine development to drain water before mining commences.

16.3.1.2.2 Deep South Zone

Pump stations are included in the Deep South Zone design to address any fugitive or perched water that is encountered during operations (contact water). The system is designed to handle a nominal 3.8 m³/min with an eight-inch schedule 40 steel discharge line in the haulage decline. One mobile pump skid with a receiver tank will support the development as it advances. A similar system without the receiver tank will be placed in the first permanent pump station. The mobile pump will be placed in the second permanent pump station at the completion of the development work.

The current mine workings are being dewatered using a network of deep surface wells. A dewatering plan is in place for the Lower and Deep South Zones using deep wells from surface. There are currently nine wells drilled from surface into the Lower Zone/Deep South Zone aquifer. Additional surface wells and underground dewatering wells in the Deep South Zone are planned to dewater the zone before mining. The number of additional wells depends upon the aquifers intercepted in the wells and the ability to produce. Based on the current dewatering model for the Lower Zone, three additional wells from surface will be required, or an additional pumping capacity of 5.7 m³/min by the first quarter of 2023. Surface wells were selected due to time constraints to get an underground-capable rig built, and the ability to help the planned Goldrush underground operation.

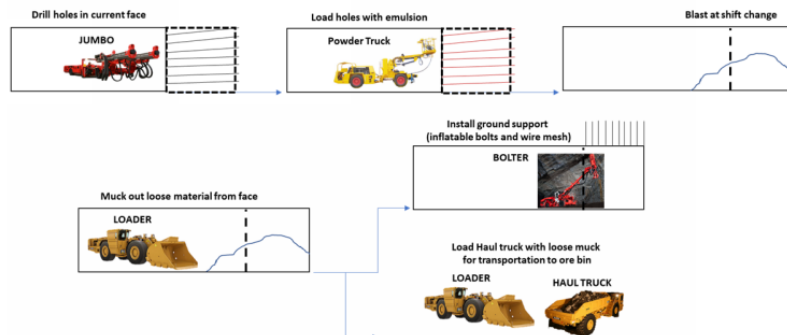
The Deep South Zone production schedule below the 1,158 m level follows the dewatering of the mine downwards. The stope designs are based upon the zone being dewatered prior to mining. If the mine plan extends below the 888 m elevation, additional dewatering efforts will need to be explored.

16.3.1.3 Mining Method

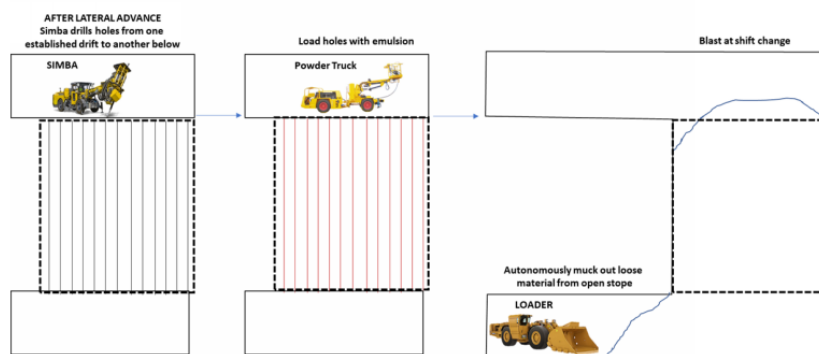
Underground mining is mechanized, with large-scale equipment using a combination of cut-and-fill mining with cemented backfill, and primary and secondary longhole stoping with cemented and uncemented backfill (Figure 16-9).

Figure 16-9: Schematic Showing Mining Method

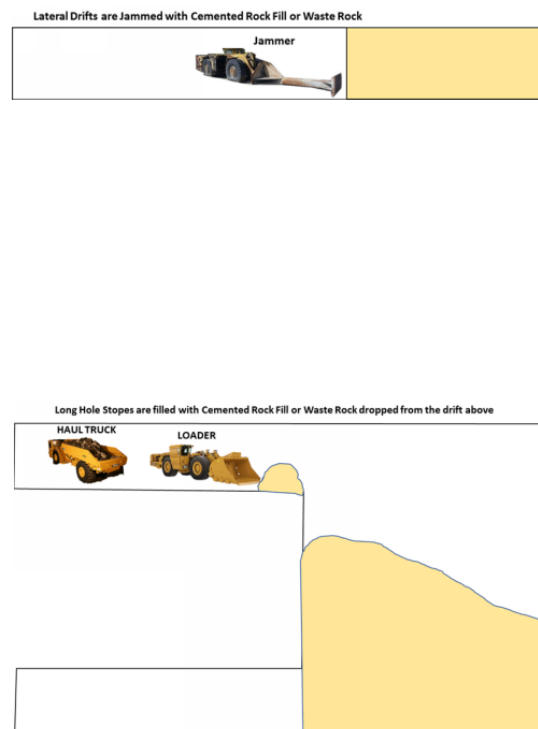
Lateral Advance



Long Hole Stopping



Backfill



Note: Figure prepared by NGM, 2021.

In the cut-and-fill stopes, headings are cycled using conventional drill/blast/muck/support on a round-by-round basis. Material is loaded into haul trucks and hauled to the materials handling system which crushes and conveys the material to surface. Top-cut headings are typically 5.5 m wide by 4.6 m high and undercut widths vary from 5.5 m to 9.1 m, depending on ground conditions and ore geometry, with 4.6 m heights.

Longhole stopes are being mined using 18 m sublevels with a series of primary and secondary longhole stopes. Development will typically be 5.5 m high and the primary and secondary stopes are planned to be 7.6 m wide and 10.7 m wide, respectively. Primary stopes will be mined in short sections to maintain stability and each section will be filled with CRF after mining. Secondary stopes will be mined after primary stopes have been completed. Where the ore zone is more than 18 m high, the stopes will be stacked vertically, as needed, to extract the ore. Longholes are planned to be vertical down holes from the upper sublevel.

The Deep South Zone mining plan is based upon longhole stoping with delayed backfill in a sequence of primary and secondary stopes.

16.3.1.4 Mine Designs

Mine designs for the Middle and Lower Zones are provided in Figure 16-10 and Figure 16-11.

16.3.1.4.1 Access

The Cortez Hills underground operations are accessed by twin declines driven to the upper level of the deposit. The two declines from the F-Canyon extend for approximately 2,134 m at a -6% grade to the 1,454 m level. Access for the Middle and Lower Zones is by a spiral ramp adjacent to the orebody giving access to the Middle Zone at the 1,195 m level and onto the Lower Zones A at 1,227 m and Zone C at 1,222 m.

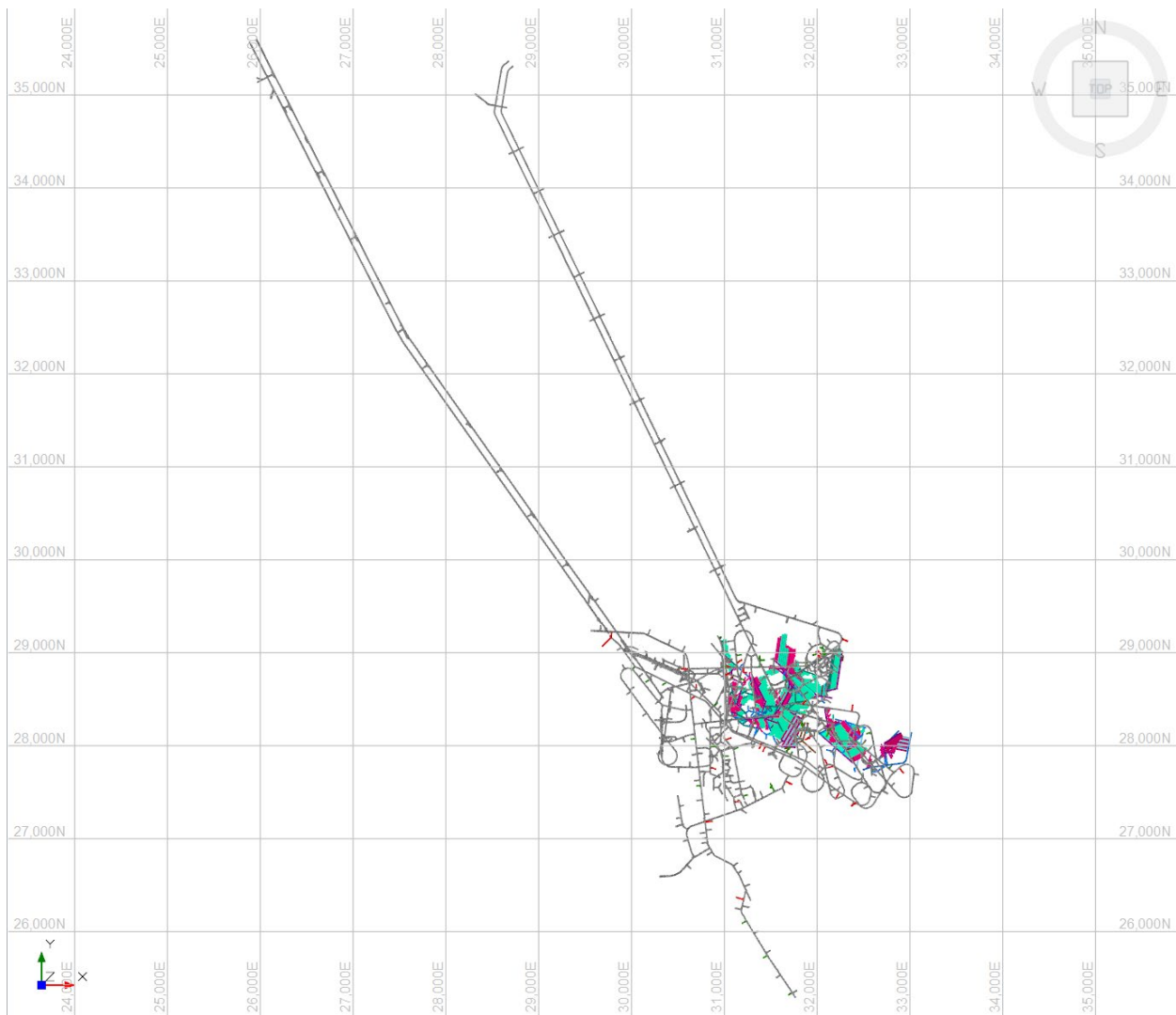
The twin declines are interconnected at regular intervals and these connections contain air doors to separate the intake and exhaust airways. An additional set of twin declines, called the range-front declines, for access to the Lower Zone and the Deep South Zone, have been developed. The western range-front decline provides additional means of egress and the eastern range-front decline contains the materials handling system where a conveyor is installed throughout the entire length of the decline.

16.3.1.4.2 Ore and Waste Haulage

With the conveyor installed in the range-front declines, there are ore passes for material, where practical, and ore haulage from other areas to a series of four bins that are located at the base of the conveyor system. The bins enable segregation of the oxide and refractory ore types.

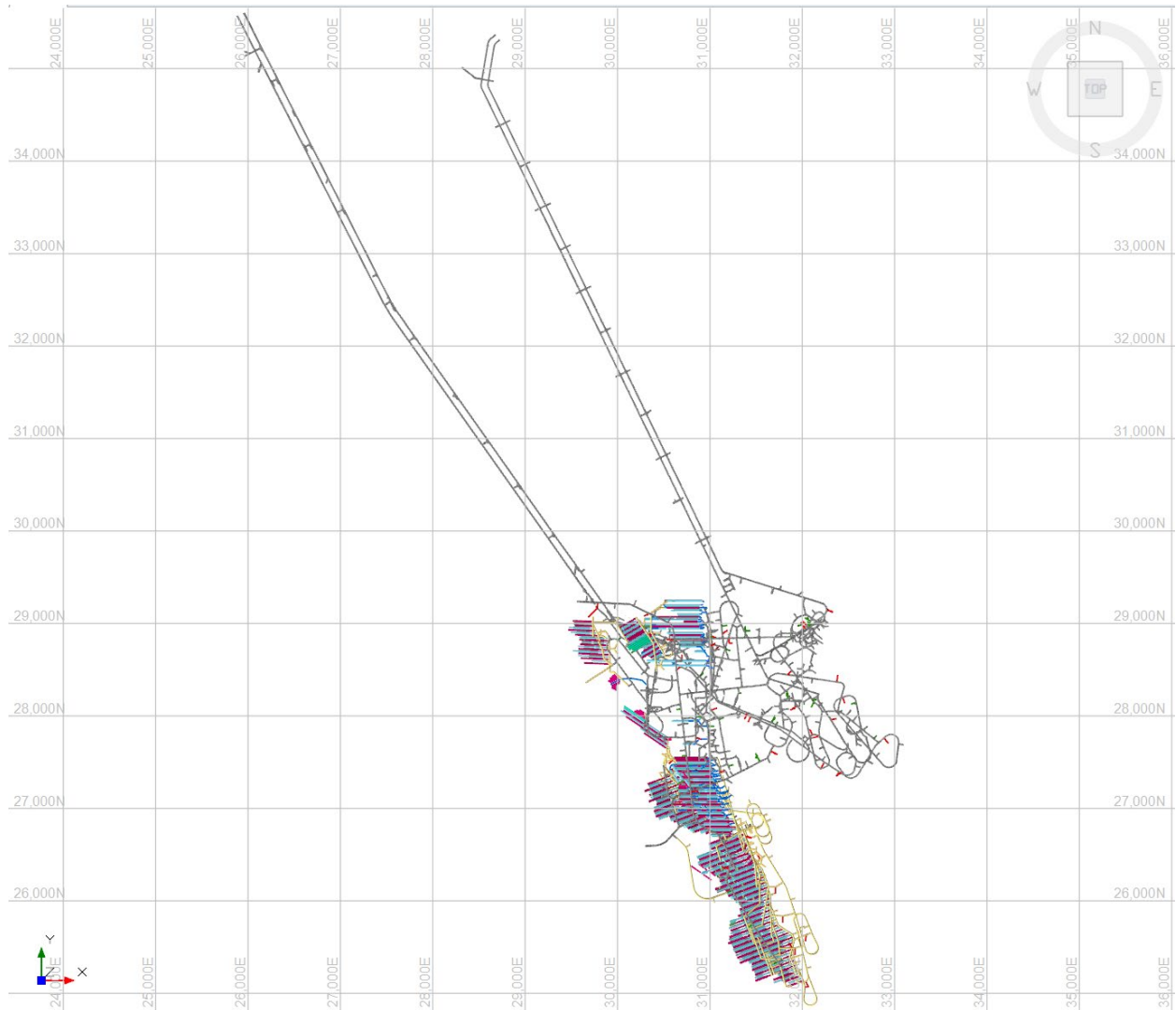
The bins are 6 m wide by 6 m long and 18 m tall to provide approximately 1,350 t capacity each. The bins are fed by dumping into feeder breakers to provide -30.5 cm material.

Figure 16-10: Final Underground Layout Schematic, Middle Zone



Note: Figure prepared by NGM, 2021.

Figure 16-11: Final Underground Layout Schematic, Lower Zone



Note: Figure prepared by NGM, 2021.

Waste material that is generated typically is hauled by truck to mining areas that are queued for waste backfilling. When there are times that an area is unavailable for waste filling, waste will be stockpiled in standby areas, otherwise an ore bin will be cleared out and waste will then be transported out of the material handling system.

16.3.1.4.3 Facilities

There are permanent offices and maintenance facilities at the F-Canyon portal area, together with the CRF plant and shotcrete batch plant. A CRF plant and service area was constructed in the Lower Zone, positioned to enable easy access to multiple mining areas.

All of the underground equipment maintenance is performed at a shop complex located adjacent to the F-Canyon portals. There is also a small maintenance bay on the 1,433 m level.

Auxiliary warehouses are located at the range-front adjacent to the declines. There is also a radial stacker located directly outside of the eastern range front decline that services the materials handling system that installed underground.

The underground mine communications system includes radio and fiber-optic cables, and a mine dispatch system, which uses Mobilaris and Pitram software. This system provides real-time monitoring for all underground equipment and allows for activity monitoring.

16.3.1.4.4 Power

Power to the site is supplied by a local utility company. In the event of a power outage, the operation is equipped with backup generation capabilities.

NV Energy provides 120 kV to the operations, which is transformed at the main substation to 13.8 kV, from which power is distributed underground to various switch gears. From the switch gears, power is distributed to various mobile load centres that transform power to 480 V, which is used at the various working faces and infrastructure.

16.3.1.4.5 Backfill

A dual purpose CRF/shotcrete batch plant is located at the mine portal in F-Canyon. Mine trucks are loaded at the portal elevation and the backfill is taken into the mine as a back haul. The backfill portion of this plant is only in service when the underground batch plant is down or if haulage were to redirected out of F-Canyon declines in the event the underground materials handling system or underground batch plant has maintenance activities. There is also a shotcrete batch plant located at the portal. Mix trucks haul the prepared shotcrete mix to the mining face.

As part of the development plan for the Middle, Lower and Deep South Zones, a CRF plant was constructed closer to working areas underground. The plant has been set up so that rock and cement can be delivered from surface via boreholes.

All production openings are currently backfilled with a designed backfill with a 4.826 Mpa unconfined compressive strength based on -5.1 cm crushed rock, 35% fines, and 6% cement binder. Cylinder tests indicate that the cemented rockfill strength consistently exceeds the design strength.

16.3.1.4.6 Ventilation

Two blind-bored ventilation shafts were installed for the mine ventilation circuit. The first was a 3.7 m diameter raise and the second was a 4.3 m diameter raise. The raises are approximately 900 m long and the ventilation capacity of the mine is approximately 34,000 m³/min.

Ventilation for the Deep South Zone will be fed from the 1,192 m development drift to the access ramp, through the stoping levels, and will exhaust out the haulage ramp. Access points, as well as ventilation raises, will be coordinated with the existing and planned Lower Zone development.

Ventilation and escape raises are designed to connect between the footwall access levels and the haulage ramp. The primary fresh airway is through internal vent raises that supply the stoping sublevels and the exhaust airway is the haulage and conveyor ramp.

A current ventilation and escapeway schematic is provided in Figure 16-12.

16.3.1.4.7 Production Plan

Based on Mineral Reserves only, the current Cortez Hills Underground production schedule is based upon the mining of up to 4,700 t/d of ore and waste from the Middle, Lower, and Deep South Zones. The schedule is provided in Table 16-2.

Based on Mineral Reserves only, the current underground mine life is estimated to be nine years (2022–2030).

