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NI 43-101 Technical Report
Preliminary Economic Assessment for the Optimization and Expansion of the El Mochito Mine

Prepared for

Ascendant Resources Inc.
79 Wellington Street West,
TD Tower South, Suite 2100, Toronto Dominion Centre,
Toronto, Ontario, Canada

Project Location
Latitude: 14°49'59" North; Longitude: 88°4'59" West (WGS 84)
Santa Barbara Department, Honduras

Prepared by:

Patrick Toth, P.Geo.	Éric Vinet, P.Eng	Michael P. Cullen, P.Geo.	D. Grant Feasby P.Eng
Ascendant Resources Inc. Toronto, Ontario	**InnovExplo Inc. Val-d'Or, Québec**	**Mercator Geological Services Ltd Dartmouth, Nova Scotia**	**P&E Mining Consultants Inc. Brampton, Ontario**

Effective Date: October 22, 2018
Signature Date: December 6, 2018

SIGNATURE PAGE – INNOVEXPLO

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ASCENDANT RESOURCES INC.

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D. Grant Feasby, P.Eng
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Signed at Brampton on December 6, 2018

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Signed at Peterborough on December 6, 2018

Patrick E. Toth, P.Geo.
Ascendant Resources Inc.

CERTIFICATE OF AUTHOR – ERIC VINET

I, Eric Vinet, (P.Eng) do hereby certify that:

1. I am temporary employed by InnovExplo Inc. at 859, Boulevard Jean-Paul Vincent, Bureau 201, Longueuil, Québec, Canada, J4G 1R3.
2. This certificate applies to the report entitled "Preliminary Economic Assessment for the Optimization and Expansion of the El Mochito Mine – Honduras (the "Technical Report") with an effective date of October 22, 2018 and a signature date of December 6, 2018. The Technical Report was prepared for Ascendant Resources Ltd (the "issuer").
3. I graduated with a Bachelor's degree in Mine Engineering from Ecole Polytechnique de Montréal, (Montréal, Québec) in 1989.
4. I am a member of the Ordre des ingénieurs du Québec (OIQ No. 100894).
5. I have worked as a mining engineer for a total of twenty-nine (29) years since graduating from university. My expertise was acquired while working as an engineer and general manager of several mining sites in Canada, Tanzania, Honduras, Mexico, Niger and Burkina Faso West Africa.
6. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a QP for the purposes of NI 43-101.
7. I visited the property that is the subject of this Technical Report from August 3 to 5, 2018.
8. I am the author and responsible for section 15, 16, 19 and 22 as well as co-author of and share responsibility for sections 1, 2, 3, 18, 21, 25, 26 and 27.
9. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101.
10. I had prior involvement with the property that is the subject of the Technical Report as Mine General Superintendent from December 2004 to September 2006 when Breakwater Resources was the owner.
11. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 6th day of December 2018 in Gatineau, Québec, Canada.

(Original signed and sealed)

Eric Vinet, (P.Eng) (OIQ No. 100894)
Innovexplo Inc.
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CERTIFICATE OF AUTHOR – D. GRANT FEASBY

I, D. Grant Feasby (P.Eng) do hereby certify that:

1. For this Technical Report, I am working under the administration of P&E Mining Consultants, P&E Mining Consultants Inc., 201 County Court Blvd., Suite 401 Brampton, Ontario, L6W 4L2.
2. This certificate applies to the report entitled "Preliminary Economic Assessment for the Optimization and Expansion of the El Mochito Mine – Honduras "(the "Technical Report") with an effective date of October 22, 2018 and a signature date of December 6, 2018. The Technical Report was prepared for Ascendant Resources Ltd (the "issuer").
3. I graduated from Queens University in Kingston Ontario, in 1964 with a Bachelor of Applied Science in Metallurgical Engineering, and a Master of Applied Science in Metallurgical Engineering in 1966. Since graduation, I have worked for over fifty (50) years as a metallurgical engineer in the mining industry, for the Government of Canada and in expert consulting for national and international clients.
4. I am a Professional Engineer registered with Professional Engineers of Ontario (PEO No. 100230400).
5. I have read the definition of "Qualified Person" set out in National Instrument ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.
6. My relevant experience for the purpose of this Technical Report has been acquired by the following activities:
   - Plant Metallurgist, large and complex copper-lead-zinc operation;
   - Research Engineer, Metallurgist and Plant Manager in the Canadian Uranium Industry;
   - Manager of Canadian National Programs on Uranium and Acid Generating Mine Tailings;
   - Director, Environment, Canadian Mineral Research Laboratory;
   - Senior Technical Manager, for large gold and bauxite mining operations in South America;
   - Expert Independent Consultant associated with several companies, including P&E Mining Consultants Inc., on mineral processing, environmental management, and mineral-based radiation assessment.
7. I visited the property that is subject of this Technical Report from February 20 to 23, 2018.
8. I am the author and responsible for sections 13 and 17 of the Technical Report as well as as well as co-author of and share responsibility for sections 1, 2, 3, 18, 20, 21, 25, 26 and 27.
9. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101.
10. I had prior involvement with the property that is the subject of this Technical Report as co-author of the previous Technical Report for the El Mochito Mine, dated May 25, 2018.
11. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 6th day of December 2018 in Brampton, Ontario, Canada.

(Original signed and sealed)

D. Grant Feasby, P. Eng (PEO No. 100230400)
P&E Mining Consultants Inc.
4nuclear@gmail.com

CERTIFICATE OF AUTHOR – MICHAEL P. CULLEN

I, Michael P. Cullen, P.Geo., do hereby certify that:

1. I am employed as Chief Geologist by Mercator Geological Services Limited at 65 Queen St, Dartmouth, Nova Scotia, Canada,B2Y 1G4.
2. This certificate applies to the report entitled "Preliminary Economic Assessment for the Optimization and Expansion of the El Mochito Mine – Honduras "(the "Technical Report") with an effective date of October 22, 2018 and a signature date of December 6, 2018. The Technical Report was prepared for Ascendant Resources Ltd (the "issuer").
3. I received a Master of Science (Geology) degree from Dalhousie University in 1984 and received a Bachelor of Science degree (Honours, Geology) in 1980 from Mount Allison University.
4. I am a registered member in good standing of the following professional associations:
   - Association of Professional Geoscientists of Nova Scotia (APGNS No. 064);
   - Professional Engineers and Geologists of Newfoundland and Labrador (PEGNL No. 05058);
   - Association of Professional Engineers and Geoscientists of New Brunswick (APGNB No. L4333).
5. I have worked as a geoscientist for a total of thirty-four (34) years since graduating from Dalhousie University. My expertise was acquired while working in exploration, consultancy and mine operation settings, both domestically and internationally. It, and includes experience in exploration planning and management, mining and/or resource estimation programs and associated reporting for base metal, precious metal, uranium, coal and industrial mineral deposits, including carbonate hosted, structurally focused zinc lead deposits, magmatic sulphide deposits, epithermal, volcanic-related silver lead zinc and gold deposits plus mesothermal gold deposits. I have authored or co-authored numerous related NI 43-101 Technical Reports and other technical documents addressing such topics.
6. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a QP for the purposes of NI 43-101.
7. I visited the Property that is the subject of this Technical Report from August 23 through September 6, 2017 and from February 14 to 21, 2018.
8. I am responsible for authoring items 4 through 12, 14, 23, and portions of items 1, 2, 3, 20, 21, 25, 26 and 27 of the Technical Report.
9. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101.
10. I have prior involvement with the property that is the subject of this technical report as co-author of the previous Technical Report for the El Mochito Mine, dated May 25, 2018.
11. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 6th day of December 2018 Dartmouth, Nova Scotia, Canada.

(Original signed and sealed)

Michael P. Cullen, P.Geo. (APGNS No. 064, PEGNL No. 05058 and APGNB No. L4333)
Mercator Geological Services Limited
info@mercatorgeo.com

CERTIFICATE OF AUTHOR – PATRICK E. TOTH

I, Patrick E. Toth, (P. Geo.) do hereby certify that:

1. I am employed by Ascendant Resources Inc., at 2100-79 Wellington St., W., Toronto, Ontario, Canada, M5K 1H1.
2. This certificate applies to the report entitled "Preliminary Economic Assessment for the Optimization and Expansion of the El Mochito Mine – Honduras "(the "Technical Report") with an effective date of October 22, 2018 and a signature date of December 6, 2018. The Technical Report was prepared for Ascendant Resources Ltd (the "issuer").
3. I graduated with a Bachelor's degree in Geology from Brock University in 1996.
4. I am a registered member in good standing with the Association of Professional Geoscientists of Ontario (APGO No. 0318).
5. I have worked as a geoscientist for a total of twenty-three (23) years since graduating from Brock University. My expertise was acquired while working in exploration, consultancy and mine operation settings, both domestically and internationally, and includes experience in exploration planning and management, mining operations and associated reporting for base metals and precious metals, including carbonate hosted, silver-lead-zinc deposits, magmatic sulphide deposits, epithermal, silver-gold deposits and mesothermal gold deposits. I have authored or co-authored related NI 43-101 Technical Reports and other technical documents addressing such topics.I have read the definition of a qualified person ("QP") set out in Regulation NI 43-101/National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a QP for the purposes of NI 43-101.
6. I have been working continuously on site since November 2017 to the present, for the purpose of the Technical Report.
7. I am the author and responsible for section 24.
8. I am currently employed by the issuer applying all the tests in section 1.5 of NI 43-101.
9. I am currently involved with exploration and mining programs being conducted on the property that is the subject of this Technical Report.
10. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 6th day of December 2018 in Peterborough, Ontario, Canada.

(Original signed and sealed)

Patrick E. Toth, (P.Geo.) (APGO No. 0318)
Ascendant Resources Inc.
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1. SUMMARY

1.1 Reliance on Other Experts

This Technical Report was prepared by InnovExplo, Mercator and P&E and the information, conclusions and recommendations contained herein are based upon information available at the time of report preparation. This includes data and reports made available by Ascendant Resources Inc. ("Ascendant") as well as publicly available reporting. Sources of such information are referenced in this report and are detailed in the References Cited section of the report. Information contained in this Technical Report is believed to be reliable, but parts of the report are based upon information not within the control of InnovExplo, Mercator and P&E. InnovExplo, Mercator and P&E and have no reason, however, to question the validity of data used in this report. Comments and conclusions presented herein reflect the authors' best judgment at the time of Technical report preparation.

Mercator relied upon Ascendant with respect to provision of opinions and information regarding Honduran mining law and regulations, mineral titles, surface titles and mineral agreements that pertain to the El Mochito mine operation and related exploration holdings. Mercator also relied upon Ascendant with respect to provision of opinions on site environmental liabilities and details of current status and nature of site environmental and production permits that exist for the El Mochito operation. Information pertaining to these items that appears in this report.

1.2 Property Description and Location

The El Mochito mine along with six Exploitation Concessions (the "Concessions") and related surface titles (collectively, the "Property") are located adjacent to the town of Las Vegas, Santa Barbara Department, in the west-central area of Honduras, Central America. The Property is held by Ascendant's wholly-owned Honduran subsidiary, AMPAC, and covers approximately 10,000 ha of surface area. Titles to all six Concessions were confirmed in 2014 by the Honduran Institute of Geology and Mining (INHGEOMIN, or Institutto Hondureño de Geologia y Mineras). In Honduras, concessions are held under the terms of the Mining General Law (2013) that is administered by INHGEOMIN. The Concessions grant AMPAC the exclusive right to explore for and produce metals from included areas, subject to acquisition of requisite environmental and operating permits. AMPAC separately holds surface rights over a substantial portion of the area covered by the Concessions, including all of the mine's operational and infrastructure areas.

Ascendant has advised that, at the effective date of this Technical Report, it was not aware of any environmental liabilities on the Property that are not addressed under the terms of existing mining, milling and environmental certificates, permits or authorizations issued by the government of Honduras. No other significant factors or risks were identified that would affect the issuer's ability to perform work on the Exploitation Concessions.

1.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Property is located adjacent to the town of Las Vegas, Santa Barbara Department. The capital city of Honduras, Tegucigalpa (population ~1.2 million), is situated 220 km to the southeast and the regional center of San Pedro Sula (population ~1.2 million) is located 88 km to the northeast. Both are accessible from the mine site via paved highway CV-5 and associated secondary highways that connect the site with highway CV-5. Las Vegas (population ~25,000) is the residential community for most of the mine's work force.

Within the El Mochito operating site, access to all facilities is gained through an extensive system of good quality gravel roads that are maintained by the issuer. Access to Concession areas located away from the mine site is more limited and typically takes the form of single lane roads or farm trails.

The climate in this area of Honduras is humid-subtropical, with average maximum temperatures ranging from 29ºC to 34ºC. Weather conditions at the El Mochito site do not typically impede normal mine operations, which are carried on continuously on a year-round basis.

The El Mochito operation currently employs approximately 1,200 people, most of whom reside in either the nearby community of Las Vegas or in smaller outlying communities. Las Vegas provides access to basic goods and services, but specialized mechanical or professional services must be accessed from further afield in such locations as San Pedro Sula or Tegucigalpa. International and domestic airline services are available at both locations and paved highway access exists northwestward through Guatemala to Mexico and the United States. Access to ocean-going commercial vessels is primarily through port facilities at Puerto Cortés on the Atlantic coast, approximately 55 highway km to the north of San Pedro Sula or 155 km from El Mochito, however another smaller port is available on the southern, Pacific coast at San Lorenzo at a distance of 289 km by paved road from the mine.

Electrical power for El Mochito is provided through connection to a 34.5 kV line from the national electrical grid operated by government-owned National Electric Power Company ("ENEE", or Empresa Nacional de Energía Eléctrica). Backup electrical generation capacity owned by AMPAC is required due to frequent power outages.

The Property is located along the southeast side of the Santa Barbara mountain, with elevation at the mine site being approximately 900 masl. The mine site itself is within the northeast trending Mochito Graben, a topographic depression that trends northerly and measures approximately 6 km across. Other than within the community of Las Vegas, the area consists of predominantly forested land with farming of coffee, sugar cane and bananas taking place on sites located along valley bottom and slope areas.

1.4 History

Significant events in the history of the El Mochito mining operation are summarized below:

- The El Mochito Deposit was originally discovered in 1938.
- In 1946, the New York & Honduras Mining Company (later Rosario Resources Corporation) purchased the property and began construction of a processing plant.
- Underground production began in 1948, with the initial zinc products being a jig concentrate containing native silver, a bulk flotation concentrate and a silver product.
- In 1960, increased volumes of sulphide material produced from deeper levels in the mine allowed the economic preparation of separate zinc and lead concentrates.
- In 1973, the company was renamed Rosario Mining Corporation, which was acquired by Amax Inc. in 1980 and operated as a subsidiary.
- The mine ceased production for several months in 1987 due to higher than acceptable costs related to taxation, labour and operations.
- AMPAC purchased the El Mochito mine, concentrator and Concessions from Amax in 1987, along with a concentrate storage facility warehouse in Puerto Cortés and the San Juancito exploration property.
- Breakwater Resources Ltd ("Breakwater") acquired AMPAC in 1990 by way of an amalgamation of AMPAC with a wholly-owned subsidiary, Santa Barbara Mining Company, Inc.
- Nyrstar Group ("Nyrstar") acquired Breakwater in August of 2011, inclusive of the El Mochito mine and concentrator and the port facilities at Puerto Cortés.
- Morumbi Resources Inc. ("Morumbi") acquired the El Mochito mine, concentrator and port facilities from Nyrstar in December of 2016 and then changed the company name to Ascendant Resources Inc.
- The concentrator has been expanded several times during the operational project life and had a nominal nameplate capacity of 2,300 tpd at the time of acquisition by Morumbi (Ascendant).

The El Mochito underground mine has operated on an essentially continuous basis since 1948 and an extensive system of underground workings has been established during that time. At the time of acquisition by Morumbi (Ascendant) in 2016, mining had reached a depth slightly in excess of 1,067 m (3,500 ft) below surface, with most production coming from mine levels below 610 m (2,200 ft) from surface.

Silver-rich, chimney-style mineralization was mined in the early years of mine operation and, with increasing depth of exploitation, was followed by the mining of mineral with increased zinc and lead levels and decreased levels of silver. All metal concentrations of economic interest are associated with calc-silicate skarns. Chimney-style mineralization predominates from surface to the top of the Mochito Shale. Stratabound (manto) mineralization along the margins of large chimney deposits such as San Juan, Port Royal and McKenny below the Mochito Shale have contributed locally to historical production, but the extensive, lower grade manto deposits that occur in association with the Cantarannas Formation–Atamia Formation contact have predominated in Mineral Resource and Mineral Reserve Estimates since completion of mining in the large high-grade chimneys.

Over the 10-year production period beginning in 2006 and ending in 2015, the last full year preceding acquisition of the Mochito operation by Ascendant, average metal grades of yearly production had gradually declined from 6.0% Zn, 2% Pb and 92 g/t Ag at a production rate of ~690,000 tpy in 2006 to 3.52% Zn, 1.7% Pb and 51.79 g/t Ag at a production rate of ~766,000 tpy in 2015.

1.5 Geology and Mineralization

1.5.1 Geology

The El Mochito District is located within the Chortis Block of the Carribean crustal plate in an area crossed by major northeast trending normal faults that define a regional rift basin named the Honduran Depression. Within this broad, extensional setting, subsidiary north-trending rifted sub-basins are present, and these manifest in the Property area as the Mochito Graben. Upper Jurassic to Quaternary age sedimentary and volcanic rocks occur within the Mochito Graben and are cut by graben-defining northeast trending faults as well as northwest and east trending faults of lesser dimension. These introduce structural complexity at both property and mine scales and to varying degrees-controlled localization of skarn-associated zinc, lead and silver mineralization in the district.

The stratigraphic succession present within the El Mochito Graben is dominated by interbedded Cretaceous limestones and shales of the Yojoa Group's Atima Formation. These are overlain disconformably to unconformably by clastic red beds of the Cretaceous Valle de Angeles Group, which are in turn overlain by Quaternary unconsolidated alluvium and soils that represent the youngest material deposited in the graben.

The base of the Cretaceous Atima Formation marks the Cretaceous-Jurassic boundary in the graben area, where limestone and argillaceous limestone of the transitional Cantarannas Formation overly quartz-rich sandstone and interbedded conglomerate of the Jurassic Todos Santos Formation. Bedding dips within the graben are typically shallow to flat but become moderate to steep and may show associated folding in close proximity to cross cutting faults or mafic dikes that may have been emplaced along faults.

Substantial portions of the Atima, Todos Santos and Cantarannas formations have been affected by development of skarn characterized by weak to very strong development of calc-silicate mineral assemblages (dominated by pyroxene and garnet) that are related to passage of high temperature volcanic-related fluids through the graben fill succession along the various faults systems.

Andesite dykes intrude the entire Mochito Graben stratigraphic section and show K-Ar whole rock radiometric ages ranging from 16.7 (±0.7) to 9.4 (±0.4) Ma (Dilles, 1982). In contrast, the nearby Yojoa Eruptive Complex that occurs 13 km northeast of the El Mochito mine is younger.

Major northeast trending faults form the main architecture of the Mochito graben and take the form of stepped structures connected by relay ramps and transfer zones. Northeast faults cut most of the other faults, including those that trend east northeast. Skarn localization and the later superimposed base metal mineralization at El Mochito were strongly controlled by fault structures that provided fluid flow pathways for multiple phases of hot hydrothermal fluid flow.

1.5.2 Mineralization

Zinc-lead-silver mineralization of economic interest at El Mochito occurs in association with calc-silicate bearing skarn intervals hosted by limestone and calcareous shale of the Upper and Lower Atima Formation, in calcareous units of the Atima Formation's main subunit, the Mochito Shale, in calcareous siltstone and shale of the Cantarannas Formation and in quartz rich sandstones and siltstones of the siliciclastic-dominated Todos Santos Formation, which underlies the Cantarannas Formation. The stratigraphic section within which economic mineralization occurs at El Mochito slightly exceeds 1,250 m in true thickness.

Mineralization consisting of sphalerite, galena, argentite, tetrahedrite, acanthite, pyrrhotite and magnetite is associated with garnet and pyroxene skarn zones that are both structurally and stratigraphically controlled. The distribution of skarn directly reflects the geometry of the complex graben-related fault systems that channeled hot hydrothermal fluids through graben fill sequences to sites where they selectively reacted with calcareous wall rock to create siliceous, garnet and pyroxene dominated skarn. Introduction of zinc-lead-silver mineralization on existing skarn zones reflects continued capacity of the graben's fault systems to conduct the large volumes of hydrothermal fluid necessary to create this district's high metal endowment.

Two main styles of zinc-lead-silver mineralization are present at El Mochito, these being mantos and chimneys, both of which show genetic association with hydrothermal fluid-controlling fault systems. The largest mantos occur as stratabound replacement zones within the Lower Atima Formation, near its lower contact with the calcareous Cantarannas Formation. Manto style mineralization is also encountered in the central portion of the Atima Formation, along the upper and lower contacts of the Mochito Shale unit, typically adjacent to large chimney structures, and also within quartz rich clastic sediments of the Todos Santos Formation.

Chimney-style mineralization occurs as pipe-like accumulations of sulphides and associated skarn assemblages that are discordant to stratigraphy, often at high angles, and are spatially controlled by discrete zones of structural ground preparation which typically coincide with fault intersection zones or with dilational zones related to orientation changes or transfer zones along strike slip or dip slip fault systems. Chimneys at El Mochito are frequently rooted in zones of well-developed manto mineralization at the base of the Atima Formation and extend upward through that formation for substantial vertical intervals, with some passing through the Mochito Shale and onward to near surface elevations.

Manto and chimney deposits differ in their metal grade characteristics, with higher zinc lead and silver values and massive to submassive sulphide zones being more commonly seen in chimneys.

1.6 Deposit Type

The zinc-lead-silver mineralized zones that comprise the El Mochito deposit are classified for current report purposes as distal zinc skarns as defined by Meinert (1992).

1.7 Exploration

Since acquisition of El Mochito in late 2016 Ascendant has not carried out a substantial amount away from mine exploration. Efforts have instead been focused on completion of detailed core drilling to support the Mineral Resource and Mineral Reserve delineation programs described in this report. However, late in 2017 a compilation of historical exploration was initiated by site staff and a relatively small amount of exploration core drilling from underground was completed in conjunction with the large Mineral Resource and Mineral Reserve delineation drilling programs, which are not classified as exploration. A small program of several short surface drill holes was also completed to check geology in one surface prospect area.

The data review and compilation program begun in 2017 is focused on historical surface exploration results from the entire Ascendant concession portfolio and was ongoing at the effective date of this Technical Report. Ascendant initiated an extensive soil geochemistry program in early 2018 over the main El Mochito Concession based on initial results of the compilation work. Although initial field aspects of the program had been completed by the report date, laboratory results had not been received. Ascendant also initiated a review of mining records and drilling results that pertain to the old mine workings area (“Mina Vieja”) located above the Mochito Shale unit, where production had occurred in the early decades of mine operations. Production from this area had primarily focused on high grade silver-bearing chimney deposits that extend down to, and sometimes through and below, the Mochito Shale. This program was in an early stage of data assessment and historical drilling data compilation at the report date and had not yet progressed to the point of defining any new exploration target areas.

The history of the El Mochito operation is characterized by consistent replacement of mined Mineral Reserves through systematic step out exploration drilling along the historical mineralized corridor structural trends that host many associated chimney and manto style zinc-lead-silver deposits. This trend continued for Ascendant in 2017 and 2018, with the majority of drilling being related to Mineral Resource and Mineral Reserve delineation programs and associated step-out programs. The exploration drilling targeted areas marginal to the limits of current Mineral Resources on the Deep East, Esperanza, Santa Elena and Victoria mineralization trends and in each case returned positive results that fully warrant follow-up through infill and additional step out drilling to define new Mineral Resources.

1.8 Drilling

Core drilling carried out for the purpose of either exploration or Mineral Resource and Reserve definition purposes has been carried out on the Property since deposit discovery in 1938 and increased substantially on an annual basis after initiation of mine production in 1948. A summary review of mine records by Mercator in early 2018 showed 8,821 drill holes in the GEMS™ database up to the effective date of this Technical Report. The drilling database does not contain all historical drill holes in the mine area for which drill logs exist. Additional historical holes were being added by Ascendant in 2018 through compilation efforts. Micon (2016) reported that through the 1948 to 2015 period a total of at least 1,168,887 m of core drilling had been completed on the Property, including both exploration and delineation categories. With addition of 2016 meterage drilled by Nyrstar and 26,876 m drilled by Ascendant in 2017, the total rose to 1,226,802 m, the majority of which was carried out from underground workings. To the end of August 2018, Ascendant completed an additional 24,434 m of primarily Mineral Resource infill and step out programs. Surface drilling has not been as extensively applied at El Mochito since its early history of near-surface mining due to difficulties encountered in drilling deep holes through karsted limestone sections.

Although more than 10,000 core drilling holes have been completed to date on the Property, a substantially smaller subset contributed directly to the Mineral Resource and Mineral Reserve estimates supported by this Technical Report. The twenty-seven named Mineral Resource areas referred to in this Technical Report are intersected by a total of 2,245 core drilling holes that were used in the current estimation programs. These define a chronological period from 1977 through 2017 and reflect a total of 392,413 m of core drilling.

Ascendant owns its own surface and underground core drilling equipment and employs experienced staff drillers and helpers. In this manner, it meets all of its Mineral Resource and Mineral Reserve delineation, exploration and geotechnical core drilling requirements. Core loss is not considered problematic with respect to impacts on geological interpretations and associated Mineral Resource and Mineral Reserve modeling of mineralization.

Results of Ascendant's 2017 delineation program drilling are reflected in the Mineral Resource Estimate described in section 14**Error! Reference source not found.** of this Technical Report. Drilling results from 2018 programs are not reflected in the current Mineraal Resource Estimate.

1.9 Sample Preparation, Analysis and Security

Ascendant operates its own analytical laboratory and preparation facility at the El Mochito site and these provide preparation and analytical services to support day to day mine sampling operations. Core samples were processed at this laboratory prior to 2016 when a protocol requiring that all drill core produced from both exploration and deposit delineation drilling programs be prepared and analyzed at an independent, fully accredited commercial laboratory was instituted. Ascendant has continued with this protocol and sends samples to the Bureau Veritas International preparation facility in Guatemala City, Guatemala, for preparation prior to analysis at the Bureau Veritas Canada Ltd (Acme) laboratory in Vancouver, BC, Canada, which is accredited to the ISO/IEC 17025-2005 standard. Analysis of samples for zinc, lead, copper, silver and iron levels is typically by Atomic Absorption Spectroscopy methods after multi-acid digestion, with assay quality determinations for over limits values. A Quality Assurance and Quality Control ("QAQC") program that includes insertion of coarse blank and certified reference material samples into the core sample stream and analysis of duplicate split pulp samples is applied and monitored by Ascendant.

Mercator is of the opinion that Ascendant's sample preparation, analysis and security programs meet current industry standards and that monitoring of mine-laboratory results prior to 2016 was carried out in a professional manner.

1.10 Data Verification

Data verification activities carried out by Mercator include completion of two site visits to the El Mochito operation, independent desktop data verification checks of GEMS™ drilling database records that support the current Mineral Resource Estimate, a limited drill hole coordinate check program for currently accessible surface exploration holes, a detailed core review study of core from 18 drill holes representative of both manto and chimney styles of mineralization, collection and analysis of 11 quarter core check samples from mineralized drill core intercepts from holes within current Mineral Resource limits.

Based on results of the above programs, Mercator is of the opinion that Ascendant's drilling database and related mine modeling data and procedures are consistent with current industry standards.

1.11 Mineral Processing and Metallurgical Testing

A review of Ascendant's 2016-2017 grade-recovery data from the on-site metallurgical laboratory shows that recovery of zinc is relatively independent of feed grade, while lead is considerably more dependent on feed grade. Silver reporting to either lead or zinc concentrates depends on silver content in the mineralized material; however, total silver recovery is relatively independent of feed grade. El Mochito has introduced an argentite (silver sulphide) specific flotation agent to increase silver recovery in the lead concentrate.

1.12 Mineral Resource Estimate

The 2018 Mineral Resource Estimate was prepared by Mercator in accordance with NI 43 101 and CIM Definition Standards and appears in the table below. It has an effective date of January 1, 2018.

– El Mochito mine Mineral Resource Estimate – Effective January 1, 2018 (Table 14.7)

Cut off Value	Category	Tonnes	Grade				Contained Metal			
			Zn	Pb	Ag	ZnEq	Zn	Pb	Ag	ZnEq
ZnEq.%		kt	%	%	g/t	%	Mlbs	Mlbs	Moz	Mlbs
3.1	Measured	1,100	5.5	2.0	65	8.2	134	48	2.3	198
	Indicated	6,452	5.2	1.7	41	7.2	735	241	8.4	1,019
	Measured and Indicated	**7,553**	**5.2**	**1.7**	**44**	**7.3**	**869**	**289**	**10.7**	**1,216**
	Inferred	4,972	5.1	1.4	33	6.7	556	156	5.4	739

Notes:

- Tonnage and grade values have been rounded and totals may vary due to rounding.
- Price assumptions used were 1.21 $/lb Zn, 1.06 $/lb Pb and 18 $/troy oz Ag. Zinc Equivalent metal grade (ZnEq%) was calculated as ZnEq% = Zn% + (Pb% * 0.82) + (Ag g/t * 0.0149) and is based on recoveries of 88.9% Zn, 74.3% Pb, and 77.7% Ag
- A cut-off of 3.1% ZnEq was used to estimate Mineral Resources and is based on fourth quarter marginal direct operating costs.
- Results of an interpolated bulk density deposit model have been applied and contributing 1.52 m (5 ft) downhole assay composites were capped at 38% Zn, 36% Pb, and 2,000 g/t Ag.
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability
- The Inferred Mineral Resource in this estimate has a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.

The El Mochito Mine Mineral Resource Estimate is based on a three-dimensional block model developed using Geovia Surpac ® Version 6.8.1 modeling software and includes 27 separate named areas of “manto” and/or “chimney” style skarn mineralization.

1.13 Mineral Reserve Estimate

This section is not relevant at this stage of the project.

1.14 Mining Methods

The El Mochito mine is in its 70th year of operation and the mining infrastructure is expansive. The existing underground workings at the El Mochito mine covers approximately 3,000 m in the east-west direction, 1,200 m north-south and vertically from surface to a depth of up to 1,300 m (-1,000 m below the shaft collar).

The mine employs a combination of long hole, cut & fill and conventional mining methods to exploit the mineral from mineralized zones of different shapes and sizes. A predominately trackless mining fleet is used in mining and hauling the mineral to the vertical shafts through multiple ramp systems that are essentially a result of a series of stope access development that have been linked together, creating a complicated, inefficient and tight transport network of tunnels.

Mining operational costs are consequently relatively high and reflect this deep mining environment with long hauling distances, coupled with high pumping and pump maintenance costs. As the mine grows deeper, transport distances will further increase. As expected, this would result in increasing the size of the trucking fleet and manpower and increasing maintenance cost and mechanical parts inventory. There would also be negative impact on the ventilation circuit, and the water pumping system is old, very extended and inefficient.

The Expansion Project proposes to address these challenges through the upgrade of infrastructure and mining and mineral processing systems across the mine which will result in the following:

- Improvements to underground mineral transportation;
- Improvements to the underground pumping and water management system,
- A crushing circuit, processing plant and tailings handling capacity that can meet the increased production from the mine (Item 17).

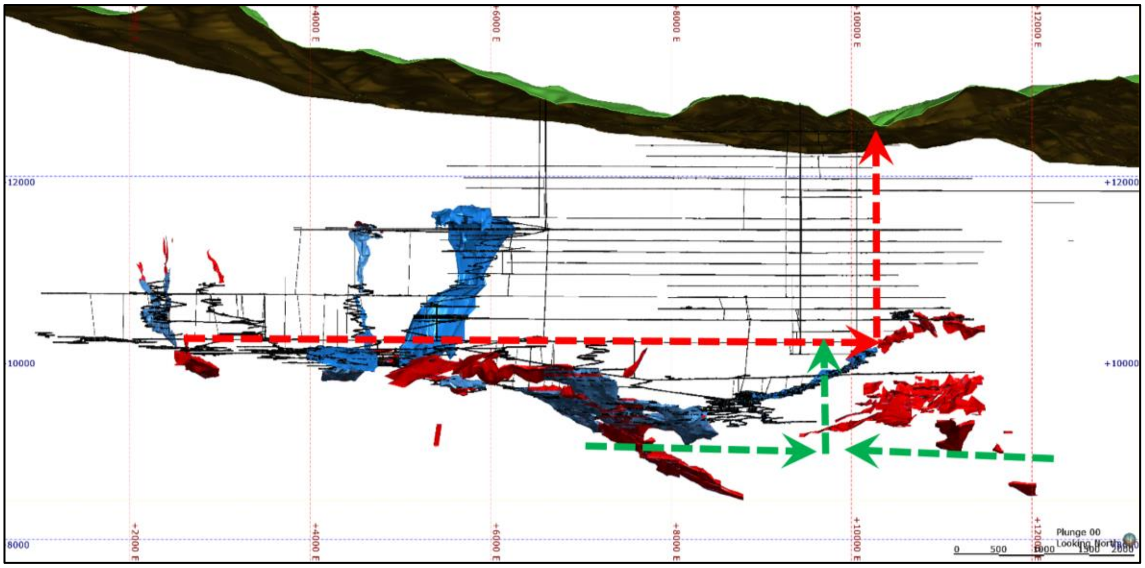
The centre of gravity of the bulk of new and potential Mineral Resources is found below the current position of the two surface shafts (No. 2 and No. 3), and to the north and east of them. This presented a good potential area of focus for the development of new infrastructure.

Improving underground mineral transportation comprise the installation of a new 442 m subvertical (or internal, vertical) shaft used for rock hoisting only, and bringing mine services to the lower levels. With this new No. 8 shaft, a new grizzly and crushing circuit would be located on the 3360L with a nameplate capacity of 2,800 tpd, augmenting the existing crusher on 2350L in the western side of the mine. The new subvertical shaft would consist of a 5.1 m raise bore hole between levels 2100L and 3250L. The final portion of the shaft in between level 3250L and final shaft bottom level 3530L representing approximately 94 m would be raise bored or drop raised to accommodate shaft loading, cleaning and pumping arrangements.

The raise bore hole would be equipped with two 6.5 t skips running on rope guides, power cables, backfill piping, compressed air piping, dewatering columns and a service water column.

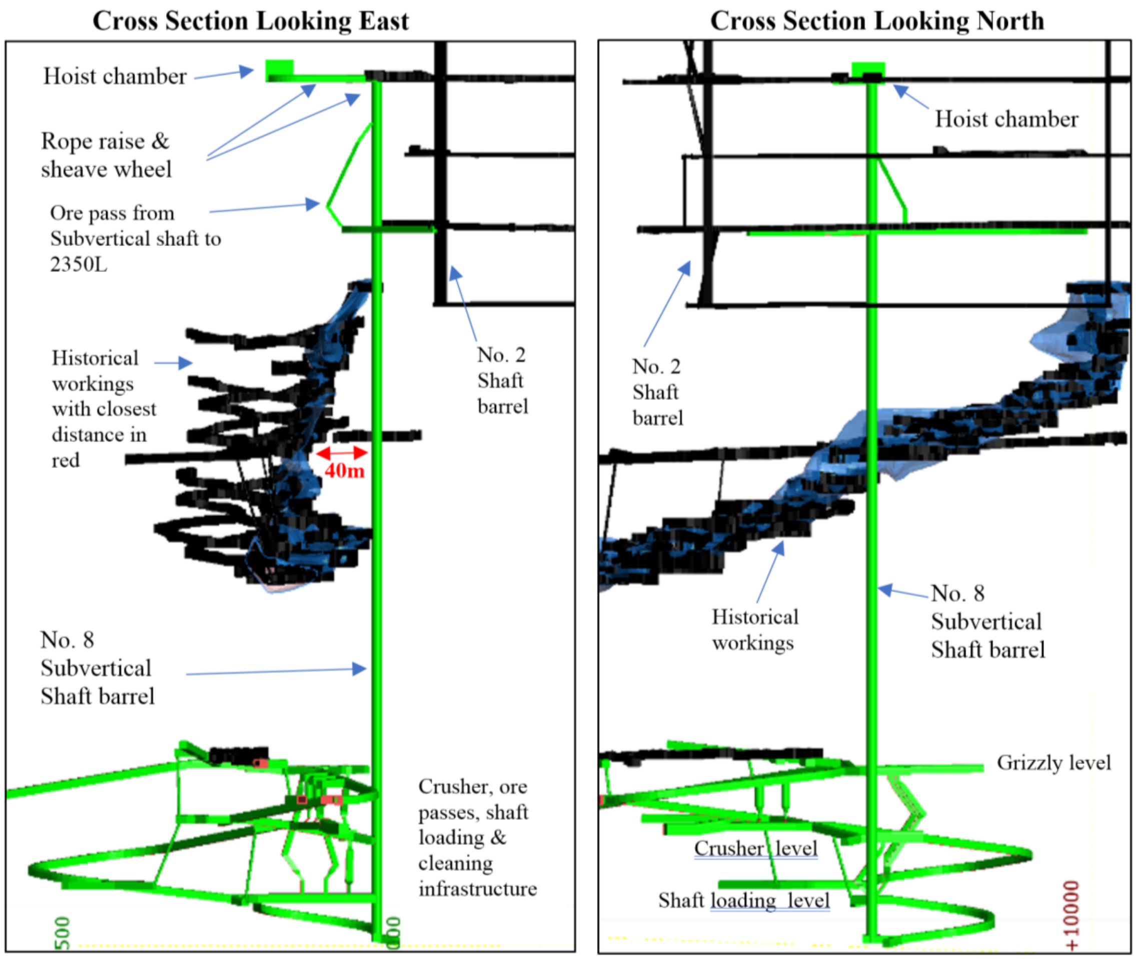
This new internal shaft would be tied in with the current No. 2 Shaft, just 200 m away, which has a 200 tph hoisting capacity to surface from 2450L. The positioning would overlap vertically over two levels and allow for transfer of mineralized material from the new No. 8 shaft to the current No. 2 shaft via the existing rail transportation system used on 2350L.

The following figure (Figure 16.1) illustrates the proposed internal No. 8 shaft, mineral resource under the current No. 2 shaft, the current horizontal haulage route and the proposed route. Figure 16.4 illustrates a cross section through the No. 8 shaft showing the required development.



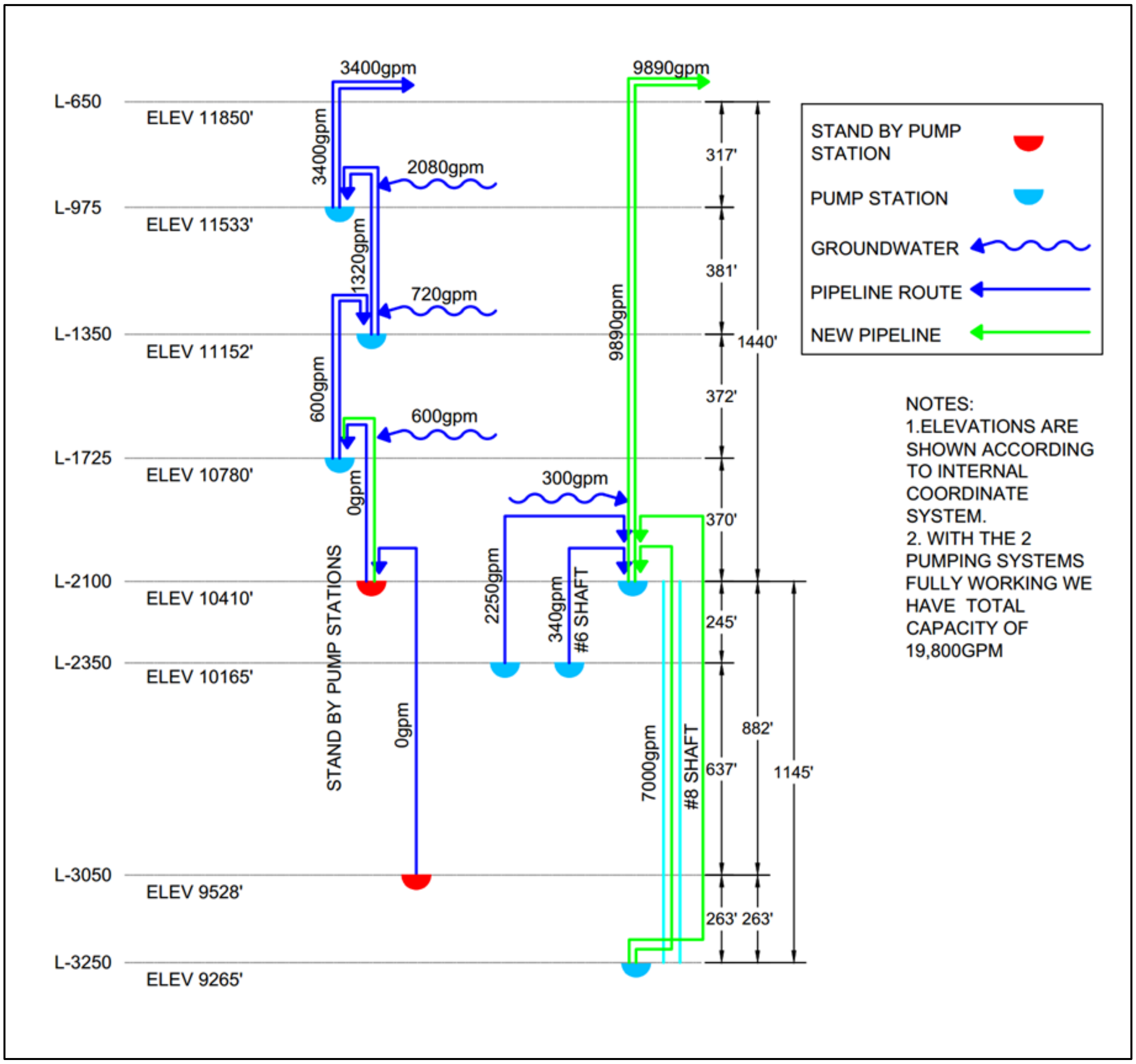
Note New horizontal and vertical haulage routes via the No. 8 Shaft are shown in green, original haulage routes in red

– Long section looking north of the El Mochito mine showing the impact of the proposed No. 8 subvertical shaft on haulage routes (Figure 16.1)



– Cross sections east and north of the No. 8 subvertical shaft (Figure 16.4)

El Mochito management has determined that the upgrade of the underground pumping and water management system would materially reduce overhead costs by changing and reducing the number of pumps, rationalizing pumping columns and installing an effective water clarification system to pump clean water. See Figure 16.17 below for the new proposed water management configuration.



– New water configuration, Phase II, El Mochito mine (Figure 16.17)

This Expansion Project represents a significant opportunity to bring the All-In Sustaining Costs ("AISC") down to less than 0.97 $/lb zinc equivalent per pound payable approximately two years after the construction period is complete. This cost figure would support the longevity of the operation and robust free cash flow even in an environment of sustained depressed metal prices.

The major impact on production from this new No. 8 shaft will be the shortening of average underground truck hauling distances by 26%. The shorter distances will translate into additional trucking capacity. By moving mineralized material and waste more rapidly, the operation will react positively by reducing the underutilized equipment especially in drilling, blasting and support. With the shorter haul distances, it becomes possible to increase production by 26% without the need for additional mining equipment.

The PEA also considers an increase in mining and processing capacity to approximately 2,800 tpd (1 million tpy) from 2,200 tpd (750,000 tpy) without significantly interfering with ongoing operations. In addition to increased revenues, the major benefit of the program is an expected reduction in operating costs of 17.76 $/t processed below the anticipated LOM average without the proposed infrastructure changes as the mine gets deeper.

Table 26.1 illustrates the production expected over the LOM.

– Prodution by stoping methods including mineral development (Table 26.1)

	Mineral Development t	Cut and Fill t	Long Hole t	Shrinkage t	Conventional t	Total t
2019	190,406	54,046	371,147	-	173,909	**789,509**
2020	198,099	87,717	501,295	-	107,955	**895,066**
2021	219,298	83,668	467,507	-	206,375	**976,847**
2022	225,605	173,095	432,535	-	161,773	**993,008**
2023	251,902	139,085	425,861	-	186,318	**1,003,166**
2024	226,149	211,883	376,833	-	180,648	**995,514**
2025	237,234	124,975	429,514	9,750	205,972	**1,007,445**
2026	200,284	156,387	397,139	14,624	229,445	**997,880**
2027	288,467	149,284	344,052	-	216,444	**998,247**
2028	273,370	81,817	254,058	-	389,846	**999,091**
Total	**2,310,816**	**1,261,957**	**3,999,940**	**24,374**	**2,058,686**	**9,655,774**
% Total	**23.90%**	**13.10%**	**41.40%**	**0.30%**	**21.30%**	**100.00%**
% Stope	**N/A**	**17.20%**	**54.50%**	**0.30%**	**28.00%**	**100.00%**

Mining development rate used in this PEA reflects current mining practices and achievements. The following (Table 16.4) illustrates the advance in feet per day considered in development.

– Estimated daily advance rates (Table 16.4)

Development (In either waste or mineral)	LOM plan description Type	Excavation size m (ft)	Advance m/d (ft/d)
Jumbo	Hz Development, Jumbo @ 15'×15'	4.47 m x 4.47 m (15 ft x 15 ft)	19.2 (63)
Jackleg	Hz Development, Jackleg @ 10'×12'	2.74 m x 2.74 m (9 ft x 9 ft)	6.4 (21)
	Subhorizontal Raise, Jackleg @ 6'×9'	3.66 m x 3.66 m (12 ft x 12 ft) W Slusher	5.5 (18)
	Sublevel, Jackleg @ 6'×6'	1.82 m x 1.82 m (6 ft x 6 ft) W Slusher	3.7 (12)
	Sublevel, Jackleg @ 9'×9'	2.74 m x 2.74 m (9 ft x 9 ft)	5.5 (18)

Development	LOM plan description	Excavation size	Advance
Raises	Subvertical Alimak, Stoper @ 8'×8'	2.44 m x 2.44 m (8 ft x 8 ft) W Alimak	2.1 (7)
	Subvertical Raise, Borer @ 5'Ø	1.52 m x 1.52 m (5 ft x 5 ft) W Raise	7.3 (24)
	Subvertical Raise, Stoper @ 5'×5'	1.52 m x 1.22 m 5 ft x 4 ft W Raise	3.0 (10)

- Ramp Access Mechanized Cut & Fill
- Long Hole Stoping
- Shrinkage Stoping
- Conventional Slusher/Panel mining

The following table (Table 16.6) represents the parameters used for mineral production including the mining recovery and mining dilution assumptions which have been calculated based on current performance is observed.

– Stoping parameters (Table 16.6)

Stoping Methods	Productivity tpd	Mining Recovery %	Dilution %
Cut & Fill	337	92	10
Long Hole	1,152	90	18
Shrinkage	48	90	7
Conventional Stoping	622	92	10

Mining services in the El Mochito mine includes electrical, communication, fuel mechanical shop and a sandfilling system throughout the actual mine.

1.15 Mineral Processing

Run of mine (“ROM”) material is delivered to a crushing facility adjacent to the main No. 2 El Mochito shaft and minus ¾ in (19 mm) crushed material is then transported to the process plant 1.3 km away where it is ground to a fine size in rod and ball mills. Separate lead and zinc concentrates are produced by froth flotation. These are dewatered and bulk transported by truck as moist concentrates 175 km to the coastal port or Puerto Cortés. Process plant tailings are normally processed in a mine backfill plant located near the crusher plant and the remaining fines are returned to the process plant for pumping 4.5 km to a lined tailings management facility.

The overall process plant facilities have a nameplate capacity of 2,300 tpd, but a normal process throughput of 2,450 tpd or more is frequently achieved. The primary grind is performed in open circuit by two rod mills in parallel followed by a secondary ball mill in open circuit and a tertiary ball mill in closed circuit. The overflows from the cyclones in the milling circuit report to the differential lead and zinc flotation circuits. The separate zinc and lead concentrates are thickened, then filtered using vacuum disc filters with the concentrates being stored in a shed before being trucked to the concentrate warehouse in Puerto Cortés.

Metallurgical recoveries have recently improved and are typically in the range of 74% to 78% Pb, 86% to over 90% Zn, and 75% to 79% Ag (payable silver content is in both Pb and Zn concentrates). The process plant and crushing facilities (including laboratory) have a staff of 124 people and operate on a 3-shift daily basis. A one day per month maintenance shutdown is scheduled. Unscheduled interruptions are mainly due to power shortages from the Honduras power grind. Site standby power is dedicated to mine needs.

Significant operational challenges include very wet ROM material, uncontrollable flotation cells, concentrate moisture exceeding transport criteria and a tailings line that 'sands out' on power interruption.

El Mochito has developed a plan to increase the process plant capacity to 2,800 tpd. Several components of the process plant will be upgraded – the most significant being the installation a crusher feed washing facility, replacement of grinding cyclones with screens, the installation of modern flotation cells and the replacement of disc concentrate filters with plate-and-frame pressure filters. The buried tailings line and pumping system will be upgraded, and the existing tailings line converted to tailings water reclaim for process plant water supply. Existing, idle, magnetic separators and thickener will be redeployed to remove the gangue mineral magnetite from either the lead or the zinc flotation circuit. The isolation and sale of magnetite will improve concentrate grade and will reduce tailings storage requirement.

The plant capacity and process improvement plan will cost $6.3M and will take 9 months to complete. Process plant operations will not be disrupted during the proposed changes.

1.16 Project Infrastructure

The El Mochito mine facility is a mature zinc, lead and silver producing underground mine and surface processing plant located in northwest Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. The processing plant nameplate capacity is 2,300 tpd. Production began in 1948 and has continued almost continuously for 70 years. The principle property infrastructure consists of a shaft-accessed underground mine and a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and are shipped by ocean freighters once sufficient material has been stockpiled at the port.

The mine site has two shafts: the No. 2 vertical shaft which is 747 m (2450 ft) deep and has a production capacity of 3,500 tpd, and the No. 3 shaft of the same depth, used for hoisting personnel and materials. Mineralized material is mined by trackless and conventional underground mining methods, transported, partially crushed underground and then hoisted largely through the No. 2 shaft. Waste is largely repacked underground as waste-fill to augment cycloned tailings backfill and minimize hoisting costs.

Zinc and lead concentrates are produced by differential flotation and shipped to a warehouse at the port of Puerto Cortés, 35 km north of San Pedro Sula on the Gulf of Honduras, 168 km by paved road from the mine. Approximately 30% of process tailings are used as backfill for the mined stopes.

The El Mochito infrastructure includes service shops, administration buildings as well as a well established, traditional mine village. Three tailings facilities have been used, with the third active one comprising several future years storage capacity.

1.17 Market Study

Zinc, lead and copper concentrate offtake agreements are in place with Nyrstar Sales and Marketing Ag, for a period of 10 years from December 2016 at international benchmark terms, as defined by average respective commodity price on the London Metal Exchange for the relative shipping period. InnovExplo has not reviewed these contracts.

Mine closures and environmental regulations have driven concentrate stocks to 10-year lows. These supply deficits drove prices to a 10-year high of 1.63 $/lb in January 2018.

Modest global growth expectations for GDP imply a strengthening demand by ~400 ktpy of additional new supply required to feed the 12.6 Mt global market for zinc metal. Commodities analysts also predict that Chinese mines will scale up production to close the gap between demand and supply figures.

Among the three metals produced by the El Mochito Mine, the price of silver appears to be the most volatile with large price swings largely due to its small relative size to other commodity markets.

The LOM metal prices of zinc, lead and silver used in the current economic analysis and in calculation of resources and reserves cut-off grades are average values provided by the issuer and reviewed and endorsed by InnovExplo. The pricing assumptions used are: 1.21 $/lb Zn, 1.09 $/lb Pb and 15.00 $/oz Ag.

Based upon review of relevant market study reporting, the issuer and InnovExplo have concluded that zinc macro-fundamentals are positive.

1.18 Environmental Studies, Permitting and Social or Community Impact

There are several environmental permits currently in place to cover mining and processing operations at El Mochito. These typically take the form of a certificate and a contract. At the present time, operations are carried out under terms of a Water Use Permit, a Mining Operations Environmental Permit and an Environmental Licence for the La Soledad TSF. All of these are issued through the Ministry of Natural Resources and Environment (“SERNA”). The company also has an environmental permit for its concentrate storage facility located in Puerto Cortés, which is issued by the Municipal Environmental Department. In addition, Ascendant maintains a forestry management plan authorized by The National Institute for Conservation and Forest Development, Protected Areas, and Wildlife (“ICF”).

1.19 Capital and Operating Costs

The capital and operating cost estimates presented in this PEA for the El Mochito mine are based on the Expansion Project including a new internal shaft (No. 8 shaft), an upgrade the underground pumping and water management system, and process plant from over 2,200 tpd (796 ktpy) to 2,800 tpd (1,000 ktpy).

Preparation of the site capital (Capex) and operating cost (Opex) estimate was developed using first principles and applying direct applicable project experience and avoiding the use of general industry factors. The site operating cost is based on owner-owned and operated mining/services fleets. All of the estimate inputs were derived from engineers, contractors, and suppliers who have provided similar services to existing operations and have demonstrated success in executing the plans set forth in this study.

All costs are presented in 2018 US dollars on a calendar year basis. No escalation or inflation is included. Operating costs were estimated using 2018 actual operating costs as a base, with projected cost savings calculated from the anticipated improvements arising from the Expansion Project. The Expansion Project would result in economic benefits.

Capex is divided into two sections. The first is Sustaining Capex, which is the annual capital expenditure in maintaining and sustaining ongoing operations every year in the traditional sense. These expenses are incurred concurrently with the Expansion Project which takes place in parallel. The second is Expansion Project (or project development) Capex, which encompasses all capital expenditures occurred in additional to Sustaining Capex during the first two years but specifically related to the Expansion Project, including the following:

- The construction and commissioning of the No. 8 subvertical shaft;
- The upgrade of the underground pumping and water management system; and
- The modification of the processing facilities to accommodate the anticipated increase in production from the mine, including surface crushing, concentrator, floatation, filtration and tailings disposal sections.

1.19.1 Operating cost

Total operating expenditure (Opex) is estimated to be 61.85 $/t milled after commission of the Expansion Project, and 63.55 $/t milled including variable and fixed costs over the life of mine (Table 21.1).

The implementation of the Expansion Project has the effect of reducing operating costs per tonne mined in the following ways:

- Underground truck hauling variable costs reductions, due to materially lower haul distances;
- Labour cost reductions through improved tonnage efficiencies (26% increase in tonnes milled)`;
- Pumping and power cost reductions as a result of the reduced number of pumps and lower pumping efficiencies generated by the improved water management and clarification systems; and
- Increased production revenue as a result of the higher throughput.

The above savings are partially offset by the following:

- Higher power usage costs from increased volumes mined and 8% increase volumes pumped as the mine grows;
- Higher labour costs during construction and partially higher after commissioning due to the increase in conventional mining methods; and
- Higher overall mining and maintenance costs as a result of increased utilization of equipment, even though unit maintenance costs per tonne will be lower.

1.19.2 Capital cost

Total LOM Capex for El Mochito amounts to $162.5M and includes site sustaining capex of $129.7M as well as the Expansion Project Capex (or development capital cost) estimate of $32.8M over the first two years of anticipated 10-year life of mine.

The total capital cost for the Expansion Project is $32.8M including $4.3M in contingency. This expenditure is expected to take place over the first 24 months development period after financing and includes funding for construction of the new subvertical shaft which will open the door to a ramp up in production volumes, an improved underground water pumping system and processing upgrades.

The capital cost presented in this report have been estimated in conjunction with El Mochito's management, operation team and engineering department, along with several manufacturers, contractors and consulting groups that have provided quotes for specific portions discussed in this report.

1.20 Economic Analysis

The economical/financial assessment of the Expansion Project was carried out using a discounted cash flow approach on a pre-tax and after-tax basis on the incremental production against the same mine plan at current production rates. An exchange rate of CAD1.30=USD1.00 was assumed to convert CAD cost components into USD.

The financial assumptions used for the financial model LOM plan are summarized in Table 22.1.

Lead and zinc concentrate Net Smelter Return ("NSR") estimates are based on produced lead concentrate grades of 60% Pb and zinc concentrate grades of 50% Zn.

An 8% discount rate was applied to the cash flow to derive the NPV for the Expansion Project on a pre-tax and after-tax basis. The after-tax financial model resulted in an internal rate of return of 58% and NPV of $83.0M with a discount rate of 8%.

The results for the project NPV and IRR are based on the sensitivities assumed in Table 22.2.

The LOM direct operating cost is 0.58 $/lb ZnEq payable after construction and the LOM all-in sustaining cost ("AISC") is expected to be 0.97 $/lb ZnEq payable after construction.

The economic analysis is based on Mineral Resources considered in the mining plan.

Inferred Mineral Resources have a lower level of confidence than that applied to an Indicated Mineral Resource. There is no certainty that this Preliminary Economic Assessment will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. It is reasonably expected that the majority of the Inferred Mineral Resources could be upgraded to an Indicated Mineral Resource with continued exploration and definition drilling.