16.3.1.4.8 Ore Control

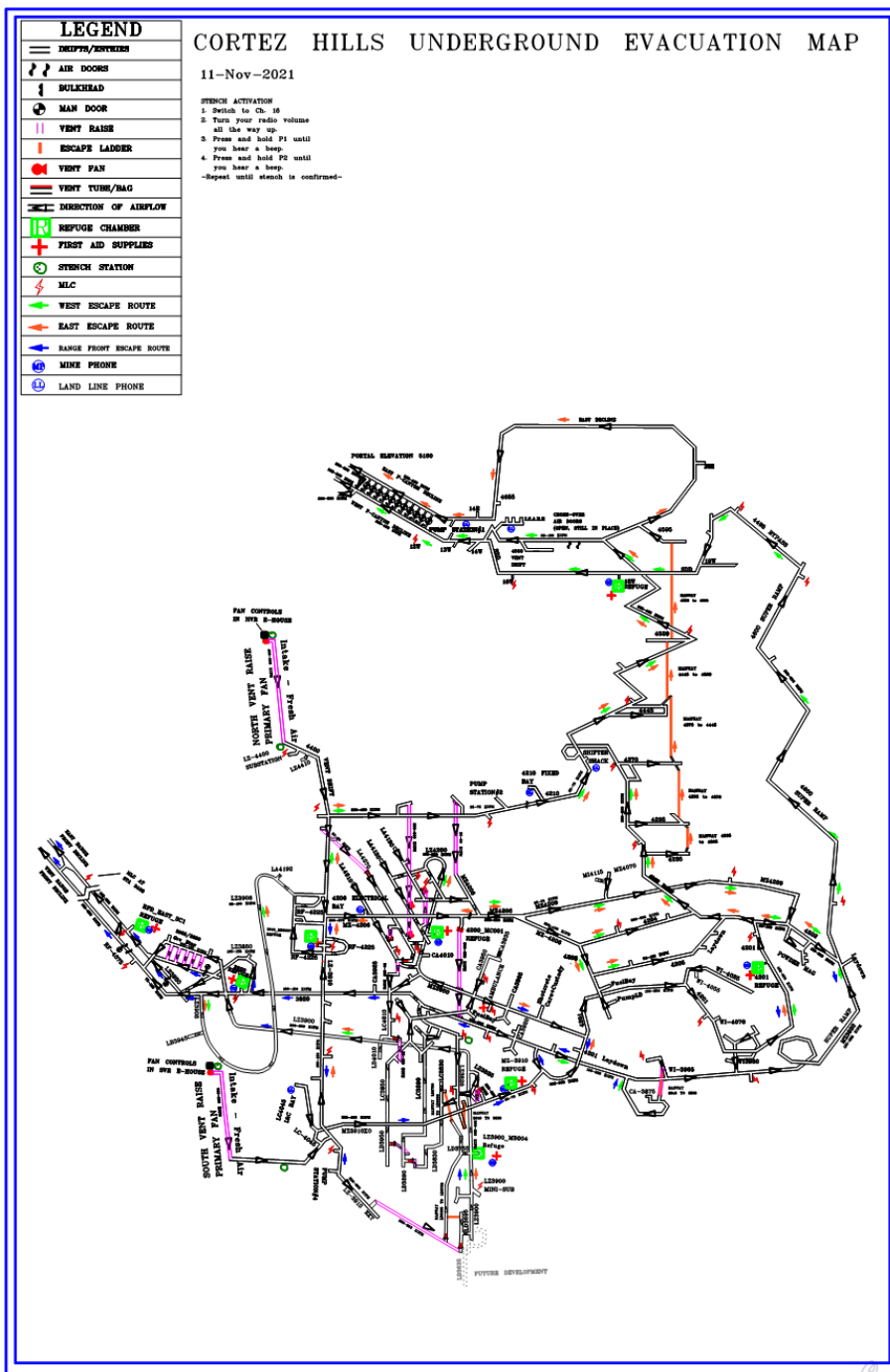
Underground grade control practices consist of daily face mapping, round-by-round sampling, reconciliation of model to actual and actual to plan, bulk ton tracking and reconciliation, infill drilling, database QA/QC, stockpile management and reconciliation, and ongoing communication of routing changes to operations and engineering.

Daily face mapping describes lithology, alteration, mineralization, ore type, and structures with a focus on ore-controlling features. Mapping occurs on tablets at the face, digitizing geology directly into Vulcan. Measurements of structures such as bedding, faults, and joints are inputted as point data. All mapping data is used in the geological modelling process.

Underground sampling uses both muck and jumbo samples. Muck sampling procedures require mucker operators to take three samples per round as the round is mucked out of stopes or headings: one sample from the first bucket, one sample from the middle bucket, and one sample from a last bucket.

The jumbo sampling procedure requires jumbo operators to take three samples after the round is drilled out: one sample from the left round cuttings, one sample from the centre round cuttings, and one sample from the right round cuttings. QA/QC of the sampling occurs with quarterly sampling presentations to each crew, observation of operators to ensure proper sampling procedure, blanks and duplicates consistently shipped with the samples to the assay laboratory, and geologist grab samples to verify results.

Figure 16-12: Ventilation Schematic



Note: Figure prepared by NGM, 2021.

Table 16-2: Production Plan, Underground

	Ore Tons (st x 1,000)	Ore Tonnes (x 1,000)	Grade (oz/st Au)	Grade (g/t)	Contained Ounces (x 1,000)	Ore and Waste Tons Per Day (x 1,000)	Ore and Waste Tonnes Per Day (x 1,000)	Waste Tons (x 1,000)	Waste Tonnes (x 1,000)	Waste Tons Per Day (x 1,000)	Waste Tonnes per Day (x 1,000)	Total Backfill Tons (x 1,000)	Total Backfill Tons (x 1,000)
2022	1,378	1,250	0.306	10.491	422	4,999	4,535	452	410	1,232	1,118	1,324	1,201
2023	1,422	1,290	0.282	9.669	401	5,292	4,801	509	462	1,396	1,266	1,444	1,310
2024	1,573	1,427	0.254	8.709	400	5,695	5,166	505	458	1,367	1,240	1,509	1,369
2025	1,372	1,245	0.247	8.469	339	5,652	5,127	691	627	1,873	1,699	1,297	1,177
2026	1,441	1,307	0.274	9.394	395	5,505	4,994	574	521	1,554	1,410	1,514	1,373
2027	1,471	1,334	0.271	9.291	399	5,299	4,807	463	420	1,235	1,120	1,430	1,297
2028	1,272	1,154	0.311	10.663	395	4,302	3,903	298	270	812	737	1,218	1,105
2029	1,485	1,347	0.265	9.086	394	4,580	4,155	186	169	510	463	1,440	1,306
2030	463	420	0.226	7.749	104	1,446	1,312	67	61	183	166	552	501
Total	11,878	10,776	0.274	9.394	3,249	N/A	N/A	3,745	3,397	N/A	N/A	11,278	10,231

Bulk muck from longhole stopes or benches is sampled from the blast hole sample cones and/or broken stope muck. For blast hole samples, each row of blast cone samples is composited into one assay. The combination of all composited row assays is weighted and averaged together based on the ratio of total row holes lengths to total row hole lengths for the entire stope. Broken stope muck is sampled during the muck cycle at set intervals to reach equivalent of one sample per 100 tons. This grade is then assigned to all tonnes coming out of that given stope.

Muck, Jumbo, and Stope jumbo samples are used to quantify the actual mined grade in weekly and monthly reconciliation. Utilization of round-by-round sampling allows for the ability to use “wait-for-grade” areas to optimize ore routing, compare to and improve model performance, and inform the process area of incoming stockpile constituents.

16.3.2 Goldrush

16.3.2.1 Geotechnical Considerations

16.3.2.1.1 Overview

The geotechnical data collection program comprised:

- A comprehensive rock strength property testing program, and the development of a three-dimensional mining rock mass model and geotechnically significant structural model;
- Stope stability dimensioning for each mining block that takes into account dimension variability associated with rock mass quality;
- Mining extraction sequence from a geotechnical perspective;
- Ground support strategies for the various lateral development types (access and orebody development), including the various over-sized development that will be required across the Goldrush deposit.

Data collected and interpretations arising from those data indicate that deformation within the rock mass will be a dominant feature during the operational life of the Goldrush project, which will be compounded by stability issues when intersecting geotechnical structures. The risk of stope overbreak will be high, particularly if drill and blast practices are not well managed.

16.3.2.1.2 Stope Stability Assessments

The purpose of the stope stability dimensioning was to establish stope parameters for the different mining zones. Open stope designs incorporated the Potvin (1988) Modified Stability Graph Method, through the use of the modified stability number (N') and stope surface hydraulic radius (HR). The required geotechnical parameters derived from the available data from the mining rock mass model, structural model, joint sets, and experience. The mining direction was determined as top-down. Stope dimensions recommended included:

- Interval height = 20 m;

- Primary slope width = 15 m;
- Secondary slope width = 15 m;
- Slope Length = 15–40 m.

As slope production starts in Red Hill and then throughout the Goldrush project, individual slope stability assessments will need to be completed using all up-to-date data and understanding/knowledge.

All rock exposed slope crowns will be reinforced with cable bolts and all rock exposed walls will be unsupported. Ground consolidation (resin injection) will be used to target the “Very Poor” rock mass slope crowns using ground consolidation to artificially improve the rock mass quality. Cable bolting requirements were defined for the various rock types expected to be encountered during mining.

16.3.2.1.3 Monitoring

Monitoring will consist of some or all of the following: multi-point borehole extensometers; survey as-builts; tape extensometer measurements; wooden wedges; crack-meters; damage mapping; and general geotechnical inspections.

16.3.2.2 Hydrological Considerations

The Goldrush project will require depressurization/dewatering to relieve hydraulic pressure and limit groundwater seepage into the development and workings. The geological conditions associated with the Goldrush deposit are likely to result in “Poor” rock-quality conditions in some areas of the mine. The preliminary design and engineering of the dewatering system includes a factor of safety such that all components of the system were sized to handle operational dewatering flow rates of up to around 19 m³/min.

The optimized dewatering wellfield will consist of seven dewatering wells, with a dewatering capacity ranging from 0.3–4.7 m³/min. Pipes will transfer the water to a water treatment plant and then to rapid infiltration basins (RIBs) for disposal or to water stands for dust suppression or other consumptive uses. Water that is produced by dewatering, but not used, will be returned to the Pine Valley basin in accordance with anticipated water rights and permit requirements. The excess dewatering water will flow into two RIB sites consisting of a total of 13 basins. The RIB sites were sized to infiltrate a total flow of about 9.5 m³/min each. A pipeline will connect the Goldrush dewatering infrastructure to the existing Cortez–West Pine Valley RIBs to provide additional capacity during peak dewatering times or upset conditions.

Projected water rates are based on recent usage rates at the nearby Cortez Mine surface and underground operations and adjusted based on the projected equipment demands and mine schedule. During the project construction phase, combined drilling, mine operation, and construction water consumption is anticipated to range between 0.8–1.9 m³/min. Construction activities are expected to require up to 0.95 m³/min of water consumption. Water demand will also increase over the LOM as production increases and depending on the amount of exploration drilling. It is anticipated that 1.3–1.9 m³/min will be needed for combined drilling and mining

operations. Water consumption for surface and underground dust suppression after construction is expected to be up to 0.23 m³/min depending on the season and the recent meteoric conditions. Drill-water requirements range up to 0.38 m³/min during peak drilling.

16.3.2.3 Mining Method

The proposed method for mining the majority of the Goldrush deposit is small to moderate sized longhole stopes with cemented paste fill. The stopes will be extracted on a transverse primary/secondary system with (where possible), a continuous mining front. The mining direction is not fixed since the geotechnical and geometric conditions vary with each sub-area within the Goldrush complex.

Due to the mine access infrastructure being located on the western edge of the deposit, all cross cuts are mined from west to east. Considering this factor and the requirement to maintain a consistent mining front, the primary stopes will be extracted in a continuous sequence from east to west, top-down (where applicable) and from south to north. Once the second level of primary stopes are extracted and backfilled extraction of the secondary stopes can commence. The secondary stopes effectively follow the primary sequence.

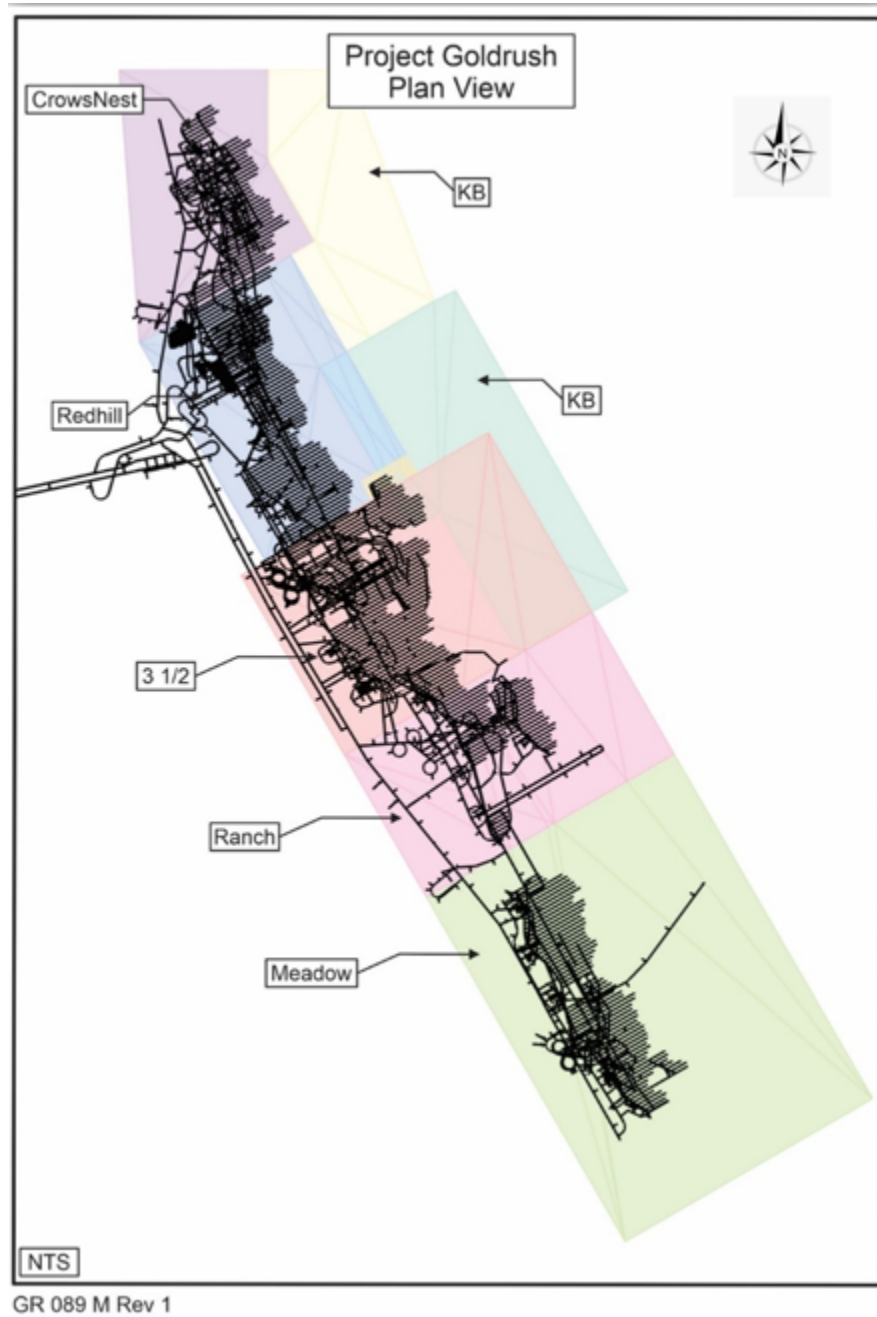
16.3.2.4 Mine Designs

Each of the sub-areas within Goldrush were planned to be extracted in a regional sense from south to north. The five sub-areas were identified as:

- Red Hill;
- Crow's Nest;
- 3½;
- Ranch;
- Meadow.

The spatial locations of these sub-areas are illustrated in Figure 16-13. Mining is planned to commence in the Red Hill Zone as this will be the first area to be accessed from the twin declines. Test stoping began in November 2021 at the Red Hill Zone, which is expected to continue in 2022.

Figure 16-13: Goldrush Underground LOM Design Schematic Showing Sub-Area Limits



Note: Figure prepared by NGM, 2021.

The main features of the final mine design are:

- Transverse primary–secondary longhole open stoping (LHOS) mining top-down under an engineered paste fill. This is a non-entry mining method. Level spacing is 20 m (floor to floor);
- Footwall drives mined the full strike length of the mining horizon and provide primary ventilation from which stope fans initiate the secondary ventilation network;
- Stope sizes have been determined using the geotechnical models (MRMM) correlating Q' to their modelled stable stope dimension. As a result, stope lengths range from 15–40 m;
- Inclined ore passes are linked into every footwall drive to enable effective materials handling;
- Designated trucks loading loops are provided below the mining areas with the exception of Red Hill;
- Truck loading areas are designed to permit effective autonomous operation of loaders reducing labor commitment;
- Primary vent raises are designed to provide defined vent districts. These will be mined as blind sinks and hence will save considerable time by not relying on underground access to be completed;
- An underground crush and conveyor system is designed to be installed adjacent to the south decline to handle all ore and waste to surface from the base of the twin declines. This will be critical in keeping the truck fleet to a sustainable size and hence, minimizing risk of heavy vehicle traffic congestion underground;
- Coarse ore and waste bins are designed to provide a buffer within the materials handling system;
- Production activities will use larger-scale equipment (LH621 loaders or equivalent) and TH663 trucks to ensure rapid turnover of stopes. The option to automate a material percentage of the production cycle is recommended, the designs have taken this into consideration.

Two major underground workshops are included in the design allowing for more rapid turnaround of mobile equipment compared to tramming to surface and distant surface facilities. Considering the extreme weather possible in the winter months, this also alleviates the risk of delays from such conditions. The workshops will be able to cater for all regular weekly servicing with a focus on drills and loaders (front-line equipment).

In terms of extraction where the strike length of the sub-area is sufficiently long, and infrastructure is available, the extraction sequence may be further divided into two or three panels to increase productivity rates and take advantage of the high tons per vertical metre.

16.3.2.4.1 Access

Early access to the Goldrush underground was initiated in 2016 when twin exploration declines received authorization by the BLM together with the construction of limited supporting surface infrastructure. The twin declines (5.5 x 5.5m) were driven from a portal located on the western flank of the Cortez Mountains.

At the end of the existing twin exploration declines, twin inclines break away, and two additional declines will be cut to the north and south to provide the main arteries for accessing the complete strike length of the Goldrush deposit. All of the declines were designed at 5.5 m wide x 5.5 m high with an arched profile with stockpiles located nominally at 150 m apart. Due to the generally low-quality rock mass conditions, care will need to be taken in development blasting to avoid unnecessary overbreak that would result in additional scaling and support.

16.3.2.4.1.1 North, Red Hill and Crow's Nest Declines

The north decline will break away from the incline at 1,862 m asl and will then drive at a relatively flat declination (1:50) for approximately 200 m to the north. The north decline will then decline at a -1:7 gradient and will follow the relative plunge of the Crow's Nest orebody. Since this is the main access to the northern extent of the deposit, the decline will be kept as straight as possible with only minor azimuth variations along its length.

The Red Hill decline will break away from the break-away incline at 1,888 m asl. The Red Hill decline will then decline at an average of -1:8 gradient for approximately 787 m to the base of the Red Hill mine area. The Red Hill decline was designed to use the break-away incline and the Red Hill levels' second egress system as well as their ventilation networks. There will be a fresh air connection at the bottom of the decline that will provide extra air for the lowest level in Red Hill and can act as a second egress for that level.

The Crow's Nest decline will break away from the north decline approximately 747 m from the start of the north decline. It will ramp down at 1:7 until it reaches the Crow's Nest haulage level. The overall design approach for this incline is a spiral. A second egress fresh air system that ultimately connects to the Crow's Nest intake raise will be connected to the Crow's Nest decline.

16.3.2.4.1.2 South, 3½, Meadows and Ranch Incline/Declines

The south decline is required to provide access to the 3½, Ranch, and Meadow zones. It will extend approximately 3.2 km to the southeast with only a 3° variance in azimuth along its length.

The 3½ incline will break away from the south decline approximately 680 m from the start of the south decline. The overall design approach for this incline is a "figure 8". The incline will ramp up at 1:7 until it reaches the same level as a multi-purpose return drive, from where it will provide the bottom link access drive for the 3½ fresh air intake raise to surface. A second egress fresh air system that ultimately connects to the 3½ intake raise will connect to the 3½ incline.

The Meadows incline will break away from the south decline approximately 2,735 m from the start of the south decline. It will ramp up at 1:7 until it reaches the multi-purpose return drive. The

overall design approach for this incline is a “figure 8”. Connected to the Meadows incline will be a second egress return air system that will connect to the multi-purpose return drive.

The Ranch decline will break away from the south decline approximately 725 m below the 3½ incline intersection or 1.4 km from the start of the south decline. The Ranch decline will extend down approximately 345 m below its breakaway point. At 1,467 m asl, the decline will transition into a haulage drive that will extend back to the north, providing access to three ore passes from the Ranch production level. A fourth ore pass that will sit further to the east will be accessed directly off the Ranch decline. This fourth ore pass access will be situated at the lowest elevation (at 1,451 m asl), due to the additional level of stopes designed on the eastern edge of the Ranch zone.

16.3.2.4.2 Ore and Waste Haulage

A total of 18 ore passes were designed: four ore passes for Meadow, four for Ranch, three for 3½, three in Red Hill, and four for Crow’s Nest. Ore passes were spaced at 150–400 m intervals, depending on level lateral extents and surrounding infrastructure. On each level, finger passes were designed to break into the ore pass to allow loaders on different levels to tip into the ore pass safely and simultaneously. Grizzlies will be placed at the openings of every finger pass to ensure coarse sizing of the ore as it is tipped by the loader.

A truck haulage loop was designed at the base of each pass to ensure fast truck loading times and traffic management. A series of coarse ore and waste bins were designed as part of the materials handling system and will have an apron feeder and sizer at the base to feed the material onto the main conveyor belt that then eventually feeds the surface conveyor belt. The conveyor belt is expected to be completed and commissioned by 2024. All material mined when the conveyor belt is operational will report to either the two ore bins or the waste bin.

Waste generated from the construction of the declines was approved for disposal at the Cortez Canyon WRSF.

16.3.2.4.3 Facilities

Within the immediate area of the mine, minimal surface facilities will be installed to support the underground mining operation. These will be limited to ventilation shafts, dewatering wells, water management infrastructure power lines and all-weather roads to access the paste plant. Additional services such as a dry and major rebuild workshop will be located within the existing Cortez Complex area.

Two major workshops will be constructed underground. One will be located on the north decline, about 370 m north of the breakaway incline, and the second workshop will be located on the south decline 585 m south of the Ranch decline entry point. The workshops will be identical and were designed with crib room facilities, tire storage, hose storage, boiler maker facilities, and primary ventilation air flow.

16.3.2.4.4 Power

The Goldrush project underground network will be an extension of the Cortez Hills surface and underground support infrastructure. Key components proposed are shown in Figure 16-14.

The portal site will be fed from a twin conductor 13.8-kV underground duct bank from the Cortez Hill open pit to the portal. A set of 15-kV switchgear will be used to distribute power to surface and underground mine development. A main 120-kV/13.8-kV substation is planned with 13.8-kV distribution to the surface and underground loads.

16.3.2.4.5 Backfill

The proposed paste fill source will be from a relatively local tailings dam source. This fill medium is expected to have the correct particle size distribution and hence with the addition of a binder, will form an accepted engineered backfill solution. Based on the proposed paste fill, the extraction sequence can be top-down, since extracting stopes under paste fill is a recognized practice when mining in poor ground conditions.

16.3.2.4.6 Ventilation

The total airflow requirement has been calculated as 1,375 m³/sec. A minimum airflow rate of 450 m³/s applies during the pre-production period phase to satisfy secondary ventilation fan requirements. A ventilation schematic is provided in Figure 16-15.

Ventilation requirements are planned to be staged, based on the mine plan, with five stages envisaged:

Stage 1 is the current ventilation setup for the initial development of Red Hill until both the fresh air and return air raises in Red Hill are completed. The main decline will be the only fresh air intake for the mine. A combination of ventilation regulators, walls, and doors will be required;

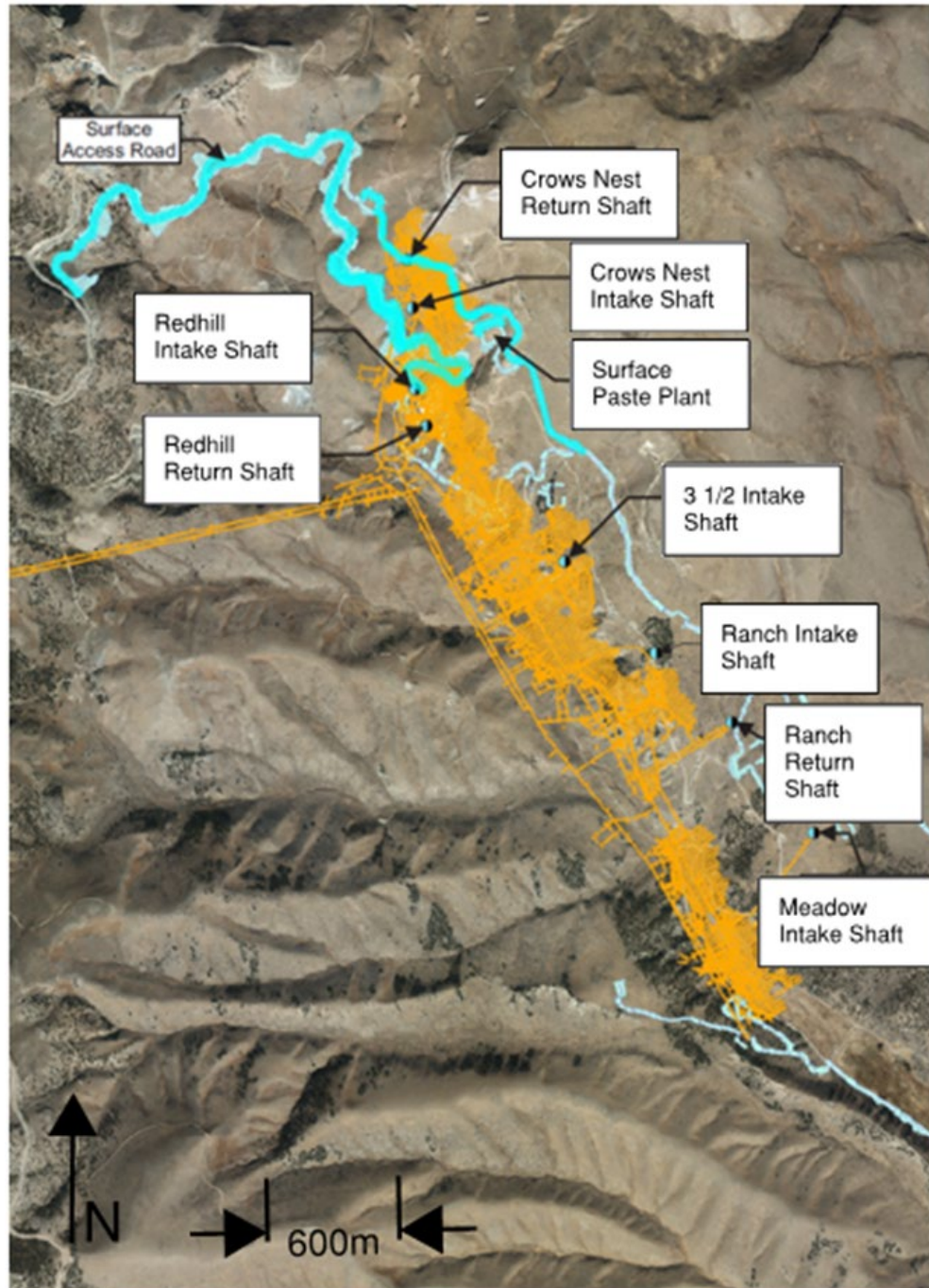
Stage 2 starts at the completion of the Red Hill fresh and return air raises, and will require the current two fans above the conveyor decline to be moved to the Red Hill return air raise, and a new fan installed in their place. This will enable stoping of Red Hill and the development towards the next two surface rises at Crow's Nest;

Stage 3 starts at the completion of the return air way at 3½ and both fresh air raises at Crow's Nest and 3½. This will enable further development of Crow's Nest and Ranch, and also to permit stoping to commence in 3½. The return and fresh air raises at Crow's Nest are required to be completed to provide primary airflow on the production levels. This will also enable development of 3½ and Ranch ventilation drives for the next surface ventilation raises;

Stage 4 is when all the all the surface raises have been completed, and all primary vent fans have been installed;

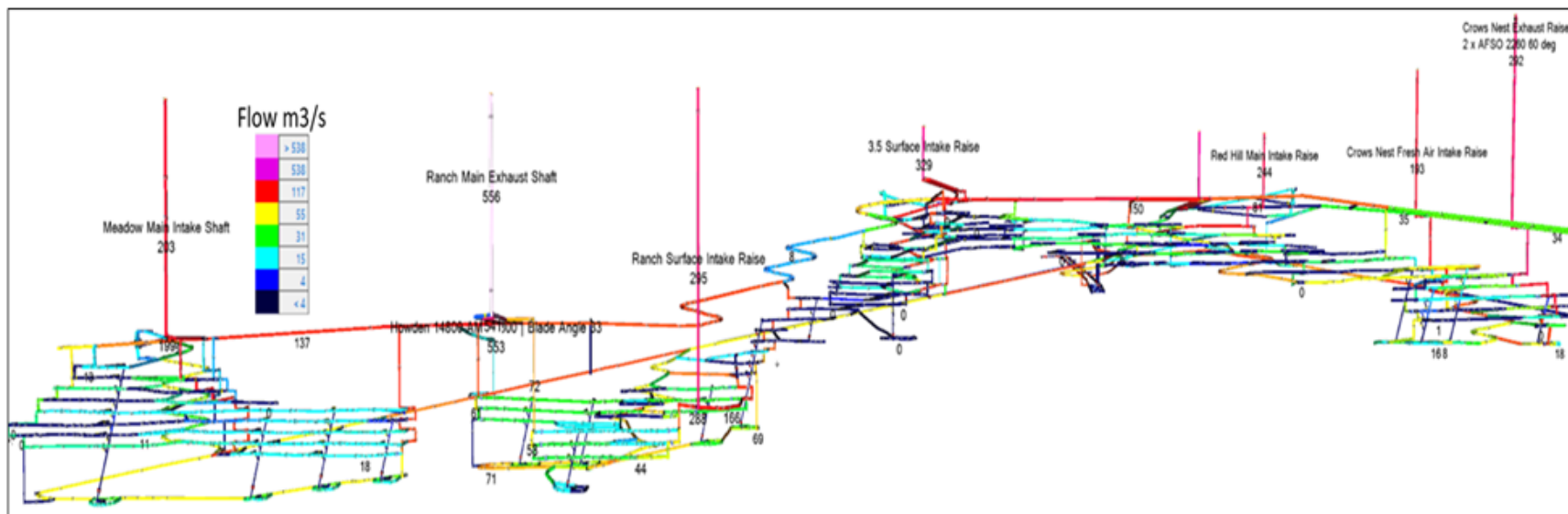
Stage 5 will consist of the final ventilation setup for the final stage of mining.

Figure 16-14: Surface Infrastructure Layout Plan, Goldrush Project



Note: Figure prepared by NGM, 2021.

Figure 16-15: Ventilation Schematic Southeast View



Note: Figure prepared by NGM, 2021.

16.3.2.4.7 Production Plan

The maximum output is artificially limited due to permitting conditions.

Intensive lateral development will be required to open up the orebody.

Based on Mineral Reserves only, approximately 13% of the ore is produced from ore drive and drift-and-fill drive development, with the remaining 87% produced from longhole production stopes.

16.3.2.5 Ore Control

Underground grade control practices consist of daily face, ribs and back mapping, round-by-round sampling, reconciliation of model to actual and actual to plan, bulk ton tracking and reconciliation, database QA/QC, stockpile management and reconciliation, and ongoing communication of routing changes to operations and engineering.

Daily face mapping documents lithology, alteration, mineralization, and structures with a focus on ore-controlling features. While mapping, ore control geologists collect channel and grab samples as needed to verify muck grades and to support observed changes in alteration and mineralization. Mapping is done on tablets at the face, digitizing geology directly into Vulcan. Measurements of structures such as bedding, faults, and joints are inputted as point data. All mapping data is used in the geological modelling process.

Mucks from blasted rounds are transported to a temporary pad at the portal before being rehandled to the waste dump or ore shipping pad, under the direction of the ore control team. Three Jumbo samples are collected for each round drilled and blasted. Three muck samples are also collected when the muck is moved after blasting. A weighted average of these production samples is used to estimate the grade of the round mined and to determine the appropriate routing of the muck. Weekly and monthly productions statistics are generated from these production sample assays, estimated volume of excavations, and surveys of advancing headings, and reconciled against models.

The jumbo sampling procedure requires jumbo operators to take three samples after the round is drilled out: one sample from the left round cuttings, one sample from the centre round cuttings, and one sample from the right round cuttings. Muck sampling procedures require mucker operators to take three samples per round as the round is mucked out of stopes or headings: one sample from the first bucket, one sample from the middle bucket, and one sample from a last bucket. QA/QC of the sampling occurs with periodic sampling presentations to each crew, observation of operators to ensure proper sampling procedure. Test holes are drilled in structurally complex areas where mapping data differs from model of the orebody. The assay results from these test holes are used to refine bench and longhole stope designs in such areas. Mucks from longhole stopes are sampled at a frequency of about one sample per 90 t of ore. An average of these assays over the life of the stope constitutes the grade of the stope.

16.3.2.6 Materials Handling

Ore and waste rock from the Goldrush project will be loaded onto the trucks from storage bins at the base of the twin declines via haul trucks and/or LHDs. Ore and waste rock will be transported out of the mine via a conveyor belt system in the south decline. Ore and waste will be metered, from the bin, by an apron feeder and then discharged to a belt conveyor. This belt conveyor will carry material to a diverter gate where waste rock will be conveyed to a truck loading bin and/or pile that will be loaded into trucks via a surface loader. Trucks will be loaded to carry ore to the range-front decline ore pad and waste to the Canyon waste rock facility.

16.4 Waste Rock Storage Facilities

A number of waste rock storage facilities (WRSFs) are in use, as summarized in Table 16-3. There is sufficient capacity for LOM plan requirements.

Where possible underground waste rock is disposed of within the underground workings. Stopes and drifts, which do not have any plans to have any mining conducted adjacent, are able to be backfilled with waste rock generated from development headings. Any surplus waste rock is trucked or conveyed to the surface where it is stockpiled until it can be relocated to the surface WRSFs using surface mining equipment.

16.5 Stockpiles

There are approximately 27 long-term and short-term stockpiles of refractory and oxide material that are included in the LOM plan, which range in age of construction from the early 2000s to present. Seventeen of these stockpiles are currently active; however, this number fluctuates depending on the production plan and rehandling and processing of several historic stockpiles can be underway at any one time.

The open pit production schedules have significant variation in ore delivery over time and there is a high proportion of the ore that is stockpiled after mining and before processing. There are several oxide stockpile options all based upon the grade of material and varying from leach ore to mill ore. Leach material is generally delivered directly to the leach pad.

Production scheduling for the oxide mill is based upon material available from the mine and stockpiles. The refractory material to be processed at Nevada Gold Mines' Carlin facilities are based upon the highest grade stockpiles available with consideration to blending constraints of the ore constituents, limited by the shipping quotas.

Table 16-3: WRSFs LOM Capacities and Status

Type	Location/Abbreviation	Remaining Capacity (st)	Remaining Capacity (t)	Active Status (Yes/No)
WRSFs	Crossroads south waste rock facility	490,262	444,758	Yes
	Crossroads north waste rock facility	93,879	85,166	No
	Gap waste rock facility	90,539	82,136	Yes
	Gap north waste rock facility	7,337	6,656	No
	Gap south waste rock facility	63,947	58,012	No
	North West Deeps west waste rock facility	61,875	56,132	No
	North West Deeps East waste rock facility	55,149	50,030	No
	Robertson waste rock facility	567,392	514,729	No
	Cortez Pits waste rock facility	79,716	72,317	No
Tailings dam expansion	Tails storage facility phase III	7,086	6,428	Yes
	Tails storage facility phase V	20,699	18,778	No
Leach pads	Area 30 expansion 5	76,568	69,461	Yes
	Area 30 expansion 4	24,595	22,312	Yes
	Robertson leach facility	108,374	98,315	No
	Area 34 heap leach facility	5,750	5,216	Yes
Pit backfill	Cortez Pits backfill	2,584	2,344	No
	Pipeline backfill	396,949	360,106	No

16.6 Blasting and Explosives

16.6.1 Surface

Explosives are stored in a dedicated powder and cap magazines located away from active areas and bulk bins for ammonium nitrate and emulsion. The mine is diligent in complying with MSHA and all other regulatory agencies for safe storage and handling of explosives. Blasting and explosive selection varies, with emulsion/ANFO and high explosive blends used according to blasting conditions and packaged product is used for pre-split holes where appropriate.

16.6.2 Cortez Hills Underground

Mining is conducted using drill and blast development and drilled and blasted long hole stopes. At present, blasting is conducted using emulsion as the primary explosive in both development and stoping. Stopes are blasted using an 89 mm blast hole, and development is conducted using 48 mm blast holes.

All explosives are stored following all regulations in the underground powder magazine.

16.6.3 Goldrush

Mining is conducted using drill and blast development and drilled and blasted longhole stopes. At present, blasting is conducted using emulsion as the primary explosive in both development and stoping. Stopes are blasted using an 89 mm blast hole, and development is conducted using 48 mm blast holes.