1.21 Adjacent Properties

The authors are not aware of any adjacent properties as defined under NI 43-101 that are pertinent to the Mineral Resource and Mineral Reserve Estimates that are the focus of this report.

1.22 Other Relevant Data and Information

The authors are not aware of any other relevant data or information that is pertinent to the content of this Technical Report, inclusion of which is necessary to make this Technical Report understandable and not misleading.

1.23 Interpretations and Conclusions

1.23.1 InnovExplo interpretation and conclusion

The El Mochito mine is in its 70th year of operation and the mining infrastructure are expansive. Exploration drilling has demonstrated that the Mineral Resource is expected to increase in the eastern part of the mine as shown in Figure 16.1 and Figure 16.2. These new horizons are lower then the current bottoms of the No. 2 and No. 3 shafts.

In the last 18 months, the issuer has made substantial progress in reducing costs by over 30% as mentioned in the October 22, 2018 press release on the Expansion Project.

The issuer remains focused on creating value at the El Mochito mine and to unlock its full potential to deliver robust economics and free cash flow over the long term in any reasonable price environment.

The Expansion Project presented in this PEA consists of the following three principal areas of development:

- Installing of a new 442 m subvertical (or internal, vertical) rock-only hoisting shaft shortening the average underground truck hauling distances by 26%, increasing hoisting capacity, ventilation, services access and mining capacities. Shorter distances translate into additional trucking capacity and underutilized drilling and blasting equipment would be able to increase production by 26% without the need for additional mining equipment.

- Upgrading the underground pumping and water management system, reducing overhead costs by changing and reducing the number of pumps, rationalizing pumping columns and installing an effective water clarification system to pump clean water.
- Upgrading the crushing circuit, process plant and tailings handling capacity to meet the Expansion Project. This has the objective of continuing the optimization and growth strategy of the issuer.

With an increase in production of 27% in tonnes milled to 2,800 tpd or 1 Mt per year, an average annual operating cost saving of 17.76 $/t milled is anticipated against projected costs without this proposed infrastructure and a similar amount lower than reported mining costs at the time of writing. The Expansion Project represents a significant opportunity to bring the AISC down to less than 0.97 $/lb payable zinc equivalent per pound produced two years after the commencement of construction.

Apart from the cost benefits there would be improved and safer conditions underground as well as better ventilation. Clean water would be pumped to the surface of the mine, and more people will have work as a result of this project.

Risk and opportunities in relation to this project are outlined in Section 25.3.

InnovExplo concludes that this PEA can advance to detailed design and construction given that the mine is already producing and has the management team and third party support to execute on the project.

1.23.2 Mercator interpretation

The current Mineral Resource Estimate prepared by Mercator in conjunction with Ascendant staff during the August 2017 through January 2018 period established a substantial new Mineral Resource base for the El Mochito mine. The new Mineral Resource Estimate represents a significant increase in global tonnage and slight increase in ZnEq grade in comparison with the historical Mineral Resource base present at the time of Ascendant's acquisition of the El Mochito Mine from Nyrstar in late 2016. The increase in Mineral Resources reflects substantial expenditure by Ascendant, particularly related to underground delineation, infill and step-out drilling in near-mine positions such as Imperial-Barbasco (Esperanza), Salva Vida, Victoria, Porvenir and Santa Elena.

Mercator believes that near-mine strike extensions of the main mineralized zones along their currently defined trends represent the highest priority and lowest risk exploration target areas for continued near-term definition of new Mineral Resources at the mine. Very good exploration opportunities also exist along the known mineralized corridors at substantial distances from the operating mine, as exemplified by earlier success at the Big Fuzzy target area on the Victoria trend in 2007. Additional surface exploration to assess such away from mine target areas, initially sited along the strike extensions of the main mineralized corridors, could result in discovery of completely new mineralized centers having the potential to be similar in size and metal grades to those mined to date. These targets could be efficiently tested from surface using drilling equipment owned by Ascendant and should be systematically pursued in future. Careful interpretation of mineralizing system proximity indicators that are currently being collected by El Mochito staff, such as zonation trends in metals, calc-silicate mineral assemblage ratios, calcite fluorescence mapping and pyroxene mineral chemistry, also have potential to play key roles in development and assessment of new exploration drilling targets. These should be collectively applied to maximum advantage.

Sustained access to both surface and underground core drilling meterage on a yearly basis will be required to properly address ongoing Mineral Resource definition, infill, step out and exploration requirements at the El Mochito Mine. Continuation of core drilling programs at the current level of approximately 40,000 m/y will be necessary to keep pace with planned production and associated depletion of Mineral Resources. This level of drilling is fully warranted, based upon the demonstrated strong potential for both expansion of Mineral Resources and discovery of entirely new mineralized zones in and around the El Mochito Mine.

1.23.3 P&E interpretation and conclusion

A fully credible strategy has been developed to increase the processing plant capacity to 2,800 tpd. This strategy addressed seven different “bottlenecks” and would cost $6.2M. Major process improvements include modifications to handle very wet ROM mineralized materials, installation of screens in grinding and the installation of modern flotation equipment. Concentrate filtration is also a capacity bottleneck – poorly performing disc filters will be replaced by industry-standard pressure filters that will reduce concentrate moisture to acceptable levels for transport.

Tailings pumping capacity will also be increased and clarified tailings water will be returned to the process plant. Magnetite is a signifcant gangue mineral in the El Mochito mineralization and tends to report to lead and zinc concentrate, reducing product grade. A process modification is under development to remove some of the magnetite using existing, idle magnetic separators. A magnetite concentrate would be sold or stockpiled for future sale.

The pre-engineering and planning of all of the debottlenecking and process improvements are well laid out and will be implemented without process plant interuptions.

1.24 Recommendations

1.24.1 InnovExplo recommendations

Several recommendations are proposed for the Expansion Project that have the same objectives of reducing the risk to the operation and maximizing the chance of success.

The issuer’s estimation of costs and proposal for the No. 8 Shaft are based on several quotes dating from spring of 2018. With this PEA demonstrating positive results, InnovExplo’s view is that all quotes should be confirmed along with the contractor’s execution timing. Contacting other contracting firms could also reposition costs and time frame for job completion.

The lower portion of the No. 8 Shaft including the shaft orepasses, belt level and shaft bottom will be situated in Todos Santos sandstone formation, which presents some geotechnical challenges. Mining development in this type of ground will have to be done at a slower pace with shorter advances per blast and be adequately supported to suit the poorer ground conditions. The use of shotcrete in these types of permanent excavation is strongly recommended. This may increase ground support costs and time to complete when comparing with standard ground support in more competent ground.

In mineral movement from the No. 8 Shaft discharge bin to the No. 2 Shaft bin could be automated and this option should be analyzed. Horizontal mineral movement on 2350L level has traditionally been by track and train, which involves manpower. Mine personnel are subjected to shift change restrictions and must be evacuated when blasting occurs in the mine. While these are normal and good practices regarding employee safety, the result is a non-productive period. The option of automation and the use of another system like a conveyor belt could help maintain productivity even between shifts. This option, or an alternative, could be attractive in a case like this with a short distance of approximately 200 m. When looking at a production increase to 1 Mt per year, mineral hoisting may need to take place over 2.5 shifts per day with exceptions for shaft maintenance and repairs. With the automation of a transport system, the operation could be carried out from surface and under camera surveillance.

The development rate estimates used in this PEA reflect what is currently achieved by mining operations.

– Estimated daily advance rates (Table 16.4)

Development **(In either waste or mineral)**	**LOM plan description** **Type**	**Excavation size** **m (ft)**	**Advance** **m/d (ft/d)**
Jumbo	Hz Development, Jumbo @ 15'×15'	4.47 m x 4.47 m (15 ft x 15 ft)	19.2 (63)
Jackleg	Hz Development, Jackleg @ 10'×12'	2.74 m x 2.74 m (9 ft x 9 ft)	6.4 (21)
	Subhorizontal Raise, Jackleg @ 6'×9'	3.66 m x 3.66 m (12 ft x 12 ft) W Slusher	5.5 (18)
	Sublevel, Jackleg @ 6'×6'	1.82 m x 1.82 m (6 ft x 6 ft) W Slusher	3.7 (12)
	Sublevel, Jackleg @ 9'×9'	2.74 m x 2.74 m (9 ft x 9 ft)	5.5 (18)
Raises	Subvertical Alimak, Stoper @ 8'×8'	2.44 m x 2.44 m (8 ft x 8 ft) W Alimak	2.1 (7)
	Subvertical Raise, Borer @ 5'Ø	1.52 m x 1.52 m (5 ft x 5 ft) W Raise	7.3 (24)
	Subvertical Raise, Stoper @ 5'×5'	1.52 m x 1.22 m 5 ft x 4 ft	3.0 (10)

Development	LOM plan description	Excavation size	Advance
		W Raise	

In order to sustain theses development rates over the LOM, the mechanical availability of fixed mobile equipment will be very important. The percentage of availability mentioned in Section 16.6.1 will decrease as years pass. Naturally, the planned rebuilds and equipment replacement schedule will address this in terms of the mobile fleet, but a constant focus on continuous improvement and preventative maintenance programs will need to be carefully managed on fixed equipment and smaller machines such as hand held jacklegs, scraper winches and Alimak machines.

Three principle mining methods are used in this PEA for production from stoping. When looking over the LOM, long hole methods will account for 54.5% of the total stoping tonnes, cut & fill methods for 17.2% and conventional slusher stoping methods for 28%. Contribution from shrinkage stoping will be negligeable.

A geotechnical report issued in October 2018 by Ingeroc includes recommendations for additional uniaxial and triaxial compressive strength tests to be conducted at an external laboratory to improve the mine's database for design assumptions. It has been further recommended that the existing GSI ground support system be replaced with the better suited Q-Barton system.

The mine should create a steering committee combining engineering and operations to analyze and address potential deficiencies in the current backfill system and make the necessary changes to meet the higher production rates anticipated in this PEA. Specifically, the committee should investigate the installation of secondary and tertiary backfill ranges for continuouos distribution to mitigate risk to the system. With respect to the excavation of the three orepasses illustrated in Figure 16.5 of Section 16.3.2, the type of ground might not be suitable for the blasting of three orepasses in such close proximity to one another. The concern is that they might join due to spalling and become one big orepass. Blasting of the raise that feeds the crusher should be the last to be completed to understand and react to the local conditions and what type of ground support it will require. Shotcrete, cables, long rock bolts, or even a combination may be necessary. It is possible that raise boring might be preferable to conventional blasting to reduce blasting stresses in the rock mass. Since a large tonnage is expected to pass through these orepasses during the LOM, the appropriate measures need to be taken to protect them.

Dewatering the mine from a sequence of planned drain holes above the future workings and from wells drilled beneath the deepest parts of the mine should be considered from an engineering and geological perspective. Infiltration from surface into the upper levels, including from drainage tunnel on 650L (Caliche Tunnel), should be captured on the upper levels and diverted to the nearest pump station before it has to be pumped from a lower elevation. The mine should create a special committee with independent hydrologists and structural geologists to focus on understanding water inflow in the mine and implement a plan to reduce and control groundwater.

A two-phase work program to commence this hydrological project has been recommended and is expected to cost approximately $180,000 with contingencies.

1.24.2 Mercator recommendations

The following recommendations reflect results of the current El Mochito Mineral Resource Estimate, associated technical reviews and site visit programs carried out by Mercator:

- Near-mine Mineral Resource expansion opportunities should continue to be systematically developed through underground core drilling to establish drilling intercepts at short step outs from the existing Mineral Resource solid limits. Priority should initially be focused on manto extensions because of their larger surface areas and then progress to chimney definition where positive indications are present. The northern extent of the Imperial-Barbasco-Esperanza trend, the eastern limits of the SalvaVida and Porvenir trends and along the southeast limits of the Victoria trend are high priority areas.
- Evaluation of non-mine area surface drilling target opportunities along all of the major mineralized structural corridors should be carried out.
- A planning program should be undertaken to assess optimum underground drilling station locations for future drill testing of the major mineralized trends, with priority given to those mentioned above. This should include assessment of old workings areas above the Mochito Shale that could be refurbished to provide favorable drilling equipment positioning.
- Funds should be budgeted on a yearly basis to cover drifting and cross cutting required to establish access to the optimum underground core drilling setups.
- The current QAQC protocol for drill core should be reviewed and possibly amended to include periodic, systematic check sample pulp split analyses carried out at a fully accredited independent laboratory to monitor primary laboratory results.
- The current density determination protocol should be reviewed to assess potential for streamlining. Study of exceptionally high and low density values generated on-site for core samples should also be completed.
- An assessment of the current use of calcite fluorescence and garnet mapping data should be completed to ensure that maximum benefit is being realized from these potentially important mineralized zone vectors. A study assessing routine application of pyroxene chemistry as a mineralized system vector is also advisable, with results of all of these to be fully integrated in future exploration planning strategies.
- Results of the currently on-going surface exploration and old mine workings compilation programs should be incorporated with 3D structural modeling of the El Mochito district to better define new regional and mine scale exploration opportunities.
- Detailed assessments of all significant known mineralized surface prospects should be carried out to clearly establish their potential and exploration significance.
- Downhole surveying data are currently subject to magnetic field interference that can result in erroneous azimuth data being recorded in areas of high magnetite or pyrrhotite content. This results in hole trace inaccuracies and difficulties in interpretation of drilling results, particularly for long exploration holes. To counter this

problem, consideration should be given to use of a multi-shot, gyroscopic system not affected by magnetic susceptibility variations.

1.24.3 P&E recommendations

The following are aspects representing opportunities for improverment in the process plant debottling and tailings management to achieve a processing capacity of 2,800 tpd:

- For the installation of mineral washing capacity in the crushing circuit, the installation of head pulley belt spray washing and recycling of wash water could be considered,
- Oversize rocks could be rejected by a grizzly at the first conveyor discharge for mechanical rock breaking. This would replace to manual rock breaking method,
- While the replacement of existing, poor performing flotation cells with modern equipment is warranted, a larger number of new, smaller cells in rougher circuits could provide more operational flexibility and reduce the potential for slurry short circuiting,
- At least one slurry conditioner could be considered for the lead circuit,
- The re-introduction of a magnetite recovery circuit could benefit from significant laboratory testwork to identify the optimum location in the flotation circuit for installation of magnetic separators,
- The tailings line sanding out phenomenon could be addressed with the installation of a dedicated genset which could remedy the result of frequent power interuptions,
- The tailings storage capacity of the El Soledad facility could be increased by the implementation of thickened tailings disposal. Thickening would be performed at the edge of the facility, and
- Consideration of recycling clarified tailings water to the process plant is an excellent consideration and will significantly reduce fresh water demand. Extensive testing will be required to ensure recycled water does not negatively impact flotation performance. The very large volumes of mine water currently discharged to the environment could be considered an alternative source of water for the new crusher plant washing circuit and for the process plant.

2. INTRODUCTION

This Technical Report was prepared for Ascendant Resources Inc. ("Ascendant"), who mandated InnovExplo Inc. ("InnovExplo"), in collaboration with Mercator Geological Services Limited (Mercator) and P&E Mining Consultants Inc. (P&E), to do the Preliminary Economical Assesment study (the "PEA") on the Mineral Resource estimates for the El Mochito Mine Project (the "Project" or the "ElMochito Project") and to prepare a supporting technical report (the "Technical Report").

The Technical Report has been prepared in accordance with Canadian Securities Administrators' National Instrument 43-101 Respecting Standards of Disclosure for Mineral Projects ("NI 43 101" or "43 101") and its related Form 43 101F1.

Accordingly, all previous Mineral Resource and Mineral Reserve estimates have been replaced by the Mineral Resource Estimate in this report, and the previous Mineral Reserve Estimate with an effective date of January 19, 2018 is no longer valid. The Mineral Resource Estimate is unmodified from that reported at the effective date of January 1, 2018.

Innovexplo inc. was retained by Ascendant to assist with the mining engineering (mining methods), the surface infrastructure description, the market studies and contracts and the economic analysis as well as the integration of the report. InnovExplo is an independent mining and exploration consulting firm based in Val-d'Or (Québec).

Mercator was retained by Ascendant in August of 2017 to assist with review and updating of Mineral Resources for the company's El Mochito underground zinc-lead-silver mine in Santa Barbara Department, Honduras. Mercator's role was subsequently expanded to include preparation of a Mineral Resource Estimate and associated Technical Report in accordance with National Instrument 43-101 (NI43-101), the Canadian Institute of Mining, Metallurgy and Petroleum Definition Standards for Mineral Resources and Mineral Reserves (the "CIM Definition Standards") and associated best practice guidelines. Mercator staff visited the El Mochito mine on two separate occasions in support of the Mineral Resource estimation program referred to above, these being from August 19, 2017 to September 6, 2017 and from February 9, 2018 to February 22, 2018.

P&E Mining Consultants Inc. (P&E) was retained by Ascendant to assist with the review of metallurgical testwork, process plant operations and recovery methods, engineering of process plant capacity expansion and the integration of the report. P&E is an independent mining and exploration consulting firm based in Ontario. The portions of this Technical Report pertaining to milling and metallurgy were prepared by and D. Grant Feasby, P.Eng. under the direction of P&E President, Eugene Puritch, P.Eng., FEC, CET. Each of these individuals is an independent Qualified Persons ("QP") as defined by National Instrument 43-101 by reason of education, affiliation with a professional association and past relevant work experience.

As part of the reporting requirements for a Mineral Company listed under the TSX Stock Exchange regulations, it is necessary that Mineral Resources and Mineral Reserves be stated in accordance with international reporting standards. To satisfy this requirement, P&E has carried out its assignment in accordance with NI 43-101, the CIM Standards and associated best practices guidelines.

2.1 Issuer

Ascendant Resources Inc. ("Ascendant") is a Canadian corporation with head offices located at 79 Wellington Street West, TD Tower South, Suite 2100. Toronto Dominion Centre, Toronto, Ontario, Canada. The company is listed on the Toronto Stock Exchange (TSX) in Canada, where its securities trade under the symbol ASND, and also on the Over the Counter (International) Exchange (OTCQX) in the United States, where its securities trade under the symbol ASDRF.

It focused on its flagship 100%-owned producing El Mochito zinc, lead and silver mine in west-central Honduras, which has been in production since 1948. After acquiring the mine in December 2016, Ascendant spent 2017 implementing a rigorous and successful optimization program restoring the historical potential of El Mochito delivering record levels of production with profitability restored. The Company now remains focused on cost reduction and further operational improvements to drive robust profitability in 2018 and beyond. Expanding and upgrading El Mochito's significant current Mineral Resource base through exploration work for near-mine growth is an ongoing focus for the Company. With a significant land package of 11,000 ha in Honduras and an abundance of historical data, there are several regional targets providing longer term exploration upside which could lead to further Mineral Resource growth.

Ascendant also holds an interest in the high-grade polymetallic Lagoa Salgada VMS Project located in the prolific Iberian Pyrite Belt in Portugal. The Company is engaged in exploration of the Project with the goal of expanding already substantial defined Mineral Resources and testing additional known targets. The Company's acquisition of its interest in the Lagoa Salgada Project offers a low-cost entry point to a potentially significant exploration and development opportunity. The Company holds an additional option to increase their interest in the Project upon completion of certain milestones.

2.2 Terms of Reference

The El Mochito Property is located in north-western Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. Production began in 1948 and has continued for 70 years almost continuously. The Property consists of an underground zinc-lead-silver mine and a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and then shipped once sufficient material is stockpiled. The mineral resource is expected to increase in the eastern part of the mine and these new horizons are lower then the current shaft bottom of shaft No. 2 and shaft No. 3

The Technical Report integrates the Expansion project based on three principal areas of development:

- Installation of a new 442 m subvertical rock-only hoisting shaft;
- Upgrading the underground pumping & water management system;
- Upgrading the crushing circuit, process plant, and tailings handling capacity.

Historical details, geological information (local and regional) and general information relevant to the mine are described.

The mineral resource estimate presented herein was taken from the previous 43-101 technical report prepared by Mercator Geological Services and P&E Mining Consultants inc (Cullen and al., 2018).

2.3 Report Responsibility and Qualified Persons

This Technical Report was prepared for the issuer by Innovexplo, Mercator and P&E. Authors are listed in Table 2.1 and are all Independent Qualified Persons (QP) as defined by National Instrument 43-101. Innovexplo was responsible for collection and collation of all report content, including that sourced from Mercator, P&E and Ascendant, and for production of the Technical Report in conformance with NI 43-101.

Table 2.1 – Qualified persons item section responsibilities

Qualified Person	Consultant	Item/Section Responsibility
Michael Cullen, P.Geo.	Mercator Geological Services Limited,	The Mineral Resource Estimate content. Author for items: 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 23. Co-Author for items: 1, 2, 3, 20, 21, 25, 26 and 27
Eric Vinet, P.Eng.	InnovExplo Inc.	The Mining engineering content. Author for items: 15, 16, 19 and 22 Co-Author for items: 1, 2, 3, 18, 21, 25, 26 and 27
D. Grant Feasby P.Eng.	P&E Mining Consultants Inc.	The Metallurgical, processing and environmental technical contents. Author for items: 13, 17 and 20. Co-Author for items: 1, 2, 3, 18, 21, 25, 26 and 27
Patrick Toth, P.Geo.	Ascendant Resources inc.	Author for items: 24.

2.4 Sources of Information and Data

The reports and documentation listed in Item 3 and Item 27 were used to support the preparation of this Report. Sections from reports authored by other consultants may have been directly quoted or summarized in this Report and are so indicated, where appropriate. As part of the mandate, the QPs have reviewed the following with respect to the ElMochito Project: the mining titles and their status at the effective date of this report, agreements and technical data supplied by the issuer (or its agents); and the issuer’s filings on SEDAR (press releases and MD&A reports).

InnovExplo has no known reason to believe that any of the information used to prepare this Technical Report is invalid or contains misrepresentations. The authors have sourced the information for the Technical Report from the collection of reports listed in Item 27.

InnovExplo conducted a review and appraisal of the information used to prepare the Technical Report, including the conclusions and recommendations. InnovExplo believes this information is valid and appropriate considering the status of the project and the purpose for which the Technical Report is prepared. By virtue of their technical review of the Project, the independent consulting firms involved in the Technical Report affirm that the work program and recommendations presented herein are in accordance with NI 43 101 criteria and CIM Definition Standards fpr Mineral Resources and Mineral Reserves ("CIM Definition Standards").

None of the QPs involved in the Technical Report have, or have previously had, any material interest in the issuer or its related entities. The relationship with the issuer is solely a professional association between the issuer and the independent consultants. This Technical Report was prepared in return for fees based upon agreed commercial rates, and the payment of these fees is in no way contingent on the results of the Technical Report.

Ascendant provided access to both current and historical hard copy and digital records and reports from both public and internal sources that pertain to the El Mochito mining operation. This includes the 2018 NI 43-101 Technical report (Cullen at al., 2018), the Micon (2016) NI 43-101 Technical Report filed by Morumbi (Ascendant) in 2016 as well as the most recent NI 43-101 Technical Report preceding that, which was prepared by Breakwater Resources Ltd. (Breakwater) in 2010 (Breakwater, 2010). All QPs were also provided access to Mineral Resource and Mineral Reserve technical data, drilling and sampling databases, block models and related digital solid models while working with Ascendant staff during respective site visits and thereafter.

Ascendant staff at the El Mochito site provided guidance additional to that obtained through written reporting through extensive technical discussions carried out during and following the site visits by Innovexplo, Mercator and P&E.

2.5 Site Visits

QPs visited the site as resume in Table 2.2.

Table 2.2 – Site visits

Qualified Person and other visitors	Consultant	Date of the visit	Portion of the mine visited
Michael Cullen, P.Geo.	Mercator Geological Services Limited,	August 23 to September 6, 2017 February 14 to 21, 2018	Active underground mining areas of Esperanza and Santa Rita zones, • Soledad tailings facility plus decomissioned sites, • Surface exploration drilling sites, • Geological outcrop locations on mine property, • Core storage facilities and logging facilities, • Milling facility, • Sample preparation facilityMine laboratory facility
Eric Vinet, P.Eng.	InnovExplo Inc.	August 3-4-5, 2018	Surface installation, underground 2100L, long hole stope on 2100L, future cut out for hoist room on 2100L, and: • surface shops, • portal,

Qualified Person and other visitors	Consultant	Date of the visit	Portion of the mine visited
			• surface garage, • sedimentation bassin, • ventilation raises, • electrical installations, • exit of Caliche tunnel, • main offices, compressor room, • surface ore handling system, • camp, • surface infrastructures.
D. Grant Feasby, P.Eng.	P&E Mining Consultants Inc.	February 20-23, 2018	• Crushing Circuit • Process Plant • Laboratory • Tailings Facilities
Patrick Toth, P.Geo.	Ascendant Resources inc.	Working continuously on site since November 2017 to the present.	

2.6 Study Contributors

In addition to the principal authors and QPs, the following people from InnovExplo, Mercator and P&E presented in Table 2.3 were also involved in the preparation of the Technical Report.

Table 2.3 – Primary PEA contributors

Contributor name	Task achieved
Geneviève Auger, Eng., Senior Mining Engineer, InnovExplo;	• Redaction of items 2 and 3; • Supervised the assemblage of the report.
Marcel St-Laurent, Eng., Senior Mining Engineer, InnovExplo;	• Technical Report integration; • Redaction of items 16, 21 and 22;
Venetia Bodycomb, M.Sc., Vee Geoservices	Provided a critical review and linguistic editing of a draft of the Technical Report.
Matthew Harrington, P. Geo., Senior Resource Geologist, Mercator	Review of Report Section 14 - Mineral Resource Estimates

2.7 Effective Date

The effective date of the Technical Report is October 22, 2018.

2.8 Currency, Units of Measure, and Abbreviations

A list of abbreviation and acronyms used in this report is provided in Table 2.4. All currency amounts are stated in American Dollars (USD or $), unless otherwise specified. Quantities are stated in metric units, as per standard Canadian and international practice, including tonnes (t) and kilograms (kg) for weight, km (km) or m (m) for distance, ha (ha) for area, and gram per tonne (g/t) for gold grades. Table 2.5 provides a list of all units used in this report. Wherever applicable, imperial units have been converted to the International System of Units (SI units) for consistency (Table 2.6).

Table 2.4 – List of abbreviation and acronyms

Abbreviation or Acronyms	Term
43-101	National Instrument 43-101 (Regulation 43-101 in Québec)
a	Annum
AA	Atomic absorption spectroscopy
Ag	Silver
AISC	All in sustaining cost
ANFO	Ammonium nitrate fuel oil
ARD	Acid rock drainage
Au	Gold
Bi	Bismuth
C/F	Cut and fill
CAD	Canadian dollar
CAD:USD	Canadian-American exchange rate
CAPEX	Capital expenditure
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CIM Definition Standards	CIM Definition Standards for Mineral Resources and Mineral Reserves
CN	Cyanide
CoG	cut-off grade
CV	Coefficient of variation
DDH	Diamond drill hole
DGRH	General Directorate of Water Resources
EBITDA	Earnings before interest, taxes, depreciation and amortization
ENEE	Empresa Nacional de Energía Eléctrica, National Electric Power Co.
EPCM	Engineering, procurement, construction, management
Fe	Iron
FOB	Freight on board
FS	Feasibility study
G&A	General and administration
GAAP	Generally accepted accounting principals

GDP	Gross domestic profit
GSI	Geological strength index
HDPE	High density polyethylene
ICF	National Institute for Conservation and Forest Development, Protected Areas, and Wildlife (Honduras)
ID2	Inverse distance squared
INHGEOMIN	Honduran Institute of Geology and Mining, Institutto Hondureño de Geologia y Mineras
IRR	Internal rate of return
ISO	International Organization for Standardization
IT	Information technology
JORC	Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy
L/H	Long hole
LLDPE	Linear low density polyethylene
LOM	Life of mine
MD&A	Management's Discussion and Analysis
mesh	US mesh
ML	Metal leaching
MRE	Mineral resource estimate
N/A, n/a	Not available, not applicable
NI 43-101	National Instrument 43-101 (Regulation 43-101 in Québec)
NPV	Net present value
NSR	Net smelter return
NTU	Nephelometric Turbidity Unit
OEM	Original equipment manufacturer
OK	Ordinary kriging
OPEX	Operational expenditure
Pb	Lead
PbT	Total lead concentration
PEA	Preliminary economic assessment
P.Eng.	Professional engineer
P.Geo.	Professional geologist
Q	Value expressing quality of rock mass (Q-system for rock mass classification)
QA	Quality assurance
QAQC	Quality assurance/quality control
QC	Quality control
QP	Qualified person (as defined in National Instrument 43-101)

Regulation 43-101	National Instrument 43-101 (name in Québec)
RMR	Rock mass rating
ROM	Run of mine
RQD	Rock quality designation
SERNA	Secretary of Natural Resources and Environment
SG	Specific gravity
SH	Shrinkage stoping
TSF	Tailings storage facility
TSS	Total suspended solids
UCS	Uniaxial compressive strength
UG	Underground
UTM	Universal Transverse Mercator coordinate system
VMS	Volcanogenic massive sulphide
WGS 84	World geodetic system 1984
Zn	Zinc

Table 2.5 – List of units

Symbol	Unit
%	Percent
$, US$	American dollar
$/t	Dollars per metric ton
°	Angular degree
°C	Degree Celsius
cc	Cubic centimetre
cfm, CFM	Cubic feet per minute
cm	Centimetre
cm^3	Cubic centimetre
d	Day (24 hr)
ft, ‘	Foot (12 inches), feet
g	Gram
g/cm^3	Gram per cubic centimetre
g/t	Gram per metric ton (tonne)
GPM, gpm	Gallons per minute
h, hr, hrs	Hour (60 minutes)
h/d	Hours per day
ha	Hectare

hp	Horsepower
Hz	Hertz
in	Inch
k	Thousand (000)
kg	Kilogram
kg/t	Kilogram per metric ton
kj	Kilojoule
km	Kilometre
kl	kilolitre
koz	Thousand ounces
kt	Kiloton
ktpy	Kiloton per year
kV, KV	Kilovolt
kW	Kilowatt
kWh	Kilowatt-hour
kWh/t	Kilowatt-hour per metric ton
L	Litre
lb, lbs	Pound, pounds
L/h	Litre per hour
L/s	Litre per second
M	Million
m	Metre
m^2	Square metre
m^3	Cubic metre
m/y	Metre per year
m^3/h	Cubic metres per hour
m/s	Metre per second
Ma	Million years (annum)
masl	Metres above mean sea level
mi	Mile
min	Minute (60 seconds)
ml	millilitre
Mlbs	Million pounds
mm	Millimetre
Moz	Million (troy) ounces
MPa	megapascal
Mt	Million metric tons
MVA	Megavolt ampere

MW	Megawatt
oz	Troy ounce
oz/t	Ounce (troy) per short ton (2,000 lbs)
pH	Potential of Hydrogen, a measure of acidity or alkalinity of water soluble substances
ppm	Parts per million
rpm	Revolutions per minute
t	Metric tonne (1,000 kg)
ton	Short ton (2,000 lbs)
tpy, t/y, tpa	Metric tonnes per year (annum)
tpd	Metric tonnes per day
tph, t/h	Metric tonnes per hour
USD, US$	American dollar
USgal	US gallon
usgpm	US gallons per minute
V	Volt
WMT	Wet metric tonne
XRF	X-ray fluorescence
y	Year (365 days)
ZnEq	Zinc equivalent

Table 2.6 – Conversion factors for measurements

Imperial Unit	Multiplied by	Metric Unit
1 in	25.4	mm
1 foot	0.3048	m
1 acre	0.405	ha
1 gallon	3.79	litres
1 ounce (troy)	31.1035	g
1 pound (avdp)	0.4535	kg
1 ton (short)	0.9072	t
1 ounce (troy) / ton (short)	34.2857	g/t

3. RELIANCE ON OTHER EXPERTS

The authors relied on the following sources for information that is not within the QPs fields of expertise:

- The issuer supplied information about mining titles, option agreements, royalty agreements, environmental liabilities and permits. Neither the QPs nor InnovExplo are qualified to express any legal opinion with respect to property titles or current ownership and possible litigation.
- The issuer supplied technical information through internal technical reports and various communications. While exercising all reasonable diligence in checking, confirming and testing the data, and in formulating opinions and conclusions, InnovExplo relied on the issuer for project data and any available information generated by previous operators.

The reports and documentation listed in Item 3 and Item 27 were used to support the preparation of this Report. Sections from reports authored by other consultants may have been directly quoted or summarized in this Report and are so indicated, where appropriate. As part of the mandate, the QPs have reviewed the following with respect to the ElMochito Project: the mining titles and their status on the effective date of this report, agreements and technical data supplied by the issuer (or its agents); and the issuer's filings on SEDAR (press releases and MD&A reports).

InnovExplo has no known reason to believe that any of the information used to prepare this Technical Report is invalid or contains misrepresentations. The authors have sourced the information for the Technical Report from the collection of reports listed in Item 27.

Ascendant provided access to both current and historical hard copy and digital records and reports from both public and internal sources that pertain to the El Mochito mining operation. This includes the 2018 NI 43-101 Technical report (Cullen at al., 2018), the Micon (2016) NI 43-101 Technical Report filed by Morumbi (Ascendant) in 2016 as well as the most recent NI 43-101 Technical Report preceding that, which was prepared by Breakwater Resources Ltd. (Breakwater) in 2010 (Breakwater, 2010). All QPs were also provided access to Mineral Resource and Mineral Reserve technical data, drilling and sampling databases, block models and related digital solid models while working with Ascendant staff during respective site visits and thereafter.

Ascendant staff at the El Mochito site provided guidance additional to that obtained through written reporting through extensive technical discussions carried out during and following the site visits by Innovexplo, Mercator and P&E.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 Mining Concessions and Surface Rights

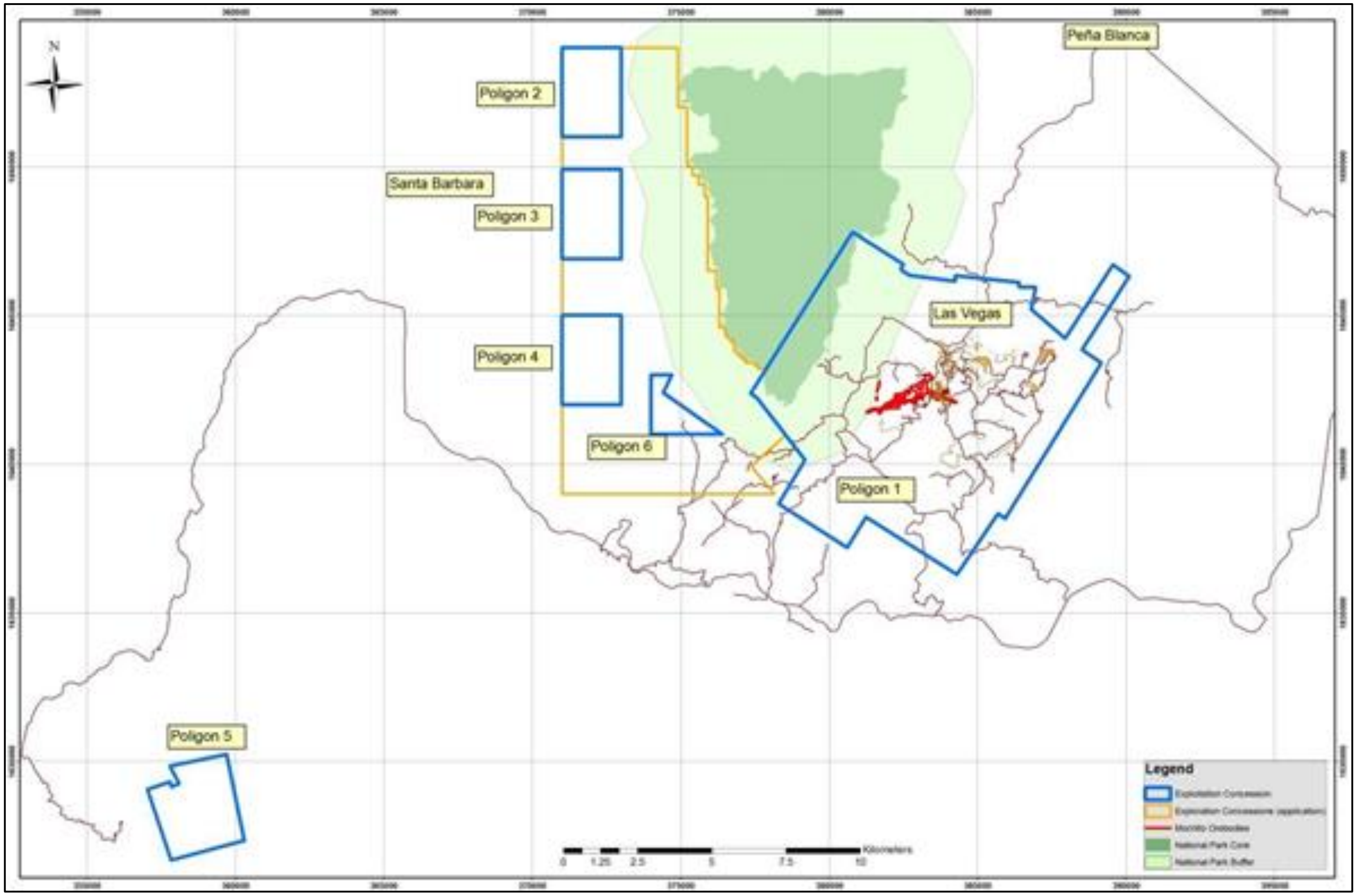
The El Mochito Property (the "Property") consists of six associated mining concessions and related surface titles (collectively, the "Concessions") in the west-central area of Honduras, Central America (Figure 4.1 and Figure 4.2). The largest concession is adjacent to the town of Las Vegas (Santa Barbara Department), four others lie several kilometres to the west, and the fifth is roughly 25 km to the southwest. The Property and mine are held by American Pacific Honduras S.A. de C.V ("AMPAC"), the wholly owned Honduran subsidiary of Ascendant. The Concessions have a total surface area of approximately 11,000 ha. Table 4.1 presents details of the Concessions, the titles to which were confirmed in 2014 by the Honduran Institute of Geology and Mining ("INHGEOMIN", or *Institutto de Geologia y Mineras).* In Honduras, concessions are held under terms of the *Mining General Law* (2013) that is administered by INHGEOMIN. Ascendant provided an independent Corporate and Real Property legal opinion dated March 6, 2017 regarding the currency of their holdings in Honduras, inclusive of the Exploitation Concessions, a copy of which appears in Appendix I.

The Concessions grant AMPAC (and therefore Ascendant) the exclusive right to explore for and produce metals from included areas, subject to the acquisition of requisite environmental and operating permits. AMPAC separately holds surface rights over a substantial portion of the area covered by the Concessions. Concessions in Honduras are held under terms of the Mining General Law (2013) that is administered by INHGEOMIN. Appendix I provides an outline of this area covered by surface rights, along with the boundary coordinates for the Concessions and a detailed map that identifies the constituent holdings of each concession.

Table 4.1 – Concessions held by ascendant

Concession Name	Polygon (Figure 4.2)	Area ha
El Mochito 1	1	**8,199**
El Mochito 2	2	**600**
El Mochito 3	3	**600**
El Mochito 4	4	**600**
El Mochito 5	5	**770**
El Mochito 6	6	**229**
	Total	**10,998**

Figure 4.1 – Map of Honduras showing the location of the El Mochito Property and mine (red star)



Source: Ascendant

Figure 4.2 – Map of the six El Mochito mining concessions

According to Ascendant, the El Mochito Concessions and related titles were in good standing at the effective date of this report and that they will remain in effect until 2027, at which time they will expire or be subject to renewal.

4.2 Mining Exploration and Mining Tenure in Honduras

The acquisition and management of mineral exploration and mining rights in Honduras is governed by the *Mining General Law* (2013) and its associated regulations. The regulatory agency responsible for application and enforcement of this legislation is the INHGEOMIN, which has a scope of regulatory responsibility that includes all mining, exploration and associated environmental matters. Mining concessions are granted for a period of 40 years and may be renewed for an additional 20 years, subject to payment of all related taxes, fees and other assigned charges.

4.3 Royalties and Taxes

The El Mochito operation is subject to a 5% net smelter return ("NSR") royalty payable on metal produced from the site. Corporate income taxes are also payable at rates assigned by the government, which in 2017 was 25% of the mine's net revenue after losses carried forward.

4.4 Environmental Liabilities

Ascendant advised Mercator that at the effective date of this report it was not aware of any environmental liabilities on the Property that are not addressed under the terms of existing mining, milling and environmental certificates, permits or authorizations issued by the government of Honduras.

4.5 Permits, Certificates and Authorizations

As noted in the issuer's 2017 Annual Information Form submitted to Securities Regulatory Authorities in Canada, Ascendant (through AMPAC) is in possession of environmental licences for the tailings and concentrate storage facilities at the El Mochito site. On May 9, 2018, Ascendant was issued a licence for its mining operations by the Honduran Ministry of Energy, Natural Resources, Environment and Mines (MIAMBIENTE). Previously, AMPAC had applied for such licencing in 2003 and reached an agreement at that time with MIAMBIENTE to establish a full suite of environmental mitigation measures defined under the terms of associated contracts. While the environmental certificate associated with the original application was never issued, AMPAC legally operated the El Mochito site under the terms of a letter of authorization issued by MIAMBIENTE and an executed agreement between AMPAC and MIAMBIENTE. These allowed operations of the mine subject to compliance with specified safety and environmental conditions.

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

5.1 Accessibility

The El Mochito mine and related exploration holdings are adjacent to the town of Las Vegas, Santa Barbara Department, in the west-central area of Honduras (see Figure 4.1). The capital city of Honduras, Tegucigalpa (population ~1.2 M), is situated 220 km to the southeast, and the city of San Pedro Sula (population 1.2 M) is located 88 km to the northeast. Both are accessible from the mine site via paved highway CV-5 and associated secondary highways that connect the mine site with CV-5. Approximate coordinates for the mine site are latitude 14˚49'59" North and longitude 88˚4'59" West (WGS 84). The community of Las Vegas (population ~35,000) is the residential community for most of the mine's work force.

Access to all facilities on the El Mochito mine site is afforded by an extensive system of good quality gravel roads that are maintained by the company. These include large haul roads for transporting mineralized material from the main shaft area to the mill, as well as smaller two-lane roads that serve all the other facilities.

Access to the other concessions is more limited, typically restricted to single lane roads that are not regularly maintained. Certain parts of the concessions can only be accessed via small farm trails that require the use of four-wheel drive vehicles or are not passable to motorized vehicles without upgrading.

5.2 Climate

The climate in this area of Honduras is humid-subtropical, with average maximum temperatures ranging from 29°C to 34°C in the warmest period from July to October. The mine site's elevation at 900 masl results in lower average temperatures and lower humidity than seen in nearby areas located closer to sea level. Minimum average temperatures range from 16°C to 25°C. Annual rainfall is approximately 2,300 mm, mostly as sudden downpours during the rainy season between March and November. Weather conditions on the Property do not impede normal mining operations, which carry on continuously year-round.

5.3 Local Resources

Las Vegas has basic goods and services, but specialized professional or mechanical services must be obtained further afield in such locations as San Pedro Sula or Tegucigalpa. International and domestic airline services are available at both of these locations and a paved highway system extends northwestward through Guatemala to Mexico and the United States. Similarly, paved highways also reach Nicaragua and South America to the south, and El Salvador to the west.

Access to ocean-going commercial vessels is primarily through port facilities at Puerto Cortés on the Atlantic coast, a distance of approximately 55 km north by highway north from San Pedro Sula or 155 km from El Mochito. Concentrate from El Mochito is shipped by truck to Puerto Cortés where it is stored for later shipment via ocean-going vessels.

5.4 Infrastructure

Major infrastructure components on the El Mochito site include the following:

- A 2,350 tpd nameplate milling/processing facility (the “mill”)
- One active and several inactive tailings storage facilities
- On-site staff accommodation and dining facilities
- Mechanical and maintenance shops, administrative offices and warehouses
- An onsite electrical generating facility and related substations
- An underground mine currently served by two operating shafts, one dedicated to hoisting mineralized material and waste and the other for transporting personnel and materials
- Drill core storage and logging facilities
- Laboratory facilities for preparing and analyzing rock, core, concentrate and other samples
- A currently inactive facility for manufacturing mining explosives.

The site has both landline and satellite communications with full telephone, fax and internet services. Recreational facilities include tennis and basketball courts, a soccer pitch, a fully equipped exercise centre and a swimming pool. The company operates an on-site school for children of employees and also operates the local hospital.

Electrical power is provided by a connection to a 34.5 kV line in the national electrical grid that is operated by government-owned Empresa Nacional de Energía Eléctrica (ENEE). Backup electricity, provided by generators owned by AMPAC, is frequently required during periods of grid power loss.

A central freshwater supply and sewage collection systems serve the mine, the offices and the accommodation sites. These systems are operated and maintained by the company under the terms of applicable government permitting.

5.5 Physiography

The Property is located along the southeast side of Santa Barbara Mountain. The mine site occurs within the northeast-trending Mochito Graben. This topographic depression measures approximately 2 km wide and is delimited by Santa Barbara Mountain to the northwest and Palmar Ridge to the southeast, which represent upthrown fault blocks of limestone-dominated stratigraphy. Karstic surface features are prevalent in the area, typically manifested as deeply incised stream valleys showing irregular, steep-sided morphology. The major drainage systems in the region follow the northeast trend of the Mochito Graben and discharge into Lake Yojoa, located approximately 6.5 km to the east of the mine site. Surface elevations on the Property range from 700 masl at the western edge of Lake Yojoa, to 2,700 masl on Santa Barbara Mountain to the west. The average elevation in the mine area is approximately 900 masl (Figure 5.1).

A portion of the Property extends under the town of Las Vegas, but most of the Property is predominantly covered by forested lands. Coffee, sugar cane and bananas are farmed along the slopes of the graben and also in the valley. Coffee is also grown by a local co-operative on property owned by AMPAC within the El Mochito Concession holdings.

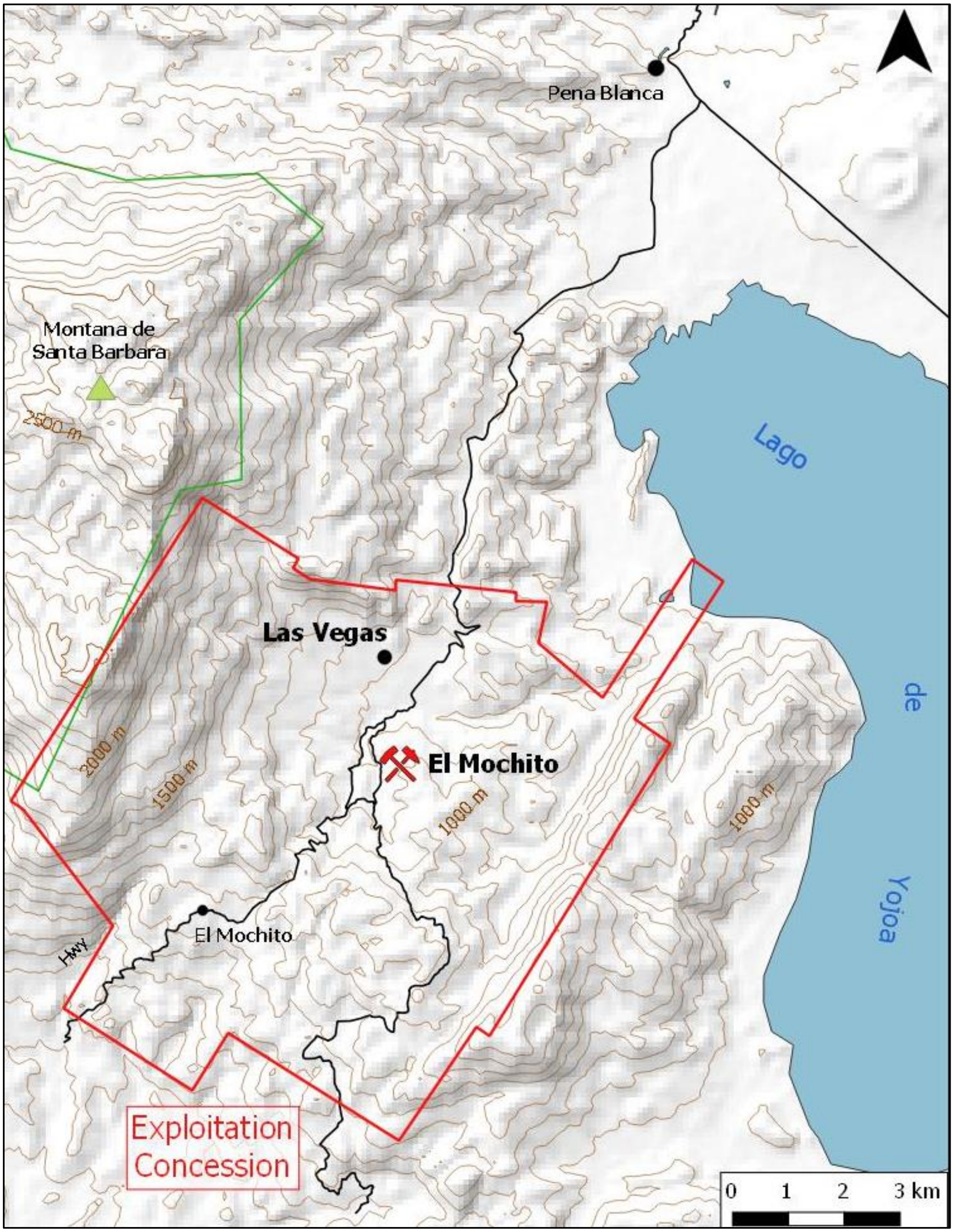


Figure 5.1 – Topographic map of the main El Mochito mining (Exploitation) concession and its immediate vicinity

6. HISTORY

6.1 Summarized History of Major Property Transactions

The list below summarizes the information appearing in the 2016 technical report on the El Mochito mine (Micon, 2016).

- The El Mochito deposit was originally discovered in 1938.
- In 1946, the New York & Honduras Mining Company (later Rosario Resources Corporation) purchased the property and began constructing a mill in 1946.
- Underground production began in 1948, with the initial products being a jig concentrate containing native silver, a bulk flotation concentrate and a silver product.
- In 1960, the greater volumes of sulphide material from deeper levels in the mine made the production of separate zinc and lead concentrates economically feasible.
- In 1973, the company was renamed Rosario Mining Corporation, which was acquired by Amax Inc. in 1980 and operated as a subsidiary.
- The mine ceased production for several months in 1987 due to higher than acceptable costs related to taxation, labour and operations.
- AMPAC purchased the El Mochito mine, concentrator and concessions from Amax in 1987, along with a concentrate storage facility warehouse in Puerto Cortés and the San Juancito exploration property.
- Breakwater Resources Ltd ("Breakwater") acquired AMPAC in 1990 by way of an amalgamation of AMPAC and a wholly-owned subsidiary, Santa Barbara Mining Company Inc.
- Nyrstar Group ("Nyrstar") acquired Breakwater in August of 2011, inclusive of the El Mochito mine and concentrator and the port facilities at Puerto Cortés.
- Morumbi Resources Inc. ("Morumbi") acquired the El Mochito mine, concentrator and port facilities from Nyrstar in December of 2016 and then changed the company name to Ascendant Resources Inc.
- The concentrator has been expanded several times over the course of the project's operational life and, at the time of its acquisition by Morumbi, the concentrator had reached a nominal nameplate capacity of 2,200 tpd.

6.2 Historical Mine Development

The El Mochito underground mine has operated on an essentially continuous basis since 1948 during which time an extensive system of underground workings has been developed. When Morumbi (Ascendant) acquired the operation in 2016, mining had reached a depth slightly more than 1,200 m (3,300 ft) below surface with most production coming from mine levels below 670 m (2,200 ft). In the early years of the mine, operations focused on silver-rich, chimney-style mineralization, but as the mine became deeper, the mineral had higher concentrations of zinc and lead with lower silver grades. By the time the mine reached the Mochito Shale, which marks the stratigraphic break between the Upper and Lower Antamina Limestone Formations, the ratio of zinc to lead was approximately 1:1, and mining below the Mochito Shale has since shown that zinc content continues to increase with depth relative to lead and silver. Chimney-style mineralization predominates from surface to the top of the Mochito Shale, where stratabound (manto) replacement-style mineralization becomes more common. Manto-style mineralization associated with the margins of large chimney deposits below the

Mochito Shale were increasingly important contributors to historical chimney mining production and, since 1990, the extensive but lower-grade manto deposits associated with the contact between the Cantarannas and Atima formations have gained volume in mineral resource and mineral reserve estimates.

The lateral extent of the underground workings developed since 1948 occur within an area measuring approximately 2.7 km by 1.2 km and it is estimated that historical and recent workings combined total well in excess of 200 km in length. At present, the maximum development depth in the mine is approximately 1,006 m (3,300 ft) below surface. Figure 6.1 presents a summary longitudinal view of the main elements of the El Mochito mine workings and Figure 6.2 presents an isometric view looking southwest of the current mine workings digital model.

6.3 Recent Historical Mine and Mill Production

Historical production figures for 2011 to 2015 when Nyrstar operated the El Mochito mine are summarized below in Table 6.1. Production figures for the Breakwater operating periods from 1994 to 2005 and 2005 to early 2011 are presented in Table 6.2 and Table 6.2 – Historical breakwater production figures* for 2006 to 2010

	Unit	2006	2007	2008	2009	2010
Mineral Milled	**t**	**690,243**	**607,583**	**646,845**	**726,818**	**714,168**
Head Grade						
Zinc	%	6.0	5.4	5.0	5.7	5.6
Lead	%	2.1	2.1	2.4	2.4	2.9
Silver	g/t	92	102	103	93	96
Recovery						
Zinc	%	90.4	88.9	88.6	87.8	85.0
Lead	%	81.0	78.6	82.4	83.6	82.6
Silver	%	87.1	86.9	88.2	85.5	n.a.
Concentrate Grade						
Zinc	%	52.0	52.0	53.0	53.0	52.6
Lead	%	68.2	66.0	66.5	65.5	64.4
Concentrate Tonnes						
Zinc	t	72,413	56,205	53,757	68,552	64,401
Lead	t	17,263	15,470	18,865	21,110	26,311
Metal in Concentrate						
Zinc	t	37,646	29,211	28,462	36,370	33,839
Lead	t	11,775	10,215	12,545	14,471	16,954
Silver	koz	1,769.5	1,732.8	1,894.8	1,855.0	1,869.8

*Data compiled from Breakwater annual reports for 2006 through 2010

Table 6.3.

Full-year results for the 2010-2015 Nyrstar operating period show that average annual mill production was 761 kt at average zinc, lead and silver grades of 4.0%, 2.1% and 72.9 g/t, respectively. Corresponding average mill recoveries were 85.3%, 78.2% and 87%, respectively.