All explosives are stored following all regulations in the underground powder magazine.

16.7 Mining Equipment

16.7.1 Surface

The surface mining fleet is comprised of electric mining shovels and haul trucks. Dozers, rubber-tire dozers, graders, blast hole drills, maintenance vehicles, a heavy haul trailer, and other equipment are present to support the operations.

The surface mobile equipment is listed in Table 16-4.

Table 16-4: Mine Equipment List, Surface Operations

Equipment	Peak Requirement
Liebherr T282B trucks	19
Caterpillar 795F trucks	30
Caterpillar 793C/D trucks	9
P&H 4100 XPB/XPC shovel	2
P&H 2800 XPB shovel	4
EX-5500 excavator	2
Atlas Copco PV271 drill	5
DrillTech D75K	1
CAT 24H grader	3
CAT 16H grader	3
854 RTD	7
CAT D9	2
CAT D10	8
CAT D11T	2
CAT 992K	3
CAT 988F	1
CAT 990D	2
CAT 992D	1
275 ton Towhaul (930E)	1
C500 Kenworth lube truck	3
Western Star 6900 lube truck	2
Western Star 4900 service truck	5
Sterling service truck	2
Freightliner service truck	2
Kenworth 300 service truck	1
988B tire handler	2
Shovel cable reeler 690D/834B	2
830E water truck	3
HD1500 water truck	3
785B water truck	1
Kenworth T800 boom truck	1
385 excavator	3

16.7.2 Underground

The underground mobile equipment fleet used at Cortez Hills consists of large scale load-haul-dump vehicles and haulage trucks, twin boom jumbos, ground support bolters as well as production drill rigs. There are also concrete and shotcrete carriers and shotcrete units. A list of the major equipment for Cortez underground is shown in Table 16-5.

The proposed equipment requirements for Goldrush are provided in Table 16-6.

16.8 QP Comments on “Item 16: Mining Methods”

NGM has regularly undertaken, and will continue to undertake, as part of its normal course of business operations, reviews of the mine plan and consideration of alternatives to and variations within the plan. Alternative scenarios and reviews are based on ongoing or future mining considerations, evaluation of different potential input factors and assumptions, and requests made of project staff by NGM.

Such iterations can include where appropriate, but are not limited to:

- Changes to Mineral Resource/Mineral Reserve estimation methodologies;
- Changes to dilution and reconciliation strategies;
- Changes to metal price assumptions;
- Changes in allocations of planned drilling, or drilling locations, that can be used to support conversion of Mineral Resources to higher confidence categories that would then be eligible for inclusion in a mine plan for conversion to Mineral Reserves;
- Changes to deposit sequencing;
- Changes to production rates;
- Changes in mining equipment strategies;
- Alternate underground configurations;
- Changes to geotechnical or hydrogeological assumptions;
- Changes in short-term production;
- Mill throughput reviews and potential mill modifications;
- Process flowsheet modifications and potential recovery improvements;
- Stockpile throughput, allocations, and planned depletion rates;
- Optimization of cash flows and review of different cash flow scenarios;
- Changes to allocations of capital expenditures to different years within the mine plan;
- Modifications to sustaining capital and operating cost assumptions;
- Changes to accounting and taxation assumptions.

Table 16-5: Mine Equipment List, Cortez Hills Underground

Equipment	Peak Requirements
Sandvik rock bolter	5
Sandvik jumbo drill	3
Epiroc longhole drill	2
Caterpillar R1600 G loader	6
LH517 loader	3
Caterpillar AD30 truck	5
Caterpillar AD45 truck	2
Sandvik TH545 truck	3
Powder truck	3
Utility equipment	3
Nipper wagon	2
Sprayers	2
Transmixer	3
Caterpillar IT loaders (920)	1

Table 16-6: Mine Equipment List, Goldrush

Equipment	Peak Requirements
Development Jumbos (Sandvik DD422/421 or similar)	5
Production Drills (Sandvik DL432 or similar)	4
Cable Bolters (Sandvik DS422)	3
Production LHD (Sandvik LH621)	10
Underground Haul Trucks (Sandvik TH663)	10
Underground Haul Trucks (Sandvik TH545)	4
Underground Boxhole (Sandvik Rhino 100)	1
Cubex Drills	2
Powder Trucks	4
Shotcrete Sprayers	3
Shotcrete Transmixers	4
IT Loaders (CAT 930/962 or similar)	6

17.0 RECOVERY METHODS

17.1 Introduction

Ore from the Cortez Complex can either be processed on site in the oxide processing facilities or transported to the Goldstrike roaster, Goldstrike autoclave, or Gold Quarry roaster for refractory ore treatment.

17.2 Process Flow Sheet

The process flowsheet for the Pipeline Mill is provided in Figure 17-1.

A simplified process flowsheet for the heap leach operations is included as Figure 17-2.

For completeness, a figure showing the flowsheet for the Goldstrike roaster, Goldstrike autoclave, and Gold Quarry roasters, parts of the Carlin Complex, are included in Figure 17-3, 17-4, and 17-5.

17.3 Plant and Process Design

17.3.1 Pipeline Mill

The Pipeline Mill was commissioned in 1997 to process oxide ore from the Pipeline open pit mine. The treatment plant currently includes crushing, semi-autogenous grind (SAG) mill, ball mill, grind thickener, carbon-in-column (CIC) circuit for the grind thickener overflow solution, CIL circuit, carbon stripping and reactivation circuits, and a refinery to produce gold doré. Plant throughput can reach up to 16,330 t/d depending on the hardness of the ore being processed. The plant is permitted for an annual total of 4.9 Mt/a.

ROM ore is dumped into the crusher dump pocket at the mill and discharges onto a vibrating grizzly. Grizzly oversize material is crushed in a jaw crusher. Grizzly undersize material and the jaw crusher discharge are conveyed to the coarse ore stockpile. The coarse ore is conveyed to the SAG mill and lime is added to the belt based on ore requirements. The grinding circuit includes one SAG mill and one ball mill. Discharge from the SAG mill is screened on one of two vibrating screens.

Figure 17-1

Barrick Gold Corporation
Cortez Joint Venture Operations
Lander & Eureka Counties
State of Nevada, U.S.A.
Pipeline Mill Process
Flow Sheet

Figure 17-2: Process Flowsheet, Heap Leach

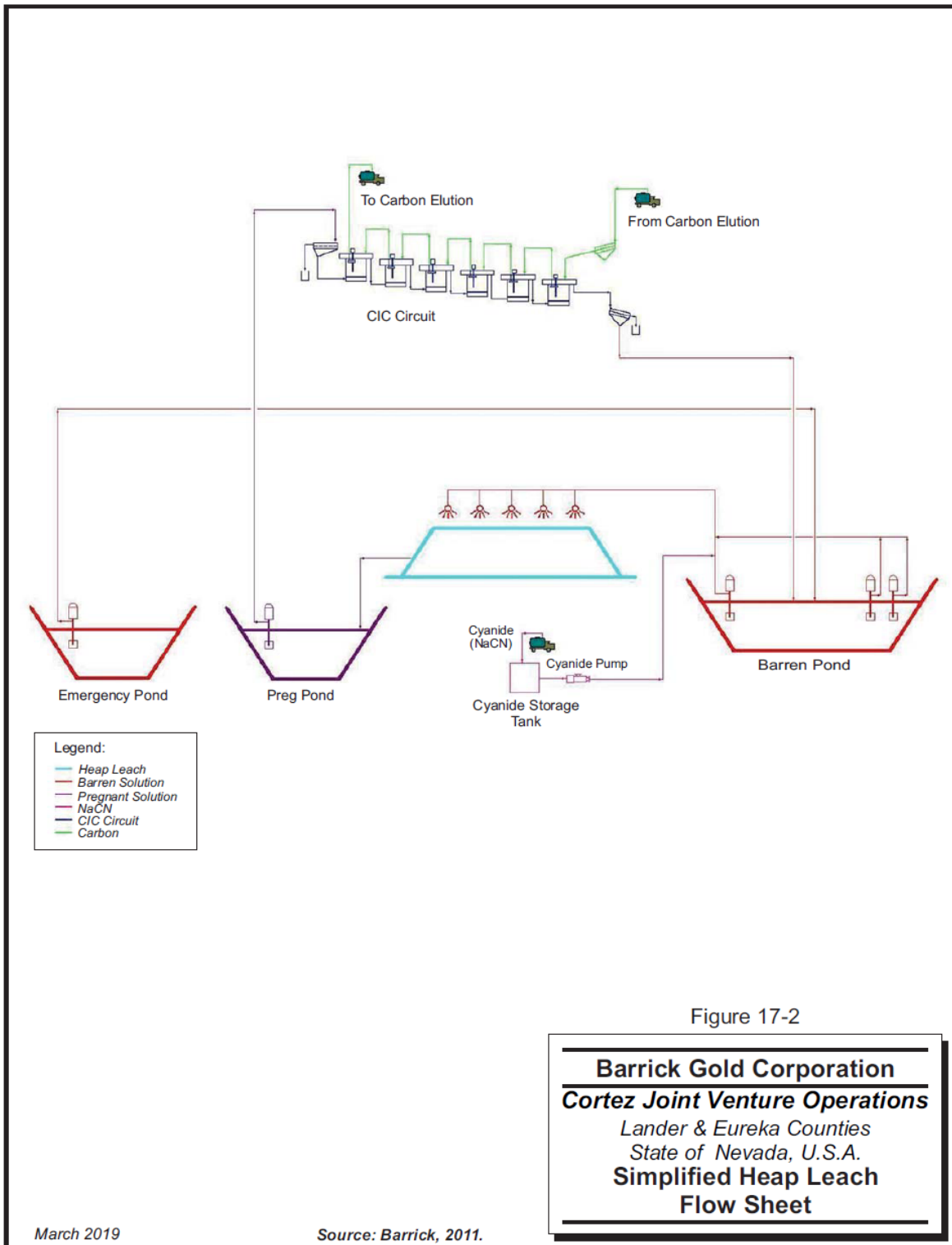


Figure 17-3: Process Flowsheet, Goldstrike Roaster

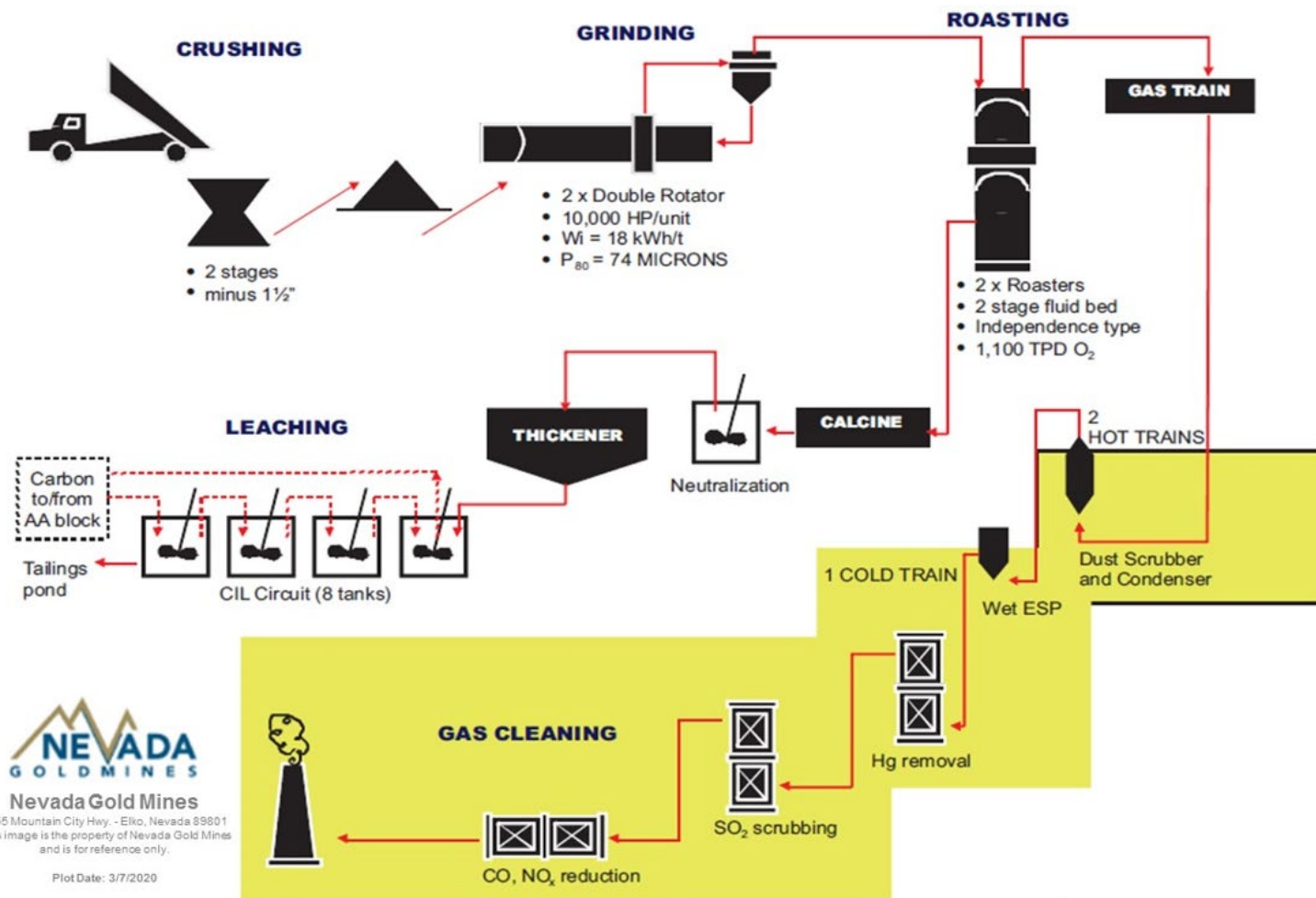
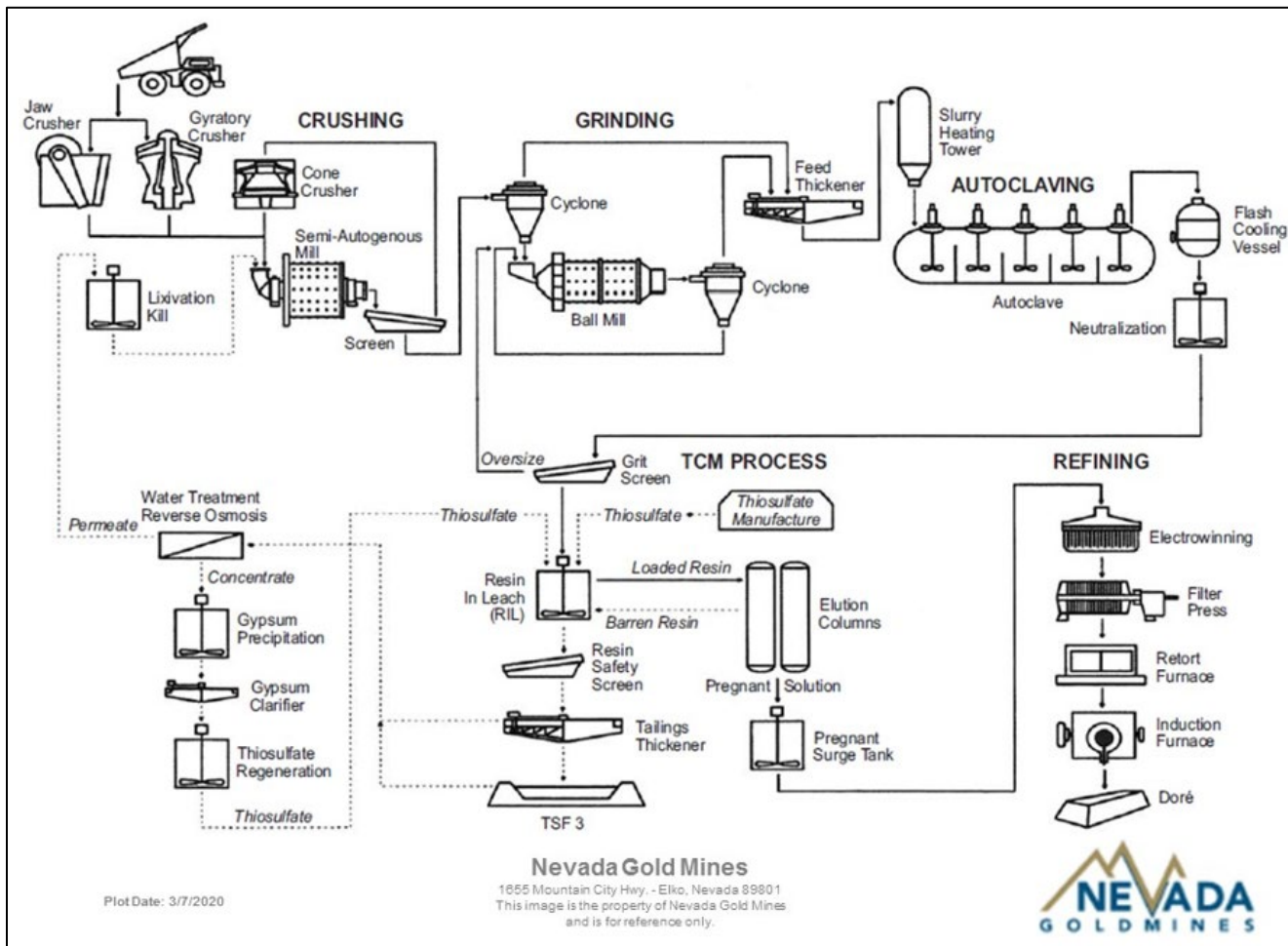
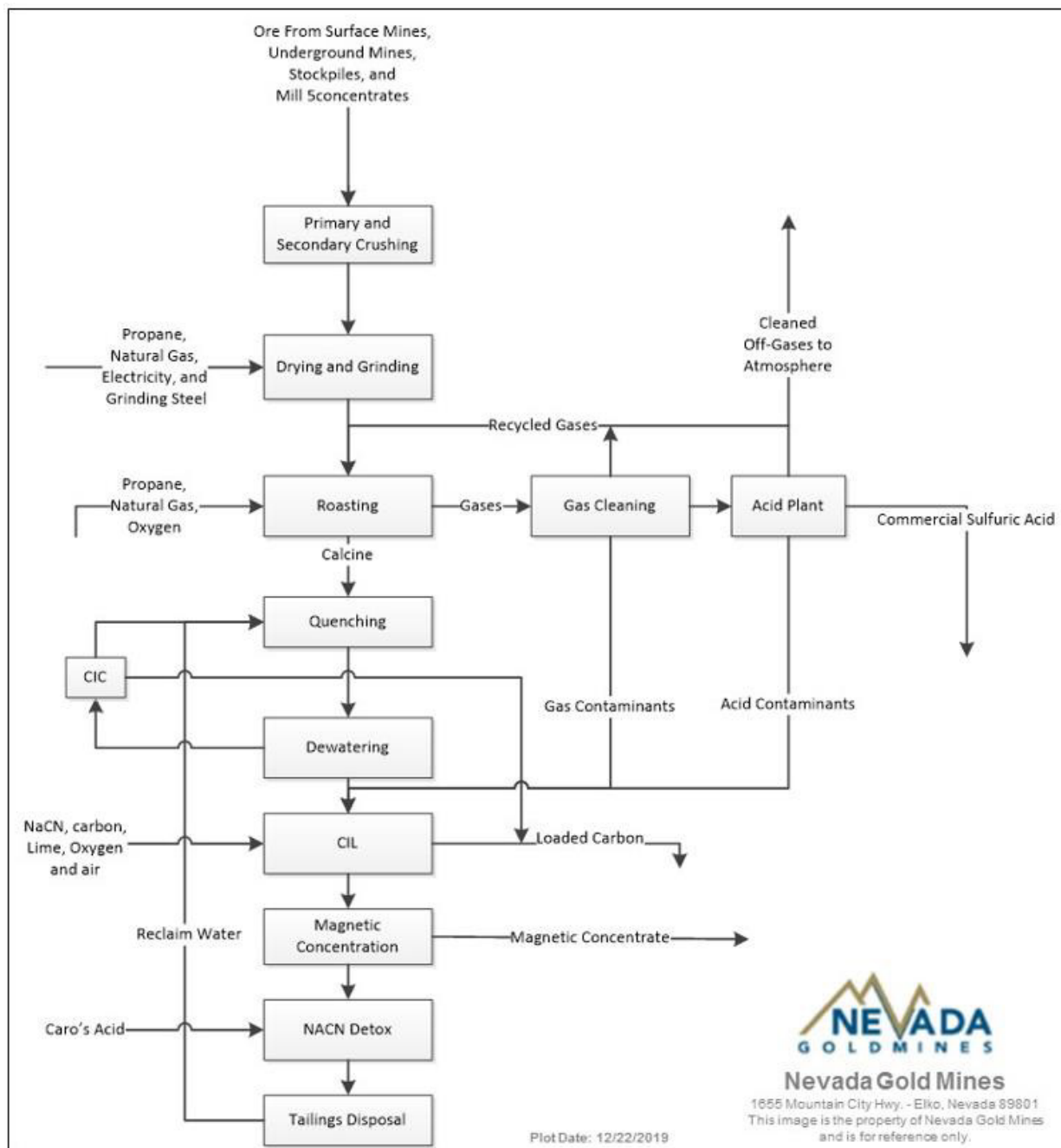


Figure 17-4: Process Flowsheet, Goldstrike Autoclave



Note: Figure prepared by NGM, 2021.