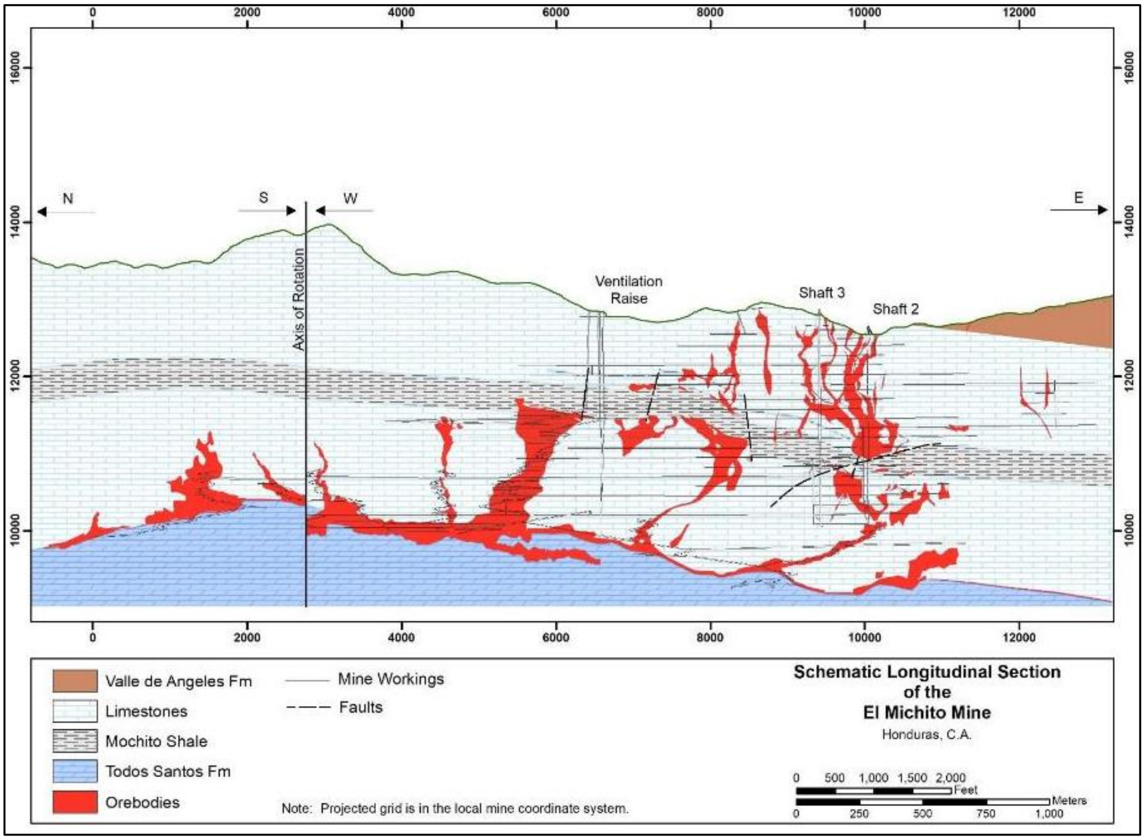


Figure 6.1 – Schematic section showing the extent of the El Mochito mine workings

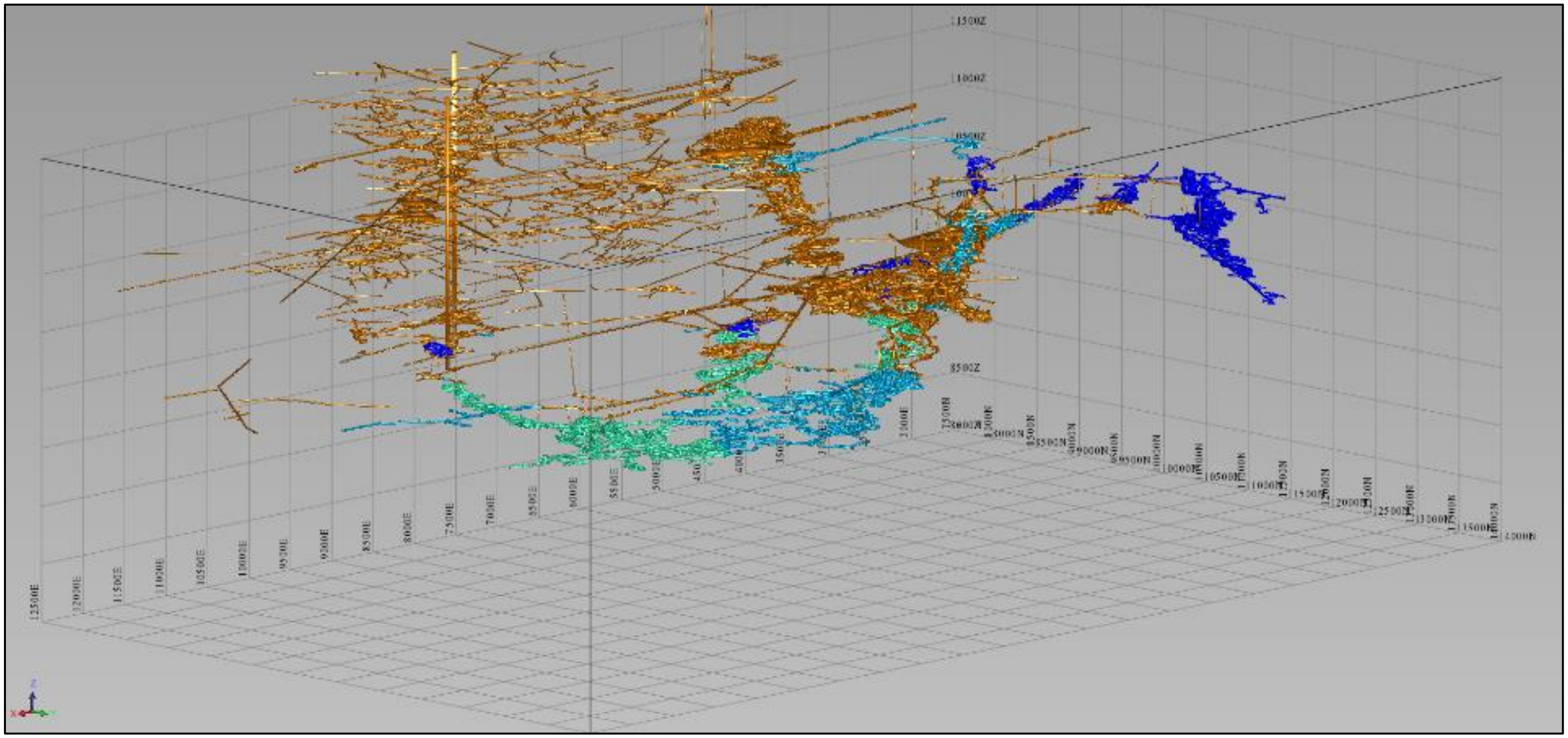


Figure 6.2 – Isometric view of the El Mochito mine workings looking southwest

Table 6.1 – Historical Nyrstar production figures for 2011 to 2015

	Unit	2011		2012[3]	2013[3]	2014[4]	2015[4]
		First 6 months: Breakwater[1]	Fourth Quarter Nyrstar[2]				
Mineral Milled	**kt**	**333**	**n/a**	**748**	**775**	**756**	**766**
Head Grades							
Zinc	%	4.6	n/a	4.1	3.8	4.6	3.5
Lead	%	2.3	n/a	2.1	1.9	2.6	1.7
Silver	g/t	86	n/a	77.7	76.2	85.9	51.8
Recovery							
Zinc	%	85.3	n/a	84.1	85.2	85.6	86.4
Lead	%	84.1	n/a	78.9	78.6	78.6	76.6
Silver	%	60.6	n/a	86.5	86.2	87.5	87.8
Concentrate Tonnes							
Zinc	kt	24.4	n/a	50.0	49.0	60.0	45.0
Lead	kt	10.5	n/a	20.4	18.0	24.3	15.2
Metal in Concentrate							
Zinc	kt	12.9	10.0	26.0	25.0	29.5	23.0
Lead	kt	6.4	4.9	12.4	11.6	15.5	9.8
Silver	Moz	0.8	0.6	1.6	1.6	1.8	1.1

1 Breakwater, 2011, Second Quarter Report (MD&A), 28 July 2011.
2 Nyrstar 2012 Annual Report (production under Nyrstar ownership); third quarter results not identified
3 Nyrstar, 2014, news release of February 6, 2014 (2013 full year results).
4 Nyrstar, 2016a, news release, February 4, 2016 (2015 full year results)
n/a – no data reported

Table 6.2 – Historical breakwater production figures* for 2006 to 2010

	Unit	2006	2007	2008	2009	2010
Mineral Milled	**t**	**690,243**	**607,583**	**646,845**	**726,818**	**714,168**
Head Grade						
Zinc	%	6.0	5.4	5.0	5.7	5.6
Lead	%	2.1	2.1	2.4	2.4	2.9
Silver	g/t	92	102	103	93	96
Recovery						
Zinc	%	90.4	88.9	88.6	87.8	85.0
Lead	%	81.0	78.6	82.4	83.6	82.6
Silver	%	87.1	86.9	88.2	85.5	n.a.
Concentrate Grade						

	Unit	2006	2007	2008	2009	2010
Zinc	%	52.0	52.0	53.0	53.0	52.6
Lead	%	68.2	66.0	66.5	65.5	64.4
Concentrate Tonnes						
Zinc	t	72,413	56,205	53,757	68,552	64,401
Lead	t	17,263	15,470	18,865	21,110	26,311
Metal in Concentrate						
Zinc	t	37,646	29,211	28,462	36,370	33,839
Lead	t	11,775	10,215	12,545	14,471	16,954
Silver	koz	1,769.5	1,732.8	1,894.8	1,855.0	1,869.8

*Data compiled from Breakwater annual reports for 2006 through 2010

Table 6.3 – Historical Breakwater Mine production figures* for 1994 to 1998

	Unit	1994	1995	1996	1997	1998
Mineral Milled	**t**	**375,392**	**400,742**	**536,073**	**593,800**	**569,476**
Head Grade						
Zinc	%	6.83	7.33	7.54	7.3	7.1
Lead	%	1.03	0.89	1.11	1.3	1
Silver	g/t	84	86	79	83	87
Recovery						
Zinc	%	n/a	n/a	n/a	n/a	91.2
Lead	%	n/a	n/a	n/a	n/a	73.5
Silver	%	n/a	n/a	n/a	n/a	n/a
Metal in Concentrate						
Zinc	t	23,611	27,177	37,037	39,483	36,639
Lead	t	2,777	2,461	4,669	5,930	4,329
Silver	koz	888.4	971.0	1,169.6	1,378.4	1,381.3

* Data compiled from Breakwater annual reports for 1994 through 1998; n/a = no data reported

Table 6.4 – Historical Breakwater production figures* for 1999 to 2005

	Unit	1999	2000	2001	2002	2003	2004	2005
Mineral Milled	**t**	**612,240**	**637,665**	**652,331**	**663,385**	**652,085**	**650,017**	**700,190**
Head Grade								
Zinc	%	7.3	7.3	8	7.5	7.3	6.9	6.7
Lead	%	1.1	1	1.3	1.5	1.7	1.7	1.8
Silver	g/t	87	94	81	90	87	84	87
Recovery								
Zinc	%	91.6	92	92.8	93	92	91.8	91.7

	Unit	1999	2000	2001	2002	2003	2004	2005
Lead	%	74.1	74.2	79.4	80.6	81.9	80.5	80.9
Silver	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Metal in Concentrate								
Zinc	t	40996	43,064	48,485	46,339	43,766	41,413	42,698
Lead	t	5226	4,805	6,750	8,128	9,014	8,877	10,488
Silver	koz	1,496.4	1,690.0	1,505.7	1,700.0	1,638.5	1,550.2	1,723.8

* Data compiled from Breakwater annual reports for 1999 through 2005; n/a = no data reported

Full-year results for the 2000-2010 portion of the Breakwater operating period show that the average annual mill production was 761,000 t at average zinc, lead and silver grades of 4.0%, 2.1% and 72.9 g/t, respectively. Corresponding average mill recoveries were 85.3%, 78.2% and 87%, respectively. Additional operating information for the earlier 1994-2005 period is presented in Table 6.2 – Historical breakwater production figures* for 2006 to 2010

	Unit	2006	2007	2008	2009	2010
Mineral Milled	**t**	**690,243**	**607,583**	**646,845**	**726,818**	**714,168**
Head Grade						
Zinc	%	6.0	5.4	5.0	5.7	5.6
Lead	%	2.1	2.1	2.4	2.4	2.9
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Recovery						
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Silver	%	87.1	86.9	88.2	85.5	n.a.
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Zinc	%	52.0	52.0	53.0	53.0	52.6
Lead	%	68.2	66.0	66.5	65.5	64.4
Concentrate Tonnes						
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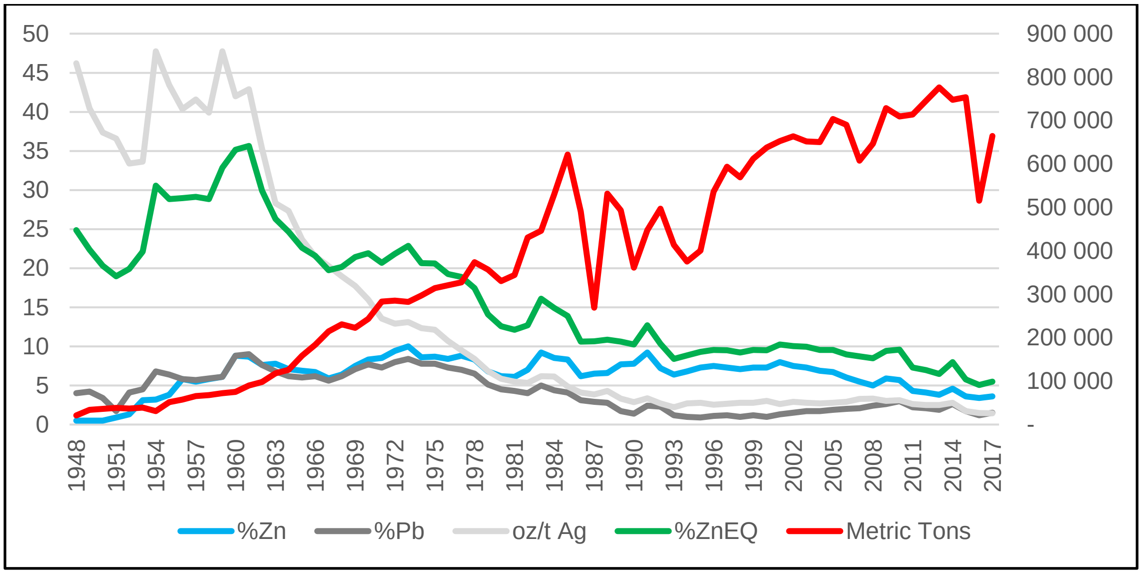
Silver	koz	1,769.5	1,732.8	1,894.8	1,855.0	1,869.8

*Data compiled from Breakwater annual reports for 2006 through 2010

Table 6.3 and Table 6.4. Comprable data for the first four years of Breakwater ownership (1990 through 1993) were not available to Mercator.

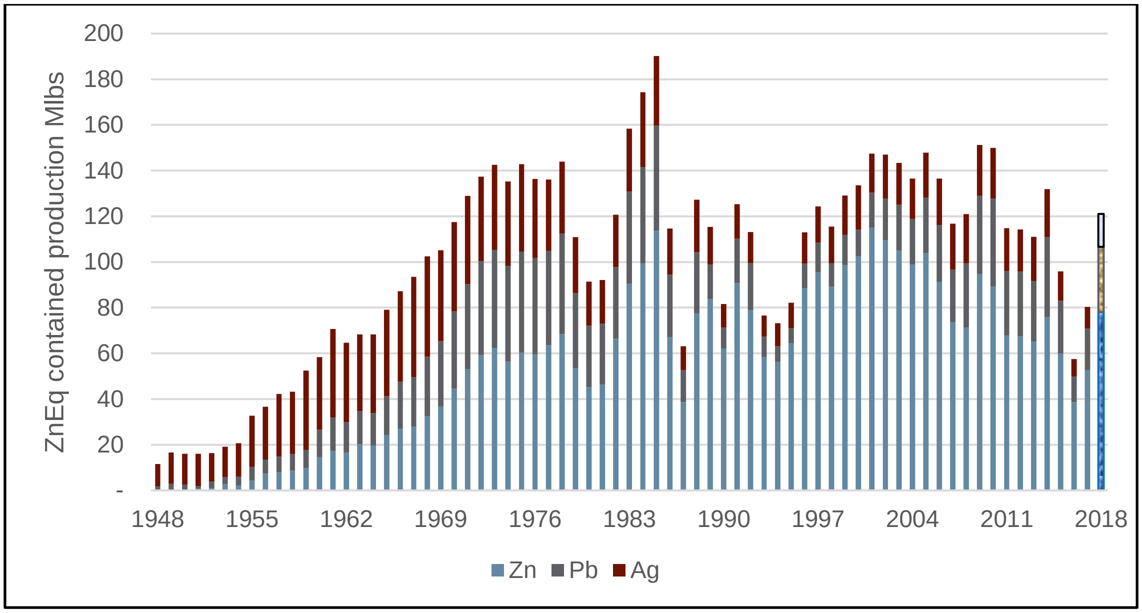
Data presented in Table 6.1 and Table 6.2 show that over the 10-year production period of 2006 through 2015, the last full year preceding the mine's acquisition by Ascendant), average metal grades had gradually declined from 6.0% Zn, 2% Pb and 92 g/t Ag in 2006, at a production rate of ~690,000 tpy, to 3.52% Zn, 1.7% Pb and 51.79 g/t Ag at a production rate of ~766,000 tpy in 2015. Notably higher grades characterize the period from 1995 through 2002 when high-grade production from the large chimney deposits accounted for much of the yearly mill feed.

Figure 6.3 and Figure 6.4 present compiled yearly mine production and contained metal figures for the entire operating period from 1948 through to January 1, 2018.



Source: Ascendant files

Figure 6.3 – El Mochito production statistics for the period from 1948 to January 1, 2018



Source: Ascendant files

Figure 6.4 – El Mochito contained production by metal type expressed in Mlbs ZnEq for the period from 1948 to January 1, 2018

6.4 Recent Historical Mineral Resource and Mineral Reserve Estimates

Numerous mineral resource and mineral reserve estimates have been prepared for the El Mochito operation since mining and processing commenced in 1948. For the purposes of the current Technical Report, the focus has been placed on the following most recent historical estimates:

1. Ascendant's Mineral Reserve estimate having an effective date of January 1, 2018 (Mercator notes that the Mineral Resource estimate that supports these Mineral Reserves remains current and is supported by the current Technical Report.),
2. Nyrstar's Mineral Resource and Mineral Reserve estimates disclosed on April 27, 2016 and pertaining to the end of 2015, and
3. Earlier Mineral Resource and Mineral Reserve estimates by Breakwater that have an effective date of December 31, 2009.

With the exception of the Breakwater 2009 estimates, all of these were prepared in accordance with NI 43-101 and CIM Definition Standards and are supported by associated Technical Reports.

The 2018 Ascendant Mineral Reserve is presented below in Table 6.5. As noted above, the Mineral Reserve Estimate is no longer considered to be current to conform with NI 43-101 and CIM Definition Standards regarding use of Inferred Mineral Resources in the PEA study supported by this Technical Report. The associated January 1, 2018 Mineral Resource Estimate remains current at the effective date of this report and and is described in Section 14 of this Technical Report.

The 2015 Nyrstar Mineral Reserve and Mineral Resource Estimates are presented below in Table 6.6 and Table 6.7. Breakwater estimates preceding 2009 are presented in Table 6.8 and Table 6.9. All estimates referred to above are now historical in nature and should not be relied upon. A Qualified Person, as defined under NI 43-101, has not done sufficient work to classify these historical estimates as current Mineral Resources or Mineral Reserves and Ascendant is not considering these to be current Mineral Resources or Mineral Reserves.

Table 6.5 – Historical ascendant Mineral Reserve Estimate at 4.76% zinc equivalent cutoff – Effective January 1, 2018

Reserve Category	Tonnes	Grade				Contained Metal			
		Zn	Pb	Ag	ZnEq	Zn	Pb	Ag	ZnEq.
	kt	%	%	g/t	%	Mlbs	Mlbs	Moz	Mlbs
Proven	785	4.7	2.1	54	7.2	81	35	1.4	124
Probable	4,946	4.7	1.6	36	6.6	516	174	5.8	717
TOTAL Prov and Prob	**5,731**	**4.7**	**1.7**	**39**	**6.7**	**597**	**209**	**7.2**	**841**

(Cullen et al., 2018)

Table 6.6 – Historical 2015 Nyrstar Mineral Reserve Estimate at 7.1% zinc cutoff – Effective April 27, 2015

Metal	Unit	Proven Mineral Reserve	Probable Mineral Reserve	Total Mineral Reserves
	Mt	0.57	1.34	1.91
Zinc	%	4.59	4.94	4.84
Lead	%	2.63	2.27	2.38
Silver	g/t	77.40	47.60	56.50

(Nyrstar, 2016b)

Table 6.7 – Historical 2015 Nyrstar Mineral Resource Estimate at 3.3% zinc equivalent cutoff – Effective April 27, 2015

Metal	Unit	Measured Mineral Resource	Indicated Mineral Resource	Measured and Indicated Mineral Resource	Inferred Mineral Resource
	Mt	1.38	4.03	5.4	3.86
Zinc	%	5.22	4.72	4.85	5.11
Lead	%	1.93	1.65	1.72	1.38
Silver	g/t	62.1	38.8	44.7	35

Mineral Resources are reported inclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
(Nyrstar, 2016b)

Table 6.8 – Historical Breakwater Mineral Reserve Estimate – Effective December 31, 2009

Metal	Unit	Proven Mineral Reserve	Probable Mineral Reserve	Proven and Probable Mineral Reserve
	Tonnes	1,083,475	2,773,174	3,856,649
Zinc	%	5.8	4.7	5.0
Lead	%	3.4	2.0	2.4
Silver	g/t	107	52	68

(Breakwater, 2010)

Table 6.9 – Historical Breakwater Mineral Resource Estimate – Effective December 31, 2009

Metal	Unit	Measured Mineral Resource	Indicated Mineral Resource	Measured and Indicated Mineral Resources	Inferred Mineral Resource
	Tonnes	1,152,509	3,049,771	4,202,280	3,329,875
Zinc	%	6.8	5.5	5.9	4.5
Lead	%	3.7	2.3	2.7	2.1
Silver	g/t	118	60	76	5.9

Mineral Resources are reported inclusive of mineral reserves. Mineral Resources that are not mineral reserves do not have demonstrated economic viability
(Breakwater, 2010)

As reported in Micon (2016), the 2015 estimate by Nyrstar is supported by the following text that appears in that company's disclosure of April 27, 2016 (Nyrstar, 2016a). The company did not prepare and file a Technical Report in accordance with NI 43-101 to support these estimates, but it was not a public company trading on Canadian stock exchanges at that time. The related disclosure states that the estimates were prepared in accordance with CIM Definition Standards as referenced in NI 43-101.

"The Mineral Resource and Mineral Reserve Estimates were developed using Geovia GEMS modelling software utilizing a zinc equivalent cut-off grade based on NSR calculation models. The cut-off grade for Mineral Resources was 3.3% zinc equivalent and for Mineral Reserves it was 7.1% zinc" (Nyrstar, 2016b).

The earlier 2009 Mineral Resource and Mineral Reserve estimates by Breakwater were reported in accordance with NI 43-101 and CIM Defintion Standards and are supported by an associated NI 43-101 Technical Report referenced herein as Breakwater (2010). This report was filed by the company on SEDAR in March of 2010. Metal prices, including premiums, used to determine economic viability for Mochito at that time were 1.00 $/lb Zn, 12.55 $/oz Ag and 0.83 $/lb Pb, and CAD:USD exchange rate of 1.12. The metal prices used represent the approximate historical five-year average for each metal from 2005 to 2009. These metal prices were used to determine the zinc equivalent grade of the various blocks. A cut-off grade of 5.0% Zn was used for all zones (Breakwater, 2010).

6.5 Acquisition of AMPAC by Morumbi

On September 22, 2016, Morumbi disclosed by way of a press release that it had entered into a share purchase agreement with certain affiliates of Nyrstar NV to purchase 100% of Nyrstar's indirect subsidiary AMPAC and its flagship asset, the producing El Mochito zinc mine in Honduras. On December 20, 2016, Morumbi announced through a press release that it had completed the acquisition of all the outstanding shares of AMPAC from the affiliates of Nyrstar NV and that it had thereby assumed ownership and control of the producing El Mochito mine. Under the terms of the agreement, Morumbi acquired from Nyrstar a 100% interest in AMPAC for a purchase price of $500,000. As of August 31, 2016, AMPAC had (unaudited) current assets of $6,131,099, current liabilities of $3,970,300, and net working capital of $2,160,799. Completion of the acquisition was subject to a number of conditions, including completion of a public financing, receipt of all government and regulatory approvals, negotiation of an industry standard off-take agreement with Nyrstar on concentrates produced from El Mochito, and the approval of the TSX Venture Exchange.

Morumbi changed its name to Ascendant Resources Inc. immediately after closing the AMPAC acquisition in January of 2017.

7. GEOLOGICAL SETTING AND MINERALIZATION

7.1 Introduction

The following descriptions of the geological setting and mineralization on the Property (the El Mochito mine and Exploitation Concessions) have been taken with local modification from descriptions in the Micon (2016) Technical Report prepared for Morumbi.

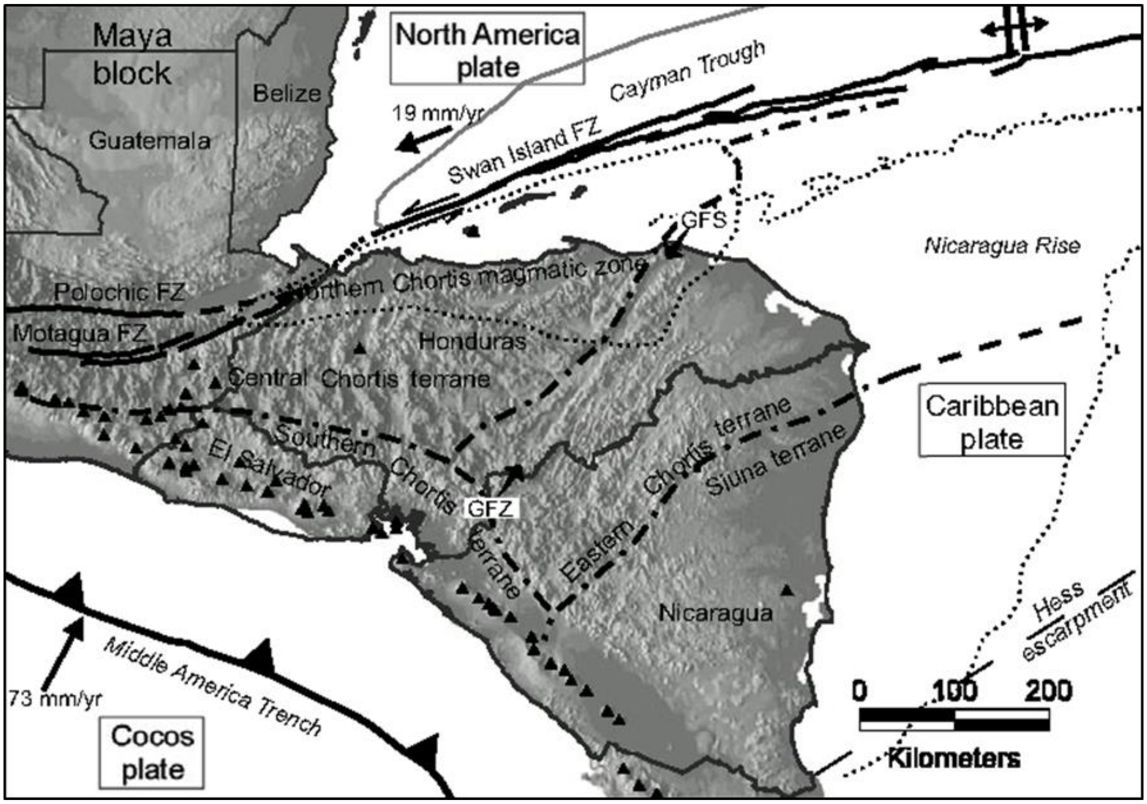
7.2 Geological Setting

7.2.1 Tectonic setting and regional geology

Rogers et al. (2007) summarized the tectonic and regional geological setting of northern Central America and describe the area as covering the boundary zone between the North American and Caribbean crustal plates. Two main crustal blocks have been recognized, these being the Chortis block of the Caribbean plate to the south and the Maya block of the North American plate to the north. The structural boundary between the two is marked by the major sinistral Motagua Fault and Polochic Fault transform system that trends northeast across Guatemala and passes through a small part of northern Honduras before trending into the Caribbean Sea's Cayman Trough. This structural boundary remains tectonically active at present and has been the focus of major earthquakes in recent times (White, 1985).

Precambrian to Paleozoic rocks comprise the Chortis block while the Maya block is comprised of pre-Mesozoic crystalline rocks and late Paleozoic sedimentary units that are largely covered by Mesozoic and Cenozoic units. Three main basement complex litho-tectonic terranes have been identified in the Chortis block, these being the Southern, Eastern and Central Chortis terranes, in addition to a northern Chortis magmatic zone (Figure 7.1). The Chortis Block's western limit is formed by an arc-trench subduction zone located in the Pacific Ocean west of Guatemala and the east boundary is marked by the sub-sea (Caribbean) Guayape sinistral fault. To the south the continental Chlortis Block merges with younger oceanic sequences (Rogers et al., 2007).

The area of the Chortis Block that hosts the Property is crossed by several northeast trending high angle normal faults that define a regional rift basin trend termed the Honduran Depression. The major faults in this area are still tectonically active, with movement generally being associated with sinistral displacements along the Motagua Fault system to the north. Within this broad extensional setting, subsidiary north-trending rifted sub-basins are present, and these manifest in the Property area as the Mochito Graben.



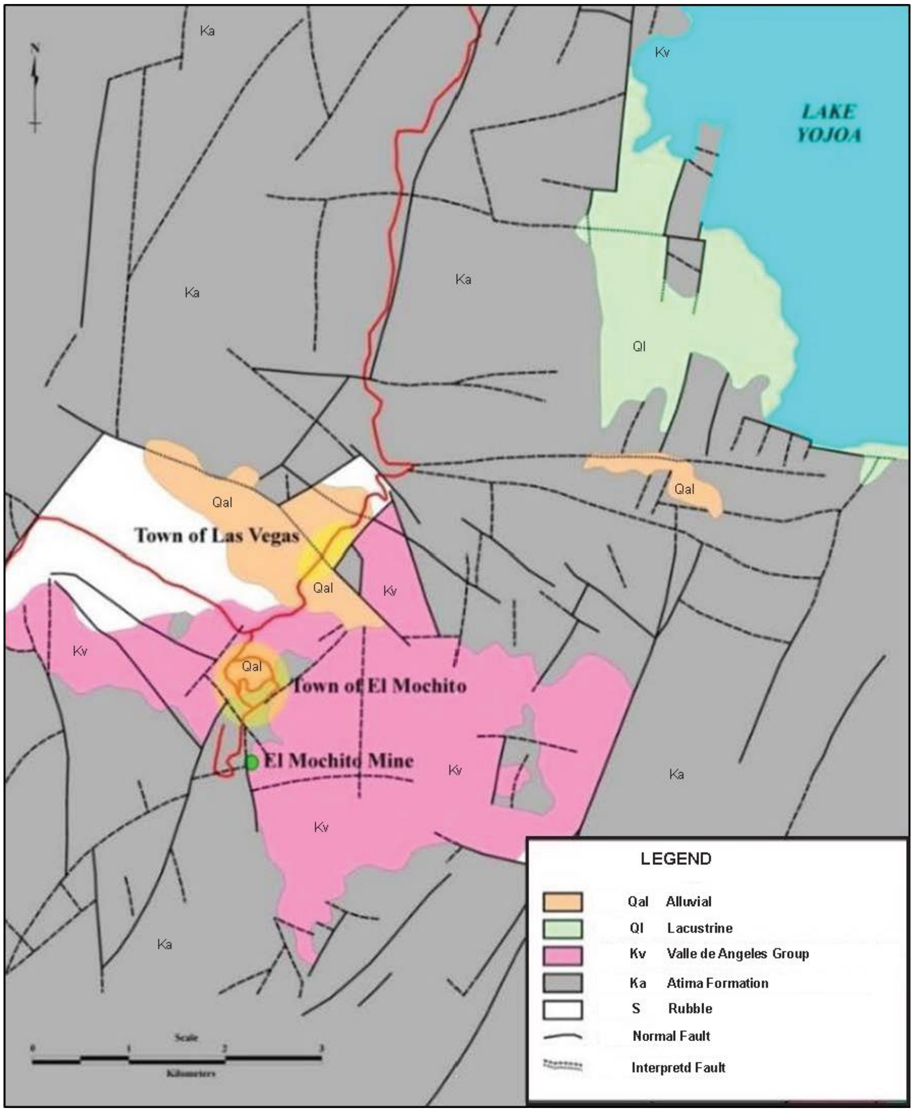
Taken from Rogers et al. (2007)

Figure 7.1 – Tectonic configuation of Central America

7.3 Local Geology

7.3.1 Stratigraphy

The El Mochito area occurs within the northeast trending Mochito Graben within which Upper Jurassic to Quaternary units define the extent of outcropping stratigraphy. Figure 7.2 illustrates the distribution of major stratigraphic units and faults in the graben area and shows that in addition to the graben-defining northeast faults, multiple northwest and east trending faults cross the graben. These introduce structural complexity at both property and mine scales. Figure 7.3 details the mine area and Mochito Graben stratigraphic section.



Taken from Santa Bárbara – Geología Honduras, 1:50,000 CA-4-1979, HOJA 2560 I G

Figure 7.2 – District scale geology map of El Mochito graben area

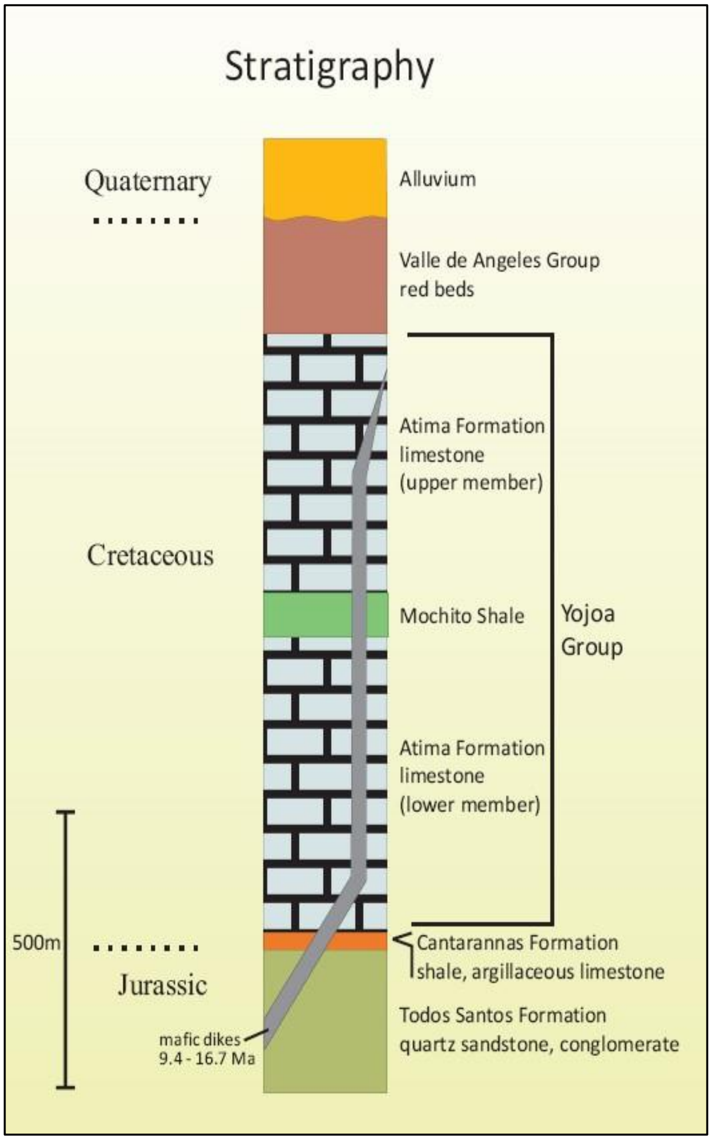
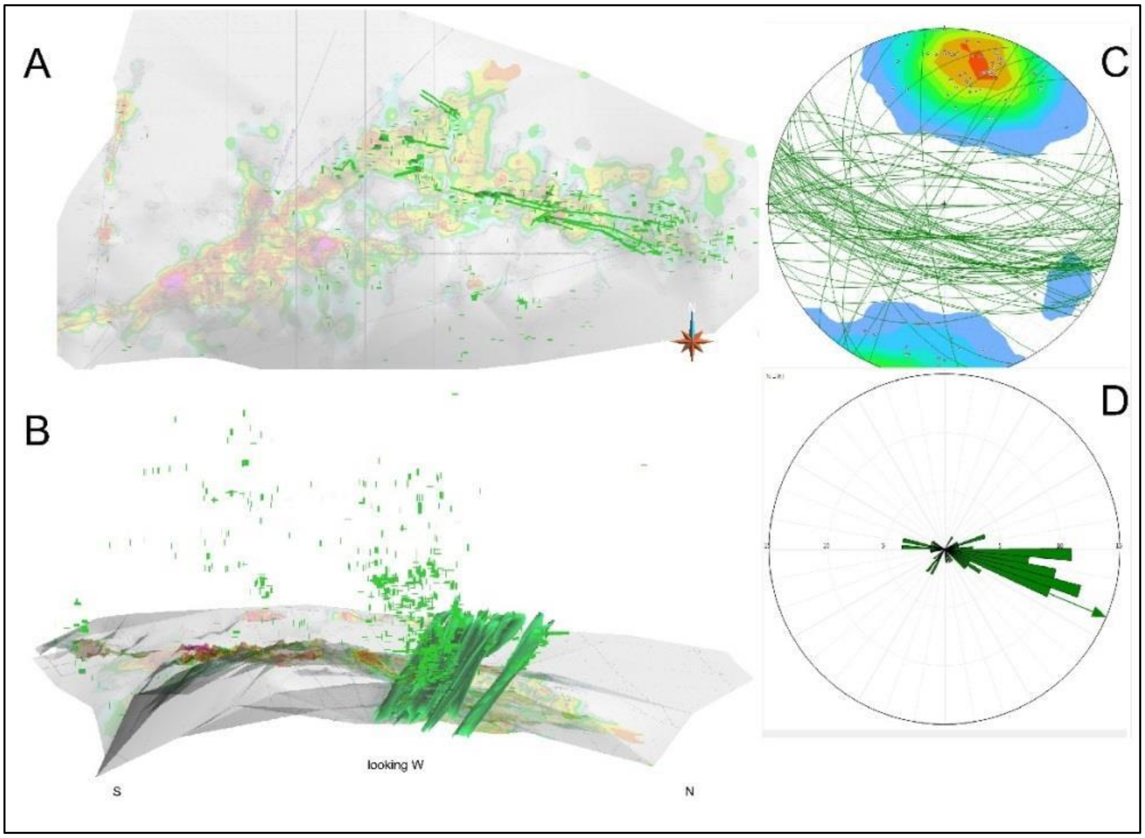


Figure 7.3 – Simplified stratigraphic section for the Mochito graben and mine area

The Atima Formation is comprised of dark grey, massive micritic to biomicritic limestone with shale partings and is subdivided into lower and upper members that correspond with stratigraphic sections above and below the centrally positioned Mochito Shale unit. This unit is grey green in color and consists of thinly interbedded limestone and limey siltstone. The base of the Cretaceous Atima Formation marks the Cretaceous – Jurassic boundary in the graben area, where limestone and argillaceous limestone of the transitional Cantarannas Formation overly quartz rich sandstone and interbedded conglomerate of the Jurassic Todos Santos Formation. Bedding dips within the graben are typically shallow to flat but become moderate to steep and may show associated folding in proximity to cross cutting faults or mafic dikes that may have been emplaced along faults.

Regional metamorphism has not affected the sedimentary and volcanic fill sections of the Mochito graben but substantial portions of the Atima, Todos Santos and Cantarannas formations have been substantially affected by development of siliceous skarn zones. These are characterized by weak to very strong development of carbonate replacement pyroxene and garnet mineral assemblages in calcareous host rocks. Skarn development is attributed to passage of high temperature volcanic-related fluids that were channeled through the graben fill succession along the various faults systems present. Lateral controls on such hot fluid migration were also exerted by the basal Atima Formation-Cantarannas Formation contact interval and by the relatively impervious Mochito shale. The intrusive body responsible for generation of the high temperature fluid flow regime that resulted in skarn development in the graben fill succession has not been encountered in exploration drilling carried out to date on the property. Skarn mineral assemblage zonation patterns in the El Mochito mine area, in combination with results of modelling high resolution airborne magnetometer survey results, have been interpreted as indicating presence of a large, buried volcanic intrusion to the east of, and below, the current mining area at El Mochito. A smaller magnetometer survey anomaly adjacent to the western mine area was interpreted as indicating presence of a separate buried intrusion in that area.

Andesite dykes intrude the entire Mochito graben stratigraphic section and show K-Ar whole rock radiometric ages ranging from 16.7 (±0.7) to 9.4 (±0.4) Ma (Dilles, 1982). In contrast, the nearby Yojoa Eruptive Complex that occurs 13 km northeast of the El Mochito mine and beneath Yojoa lake is younger than these dikes and has a K-Ar whole rock age of 5.2 (±2) to 0.2 (±0.05) Ma (Eppler et al., 1987). The older andesitic dikes are commonly present in some areas of the El Mochito mine and frequently occur in spatial association with economic base metal sulphide mineralization. The Aque (2014) structural study documented the dikes as having a thickness range from a few centimetres to over 3 m and to commonly show ESE-WNW trends with dip angles from 50° to 80° towards the NNE and SSW (Figure 7.4).



A) Map view of the distribution of dykes (green) from drill holes and mapping;
B) North-south section through A looking west and showing dike dips trends;
C) Stereogram of dyke attitude measurements with poles and contours;
D) Rose diagram of dike azimuths and mean vector (~ N113°)
Taken from Aquè (2014).

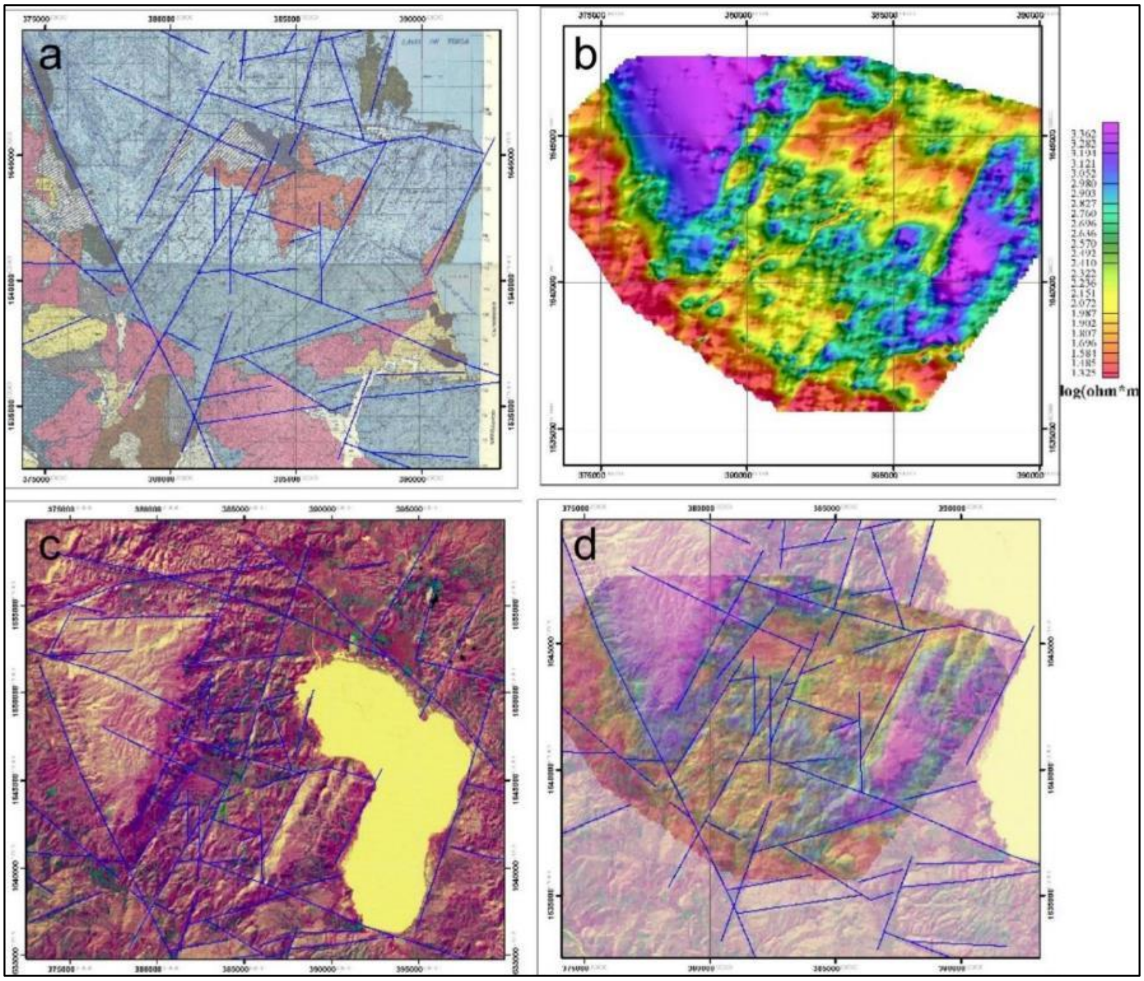
Figure 7.4 – Ande site dike orientation patterns and data

7.3.2 Structure

Structural geology studies of the Mochito graben have been carried out at several times throughout the history of exploration and mining at El Mochito. The most recent of these was carried out by SRK Consulting (Canada) Inc. in 2014 on behalf of Nyrstar with results reported by Aquè (2014). A substantive study was also carried out in 2008 by Dr. E. Nelson of the Colorado School of Mines (Nelson, 2008) and results were incorporated in contemporary exploration planning reported by Western Mining Services for Nyrstar in 2009 (Margeson, 2009).

Aquè (2014) summarized the structural setting of the Mochito area as including faults with three main orientations, these being northeast, northwest and east northeast. Smaller faults trending east southeast and north-south were also identified. The main northeast trending faults that define the Mochito graben appear as well developped lineaments in satellite imagery and are also evident in resistivity and magnetic field data sets (Figure 7.5). Major northeast trending faults form the main architecture of the Mochito graben and take the form of stepped structures connected by relay ramps and transfer zones.

Field observations show that NE faults cut most of the other faults, including those that trend east northeast and are associated with some of the major mineralized trends within the El Mochito mine. The northwest trending lineaments are secondary in prominence to that trending northeast and are more widely spaced. Nelson (2008) suggested that the important east northeast mineralized trends such as Porvenir within the El Mochito mine area may be relay structures between some of the main northeast trending normal faults and proposed a Riedel shear based kinematic model to account for the main mineral deposit trends within the immediate mine area (Figure 7.6). Aquè (2014) reported on a more detailed structural study which documented that initial graben development stage extensional faulting was followed by reactivation of extensional structures to accommodate strike slip movements related to regional transtension. The 2014 model incorporates observed evidence of dextral strike slip along the north striking Imperial-Barbasco-Esperanza fault trend and sinistral strike slip along the major Main, Porvenir and Salva Vida fault trends (Figure 7.7).



Notes:

(a) geological map of the El Mochito graben study area showing main satellite imagery lineaments;

(b) resistivity map for the study area showing definition of main northeast structural trends;

(c) Landsat ETM+7 enhanced image of the study area;

(d) Composite view of satellite and resistivity results; high resistivity corelates with thicker limestone sections and low resistivity correlates with clastic rocks such as alluvium and landslide material, Valle de Angeles red beds or Todos Santos sandstones and siltstones. Taken from Aquè (2014),

Figure 7.5 – Major structural lineaments of the Mochito graben

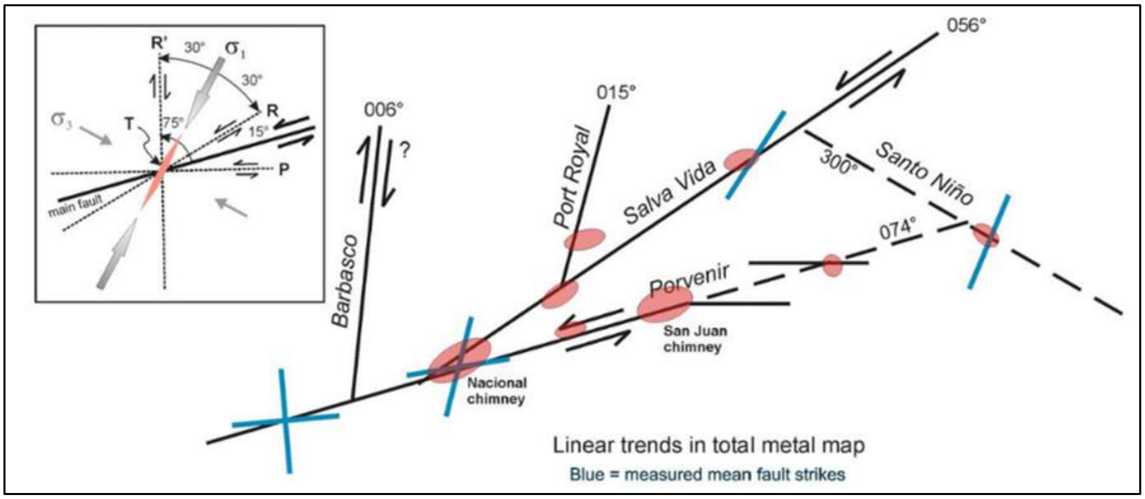


Figure 7.6 – Basic kinematic model proposed by Nelson (2008)

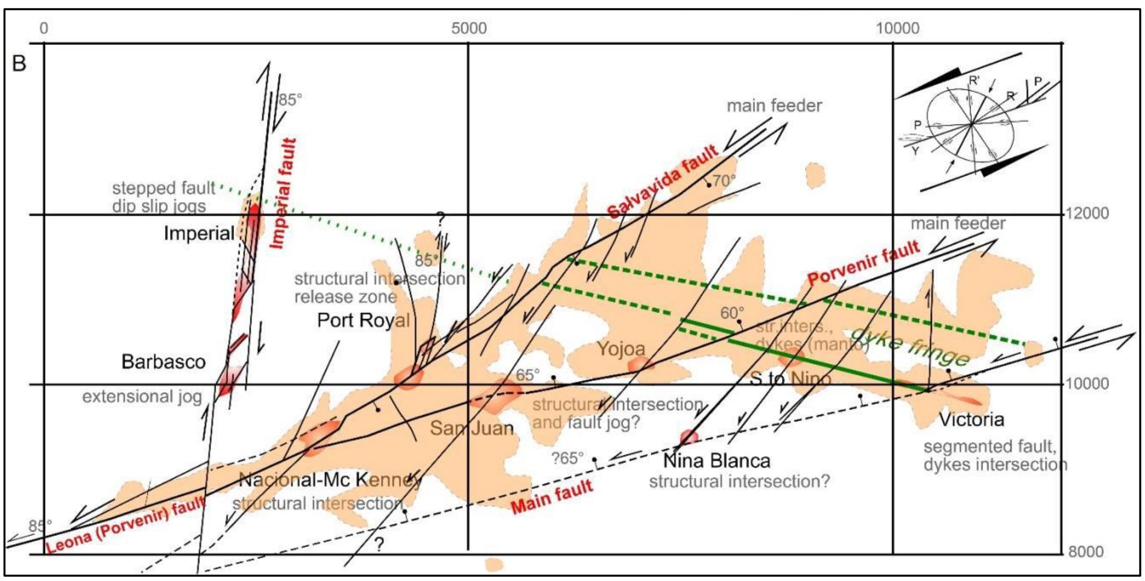


Figure 7.7 – More detailed kinematic model proposed by Aquè (2014)

Skarn localization and the later superimposed base metal mineralization at El Mochito were strongly controlled by fault structures that provided pathways for multiple phases of hot hydrothermal fluid flow. As a result, their importance in understanding the form and spatial occurrence of mineralization in the district cannot be underestimated.

7.4 Mineralization

7.4.1 Host rocks and deposit styles

Zinc-lead-silver mineralization of economic interest at El Mochito occurs in association with calc-silicate bearing skarn intervals hosted by limestone and calcareous shale of the

Upper and Lower Atima Formation, in calcareous units of the Atima Formations main subunit, the Mochito Shale, in calcareous siltstone and shale of the Cantarannas Formation that immediately underlies the Atima Formation, and in quartz rich sandstones and siltstones of the siliciclastic-dominated Todos Santos Formation, which underlies the Cantarannas Formation and is the deepest mineralized formation identified to date in the area. A graphic representation of the stratigraphy of the El Mochito area appeared previously in Figure 7.3. The stratigraphic section within which economic mineralization occurs slightly exceeds 1,250 m in true thickness. Stratigraphy in the Mochito graben in the general vicinity of the mine is shallowly dipping but defines a low amplitude regional structural doming trend that is broadly centered in the mine area. Nelson (2008) attributed the doming trend to development of a positive fault flower structure within the Mochito graben during late trans-tension across the graben that may have been in part synchronous with metallization.

Mineralization is associated with garnet and pyroxene skarn zones that are structurally controlled. The distribution of skarn directly reflects the geometry of the complex graben-related fault systems that channeled hot hydrothermal fluids through graben fill sequences to sites where they selectively reacted with calcareous wallrock to create siliceous, garnet and pyroxene dominated skarn. Notably, research has shown that zinc-lead-silver mineralization was not introduced with the early pulses of skarn-forming fluid (Ault, 2011). Cross cutting geological and textural relationships documented historical ly by various workers in this district combine to show that sulphide mineral phases of economic significance were introduced subsequent to formation of the initial calcsilicate skarn assemblages. Their spatial coincidence reflects continued capacity of the graben’s fault systems to channel and conduct the large volumes of hydrothermal fluid necessary to create this district’s high metal endowment.

Ault (2004) described the El Mochito deposits as representing a distal Zn-Pb-Ag skarn environment where the bulk of economic mineralization occurs in either steeply dipping pipes (chimneys) or flat-lying manto bodies. The same author provided the following summary of the mineralization process documented at El Mochito.

“Skarn mineralogy consists of early grossularitic garnet followed by andraditic garnet and hedenbergitic pyroxene, with pyroxene skarn the principal host to sphalerite mineralization. Minerals, which post-dated silicate precipitation, comprise sphalerite of variable Fe content, galena, magnetite, pyrrhotite, chalcopyrite, pyrite and trace amounts of arsenopyrite. The distribution of metals in the mineralized bodies is zoned from Zn-Fe-rich cores to adjacent Pb- and Ag-rich zones reflecting the sequential saturation of sphalerite and galena in the fluid with decreasing temperature. Skarn formation was accompanied by significant additions of Si, Fe, Mg, Al, and Mn and variable changes in Ca during early alteration. Apparent decreases in the concentrations of Ti and Zr suggest that the fluid:rock ratio was high.”

Sulphur isotope values of sphalerite, galena and pyrrhotite indicate that sulphur was primarily igneous in origin, and lead isotope ratios of galena are similar to those of the Miocene-Pliocene Padre Miguel ignimbrite. Variation in the sulphur isotope values of sphalerite and the whole-rock Pb isotope ratios of the host limestone are interpreted to reflect decreasing alteration toward the southwest (Ault, 2014).

As noted previously, two dominant styles of Zn-Pb-Ag mineralization are present at El Mochito, these being mantos and chimneys, both of which show genetic association with hydrothermal fluid-controlling fault systems. The largest mantos occur as

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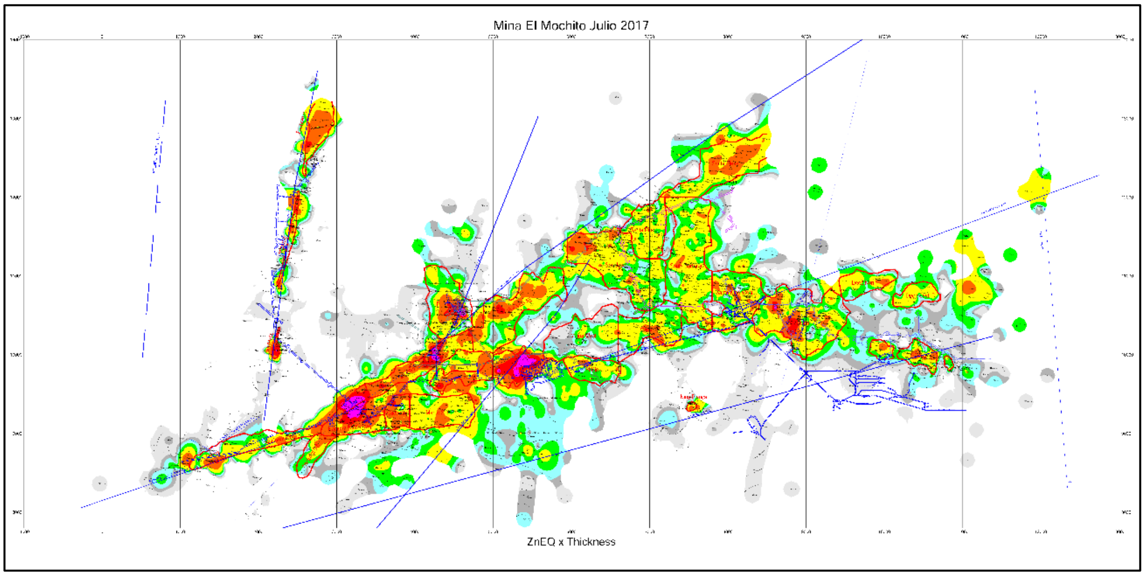
stratabound replacement zones within the Lower Atima Formation, near its lower contact with underlying calcareous siltstones and shales of the Cantarannas Formation, and therefore generally conform with geometry of the top of the Todos Santos Formation. Manto style mineralization is also encountered in the central portion of the Atima Formation, along the upper and lower contacts of the Mochito Shale unit, typically adjacent to chimney structures, and also within quartz rich clastic sediments of the Todas Santos Formation, below the Cantarannas Formation.

Manto style mineralization at the base of the Atima is extensively distributed and at the 3 m% Zn Eq. level defines a corridor of nearly continuous mineralization along the Porvenir fault trend that measures over 3 km in length, with lateral extent ranging between 70 m and 600 m (Figure 7.8). The mineralized corridor that parallels northwest trending andesite dikes that extend from the Victoria deposit area in the southeast to the Santa Rita deposit area in the northwest provides another example of extensive manto mineralization. In this instance, essentially continuous manto mineralization at the 3 m% ZnEq. level defines a currently open strike length of at least 1700 m, with lateral extents ranging between 150 m and 300 m. Manto zone thicknesses range from a few centimeters to locally greater than 30 m in proximity to chimney structures.

Chimney style mineralization occurs as pipe-like accumulations of sulphides and associated skarn assemblages that are discordant to stratigraphy, often at high angles, and are spatially controlled by discrete zones of structural ground preparation which typically coincide with fault intersection zones or with dilational zones related to orientation changes or transfer zones along strike slip or dip slip fault systems. Chimneys at El Mochito are frequently rooted in zones of well developed manto mineralization at the base of the Atima Formation and extend upward through that formation for substantial vertical intervals. Some have been continuously traced through mining, drilling and underground development from the base of the Atima Formation, through the Mochito Shale and onward to near surface elevations, thereby defining a mineralized extent in excess of 1,200 m in vertical dimension.

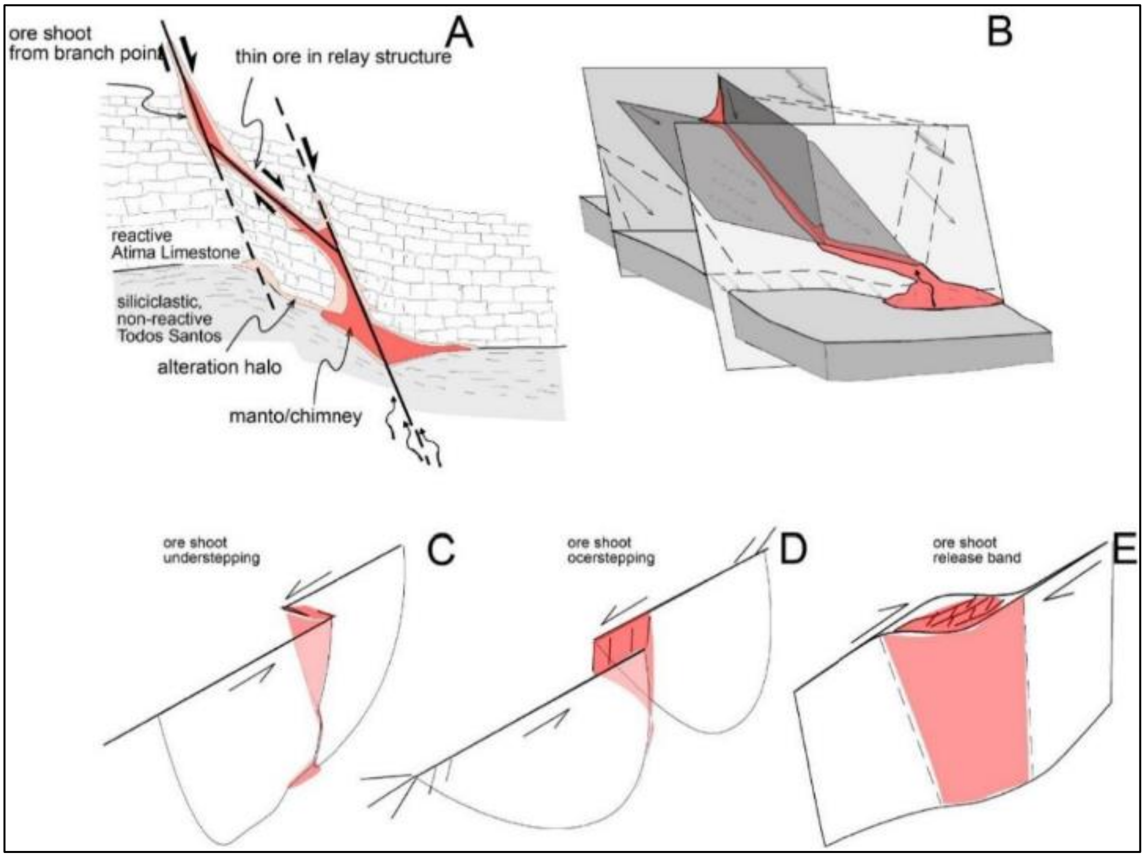


Note: Zn equivalent% x thickness (ft) plot from Ascendant files, 2017

Figure 7.8 – Plan view of El Mochito Mine area mapped drillhole mineralization in 2017

Not all chimneys show extensive vertical development, and many die out at the base of the Mochito Shale unit or prior to reaching that elevation. The lower contact of the relatively impervious Mochito Shale appears to have diverted flow of mineralizing fluids associated with some chimneys, resulting in creation of manto style mineralization zones concordant with the lower Mochito Shale contact. In a few instances, chimneys also show associated manto mineralization at the upper shale contact.

Aquè (2014**)** proposed several mechanisms of chimney formation, all of which are related to fault plane geometry or intersecting fault surfaces. These are graphically summarized in Figure 7.9 and include a normal fault relay structure model, an intersecting fault surfaces model and several models based on step over or dilational jog geometries developed along related fault surfaces. Chimneys range from a few tens of meters in vertical extent, with limited lateral dimensions, to large zones of highly mineralized skarn such as those associated with the major, now largely mined out, San Juan and Port Royal chimney deposits that were exploited during the Breakwater and Nyrstar operational periods. The San Juan deposit extended continuously from the base of the Atima Formation and terminated at the base of the Mochito Shale unit, where it is associated with skarn and a related manto sulphide deposit concordant with the basal shale contact. The San Juan chimney does not pass continuously upward through the Mochito Shale at this location but potential for its extension above the shale has been a target of ongoing exploration interest. Although now mined out, this deposit showed a vertical mineralized extent of approximately 350 m above its root zone manto deposit at the base of the Atima Formation. Notably, it contained in excess of 10M tonnes of high grade sulphide mineralization and represents the largest and most valuable single deposit exploited in the El Mochito mine's history. Other examples of substantial chimney deposits within the El Mochito mine area include Nacional, Salva Vida.



Notes: Chimney deposit formation conceptual models: A) Connecting ramp between two normal faults reactivated during strike-slip tectonics; B) Interaction between intersecting structures such as pre-existing faults or dykes; D) fault related extensional zones at right steps on sinistral faults; E) fault related extensional zones at release bends in dextral faults.

Figure 7.9 – Chimney formation mechanisms proposed by Aquè (2014)

Yojoa, Niña Blanca and Nueva. Manto and chimney deposits differ in their metal grade characteristics, with higher zinc lead and silver values and massive to submassive sulphide zones being more commonly seen in chimneys.

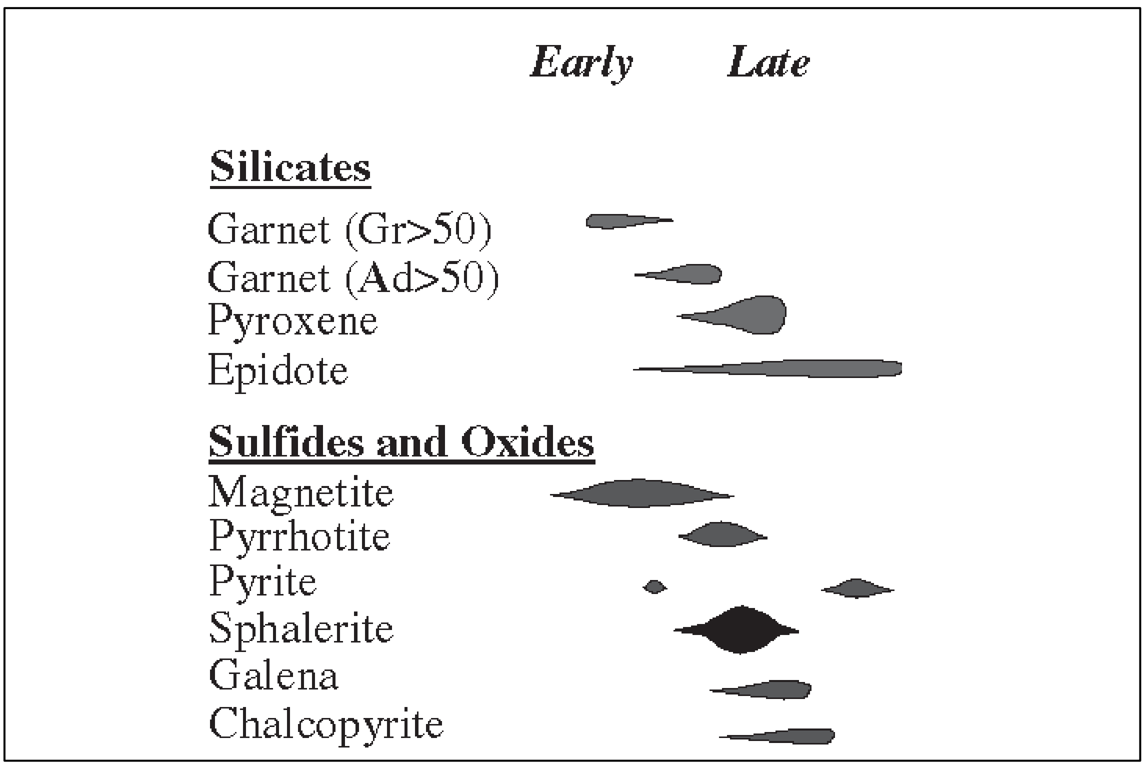
As noted earlier in this Technical Report, vertical zonation in zinc, lead and silver grade ratios occurs between the surface elevation and the deepest manto and chimney deposits of the El Mochito mine. At near surface levels, chimney mineralization mined in the early years of operation was rich in silver and showed higher lead levels relative to zinc. The zinc:lead ratio at the depth of the Mochito Shale unit, approximately 500 m below surface, is in the vicinity of 1:1 and at the level of extensive manto mineralization at the base of the Atima Formation, approximately 1,200 m below surface, zinc:lead ratios are in the range of 4:1 or 5:1 and average silver grades are less than 100 g/t.

7.4.2 Sulphide and alteration mineralogy

Silicate mineralization at El Mochito is typical of skarn deposits and generally consists of an assemblage of medium to coarse grained primary silicates such as grossular to andradite garnet and hedenbergitic pyroxene along with ubiquitous assemblage of epidote-quartz-calcite-chlorite-iron oxide (magnetite) and, less commonly, vesuvianite and rhodocrosite. Locally, retrograde minerals after pyroxene are present, including the assemblage epidote, quartz-calcite-chlorite-manganese-actinolite-iron oxide. Some clay minerals have also been identified, including smectite-nontronite and iron/saponite.

Ault (2004) described mineralogy of the El Mochito deposit as being typical of zinc skarns as described by Einaudi et al. (1981). The assemblages present include a silicate gangue of pyroxene and garnet plus a later mineral assemblage consisting of sphalerite, galena, pyrite, pyrrhotite, chalcopyrite, magnetite, and trace arsenopyrite. Two generations of garnet are present, an early grossularitic variety and a later variety that is more andraditic.in composition. Both generations are replaced by hedenbergitic pyroxene followed by epidote (Dilles, 1982; Ault, 2004).

Magnetite was the earliest of the mineralization assemblage to form and either mantles skarn silicates or has replaced those phases. Pyrite was the earliest sulfide to form, followed by pyrrhotite and then sphalerite. Sphalerite contains from 3 to 26 mol percent FeS (Ault, 2004) and both sphalerite and pyrrhotite replace magnetite. Sphalerite also replaces pyrrhotite. Chalcopyrite and galena precipitated at approximately the same time and form separate inclusions in sphalerite. Chalcopyrite commonly replaces pyrrhotite and pyrite was the final sulfide to crystallize. It either replaces pyrrhotite or occurs as late cubes accompanying calcite. (Ault and Williams-Jones, 2004). Figure 7.10 presents a summary of the paragenetic sequence described above.



Taken from Ault and Williams-Jones (2004)

Figure 7.10 – Paragenetic sequence of sulphide, oxide and gangue silicate minerals

8. MINERAL DEPOSIT TYPES

The zinc-lead-silver mineralized zones that comprise the El Mochito deposit are classified for current Technical Report purposes as distal zinc skarns as defined by Meinert (1992).

Since its discovery in 1938 and subsequent development, sulphide mineralization at El Mochito has been recognized as having direct association with silicate skarn alteration zones that occur along and adjacent to either discrete fault corridors or igneous dike contact zones. Faults that cross cut and displace host stratigraphy of the Atima Formation, Todos Santos Formation and Cantarannas Formation are interpreted to have initially channeled hot hydrothermal fluids of probable igneous origin through the host formations, resulting in development of silicate (garnet-pyroxene) skarn in adjoining reactive rock types such as limestone and calcareous siltstone. Subsequent passage of hot, metal-bearing saline hydrothermal fluid along the same structural plumbing systems resulted in replacement style overprinting of the initial silicate skarn assemblages by silver-bearing, disseminated to massive zinc and lead sulphides, minor copper sulphides, disseminated to massive iron oxide (commonly as magnetite), and disseminated to massive iron sulphide, commonly as pyrrhotite. As noted previously, at El Mochito the resulting deposits of zinc-lead-silver mineralization take the form of stratabound manto replacement bodies, such as the newly defined Esperanza zone, or steep to moderately plunging chimneys, such as the large, high grade, previously mined San Juan zone.

Distal zinc skarn deposits commonly occur as spatially associated families of manto and chimney style mineralized zones that collectively show both horizontal and vertical metal zonation trends relative to their associated source areas of hot, metallizing fluid. Zonation reflects localization of copper sulphides and gold (if present) in closest proximity to causative intrusions, followed outward from the intrusions along a cooling trend by replacement style zinc and lead sulphides plus silver mineralization, which is followed at even greater distance from the intrusions by silver-rich sulphosalt deposits with lesser zinc and lead levels. Causative intrusions frequently do not occur in close proximity to skarn-hosted replacement style zinc-lead silver deposits such as those present at El Mochito and this separation underlies their classification as "distal" skarn deposits. Figure 8.1 schematically depicts the skam settings as interpreted by Megaw (2005). In contrast, "proximal" skarn deposits occur in close spatial association with genetically related igneous intrusions, either in contact zones (exoskarns) or in altered and fractured zones occurring internal to intrusion boundaries (endoskarns)

Deposits showing characteristics outlined above have been well documented in many areas of the world and span a broad spectrum of geological time and host sequences. Studies of mineralized and unmineralized strata have found no consistent links between metal deposition and carbonate composition, facies, organic content, or insoluble components. Zones of secondarily enhanced porosity and permeability induced by recrystallization, heating, deformation, or hydrothermal dolomitization are, however, important mineralization controls.

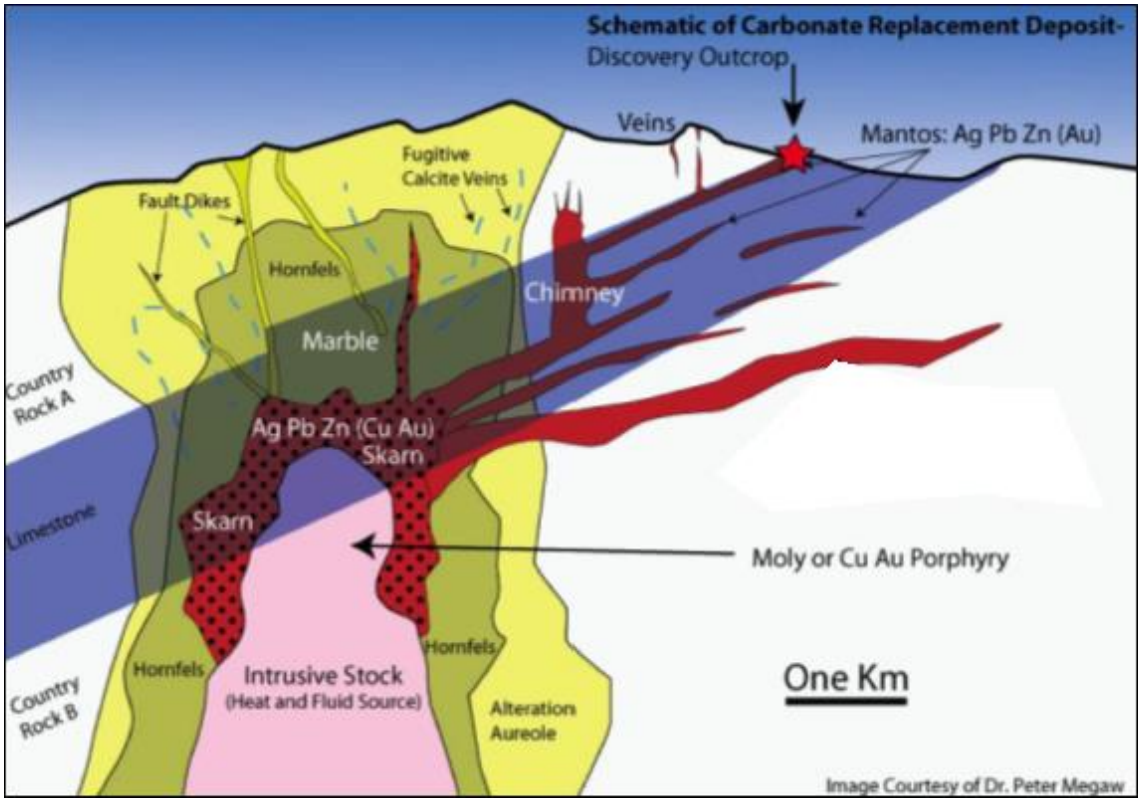


Figure 8.1 – Schematic of skarn deposit settings (modified after Megaw, 2005)

9. EXPLORATION

9.1 Ascendant Exploration Overview

Since acquisition of El Mochito in late 2016, Ascendant has largely limited exploration to completion of core drilling from underground designed to test certain interpreted extensions to historical Nyrstar Mineral Resources referenced in the Micon (2016) NI 43-101 Technical Report prepared for Morumbi (Ascendant). This drilling was carried out in conjunction with underground Mineral Resource and Mineral Reserve infill and step out drilling completed by the company in the same period. In late 2017 Ascendant also carried out a small program of short surface drill holes designed to check historical drilling results from the outcropping Mazanal silver-lead prospect that is located in the main mine area.

A review and compilation of historical surface exploration results from the entire Ascendant concession portfolio was begun in late 2017 and was completed in 2018. An extensive soil gas geochemistry program was initiated in early 2018 over the main El Mochito concession based on initial recommendations arising from a compilation program. Analytical results for the soil geochemistry program have not yet been received.

In addition to the 2017 surface exploration compilation program, Ascendant initiated a review of mining records and drilling results that pertain to the old mine area ("Mina Vieja") located above the Mochito Shale unit. Production from this area occurred in the early decades of mine operation and was primarily focused on high grade silver bearing chimney deposits that extend down to, and sometimes through and below, the Mochito Shale unit. Re-interpretation of geology based on historical drilling results and mine mapping data is planned to support definition of new drilling and sampling targets.

In late 2017 Ascendant carried out a small program of short surface drill holes designed to check historical drilling results from the outcropping Manzanal, silver-rich prospect. This prospect is a chimney-type target that is located approximately 600 m NE of the main shaft. The nine holes drilled met with limited success, but many questions remained as to the possible source of the high-grade mineralization intercepted in the historical drilling. In July of 2018, a program of hand dug trenching was initiated along with reconnaissance mapping to define the source and trend of the mineralization. This work continues and pulps from all samples collected to date have been sent to Bureau Vertitas Ltd. (Acme) for analysis. Acme is a commercial analytical services firm with an international services scope which is ISO 17025 registered and holds Canadian Association for Laboratory Accreditation (CALA) accreditation. Associated sampling results were pending at the report date.

In addition to the Manzanal prospect, ongoing compilation of historical exploration files covering the El Mochito concession have resulted in the discovery of two more prospective Ag-Pb-Zn -rich, chimney-style targets that date back to the early 1970's. These prospects, called Soledad and Palmar, are located immediately south of the Soledad tailings facility. In addition to highly prospective mineralization, reconnaissance of these areas revealed the presence several historical pits and a small adit at each of the prospects. To date, work has focused on the Soledad prospect and consists of geological mapping, hand dug trenching and the rehabilitation of the adit. Preliminary results received back from Mochito's onsite lab are positive and pulps from these samples have also been shipped to Bureau Veritas for analysis. Results are pending.

In 2018, Ascendant also finished the compilation and data entry program of the drilling results that pertain to the upper part of the old mine. Approximately 3000 additional drill holes were verified and added to the existing database. Production from this area occurred in the early decades of mine operation and was primarily focused on high grade, silver bearing chimney deposits that extend down to, and sometimes through and below, the Mochito Shale unit. Re-interpretation of geology based on the addition of these new historical drilling results is ongoing and has resulted in the planning of additional underground drillholes.

Ascendant's current exploration strategy remains largely focused on core drilling assessments of near-mine exploration targets, with those defining direct extensions to existing Mineral Resources ranking highest in priority. Examples of related drilling results for 2017 and 2018 programs completed to the report date are briefly outlined in section 9.2 below. Exploration drilling efforts were reduced in early 2018 in recognition of tightening metal markets.

9.2 Near Mine Exploration in 2017 and 2018

The history of mining and exploration at El Mochito over its 70 year production period has consistently shown that near mine exploration potential has been high for both chimney and manto style deposits and this trend continued for Ascendant in 2017 and 2018.

In addition to the large resource and reserve step out, delineation and infill drilling completed during 2017, approximately 2,318 m of underground exploration core drilling was assigned to test extensions of know mineralized trends beyond the limits of Mineral Resources and Mineral Reserves present at that time. The mineralized zone areas tested by these holes are Victoria, Santa Elena, Deep East and Esperanza. Highlights of drilling results for 2017 from these areas were publicly disclosed in a January 22, 2018 Ascendant press release and define strong zones of well mineralized skarn in each case. Table 9.1 below presents a summary of weighted average drilling intercepts from these exploration holes and Table 9.2 presents associated hole location information. Figure 9.1 shows hole traces relative to existing Mineral Resource areas. In each case, results warrant follow-up through both infill and step out drilling to support future expansion of Mineral Resources and Reserves.

Table 9.1 – Selected 2017 exploration drilling results

Area	DDH No.	From (m)	To (m)	Length (m)	True or Apparent Length (m)*	Ag (g/t)	Pb (%)	Zn (%)	ZnEq (%)**
Deep East	10909	56.0	58.2	2.2	1.9	59.0	5.0	7.5	12.5
	and	63.7	65.7	2.0	1.7	29.0	2.3	2.6	4.9
	and	71.9	75.7	3.7	3.7	121.9	15.0	19.3	33.7
	including	71.9	73.5	1.5	1.5	84.0	11.6	12.1	23.0
	including	73.5	74.4	0.9	0.9	143.0	17.3	22.9	39.5
	including	74.4	75.7	1.3	1.3	152.0	17.4	25.4	42.2

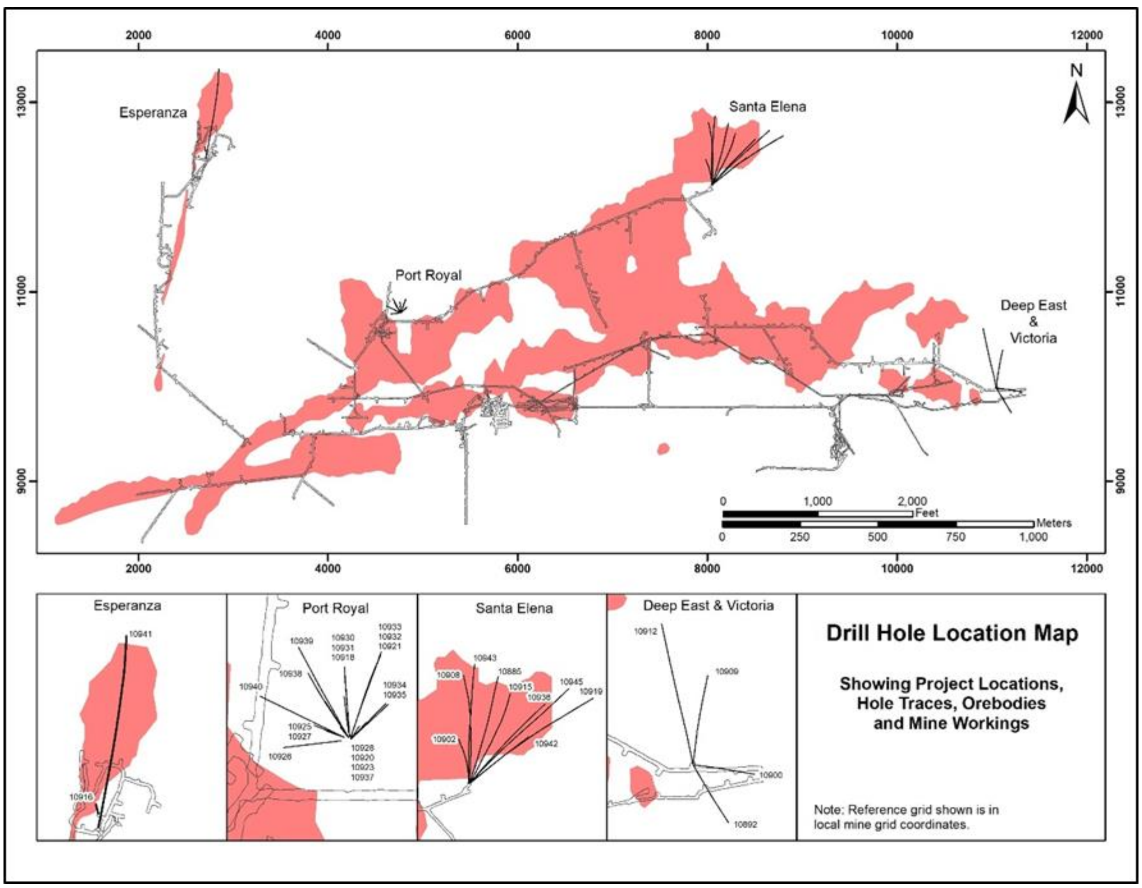
Area	DDH No.	From (m)	To (m)	Length (m)	True or Apparent Length (m)*	Ag (g/t)	Pb (%)	Zn (%)	ZnEq (%)**
	and	186.7	188.3	1.6	1.5	26.0	1.8	5.6	7.5
	and	192.0	193.5	1.5	1.3	8.0	0.3	4.6	4.9
Deep East	10912	19.5	20.7	1.2	0.9	46.0	4.6	0.5	5.1
	and	70.7	72.4	1.7	1.5	96.0	3.3	12.6	16.9
	and	75.6	76.7	1.1	0.9	137.0	4.8	3.7	9.9
	and	199.6	201.8	2.1	2.0	26.0	3.0	4.1	7.0
	and	209.9	212.1	2.3	2.1	10.0	0.8	3.6	4.4
Esperanza	10941	377.6	395.5	18.0	15.2	60.9	1.4	5.8	7.9
	including	377.6	382.5	4.9	4.2	23.1	1.0	5.9	10.7
	including	382.5	384.0	1.5	1.3	14.0	0.0	2.7	2.9
	including	384.0	388.3	4.3	3.6	50.7	2.2	8.5	11.1
	including	388.3	395.5	7.2	6.1	96.5	1.3	2.6	5.2
	and	399.1	419.1	20.0	16.8	38.4	0.8	5.5	6.9
	including	399.1	402.6	3.5	2.9	51.4	3.6	7.2	11.1
	including	402.6	419.1	16.5	13.8	35.6	0.2	5.2	6.0
Santa Elena	10919	292.3	293.8	1.5	1.4	37.0	2.6	2.3	5.1
	and	499.3	500.2	0.9	0.8	10.0	0.1	4.3	4.6
	and	505.7	509.2	3.5	3.3	24.6	1.9	5.0	7.0
Santa Elena	10945	477.9	492.7	14.8	13.4	51.3	3.2	3.9	7.4
	including	477.9	483.1	5.2	4.7	17.5	1.7	1.9	3.6
	including	483.1	484.9	1.8	1.7	43.0	6.8	5.4	11.7
	including	484.9	489.8	4.9	4.4	43.5	3.4	5.0	8.5
	including	489.8	491.5	1.7	1.5	224.8	5.1	8.3	16.1
	including	491.5	492.7	1.2	1.1	19.0	0.2	3.2	3.6
Victoria	10892	118.2	125.0	6.8	6.4	16.0	1.0	6.4	7.5
	including	118.2	123.4	5.2	5.0	15.8	1.1	4.7	5.9
	including	123.4	125.0	1.5	1.4	17.0	0.6	12.4	13.2
	and	155.4	157.0	1.5	1.5	20.0	0.6	5.6	6.4
Victoria	10900	84.4	84.9	0.5	0.5	57.0	5.0	8.1	13.2

** ZnEq. Assumptions: Prices – Zn$1.13/lb, Pb$1.00/lb, Ag$18.00/oz; Payable metal – Zn 85 %, Pb 95 %, Ag 69 %, Processing recoveries – Zn 89 %, Pb 74 %, Ag 79 %.
Taken from Ascendant files.

Table 9.2 – Details of drill holes referenced in Table 9.1

Area	Drill Hole Categorie	Mine Level	DDH No.	WGS 84 UTM Coord		Elev	Azimut	Dip	Length
				Easting m	Northing m	m	m		m
Victoria	Exploration	2790	10892	384,284.3	1,642,147.7	108.4	149	-55	179.8
Victoria	Exploration	2790	10900	384,285.4	1,642,148.3	108.4	96	-59	179.8
Deep East	Exploration	2790	10909	384,284.0	1,642,149.0	108.4	6	-53	220.4
Deep East	Exploration	2790	10912	384,283.5	1,642,151.0	108.4	350	-39	270.4
Santa Elena	Exploration	2680	10919	383,373.2	1,642,807.6	123.2	49	-54	530.4
Esperanza	Exploration	1814	10941	381,746.2	1,642,900.3	407.1	10	-45	435.9
Santa Elena	Exploration	2680	10945	383,373.2	1,642,807.6	123.2	41	-56	501.4

Taken from Ascendant files



Taken from Ascendant files

Figure 9.1 – Location plan for drill holes appearing in Table 9.1

Core drilling related to infill and exploratory work in near-mine areas continued in 2018 and totalled 24,434 m to the end of August, 2018. The most recent results of this program were disclosed by Ascendant in a press release dated September 10, 2018 and reflect the most recent 4,254 m of the total program to date. This meterage was split between in-fill (48 %) and step-out (52 %) drill holes and targeted extensions of four mineralized bodies, namely Porvenir, Santa Elena, Port Royal Manto and Esperanza. Results of the program served to extend existing mineralized zone limits by step out (exploration) drilling and to better define mineralization within existing deposit areas by infill drilling. Results of similarly focused earlier drilling were disclosed in a press release dated June 14, 2018 that accounts for results from an additional 40 diamond drill holes (12,015 metres) of the 2018 exploration and definition drilling program.

The later 2018 drilling continued to be split between step-out or exploration (66%) and in-fill (34%) holes, and targeted extensions of four mineralized zones, these being Porvenir, Santa Elena, Port Royal Manto and Esperanza. Table 9.3 presents a summary of selected weighted average drilling intercepts from the most recent holes and Table 9.4 presents associated hole information. Figure 9.2 shows hole traces relative to existing Mineral Resource areas. As in 2017, 2918 results warrant continued follow up through additional infill and step out drilling to support future expansion of Mineral Resources and future definition of Mineral Reserves.

At mid-year, Ascendant responded to weakening metal pricing by curtailing remaining planned exploration and stepout drilling. Since that time, infill drilling within existing resource outlines has been the sole focus of such work.

Table 9.3 – Selected 2018 infill and step out (Exploration) drilling results

Area	DDH No.	From (m)	To (m)	Length (m)	True / Apparent Width (m)*	Ag (g/t)	Pb (%)	Zn (%)	ZnEq (%)**
Esperanza	10991	57.9	65.3	7.5	7.2	109.0	5.8	6.2	12.9
	including	57.9	59.3	1.5	1.4	58.0	4.0	3.5	7.8
	including	59.3	64.0	4.7	4.5	136.1	7.6	8.4	16.9
	including	64.0	65.3	1.3	1.3	70.0	1.9	1.6	4.3
Esperanza	10993	82.4	84.9	2.5	2.0	137.3	8.8	6.9	16.4
	including	82.4	83.7	1.2	1.0	235.0	15.7	11.5	28.3
	including	83.7	84.9	1.2	1.0	42.0	2.1	2.5	4.8
Esperanza	10996	63.1	71.8	8.7	7.1	86.5	6.2	7.4	14.0
	including	63.1	65.5	2.4	2.0	137.5	7.7	9.2	17.8
	including	65.5	71.8	6.2	5.1	66.6	5.7	6.7	12.5
Esperanza	10998	69.5	89.3	19.8	13.7	72.0	4.6	5.7	10.7
	including	69.5	77.9	8.4	5.8	38.5	2.2	3.8	6.2
	including	77.9	78.2	0.3	0.2	1.0	0.0	0.0	0.0
	including	78.2	80.2	2.0	1.4	64.0	3.4	7.0	10.8
	including	80.2	82.0	1.8	1.3	172.0	13.6	14.2	28.3
	including	82.0	89.3	7.3	5.1	90.2	5.6	5.8	11.9
Esperanza	10999	55.8	60.7	5.0	4.8	166.5	6.6	8.2	16.4

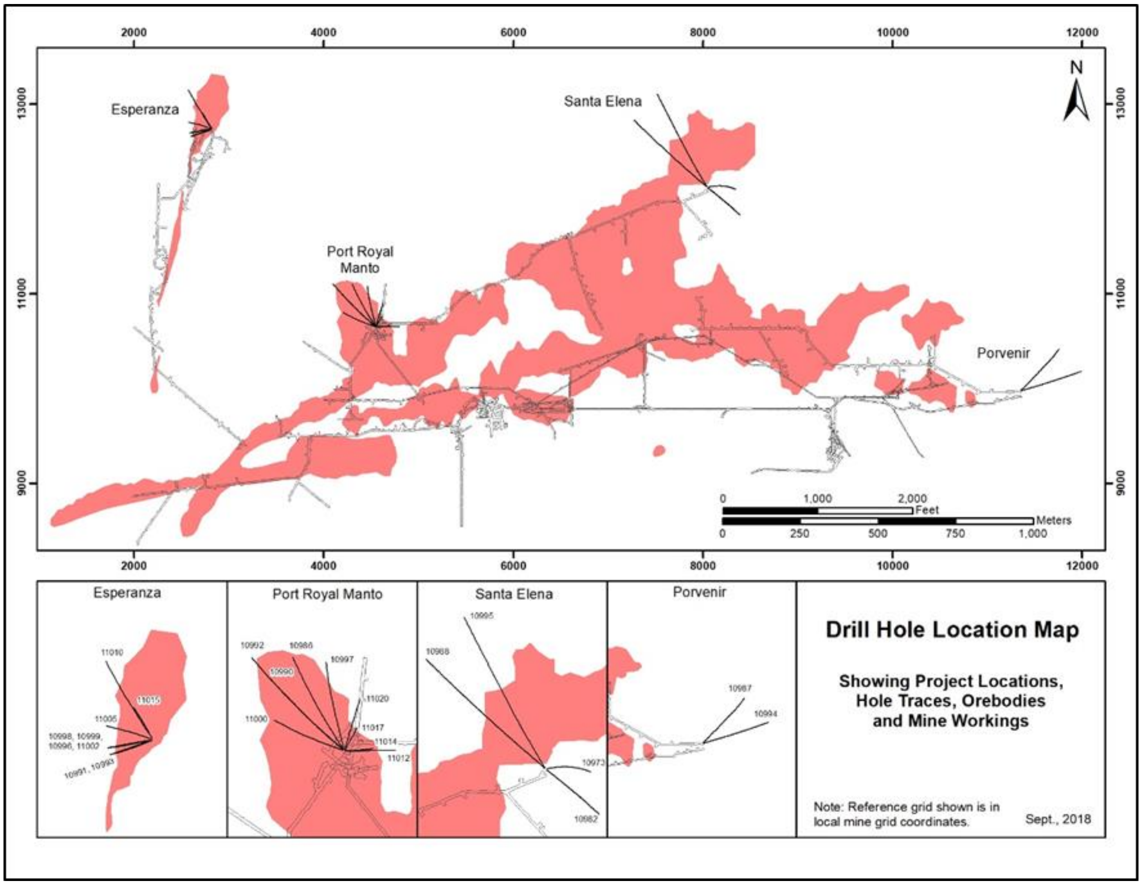
Area	DDH No.	From (m)	To (m)	Length (m)	True / Apparent Width (m)*	Ag (g/t)	Pb (%)	Zn (%)	ZnEq (%)**
	including	55.8	57.6	1.8	1.8	301.0	9.5	12.2	25.0
	including	57.6	59.4	1.8	1.8	107.0	5.5	7.0	13.3
	including	59.4	60.7	1.3	1.3	62.0	4.1	4.3	8.7
Esperanza	11002	77.3	78.8	1.5	0.9	59.0	4.5	4.8	9.5
	and	107.4	108.8	1.4	0.9	74.0	3.2	3.6	7.4
Esperanza	11005	53.0	57.0	4.0	3.7	75.9	5.7	7.1	13.0
Esperanza	11010	14.4	16.6	2.2	2.0	57.0	0.8	3.5	5.1
	and	67.2	70.1	2.9	2.7	78.2	4.8	5.8	11.1
	including	67.2	68.6	1.3	1.3	92.0	5.7	6.9	13.1
	including	68.6	70.1	1.5	1.4	66.0	4.1	4.9	9.3
	and	75.6	80.3	4.7	4.5	55.8	2.5	4.5	7.4
	including	75.6	77.6	2.0	1.9	58.0	4.9	5.1	10.1
	including	77.6	79.2	1.6	1.6	38.0	0.6	3.3	4.5
	including	79.2	80.3	1.0	1.0	80.0	0.8	5.1	7.0
	and	107.9	109.7	1.8	1.6	129.0	0.1	3.0	5.1
	and	114.3	115.5	1.2	1.1	30.0	0.6	3.9	4.9
	and	117.0	121.9	4.9	4.6	34.3	1.7	5.5	7.5
	including	117.0	118.7	1.7	1.6	16.0	0.5	3.9	4.5
	including	118.7	120.4	1.7	1.6	61.0	4.4	8.4	13.1
	including	120.4	121.9	1.5	1.4	25.0	0.2	3.9	4.5
Esperanza	11015	13.5	25.3	11.8	9.2	74.2	5.1	5.8	11.3
	including	13.5	15.2	1.7	1.4	116.0	7.0	7.8	15.5
	including	15.2	18.3	3.0	2.4	130.5	8.1	10.0	18.8
	including	18.3	20.1	1.8	1.4	62.0	5.3	5.8	11.2
	including	20.1	21.9	1.8	1.4	31.0	2.9	3.1	5.9
	including	21.9	23.1	1.2	0.9	1.0	0.2	0.2	0.3
	including	23.1	25.3	2.2	1.7	47.8	3.7	3.8	7.7
	and	55.2	62.5	7.3	4.9	64.1	0.6	4.2	5.7
	including	55.2	56.4	1.2	0.8	32.0	1.5	4.4	6.1
	including	56.4	57.9	1.5	1.0	7.0	0.0	2.7	2.8
	including	57.9	62.5	4.6	3.1	91.3	0.6	4.7	6.6
	and	68.0	71.3	3.4	2.3	28.0	0.0	4.3	4.8
	including	68.0	69.6	1.7	1.2	44.0	0.0	3.2	3.9
	including	69.6	71.3	1.7	1.2	12.0	0.0	5.4	5.6
Port Royal	10986	143.3	146.0	2.7	1.5	340.3	1.7	2.4	9.1

Area	DDH No.	From (m)	To (m)	Length (m)	True / Apparent Width (m)*	Ag (g/t)	Pb (%)	Zn (%)	ZnEq (%)**
Manto	*including*	143.3	144.8	1.5	0.8	111.0	1.0	4.3	6.8
	including	144.8	146.0	1.2	0.7	627.0	2.5	0.0	12.0
	and	168.9	173.4	4.6	2.5	96.2	1.2	1.7	4.2
	including	168.9	170.7	1.8	1.0	170.0	1.5	1.3	5.2
	including	170.7	173.4	2.7	1.5	47.0	1.0	1.9	3.5
Port Royal Manto	10990	158.5	171.0	12.5	6.2	41.8	2.9	4.1	7.2
	including	158.5	161.5	3.0	1.5	85.0	5.3	7.3	13.1
	including	161.5	163.1	1.5	0.8	38.0	3.6	5.5	9.1
	including	163.1	166.0	2.9	1.4	70.7	5.2	7.0	12.4
	including	166.0	167.0	1.1	0.5	4.0	0.1	0.2	0.3
	including	167.0	171.0	4.0	2.0	109.1	0.9	3.5	5.9
Port Royal Manto	10992	No Significant Intercepts							
Port Royal Manto	11000	101.1	107.3	6.2	2.7	102.6	4.5	5.7	11.1
	including	101.1	104.4	3.3	1.4	156.3	6.0	8.0	15.5
	including	104.4	105.2	0.9	0.4	29.0	1.9	1.9	3.9
	including	105.2	107.3	2.0	0.9	48.0	3.2	3.7	7.2
	and	125.0	131.1	6.1	3.4	51.3	0.7	8.5	10.0
	including	125.0	128.0	3.0	1.7	58.5	1.0	9.5	11.3
	including	128.0	131.1	3.0	1.7	44.0	0.5	7.5	8.6
Port Royal Manto	10997	124.4	126.0	1.7	0.9	49.0	3.1	4.3	7.7
	and	140.5	142.2	1.7	1.0	34.0	2.3	4.4	6.8
Port Royal Manto	11012	86.9	88.4	1.5	0.6	64.0	4.6	7.2	12.1
	and	91.4	93.0	1.5	1.0	46.0	0.1	9.6	10.4
Port Royal Manto	11014	No Significant Intercepts							
Port Royal Manto	11020	No Significant Intercepts							

Table 9.4 – Details of drill holes referenced in Table 9.3

Area	Drill Hole Category	Mine Level (m)	DDH No.	UTM Coordinates (WGS84Z16N)			Azi.	Incl.	Length (m)
				Easting (m)	Northing (m)	Elev. (m)			
Esperanza	Infill	794 m (2605 ft)	10991	381,780	1,643,192	171	249	19	73.2
Esperanza	Infill	794 m (2605 ft)	10993	381,780	1,643,192	172	250	41	94.5

Area	Drill Hole Category	Mine Level (m)	DDH No.	UTM Coordinates (WGS84Z16N)			Azi.	Incl.	Length (m)
				Easting (m)	Northing (m)	Elev. (m)			
Esperanza	Infill	794 m (2605 ft)	10996	381,780	1,643,192	172	263	30	82.3
Esperanza	Infill	794 m (2605 ft)	10998	381,780	1,643,192	172	262	45	96.0
Esperanza	Infill	794 m (2605 ft)	10999	381,780	1,643,192	171	260	17	73.2
Esperanza	Infill	794 m (2605 ft)	11002	381,780	1,643,192	173	260.6	53.6	121.3
Esperanza	Infill	794 m (2605 ft)	11005	381,781	1,643,194	171	291	26	83.8
Esperanza	Infill	794 m (2605 ft)	11010	381,781	1,643,196	170	326	-15	150.6
Esperanza	Infill	794 m (2605 ft)	11015	381,782	1,643,195	170	331	-36.4	74.1
Port Royal Manto	Infill	747 m (2450 ft)	10986	381,780	1,643,192	172	328.5	-36	96.0
Port Royal Manto	Infill	747 m (2450 ft)	10990	382,308	1,642,557	193	311	-35	180.1
Port Royal Manto	Infill	747 m (2450 ft)	10992	382,308	1,642,557	193	312	-30	217.9
Port Royal Manto	Infill	747 m (2450 ft)	11000	382,308	1,642,556	192	290	-44	150.9
Port Royal Manto	Infill	747 m (2450 ft)	10997	382,309	1,642,559	192	346.9	-42.5	175.3
Port Royal Manto	Infill	747 m (2450 ft)	11012	382,311	1,642,555	192	90	-43.5	103.9
Port Royal Manto	Infill	747 m (2450 ft)	11014	382,311	1,642,556	192	86	-58.5	82.3
Port Royal Manto	Infill	747 m (2450 ft)	11020	382,311	1,642,557	192	16.2	-40	103.6
Port Royal Manto	Infill	747 m (2450 ft)	11017	382,311	1,642,557	192	30	-59	71.6
Porvenir	Step Out	851 m (2790 ft)	10994	384,385	1,642,350	111	73	-42	323.1
Porvenir	Step Out	851 m (2790 ft)	10987	384,383	1,642,351	111	44	-39	300.2
Santa Elena	Step Out	817 m (2680 ft)	10973	383,378	1,643,006	125	80	-74	350.5
Santa Elena	Step Out	817 m (2680 ft)	10988	383,373	1,643,007	126	312	-38	420.6
Santa Elena	Step Out	817 m (2680 ft)	10982	383,378	1,643,003	125	127.5	-61	353.6
Santa Elena	Step Out	817 m (2680 ft)	10995	383,374	1,643,007	125	330.6	-39.4	475.5



Taken from Ascendant files

Figure 9.2 – Location plan for drill holes appearing in Table 9.3

9.3 Additional Exploration Target Areas Defined by Previous Operators

Current exploration by Ascendant at the El Mochito mine has continued a pattern in which new manto and chimney deposits have been sequentially discovered along long-established main mineralized trends of the district that are recognized as following fault or structural disturbance corridors. Further systematic exploration of these target corridors outward from the currently defined Mineral Resource outlines constitutes an important and proven strategy for exploration success. As noted previously in Micon (2016) and exemplified abundantly in the exploration history of this district, the main mineralized trends itemized below can be used to provide first order guidance for future exploration planning.

The exploration footprint of most chimney deposits is relatively small, and exploratory holes are unlikely to successfully intercept such mineralization when drilled on a broad spacing. However, with careful analysis of optimum drilling setup locations, a combination of surface and mine workings exploration drilling setups should be available to systematically extend exploration along the main corridors of interest. In all cases, manto style mineralization will have the greatest probability of being discovered due to its larger spatial footprint that is relatively flat lying. Careful attention to all known indicators of mineralization proximity must be applied to such exploration, with these including assessments of garnet type and composition distributions, mapping of calcite florescence and careful attention to structural features encountered in core.

Completion of multiple deep surface holes from a single setup, as previously employed at the Big Fuzzy target should be beneficial in areas distant from mine workings and refurbishment of access to some upper level workings purely for underground drilling setup purposes should be assessed. In cases where surface drilling is carried out, the Cantarannas Formation manto target depth will exceed 1,000 m vertically below surface, so planning for direction drilling of step out cuts from discovery holes should be contemplated. Areas of obvious exploration potential exist on the strike extensions and intersections of the following trends that are schematically represented in Figure 9.3.

- Porvenir Trend.
- Victoria Deep East Trend.
- Santa Elena Trend.
- Imperial Trend.
- Salva Vida Trend.
- Port Royal.

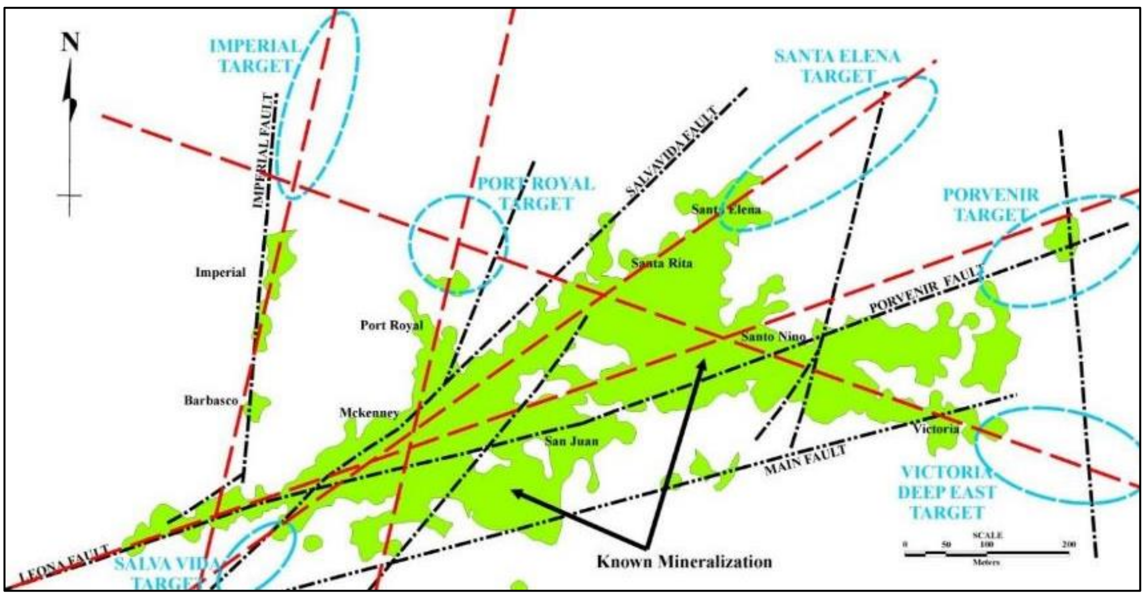
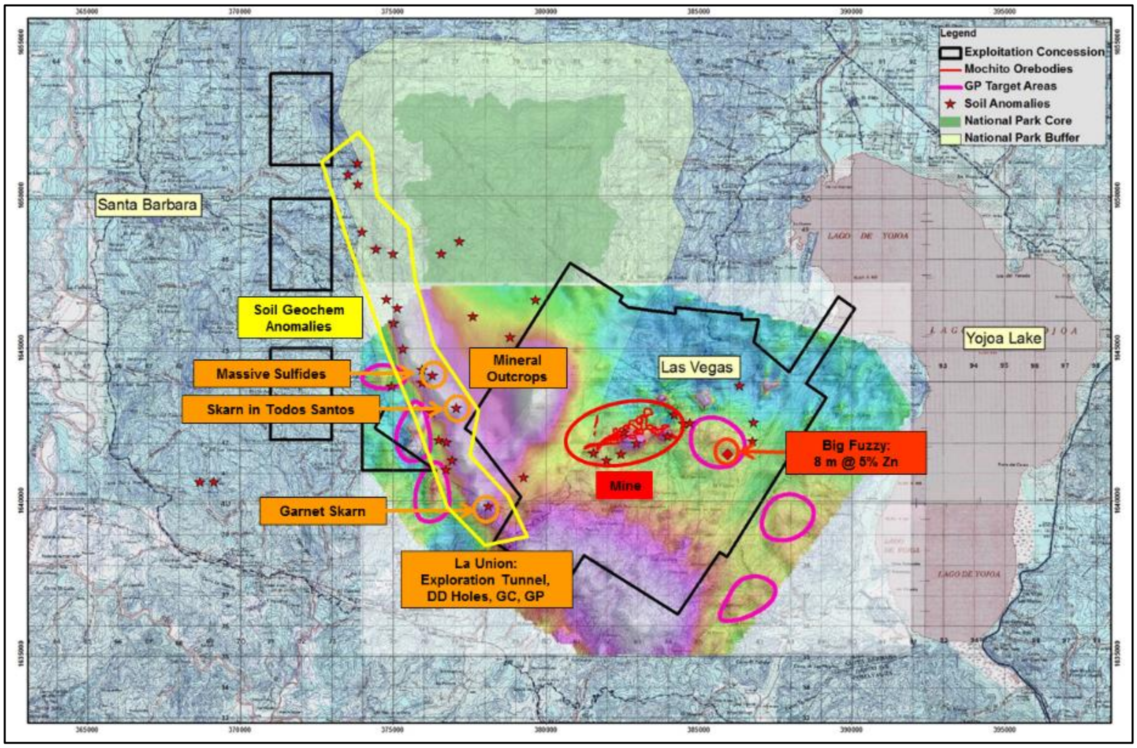


Figure 9.3 – Mine and district scale exploration target corridors (Nyrstar, 2016b)

As noted previously in the Micon (2016) report, several surface drill holes have intersected mineralization at depth outside the mine workings, notably in the Caliche, Soledad and Big Fuzzy areas. These require follow up assessments.

Additional areas of defined prospectivity were highlighted in 2016 internal reporting by Nyrstar and appear in Figure 9.4. These include the previously investigated La Union manto mineralization and structural trend that was tested earlier by limited drilling and underground work, as well as compiled soil geochemical anomaly targets and skarn occurrences that define a north-northwest trending target zone measuring about 15 km in length. Much of this trend occurs within or adjacent to the Santa Barbara National Park boundary and its related buffer zone however, which may affect exploration access (Nyrstar, 2016b).



Source : Nyrstar (2016)

Figure 9.4 – Areas of off mine site exploration interest identified in Nyrstar (2016) reporting

10. DRILLING

10.1 Introduction

Core drilling carried out for the purpose of either exploration or Mineral Resource and Mineral Reserve definition or stope planning purposes has been carried out on the Property (El Mochito mine and Exploitation Concessions) since deposit discovery in 1938, and increased substantially on a annual basis after initiation of mine production in 1948. A summary review of mine records by Mercator in early 2018 showed 8,821 separate drill holes in the GEMS™ database up to the January 1, 2019 effective date of the Mineral Resource Estimate described in this Technical Report. In addition, Ascendant staff advised that logs for a large number of very old drill holes that were completed in the upper levels of the mine, above the Mochito Shale, are present as hard copy records in the mine archives and that early in 2018 the process of having these entered into digital (Excel™) spreadsheets in preparation for their addition to the GEMS™ drilling database had been initiated. As noted in report section 9.1 above, approximately 3,000 historical holes have been processed to date.

10.2 Summarized Core Drilling Meterage

Micon (2016) reported that through the 1948 through 2015 period a total of at least 1,168,88 m of core drilling had been completed on the Property, including both exploration and delineation categories. With addition of 2016 mage drilled by Nyrstar and 2017 mage drilled by Ascendant, this total rises to 1,222,753 m. An additional 24,434 completed by Ascendant to the end of August in 2018 brings the cumulative meterage total to 1,251,198 m.

The majority of this drilling was carried out from underground stations within the continually advancing mine complex, but surface drilling has also played an important role at the site, particularly with respect to deep hole exploration at distances beyond the reach of underground core drilling operations conducted form the workings.

Table 10.1 below presents summarized drilling meterage's for the 1949 to 2018 period and shows that in the first ten years of operation the mine averaged only 2,305 m per year of drilling. This was followed by a substantial increase to approximately 10,000 m per year over the next thirty year period ending in 1989. That average doubled to approximately 20,000 m/y by 1999 and continued to steadily increase until the five year period ending in 2015, which averaged 51,196 m/y of drilling. Since 2015, average drilling rates have lessened to about 25,000 m/y. The systematically increasing average rates of core drilling per year through 2015 that appear in Table 10.1 broadly track increases in mine production levels, a good example of which is seen in the 1990 to 1999 period when a doubling in drilled annual meterage corresponds with production increasing from less than 400,000 tpy in 1990 to in excess of 700,000 tpy in 1999. Increased drilling was necessary to provide systematic replacement of mined Mineral Reserves and Mineral Resources.

Table 10.1 – Summary of recorded El Mochito core drilling 1949-2018

Period From:	Period To:	Recorded Drilling	No. of Years	Average/Year (m)
1949	1959	25,352	11	2,305
1960	1969	96,980	10	9,698
1970	1979	111,715	10	11,172
1980	1989	84,414	10	8,441
1990	1999	204,927	10	20,493
2000	2009	338,322	10	33,832
2010	2015	307,177	6	51,196
2016	2017	31,039	1	31,039
2017	2018	26,838	1	26,838
2018	2018	24,434 (to August 31)	1	24,434
	Total:	**1,251,198**	**70**	**21,945**

•Modified after Micon (2016): additional data for 2017 and 2018 from Ascendant files

10.3 Drill Holes Used in Current Mineral Resources/Reserve

Although more than 10,000 core drilling holes have been completed on the Property since 1948, a substantially smaller subset of this total population contributed directly to the Mineral Resource estimate supported by this Technical Report. The twenty-seven named Mineral Resource areas are intersected by a total of 2,245 core drilling holes that were used in the current estimation program. These define a chronological period from 1977 through 2017 and reflect a total of 392,413 m of core drilling. Notably, a majority of the drill holes supporting the current Mineral Resource estimate fall within the period for which structured QAQC programs of various descriptions were sequentially established by Breakwater, Nyrstar and Ascendant. Table 10.2 below identifies the number of drill holes and corresponding meterage used to support grade and tonnage estimates for each of the named Mineral Resource areas that comprise the current Mineral Resource Estimate and Figure 10.1 presents a plan view of all holes relative to the mine workings solids.