Figure 17-5: Process Flowsheet, Gold Quarry Roaster



Note: Figure prepared by NGM, 2021.

Screen oversize is conveyed to a cone crusher where it is crushed prior to being recycled to the SAG mill feed. Screen undersize and ball mill discharge flow by gravity to the hydrocyclone feed pump box. The slurry is pumped from the pump box to the hydrocyclones. The ball mill is operated in closed circuit with the hydrocyclones to produce the target grind size for the CIL circuit, which is nominally 150 μm . The underflow from the hydrocyclones is recycled to the ball mill feed; the overflow from the hydrocyclones discharges into an agitated surge tank, which feeds the grind thickener. Cyanide is added to the surge tank to begin the leaching process prior to the grind thickener. Milk of lime can also be added to the surge tank if the lime silo is down, and dry lime cannot be added to the belt.

An appreciable amount of gold is dissolved in the grinding circuit, so a CIC circuit is used to recover gold from the grind thickener overflow solution. The grind thickener underflow is pumped to the CIL circuit, which consists of eight CIL tanks, 16 screens, and eight carbon forwarding pumps. The slurry overflows by gravity from the first tank to the eighth tank. Carbon that has been stripped and re-activated is added to the last tank and is advanced counter current to the slurry flow. Cyanide can be added to CIL 1 and 3 to maintain optimal leaching conditions, but addition to tank 3 is usually not necessary. The nominal retention time is 36–48 hours, depending on plant throughput. Slurry flows from the final tank to cyanide detox where ferrous sulfate is added to achieve cyanide concentration less than 50 ppm cyanide for discharge to the tailing facility.

Loaded carbon from the CIL and CIC circuits is washed with dilute (3%) hydrochloric acid before elution. The acid is removed from the carbon by washing with fresh water. The washed carbon is transferred to the elution column by pressure eduction. Three columns provide for acid washing and three for gold elution. The pressurized Zadra process is used for gold elution. Hot strip solution containing approximately two percent sodium hydroxide is circulated through the elution column. Elevated temperature and pressure are maintained in the elution column. Pregnant strip solution is stored in the preg tank before being pumped to the electrowinning (EW) cells.

Electrowinning takes place in six EW cells. After loading with gold, the stainless steel cathodes are washed with high pressure water. The gold sludge from the EW cells is dewatered in a filter press. The stripped cathodes are returned to the EW cells. The filter cake is dried, melted in an induction furnace, and poured into doré bars. The stripped carbon is transferred from the elution column over a screen and into the reactivation furnace feed tanks. Carbon reactivation is accomplished in two propane-fired kiln-type furnaces.

Tailings are stored in a zero-discharge tailings storage facility (TSF). A double liner covers the entire tailings area, extending completely under the dam embankment. A 0.6 m-thick blanket drain of crushed rock covers the liner to permit seepage from the tailings to be collected in a lined ditch outside the dam embankment. All tailings solutions return to the mill.

17.3.2 Heap Leach

Low-grade oxide material is leached as ROM ore on three prepared double-lined leach pads. Pregnant solution from the leach pads is fed to CIC columns for gold recovery. The loaded carbon from the heap leach operation is transported to the mill for gold recovery in the carbon elution and EW circuits and the refinery. The carbon is also acid-washed and regenerated at the mill. Make-

up solutions come from the mill or mine dewatering wells to account for evaporative losses and ore saturation requirements.

Area 28 is an inactive heap leach circuit that is currently used for water management. The Area 30 heap leach circuit is independent of the Pipeline Mill. Ore delivery to the pad recommenced in 2013. An expansion of 650,000 m² was completed in 2019 with ore deliveries extending through 2027. The Area 34 heap leach is a third pad that was designed to treat Cortez Hills open pit ore. The first cells were placed under leach during March 2011 and ore deliveries were completed in May 2019 with low-grade stockpile rehandling completed in the second half of 2021. Area 34 is planned to begin closure starting 2023.

17.3.3 Carlin Refractory Processing

Refractory ore (CNAA/FA ratio of <50% or PPREG% >40%) is mined and stockpiled, then shipped to NGM's Carlin Complex, which is approximately 110 km north of Cortez, for processing. Refractory ore trucking is currently subject to permitted tonnage limitations of approximately 2.3 Mt/a.

At Goldstrike, ore is processed in the roaster followed by a CIL circuit. There is also a facility at Goldstrike which processes refractory ore using autoclaving and total carbonaceous material leaching, which includes pressure oxidation (POX) followed by resin-in-leach (RIL) with calcium thiosulfate (CaTS) as a lixiviant in lieu of sodium cyanide. The autoclave/RIL process yields lower recovery than roasting so is typically not used for processing Cortez ores. However, a borderline refractory stockpile from Cortez Hills open pit was successfully processed in 2021 using the alkaline autoclaving process and may be considered in the future for similar ore types.

Fluid bed roasters were constructed at Goldstrike in 1999 to treat carbonaceous refractory ores that could not be treated effectively by the existing POX circuit. The roasters process double refractory (i.e., sulfide refractory and total organic carbon refractory) feed with a moderate carbonate content to help fix the sulfur dioxide that is generated by the oxidation reactions. Minimum sulfide sulfur levels are required to maintain sufficient bed temperatures. When the ore does not contain the minimum required sulfide sulfur content, sulfur prills are used as a supplement to provide the energy necessary to operate the roasters.

The roasters use oxygen to oxidize organic carbon and sulfide sulfur prior to processing the neutralized slurry in a conventional CIL circuit. There are two circuits, each include crushing and dry grinding followed by a two-stage roaster, a calcine quenching tank, and dust and gas handling operations. The quenched gas goes to the gas cleaning stage, which is common to both roaster circuits, and the calcine is processed in common neutralization and CIL circuits.

At Gold Quarry, ore is processed in a similar manner to the Goldstrike roasters, using a single dry grind mill, two single-stage roasters, CIC and CIL circuits, and a sulfuric acid plant. The Gold Quarry roaster manages fuel requirements through ore blending and sulfur concentrate addition.

Loaded carbon from any of the refractory circuits is sent to the main refineries for elution, regeneration, and production of gold doré.

Ore routing from the Cortez Complex to the Carlin Complex is optimized using Deswik Blend to provide maximum value to NGM.

17.4 Energy, Water, and Process Materials Requirements

The Cortez process facilities are centred around a SAG and ball mill grinding circuit. Each mill is rated for 3,200 kW. Alternative processing at the Area 30 heap leach facility requires a total of 1,500 kW. Overall process and support facilities require 12.5 MW.

Mill facilities use grinding media, lime, cyanide, activated carbon, ferrous sulfate, hydrochloric acid, caustic, and antiscalant. The roaster requires oxygen, grinding media, cyanide, lime, soda ash, antiscalant, chlorine and sulfur.

Water supply for processing operations is sourced, depending on the facility, from well fields, TSF reclaim, storm run-off water, and pit dewatering. Raw and gland water is provided by permitted water wells. Potable water is provided by permitted water wells and supporting treatment and infrastructure facilities.

The current water sources, assuming similar climate conditions to those experienced by the operations in the past, will be sufficient for the LOM plan.

17.5 QP Comments on “Item 17: Recovery Methods”

All process facilities are constructed and operational. Facilities are suitable for processing the ores envisaged in the LOM plan.

18.0 PROJECT INFRASTRUCTURE

18.1 Introduction

18.1.1 Existing Infrastructure

The Cortez and Cortez Hills complexes are located on the western flank of Mount Tenabo in the Cortez Mountains on the southeast side of Crescent Valley, approximately 7 mi southeast of the Pipeline Complex. The existing Gold Acres Complex is located directly west of the Pipeline Complex. Facilities at the Gold Acres Complex are in various stages of reclamation, and this area includes pre-1981 disturbance that is inactive.

Current infrastructure at the Cortez Complex includes:

- Pipeline:
 - One open pit complex (Pipeline pit complex, inclusive of the Pipeline, Crossroads, and Gap pits);
 - Two waste rock facilities (Gap and Pipeline);
 - Two pit backfill areas (Pipeline pit and northern portion of Gap pit);
 - Pipeline Mill for processing mill-grade oxide ore;
 - Two heap leach facilities (Pipeline [Area 28] and Pipeline South Area [Area 30]);
 - One tailings impoundment (Pipeline [Area 28]);
 - Ancillary and support areas including administration, laboratory and other support buildings, truck shop, fuel facilities, storage areas, water treatment plant, growth media stockpiles, refractory and oxide ore stockpiles, blasting materials storage area, and power infrastructure;
 - Dewatering facilities and infiltration basins;
- Gold Acres:
 - One open pit (Gold Acres);
 - Three waste rock facilities (Gold Acres North, Gold Acres South, and Gold Acres East);
 - Heap leach facility (closed - material removed and placed on the Pipeline Heap Leach Facility);
 - Buildings (authorized for use);
 - Class III landfill (authorized for use);
 - 90-day temporary hazardous materials storage facility (e.g., oil, etc.);
 - Hydrocarbon bio-remediation facilities;
 - Blasting materials storage area;

- Cortez Hills:
 - One open pit (Cortez Hills);
 - Three waste rock facilities (Canyon, North, and South);
 - One heap leach facility (Grass Valley);
 - Ancillary facilities including truck shop; safety, security, and administration buildings; growth media stockpiles; ore stockpiles; overland conveyor with crusher/ore stockpile area; blasting materials storage area; range front declines and surface support facilities for underground operations, power infrastructure, and fuel and lubricant storage facilities;
 - Dewatering system;
 - Fresh water reservoir;
 - Underground mine.
- Cortez:
 - Three open pits (Cortez and Ada 52 [currently authorized for mining] and F-Canyon);
 - Three heap leach facilities (closed);
 - One pit backfill area (F-Canyon Pit);
 - Four waste rock facilities (Cortez, Cortez East, Ada 52 Top, and F-Canyon);
 - One tailings area composed of eight ponds (Ponds 1 through 4 and 6 [closed], Pond 5 [authorized for water management for the Cortez Hills underground operations], Pond 7 [open but not currently in use], and Pond 8 [authorized but not constructed]);
 - Ancillary facilities including administration buildings, truck shop, underground portals and surface support facilities in the F-Canyon Pit for underground operations, power infrastructure, blasting materials storage area, and pumpback/remediation systems;
 - Cross-valley water pipelines to the existing Pipeline infiltration basins and process facilities.

Other infrastructure includes:

- Gravel pits;
- Assay laboratory;
- Built infrastructure including offices and warehouses;
- Mobile equipment shops;
- Haul and access roads for heavy and light equipment;
- Powder magazines;
- Fiber optic lines and network communication;

- Mine radio network;
- Electrical distribution network;
- Dewatering, piezometer, and potable water wells;
- Dewatering and potable water pipelines.

Infrastructure locations in the Pipeline area were shown in Figure 16-1, and for the Cortez area in Figure 16-2.

18.1.2 Goldrush Planned Infrastructure

The infrastructure proposed is shown in Figure 18-1 and Figure 18-2.

Within the immediate area of the planned mine, minimal surface facilities will be installed to support the underground mining operation. These will be limited to ventilation shafts, dewatering wells, water management infrastructure power lines and all-weather roads to access the paste plant. Additional services such as a dry and major rebuild workshop will be located within the existing Cortez Mine area.

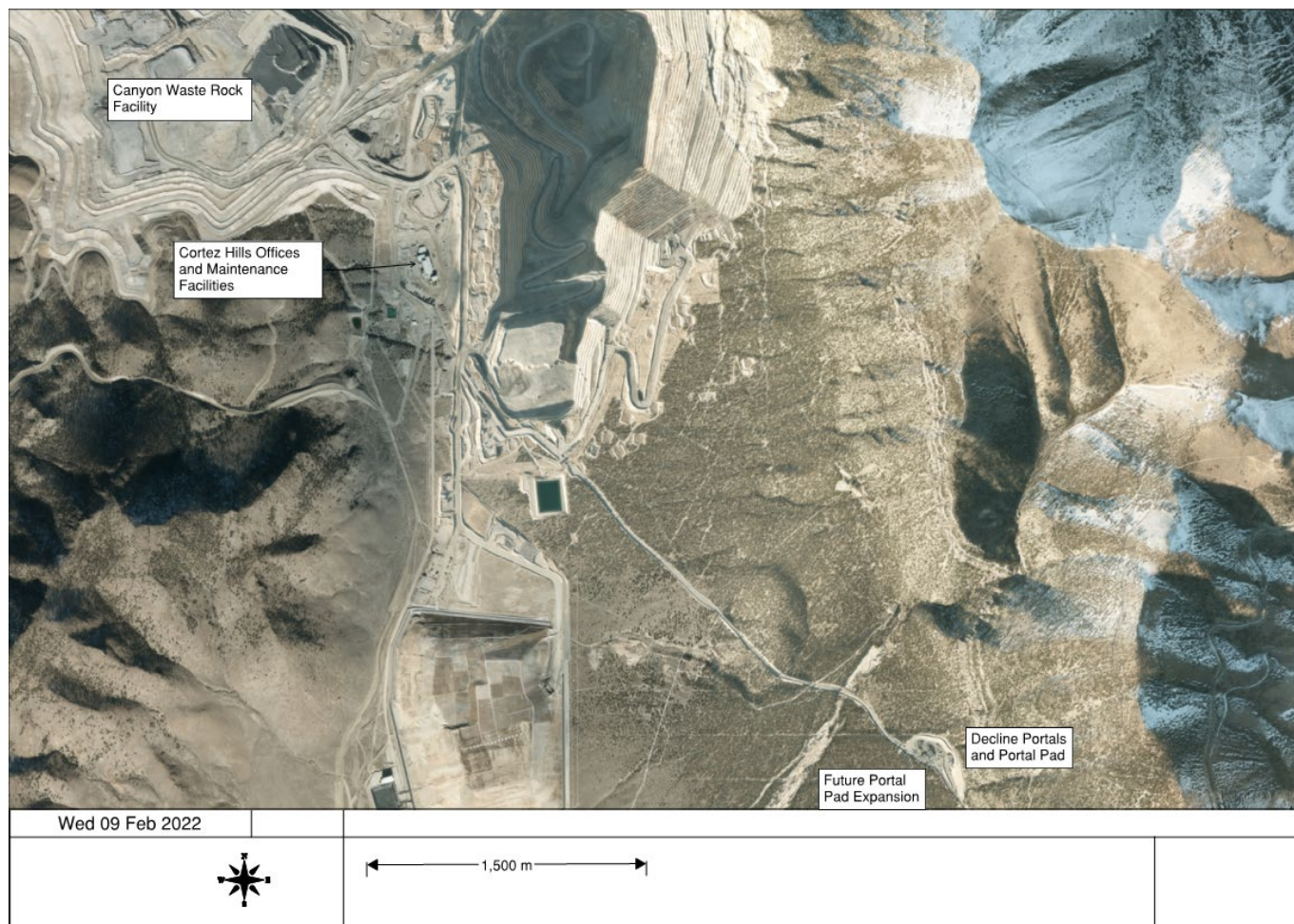
While the majority of the infrastructure is required in 2022 and 2023 (power lines, substations, RIBs, dewatering wells and pipeline), the construction of the ventilation shafts will be staged with the advancement of the mine design.

Key infrastructure that will be required to support the planned Goldrush mine includes:

- Mine accesses including portals, declines, and inclines;
- Surface dewatering wells and associate pipe and pumping infrastructure;
- Rapid infiltration basins;
- Underground dewatering/pumping infrastructure;
- Backfill plant;
- Ventilation system;
- Electrical distribution network.