Table 10.2 – Mineral Resource areas and number of associated core drill holes

Mineral Resource Area	Number of Drill Holes Used in Mineral Resource	Drill Core Meterage
Canoe	263	18,431
Deep East	20	7,618
Deep North	22	7,895
Esperanza	50	14,286
Barbaasco	36	2,288
Imperial	45	5,097
McKenny	36	5,468
Nacional	2	359

Mineral Resource Area	Number of Drill Holes Used in Mineral Resource	Drill Core Meterage
Niña_Blanca	26	5,523
Nueva_Este	77	5,512
Palmar_Dyke	92	19,679
Port_Royal_Chimney	85	10,965
Port_Royal_Manto	59	6,201
Porvenir	20	12,886
Salva_Vida	56	7,588
San_Jose	168	25,238
San Juan South	49	8,111
Santa_Barbara_South	113	19,338
Santa_Barbara_North	110	32,876
Santa_Elena	82	29,551
Santa_Nino_Manto	195	31,668
Santa_Nino_West	131	25,659
Santa_Rita	97	17,666
Victoria	272	55,645
Victoria	84	10,345
Yojoa_Manto	55	6,522
Yojoa_West	263	18,431

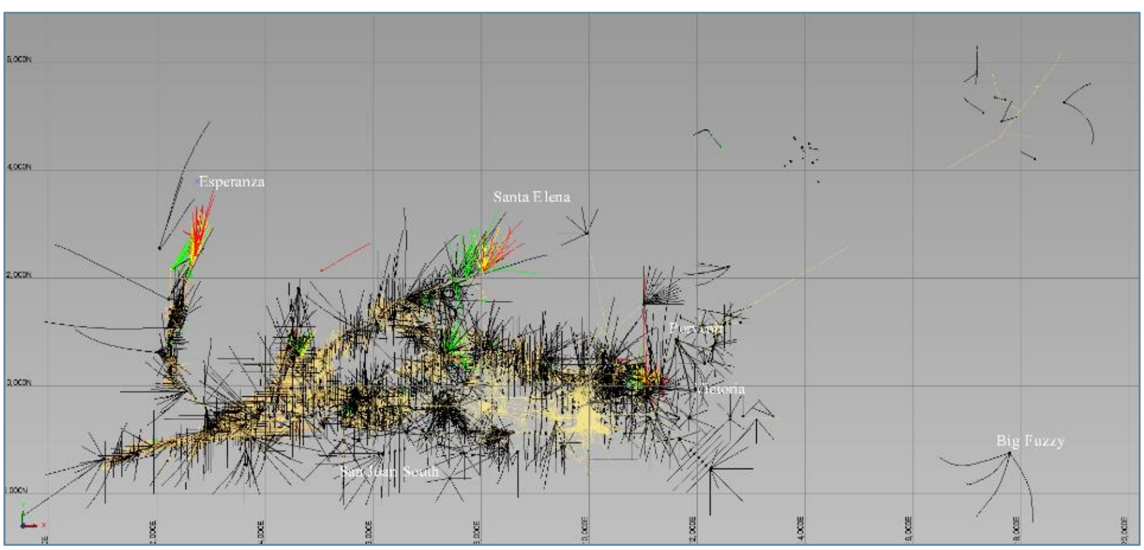


Figure 10.1 – Drill hole plan for the El Mochito Mine (2017 – Red, 2016 – Yellow, 2015 – Green, < 2015 – Black)

10.4 Core Drilling Equipment

Ascendant owns its own core drilling equipment that is operated by experienced staff drillers and helpers. Both underground and surface drilling equipment is included along with all required support equipment. This model of mine-owned and operated drilling equipment was inherited from Nyrstar and had previously been employed by Breakwater. As a result, with the possible exception of certain highly specialized drilling requirements, Ascendant is able to meet all of its underground exploration and delineation drilling needs using its own equipment and crews and similar capability exists with respect to surface exploration requirements. The company owns several drilling rigs, details of which appear in Table 10.3 and most coring now undertaken is of NQ (47.6 mm) or BQ (36.5 mm) size.

Table 10.3 – Core drilling equipment owned by ascendant

Drill Rig Type	Manufacturer	Model	Year	Depth Capacity (m)
Underground	Boart Longyear	LM-90	2011	910
Underground	Boart Longyear	LM-75	2011	910
Underground	Boart Longyear	LM-75	1998	760
Underground	Boart Longyear	LM-55	2008	450
Underground	Atlas Copco	Diamec 262	1996	450
Underground	Atlas Copco	Diamec 262	2001	450
Underground	Atlas Copco	Diamec 262	2001	450
Surface	Tec Drill	Muky FB-100	2015	90
Surface		YS-1500	2006	1790
Surface		YS-1500	2007	1790

10.5 Orientation Surveying of Drill Holes

Review by Mercator of drilling database survey tables showed that until the mid-2000's, detailed downhole surveying for borehole deviation purposes was not routinely carried out and hole trajectories were set at the collar inclination and azimuth values only. Subsequently, mechanical and then electronic single and/or multi-shot downhole survey systems have been employed to collect hole deviation data. Observations have been collected at various intervals through time, with these commonly ranging between 25 m and 100 m. All systems routinely used at the site have been based on magnetic field measurements and provide reliable results for locations not located close to skarn intervals having substantial magnetite components. Since these intervals are directly associated with the mineralized zones of economic interest at this site, hole deviation errors are most likely to occur when instrument readings are taken close to mineralization.

Geology department staff currently review digital downhole survey files prior to their entry into the drilling database and note whether errant readings are included in the raw data file. The magnetic field intensity measurements logged by the current ReFlex™ system are also used to assess potential negative influence of high magnetic susceptibility materials on survey data. Obviously inaccurate observations are selectively removed from a copy of the original survey file to produce a new file that lacks influence of affected data. This file is entered into the drilling database and the original data file is archived along with the hole log information. Mercator understands that this approach was also employed at El Mochito previously by both Nyrstar and Breakwater.

Subjectivity of file assessment and resulting irregular survey point spacing associated with the method described above can result in poor spatial control for some drill holes, particularly long exploration holes exceeding 400 m in length. As a result of compromised survey file data, it is not uncommon to find that geological interpretations that include both long holes and short holes sometimes show local spatial conflicts with respect to contact and mineralized intercept locations. In some cases, mis-location of the hole is sufficient to require its removal from the drilling dataset.

The downhole survey quality issue has been apparent for some time and was flagged in both Micon (2016) and Arsenault (2015) reporting. These workers recommended use of a gyroscopically controlled multi-shot instrument rather than the Reflex™ magnetic systems currently used by the company, which were inherited from Nyrstar. Mercator encountered several problematic examples of hole deviation affecting local interpretation of Mineral Resource solid spatial extents and concurs with the earlier recommendations to transition downhole surveying to a robust non-magnetic system, at least for use in longer exploration holes that are most susceptible to slight deviation errors.

10.6 Core Recovery

Calculation of core recovery percentage is routinely carried out in conjunction with RQD logging completed for geotechnical purposes prior to lithologic logging and core sampling. Results are written to the drilling database. During Mercator's two site visits, drill core from 18 holes was reviewed in detail, with some holes viewed prior to skeletonization of the core. All holes included mineralized zone intercepts and it was noted that good core recovery is typical, particularly in mineralized skarn zones. Areas of recognizable shearing and faulting, marked by breccia and gouge development, showed high fracture density and highest calculated core losses. Since faults controlled skarn development and location of mineralization, it is not uncommon to see short fault associated intervals of poor recovery located near mineralized intercepts showing excellent recovery.

Based upon its review of drill core, RQD results and lithologic logs during site visits, plus discussion of core loss with geology department staff, Mercator has concluded that core loss is, and has been, effectively monitored at El Mochito, and that it is not a widespread and problematic factor that materially affects the quality of geological interpretations and associated modeling of mineralization.

10.7 Operational and Planning Aspects

Ascendant drilling programs are designed by the company's exploration and mining staff and then submitted for review and budgeting by senior staff. Programs to date have been very heavily directed toward Mineral Resource and Mineral Reserve infill and extension drilling related to the known deposit areas and has been almost exclusively carried out from the underground workings. Typically, mine or exploration group geologists are responsible for coordinating setup of drilling locations through the mine surveying staff, who also layout hole orientation references to ensure that correct azimuths are available to drilling crews. Underground drilling is spatially registered within the mine grid coordinate system. For surface drilling, hole locations and azimuths are set under supervision of geological staff using GPS and compass methods and coordinated to the UTM coordinate system. Transport of core from the underground workings or field locations is carried out by site technical staff.

10.8 Comment on Drilling Programs by Ascendant and Previous Operators

Core drilling programs carried out at El Mochito during the Ascendant, Nyrstar and Breakwater periods of operation are particularly relevant to the current Mineral Resource Estimate on the basis of associated drill hole support. As a result, these were the primary focus of review by Mercator for current report purposes. Based on desktop review of historical program documentation, physical review of core from drill holes, and discussions with site professionals having careers that span all three of the operating periods noted above, Mercator has concluded that core drilling programs at the El Mochito site through time were systematically carried out and that archival documentation of associated results has been carried out to a standard that exceeds industry norms.

During the course of Mineral Resource modeling in 2017 and 2018, several examples of problematic down hole survey data were encountered that locally complicated wireframing of Mineral Resource digital solids. This resulted in additional expense to Ascendant through staff and consultant time committed to address the issues. To reduce occurrence of such in the future, Mercator recommends that Ascendant carry out an assessment of currently available non-magnetic down hole surveying tool options, including gyroscopic systems. The intention of this assessment should be to establish an inhouse capability to collect high quality hole deviation data irrespective of the amount of high magnetic susceptibility material in the rock sequence being cored. Such surveying is probably not required for short exploration and delineation holes but all longer holes (>150 m) drilled from both surface and underground should be surveyed by non-magnetic methods. This recommendation is consistent with those provided earlier by Micon (2016) and Arsenault (2015).

11. SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Introduction

The following discussion of sample preparation, analyses and security items first addresses the Ascendant operating period that began in December of 2016 and is on-going. Summary comments on the immediately preceding period of Nyrstar and Breakwater operations are subsequently presented.

At the present time, Ascendant operates its own analytical laboratory and preparation facility at the El Mochito site and these provide preparation and analytical services to support day to day mine and concentrator operations. More specifically, all samples collected on a routine basis in association with mining operations, such as face samples, muck samples or drill jumbo cuttings samples are processed at this facility, along with all samples associated with operation and monitoring of milling operations and concentrate production. Prior to 2016, most of the drill core produced by Mineral Resource and Mineral Reserve delineation programs and also by exploration programs was prepared and analyzed at this facility, with the remainder being shipped to independent commercial laboratories for processing. In all instances, responsibility for establishment and monitoring of quality control and quality assurance programs was assigned to the operations or exploration group associated with original sampling.

In 2016, Nyrstar initiated a protocol by which all drill core produced from both exploration and deposit delineation drilling programs was no longer prepared and analyzed at the on-site laboratory. Since that time, all core samples have been analyzed at Bureau Veritas Commodities Canada Ltd. (ACME or Bureau Veritas), in Vancouver, BC, Canada. Ascendant has continued with this approach to core sample analysis. ACME is an independent analytical services firm accredited to the ISO/IEC 17025-2005 standard and operates on an international basis. Analysis of muck, drill jumbo and other mine-related samples continue to be carried out at the company's laboratory at the El Mochito site. The decision to segregate core sample programs from on-site analysis reflects strong weighting of associated results in on-going Mineral Resource delineation and exploration programs for which independence from the analytical services firm is preferred.

11.2 Core Sampling Method and Approach

The following description of core handling procedures is taken with modification from the Micon (2016) Technical Report prepared for Morumbi (Ascendant). Based on reviews carried out by Mercator during 2017 and 2018 site visits, the 2015 description of procedures being followed by Nyrstar and previously Breakwater remain generally applicable, with the exception of initiation of on-site density determinations by logging facility staff in 2014.

The core is extracted from the drill core tube and placed into wooden or metal boxes by the drilling staff at the rigs. The core boxes are labeled with sequential box numbers and include the drill run footage. Wooden or plastic lids are secured to the top of each box to prevent core spillage during transport. The boxes are transported to the core logging facility, located adjacent to the mine operations office complex, by mine or exploration group technical staff for subsequent logging, sampling and archiving (Figure 11.1).

Core facility staff arrange the core boxes for logging and photography, take measurements of the core recovery in each box and digitally record associated data in spreadsheet format. Core intervals are measured, their lengths recorded, and a percentage recovery is calculated by comparing actual core lengths to reported drilling lengths indicated by core depth tags. Collection of Rock Quality Determination (RQD) values and rock hardness values began in late-2008 and has continued since that time. Geotechnical data were maintained in paper format until late-2008 but are now entered into the digital geological database (Dassault Systems, Geovia, GEMS™ software).

The drill core is logged by the geological staff using a standardized coding system that includes lithology, alteration and structure fields. A detailed description of each logged rock unit is also recorded. Each core box is photographed digitally for future reference and the associated photos are digitally archived under a hole number-based filename system. Qualified geologists log the drill core and mark intervals that are to be sampled. Sampling is normally done on 1.5 m (5 ft) intervals, with restriction of samples to within major geological boundaries. Core logging was originally done on paper with results manually entered into the GEMS™ database.

Figure 11.1 – Core logging facility

At present, logging and sampling data are collected and entered directly into the GEMS™ database at the core logging facility. Geological staff accesses the Bureau Veritas and mine laboratory database on a read-only basis to extract corresponding assay results and then merge these with the geological database. The Excel files are created, checked and approved prior to being imported into the GEMS™ database.

After logging and sampling procedures are completed, geological technicians skeletonize core from each hole by moving one representative piece per lithological unit identified by the logging geologist. These subsamples are placed in wooden or metal core boxes for archiving. The logging geologist identifies core intervals that are to be sampled by marking the core and these intervals are split by a technician into two equal halves using a diamond saw. A water immersion specific gravity measure is also obtained for each core sample and entered into the drilling database. Half of the sampled core is replaced into the core box and is then stored, along with associated skeletonized samples, from the same hole, in a secure archive area that is contiguous with the current logging facility (Figure 11.2). A second core archive facility is located at the exploration office site (Figure 11.3).

Figure 11.2 – New core storage at logging facility

Figure 11.3 – Exploration office core storage facility

After insertion of Quality Assurance and Quality Control (QAQC) materials, core samples are subject to inspection prior to being placed in larger bags in groups to be shipped by commercial carrier to the Bureau Veritas preparation laboratory in Guatemala City, Guatemala. A continuous numbering system approach is used for all core samples and QAQC samples for each laboratory shipment are assigned numbers within this continuous system. Sample pulps are returned from Bureau Veritas for storage.

Mercator did not review any specific documentation of core logging and sampling procedures that were being applied prior to 1994. However, review of original hard copy historical drill logs for the period showed that detailed lithologic logging was carried out in a structured mine legend format and that systematic half core sampling was followed by analysis at the mine laboratory. It is assumed that mine laboratory QAQC procedures were applied to such samples.

Hard copy drill logs for almost every drill hole completed between 1953 and 2006, totaling nearly 8000 holes, are archived in binders at the exploration office. Most of these have been compiled in digital (Excel™) spreadsheets and have been transferred to the mine's current GEMS™ drilling database. Ascendant recently initiated a program to ensure that all historical drill holes that were completed in the historical upper mine levels, above the Mochito Shale, are also included in the GEMS™ drilling database. This project was ongoing at the time of Mercator's February 2018 site visit and was previously referenced in report section 9.1.

11.2.1 Mine sampling

As described by Micon (2016) and confirmed during the Mercator site visit in August of 2017, two main types of rock samples are routinely collected underground at El Mochito, these being grab samples of broken mineralized material from active working areas and/or face, back or rib chip samples from such areas. Continuous chip samples have historical ly been collected from face, back or rib exposures and then analyzed to support short term production grade control and planning. More recently, this type of sampling has been augmented by collection of drill cuttings samples (typically from five holes distributed within a jumbo drilling face) collected on a routine basis from operating faces in Mineral Reserves or Mineral Resources. These are numbered, entered into the sampling database along with all other underground samples, and analyzed at the mine laboratory after standard protocol preparation. Analytical data generated from underground sampling programs are used for short term planning purposes but are not used in Mineral Resource and Mineral Reserve estimation programs

11.2.2 Density determination method

A density determination is currently carried out on each half core sample submitted for assaying using a variation of the saturated surface dry method and this approach has been applied since 2013 and provides a density value for the rock mass plus included pore fluid, if any. Measurement procedures are carried out at the El Mochito core logging facility and are as follows:

- sample is air dried for 24 h;
- dried sample placed in a pre-weighed plastic mesh bag and is weighed in air;
- the bagged sample is submerged in clean fresh water for 24 h;
- the bagged sample is removed from the water, allowed to dry to a surface dry condition and then weighed while submerged in clean fresh water;
- a specific gravity value is calculated from dry and immersed weights using Equation 1.

Equation 1 : Specific gravity

$A / (A - C)$

where :

A = Dry weight of the sample, and

C = Submerged weight of the sample.

This procedure was implemented in 2013. Prior to that, average density values developed for manto, chimney and waste rock materials were applied to modelled volumes to estimate tonnages. Two linear regression formulas were subsequently developed for manto and chimney mineralization settings based on a substantial population of measured density data and corresponding summed values for contained zinc, lead, copper and iron grades (Equation 2 and Equation 3).).

Equation 2 : Chimney Equation

((Zn% + Pb% + Fe% + Cu%) * 0.0206 + 3.1645)

Equation 3 : Manto Equation

((Zn% + Pb% + Fe% + Cu%) * 0.0198 + 3.0137)

These were used by Nyrstar and subsequently Ascendant until the time of the current Mineral Resource Estimate. Mercator reviewed all available density data in support of the current Mineral Resource Estimate and determined that a single revised estimate in the form of Equation 4 produced values better suited to modelling of the related mineralized zones. In future, if high volumes of high-grade chimney mineralization are encountered, it may be appropriate to revisit this determination.

Equation 4 : Specific Gravity (SG) Equation

0.0186*(Cu% + Pb% + Zn% + Fe%) + 3.09

Mercator's review of the calculated density dataset included comparison of a population of commercial laboratory determinations carried out on core pulps with mine site determinations carried out on the source samples. This showed that substantial local discrepancies occur in paired results within generally comparable larger scale trends. The differences noted are greater than might typically be attributed to the differing determination protocols alone and further investigation using directly comparable laboratory methods is recommended.

11.2.3 Extent of archived core collection at El Mochito site

Archiving of skeletonized core has been carried out since early in the El Mochito mine's operating history and has resulted in accumulation of a very extensive and valuable inventory of drill core. Archived core is stored at two locations, these being:

- at the current core logging facility, and
- at a core storage facility located adjacent to the exploration office.

During the August 2017 site visit by Mercator staff, core from both facilities was accessed for purposes of collection of independent analytical check samples.

Core stored at the exploration office facility is catalogued in a non-digital inventory document. Document entries show that several thousand historical holes are present at the exploration office site that date back to the earliest days of mine exploration. Skeletonized core from holes drilled since approximately 2007 is stored at the current logging facility with the exception of about 1,300 holes lost in a fire in 2015.

11.3 Quality Assurance and Quality Control

11.3.1 Summary of programs

Prior to December 2008, quality assurance and quality control (QAQC) programs for drill core were implemented on a routine basis at the mine laboratory, since drill core and mine samples were routinely analyzed at that facility. This included routine use of blank and calibration materials plus analysis and monitoring of duplicate split sample results. Mercator's review of historical reporting showed that monitoring of laboratory performance was periodically undertaken and that quality control issues for specific metals and sample shipments were occasionally identified and addressed. Prior to 2008, reliance was largely placed on monitoring of results for inserted blank samples along with results of internal mine laboratory QAQC samples. Subsequent to 2008 and prior to 2017, systematic insertion of additional blank samples was added along with accredited commercial laboratory check analyses of pulp splits at Bureau Veritas Commodities Canada Ltd. (Bureau Veritas –ACME) for approximately 5% of the core samples analyzed. Beginning in 2016, analysis of all core was assigned to Bureau Veritas, after completion of sample preparation at that firm's laboratory facility in Guatemala City, Guatemala. As noted previously, Bureau Veritas is an accredited, independent analytical services firm registered to the ISO/IEC 17025-2005 standard. Early in 2017, Ascendant introduced project-specific certified reference materials to the core sample QAQC protocol, with core sample preparation and analysis still being carried out by Bureau Veritas. Pulps are returned from Bureau Veritas for storage at the mine site.

All face, back and other samples collected by Ascendant staff for grade control purposes at the mine are processed using standard mine laboratory protocols and are subject to the laboratory's internal QAQC procedures. Mine staff also insert blind blank sample materials in the drill cuttings sample stream to monitor laboratory results for potential preparation stage cross contamination.

11.3.2 Ascendant QAQC results

Mercator reviewed compiled sampling and QAQC program results for Ascendant's 2017 core drilling program to support preparation of the current Mineral Resource Estimate. This included graphing of zinc, lead, copper and silver analytical results returned for certified reference materials, blank samples and duplicate pulp splits. All program components consistently returned satisfactory results and Mercator observed that QA reviews of QC results are carried out by a designated mine staff geologist. The existing QA protocol requires that investigation of any abnormal results includes initial investigation of sample sequence or input error possibilities followed by re-analysis requests for any over-limits analyses identified.

Mercator reviewed QAQC results and associated analysis plots for Ascendant drilling data from 2017 and also early 2018 and concluded that results consistently showed that data were of good quality. Representative 2017 plots for the six-month period from April through September are provided below to illustrate this point. Figure 11.4 to Figure 11.9 present certified reference material results, Figure 11.10 to Figure 11.12 present coarse blank sample results, and Figure 11.13 to Figure 11.16 present duplicate pulp split results. All plots were sourced in current Ascendant QAQC files. The certified reference materials were produced by CDN Resource Laboratories Ltd. (CDN) from sample material provided by Ascendant. CDN is an accredited analytical services firm registered to the ISO 9001-2015 standard.

In 2017, QAQC analyses accounted for approximately 14% of total core analyses. It is recommended that consideration be given to inclusion of a pulp split analysis program by a second accredited and independent laboratory to monitor results of the primary laboratory, Bureau Veritas. This could be balanced by a slight decrease in blank sample analysis frequency to control cost.

Based on its review of Ascendant's 2017-early 2018 QAQC program results and procedures, Mercator is of the opinion that the program meets current industry standards, provides good assessment of drill core program analyses and provides data that are suitable for use in Mineral Resource estimation programs.

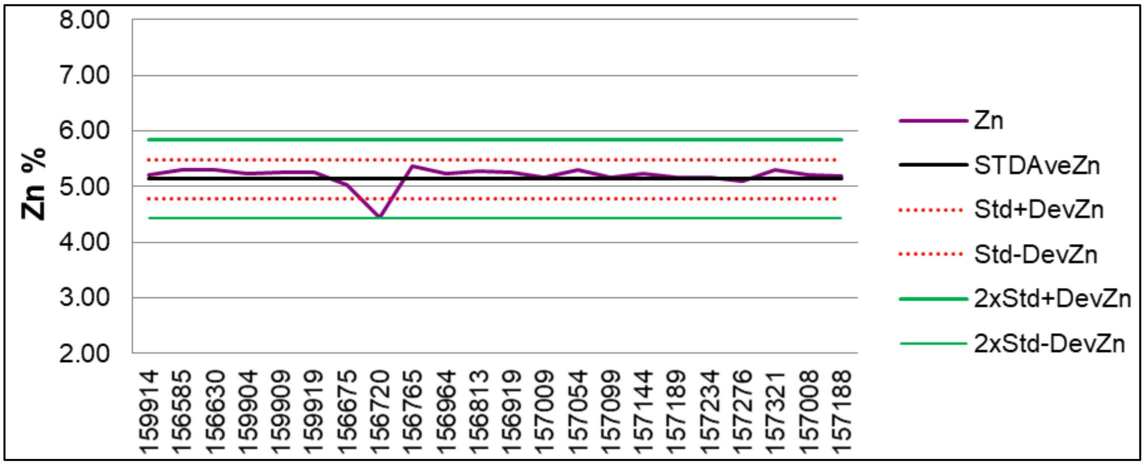


Figure 11.4 – 2017 El Mochito certified reference material (high) results – Zn (n=22)

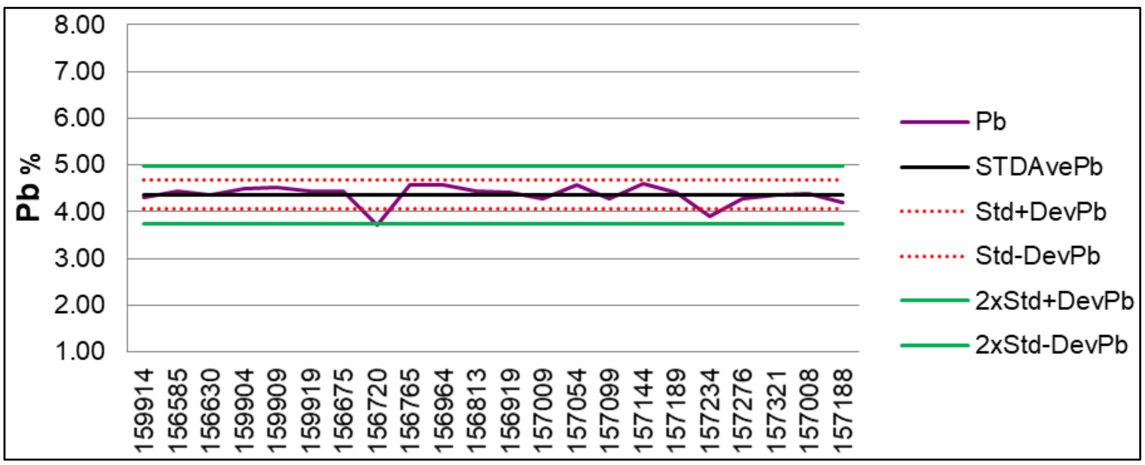


Figure 11.5 – 2017 El Mochito certified reference material (high) results – Pb (n=22)

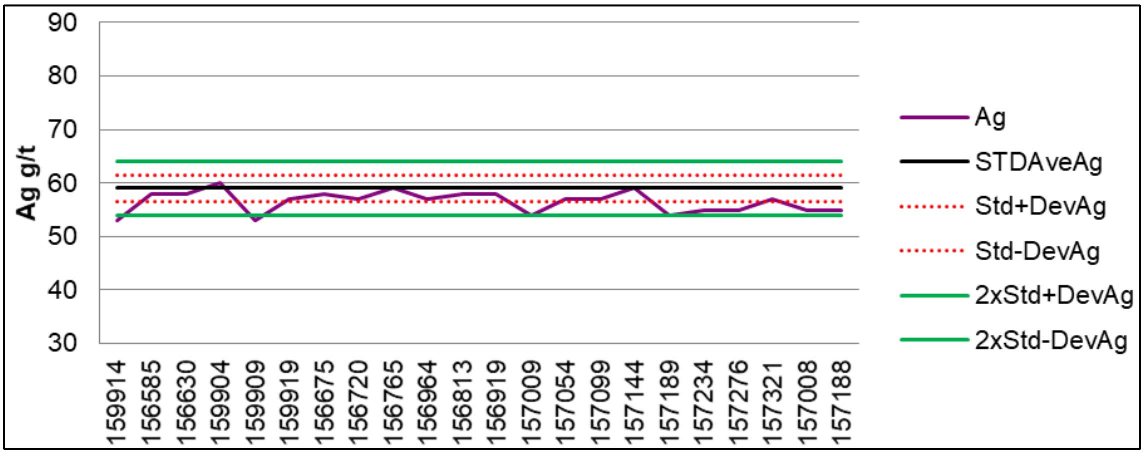


Figure 11.6 – 2017 El Mochito certified reference material (high) results – Ag (n=22)

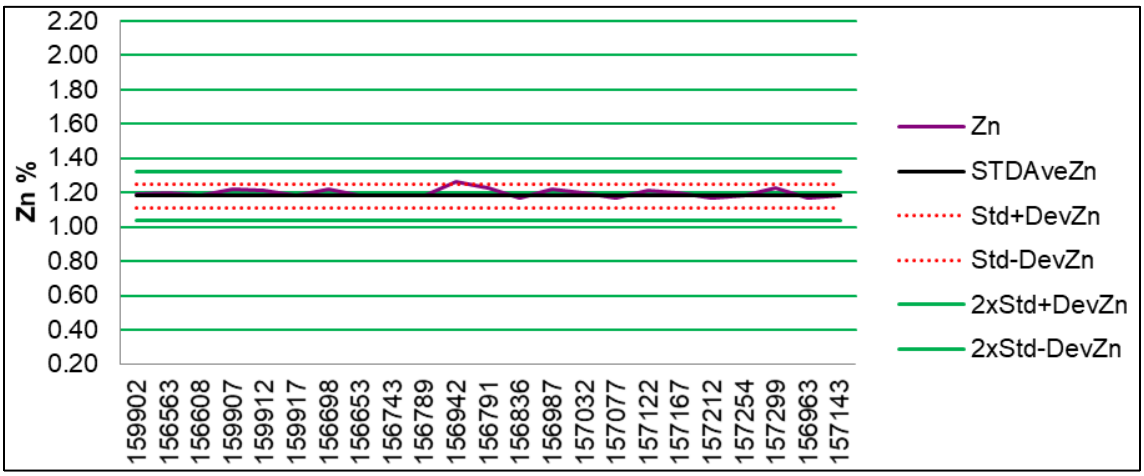


Figure 11.7 – El Mochito certified reference material (low) results – Zn (n=23)

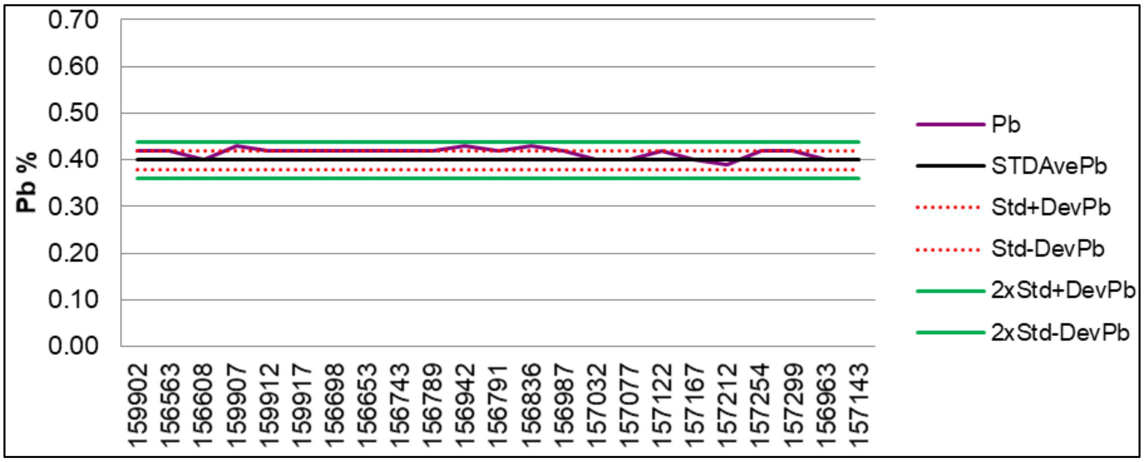


Figure 11.8 – 2017 El Mochito certified reference material (low) results – Pb (n=23)

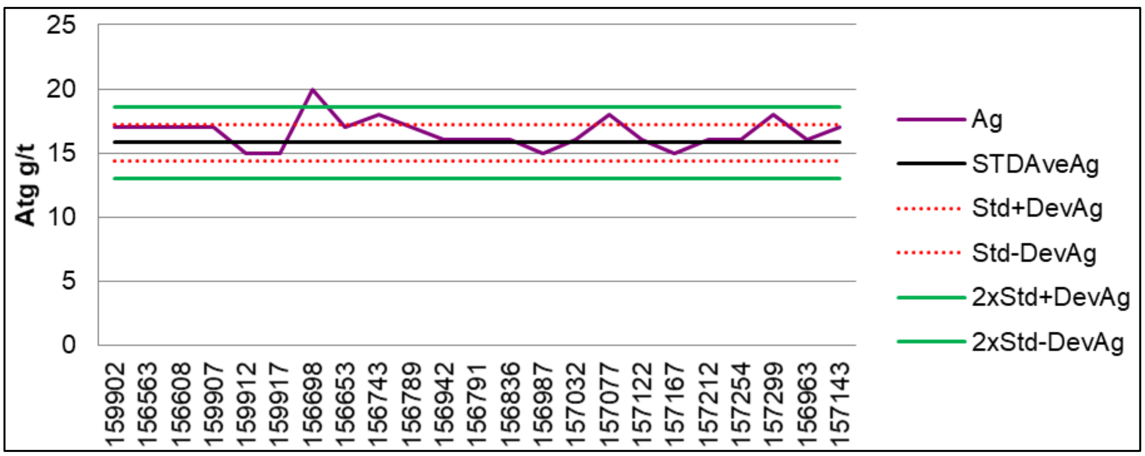


Figure 11.9 – 2017 El Mochito certified reference material (low) results – Ag (n=23)

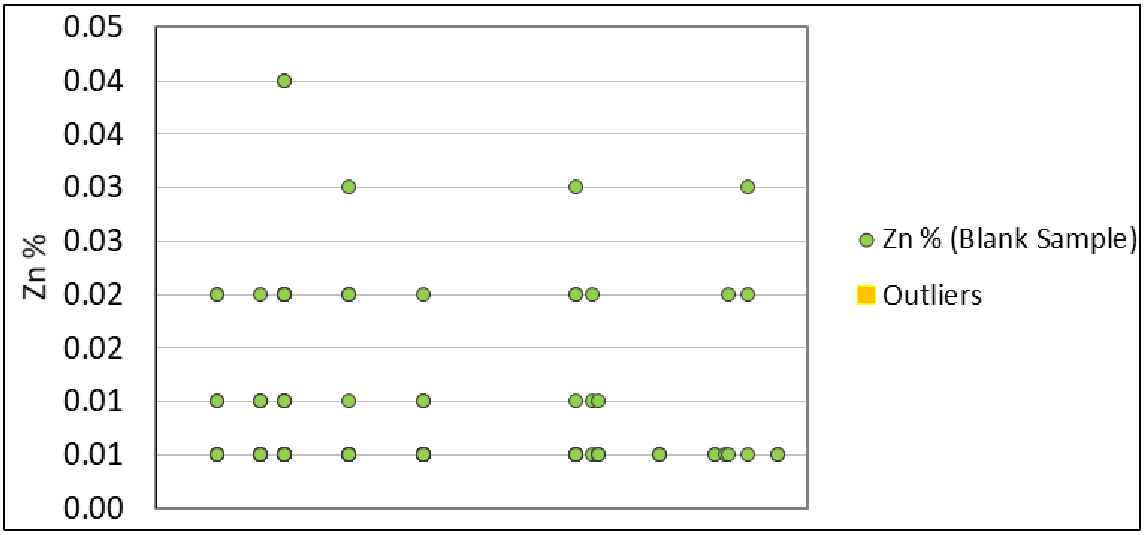


Figure 11.10 – El Mochito coarse blank sample results – Zn (n=119)

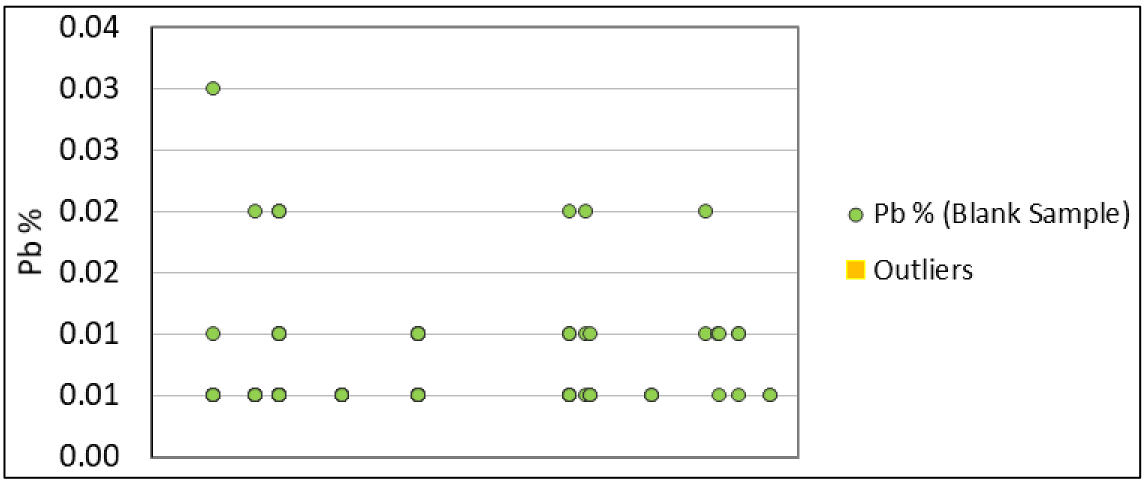


Figure 11.11 – 2017 El Mochito coarse blank sample results – Pb (N=119)

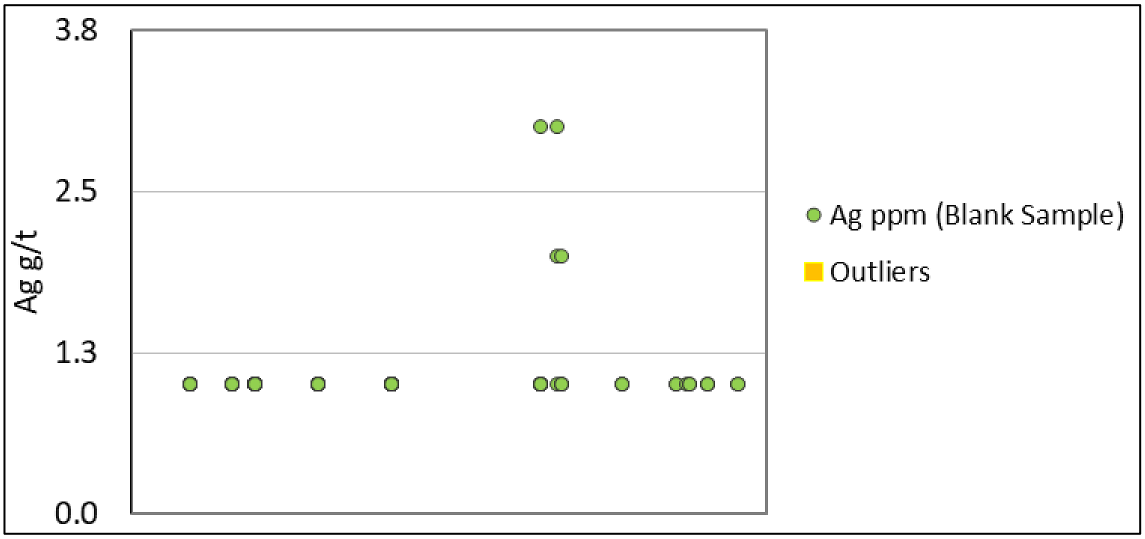


Figure 11.12 – El Mochito coarse blank sample results – Ag (n=119)

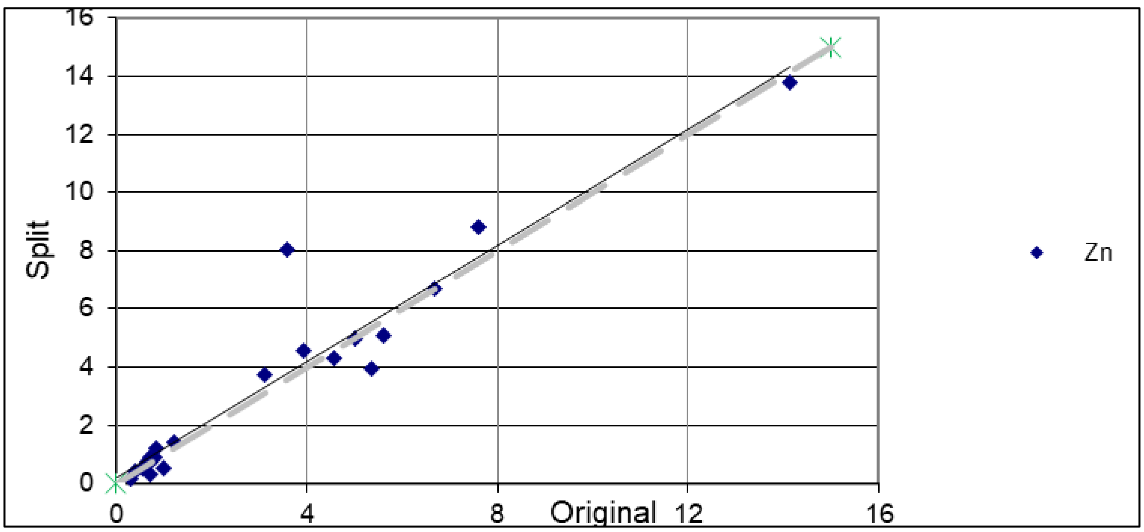


Figure 11.13 – El Mochito duplicate split sample results – Zn (n=22)

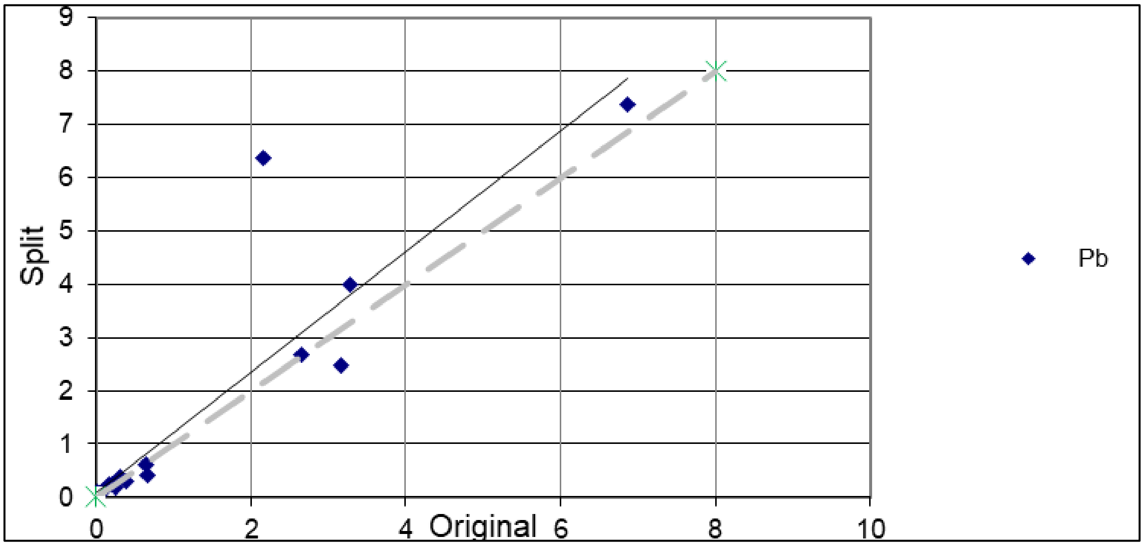


Figure 11.14 – El Mochito duplicate split sample results – Pb (n=22)

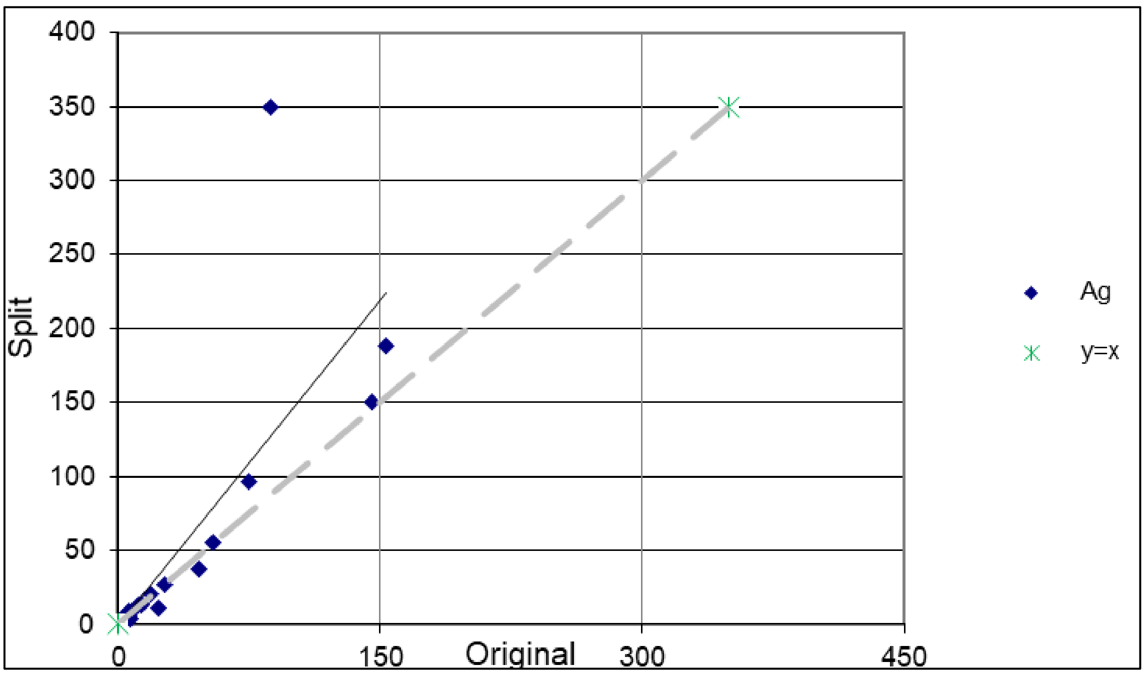


Figure 11.15 – 2017 El Mochito duplicate split sample results – Ag (n=22)

11.4 QAQC Programs Pre-Dating Ascendant

11.4.1 Summary description

As summarized above in section 11.1, QAQC programs at the El Mochito operation have evolved through time. Responsibility for all mine and drill core related analyses was borne by the on-site mine laboratory for most of the operational history, with this gradually shifting to increasing use of fully accredited commercial laboratories. To support the current Mineral Resource estimation program, Mercator reviewed internal reporting prepared by Nyrstar and Breakwater that documents core analysis approaches and associated QAQC monitoring carried out to varying degrees during the 1994 through 2016 operating period. This showed that monitoring of the mine laboratory has been carried out on an on-going basis and that biases in analytical results have been detected and addressed from time to time.

Burns and Ross (2005) document that in 1997 a program of repeat analyses and analysis of reference standards was instituted at the mine laboratory on the recommendation of Strathcona Mineral Services Ltd. The repeat analysis portion of the program was apparently removed at some time between 1997 and 2004, when it is reported to have been re-instated. In 2003, site staff prepared three non-certified standards from representative underground samples that were prepared at SGS Canada Ltd., an independent, fully accredited, commercial analytical services firm at that time and at present.

Burns and Ross (2005) reviewed performance of the internal standards instituted in 2003 and noted periodic high and low biases being present in data sets. They also noted that the repeat analysis program is marked by poor correlations in some cases and recognize that this may in part be due to a procedural (human) error factor related to recovery of correct pulp splits from the laboratory inventory. They recommended re-institution of blanks in the analytical sample streams and that a formalized QAQC program supported by written documentation be undertaken, including use of reference standards of improved quality. No independently produced certified reference materials appear to have been systematically used during this period.

Araujo and Scholtysek (2016) present compiled QAQC program results for the 2009 through late 2016 period which, in combination with 2017 drilling by Ascendant, cover a substantial percentage of the exploration and delineation core drilling carried out to define current Mineral Resources. In contrast, much of the earlier drilling assigns to areas that are largely now mined out. During the earlier period, approximately 5% of sample pulps processed at the mine laboratory were also analysed at Bureau Veritas (Acme), which, as noted above, is an independent, fully accredited analytical services firm. These constitute “third party check samples” against the original data set. After that in 2016, when all core was being analyzed at Acme, sample pulps from Acme were re-analysed as checks at the mine laboratory. Review of program results for the 2014 through 2016 period that immediately predates acquisition of the El Mochito operation by Ascendant, shows that consistently good correlation exists for both classes of check samples. Notably, specific blank sample exceedances occurred in mid 2015 and these are reported to have been identified and addressed for investigation.

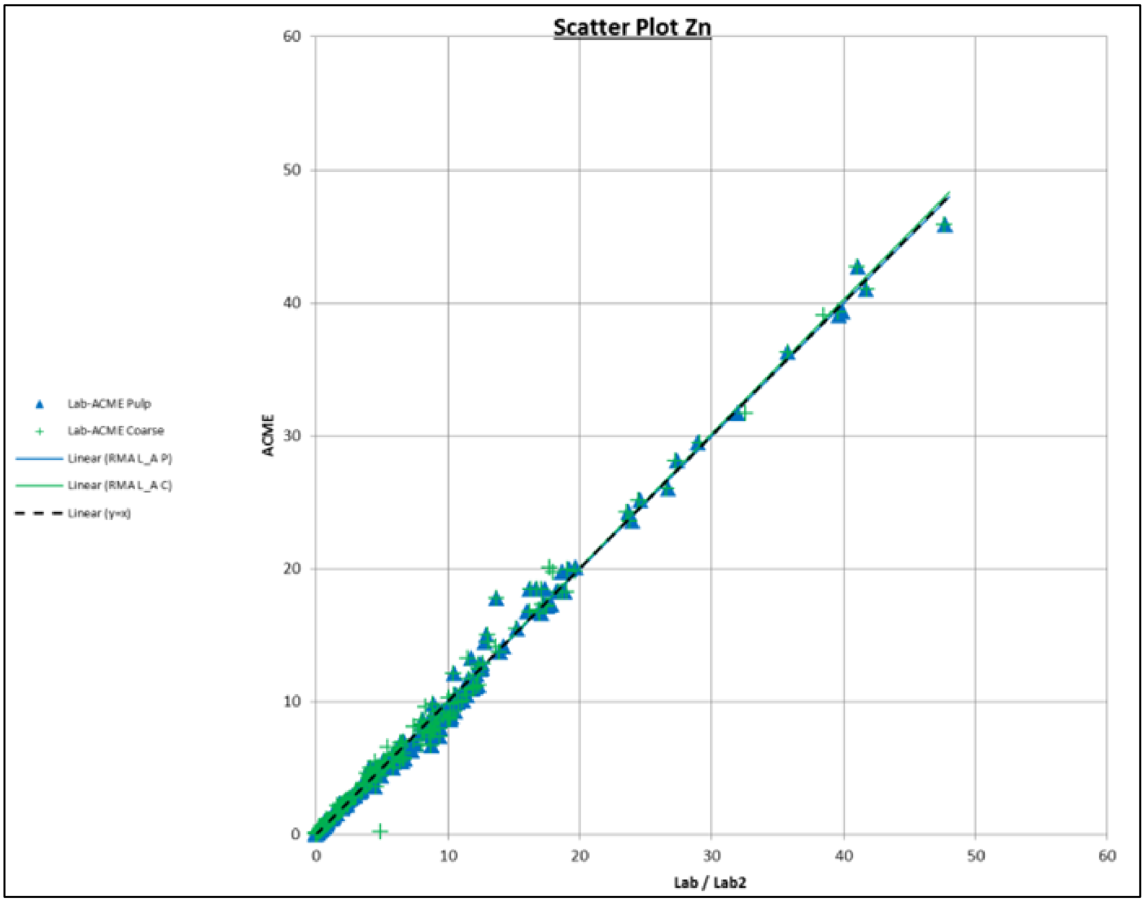
Figure 11.16 to Figure 11.21 below present 2015 and 2016 drill core check sample results and these are included as examples of the broader program of QAQC monitoring that was carried out during the 2009 through 2016 period by Breakwater and subsequently Nyrstar. Results for that entire period are reported by Araujo and Scholtysek (2016) and were also reviewed by Mercator for current report purposes. The plots presented in Figure 11.16 to Figure 11.21 were sourced from the Araujo and Scholtysek (2016) report prepared for Nyrstar.

11.4.2 Mercator comment on pre-Ascendant QAQC programs

Due to the very long operating history of the El Mochito mine, substantial diversity exists with respect to the nature and extent of QAQC programs implemented to assess laboratory analysis of core, rock sample and milling flowsheet materials. For a substantial portion of this time, on-site analysis of drill core and the other materials was the norm and internal methods of assessing accuracy and precision of laboratory analyses and detection of preparation stage cross contamination issues. The last ten years of operating history is particularly pertinent to this report, since much of the exploration and delineation core drilling carried out during this period was focused on defining mineralized zones that constitute current Mineral Resources. These all occur below the stratigraphic top of the Mochito Shale unit and are dominated on a tonnage and total contained metal basis by manto style mineralization.

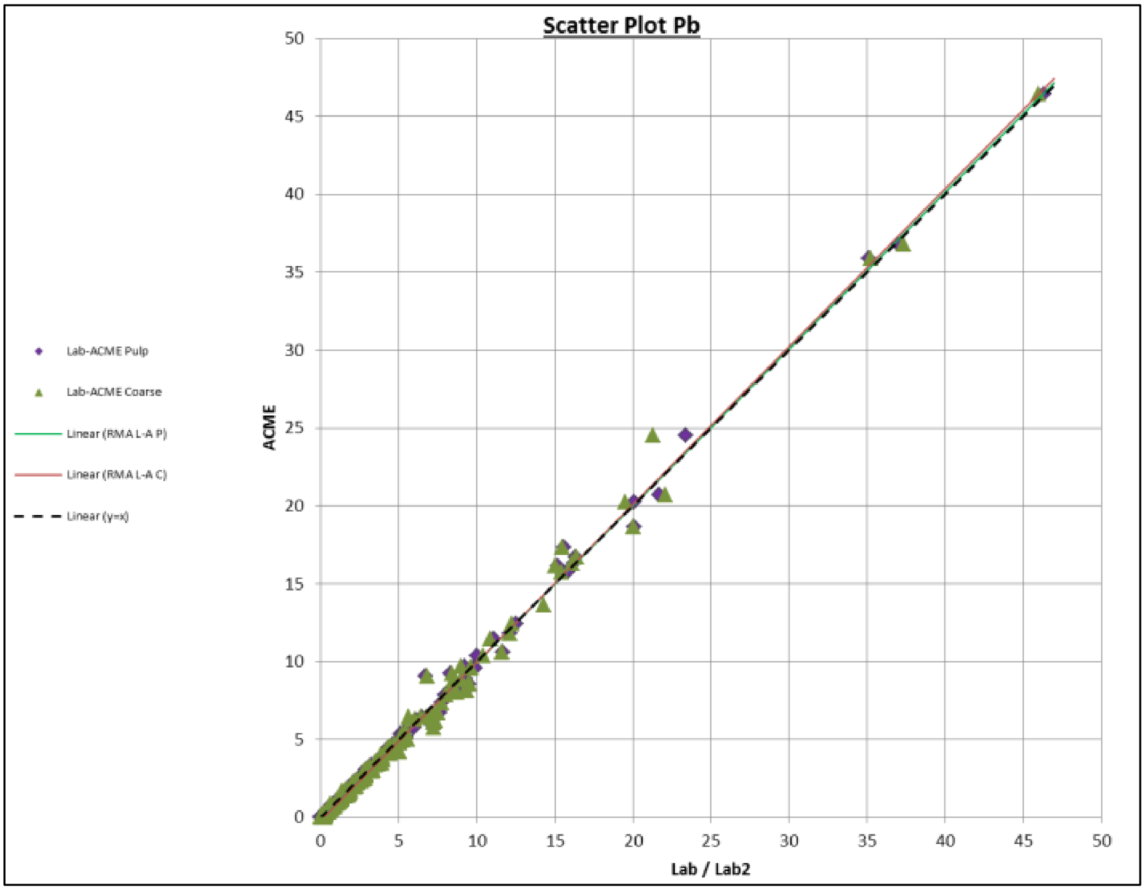
Review of internal documentation for the Pre-Ascendant 2009 through 2016 period showed that assessment of laboratory results was carried out on a continuous basis, and that the means and methods of such assessment changed with time. Most, but not all, pre-2015 programs were weighted on analysis of inserted blank samples, re-analysis of sample pulps, and use of in-house, non-certified reference materials. Consistent application of multiple certified reference materials prepared for the operation was re-established in early 2017, after Ascendant had acquired the operation from Nyrstar. As noted earlier, Burns and Ross (2005) report that a similar approach was initiated in 2003 but was ultimately removed.

Based on its review of available results and associated reporting, it is clear that a progression of increasingly detailed QAQC programs were carried out during the 1994 through 2016 pre-Ascendant period. Mercator is of the opinion that, although the primary laboratory for core analysis was the non-accredited on-site facility for much of this period prior to 2016, sufficient internal and accredited external (since 2009) monitoring of core analysis results was carried out to provide a basic assessment of related data quality. Additionally, core drilling results in a broad sense were validated through successful mining of reserves at grade levels comparable to those assigned from modelling of core drilling results.