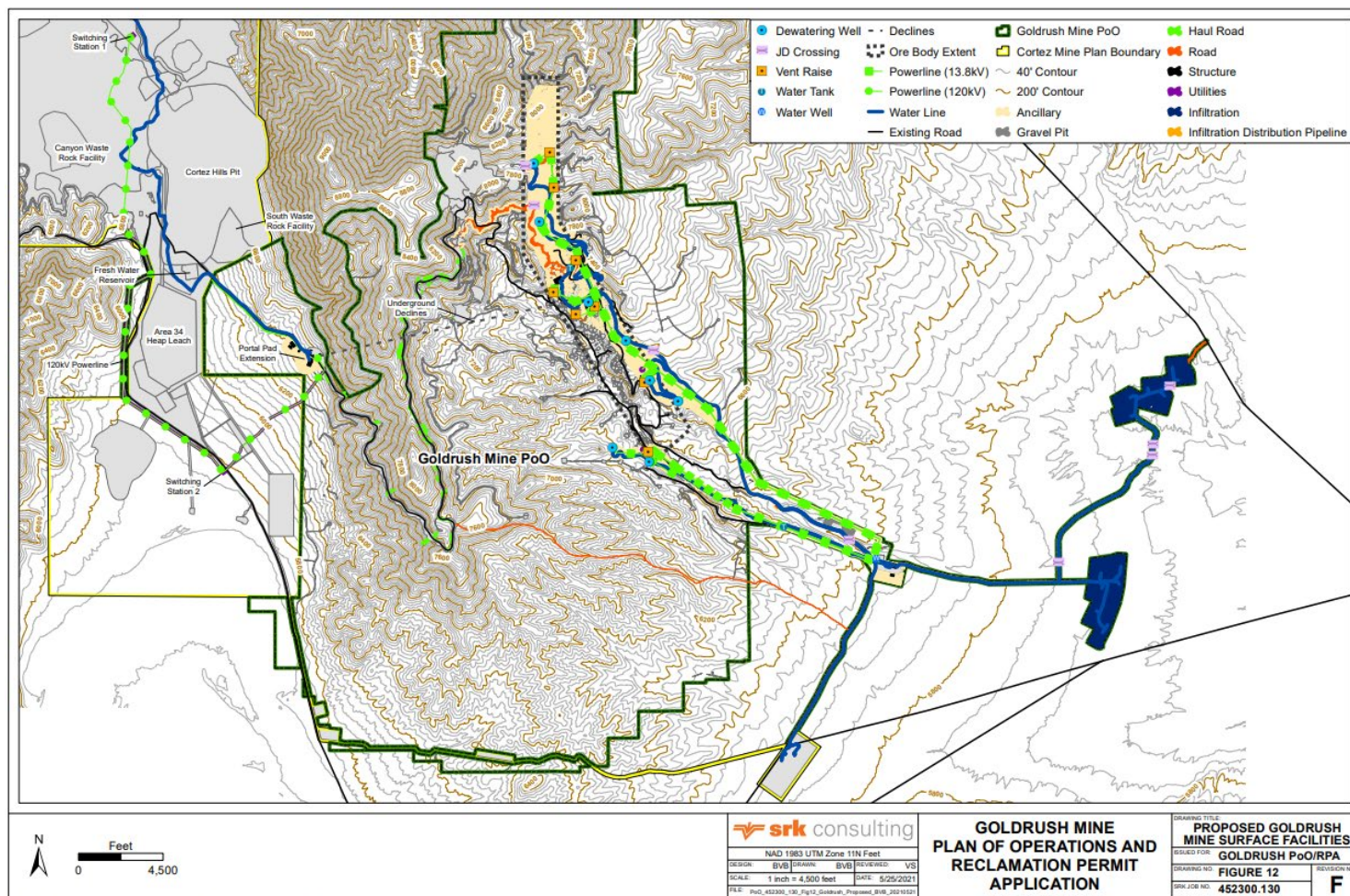
A portion of the infrastructure required for the Goldrush project will be repurposed from the Cortez Hills open pit administration complex. The existing Horse Canyon exploration lay down yard will become NGM's main staging area for the Goldrush surface infrastructure and will become the location of the multi-use shop and water treatment plant.

Figure 18-1: Infrastructure Layout Map, Goldrush



Note: Figure prepared by NGM, 2022

Figure 18-2: Goldrush Layout Map



18.2 Road and Logistics

Road and rail access and the proximity to airfields are discussed in Section 5.

Primary access to the Horse Canyon site is from the gravel county road to Grass Valley, at the south end of the paved Nevada State Route 306. State Route 306 connects to U.S. Interstate-80 (I-80) between Battle Mountain and Carlin. Approximately 16 km south of the Cortez Hills Pit, the Eureka County Grass Valley-Cortez Road intersects with the JD Ranch Road. The JD Ranch Road heads north and east from the intersection into Pine Valley and ties into State Route 278, a paved highway.

The road network design criteria for accessing the Goldrush surface infrastructure facilities will include all necessary improvements to operate and maintain dewatering conveyance and provide safe access within the steep terrain of Horse Canyon.

18.3 Stockpiles

Stockpiles are discussed in Section 16.5.

18.4 Waste Storage Facilities

WRSFs are discussed in Section 16.4.

18.5 Tailings Storage Facilities

Currently, the Cortez Complex has two active TSFs, Cell 1–2 and Cell 4.

The Cell 1–2 facility commenced operations in 1997, and stores approximately 55.5 Mt of dry tailings.

The Phase IV Interim Raise on the Cell 1–2 facility was designed to provide storage until Cell 4 could be permitted, constructed, and placed into operation. Construction of the Phase IV Interim Raise was completed in 2012 and provided approximately 2.7 Mt of tailings storage. The facility was filled to near capacity in mid-2013 and currently only used for emergency deposition.

Cell 4 Phase I was designed in 2011 and construction completed in April 2013. Deposition began in July 2013. Cell 4 is hydraulically independent of the Cells 1–2 facility with a continuous 80 ml high density polyethylene (HDPE) geomembrane liner incorporated on the upstream slope of the embankments. The supernatant pool area lining system includes an 80 ml HDPE primary liner above a geosynthetic clay liner (GCL). Outside the pool area, geomembrane is underlain with a non-woven geotextile.

Cell 4 Phase II construction was completed in November 2015 and provided for an estimated storage capacity of 23.3 Mt.

Cell 4 Phase III construction was completed in October 2018 and provides an extra 15.4 Mt of storage capacity. The Phase III decant pool configuration was changed to a centre-pool decant.

Cell 4 Phases III–V were redesigned in 2017, eliminating Phase IV. Clearing and grubbing was completed in June 2019 and mine haul of buttress material to the 1,564 m elevation was completed in November 2021. Remaining lift construction and lining of the facility to an ultimate crest elevation of 1,569 m will start in March 2022, with completion expected during October 2022. At full build-out, the facility will encompass approximately 0.97 Mm² with a maximum embankment height of 69 m and an ultimate tailings storage capacity of 56 Mt.

18.6 Water Management

18.6.1 Pipeline

The Pipeline Complex currently has a permitted dewatering elevation of 975 m asl. The permitted dewatering elevation at the Cortez Hills Complex is 762 m asl. NGM holds the needed approvals to support the dewatering rate required to support mining.

18.6.2 Crescent Valley

Existing RIBs in Crescent Valley are used for disposal of excess dewatering water via infiltration, and an annualized average of up to 18.5 m³/min of excess dewatering water is piped via an approved ROW to the Dean Ranch for seasonal irrigation purposes.

18.6.3 Goldrush

Stormwater controls for the Goldrush surface infrastructure project are designed to convey the 25-year and 100-year peak storm events based on contributing drainage area and the susceptibility to inundate the surface infrastructure and per the respective storm event.

Facilities that support the Goldrush project, such as, dewatering wells, ventilation shafts, multi-use shop, and the RIBs are designed to convey the 100-year storm event. The proposed locations of these facilities are generally in areas above concentrate drainages and have smaller contributing watershed areas. In the event of a probable maximum storm event, these facilities will not be affected by flooding.

Primary and secondary access roads are designed to convey the 25-year storm event, which is likely to occur within the LOM duration. Drainage infrastructure within Horse Canyon will typically consist of culverts, diversion channels, slope stabilization, berm openings, and best management practices for erosion control. Stormwater facilities for the Willow and Dry Creek areas will primarily consist of culverts and diversion V-ditches to protect the RIBs and access roads.

The Goldrush Mine-Site Water Management Plan will be consistent with current practices at NGM's mining operations in Crescent Valley. Water management for the Project will require the following:

- Stormwater diversions away from the surface facilities (portal pad area, dewatering infrastructure, shafts and raises, etc.);
- Maintenance of appropriate water rights for mine dewatering and consumptive use;

- An underground-mine dewatering system, consisting of surface production wells, passive drain holes, sumps, and water conveyance pipelines and booster stations (as necessary);
- Disposal of excess produced water (after mining and milling consumptive uses), which will consist of discharge to RIBs located in Pine Valley.

The potential sources of discharge water include:

- Non-contact groundwater pumped from wells and collected from drain holes;
- Contact water (residual passive inflow) from the Goldrush project;
- Stormwater collected on the portal pad and from other surface facilities (e.g., fuel bay).

The groundwater around the mine naturally exceeds NDEP Bureau of Mining Regulation and Reclamation Profile I reference values for arsenic, manganese, iron, pH, and occasionally antimony. These constituents require removal/reduction before the water reaches the groundwater aquifer. Attenuation during infiltration in the RIBs will remove these elevated constituents prior to reaching the water table. Contact water is managed in the Cortez contact water management system. Treatment of contact water collected within the mine is being evaluated for reuse in underground drilling and equipment.

18.7 Water Supply

18.7.1 Current Operations

Consumptive water use for mining (open pit and underground) and processing is supplied by the mine dewatering wells. Potable water is sourced from bottled water or existing water supply wells in accordance with applicable Nevada Bureau of Safe Drinking Water standards.

18.7.2 Goldrush

All of the water supply will need to be derived from groundwater. Airlift testing of exploration boreholes within the Horse Creek drainage indicated numerous locations where sustained flow rates in excess of 0.38 m³/min were observed. Two production wells in Horse Canyon and a nearby Willow Springs well indicate that there is a readily-available local water supply that can be developed for use during the construction phase of the Project. Water rights have been granted that will meet the needs of the Project.

The predicted annual-average dewatering rates are projected to be up to approximately 17 m³/min with a minimum of approximately 5.5 m³/min during the final year of mining (SRK 2019). Therefore, during operation, the mine dewatering system should be able to provide a sufficient water supply for the project requirements. Prior to the start of dewatering, water will be supplied from the existing production wells, or from newly constructed wells, for dust suppression and drilling. After the cessation of dewatering operations, a supplemental water supply will be required for completion of mine closure.

18.8 Built Infrastructure

No additional infrastructure is required to complete the surface mine plan at Crossroads or Pipeline. The following is currently being completed near the Cortez Pits site and is scheduled to be finalized in 2022:

- 75,700 L fuel skid to support the mining operations;
- Moving the metal removal plant from its current location at the Cortez Hills underground location to the range-front declines, outside the surface mining area;
- Installing an overhead silo for ANFO, and two ground mounted silos for emulsion;
- Extending existing power lines to the area to support electric shovel

As noted in Section 18.1.2, the Goldrush project will use the existing office, shop, and warehouse facilities located at the Cortez Hills Open Pit administration complex.

18.9 Camps and Accommodation

There are no accommodation facilities on site. Most personnel reside in nearby cities along the Interstate 80 corridor. The JD Lodge is an accommodation facility located about 30 km to the east-southeast of the Cortez Hills Open Pit that is sometimes used by contractors during projects and on occasion by NGM staff completing seasonal field work.

18.10 Power and Electrical

Electrical power is obtained from the grid and generated from the Western 102 and TS power plant (which is owned and operated by NGM) with transmission by NV Energy. Power is purchased on a wholesale basis using dedicated buyers. The load is predicted on an hourly basis and the Western 102 and TS supply is used to balance the load. The Western 102 and TS plant delivers power to NGM operations at Cortez, Carlin, and Turquoise Ridge.

Electric power is provided to the Cortez site by NV Energy via an approximately 80 km long radial transmission line originating at their Falcon substation. The incoming NV Energy line terminates at the Barrick-owned Pipeline Substation, Crossroads Substation, F Canyon Substation, Cortez Hills Substation, and South Pipeline Capacitor Station.

- Approximately nine miles of extension to serve the Cortez Hills development;
- Approximately three miles of extension to serve the South Pipeline and Crossroads pits.

The current load for the Cortez Complex has a peak of 45 MW. The current transmission line has the capacity for 55 MW, and with the addition of capacitors and switching station, the capacity of the line could be increased to 78 MW, but for any expansion beyond 78 MW, additional transmission capacity will be required.

The Cortez Complex currently has 55 MW of network integrated transmission service from NV Energy for the delivery of capacity and energy from the Midpoint 345 kV and Dove 120 kV points of receipt. The Cortez Complex also has a Distribution Service agreement with NV Energy to a level of 55 MW. NGM purchases power from the western electric grid for delivery to Midpoint at 345 kV.

The Goldrush project is expected to require 18 MW of power, which will be sourced from the Wells Rural Electric Company. The operations will use a new 120-kV transmission line and 13.8-kV distribution system. An application for service was filed with the Wells Rural Electric Company and a new electric power service agreement for 28 MV load service was executed on June 15, 2020. The Wells Rural Electric Company is a full requirement customer of the Bonneville Power Authority and will use transmission lines owned by NV Energy to deliver the required energy to the Goldrush project. The Wells Rural Electric Company is in the process of building their own power transmission infrastructure to serve Goldrush with permanent power, and this system is projected to be in operation by the end of 2023.

Emergency power for critical loads will be provided by stand-by diesel engine-driven generators.

18.11 QP Comments on “Item 18: Project Infrastructure”

Infrastructure requirements to support the LOM plan are well understood. The necessary infrastructure to support surface mining operations is in place, or is scheduled for completion in 2022. A total of US\$4.3 million is budgeted to complete the surface work near Cortez Pits to commence mining in 2022. Infrastructure necessary for the Goldrush project is included in the Goldrush PoO.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

No market studies are currently relevant as the Cortez Complex consists of active mining operations producing a readily-saleable commodity in the form of doré. Gold is freely traded, at prices that are reported daily by reputable trading facilities such as the London Metals Exchange.

NGM has contract agreements with two refineries for doré refining. The terms contained within the existing sales contracts are typical and consistent with standard industry practices and are similar to contracts for the supply of doré elsewhere in the world.

19.2 Commodity Price Projections

Commodity prices used in Mineral Resource and Mineral Reserve estimates are set by Barrick, as operator of the NGM JV. The current gold price provided for Mineral Reserve estimation is US\$1,200 per troy ounce. The gold price used for Mineral Resource estimation is US\$1,500 per troy ounce.

19.3 Contracts

The Cortez Complex is a large modern operation and NGM is owned by major international firms with policies and procedures for the letting of contracts. NGM has many supply contracts in place for goods and services required to operate the open pit, underground mines and integrated processing facilities. Contracts are negotiated and renewed as needed. Contract terms are within industry norms, and typical of similar contracts in Nevada with which NGM is familiar. The contracts for smelting and refining are normal contracts for a large producer. There are no contracts related to the Cortez Complex which, in and of themselves, are material to NGM.

19.4 QP Comments on “Item 19: Market Studies and Contracts”

The QP notes:

- The terms contained within the sales contracts are typical and consistent with standard industry practice, and are similar to contracts for the supply of doré elsewhere in the world;
- Metal prices used in this study have been set by NGM management and are appropriate to the commodity and mine life projections.

The QP has reviewed commodity pricing assumptions, marketing assumptions and the current major contract areas, and considers the information acceptable for use in estimating Mineral Reserves and in the economic analysis that supports the Mineral Reserves.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Baseline and Supporting Studies

Baseline and environmental studies were completed to support permitting of current operations. Current disturbance in the Cortez Complex area is associated with open pits, WRSFs, roads, heap leach pads, and mill and tailings facilities.

The Goldrush project is situated in a culturally- and biologically-sensitive area, with numerous cultural sites and within greater sage grouse habitat. Major study areas in support of the planned mining operation include air quality, water quality and consumption, hazardous material and solid waste, noise, waste rock characterization, geochemical characterization at closure, soils, biological resources, wildlife, special status species, visual and cultural resources, Native American Traditional Values, social and economic values, and environmental justice.

20.2 Environmental Considerations/Monitoring Programs

NGM uses an ISO14001 certified Environmental Management Systems (EMS). The individual components of the EMS are reviewed and updated as needed or at minimum an annual basis. Cortez is externally audited against the ISO 14001 standard and EMS policy. Every three years, the certification is renewed. Environmental incidents are noted in a register which forms part of the EMS. Causes and responses are identified, and once completed, the incident is closed out.

The Cortez Complex is operating in compliance in all material respects with all applicable regulations and permit requirements as required by the BLM and the Nevada Department of Environmental Protection (NDEP). Environmental Management Plans will continue to be complied with during operations and closure.

The primary ongoing reclamation project in the Cortez Complex is the partial backfill and placement of waste rock for construction for the Cortez Hills open pit buttress. Multiple environmental studies and reports have been produced or are underway to support the ongoing permitting and environmental analysis for Goldrush, Robertson, and Cortez Pits.

20.3 Closure and Reclamation Plans

Closure and reclamation strategies and methods for the project remain in accordance with the approved Plans of Operations, as amended, and the Reclamation Permit Application. With the exception of pit highwalls, ramps, and floors; post-reclamation stormwater control features; rerouted county roads (e.g., CR 225); and roads selected by BLM for post-mining use, all of the surface disturbance associated with the mine components would be reclaimed.

The Cortez Complex closure costs are updated each year, with increases or decreases in disturbed areas noted and costed; the current cost for NGM to complete rehabilitation and closure of the mine according to the calculation model is approximately US\$183 million for the entire site.

In addition, NGM is required to maintain a reclamation surety bond for the Cortez Complex to guarantee completion of reclamation and closure activities. The bond is updated on a three year cycle and revised as needed based on permit modifications or completed rehabilitation activities. The bond amount is subject to review and approval by the BLM and NDEP-BMRR, and is currently approximately US\$279 million.

The Goldrush project will require development of a temporary closure plan, a tentative plan for permanent closure/interim closure plan, a plan of operations that includes a reclamation plan and reclamation surety estimate, and a plan for monitoring the post-closure stability of the site. Additionally, at least two years prior to the initiation of closure, NGM must prepare and submit a final plan for permanent closure under terms of their water pollution control permit (WPCP) and NAC 445A.447. A financial surety must be provided in the form of a performance bond or other instrument suitable to construct, operate, and guarantee completion of reclamation and closure activities. A long-term funding mechanism is anticipated, based on existing mine activities in the Cortez District and elsewhere in the state. The BLM will generally require an estimate of long-term liabilities associated with the holding and monitoring of post-closure mine features. This calculation will include funds for identifiable post-closure contingencies. An estimate for this funding instrument will be developed in consultation with NGM, using existing operations as analogs and adjusting for predicted monitoring requirements.

20.4 Permitting

20.4.1 Current Operations

NGM maintains many permits for the operation of the Cortez mining operations. These compliance permits cover areas such as air quality, water rights, water management and quality, wastewater treatment, tailings storage, hazardous materials storage, drinking water, petroleum contaminated soils, and land reclamation. NGM also maintains a legal obligation register to track permitting and ensure on-going compliance. Permit applications and renewals are undertaken as required. As of the end of December 2021, all permits for active mining operations were in compliance.