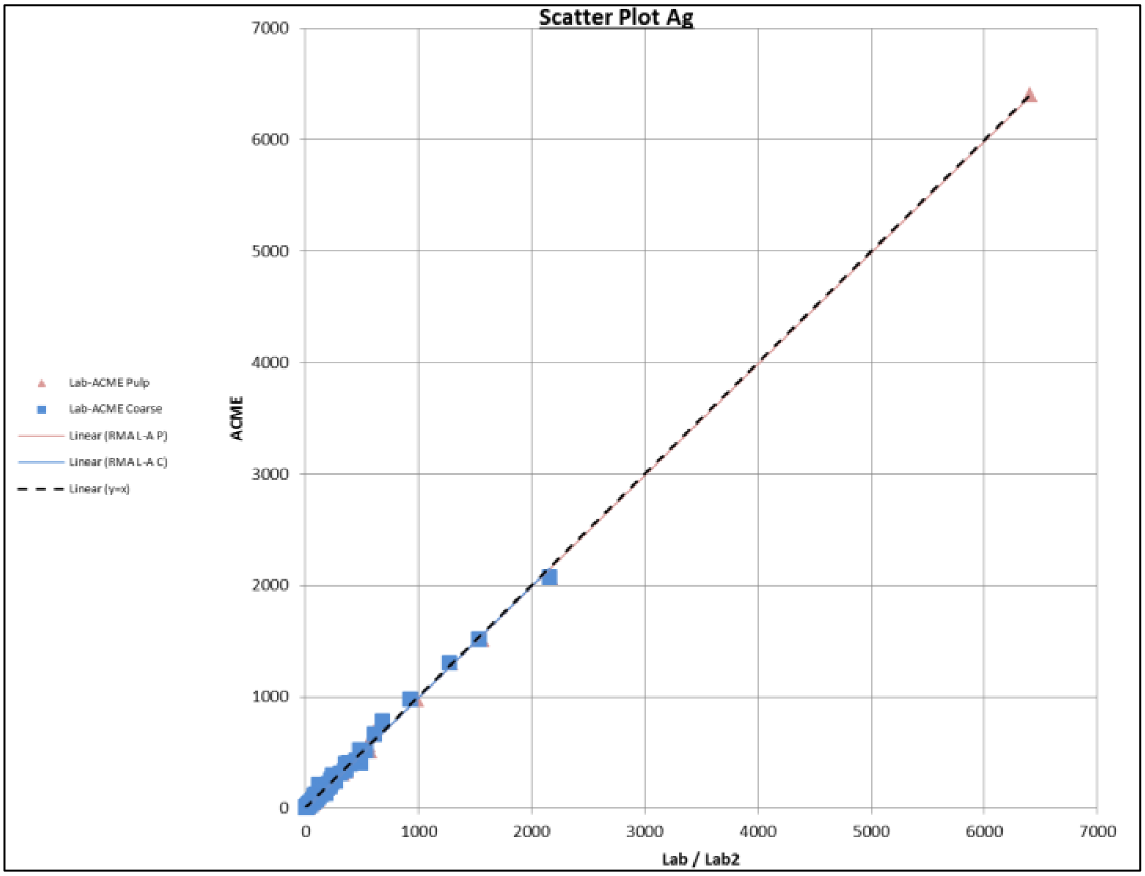
Taken from Araujo and Scholtysek (2016)

Figure 11.16 – 2016 ACME check sample results – Zn (N = 269)



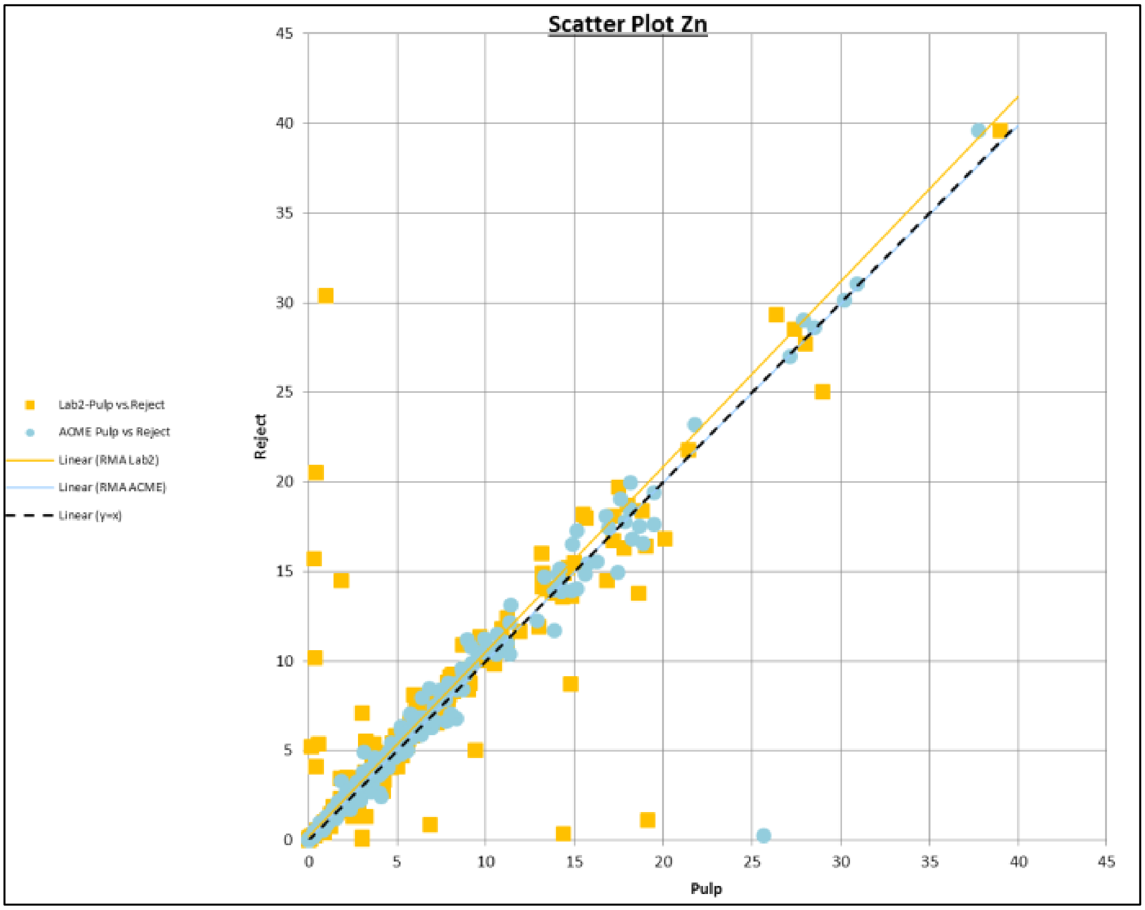
Taken from Araujo and Scholtysek (2016)

Figure 11.17 – 2016 ACME check sample results – Pb (N=269)



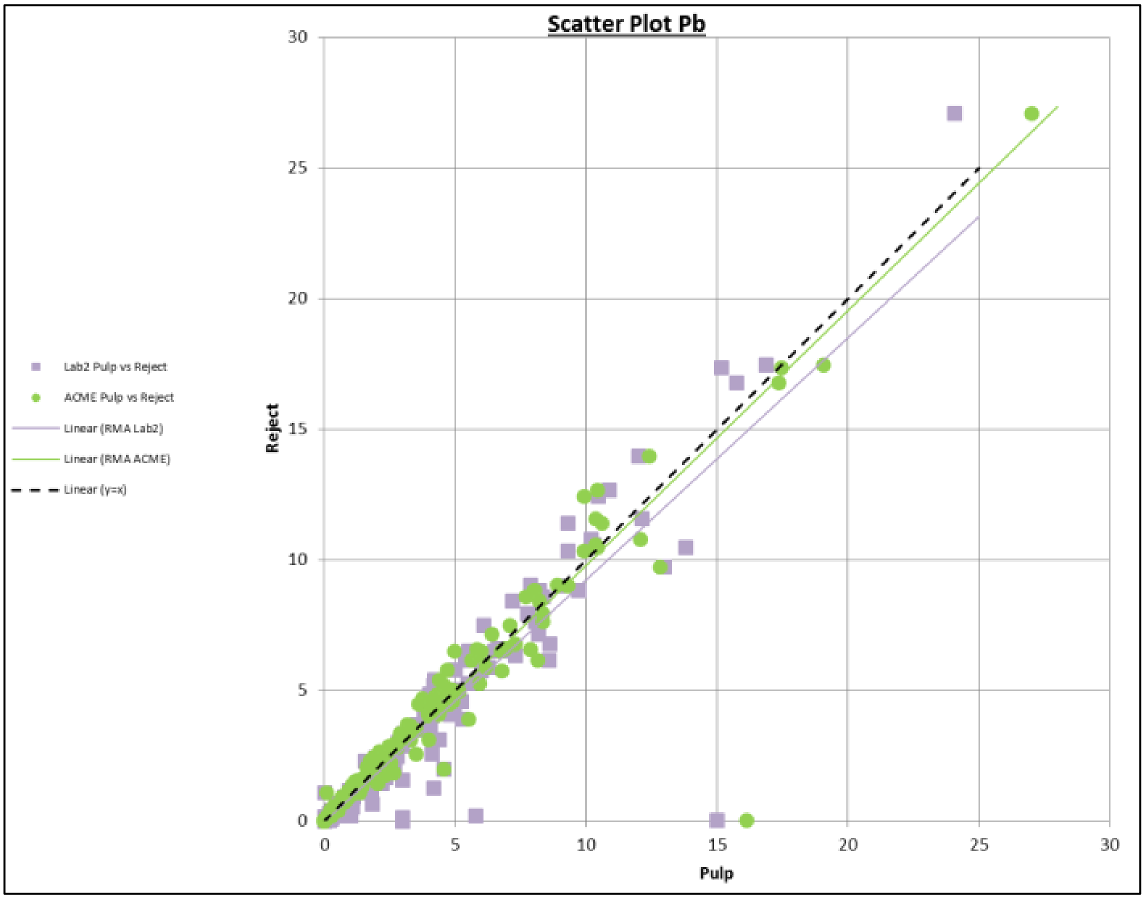
Taken from Araujo and Scholtysek (2016)

Figure 11.18 – 2016 ACME check sample results – Ag (N = 269)



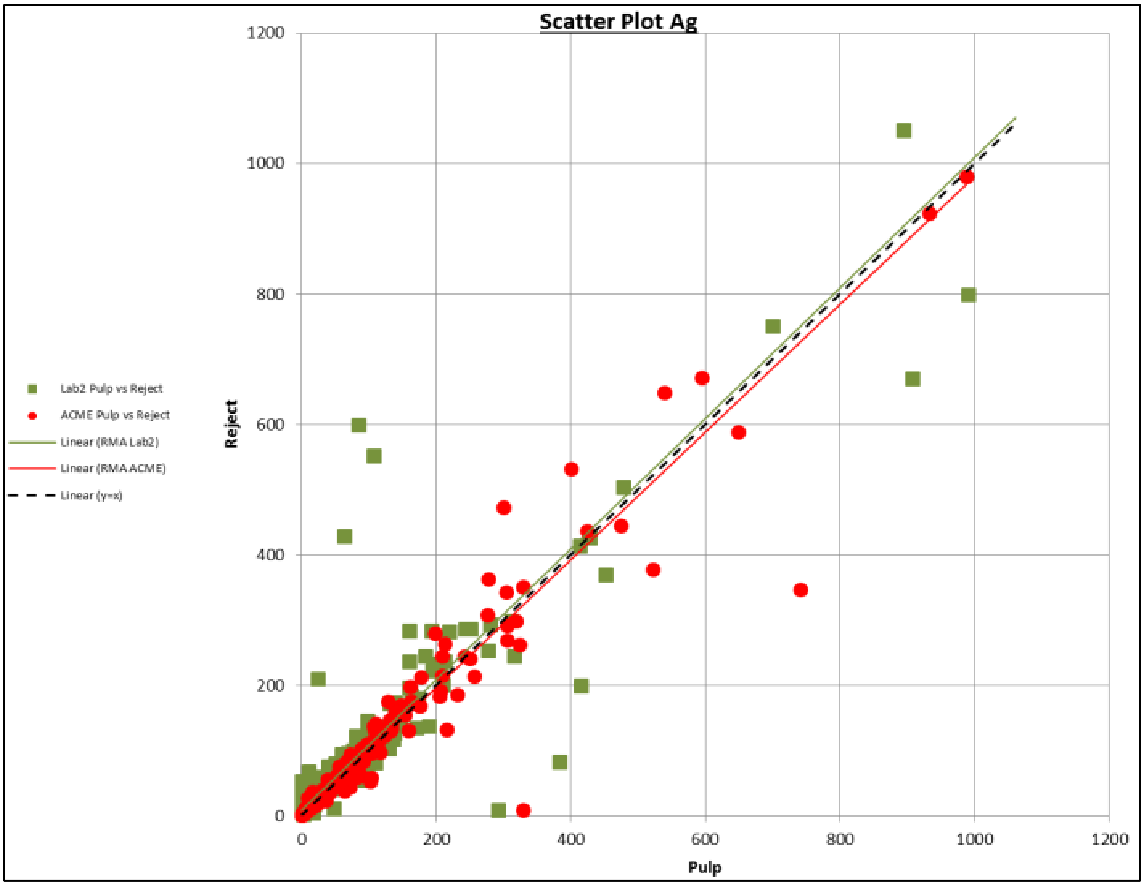
Taken from Araujo and Scholtysek (2016)

Figure 11.19 – 2015 ACME check sample results – Zn (N = 204)



Taken from Araujo and Scholtysek (2016)

Figure 11.20 – 2015 ACME check sample results – Pb (N = 204)



Taken from Araujo and Scholtysek (2016).

Figure 11.21 – 2015 ACME check sample results – Ag (N = 204)

In summary, Mercator notes that metal-specific high and low bias issues were identified and addressed from time to time with respect to mine laboratory results prior to the 2016 change to use of an independent accredited laboratory for analysis of all drill core samples. The majority of historical core drilling analyses produced during this period were also successfully applied to definition of Mineral Resources that supported earlier Mineral Reserves which were consistently mined at grade levels predicted by modelling of the drilling data. On this basis, and in combination with results of more thorough QAQC programs of the 2009 through 2016 period, Mercator has concluded that historical drill core analyses associated with areas comprising the current Mineral Resource inventory are sufficiently reliable for use in the Mineral Resource estimation programs carried out in accordance with NI 43-101 and CIM Definition Standards.

11.5 Sample Security

The entire El Mochito mine complex and related surface installations such as haul roads, administrative offices, accommodations, tailings pond facilities and other site infrastructure are guarded on a 24 per hour per day basis by a large site security force. This force provides armed security services and is highly visible throughout the mine's surface complex extent. Entrance to the El Mochito site is controlled through gated access points staffed by security force personnel. These site-scale security measures ensure that activities within the mine's surface complex are not readily subject to outside influences. They also serve to establish a setting within which access to core or core samples is limited to authorized personnel only.

With respect to core handling and sampling within the site, core security at Ascendant drilling sites is the responsibility of staff drilling crews until core is transported from the drill sites to the core shed under direction of staff technicians. Similarly, mine samples are the responsibility of staff sampling technicians until they are delivered to the mine laboratory for analysis. As described previously, core is logged, cut, sampled and bagged by Ascendant staff and then shipped by commercial transport to the Bureau Veritas preparation laboratory in Guatemala City. An electronic confirmation of receipt is sent by Bureau Veritas upon arrival of the samples at the preparation facility, where that company's internal security and chain of custody provisions apply. Similar measures were applied by Nyrstar after instituting use of Bureau Veritas for all core analyses in 2015. Prior to that, analysis of core and mine samples at the mine laboratory was carried out under the direct custody and supervision of laboratory staff.

Mercator is of the opinion that past and ongoing approaches to drill core, core sample and mine sample security are reasonable and appropriate and that they now meet, and have met, contemporary industry standards.

12. DATA VERIFICATION

12.1 Introduction

The data verification discussion presented below consists of reporting on work completed by Mercator specifically for the current Mineral Resource Estimate.

Mercator carried out independent desktop data verification checks of GEMS™ drilling database records for a total of 200 El Mochito mineralized zone drill holes that are included in the population of 2,245 drill holes that intercept the current Mineral Resource estimate solid models. Mercator staff also completed a limited drill hole coordinate check program for currently accessible surface exploration holes, carried out a detailed core review study of 15 drill holes representative of both manto and chimney styles of mineralization contained within current Mineral Resource limits, and collected 11 quarter core check samples from mineralized drill core intercepts within current Mineral Resource limits. In addition, field checking of lithologic surface mapping in the deposit area was undertaken on a limited scale, with this consisting of visiting various mapped limestone outcrop locations of the Upper Atima Formation as well as several sandstone-dominated outcrops of the overlying Valle de Angeles Group.

12.2 Review and Validation of Project Data Sets

Data from core sample records, lithologic logs, assay results, laboratory reports and drill hole coordinate and survey information for all drilling programs completed in the current Mineral Resource areas has been digitally compiled by current and past operators of the El Mochito mine. Mercator was provided with the latest version of this database for Mineral Resource estimation purposes in August of 2017 and it was progressively updated through addition of new records for drill holes completed up to December 31, 2017. The January 1, 2018 effective date of the current Mineral Resource Estimate reflects the December 31, 2017 cut-off for inclusion of new 2017 drill hole records.

Digital database drill hole records were mostly checked against original Excel spreadsheet-based drill logs that have been the logging standard at this site for many years. In addition, several original hard copy drill logs from the log archive located at the exploration office were also reviewed against corresponding database records. The purpose of this approach was to assess consistency and accuracy of such records. Parameters that were spot checked include collar coordinates, down hole survey values, hole depths, sample record entries, corresponding analytical results and consistency of database lithocodes as descriptors of logged lithologies. Emphasis was placed on sample records and analyses. Checking of the entire mine area drill hole database was not possible or required for preparation of the current Mineral Resource Estimate, since much of the historical drilling took place in areas of the mine that are spatially removed from areas of current Mineral Resource definition.

In total, database records for approximately 10% of the drill holes contributing to the current Mineral Resource Estimate were checked against their corresponding digital or hard copy log entries. This review showed that lithologic logging and sample records showed generally good agreement between original files or documents and drilling database records. Database analytical results were also spot checked against original drill log sample intervals and, in the case of drill holes for which core was physically inspected, against actual marked sample intervals and tags present in drill core archive trays. Original assay certificate entries for holes completed by Ascendant and/or Nyrstar in the last NI 43-101 Mineral Resource and Mineral Reserve Estimate completed by Breakwater in 2010 were of particular focus for site visit checking, since validation of results prior to that period had been carried out in support of the earlier estimates. Records for the 200 holes within the Mineral Resource solids were checked for lithocode and sample record agreement and these showed that the most common discrepancies present were hole depth sample or lithocode entries that differed slightly between sources. These were typically non-systematic and short in length. No discrepancies considered sufficiently important to remove a hole from consideration were noted.

After completion of all manual record checking procedures the drilling and sampling, database records were further assessed through digital error identification methods available through the Gemcom-Surpac Version 6.7.1™software. This provided a check on items such as sample record duplications, end of hole errors, survey and collar file inconsistencies and some potential lithocode file errors. The digital review and import of the manually checked datasets through Surpac produced the validated Microsoft Access® database that Mercator considers to be acceptable with respect to spatial limits included in the current Mineral Resource and Mineral Reserve Estimates.

Results of the database checking program showed consistently good correlation between source documents and database lithocode, sample interval and assay value entries. During resource modelling, a number of drill collar coordinate inconsistencies were detected and corrected, with assistance in this provided by El Mochito geology department staff. Identification of such holes was carried out in coordination with site geology staff, who use this method of hole exclusion as a standard approach.

12.3 Mercator Site Visit: August 23 to September 6, 2017

12.3.1 Introduction

The first site visit to the El Mochito site was carried out between August 21 and September 6, 2017, with actual time on site totaling approximately 14 days. Author Cullen and Mercator's Senior Resource Geologist, Matthew Harrington, carried out the visit, the first component of which was to access and evaluate project data sets, and to then review in detail with Ascendant staff the existing Mineral Resource model and approaches to Mineral Resource estimation. The second component of the site visit program consisted of review of historical hard copy and digital files relating to geology and past Mineral Resource estimation programs carried out at the site. The third component consisted of completing activities commonly carried out in support of NI 43-101 Technical Report projects. This included visiting active underground mining areas in the Esperanza and Santa Rita mineralized bodies, touring various support and access facilities located on and below the 2250 mine level, completing a detailed drill core review, a database checking program, collection of outcrop and surface drill hole collar location data, collection of a suite of quarter core check samples from archived drill core stored at the site, and review of core logging, sampling, QAQC and sample security procedures.

Initial discussions with Ascendant site staff focused on topics related to the existing Mineral Resource model, its supporting drill hole database and digital solids. The core logging and sampling facility, underground mine workings, mine analytical laboratory, tailings pond areas, milling complex and several surface exploration drilling sites were all visited during the trip.

Mr. Neil Ringdahl, Ascendant's Chief Operating Officer, and mine administrative staff coordinated site visit details with geology and mining department staff and also arranged for English/Spanish translation services to be available during working hours at the site. Mercator worked closely with geology and mining department staff throughout the visit and received excellent support at all times.

12.3.2 Core review

Archived core from 15 current and historical drill holes was reviewed in detail at the mine site core logging facility. These holes were selected to cover a range of resource areas as well as both manto and chimney styles of mineralization.

Drilling database lithocode entries and sample record intervals for the inspected drill cores were spot checked against the archived core and correlation no errors were identified for these holes. Lithocodes were also found to consistently correlate with recognizable rock units, although substantial variability was noted in the level of detail that exists in individual logs. Importantly, clear identification of mineralization-hosting skarn lithologies and their associated calcsilicate phase components was consistently apparent. Since historical core has been skeletonized in non-mineralized intervals, this restricted close inspection of log entries to core in the fully preserved mineralized zones.

12.3.3 Quarter core check sampling

Mercator collected a suite of 11 quarter core samples from several Mineral Resource area drill holes for use as independent check samples with respect to database assay records. After selection of sample intervals by Mercator staff, Ascendant staff provided sample cutting services and bags for cut samples (Figure 12.1 and Figure 12.2).

The quarter core samples were collected from sample intervals appearing in the GEMS™ drilling database and in corresponding drill logs and were identified in respective core boxes through an affixed paper sample tag. After sampling, boxed core was replaced in the core archive. All check samples remained in the secure possession of Mercator staff until being packaged and delivered to the site administrative office for pickup by a commercial courier service (DHL) for shipment to the Mercator office in Dartmouth, NS, Canada. Individual samples were sealed by Mercator prior to shipment and were received at the Mercator office with seals intact.

After arrival at the Mercator office, a certified reference material sample and a coarse blank material sample were added to the continuous sample number series and all samples were shipped by commercial courier to the Activation Laboratories Ltd. (Actlabs) preparation facility in Fredericton, NB, Canada. After preparation at that facility, sample pulps were sent to the Actlabs laboratory in Ancaster, ON, Canada for analysis. Actlabs is an independent, Canadian Association for Laboratory Accreditation (CALA) accredited, commercial analytical services firm that is registered to the ISO-IEC 17025 standard.

Samples prepared under the standard Actlabs rock preparation protocol (Actlabs Code RX-1) that reduces the sample by sequential crushing, pulverization and splitting to produce a 70% passing 75 microns pulp fraction from which analytical splits are obtained.

Samples were initially analyzed using multi-element, Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP_OES) methods following multi-acid digestion, with assay level re-analysis for over limits values of zinc, copper, lead and silver. Gold levels were determined using standard fire assay preconcentration and atomic absorption finish methods (Actlabs Code 1A2 – FA AA).

Figure 12.3 through Figure 12.5 present scatter plots of the original core analysis data and Mercator check sample data for zinc, lead and silver, respectively. Database values are substantiated in all cases, with zinc showing strongest correlation followed by lead and silver. Silver data include one outlier pair and define a trend toward slightly higher Mercator check sample silver values in comparison with corresponding database values. Mercator is of the opinion that these results reflect a reasonable and acceptable level of correlation for such a small sample population.

Figure 12.1 – Mercator quarter core check sample intervals in drill hole 10831

Figure 12.2 – Ascendant staff cutting Mercator quarter core check samples

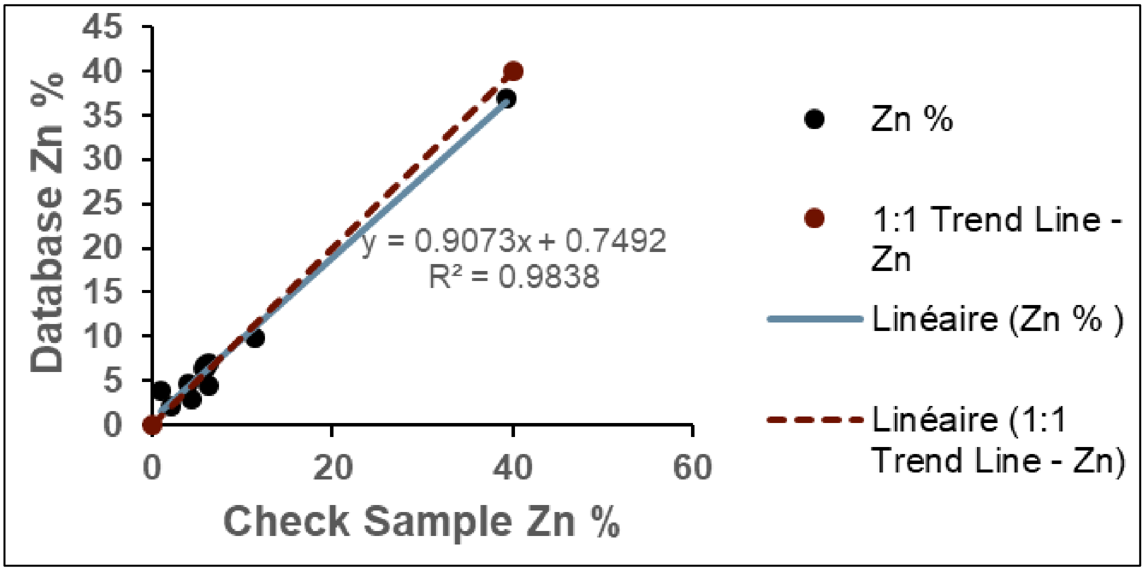


Figure 12.3 – Mercator quarter core check samples – zinc (N=11)

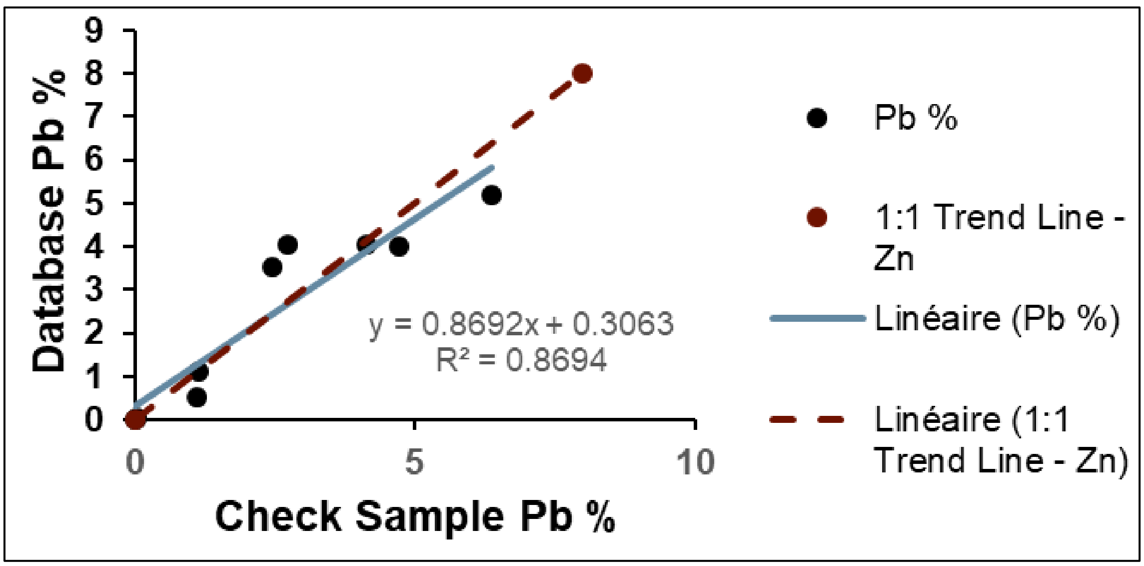


Figure 12.4 – Mercator quarter core check samples – lead (N=11)

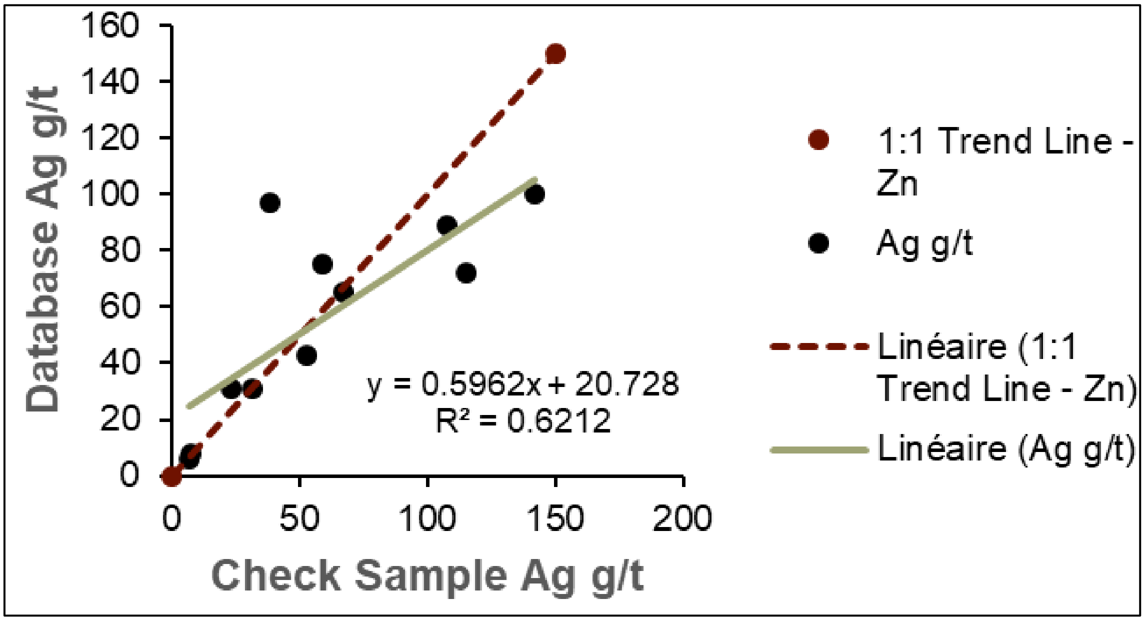


Figure 12.5 – Mercator quarter core check samples – silver (N=11)

12.3.4 Drill collar check program

In addition to drill core check sampling, a limited drill collar coordinate check program was carried out that consisted of field acquisition of collar coordinates for four separate drill pad locations for surface diamond drill holes recorded in the project database. A handheld Geographic Positioning System (GPS) unit was used to collect Universal Transverse Mercator (UTM – WGS-84 datum) coordinates for the drill collars located in the field. Drill holes 14 PS 01, 14 PS 02, SS 01, SS 02, SS 03, SS 04, 14 SV 01 were assessed and coordination checks against database records showed that easting and northing values collected in the field have a maximum variation range of only a few meters in easting and in northing. Elevation values show a greater variation, which can be expected when handheld device data are compared to locations such as these that have differential GPS coordination.

The limited collar check sample program included two holes within the current Mineral Resource areas. Mercator considers the results of the 2017 field checking program to be acceptable. Two underground drilling setup location were visited during the mine tour on August 25, 2017 but no means of checking underground hole coordinates was available at that time. Locations were, however, noted as visually matching mine model level plan locations

12.4 Mercator Site Visit: February 6 to February 21, 2018

Mercator's Senior Resource Geologist, Matthew Harrington, returned to the El Mochito site for the February 6 to Februa 21, 2018 period to work directly with geology department staff on re-interpreting, upgrading and checking the wireframe solid models associated with the current Mineral Resource Estimate, details of which are presented below in report section 14.

Author Cullen returned to the El Mochito site for the February 11 to 21 period for the purpose of reviewing the ongoing solid modeling program and to coordinate directly with senior Ascendant and P&E staff on review and updating of the zinc equivalent equation and the Mineral Resource and Mineral Reserve cut-off values to be used in the Mineral Resource and Mineral Reserve estimates having and effective date of January 1, 2018. In addition, author Cullen met during the site visit with Ascendant's Director of Exploration, Mr. Patrick Toth, P. Geo., for updating on current and planned surface exploration programs and also briefly reviewed progress of an ongoing digital compilation program of historical drill holes from older mine levels above the Mochito Shale.

12.5 Requirement for Additional Site Visit by Mercator Staff

No changes to the January 1, 2018 Mineral Resource estimate have been made since that effective date. This estimate and its associated block model support the Preliminary Economic Assessment (PEA) that is described in detail elsewhere in this Technical Report. Since no changes were made in the January 1, 2018 block model or Mineral Resource estimate, Mercator determined that there was no need to carry out an additional site visit.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Historical Metallurgical Testing

Limited information related to metallurgical testwork for the El Mochito resources is available. It can be assumed that tests focused on efficient production of lead and zinc concentrates and this would include optimizing grinding methods, galena and sphalerite liberation and froth flotation strategies.

13.2 El Mochito Mineralogy

The currently exploited mineral resources at El Mochito occur in two distinct types - chimney and mantos deposits. The deposits exhibit mineralogy consisting of pyroxene and garnet with sphalerite, argentiferous galena, magnetite, pyrrhotite, pyrite, chalcopyrite and arsenopyrite. Generally, the sulphide mineralization consists of sphalerite and galena with minor chalcopyrite. Magnetite is a significant gangue mineral (in the order of 15%) which has been selectively recovered in the past by magnetic separation. Magnetite recovery is currently being considered. The mineralogy of the mineralized material is believed to be variable and could justify the tailoring of process metallurgical parameters to achieve optimum recovery and grade of concentrate.

The average mineral specific gravity ("SG") for mineral processing calculations has been listed by El Mochito to be 3.34. Exploration drill core is subject to density measurements and a formula resource assessment based on metal content:

$$SG = 3.09 + 0.0186*(Cu\% + Pb\% + Zn\% + Fe\%)$$

Using the average mill feed analyses for the first 3 ½ months of 2018, the SG would be calculated to be slightly higher at 3.46. A recent report (El Mochito Mine Expansion Project, July 2018) indicates a density of 3.82 for mineralized material.

13.3 Comminution Testwork

An El Mochito primary grinding survey conducted in 2012 is shown in Figure 13.1. While this survey is a few years old, the primary grinding equipment remains the same. The grinding configuration has slightly changed with the tertiary mill operating in closed circuit. In this 2012 case, the feed rate was 101 tph (2,424 tpd) and the grind was 52% -75 µm, and 80% -177 µm. Absent from this survey is the zinc rougher-scavenger concentrate regrind ball mill.

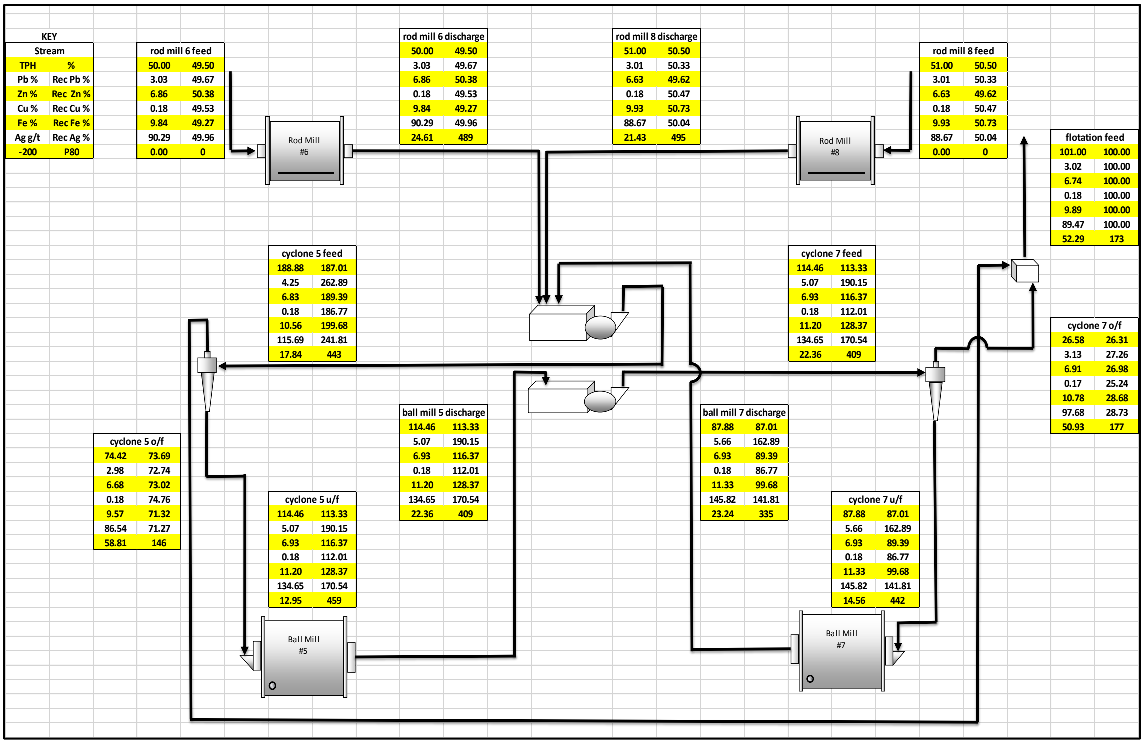


Figure 13.1 – El Mochito grinding survey, 2012

13.4 Metallurgical Laboratory

13.4.1 Facility

The El Mochito metallurgical laboratory is shown in Figure 13.1. The laboratory is used mainly for screen size and flotation testing. The facility is adequately equipped but is currently short of technicians (two employees are on leave (September 2018)).

Figure 13.2 – Mill metallurgical laboratory (Source: P&E, Feb 2018)

13.4.2 Resource-specific sampling and testing

Micon (2016) reported some resource specific metallurgical testing had been performed in 2014 on the Port Royal orebody. These tests indicated that a finer grind could produce higher recovery – 90% for lead and 95% for zinc. These recoveries are significantly higher than normally achieved at El Mochito.

Plans are in place to conduct resource specific grinding and flotation testing in the metallurgical laboratory. While many zones – up to 9, make up plant feed, such tests could be used as a guide to tailor processing conditions such as grinding and reagent additions. The acquisition of representative ROM samples from specific zones is pending.

13.4.3 Grade-recovery relationship

Usually, a significant head grade-recovery relationship normally exists in mineral processing – higher head grades result in higher recoveries. A summary of recent (2016-18) grade-recovery data is shown in Figure 13.2 and Figure 13.3. These figures show that the recovery of zinc is relatively independent of feed grade, while the recovery of lead is more feed grade dependent. As shown in Figure 13.4 silver reporting to either lead or zinc concentrates relates to silver content and is relatively dependent on feed grade. The silver content of both concentrates is payable. El Mochito has recently introduced an argentite (silver sulphide) specific flotation agent which has increased silver recovery in the lead concentrate.

Metal recoveries based on screen size have been followed by the metallurgical laboratory. Results indicate good lead recovery in coarse fractions (+150M) while zinc recoveries are somewhat less. This supports the ongoing need for the zinc regrind circuit.

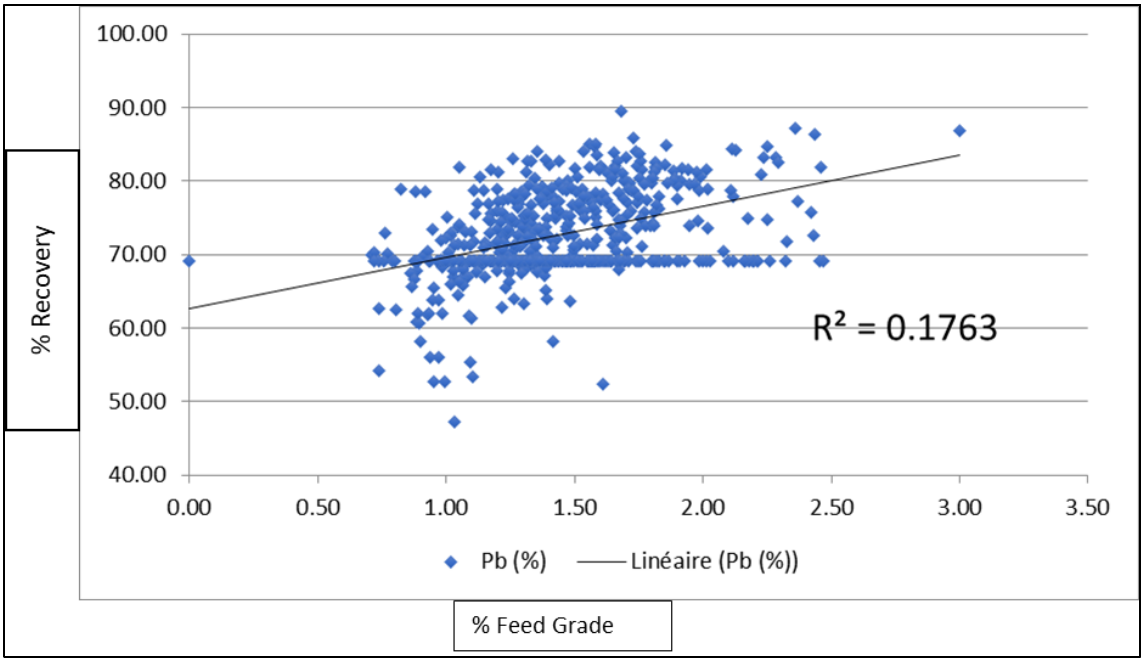


Figure 13.3 – Pb feed grade vs recovery, El Mochito, January 2016 – August 2018

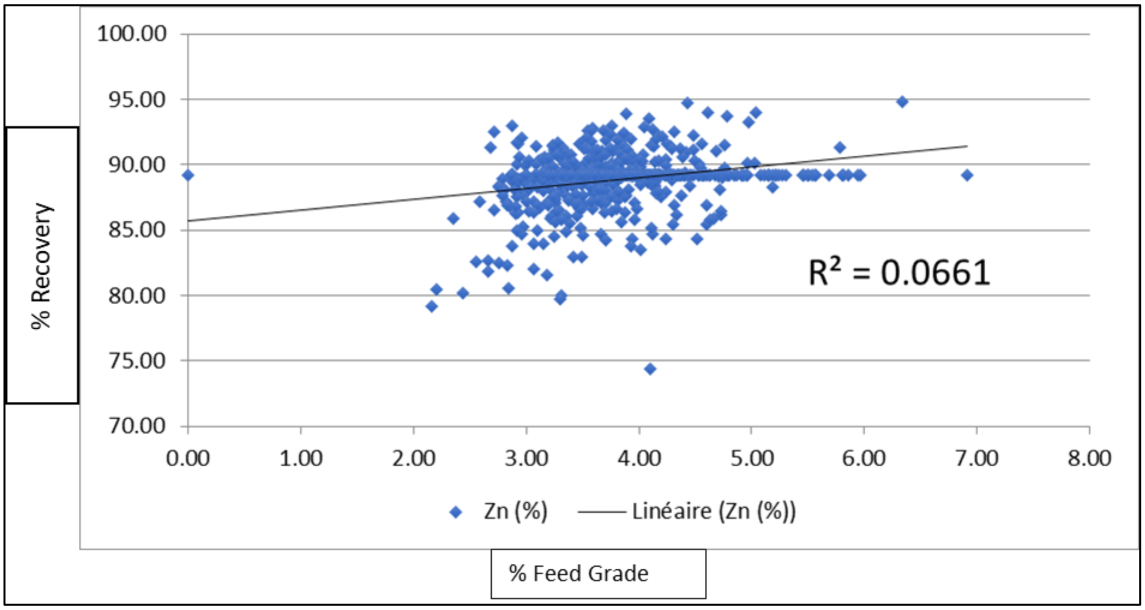


Figure 13.4 – Zn feed grade vs recovery, El Mochito, January 2016 – August 2018

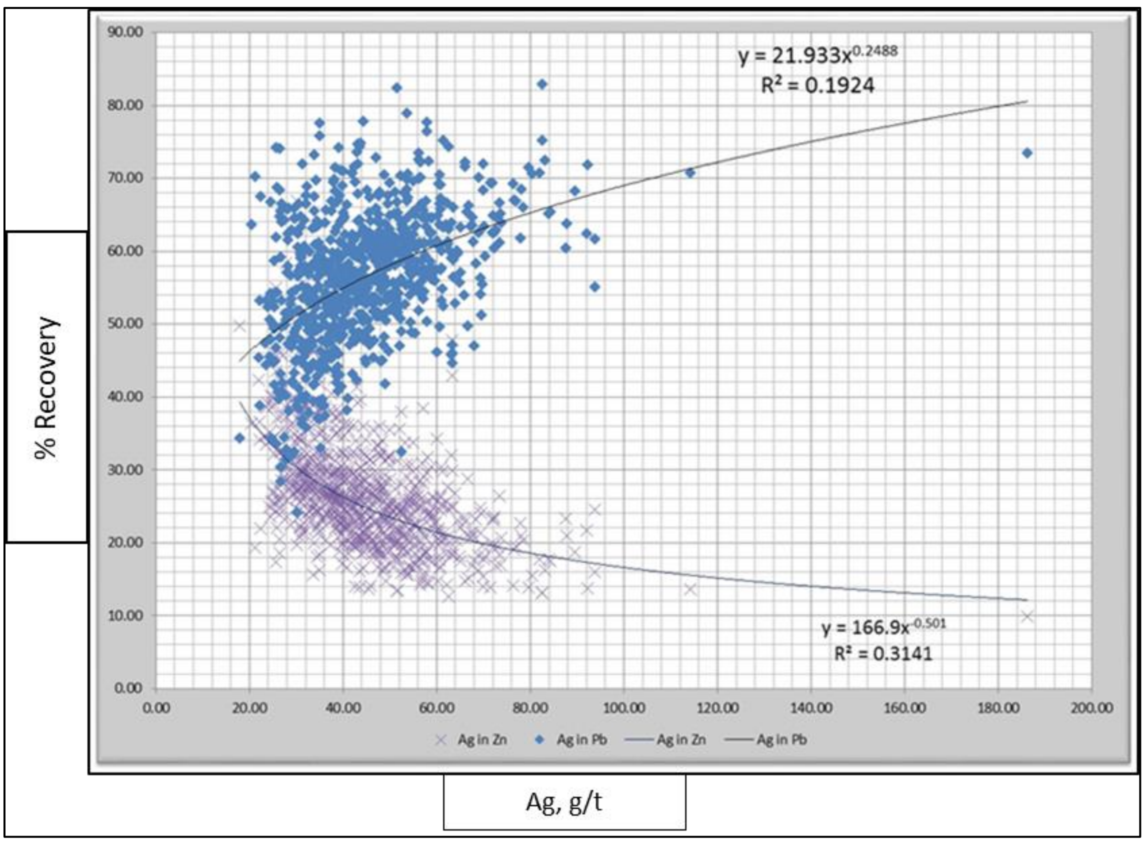


Figure 13.5 – Ag feed grade vs recovery, El Mochito, January 2016 – September 2017

A comparison of the plant metallurgical performance in the first 8 months of 2018 versus the average since January 2016 is shown in Table 13.1. A significant improvement in metallurgical performance has been realized in the recent months. With proposed (July 2018) improvements, particularly in grinding and flotation, metallurgical performance is anticipated to further improve.

Table 13.1 – Comparison of metallurgical performance 2016 - August 2018 to 2018

	AVERAGE MILLED tpd	HEAD GRADE, %		RECOVERY, %		
		Pb	Zn	Pb	Zn	Ag
2016 – Aug 18	1721	1.19	3.23	65.5	78.7	80.9
Jan – Aug 2018	2113	1.50	4.24	76.8	89.5	78.7
change	+ 23 %	0.31	1.01	11.3	10.8	- 3.2

14. MINERAL RESOURCE ESTIMATE

14.1 Introduction

The definition of Mineral Resource and associated Mineral Resource categories used in this report are those recognized under NI 43-101 and CIM Definition Standards (2014). Assumptions, metal threshold parameters and deposit modeling methodologies associated with the current El Mochito mine Mineral Resource Estimate are presented below. The current Mineral Resource Estimate was developed through extensive and ongoing consultation with Ascendant site staff and reflects a shared "best information" understanding of mineralized zone geometries and grade trends at the January 1, 2018 Mineral Resource Estimate effective date. No changes have been made to the January 1, 2018 Mineral Resource Estimate since its effective date.

14.2 Geological Interpretation Used in Resource Estimation

The El Mochito mine area is located in the northeast trending Mochito Graben within which the stratigraphic succession is dominated by interbedded Cretaceous limestone and shale stratigraphy of the Yojoa Group's Atima Formation. This formation is comprised of dark grey, massive micritic to biomicritic limestone with shale partings and is subdivided into lower and upper members that correspond with stratigraphic sections above and below the centrally positioned Mochito Shale sub-unit. These units are overlain disconformably to unconformably by clastic red beds of Cretaceous Valle de Angeles Group which are in turn overlain by Quaternary unconsolidated alluvium and soils that represent the youngest material deposited in the graben. The base of the Cretaceous Atima Formation marks the Cretaceous – Jurassic boundary in the graben area, where limestone and argillaceous limestone of the transitional Cantarannas Formation overly quartz rich sandstone and interbedded conglomerate of the Jurassic Todos Santos Formation. In addition to the graben-defining northeast faults associated with the Motagua Fault system, multiple northwest and east trending faults cross the graben and introduce structural complexity at both property and mine scales.

Zinc-lead-silver mineralization of economic interest at El Mochito occurs in association with calc-silicate bearing skarn intervals hosted by limestone and calcareous shale of the Upper and Lower Atima Formation, in calcareous units of the Atima Formations main subunit, the Mochito Shale, in calcareous siltstone and shale of the Cantarannas Formation, and in quartz rich sandstones and siltstones of the siliciclastic-dominated Todos Santos Formation, which underlies the Cantarannas Formation and is the deepest mineralized formation identified to date in the area. Skarn development is attributed to passage of high temperature volcanic-related fluids that were channeled through the graben fill succession along the various faults systems present. Lateral controls on such hot fluid migration were also exerted by the basal Atima Formation-Cantarannas Formation contact interval and by the relatively impervious Mochito Shale. Ault (2004) described the El Mochito deposits as representing a distal Zn-Pb-Ag skarn environment, as described earlier by Meinert (1992), where the bulk of economic mineralization occurs in either steeply dipping pipes (chimneys) or flat-lying manto bodies. Andesite dykes intrude the entire Mochito graben stratigraphic section and are commonly present in some areas of the El Mochito mine, frequently occurring in spatial association with economic base metal sulphide mineralization.

14.3 Overview of Estimation Procedure

The El Mochito mine Mineral Resource Estimate is based on a three-dimensional block model developed using Geovia Surpac ® Version 6.8.1 modeling software and is based on 27 areas of “manto” and/or “chimney” style skarn mineralization defined by 2,245 diamond drill holes and 21,901 core samples available up to the January 1, 2018 effective date of the estimate.

Peripheral geological solid model development was a collaborative effort between Mercator and El Mochito staff. The peripheral geological solid models reflect nominal minimum included grades of 3% to 5% zinc equivalent over minimum true widths of approximately ~3 m (10 ft), in manto zones and ~1 m (3 ft.) in chimney zones. Manto geological solid models were extended from ~15 m (50 ft) to ~30 m (100 ft.) along strike and down dip from drill hole intercepts or were limited at half the distance to a constraining drill hole if the qualifying grade criterion was not met. Chimney geological solid models were restricted to a maximum of a few 10’s of feet along strike and dip from a drill hole intercept or were limited to half the distance to a constraining drill hole if the qualifying grade criterion was not met. A total of 27 separate named deposit areas were defined by solid modelling for the current Mineral Resource Estimate. The Mineral Resource Estimate volumes defined in all geological solid models were depleted for previously mined volumes. The resulting depleted solid models were used to define block solid model Mineral Resource estimation volumes.

Inverse distance squared grade interpolation (ID^2) methodology was used to assign grades for zinc (%), lead (%), silver (g/t) and density (g/cm^3) constrained within the depleted domain wireframes. Contributing 1.5 m (5 ft) downhole assay composites were capped at 38% zinc, 36% lead, and 2,000 g/t silver. Up to four interpolation passes were applied using progressively increasing ellipsoid ranges to cover the range of depleted solid model sizes present. Variography assessment determined a major axis range of 27.4 m (90 ft), semi-major axis range of 18.3 m (60 ft), and a minor axis range of 9.1 m (30 ft). Ellipsoid ranges reflect half, equal to, double and triple the ranges determined from the variography for the first, second, third and fourth interpolation passes respectively. Ellipsoids used in manto zones are predominantly oriented east-west with gentle to moderate dips to the north. In manto deposits with significant dyke material, the primary axis of continuity was oriented along the main dyke trend that typically was observed to be east to south-east. Ellipsoids used in chimney type deposits support a wide range of strike orientations but are predominantly steeply dipping with the primary axis of continuity oriented along the dip direction. The minimum number of contributing assay composites required to interpolate block grades was progressively decreased with increasing interpolation pass number. Interpolation pass one, two, three, and four require a minimum of seven, five, three, and three contributing composites respectively. The maximum number of contributing composites was constrained to twelve, with no more than four contributing composites from a single drill hole. Block size is 3 m (10 ft) (x) by 3 m (10 ft)(y) by 3 m (10 ft)(z) with two levels of sub-blocking allowed to a minimum block size of 0.8 m (2.5 ft) (x) by 0.8 m (2.5 ft)(y) by 0.8 m (2.5 ft)(z). Resource categorization was applied using discrete solid models developed from contributing drill hole and assay composite parameters.

14.4 Data Validation

The drill hole database was received from El Mochito staff through delivery of various exported Excel (.xlsx) spreadsheets from the GEMS™ project database maintained by El Mochito staff. These files provided data for creation of the following separate MS-Access database tables: collar/header table, downhole survey table, summary lithology table, GEMS™ drill holes intercepts table, and an assay table that included available silver (g/t), lead (%), zinc (%), copper (%), iron (%), cobalt (%) and density (g/cm^3) data sets. The project database is setup in the local mine grid coordination system that reflects measurement in US standard measure feet.

The El Mochito database received by Mercator contains 8,821 predominantly underground diamond drill holes for a total of 1,116,251 m (3,662,240 ft), including 118 diamond drill holes for a total of 22,827 m (74,892 ft) that were drilled in 2017. The database includes 116,719 core samples, with a total of 21,901 samples from the 2,245 diamond drill holes that occur within or immediately adjacent to the limits of the current Mineral Resource Estimate solids. Validation checks on overlapping intervals, inconsistent drill hole identifiers, improper lithological assignment, unreasonable assay value assignment, and missing interval data were performed, and no substantive issues were identified. Checking of database analytical entries was also carried out against laboratory records supplied by El Mochito staff for 12 holes from Ascendant's 2017 program and sample record and assay checks were carried out on 200 additional drill logs from the older resource drill hole population. Validation checks and checking of analytical entries did not identify any systematic or substantive errors that would materially affect a Mineral Resource Estimate but did identify various minor discrepancies between database records and log source files or laboratory reports. By extension and combined with positive results of the 2017 core check sample program completed by Mercator, and recognition that associated drilling results have supported accurate modeling of Mineral Resources and Mineral Reserves to date, it was concluded that the drill hole database population selected for use in the current Mineral Resource Estimate program was acceptable for such use.

Laboratory results for water immersion core sample specific gravity determinations included in the drilling database were comprehensively collected by El Mochito staff for the 2013 through 2017 drilling campaigns and used as density values for Mineral Resource modelling. Comparable coverage for previous drill programs is not available and to address this discrepancy Mercator developed a regression curve and equation relating the 2016 and 2017 laboratory determinations to drill core assay results for copper (Cu), lead (Pb), zinc (Zn) and iron (Fe) for combined manto and chimney types of mineralization. El Mochito staff had previously developed regression equations for separate populations of chimney and manto mineralization based on smaller data populations. The actual and calculated drill hole density values were used to develop interpolated density models for each of the block modeled mineralized zones that contribute to the current Mineral Resource Estimate.

14.5 Data Domains and Solid Modeling

14.5.1 Domain modeling

The procedure for developing the geological solid models for each area, which define the peripheral limits and included volume for each area prior to mining, consisted of two steps. The first step was for El Mochito staff to create a preliminary solid model for each deposit area and to deliver this to Mercator for consultative review and revision. An exception to this process occurred in relation to development of the geological solid models for the Victoria area, including the Victoria manto, Victoria vertical chimney and Victoria horizontal chimney zones, the Palmar Dyke area, the Porvenir area, and the San Juan South area. In these instances, all solids were originally developed by Mercator using drilling database information and then sent to El Mochito staff for review.

The geological solid models in areas with significant mining were adjusted by El Mochito staff to reflect mining outlines and underground mapping and therefore no longer exclusively reflect the drill hole database. As a result, the resource solid models in mining areas are not exclusively snapped to drill hole intercepts and may include or exclude portions of drill holes based on mining results rather than results of the specific drill hole. Mercator and El Mochito staff collectively reviewed all such occurrences and, generally, unless a drill hole was located within 3 m (10 ft) of the newly interpreted geological solid contact, it was excluded from use in the Mineral Resource Estimate.

Solid models deemed acceptable to both Mercator and El Mochito staff after combined review were used to constrain block model grade interpolations for Mineral Resource Estimate purposes. The Mineral Resource Estimate volumes defined in all geological solid models were depleted as required by El Mochito staff for previously mined solid model volumes and the resulting depleted solid models were used to define bock model Mineral Resource Estimate volumes. The non-depleted deposit solids were used to define included down hole assay composite intercepts from drill hole database sampling records. Drill holes within the spatial buffer mentioned above that did not conform to the interpreted geological contacts were accepted with their current location and drill trace trajectory, but the resource drill hole solid intercept files were modified to reflect inclusion of the geology and grade distribution of those drill hole and not the intersection with the respective solid model.

The geological solid models typically reflect modeling of skarn intervals showing nominal minimum included grades of 3% to 5% zinc equivalent over minimum true widths of approximately 3 m (10 ft), in manto zones and ~1 m (3 ft) in chimney zones. Manto geological solid models were extended from ~15 m (50 ft) to ~30 m (100 ft) along strike and down dip from drill hole intercepts or were limited at half the distance to a constraining drill hole if the qualifying grade criterion was not met. Chimney geological solid models were restricted to a maximum of a few 10's of feet along strike and dip from a drill hole intercept or were limited to half the distance to a constraining drill hole if the qualifying grade criterion was not met. A total of 27 separate, named mineralized areas were defined by solid modelling, many of which are contiguous and separated solely on the basis of exploration history or mineralization type (eg. Manto vs chimney). Geological solid models and the respective mining depleted solid models are identified in Figure 14.1 through Figure 14.4. and their associated solid names appear in Table 14.1. The Santa Elena Mineral Resource solid is the largest in volume defined for current purposes and is followed in deceasing size by Victoria Manto, Victoria Chimney, Esperanza and Porvenir, which have volumes that range between approximately 44% and 47% of Santa Elena.

Table 14.1 – Named 2018 mineral resource solid areas

Area	Area	Area
Barbasco	Nueve Este	Santa Barbara South
Canoe	Palmar Dyke	Santa Elena
Deep East	Port Royal Chimney	Santa Nino Manto
Deep North	Port Royal Manto	Santa Nino West
Esperanza	Porvenir	Santa Rita
Imperial	Salva Vida	Victoria Chimney
McKenny	San Jose	Victoria Manto
Nacional	San Juan South	Yojoa Manto
Nina Blanc	Santa Barbara North	Yojoa West

Zones of internal dilution within the Mineral Resource Estimate solids typically reflect intervals of non-mineralized dyke material, sub-cut-off lower grade zones included for model continuity, or lower grade intercepts adjacent to higher grade intercepts. Where possible, coherent spatial zones of internal dilution were isolated by wireframing to allow removal of dilutive volume from Mineral Resource estimation. In some instances, this is reflected directly in the geological solid model, such as the Santa Barbara North area where 2 bands of manto style mineralization are separated by an internal zone of sub-cut-off grade material. In the case of the Victoria vertical chimney, chimney style mineralization is modelled on the hanging wall and footwall of a non-mineralized dyke and the dike volume is excluded from the resource estimation solid. For the Santa Elena area, Mercator developed a solid model of dyke material that could be spatially correlated between multiple drill holes. In that case, hole intersections within the dyke solid model were excluded from compositing and the intersecting block model volume was excluded from resource estimation. Non-mineralized dyke material was otherwise accepted as internal dilution at 0 grade where complexity, size and distribution prevented reliable correlation of the dilutive zones from section to section.

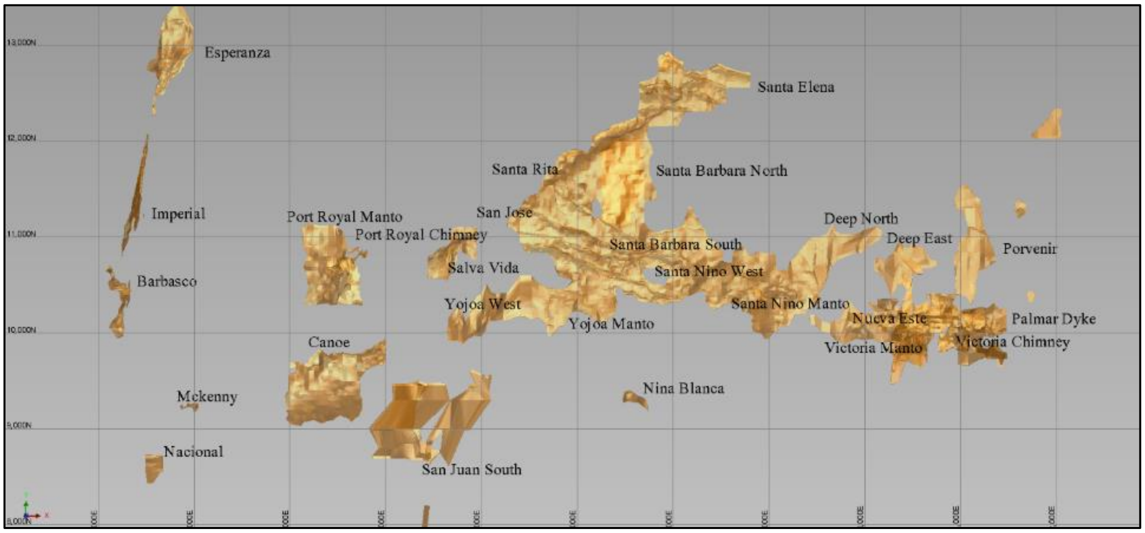


Figure 14.1 – Plan view of the 2018 Mineral Resource Estimate geological solid models

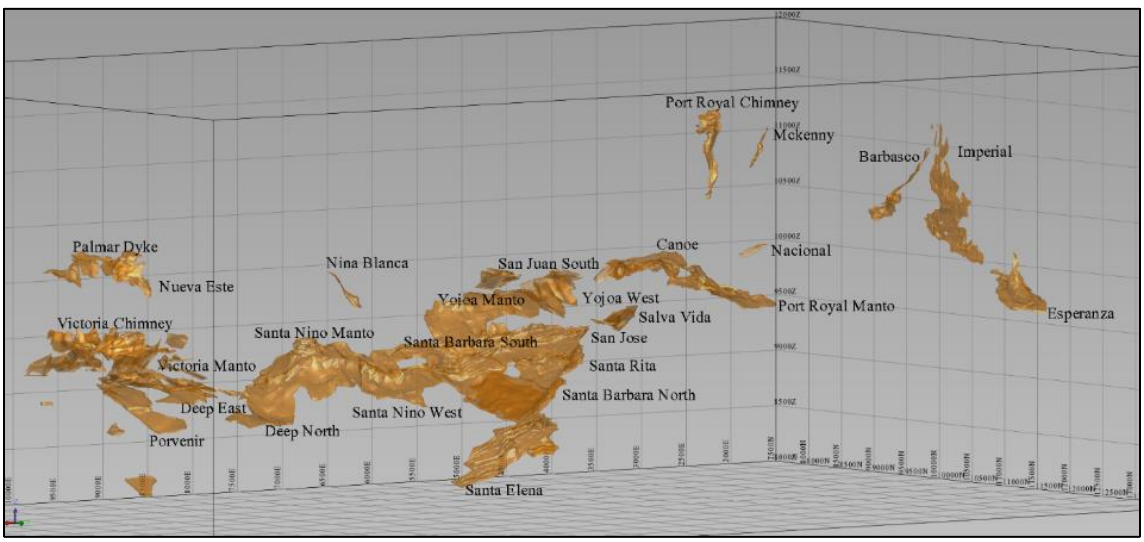


Figure 14.2 – Isometric view to southwest of 2018 Mineral Resource Estimate geological solid models

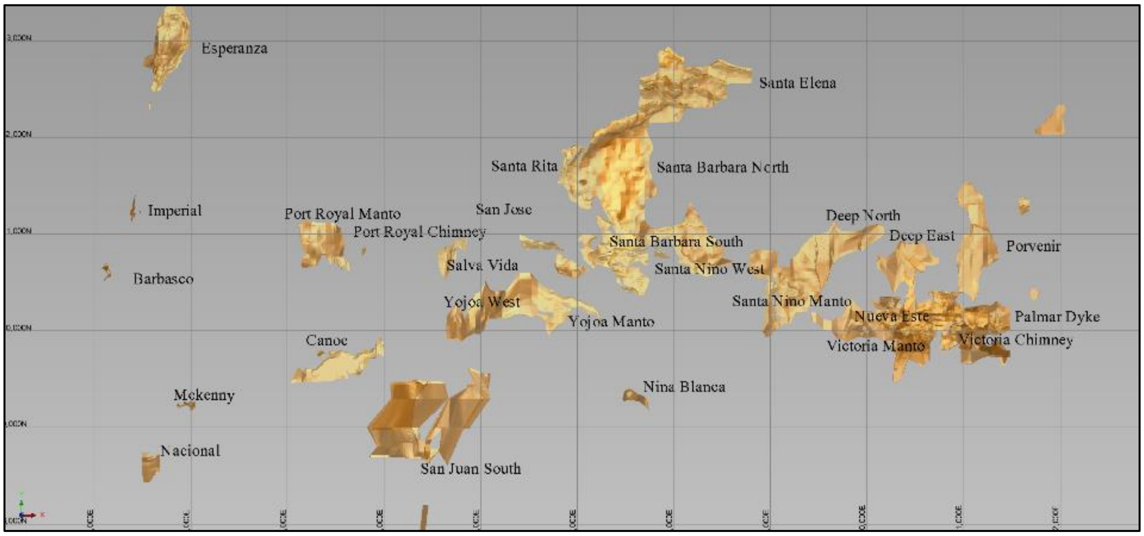


Figure 14.3 – Plan view of 2018 Mineral Resource Estimate solid models depleted for mining

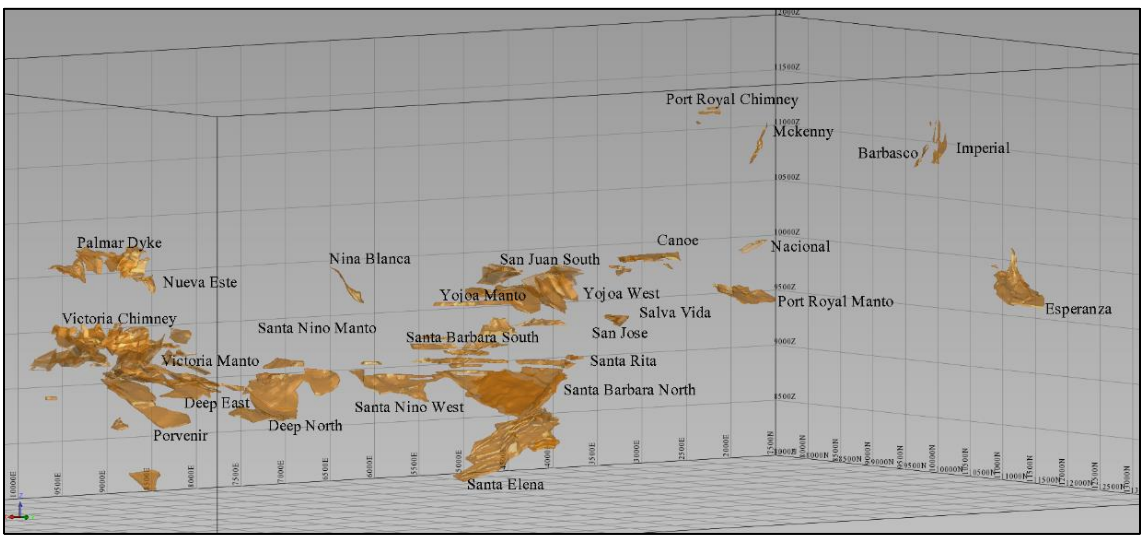


Figure 14.4 – Isometric view to southwest of 2018 Mineral Resource Estimate solid models depleted for mining

14.5.2 Underground workings model

El Mochito staff maintain continuously updated solid models for the underground workings. Mapping of underground faces, stopes, and development advance is digitized in AutoCAD format. This mapping supports creation of solid models that represent the monthly development and mining for each mining area and these are collectively applied to the solid models to update the main El Mochito underground workings digital model.

Figure 14.5 and Figure 14.6 show the entire El Mochito underground workings model available at the end of August 2017, excluding some historical stoping. The peripheral geological solid models used in the current Mineral Resource estimate were depleted for mining up to the end of December 2017.

14.6 Drill Core Assays and High Grade Capping

To facilitate compositing of down hole assay data, a drill hole intercept table consisting of drill hole intervals to be composited for each area was created using one of two methods. In the first case, solid model drill hole intersections were created for areas that have little to no previous mining and exclusively reflect the drill hole database. This includes the deposit areas of Esperanza, Santa Elena, Santa Barbara North, Victoria, National, Yojao West, Deep North, Deep East, Porvenir, and San Juan South. For areas where previous mining has occurred, and the geological solid models do not exclusively reflect the drill hole database, Mercator extracted and modified the drill hole intercepts to reflect the geological interpretation. This includes the deposit areas of Barbasco, Imperial, Canoe, McKenny, Port Royal Chimney, Port Royal Manto, Santa Rita, Santa Barbara South, San Jose, Yojoa Manto, Santa Nino West, Santa Nino Manto, Nueve Est, Nina Blanc and Salva Vida.

Assay sample length statistics showed a mean length of 1.4 m (4.60 ft) with a minimum length of 0.12 m (0.40 ft) and maximum length of 5.2 m (17 ft). Downhole assay composites measuring 1.4 m (5 ft) in length, constrained to the drill hole intercepts for each area, were therefore created for zinc, lead, copper, silver, iron and specific gravity (as density) using Surpac's "best-fit" method (Table 14.2). A total of 22,034 assay composites were created with lengths ranging from 0.30 m (1 ft) to 2.28 m (7.49 ft) and a mean length of 1.5 m (4.98 ft). Included un-sampled intervals were diluted to "0 %" (zero %) grade for zinc, lead, copper, silver and iron and assigned a 2.94 g/cm^3 specific gravity value. Assay composite descriptive statistics were reviewed for the global contributing composite population and top caps of 38% zinc, 36% lead, 2000 g/t silver, 5% copper, and 58% iron were applied (Table 14.3). These capping values were reviewed on an individual area basis and in some instances local assay composite top caps were applied. Global impact of capping is minimal, with most effect registering with silver. The potential impact of outlier high metal values on local grade estimation was of greater concern.

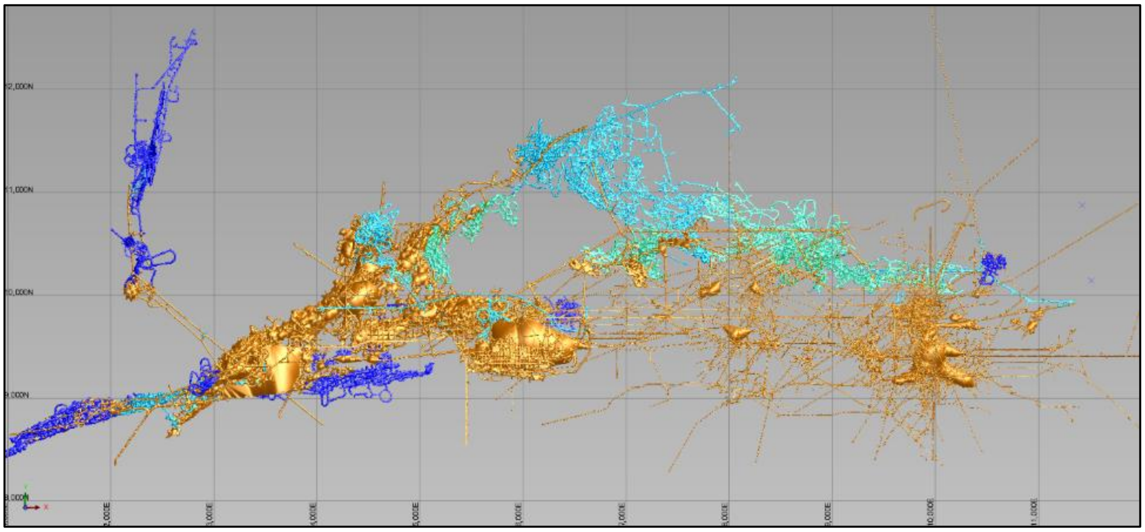


Figure 14.5 – Plan view of the El Mochito underground workings model

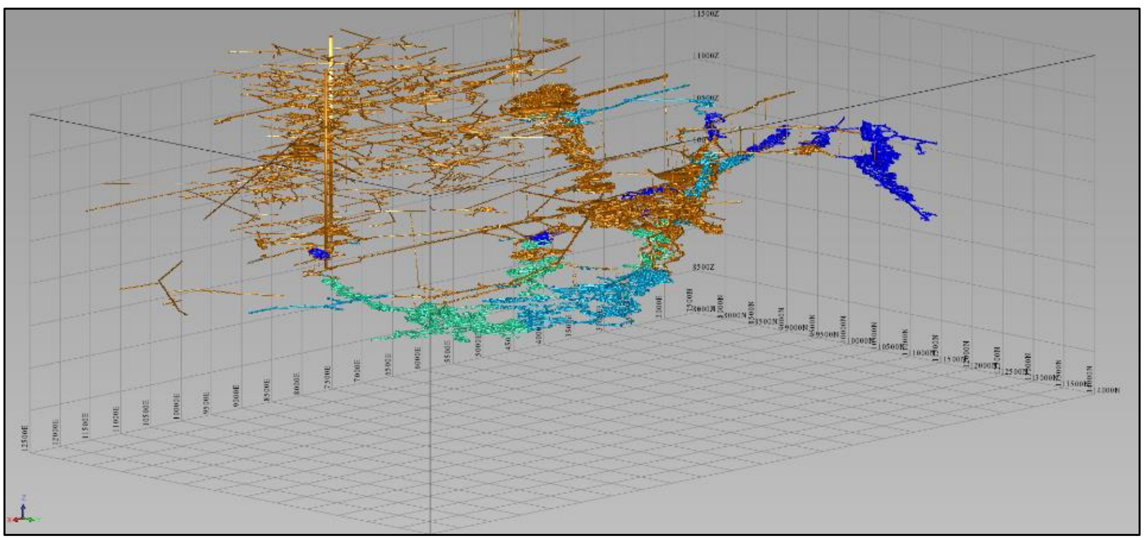


Figure 14.6 – Isometric view to southwest of the El Mochito underground workings model

Table 14.2 – El Mochito zinc, lead, silver, copper, iron, and density raw statistics

Parameter	Zn %	Pb %	Ag g/t	Cu %	Fe %	Density g/cm3
Mean	4.55	1.60	57.65	0.09	8.56	3.37
Maximum	45.82	48.96	16,801	12.76	76.03	5.00
Minimum	0	0	0	0	0	2.22

Parameter	Zn %	Pb %	Ag g/t	Cu %	Fe %	Density g/cm3
Variance	27.07	8.88	53,281.08	0.07	89.48	0.06
Standard Deviation	5.20	2.98	230.83	0.26	9.46	0.26
Coefficient of Variation	1.14	1.86	4.00	3.01	1.11	0.08
Number of Samples	22,034	22,034	22,034	22,034	22,034	22,034

Table 14.3 – El Mochito zinc, lead, silver, copper, iron, and density capped statistics

Parameter	Zn %	Pb %	Ag g/t	Cu %	Fe %	Density g/cm3
Mean	4.55	1.60	54.75	0.08	8.56	3.37
Maximum	38	36	2,000	5	58	5.00
Minimum	0	0	0	0	0	2.22
Variance	26.79	8.67	13,098.06	0.05	89.11	0.06
Standard Deviation	5.18	2.95	114.45	0.24	9.44	0.26
Coefficient of Variation	1.14	1.84	2.09	2.78	1.10	0.08
Number of Samples	22,034	22,034	22,034	22,034	22,034	22,034

14.7 Variography and Interpolation Parameters

Mercator completed experimental downhole and directional variograms for the Esperanza area from the respective 1.5 m (5 ft) assay composite dataset. The Esperanza area is defined by systematic drill spacing from recent drill programs (2015 – 2017) and supports a relatively simple geometry over 381 m (1,250 ft) of strike length. As such, it was felt that the area could provide informative and representative grade distribution and continuity results, with these primarily reflecting impact of manto style mineralization. Good spherical model results were obtained for experimental downhole variograms, thereby providing assessment of global nugget values and providing a basis of consideration for interpolation ellipsoid minor axis ranges (Figure 14.7). Best experimental variogram results for the major axis of continuity were developed within a trend plunging 15° at azimuth 016° using a spread of 25° (Figure 14.8). Best experimental variogram results for the semi-major axis of continuity were developed within a plane plunging 0° towards an azimuth of 286° using a spread of 25° (Figure 14.8). A maximum range of continuity of 27.4 m (90 ft) was modelled for the primary axis and a maximum range of 18.3 m (60 ft) with modelled for the secondary axis of continuity (Figure 14.8).

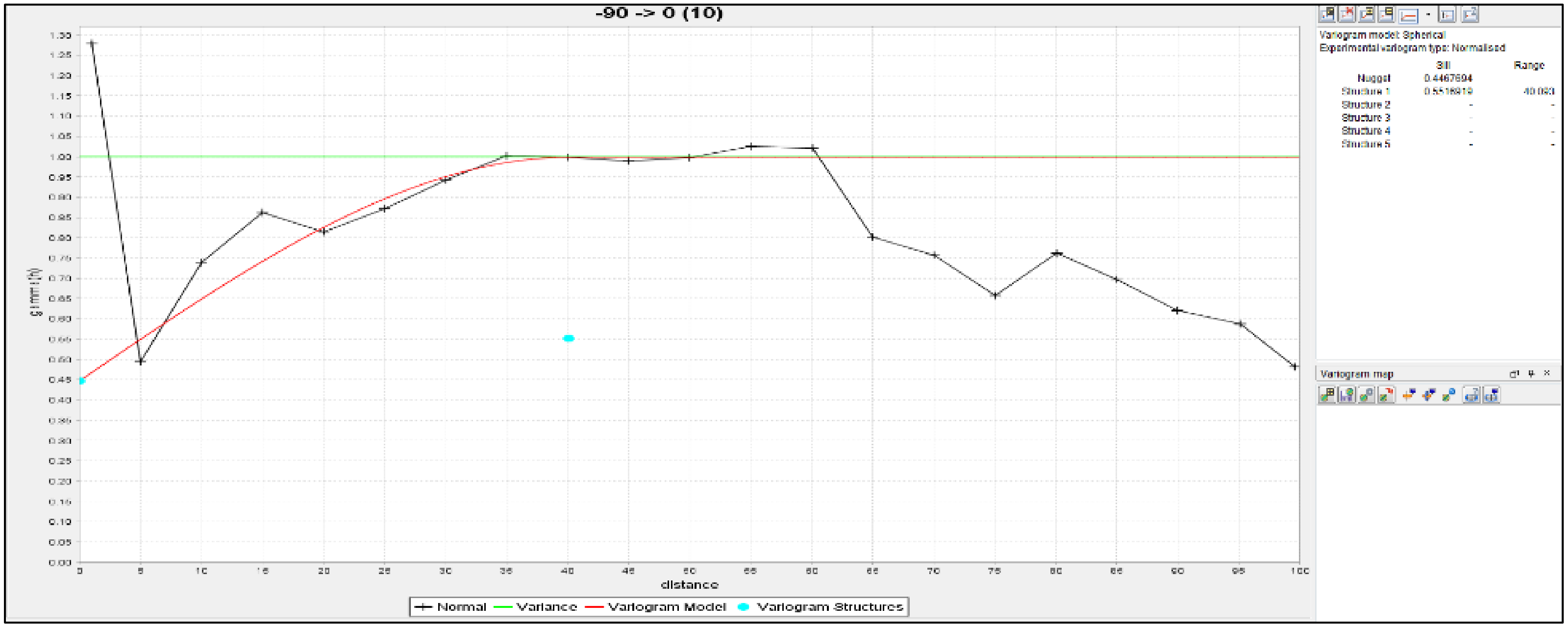


Figure 14.7 – Downhole experimental variogram of assay composites for Esperanza area

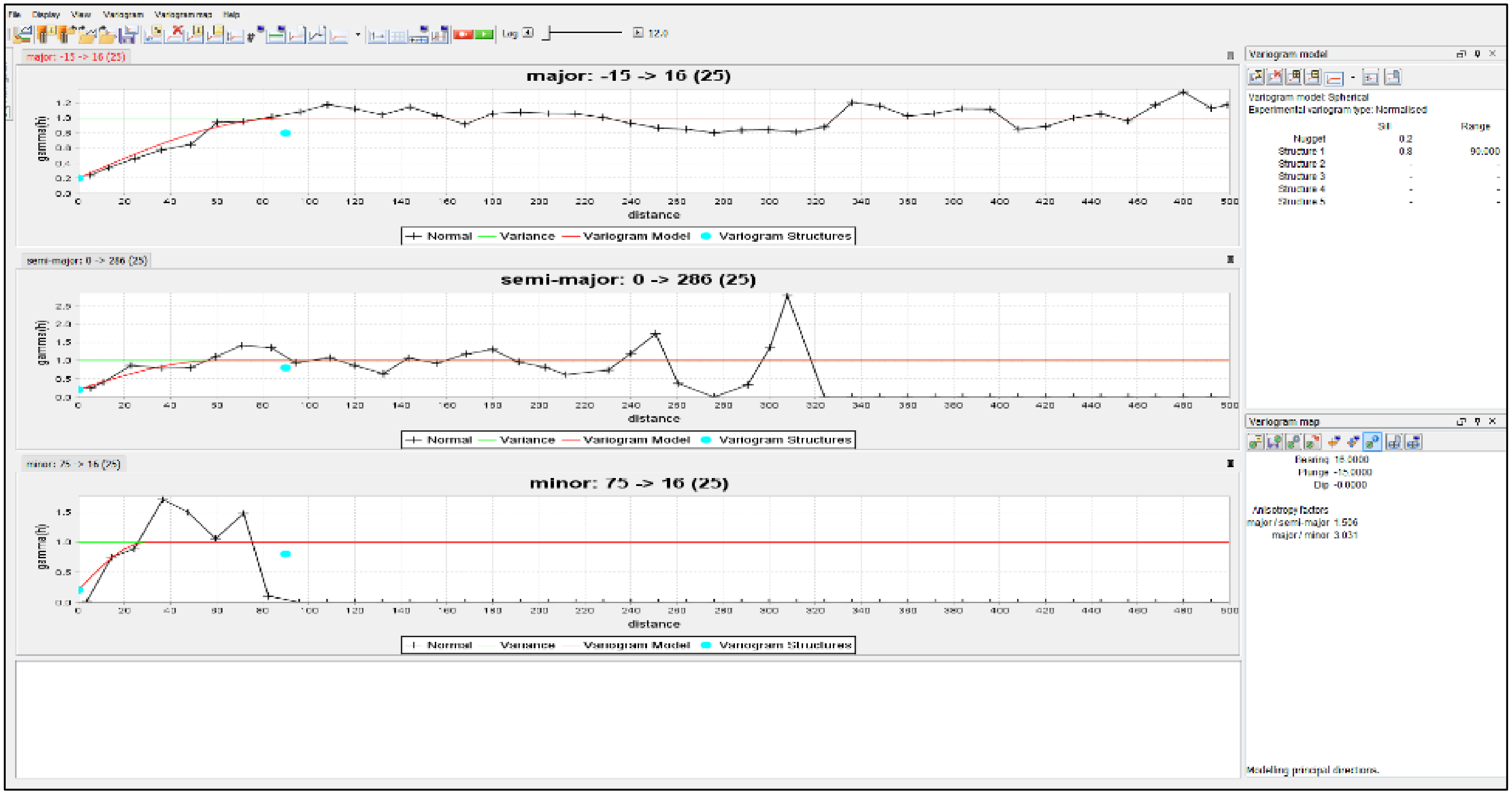


Figure 14.8 – Directional experimental variograms of assay composites for Esperanza area

Interpolation ellipsoid ranges were developed through consideration of the variogram assessment, geological interpretation, mining history, previous El Mochito staff practices, and resource categorization requirements. A multi-pass interpolation approach consisting of four separate stages was implemented using progressively increasing ellipsoid ranges for each pass. Ellipsoid ranges summarized in Table 14.4 below reflect half, equal to, double and triple the ranges determined through variography for the first, second, third and fourth interpolation pass.

Table 14.4 – Interpolation ellipsoid ranges

Interpolation Pass	Ellipsoid Axes Ranges		
	Major (ft)	Semi-Major (ft)	Minor (ft)
1	45 (13.7 m)	30 (9.1 m)	15 (4.6 m)
2	90 (27.4 m)	60 (18.2 m)	30 (9.1 m)
3	180 (54.9 m)	120 (36.6 m)	60 (18.2 m)
4	270 (82.3 m)	180 (54.9 m)	90 (27.4 m)

Interpolation ellipsoids were oriented along the general geological trends identified for each deposit area solid and locally modified for changes in solid geometry. As such, each deposit area typically supports between 1 and 10 interpolation sub-domains. Notably, the large Victoria area has 47 interpolation sub-domains due to local complexity in the geometry of the mineralized envelops plus abundance of dykes and faulting. Ellipsoids used in manto zones are predominantly oriented east-west with gentle to moderate dips to the north. In manto deposits with significant dyke material, the primary axis of continuity was oriented along the main dyke trend that typically was observed to be east to south-east. Ellipsoids used in chimney type deposits support a wide range of strike orientations but are predominantly steeply dipping with the primary axis of continuity oriented along the dip direction.

14.8 Setup of Three Dimensional Block Model

Mercator sub-divided the El Mochito mine workings area into three block models based on X-Y-Z coordination to reduce processing times, memory requirements, and file size. The El Mochito mine local grid reflects US standard measure feet and the minimum and maximum extents of the entire block model area are presented in Table 14.5. All block models are sub-blocked, with a parent block size of 10’X by 10’Y by 10’Z and a minimum block size of 2.5’X by 2.5’Y by 2.5’Z. No rotation has been applied.

Table 14.5 – Resource block model local grid spatial parameters

Type	Y (northing ft)	X (easting ft)	Z (elevation ft)
Minimum Coordinates	7,600 (2,317 m)	2,000 (610 m)	8,400 (2,561 m)
Maximum Coordinates	13,400 (4,085 m)	12,100 (3,689 m)	11,700 (3,567 m)

Type	Y (northing ft)	X (easting ft)	Z (elevation ft)
User Block Size (ft)	10 (3 m)	10 (3 m)	10 (3 m)
Min. Block Size (ft)	2.5 (0.8 m)	2.5 (0.8 m)	2.5 (0.8 m)
Rotation	0	0	0

14.9 Mineral Resource Estimation

Inverse distance squared (ID^2) grade interpolation methodology was used to assign block grades for zinc, lead, silver, copper, iron and specific gravity within the El Mochito block models based on the 1.5 m (5 ft) capped assay composites. As reviewed earlier, interpolation ellipsoid orientation values and ranges used in the estimation reflect trends determined from variography plus sectional interpretations of geology and grade distributions for the deposit.

Grade interpolation for Inferred, Indicated and Measured Mineral Resources were constrained to the block volumes defined by the depleted solid models using the 4 interpolation pass approach previously discussed. Interpolation passes, implemented sequentially from pass 1 to pass 4, progress from being restrictive to more inclusive in the composites available and number of composites required to assign block grades. Table 14.6 summarizes the included composite parameters and blocks available to assign grade for each interpolation pass. Block discretization was set at 1Y x 1X x 1Z. Each block is interpolated with a density value in g/cm^3 and converted to metric tonnes/ft^3 by dividing the interpolated value by 35.3147. The converted density value allows the block model, which is setup in feet, to be reported directly in tonnes.

Table 14.6 – Included composite parameters and qualifying blocks for each interpolation pass

Interpolation Pass	Included Composite Parameters			Qualifying blocks for interpolation pass
	Minimum	Maximum	Maximum /Hole	
1	7	12	4	ALL
2	5	12	4	≤ 2 DDH from pass 1
3	3	12	4	≤ 2 composites from pass 1 or 2
4	3	12	4	≤ 2 composites from pass 1, 2, 3

Adjacent and connecting deposit areas, both locally and regionally, were assigned soft domain boundaries for grade estimation purposes. As such, the 1.5 m (5 ft) assay composites in adjacent and connecting deposits areas contribute to the grade interpolation. Alternatively, isolated deposit areas, both locally and regionally, were assigned hard domain boundaries for grade estimation purposes and grade interpolation is restricted to the 1.5 m (5 ft) assay composites associated with the drill hole intercepts assigned to that deposit area solid

14.10 Density

Specific gravity data generated in the El Mochito core logging facility have been used as in situ density values (g/cm^3) for Mineral Resource estimation purposes. As previously discussed in Section 14.4 and Section 14.9, a regression curve was used to assign density values to sampled drill hole intervals that lacked such data. These values were subsequently composited and interpolated along with metal grade values. A summary of the approach is restated below.

Laboratory results for water immersion core sample specific gravity determinations included in the drilling database were comprehensively collected by El Mochtio staff for the 2016 and 2017 drilling campaigns and provided 3,429 results for current purposes. Comparable coverage for previous drill programs is not available, and to address this discrepancy Mercator developed a regression curve and equation relating the 2016 and 2017 laboratory specific gravity determinations to drill core assay results for copper, lead, zinc and iron for combined manto and chimney types of mineralization. For sample intervals for which the combined metal value (Cu% + Pb% + Zn% + Fe %) exceeds 0 %, the following regression equation was applied:

Equation 5 : specific gravity

$$0.0186*(Cu\% + Pb\% + Zn\% + Fe\ \%) + 3.09$$

For sample intervals having a combined metal grade of 0 %, a value of 2.94 g/cm^3 was applied. This reflects the average of all 2016 and 2017 specific gravity determinations for non-mineralized sample intervals below the 3.09 g/cm^3 y intercept value of the above regression equation. A total of 100,906 of the 116,719 core samples recorded in the entire drilling database have a density value calculated by the regression curve method. Previously, Mineral Resource solids were assigned average laboratory determined density values depending upon the dominant mineralization type present (manto or chimney) and waste rock was assigned an average of laboratory waste rock determinations. In 2016, Nyrstar initiated application of a regression based approach to assigning density to assayed intervals but did not interpolate these data into associated block models.

An interpolated density value in g/cm^3 was assigned to each 2018 block centroid and then converted to metric tonnes/ft^3 by dividing the interpolated value by 35.3147. The converted density factor allows the block model, setup in feet, to be reported directly in tonnes.

14.11 Resource Category Definitions and Parameters Used in Current Estimate

Definitions of Mineral Resources and associated Mineral Resource categories used in this report are those recognized under NI 43-101 and set out in CIM Definition Standards (as amended in 2014). Mineral Resources presented have been assigned to Inferred, Indicated and Measured Mineral Resource categories that reflect increasing levels of confidence with respect to spatial configuration of resources and corresponding grade assignment within the deposit. Several factors were considered in defining resource category assignments, including drill hole spacing, geological interpretations, and number and range of informing composites. Specific definition parameters for each resource category applied in the current estimate are set out below.

Measured Resource: Measured Mineral Resources are defined as all blocks with interpolated grade and specific gravity values from the first or second Inverse Distance Squared interpolation passes with at least 3 contributing drill holes and 5 contributing composites having a maximum average distance of 14 m (45 ft) from the block centroid.

Indicated Resources: Indicated Mineral Resources are defined as all blocks with interpolated grade and specific gravity values from the first, second, or third Inverse Distance Squared interpolation passes with at least 3 contributing drill holes and 5 contributing composites having a maximum average distance of ~27 m (90 ft) from the block centroid, and not previously categorized as measured resource.

Inferred Resources: Inferred Mineral Resources are defined as all blocks with interpolated grade and specific gravity values from the first, second, third, or fourth Inverse Distance Squared interpolation passes with at least 2 contributing composites having a maximum average distance of ~55 m (180 ft) from the block centroid, and not previously categorized as indicated or measured resource.

Application of the Mineral Resource Estimate category parameters specified above provided a distribution of Measured, Indicated and Inferred Mineral Resource Estimate blocks for each deposit area in the El Mochito deposit. To eliminate irregular category assignment artifacts, the peripheral limits of blocks in close proximity to each other that share the same category designation and demonstrate reasonable continuity were wireframed and developed into discrete solid models. All blocks occurring within these category solid models were re-classified to match that model's designation. This process resulted in more continuous zones of each Mineral Resource Estimate category and limited occurrences of orphaned blocks of one category occurring as imbedded patches in other category domains. Inferred Mineral Resource Estimate blocks adjacent to open development and stoping were also upgraded to the Indicated Resource Estimate category based on the increased certainty of continuity that arises from such positioning.

14.12 Zinc Equivalent Calculation and Resource Cut-Off Grade

El Mochito staff developed an updated zinc equivalent calculation for operational application in late 2017 and Mercator reviewed this calculation in detail prior to accepting it for resource estimation purposes. The 2017 calculation is based on metal prices of 1.21 $/lb Zn, 1.06 $/lb Pb, and 18 $/oz Ag (all US currency) and recoveries of 88.9% Zn, 74.3% Pb, and 77.7% Ag. Metal prices were provided by Ascendant and reflect an average of BMO Capital Markets projections for the 2018 through 2023 period and metal recoveries from milling reflect El Mochito realized values for 2017. Payable factors of 85% for zinc in concentrate, 95% for lead in concentrate, 83% for silver in lead concentrate and 33.7% for silver in zinc concentrate were applied in the zinc equivalent calculation and reflect 2017 Ascendant concentrate sales and mill performance figures. A marginal direct operating cost of 62.58 $/t milled was used in calculation of the resource reporting cut-off value and reflects Ascendant financial results for the fourth quarter of 2017. This excludes costs of concentrate transport, mine pumping and administration. The following zinc equivalent equation (Equation 6) was derived using pricing, process recovery and payable factors noted above:

Equation 6: Zinc equivalent equation

ZnEq.% = Zn% + (Pb% * 0.82) + (Ag g/t * 0.0149)

A resource zinc equivalent cut-off grade of 3.1% was determined for the Mineral Resources Estimate based on the previously noted marginal direct operating cost of 62.58 $/t milled, 88.9% zinc recovery and 85% zinc payable factor.

14.13 Mineral Resource Estimate

Block grade, block density and block volume parameters for the El Mochito mine were estimated using methods described in preceding sections of this report. Subsequent application of resource category parameters resulted in the El Mochito mine Mineral Resource Estimate presented below in Table 14.7. Individual Mineral Resource Estimate figures for the 27 named contributing deposit areas that support the global estimate are presented in Table 14.8. Figure 14.9 through Figure 14.13 present plan views of block grade and Mineral Resource Estimate category distributions. Relationships between ZnEq. %, Zn %, Pb% and Ag g/t relative to global deposit tonnage at various zinc equivalent cut-off values are highlighted in Figure 14.14 through Figure 14.17.

Table 14.7 – El Mochito mine Mineral Resource Estimate – Effective January 1, 2018

Cut off Value	Category	Tonnes	Grade				Contained Metal			
			Zn	Pb	Ag	ZnEq	Zn	Pb	Ag	ZnEq
ZnEq%		kt	%	%	g/t	%	Mlbs	Mlbs	Moz	Mlbs
3.1	Measured	1,100	5.5	2.0	65	8.2	134	48	2.3	198
	Indicated	6,452	5.2	1.7	41	7.2	735	241	8.4	1,019
	Measured and Indicated	**7,553**	**5.2**	**1.7**	**44**	**7.3**	**869**	**289**	**10.7**	**1,216**
	Inferred	4,972	5.1	1.4	33	6.7	556	156	5.4	739

Notes:
- Tonnage and grade values have been rounded and totals may vary due to rounding.
- Price assumptions used were 1.21 $/lb Zn, 1.06 $/lb Pb and 18 $/troy oz Ag. Zinc equivalent metal grade (ZnEq%) was calculated as ZnEq% = Zn% + (Pb% * 0.82) + (Ag g/t * 0.0149) and is based on recoveries of 88.9% Zn, 74.3% Pb, and 77.7% Ag
- A cut-off of 3.1% ZnEq was used to estimate Mineral Resources and is based on fourth quarter marginal direct operating costs.
- Results of an interpolated bulk density deposit model have been applied and contributing 1.52 m (5 ft) downhole assay composites were capped at 38% Zn, 36% Pb, and 2,000 g/t Ag.
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability
- The Inferred Mineral Resource in this estimate has a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.

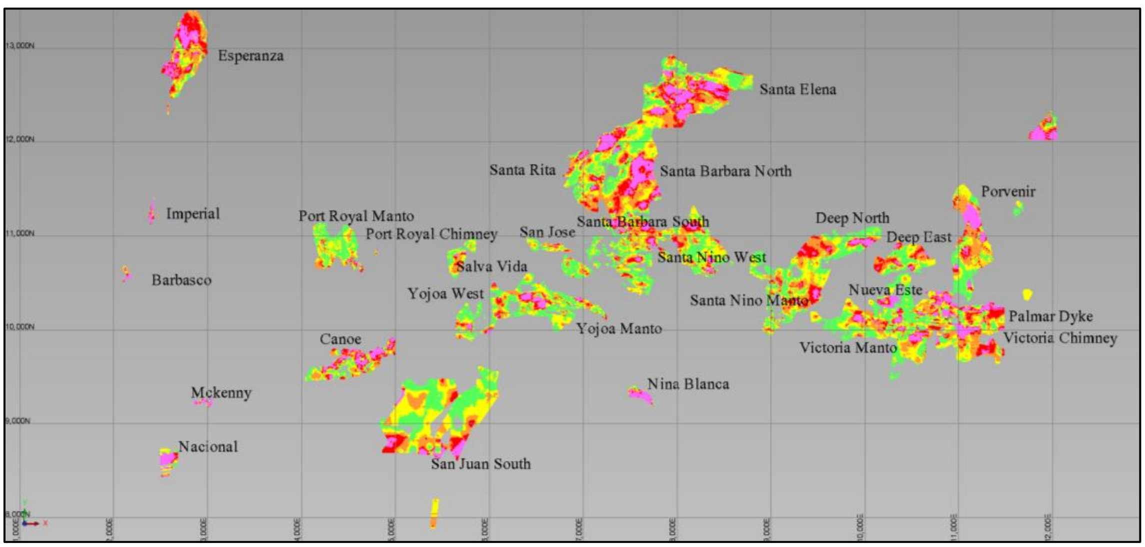
Table 14.8 – Contributing Mineral Resources at a 3.1% ZnEq cut-off

Area	Category	Tonnes	Zn %	Pb %	Ag g/t	ZnEq%
Esperanza	Measured	84,000	4.8	1.8	42	7.0
	Indicated	632,000	5.2	2.0	49	7.6
	Inferred	266,000	6.1	1.5	51	8.1

Area	Category	Tonnes	Zn %	Pb %	Ag g/t	ZnEq%
Barbasco	Measured	-	-	-	-	-
	Indicated	4,800	6.5	4.1	198	12.8
	Inferred	-	-	-	-	-
Imperial	Measured	-	-	-	-	-
	Indicated	10,000	5.8	5.7	157	12.7
	Inferred	11,000	4.6	4.6	144	10.5
Canoe	Measured	224,000	6.3	0.7	72	8.0
	Indicated	121,000	4.6	0.6	61	6.0
	Inferred	-	-	-	-	-
Port Royal Manto	Measured	-	-	-	-	-
	Indicated	132,000	3.8	1.3	44	5.5
	Inferred	210,000	3.0	1.5	59	5.1
Port Royal Chimney	Measured	9,200	1.8	4.8	168	8.3
	Indicated	2,800	2.5	4.6	153	8.5
	Inferred	-	-	-	-	-
McKenny	Measured	23,800	4.9	3.4	291	12.0
	Indicated	2,000	2.4	2.7	678	14.7
	Inferred	-	-	-	-	-
Nacional	Measured	-	-	-	-	-
	Indicated	-	-	-	-	-
	Inferred	39,000	9.7	1.3	66	11.7
Santa Elena	Measured	57,000	6.6	1.2	26	8.0
	Indicated	1,339,000	5.7	1.4	30	7.3
	Inferred	732,000	5.6	1.1	23	6.9
San Juan South	Measured	-	-	-	-	-
	Indicated	-	-	-	-	-
	Inferred	704,000	4.4	1.1	39	5.9
Santa Barbara North	Measured	20,000	6.0	2.6	43	8.7
	Indicated	436,000	5.6	1.9	33	7.6
	Inferred	358,000	5.1	2.1	29	7.3
Santa Barbara South	Measured	35,000	4.0	1.4	51	5.9
	Indicated	431,000	4.7	1.4	35	6.4
	Inferred	-	-	-	-	-
Santa Rita	Measured	39,000	4.5	0.9	28	5.7
Santa Rita	Indicated	307,000	4.4	1.1	29	5.8

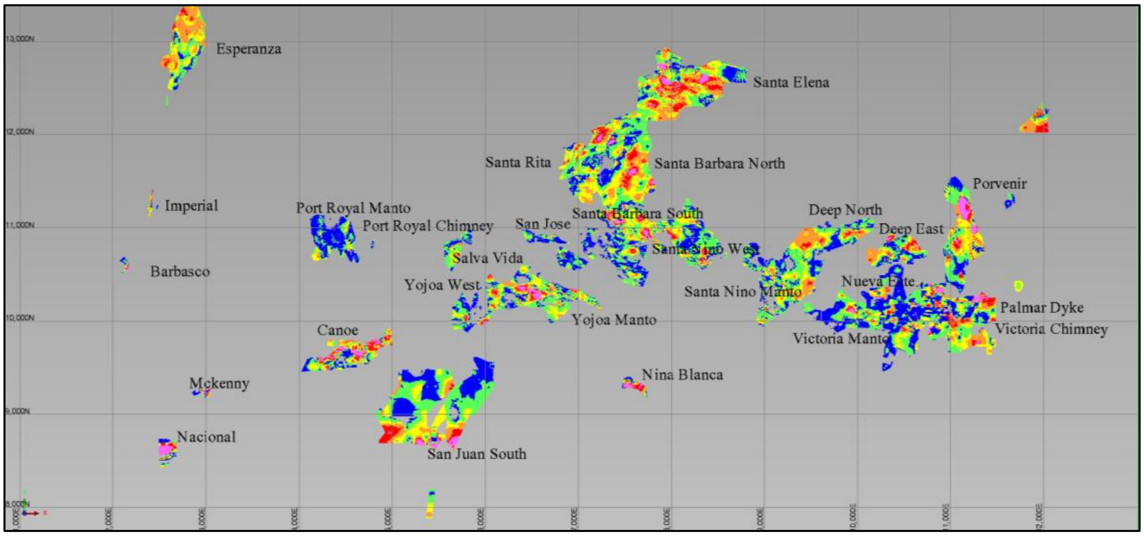
Area	Category	Tonnes	Zn %	Pb %	Ag g/t	ZnEq%
San Jose SE	Inferred	16,000	5.0	1.1	20	6.1
	Measured	26,000	3.1	1.9	44	5.4
San Jose SE Santa Nino West	Indicated	143,000	3.0	1.4	36	4.7
	Inferred	-	-	-	-	-
	Measured	50,000	4.7	1.3	25	6.2
Santa Nino West Santa Nino Manto	Indicated	371,000	4.3	1.5	30	5.9
	Inferred	42,000	3.9	1.9	45	6.1
	Measured	72,000	4.9	1.0	24	6.0
Santa Nino Manto Deep North	Indicated	531,000	4.4	1.1	24	5.7
	Inferred	115,000	5.3	1.5	26	6.9
	Measured	-	-	-	-	-
Deep North Yojoa Manto	Indicated	86,000	5.4	1.4	28	6.9
	Inferred	236,000	5.2	1.1	33	6.6
	Measured	2,000	3.8	0.2	19	4.3
Yojoa Manto Yojoa West	Indicated	154,000	4.8	0.4	21	5.4
	Inferred	33,000	5.1	0.2	10	5.4
	Measured					
Yojoa West Nueve Este	Indicated	238,000	6.0	0.8	25	7.0
	Inferred	203,000	4.7	0.8	24	5.8
	Measured	36,000	4.4	3.5	124	9.1
Nueve Este Salva Vida	Indicated	58,000	4.3	4.0	153	9.9
	Inferred	-	-	-	-	-
	Measured	40,000	3.5	0.8	41	4.8
Salva Vida Nina Blanc	Indicated	81,000	4.0	1.5	35	5.8
	Inferred	-	-	-	-	-
	Measured	31,000	8.4	6.8	199	17.0
Nina Blanc Victoria Manto	Indicated	31,000	8.6	7.9	230	18.5
	Inferred	-	-	-	-	-
	Measured	97,000	5.3	1.3	24	6.7
Victoria Manto	Indicated	605,000	5.1	1.6	26	6.8
	Inferred	308,000	3.6	1.3	24	5.1
Victoria Chimney	Measured	115,000	6.9	4.3	68	11.4
Victoria Chimney	Indicated	480,000	6.0	3.7	63	10.0

Area	Category	Tonnes	Zn %	Pb %	Ag g/t	ZnEq%
Palmar Dyke	Inferred	400,000	4.5	2.5	36	7.0
	Measured	140,000	5.8	2.7	85	9.3
Palmar Dyke Deep East	Indicated	257,000	6.1	2.4	117	9.8
	Inferred	65,000	6.0	1.7	103	8.9
	Measured	-	-	-	-	-
Deep East Porvenir	Indicated	-	-	-	-	-
	Inferred	296,000	4.8	1.1	22	6.0
	Measured	-	-	-	-	-
Porvenir	Indicated	-	-	-	-	-
	Inferred	928,000	6.0	1.5	31	7.7



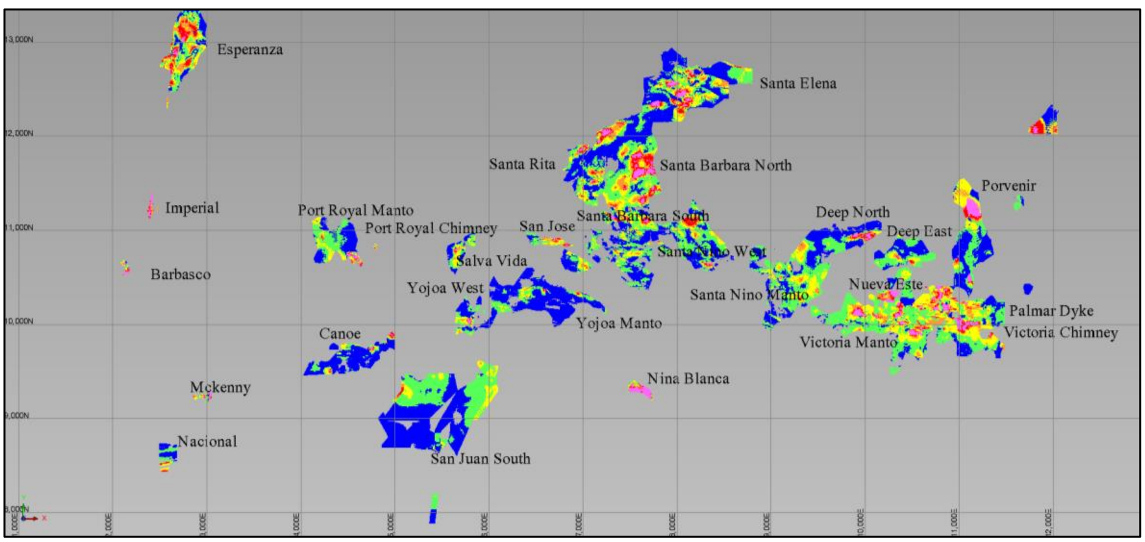
Note: ZnEq% Legend: < 3 (blue), 3 – 4.5 (green), 4.5 – 6 (yellow), 6 – 8 (orange), 8 – 10 (red), > 10 (pink)

Figure 14.9 – Plan view of ZnEq% block model grade distribution at 3.1% ZnEq cut-off



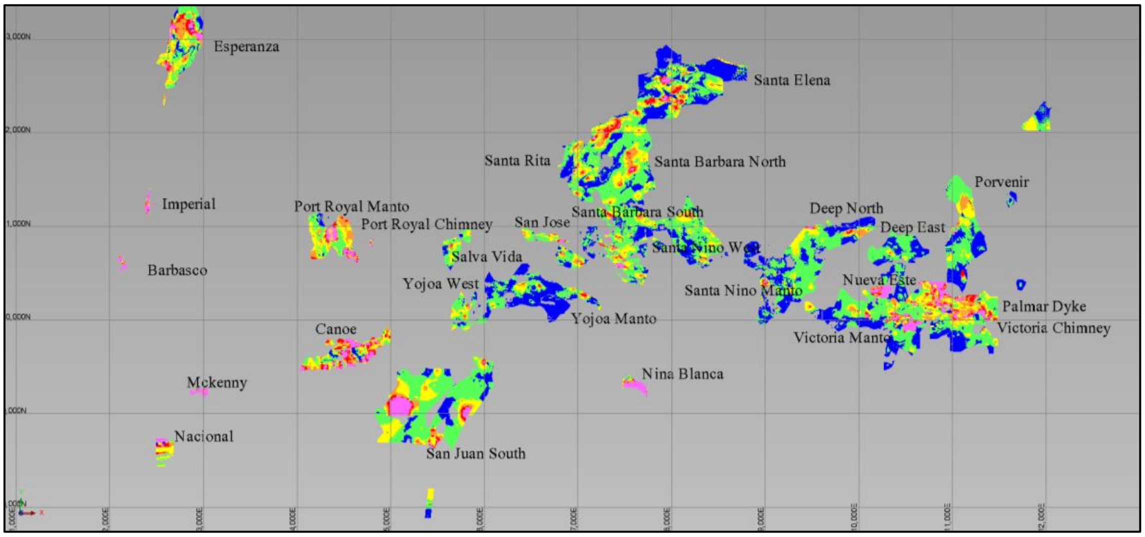
Note: Zn% Legend: < 3 (blue), 3 – 4.5 (green), 4.5 – 6 (yellow), 6 – 8 (orange), 8 – 10 (red), > 10 (pink)

Figure 14.10 – Plan view of Zn% block model grade distribution at 3.1% ZnEq cut-off



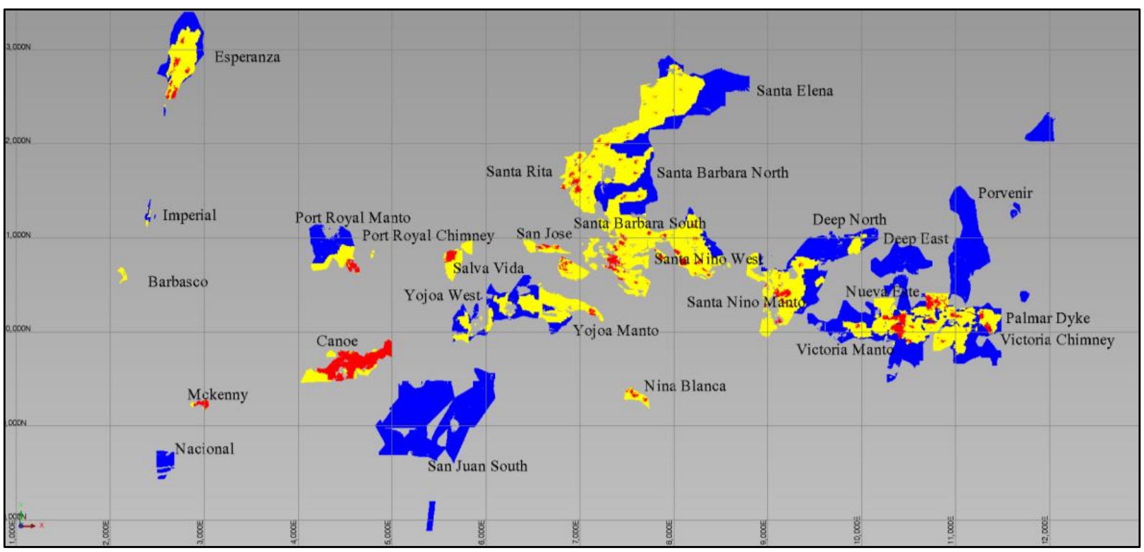
Note: Pb% Legend: < 1 (blue), 1 – 2 (green), 2 – 3 (yellow), 3 – 4 (orange), 4 – 5 (red), > 5 (pink)

Figure 14.11 – Plan view of Pb% block model grade distribution at 3.1% ZnEq cut-off



Note: Ag g/t Legend: < 20 (blue), 20 – 40 (green), 40 – 60 (yellow), 60 – 80 (orange), 80 – 100 (red), > 100 (pink)

Figure 14.12 – Plan View of Ag g/t block model grade distribution at 3.1% ZnEq cut-off



Note: Category Legend: Inferred (blue), Indicated (yellow), Measured (red)

Figure 14.13 – Plan view of mineral resource category distribution at 3.1% ZnEq cut-off