20.4.2 Goldrush

The Goldrush project will need the permits and authorizations outlined in Table 20-1. This table assumes off-site transport of ore for processing at Goldstrike and Gold Quarry.

The Goldrush Plan of Operations (PoO) is currently moving through the NEPA process. At the Report effective date, the Draft Environmental Impact Statement (DEIS) was undergoing final reviews by the District, State, and Federal BLM offices before being made available for a public review and comment period. Comments received will then be addressed in the Final Environmental Impact Statement (FEIS) followed by another public review period. The Record of Decision (ROD) on the Goldrush PoO is currently expected in the second half of 2022.

Table 20-1: Major Permits and Approvals, Goldrush

Permit or Approval	Granting Agency
Plan of Operations, EIS ROD	U.S. Department of the Interior, BLM
Reclamation Permit	NDEP-BMRR
Historic Properties Treatment Plan (HPTP)	BLM and State Historic Preservation Office (SHPO)
Explosives Permit	U.S. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms
Review of jurisdictional determinations for CWA Section 404 permitting	US Army Corps of Engineers (USACE), Environmental Protection Agency (EPA)
Surface Disturbance Permit Class II Operating Permit	Nevada (NV) Department of Conservation and Natural Resources (NV DCNR), NDEP, Bureau of Air Pollution Control, EPA
WPCPs	NV DCNR, NDEP, BMRR
Approval to dispose of solid waste authorized at Cortez Sanitary Landfill (Class III Waiver)	NV DCNR, NDEP, Bureau of Waste Management
EPA Identification Number from Cortez Mine will be utilized	NV DCNR, NDEP, Bureau of Waste Management
General Discharge Permit (stormwater)	NDEP, Bureau of Water Pollution Control
Permit to Operate, NRS 519A.250	Nevada State Minerals Commission, Division of Minerals
Status and production of all mining and exploration projects, NRS 519A.260	Nevada State Minerals Commission, Division of Minerals
USFWS Avian Protection Plan/Take Permit	USFWS
Working in Waters Permit	NV DCNR, NDEP, Bureau of Water Pollution Control
Water Rights Change in Point of Use and Point of Diversion, new appropriations	NV DCNR, NDWR
Hazardous Materials Permit	NV Department of Public Safety-NV State Fire Marshall
Liquefied Petroleum Gas	NV Board for the Regulation of Liquefied Petroleum Gas
Solid and Universal Waste Management (batteries, electric fluorescent lamps)	NV DCNR, NDEP, Bureau of Waste Management
Develop Obligation Register	Internal NGM Requirement

Additional permitting will be required to mine the entirety of the Goldrush Mineral Reserves. Similarly, additional permitting will be required to increase the LOM waste tonnage to mine the entirety of the reserves.

There is sufficient time to complete any additional permitting efforts since the mine plan, based on Mineral Reserves only, currently extends to 2042.

20.5 Considerations of Social and Community Impacts

NGM is a prominent local business that applies industry best practices when it comes to social and community engagement standards at each operation. Stakeholder engagement activities, community development projects and local economic development initiatives contribute to the maintenance and strengthening of NGM's Social License to Operate. NGM's corporate social responsibility standard includes a social engagement plan, stakeholder matrices, and a formal grievance process. These items are regularly updated and maintained to ensure adequacy and relevance for each area of operation.

The Cortez Complex operates on lands traditionally inhabited by the Western Shoshone, and as such, NGM puts forth an immense amount of effort to demonstrate respect for indigenous cultural resources, including placing emphasis on environmental stewardship. These efforts are reflected in the 2020 Collaborative Agreement between NGM and the partner Tribes/Bands, as well as in the 2018 Programmatic Agreement governing the consultation process for exploration and mining activities potentially impacting cultural or historic resources.

NGM also works to further educate the workforce on cultural awareness in our operating communities and around the mine sites. These efforts include an annual Cultural Awareness training that is required for all NGM employees. This training focuses on the history of Native American Tribes in the area, the background of Native American Affairs programming, and Native American challenges and policies and procedures following the discovery of artifacts. The cultural awareness video was produced in collaboration with NGM partner Tribes to ensure accuracy of information.

In addition to mandated regulatory processes, NGM's Corporate Social Responsibility (CSR) department maintains a regular program of engagements with local government, community members, local organizations and other stakeholders associated with projects under development and in operation. This program includes meeting these stakeholders in both formal and informal settings, which provide opportunities to gain a greater understanding of concerns and opinions related to NGM projects and operations.

As the Goldrush project develops, NGM will hold community meetings to allow community members in surrounding areas the opportunity to learn about the project and express their support or concerns. NGM may also share employment growth projections with local government and organizations if needed for local planning purposes.

NGM also strives to maintain a positive, open relationship with the local media. Historically, NGM has been proactive in initiating coverage of projects, expansions or changes in operations or

processes. As deemed appropriate, the NGM Communications Group will engage the media for coverage about this project.

NGM's CSR Department has organized several tours for members of the Western Shoshone Cultural Advisory Group and the Battle Mountain Band Tribal Elders, along with elected officials, to visit the Goldrush portals. As the Robertson open pit develops, there is a potential to offer tours of this property as well. Updates on the projects are also provided at the Western Shoshone quarterly dialogue meetings. NGM's CSR Department and Cortez District Management have regular meetings with the community of Pine Valley, Lander, Eureka and Humboldt County Commissioners and the Crescent Valley Town Advisory Board to provide project updates.

20.6 QP Comments on “Item 20: Environmental Studies, Permitting, and Social or Community Impacts”

NGM is familiar with the permitting and environmental regulations in Nevada and has experience with permitting projects in the jurisdiction.

The QP notes:

- Community impacts associated with the proposed Goldrush project include:
 - Mine development and operation would maintain (and potentially increase) local employment and tax revenues;
 - Ore hauling and/or processing options would increase water consumption by mine operations, generate air emissions that would require mitigating controls, increase truck traffic over area roadways, and disturb grounds with potential cultural resources and/or wildlife habitat;
 - Dewatering operations would increase the extent of groundwater drawdown and may require mitigation controls to address potential impacts to groundwater resources, surface water resources, and/or riparian habitat and associated existing uses.

21.0 CAPITAL AND OPERATING COSTS

21.1 Introduction

Capital and operating costs for the Cortez Complex are based on the experience gained in the many years of operating at these mines. Sustaining (replacement) capital costs reflect current price trends. Operating costs are in line with historical data.

21.2 Capital Costs

Based on only Mineral Reserves, the total capital expenditure in the current LOM plan is US\$2,019.7 million (on a 100% basis). The capital costs for the Cortez Complex were developed and revised on an annual basis as part of the budget cycle. The LOM capital plan is shown in Table 21-1.

The capital costs include ongoing sustaining capital as well as capital for the expansion for some of the facilities. The scope of the capital costs for the mine is appropriate.

The following are excluded from the capital cost estimate:

- Project financing and interest charges;
- Income or federal taxes;
- Import duties and custom fees;
- Working capital; and
- Sunk costs.

21.3 Operating Costs

The total operating costs were estimated for the Cortez Complex based on historical costs, and the LOM plan for mining and processing activities.

Consumable prices such as diesel fuel, cement, bolts, were updated as needed throughout the year within quarterly forecasts and annual budgets. Costs per tonne are broken down into open pit mining costs, underground mining, and processing. Based on Mineral Reserves only, mining costs are shown in Table 21-2, and process costs by facility in Table 21-3.

Table 21-1: LOM Capital Cost Estimate

Year	Sustaining Capital (US\$ M)	Open Pit Stripping (US\$ M)	Underground Development (US\$ M)	Capitalized Exploration (US\$ M)	Total Capital (US\$ M)
2022	\$181.4	\$195.0	\$55.4	\$10.5	\$442.3
2023	\$101.2	\$99.7	\$64.3	\$6.5	\$271.7
2024	\$95.7	\$167.6	\$28.8	\$6.2	\$298.3
2025	\$72.2	\$0.0	\$55.8	\$6.8	\$134.8
2026	\$118.8	\$0.0	\$42.6	\$6.2	\$167.6
2027	\$64.9	\$0.0	\$57.5	\$2.9	\$125.3
2028	\$42.5	\$0.0	\$38.0	\$2.0	\$82.5
2029	\$34.0	\$0.0	\$26.7	\$2.2	\$62.9
2030	\$24.4	\$0.0	\$35.2	\$0.5	\$60.1
2031	\$34.8	\$0.0	\$32.6	\$0.4	\$67.8
2032	\$35.3	\$0.0	\$38.3	\$0.5	\$74.1
2033	\$8.8	\$0.0	\$31.6	\$0.1	\$40.5
2034	\$15.1	\$0.0	\$33.7	\$0.1	\$48.9
2035	\$16.0	\$0.0	\$25.0	\$0.2	\$41.2
2036	\$12.3	\$0.0	\$20.4	\$0.1	\$32.8
2037	\$24.1	\$0.0	\$18.4	\$0.1	\$42.6
2038	\$7.3	\$0.0	\$0.2	\$0.2	\$7.7
2039	\$8.4	\$0.0	\$0.0	\$0.1	\$8.5
2040	\$5.9	\$0.0	\$0.0	\$0.0	\$5.9
2041	\$4.2	\$0.0	\$0.0	\$0.0	\$4.2
2042	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Totals	\$907.3	\$462.3	\$604.5	\$45.6	\$2,019.7

Note: Costs are presented on a 100% basis. Numbers have been rounded and may not sum due to rounding. Figures for sustaining capital, underground development, capitalized exploration and total capital includes the development of Goldrush.

Table 21-2: LOM Mining Costs

Year	Units	Open Pit	Cortez Hills Underground	Goldrush Underground
2022	US\$/t mined (ore and waste)	1.95	71.91	106.70
2023	US\$/t mined (ore and waste)	1.90	64.89	110.68
2024	US\$/t mined (ore and waste)	2.04	61.83	92.80
2025	US\$/t mined (ore and waste)	2.76	62.51	77.45
2026	US\$/t mined (ore and waste)	2.07	63.70	75.53
2027	US\$/t mined (ore and waste)	—	64.62	79.46
2028	US\$/t mined (ore and waste)	—	67.03	77.70
2029	US\$/t mined (ore and waste)	—	59.71	77.14
2030	US\$/t mined (ore and waste)	—	67.24	65.74
2031	US\$/t mined (ore and waste)	—	—	70.01
2032	US\$/t mined (ore and waste)	—	—	76.16
2033	US\$/t mined (ore and waste)	—	—	72.24
2034	US\$/t mined (ore and waste)	—	—	70.75
2035	US\$/t mined (ore and waste)	—	—	66.68
2036	US\$/t mined (ore and waste)	—	—	72.55
2037	US\$/t mined (ore and waste)	—	—	75.23
2038	US\$/t mined (ore and waste)	—	—	75.48
2039	US\$/t mined (ore and waste)	—	—	75.27
2040	US\$/t mined (ore and waste)	—	—	73.87
2041	US\$/t mined (ore and waste)	—	—	76.20
2042	US\$/t mined (ore and waste)	—	—	61.16

Note: Costs are presented on a 100% basis. Tonnes are metric tonnes. Numbers have been rounded and may not sum due to rounding.

Table 21-3: LOM Processing Costs per Tonne Processed by Facility

	GQ Roaster	GS Roaster	Cortez Mill	Cortez Leach
US\$/t	32.59	19.57	9.76	2.25

Note: Costs are presented on a 100% basis. Tonnes are metric tonnes. GQ = Gold Quarry, GS = Goldstrike.

LOM annual operating costs were prepared by NGM based upon the current LOM plan. The QPs consider the operating cost estimates in the LOM plans to be reasonable and consistent with historical performance.

For the Goldrush project, operating cost estimates were related to unit rates of production or direct costs to be applied to the financial model. Mining costs were based on a series of detailed costing packages obtained in 2017 and escalated to current using a 10% escalation factor, and on actual rates from the nearby Cortez Hills underground mine. Where applicable these rates were adjusted to account for the change in mobile equipment specification at the Goldrush project or key dimensions such as stope size. General and administrative costs were benchmarked to the Cortez Hills underground mine.

21.4 QP Comments on “Item 21: Capital and Operating Costs”

The QPs have reviewed the capital and operating cost provisions for the LOM plan that supports Mineral Reserves and considers that the basis for the estimates that include mine budget data, vendor quotes, and operating experience, is appropriate to the known mineralization, mining and production schedules, marketing plans, and equipment replacement and maintenance requirements.

Appropriate provision has been made in the estimates for the expected mine operating usages including labour, fuel and power and for closure and environmental considerations.

Capital cost estimates include appropriate sustaining estimates.

22.0 ECONOMIC ANALYSIS

Under NI 43-101, producing issuers may exclude the information required for Section 22 Economic Analysis on properties currently in production, unless the technical report includes a material expansion of current production. This section is not required as Barrick is a producing issuer, the operations are currently in production, and there is no material expansion of current production planned.

NGM performed an economic analysis of the Cortez Complex using the assumptions and Mineral Reserve estimates presented in this Report and verified that the outcome is a positive cash flow that confirms the economic viability of the Mineral Reserves.

23.0 ADJACENT PROPERTIES

This section is not applicable for this Technical Report.

24.0 OTHER RELEVANT DATA AND INFORMATION

This section is not applicable for this Technical Report.

25.0 INTERPRETATION AND CONCLUSIONS

25.1 Introduction

The QPs note the following interpretations and conclusions, based on the review of data available for this Report.

25.2 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

The Cortez Complex covers an area of about 36,096 ha in a total of 5,137 lode, millsite, patented and placer claims located within the Plan of Operations (PoO) area.

Surface rights are either held by NGM outright, or administered by the BLM. There are sufficient surface rights to support the LOM plan assumptions for the individual mines within the Cortez Complex.

Water rights have been and are projected to be sufficient to support all future mining activities. NGM also maintains additional consumptive rights with other manners of use that can be made available to the mine operation if deemed necessary.

The PoO is broken up into six distinct royalty regions, with different royalties payable to third-parties on different deposits. Royalty types include gross value royalties, net value royalties, gross smelter return royalties, and net smelter return royalties. Royalty payments vary, as the payments depend upon actual tonnages mined, the amount of gold recovered from that mined material, the deposit being mined, the receiving entity, and the type of royalty.

In connection with the formation of NGM, each of Barrick and Newmont was granted a 1.5% net smelter returns royalty over the respective properties they contributed to the NGM JV. Each of these “retained royalties” is only payable once the aggregate production from the properties subject to the royalty exceeds the publicly-reported Mineral Resources and Mineral Reserves as of December 31, 2018.

State royalties are also payable.

A number of agreements exist with federal, state, and third-party entities and these are monitored using a land management database.

25.3 Geology and Mineralization

The deposits that comprise the Cortez Complex are considered to be examples of Carlin-style carbonate-hosted disseminated gold–silver deposits and intrusion-related gold deposits.

The geological understanding of the settings, lithologies, and structural and alteration controls on mineralization in the different zones is sufficient to support estimation of Mineral Resources and Mineral Reserves. The geological knowledge of the area is also considered sufficiently acceptable to reliably inform mine planning.

The mineralization style and setting are well understood and can support declaration of Mineral Resources and Mineral Reserves.

Exploration potential exists adjacent to many of the deposits, along strike and at depth along favorable mineralized structures and within the favorable host lithologies. NGM continues to actively explore in the immediate and near-mine areas. Multiple opportunities also exist in the district to discover additional mineralization.

25.4 Exploration, Drilling and Analytical Data Collection in Support of Mineral Resource Estimation

The exploration programs completed to date are appropriate for the style of the mineralization within the Cortez Complex area.

Drill orientation and spacing are adequate for characterizing mineralization controls.

Sampling methods, sample preparation, analysis and security conducted prior to Barrick/NGM's interest in the operations were in accordance with exploration practices and industry standards at the time the information was collected. Current NGM sampling methods are acceptable for Mineral Resource and Mineral Reserve estimation. Sample preparation, analysis and security for the NGM programs are currently performed in accordance with general industry standards.

The quantity and quality of the lithological, geotechnical, collar and down-hole survey data collected during the exploration and delineation drilling programs are sufficient to support Mineral Resource and Mineral Reserve estimation. The collected sample data adequately reflect deposit dimensions, true widths of mineralization, and the style of the deposits. Sampling is representative of the gold mineralization and grade, reflecting areas of higher and lower grades.

Density measurements are considered to provide acceptable density values for use in Mineral Resource and Mineral Reserve estimation.

The sample preparation, analysis, quality control, and security procedures in use at the Cortez Complex have changed over time to meet evolving industry practices. Practices at the time the information was collected were industry-standard, and frequently were industry-leading practices. The sample preparation, analysis, quality control, and security procedures are sufficient to provide reliable data to support estimation of Mineral Resources and Mineral Reserves.

The QA/QC programs adequately address issues of precision, accuracy and contamination. Modern drilling programs typically included blanks, duplicates and standard samples. QA/QC submission rates meet industry-accepted standards.

The QP personally visited and reviewed each Cortez site in December 2021.

Validation checks are performed by NGM operations personnel on data used to support estimation and consists of checks on surveys, collar coordinates, lithology data (cross-checking from photographs), and assay data. Errors noted are rectified in the database prior to data being flagged as approved for use in resource estimation.

Reviews performed by external consultants were undertaken in support of acquisitions, support of feasibility-level studies, and in support of technical reports, producing independent

assessments of the database quality. No significant problems with the database, sampling protocols, flowsheets, check analysis program, or data storage were noted.

The QP has reviewed the reports and is of the opinion that the data verification programs completed on the data collected from the Project are consistent with industry best practices and that the database is sufficiently error-free to support the geological interpretations and Mineral Resource and Mineral Reserve estimation, and mine planning.

25.5 Metallurgical Testwork

Industry-standard studies were performed as part of process development and process designs. Subsequent production experience and focused investigations guided mill alterations and process changes. Testwork programs, both internal and external, continue to be performed to support current operations and potential improvements. From time to time, this may lead to requirements to adjust cut-off grades, modify the process flowsheet, or change reagent additions and facility parameters to meet quality, production, and economic targets.

Samples selected for testing were representative of the various types and styles of mineralization. Samples were selected from a range of depths and spatial orientation within the deposit. Sufficient samples were taken so that tests were performed on relevant sample mass.

Recovery factors estimated are based on appropriate metallurgical testwork and are appropriate to the mineralization types and the selected process routes. Gold recovery is a function of the processing method (e.g., heap leaching, CIL, roasting, and arsenic concentration for refractory ore) and the lithology of the mineralization being processed. As applicable, recovery estimates may include consideration of the head grade, cyanide-soluble gold to fire assay gold ratio, sulfide sulfur concentration, total organic carbon concentration, and silica concentration.

The process throughput and associated recovery factors are considered appropriate to support Mineral Resource and Mineral Reserve estimation, and mine planning.

Depending upon the specific processing facility, several processing factors or deleterious elements could have an economic impact on extraction efficiency of a certain ore source, based either on the presence, absence, or concentration of the following constituents in the processing stream: organic carbon, sulfide sulfur, carbonate carbon, arsenic, mercury, antimony, copper. However, under normal ore routing and blending practices at NGM where material from several sites may be processed at one facility, the above list of constituents is typically not a concern.

25.6 Mineral Resource Estimates

NGM has a set of protocols, internal controls, and guidelines in place to support the Mineral Resource estimation process.

All mineralogical information, exploration boreholes and background information were provided to the estimators by the geological staff at the mines or by exploration staff.

Mineral Resources are reported using the 2014 CIM Definition Standards. Mineral Resources are reported on a 100% basis. Barrick owns a 61.5% JV interest, with Newmont owning the remaining 38.5% JV interest.

Factors that may materially impact the Mineral Resource estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralization geometry and continuity of mineralized zones; changes to geological shape and continuity assumptions; changes to grade estimation methods and parameters; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the input assumptions used to derive the pit shell used to constrain the open pit estimates; changes to the input assumptions used to derive the mineable shapes used to constrain the underground estimates; changes to the marginal cut-off grade assumptions used to constrain the estimates; variations in geotechnical, hydrogeological and mining assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

25.7 Mineral Reserve Estimates

Mineral reserves were converted from Measured and Indicated Mineral Resources. Inferred Mineral Resources were set to waste.

All current Mineral Reserves will be exploited using open pit mining methods, underground mining methods, or are in stockpiles. Mineral Reserves amenable to open pit mining methods were estimated assuming open pit methods with conventional methods for drilling, blasting, loading with hydraulic shovels and haulage by large trucks. Mineral Reserves amenable to underground mining methods were estimated assuming conventional stoping methods. Mineral Resources were converted to Mineral Reserves using a detailed mine plan, an engineering analysis, and consideration of appropriate modifying factors. Modifying factors include the consideration of dilution and ore losses, open pit and underground mining methods, metallurgical recoveries, permitting and infrastructure requirements.

Mineral Reserves are reported using the 2014 CIM Definition Standards. Mineral Reserves are reported on a 100% basis. Barrick owns a 61.5% JV interest, with Newmont owning the remaining 38.5% JV interest.

Factors that may materially affect the Mineral Reserve estimates include: changes to long-term gold price assumptions; changes in local interpretations of mineralisation geometry and continuity of mineralised zones; changes to geological shape and continuity assumptions; changes to metallurgical recovery assumptions; changes to the operating cut-off assumptions for open pit and underground mining methods; changes to the marginal cut-off grade assumptions used to constrain the estimates; geotechnical and design parameter changes impacting dilution and mining recovery factors; potential for lower mill recovery in new mining areas or from long-term stockpiles; fluctuations in commodity price and exchange rates; and mining cost assumptions; changes to environmental, permitting and social license assumptions; and changes to the current regulatory regime.

25.8 Mining Methods

The Mineral Reserves are contained within three open pit deposits (Pipeline, Crossroads, Cortez Pits), three zones at the Cortez Hills Underground deposit (Middle Zone, Lower Zone, and Deep South), five zones at the Goldrush underground deposit (Red Hill, Crow's Nest, 3 ½, Ranch, Meadow), and surface stockpiles.

The open pit mine is a conventional operation that currently has off-highway haul trucks that are loaded by one hydraulic shovel and five electric shovels.

Cortez Hills Underground is a mechanized decline access underground mine based upon the mining of up to 4,700 t/d of ore and waste. The Middle Zone is being exploited using cut-and-fill mining methods and minor amounts of longhole stoping; while the Lower and Deep South Zones are planned to be mined by longhole stoping.

Goldrush underground is a mechanized decline access underground mine with intensive lateral development required to open up the orebody. The primary mining method will be longhole stoping with minor amounts of cut-and-fill where the orebody geometry does not allow for longhole stopes.

The mining methods and equipment are considered to be suitable for the deposits.

25.9 Recovery Methods

The process facilities designs were based on a combination of metallurgical testwork, previous study designs, and previous operating experience. The designs are generally conventional to the gold industry and have no novel parameters.

25.10 Infrastructure

The majority of the key infrastructure to support the mining activities envisaged in the LOM is in place. New infrastructure will be required to support proposed operations at Goldrush.

A stockpiling strategy is practiced to defer lower-grade ores to the end of mine life.

There is sufficient capacity in the heaps, WRSFs and TSFs for LOM planning purposes.

The current water sources, assuming similar climate conditions to those experienced by the operations in the past, will be sufficient for the LOM plan.

The current water management practices are expected to be applicable for the LOM plan.

The existing infrastructure, staff availability, existing power, water, and communications facilities, and the methods whereby goods are transported to the mine are all in place and well-established, and can support the estimation of Mineral Resources and Mineral Reserves. Requirements for additional infrastructure to support the proposed operations at Goldrush and Robertson are well understood.

Personnel commute from surrounding settlements.

25.11 Environmental, Permitting and Social Considerations

25.11.1 Environmental Considerations

NGM maintains an ISO 14001-certified EMS and implements additional operational controls and any prescribed monitoring and reporting requirements. All of these are maintained in compliance with the EMS.

25.11.2 Closure

The approach of the site's closure plan is consistent with the Nevada reclamation permit application form that has been determined acceptable to the BLM for their plans of operations in accordance with the Memorandum of Understanding between the BLM, the Nevada Division of Environmental Protection, and the United States Forest Service. NGM has developed a temporary closure plan, a tentative plan for permanent closure, an interim closure plan, a reclamation plan and reclamation surety estimate, and a plan for monitoring the post-closure stability of the site.

The Cortez Complex closure costs are updated each year, with increases or decreases in disturbed areas noted and costed; the current cost for NGM to complete rehabilitation and closure of the mine according to the calculation model is approximately US\$183 million for the entire site.

The Goldrush project will require development of a temporary closure plan, a tentative plan for permanent closure/interim closure plan, a plan of operations that includes a reclamation plan and reclamation surety estimate, and a plan for monitoring the post-closure stability of the site.

25.11.3 Permitting

NGM maintains many permits for the operation of the mine complexes. These compliance permits cover areas such as air quality, water rights, water management and quality, wastewater treatment, tailings storage, hazardous materials storage, drinking water, petroleum contaminated soils, and land reclamation. NGM also maintains a legal obligation register to track permitting and ensure on-going compliance. Permit applications and renewals are undertaken as required. As of the end of December 2021, all permits for active mining operations were in compliance.

The Goldrush Plan of Operations (PoO) is currently moving through the NEPA process. At the Report effective date, the Draft Environmental Impact Statement (DEIS) is undergoing final reviews by the District, State, and Federal BLM offices before being made available for a public review and comment period. Comments received will then be addressed in the Final Environmental Impact Statement (FEIS) followed by another public review period. The Record of Decision (ROD) on the Goldrush PoO is currently expected in the second half of 2022.

NGM's Permitting Group and Environmental Group lead discussions with the BLM and Nevada Division of Environmental Protection to acquire the necessary Federal and State permits as needed.

It is possible for legal challenges and administrative challenges to occur during the public portions of major Federal and State permitting processes. NGM's project budgets always include appropriate legal resources to address development and litigation of all permitting actions.

25.11.4 Social Considerations

NGM is a prominent local business that applies industry best practices when it comes to social and community engagement standards at each operation. Stakeholder engagement activities, community development projects and local economic development initiatives contribute to the maintenance and strengthening of NGM's Social License to Operate.

The Cortez Complex operates on lands traditionally inhabited by the Western Shoshone, and as such, NGM puts forth an immense amount of effort to demonstrate respect for indigenous cultural resources, including placing emphasis on environmental stewardship. These efforts are reflected in the 2020 Collaborative Agreement between NGM and the partner Tribes/Bands, as well as in the 2018 Programmatic Agreement governing the consultation process for exploration and mining activities potentially impacting cultural or historic resources.

NGM's Corporate Social Responsibility (CSR) vision is to work together with host communities to leave a sustained positive contribution to the regions in which the joint venture operates. The CSR envisions that communities will benefit from increased economic participation and a strong, diversified, local economy. In addition, the CSR contemplates that NGM will relinquish its land and liability in a manner that is aligned with evolving community expectations and will be the partner of choice for new opportunities.

25.12 Market Studies and Contracts

No market studies are currently relevant as the Cortez Complex consists of active mining operations producing a readily-saleable commodity in the form of doré.

Commodity prices used in Mineral Resource and Mineral Reserve estimates are set by Barrick. The current gold price provided for Mineral Reserve estimation is US\$1,200 per troy ounce. The gold price used for Mineral Resource estimation is US\$1,500 per troy ounce.

The Cortez Complex is a large modern operation and NGM is owned by major international firms with policies and procedures for the letting of contracts. NGM has many supply contracts in place for goods and services required to operate the open pit, underground mines and integrated processing facilities. Contracts are negotiated and renewed as needed. Contract terms are within industry norms, and typical of similar contracts in Nevada with which NGM is familiar. The contracts for smelting and refining are normal contracts for a large producer. There are no contracts related to the Cortez Complex which, in and of themselves, are material to NGM.

25.13 Capital Cost Estimates

Capital costs for the Cortez District are based on the experience gained in the many years of operating at these mines. Sustaining (replacement) capital costs reflect current price trends.

Based on Mineral Reserves only, the total capital expenditure in the current LOM plan is US\$2,019.7 million. The capital costs for Cortez are developed and revised on an annual basis as part of the budget cycle.

The capital costs include ongoing sustaining capital as well as capital for the expansion for some of the facilities. The scope of the capital costs for the mine is appropriate.

25.14 Operating Cost Estimates

Operating costs for the Cortez District are based on the experience gained in the many years of operating at these mines.

The total operating costs were estimated for the Cortez Complex based on historical costs, and the LOM plan for mining and processing activities based on Mineral Reserves only. Consumable prices such as diesel fuel, cement, bolts, are updated as needed throughout the year within quarterly forecasts and annual budgets.

For Goldrush, operating cost estimates were taken from the 2021 Feasibility Study. Costs on a US\$/t basis for total tonnes mined (ore and waste) include:

- Open pit mining costs: range from US\$1.90–2.76/t mined for the remaining open pit mine life;
- Cortez Hills underground mining costs: range from US\$59.71–71.91/t mined for the remaining underground mine life;
- Goldrush underground mining costs: range from US\$61.16–110.68/t mined for the underground mine life.

Processing costs vary by destination facility:

- Gold Quarry roaster: US\$32.59/t processed;
- Goldstrike roaster: US\$19.57/t processed;
- Cortez mill: US\$9.76/t processed;
- Cortez leach: US\$2.25/t processed.

25.15 Economic Analysis

This section is not required as Barrick is a producing issuer, the operations are currently in production, and there is no material expansion of current production planned. Mineral Reserve declaration for the Cortez Complex is supported by a positive cash flow.

25.16 Risks and Opportunities

25.16.1 Risks

The risks associated with the Cortez Complex are generally those expected with open pit and underground mining operations and include the accuracy of the resource model, unexpected geological features that cause geotechnical issues, and/or operational impacts.

Other risks noted include:

- Commodity price increases for key consumables such as diesel, electricity, tires and chemicals would negatively impact the Mineral Reserve and Mineral Resource estimates;
- Labor cost increases or productivity decreases could also impact the Mineral Reserve and Mineral Resource estimates, or impact the economic analysis that supports the Mineral Reserves;
- Geotechnical parameters used in mine planning are based on geotechnical data gathered from exploration drill holes. Unforeseen geotechnical or hydrogeological conditions could affect mine planning, affect capital and operating cost estimates due to mitigation measures that may need to be imposed, and impact the economic analysis that supports the Mineral Reserve estimates;
- The input assumptions to the cut-off grades used to report the Mineral Reserves estimated for the Crossroads open pit include transport costs for that portion of the refractory mineralization that would be sent to the Carlin facilities for treatment. If the transport costs are higher than currently forecast, the cut-off grade may need to be revised for the portion of the refractory material within the mine plan destined for treatment at Carlin. Such a change may result in a minor decrease in the overall LOM cashflow forecasts for the duration of the Crossroads operation;
- The Mineral Resource estimates are sensitive to metal prices. Lower metal prices could require revisions to the Mineral Resource estimates. In March 2022, spot gold prices were closer to \$1,800/oz Au versus the price assumption of \$1,500/oz Au used in the Mineral Resource estimates;
- The Goldrush project will require additional environmental studies to address the management of the golden eagle. An eagle take permit will be required for the proposed Goldrush project. Acquisition of such a permit may require mitigation and/or offset actions, which could lead to some additional costs. The Environmental Assessment (EA) for the eagle take permit at Goldrush will be underway in early 2022;
- Regulatory approval of the Goldrush project is still pending and is in the National Environmental Policy Act (NEPA) process. If conditions are imposed by the regulators as a result of this process, this could impact the project schedule and cost estimates;
- On-highway transport of ore or concentrate could be impacted by stricter regulations on the number of trucks that can be used;

- Exceedances of permit conditions have historically occurred at certain of the process facilities. Should such exceedances recur, there could be social and regulatory impacts to operations, mine plans, and the forecast economic analyses;
- The long-term reclamation and closure of the Cortez Complex can be appropriately managed within the estimated closure timeframes and closure cost estimates;
- Political risk from challenges to the current state or federal mining laws for permitting and taxes.

25.16.2 Opportunities

Opportunities include:

- Conversion of some or all of the Measured and Indicated Mineral Resources (that have not been converted to Mineral Reserves) to Mineral Reserves, with appropriate supporting studies;
- Upgrade of some or all of the Inferred Mineral Resources to higher-confidence categories, such that such some or all of this material could be used in Mineral Reserve estimation;
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics;
- NGM holds a significant ground package within the Cortez Complex that retains significant exploration potential:
 - Exploration potential around current and historical open pits;
 - Potential for new underground operations proximal to the current Mineral Resource and Mineral Reserve estimates, with the support of additional studies;
- Improved processing efficiencies in the Gold Quarry Roaster (Mill 6) with modifications;
- Mineral Resources are currently estimated for the Robertson project. Conversion of some or all of these Mineral Resources to Mineral Reserves and incorporation into mine planning represent Project upside;
- The 100%-Barrick owned Fourmile property is currently excluded from the NGM JV. Future incorporation of this project into the JV represents upside potential.

25.17 Conclusions

An economic analysis was performed in support of estimation of Mineral Reserves; this indicated a positive cash flow using the assumptions and parameters detailed in this Report.

26.0 RECOMMENDATIONS

NGM has budgeted US\$16.8 million to the Robertson complex for a prefeasibility study, geotechnical drilling and environmental permitting. On completion of this work, there is potential to include Robertson in the current LOM plan.

The QPs concur with the work planned and the estimated budget to complete the study and associated works.

27.0 REFERENCES

- AuTec Innovative Extractive Solutions Ltd., 2015, Cortez – Deep South Project Update 3, May 12, 2015.
- AuTec Innovative Extractive Solutions Ltd., 2016. Cortez Crossroads Final Report, November 2016.
- Barrick Annual Reports from 2006 - 2019.
- Barrick, Cortez: 2018 Year-End Cut-Off Grade Report, Cortez Hills Underground, January 2019.
- Barrick, Cortez: 2018 Year-End Cut-Off Grade Report, Cortez Open Pit Mine, February 2019.
- Barrick, 2019: Figures 4-2, 10-8, 10-10, 14-2, 14-7, 14-13, 14-14, 14-15, 18-1, and 20-1 were provided as images directly from Mine Staff.
- Barrick Cortez, Inc., 2012, Amendment to Plan of Operations and Reclamation Permit Application (NVN-067575 (11-4A)), October 2012.
- Barrick Cortez, Inc., 2014, Amendment 3 to Plan of Operations and Reclamation Permit Application (NVN-067575 (11-4A)), August 2014, Revised October 2014.
- Barrick Cortez, 2017, Cortez Hills Deep South, Feasibility Study, August 2017. Barrick Cortez, 2018, 2018-07 CHOP Recovery Model PDF, August 2018.
- Barrick Cortez, 2019, Ore Characterization Timeline 2019-01-21 v2 MPP file, January 2019.
- Barrick Gold Corporation, 2016, Press Release – Barrick Reports Project Study Results, February 22, 2016.
- Barrick Gold of North America and Minetech USA, LLC, 2015 Cortez Hills Deep South Prefeasibility Study, December 7, 2015.
- Barrick Gold of North America and Minetech USA, LLC, 2017, Cortez Hills Deep South Feasibility Study Draft, August 2017.
- Bureau of Land Management, 2008, Cortez Hills Expansion Project, Record of Decision and Plan of Operations Amendment Approval, NVN-067575, NV063-EIS06-011, November 2008.
- Bureau of Land Management, 2011, Cortez Hills Expansion Project Final Supplemental Environmental Impact Statement, NVN-067575, DOI-BLM-NV-2010-0132-SEIS, January 2011.
- Bureau of Land Management, 2011, Cortez Hills Expansion Project, Record of Decision and Plan of Operations Amendment Approval, NVN-067575, DOI-BLM-NV2010-0132-SEIS, November 2011.
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM), 2014, CIM Definition Standards for Mineral Resources and Mineral Reserves, adopted by the CIM Council on May 10, 2014.
- Goss, J., 2010, Gold Acres Window Geologic Modeling, prepared for Barrick Gold-Cortez by Rangefront Consulting, LLC (January 1, 2010).
- McClelland Laboratories Inc., 2016, Cyanidation Testing on Cortez Crossroads Drill Core Composites Prepared for Mr. Jeff Olson, Barrick Cortez Mine, December 16, 2017.

Minetech USA, LLC, 2015, Cortez Deep South Underground Mining Report, December 7, 2015.

Obert, L., Duval, W.I., 1967, Rock Mechanics and the Design of Structures in Rock. Wiley NY.

Potvin, Y., 1988, Empirical Open Stope Design in Canada. Ph.D. Thesis. University of British Columbia, 343 p.

RPA, 2019, Graphs developed by RPA based on data from Underground Life Of Mine Plan and previous RPA reports.

RPA, 2012, Technical Report on the Cortez Joint Venture Operations, Lander and Eureka Counties, State of Nevada, U.S.A., prepared for Barrick Gold Corporation, filed on SEDAR March 28, 2012.

RPA, 2016: Technical Report on the Cortez Operations, State of Nevada, U.S.A., NI 43-101 report prepared by Altman, K.A., Bergen, R.D., Collins, S.E., Moore, C.M., and Valliant, W.W., for Barrick Gold Corporation (March 21, 2016).

RPA, 2019: Technical Report on the Cortez Operations, State of Nevada, U.S.A., NI 43-101 report prepared by Altman, K.A., Bergen, R.D., Geusebroek, P., Miranda, H., and Valliant, W.W., for Barrick Gold Corporation (March 22, 2019).

SRK, 2011, Cortez Hills Underground Geotechnical Assessment for the Middle and Lower Zones", August 2011.