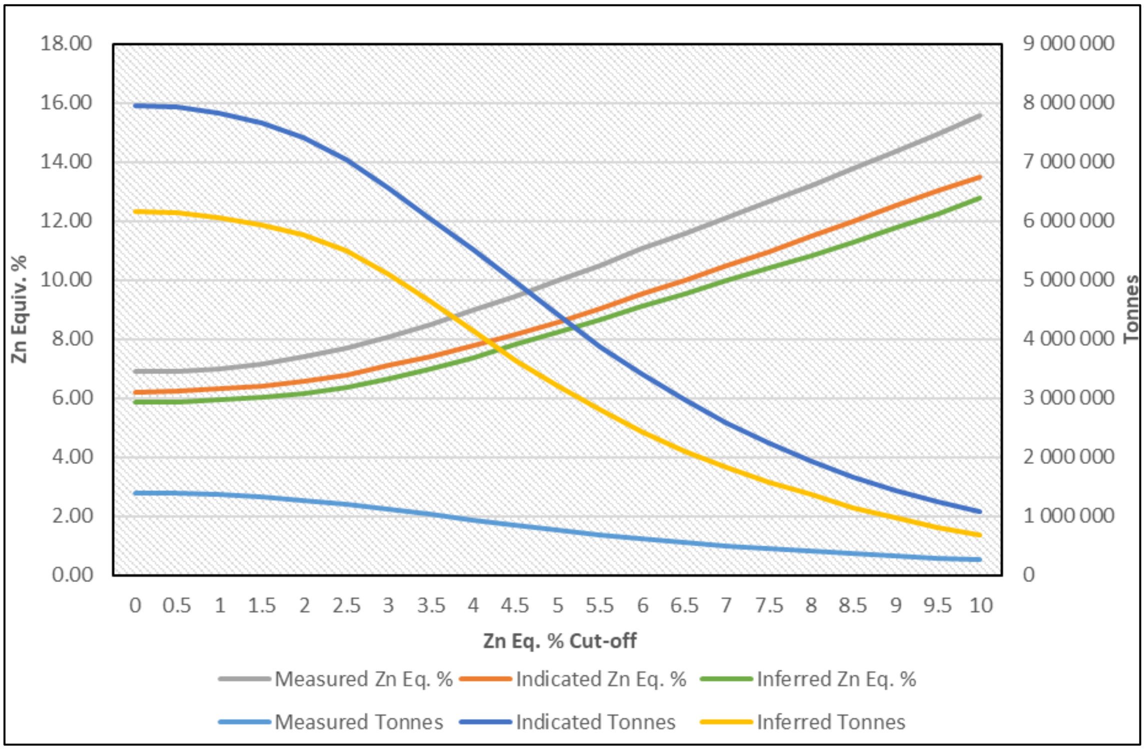


Figure 14.14 – El Mochito mine Zn Eq% grade tonnage chart

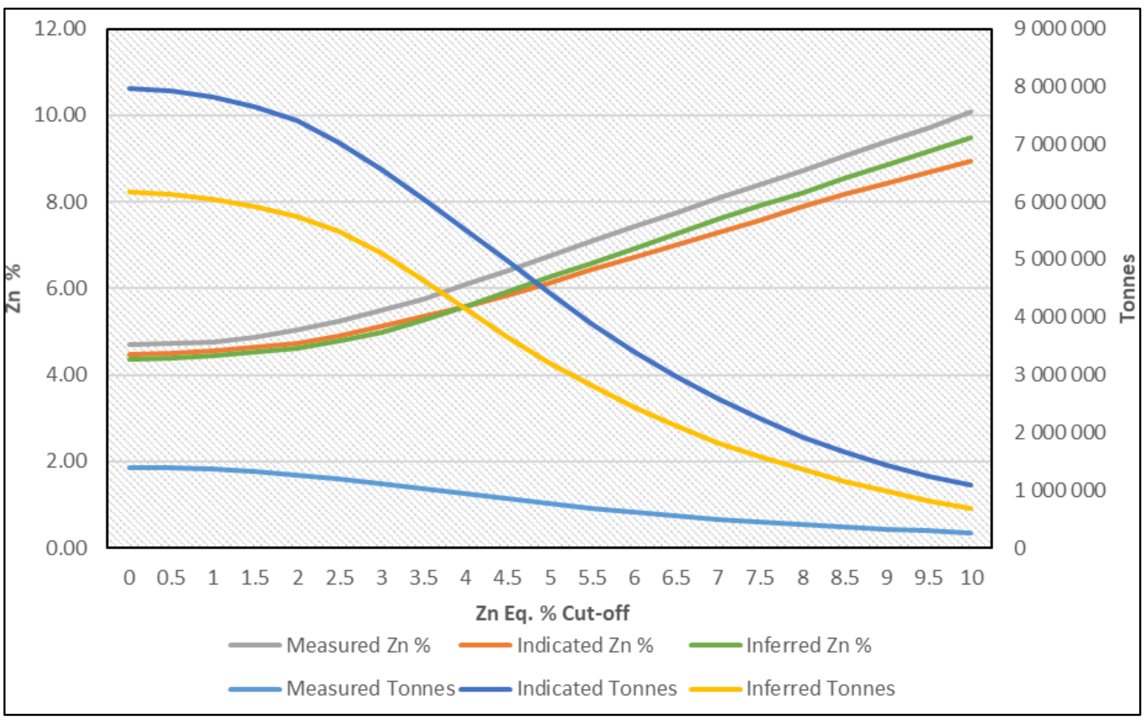


Figure 14.15 – El Mochito mine Zn% grade tonnage chart

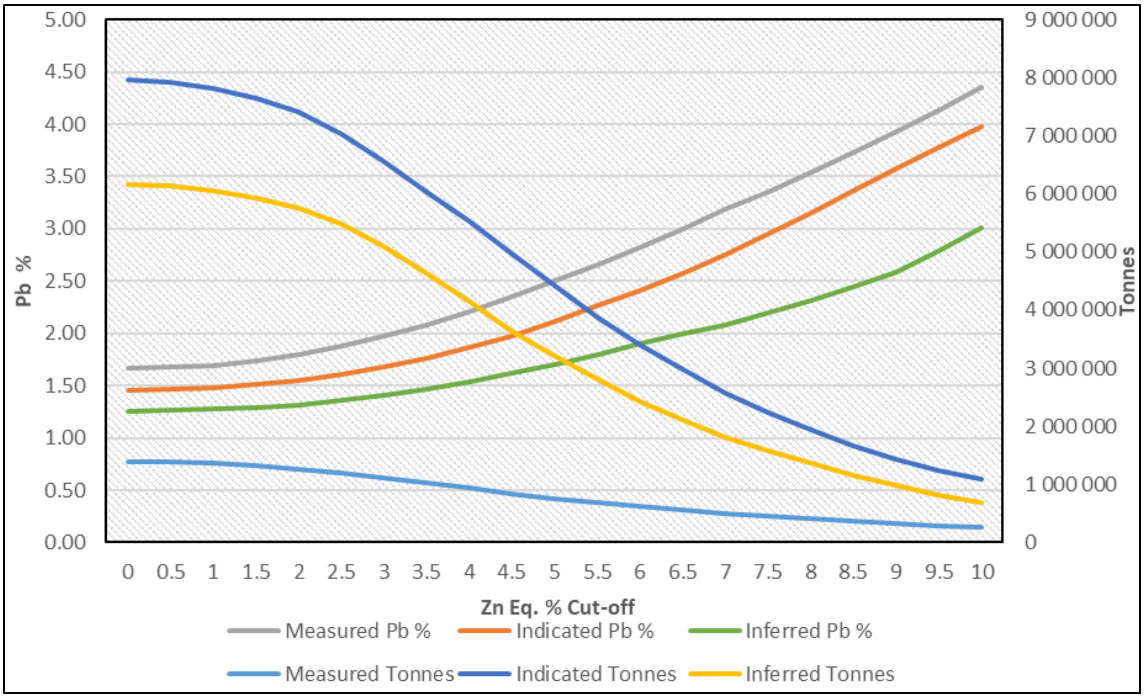


Figure 14.16 – El Mochito mine Pb% grade tonnage chart

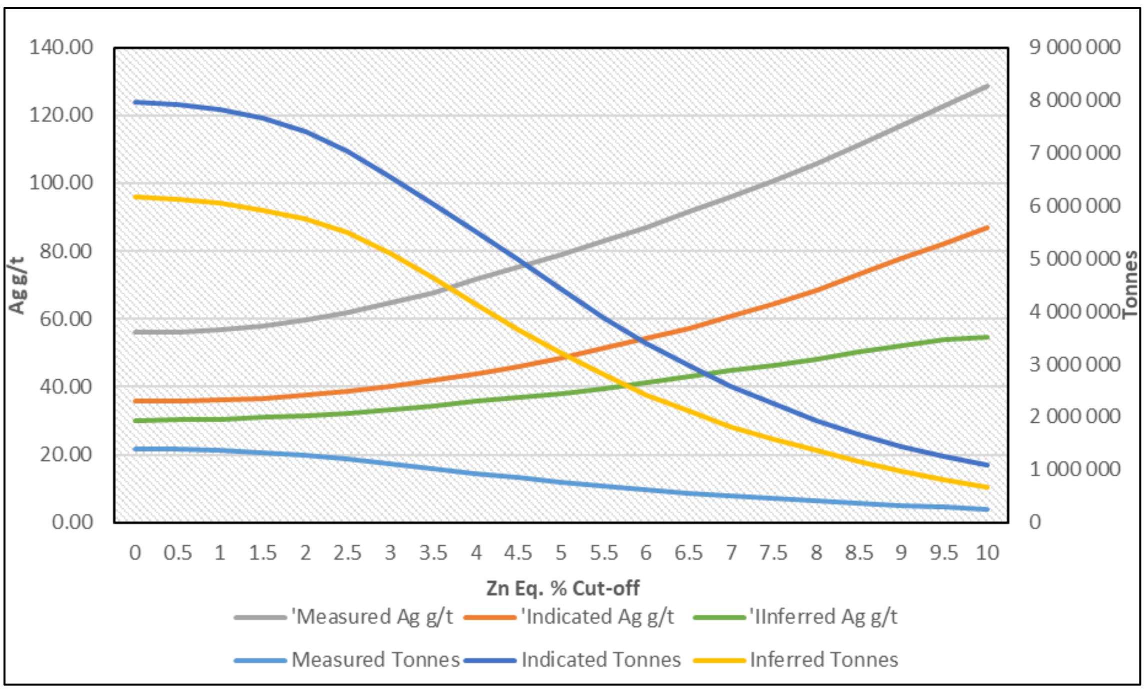


Figure 14.17 – El Mochito mine Ag g/t grade tonnage chart

14.14 Model Validation

Results of block modeling were reviewed in three dimensions and compared on a section by section basis with associated drill hole data. Block grade distributions were deemed to show acceptable correlation with the drill hole data. Visual inspection of zinc, lead, and silver distribution trends also showed consistency between the block model and the independently derived geological interpretations of the deposit. In addition, block model statistics for the combined 27 resource solids were reported and tabulated at a zero cut-off value to facilitate inspection of basic statistical parameters. Results appear below in Table 14.9 and include favorably low coefficient of variation values for all metals.

Block volume estimates for each resource solid were compared with corresponding solid model volume reports generated in Surpac™ and results showed good correlation, indicating consistency in volume capture and block model volume reporting. For each deposit area, average block grade values were compared with the underlying assay composite dataset averages and in all cases, results were deemed acceptable. Mercator also created horizontal swath plots in both northing and easting directions for ZnEq%, tonnage and average assay composite values for selected manto deposits and created vertical swath plots for selected chimney deposits. The resulting spatial distribution trends of the average assay grades and the average block grade values compared favorably in all cases considered.

The inverse distance squared (ID^2) resource model for the Esperanza and Santa Elena deposit areas that are presented in Table 14.8 above were checked using ordinary kriging (OK) interpolation methodology and results appear in Table 14.10. These two deposit areas were selected because of their large sizes, Santa Elena being the largest resource area in the current estimate. Interpolation parameters were the same as those used in ID^2 with the additional required parameters derived from the variography assessment. Results of the OK modeling showed that average grades and tonnage closely match those of the ID^2 model. Results of the two methods are considered sufficiently consistent to provide an acceptable check.

Table 14.9 – Block model zinc, lead, silver, copper, iron, and density block statistics

Parameter	Zn %	Pb %	Ag ppm	Cu %	Fe %	Density g/cm3
Mean	4.41	1.53	38.60	0.08	8.34	3.38
Maximum	35.86	26.43	1886.71	5.15	56.56	4.50
Minimum	0	0	0	0	0	2.50
Variance	7.73	2.69	2771.81	0.02	54.53	0.04
Standard Deviation	2.89	1.64	52.65	0.15	7.38	0.19
Coefficient of Variation	0.63	1.07	1.36	1.88	0.88	0.06
Number of Samples (Blocks)	2,801,748	2,801,748	2,801,748	2,801,748	2,801,748	2,801,748

Table 14.10 – OK check model results using a 3.1% ZnEq cut-off

Area	Category	Tonnes	Zn %	Pb %	Ag g/t	ZnEq%
Esperanza (OK)	Measured	84,000	4.8	1.8	42	6.9
	Indicated	636,000	5.2	2.0	48	7.5
	Inferred	268,000	6.0	1.5	51	8.0
Santa Elena (OK)	Measured	58,000	6.7	1.3	27	8.1
	Indicated	1,364,000	5.7	1.4	29	7.3
	Inferred	742,000	5.6	1.0	22	6.7
Esperanza (ID^2)	Measured	84,000	4.8	1.8	42	7.0
	Indicated	632,000	5.2	2.0	49	7.6
	Inferred	266,000	6.1	1.5	51	8.1
Santa Elena (ID^2)	Measured	57,000	6.6	1.2	26	8.0
	Indicated	1,339,000	5.7	1.4	30	7.3
	Inferred	732,000	5.6	1.1	23	6.9

15. MINERAL RESERVE ESTIMATE

This section is not relevant at this stage of the project. The reader is cautioned that this Preliminary Economic Assessment (the "PEA") is preliminary in nature. The PEA includes Inferred Mineral Resources that are too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA will be realized.

16. MINING METHODS

16.1 Introduction

The El Mochito mine is in its 70th year of operation and the mining infrastructure is expansive. The existing underground workings at the El Mochito mine extend approximately 4,500 m east-west, 1,500 m north-south, and vertically to a depth of 1,500 m from surface (1,300 m below the shaft collar).

The Expansion Project represents a significant opportunity to bring the all-in sustaining costs ("AISC") below 0.97 $/lb per zinc equivalent payable approximately two years after the construction period is complete. This cost figure would support the longevity of the operation and a robust free cash flow even in a sustained lower metals price environment.

The Expansion Project will enable the El Mochito mine to increase the mining and milling capacity to approximately 2,800 tpd (1,000,000 tpy) from 2,200 tpd (750,000 tpy) without significantly interfering with ongoing operations. In addition to increased revenues, another major benefit of the Expansion Project would be a reduction in operating costs from the current 78 $/t milled to an average of 62 $/t milled as a LOM average after project commissioning. The annual contained zinc equivalent ("ZnEq") metal production would average 120M lbs over the life-of-mine ("LOM"). Capital costs to complete the development program have been estimated at $32.8M with a construction period of approximately two years and an expected payback of less than two years.

The three principal aspects considered by the PEA are presented below.

Improving underground mineral transportation

Installing a new subvertical shaft[1] dedicated to rock hoisting will reduce the average underground truck hauling distances by 26% and thus increase additional trucking capacity and production by 26% without the need for additional mining equipment. The new winze (the No. 8 shaft) would connect the deeper portions of the mine to the surface more efficiently. The increase in hauling capacity can be met by the drilling, blasting, ground support and hoisting resources as they are all underutilized due to the bottleneck caused by truck hauling and related congestion in the very extensive and meandering ramps that were originally designed as short-term accesses, not principal hauling routes.

Additional benefits would include shortening the installed services, such as pump lines, compressed air lines, service water lines, power cables, backfill ranges, and so on, as well as significantly improving the regional ventilation network of the mine. The subvertical shaft would be dedicated to rock hoisting operations only; the existing ramp system would be used to move personnel, materials and machines.

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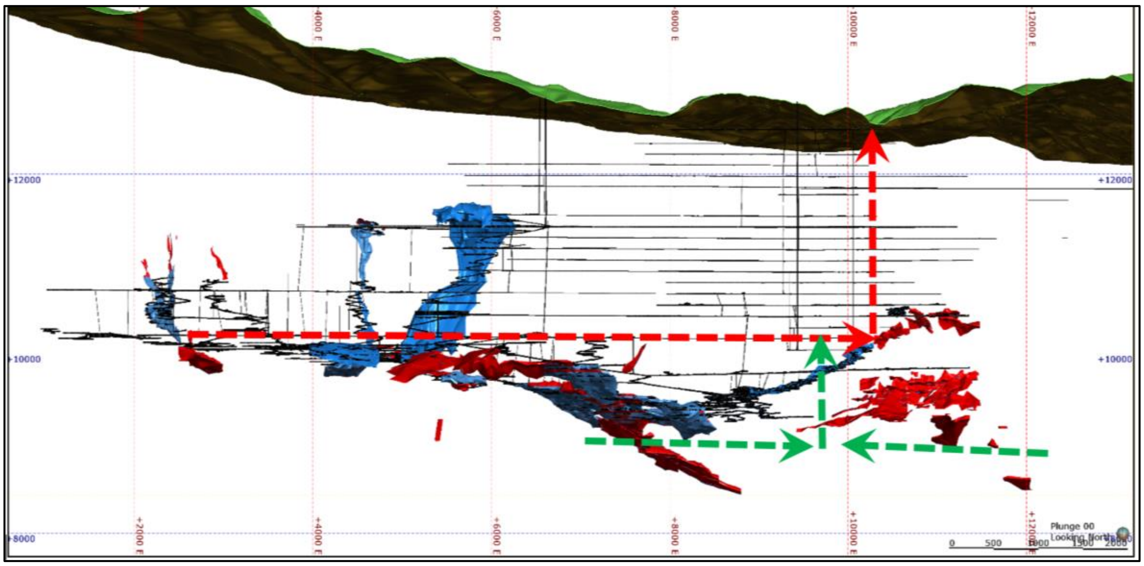
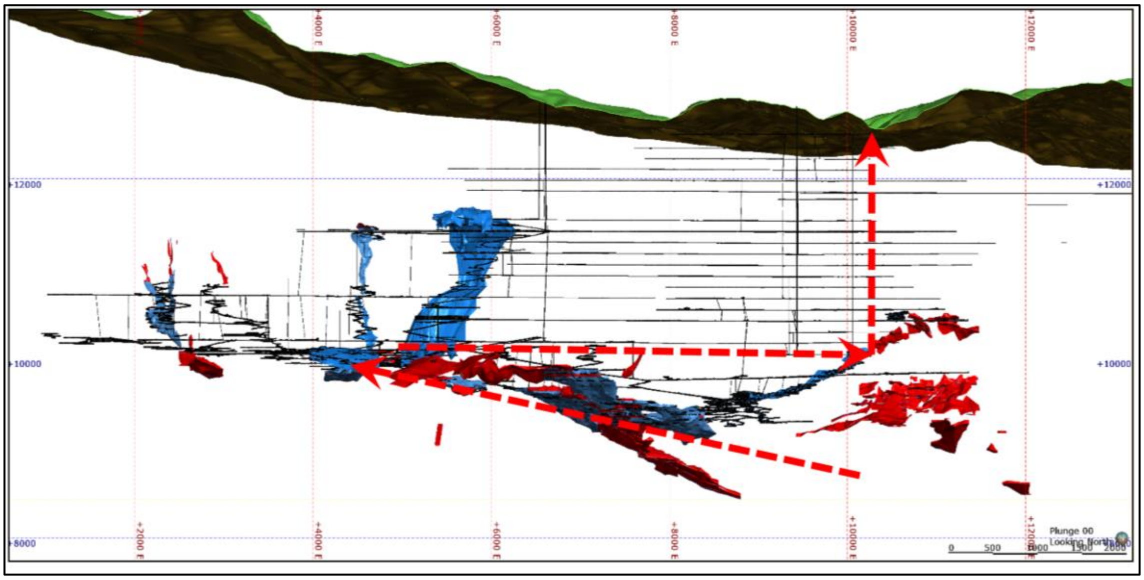
[1] Subvertical shaft or winze: Secondary vertical shaft servicing a deeper portion of a mine, from another shaft reaching the surface, with all hosting arrangement situated underground.

The proposed No. 8 shaft is planned to be situated 120 m (390 ft) from the the existing No. 2 rock-hoisting shaft. It would be excavated between levels 2100L and 3250L to a diameter of 5.1 m using a raise borer for a length of 442 m. The final portion of the shaft between levels 3250L and 3530L (approximately 94 m) would be raise-bored or drop-raised by long hole methods. The two shafts would overlap vertically over two levels, allowing mineralized material to be transported from the bottom of the mine via the new No. 8 shaft to the current No. 2 shaft, considerably shortening the current hauling route from the deeper sections of the mine where most of the mineral resources lie.



Note New horizontal and vertical haulage routes via the No. 8 Shaft are shown in green, original haulage routes in red

Figure 16.1 – Long section looking north of the El Mochito mine showing the impact of the proposed No. 8 subvertical shaft on haulage routes



Note: showing approximate current haulage routes in red

Figure 16.2 – Long section of the El Mochito mine looking north showing current infrastructure and approximate haulage routes

The setup of a new grizzly on 3250L with a crusher below on 3360L would have a nameplate capacity of 2,800 tpd. The subvertical (No. 8) shaft would be equipped with two 6.5 t skips running on rope guides, as well as power cables, backfill piping, compressed air piping, dewatering columns and a service water column. A cross-sectional view of the shaft is shown in Figure 16.3 and Figure 16.4.

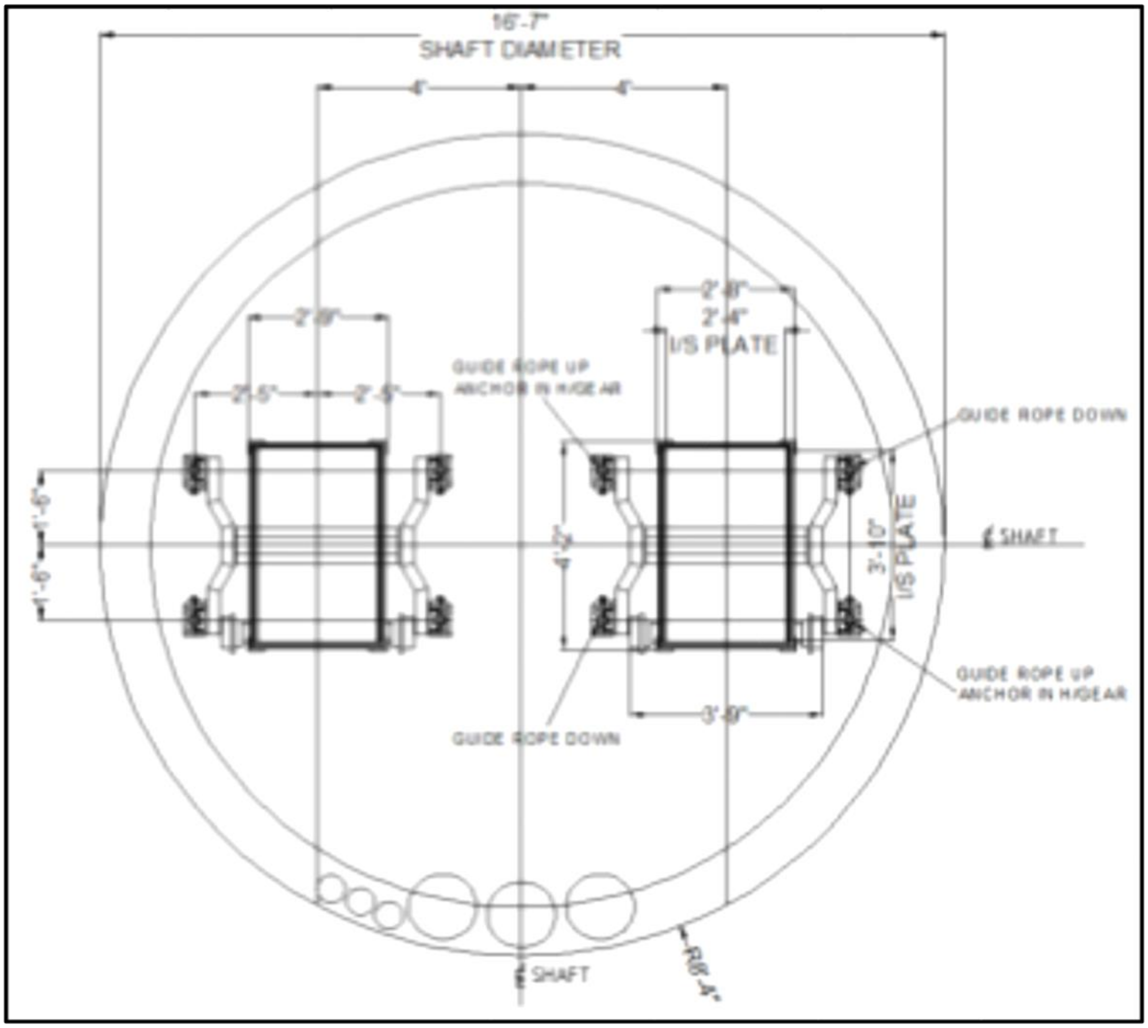


Figure 16.3 – Cross-sectional view of the proposed raise bore internal shaft with two 6.5 t skip assemblies on guide ropes

The diameter of the shaft design was based on the analysis of the rope guide oscillations to ensure adequate spacing between the two skips, including a safety factor. Other design considerations for the shaft diameter included ventilation, geotechnical and installation criteria, requirements and constraints. The position of the various pipes and cables and future access for their maintenance was also considered. See Section 16.2 for details.

Upgrading the underground pumping and water management system

An upgrade in the underground pumping and water management system will lower overhead costs by reducing the number of pumps in operation at the mine, rationalizing pumping columns and installing an effective underground water clarification system to pump clean water, which further reduces abrasion and operational and capital costs related to pumping. See Section 16.3 for details.

16.2 Subvertical No. 8 shaft

16.2.1 Objectives

The primary purpose of the No. 8 subvertical shaft (or winze) is to reduce the underground trucking component and increase the productivity of all equipment used in the mining cycle with no additional purchase in mining equipment.

The diagrams below show the general layout of the No. 8 shaft.

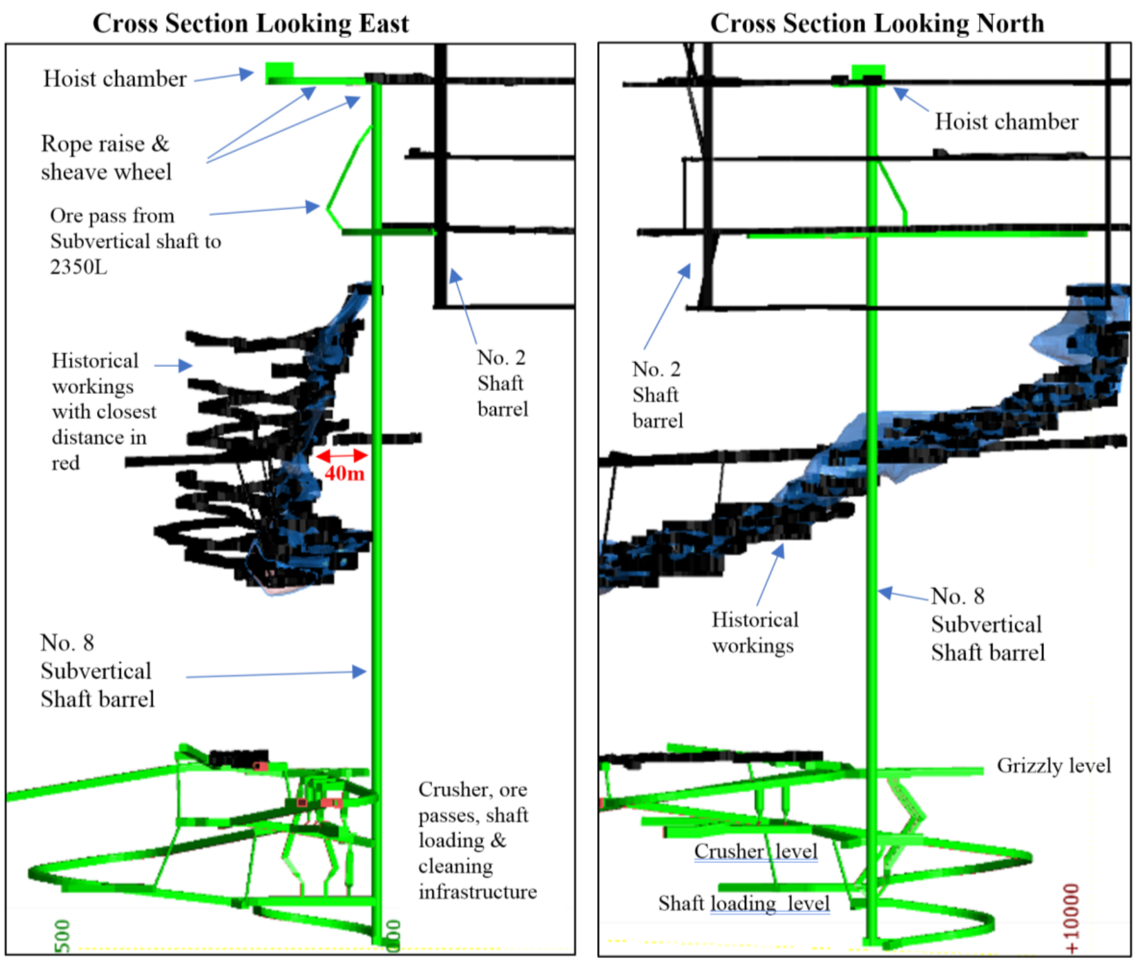


Figure 16.4 – Cross sections east and north of the No. 8 subvertical shaft

As demonstrated in the two cross sections, the new internal shaft will be closely linked with the existing No. 2 shaft rock hoisting system in the east area of the mine. Extending the hoisting depth 442 m, all the transport distances will be shorter for mineral from the deeper sections of the mine, particularly in the deeper east where the majority of the defined mineral resources lie.

The resources that will be positively affected by this new shaft are in eight areas: Santa Elena, Santa Rita, Santa Niño, Santa Niño East, Victoria, Deep East, Deep North and Porvenir. The mineral extracted in the western portion of the mine and above the 2350L level will continue to use the current haulage route.

16.2.2 Layout and mining sequence of the No. 8 shaft

The new subvertical shaft will be excavated from 2100L to 3250L by means of a raise-bored hole with a diameter of 5.1 m, piloted by a directionally drilled hole. Cleaning of the raise-bore hole will be by scoop and truck through the access gained by mining a 70 m crosscut from the existing ramp on 3250L. A hoist chamber will be mined on 2100L with the sheave wheels being installed on the 2100L shaft collar. On the 2350L haulage level, an orepass will be mined conventionally intersecting the shaft barrel just above 2250L where the shafts skips will be tipped. A new crosscut will be mined from the existing 2350L haulage to establish a station in the new shaft. This station will be used to construct the shaft equipping stage and later for providing service access service access and underground workshop for skip replacements and repairs. Skips for the subvertical shaft will be brought down the No. 2 shaft and slung onto 2350L, before being transported to the 2350L station on the No. 8 internal shaft for slinging and installation. All steelwork, cables and pipes will also follow this route for installation during the construction phase.

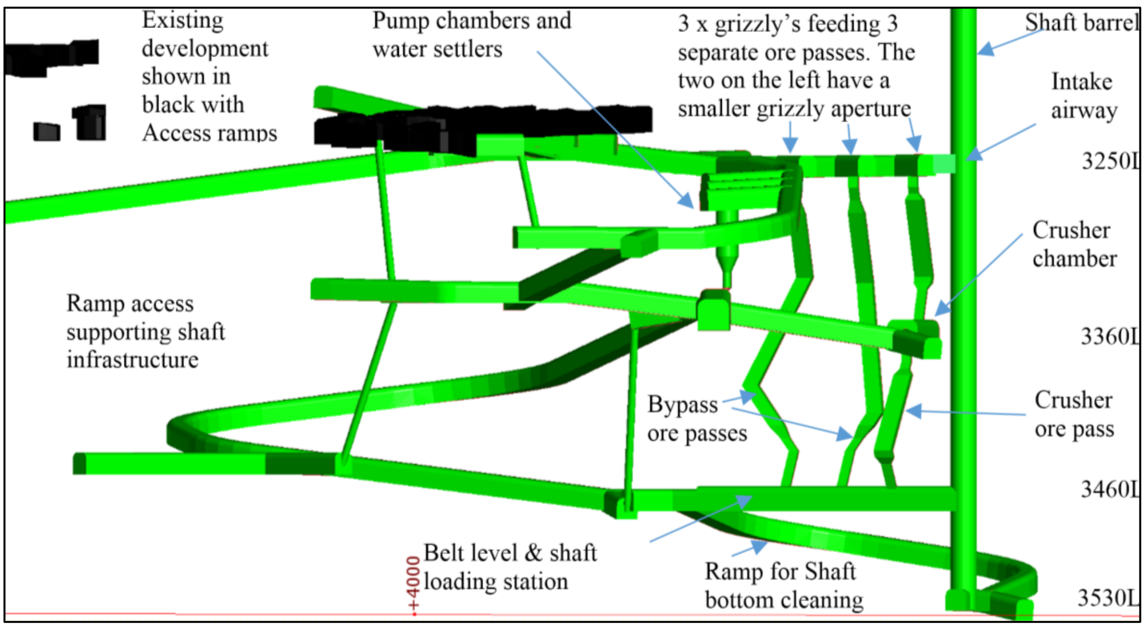


Figure 16.5 – View of the bottom of the of the proposed subvertical No. 8 shaft, looking east

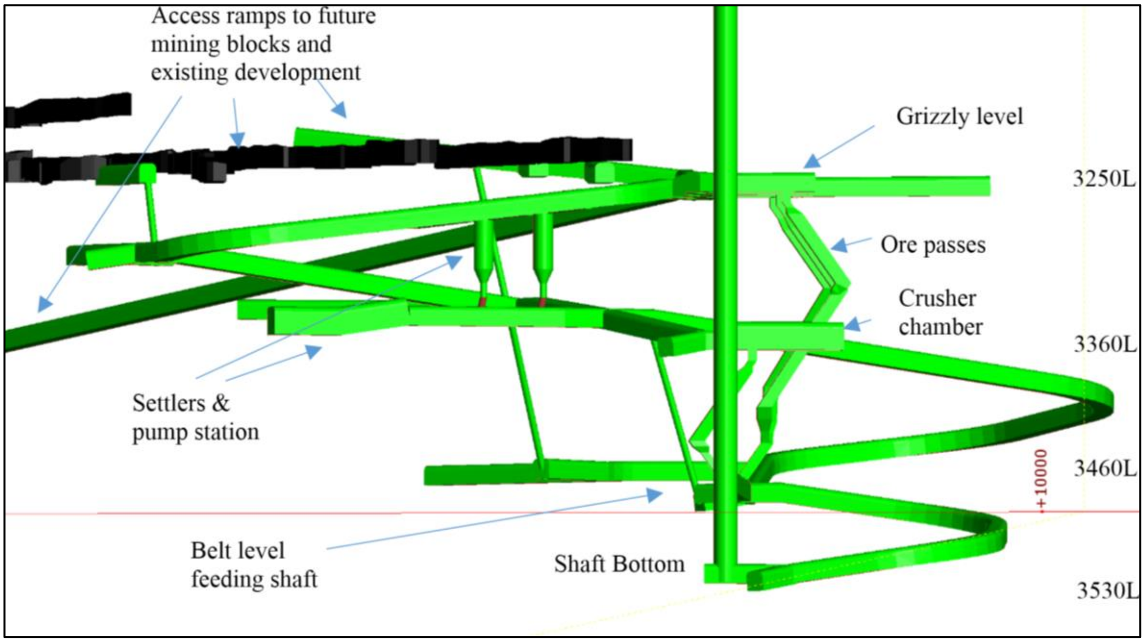


Figure 16.6 – View of the bottom of the No. 8 subvertical shaft bottom, looking north

While the raise boring of the main shaft barrel is taking place, development of the ramps will continue to the crusher level, pump stations, belt level and shaft bottom. All large excavations in this area will be mined from ramps using trackless machines, and in the case of the vertical settlers, by conventional raising and widening of the openings. The shaft barrel will be mined between the shaft bottom and the grizzly level from the bottom upwards in two lifts. The first lift will be done by conventional raising or Alimak and then slashed out to full shaft diameter and will stretch a vertical distance of 64 m (210 ft) from the belt level (3460L) to the grizzly level (3250L). The second lift will be mined by drop raising the last portion of the shaft between the belt level and shaft bottom. This represents a distance of 30 m (90 ft) and cleaning would be done throughout the ramp at the shaft bottom.

This mining sequence permits concurrent mining of the upper and lower portions of the shaft and also concurrent equipping of the upper shaft until the lower part of the shaft is holed into 3250L, all of which considerably shortens the construction period. The raise boring of the shaft will be outsourced to a suitable contractor, while the mining of the various ramps, orepasses and chambers will be conducted by a combination of owner-operated teams and contractors. The entire project, including equipping and commissioning, will be managed by a qualified project manager.

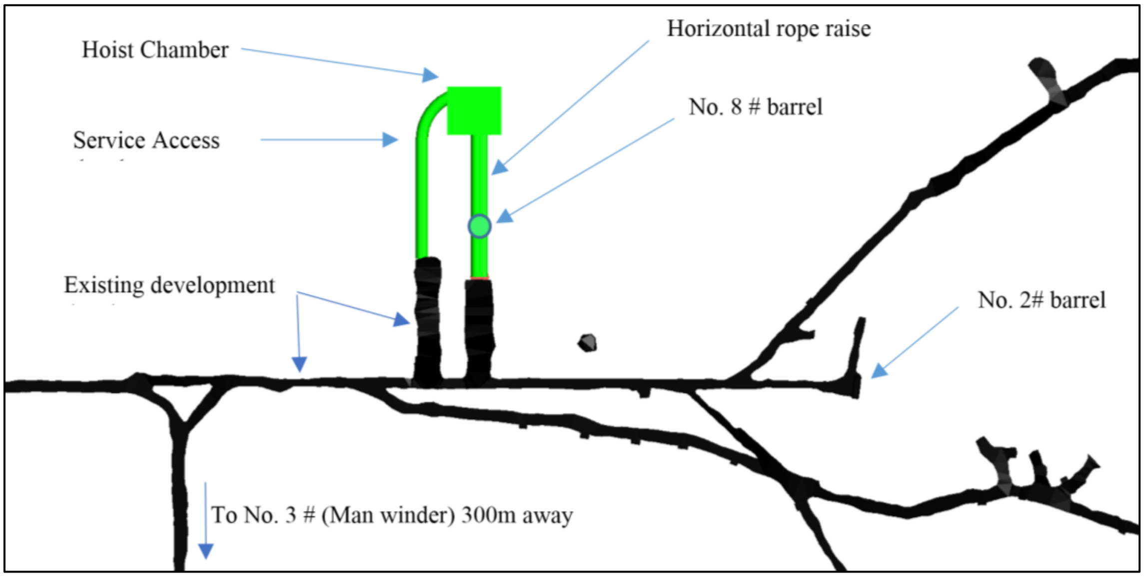


Figure 16.7 – Plan view of 2100L showing the positions of the No. 8 shaft, hoisting chamber and No. 2 main shaft

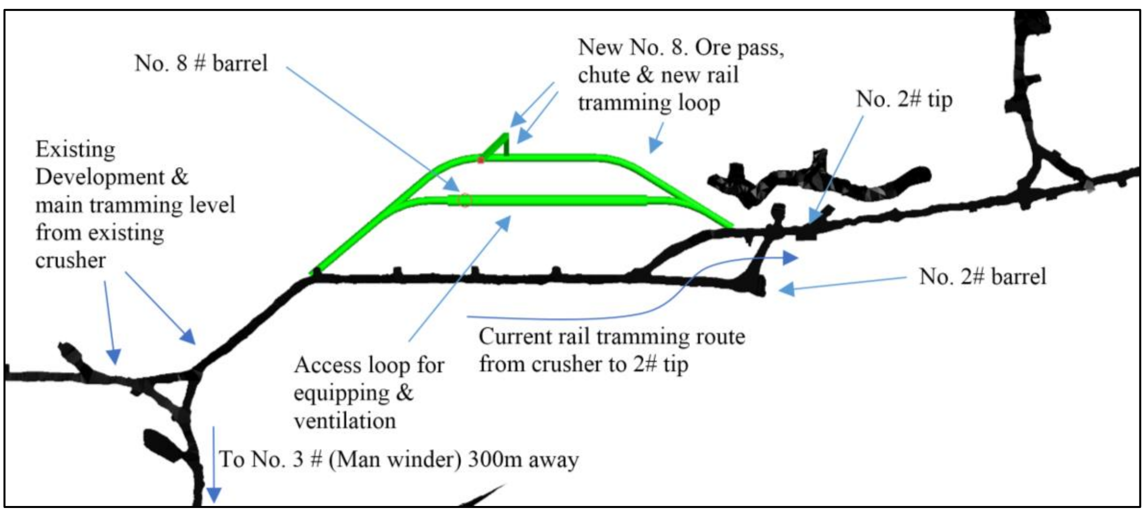


Figure 16.8 – Plan view of 2350L showing the positions of the No. 8 shaft and new tramming loop

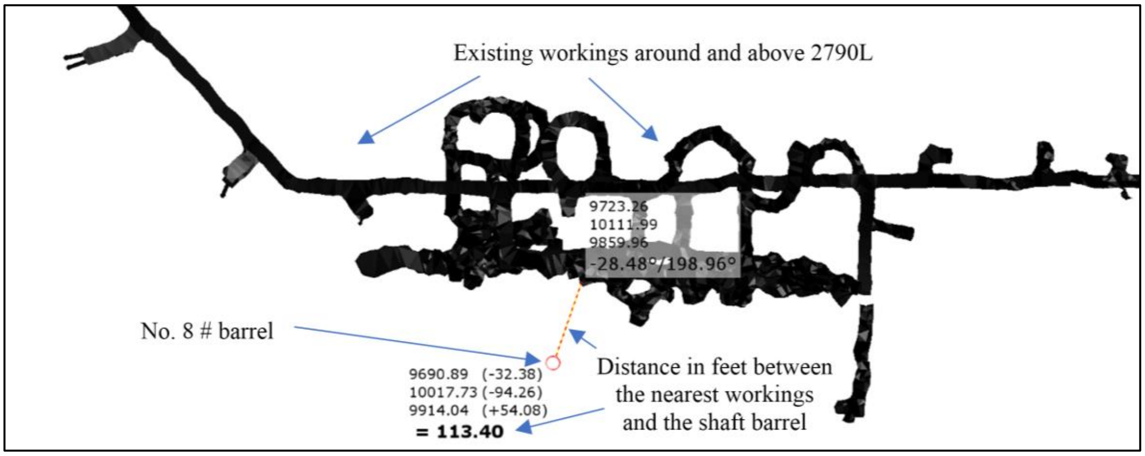


Figure 16.9 – Plan view of 2790L showing the positions of No. 8 shaft, measured proximity of old stoping in feet from the shaft barrel (113 ft / 35 m)

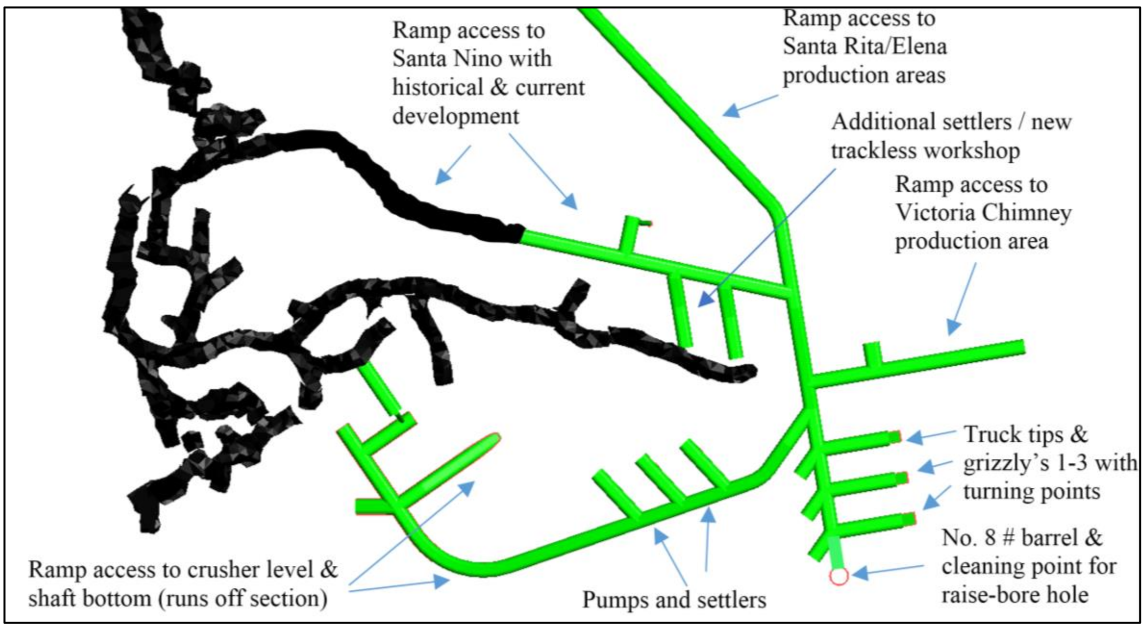


Figure 16.10 – Plan view of 3250L showing the positions of the No. 8 shaft, truck tips, pumping chambers/settlers and shaft access ramps

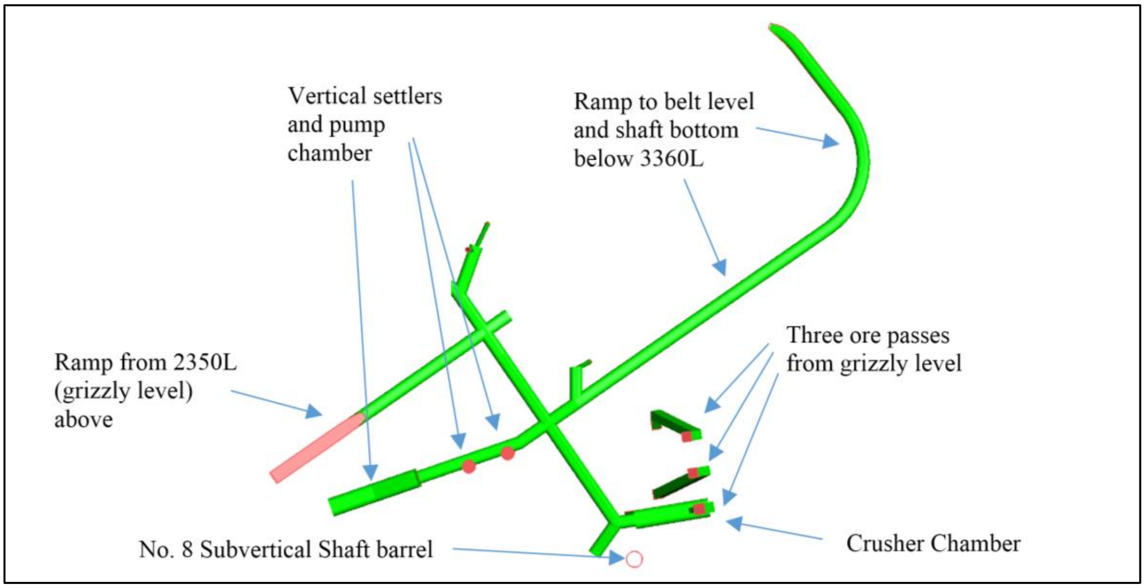


Figure 16.11 – Plan view of 3360L showing the positions of the No. 8 subvertical shaft, crusher chamber, pump/settler chambers and shaft access ramps

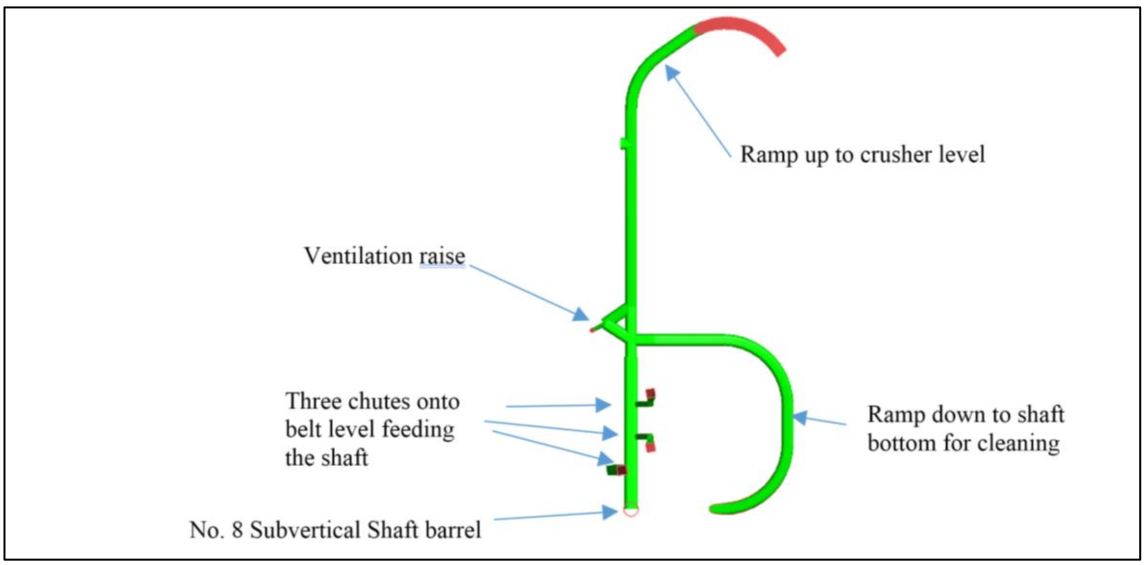


Figure 16.12 – Plan view of 3460L showing the positions of the No. 8 subvertical shaft, belt level and access ramps

16.2.3 Mineral movement between No. 8 and No. 2 shafts

Mineral will be tipped by truck into one of three available grizzlies on 3250L. The first grizzly will lead to an orepass with 500 t capacity feeding the underground crusher which will be situated on on 3360L. A second orepass, also with 500 t capacity, leads from below the crusher to the belt and skip loading level on 3460L. The two other grizzlies with smaller apertures bypass the crusher and feed directly onto the shaft loading belt through separate chutes situated on 3460L. They will have a combined capacity of 1,500 t and can be used during crusher maintenance or as an alternative storage area for hoisting if the need arises, for example, if waste is required to be hoisted at some point. Mineral will be loaded into two 6.5 t skips via a measuring flask and hoisted just above 2225L along rope guides by the double drum hoist which will be installed along with its rope raise and sheave wheels all on 2100L. At the loading pocket, the skips will be held in place by steel guides, in addition to the rope guides.

Above 2225L, the skips will run into a steel guide system enabling them to discharge into an orepass connecting to a hydraulic chute discharging into a bypass loop to be mined close to the subvertical shaft on 2350L. This is also the current locomotive tramming level. Mineral can then be transferred horizontally on a distance of 200 m to the existing No. 2 shaft stockpile bin by rail locomotive and 6 t cars. It will then be hoisted to surface the usual way through the No. 2 shaft, which has a maximum capacity of over 3,400 t.

Between 61% of all Measured and Indicated Resources and 45% of Inferred Mineral Resources (64% as a combined weighted average) is likely to report through the No. 8 shaft system once commissioned (Table 16.1). The balance would report either directly to the No. 2 shaft or, if coming from the western side of the mine, through the existing crusher and belt system in the 2350L-2450L San Juan area, and then railed to the shaft by the same rail system in the normal manner. This rail system would have a reduced tramming requirement and reduced operating cost which has not been calculated at this time.

Table 16.1 – Tonnage of mineral resources likely to be mined through the new No. 8 shaft by area[3,4]

Area	MEASURED AND INDICATED kt	INFERRED kt
Mineral to be mined through existing route		
Barbasco	5	-
Canoe	345	-
Esperanza	668	4
Esperanza	48	262
Imperial	10	11
McKenny	26	-
Nacional	-	39
Niña Blanca	61	-
Nueva Este	94	-
Palmar Dyke	398	65
Port Royal Chimney	12	-
Port Royal Manto	132	210
Salva Vida	121	-

	MEASURED AND INDICATED	INFERRED
San Jose	169	-
San Juan South	455	714
Yojoa Manto	157	33
Yojoa West	238	203
SUBTOTAL	**2,937**	**1,541**
Percentage of Total	**39%**	**20%**
Mineral to be mined though No. 8 shaft		
Deep East	-	296
Deep North	86	236
Porvenir	-	928
Santa Barbara North	466	358
Santa Elena	1,395	732
Santa Nino Manto	603	115
Santa Nino West	421	42
Santa_Rita	346	16
Victoria Manto	702	308
Victoria	595	400
SUBTOTAL	**4,615**	**3,431**
Percentage of Total	**61%**	**45%**
TOTAL MINERAL RESOURCES	**7,553**	**4,972**

3 - Refer to item 0 for the full details on the mineral resources

4 - The Inferred Mineral Resource in this table have a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.

16.2.4 Energy requirements

The mine's electrical department has planned some improvements to the power distribution. These consist of removing cable #13 from the Bonanza ventilation raise (from surface to 2350L) and replacing it with a new cable passing through the No. 2 shaft and the nearby No. 3 shaft, which is also used for hoisting personnel and material.

This work also makes it possible for the mine to supply the extra power required by the addition of the new internal shaft (No. 8). An estimated additional 3 MVA will be required in the mine to operate the following:

1. The double drum winder and Hepburn winches for the No. 8 shaft on 2100L
2. The new pump station and settlers on 3350L close to the new shaft
3. The crusher on 3360L
4. Belt level, surge bins and loading flasks on 3460L
5. shaft bottom pumps on 3530L

The cable must be removed so that the Bonanza raise-bored hole can then be used to lower the winder and other large material and equipment for the No. 8 shaft as described in the next section.

16.2.5 Large equipment logistics

The rectangular No. 2 and No. 3 shafts from surface are very limited in size. It is not possible to lower equipment with a cross section larger than 1.37 m x 1.30 m (54 in x 51 in). To date, the mine has resorted to stripping down all large trackless equipment into smaller pieces, lowering these into the mine and then rebuilding the machines in the main underground workshop approximately 820 m underground and 2 km to the west of the No. 3 shaft.

Unfortunately, this practice will not be possible for some of the equipment to be used in the construction and operation of the No. 8 shaft.

An alternative solution was developed by mine personnel to accomodate larger equipment such as the raise bore machine, reamer head and the new hoist. The result is the so-called "Bonanza raise bore hole" that connects the surface to 1100L. It has a diameter of 2.74 m in diameter and is equipped with a single drum hoist (Figure 16.13).

The planned hoist chamber on 2100L can be accessed via a ramp system from 1100L to 2100L, and then a horizontal haulage. The raise bore machine and hoist can be broken down into pieces small enough to fit be lowered through the Bonanza raise bore hole to 1100L and from there transported by truck and rail into their final position on 2100L.

The Bonanza hoist is being commissioned as a single drum hoist with a capacity of 16 t for hoisting and lowering equipment and material. The hoist operates at a velocity of 0.12 m/s, which is suitable for lowering heavy equipment. Equipment and containers not exceeding 1,600 mm x 1,600 mm or pieces of equipment not exceeding 2.4 m in diameter can be lowered down this shaft to 1100L. This level will be able to receive, handle and transfer all equipment and material coming down this route and continuing to lower levels by using the main ramp joining levels 1100L, 2100L and 2350L.

Figure 16.13 – Shaft headframe installed over 2.7 m borehole - Bonanza raise bore hole (shaft) to 1100L

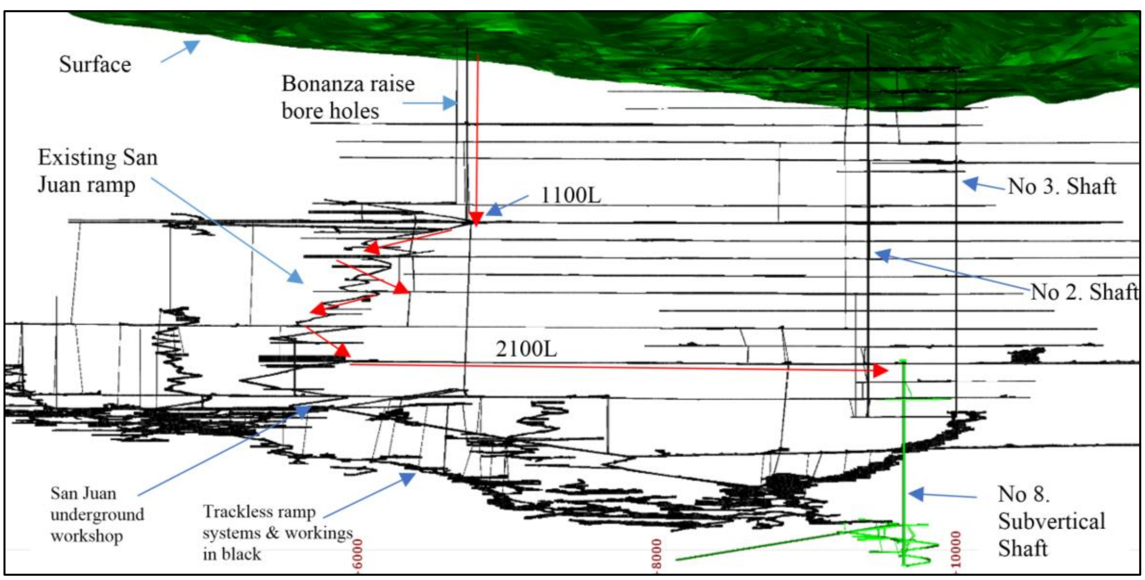


Figure 16.14 – Long section of the El Mochito mine, looking north, showing the Bonanza route to be used for lowering large equipment (hoist, raise bore parts, etc.) from surface to the new No. 8 shaft

16.2.6 Impact on ventilation

Ventilating the El Mochito mine remains a challenge and top priority. The new No. 8 shaft will enable the ventilation areas to be completely reconfigured to allow more fresh air down the No. 2 and No. 3 shafts and up the Bonanza shaft. This will have the effect of increasing ventilation volumes throughout the mine as shown in the following two figures.

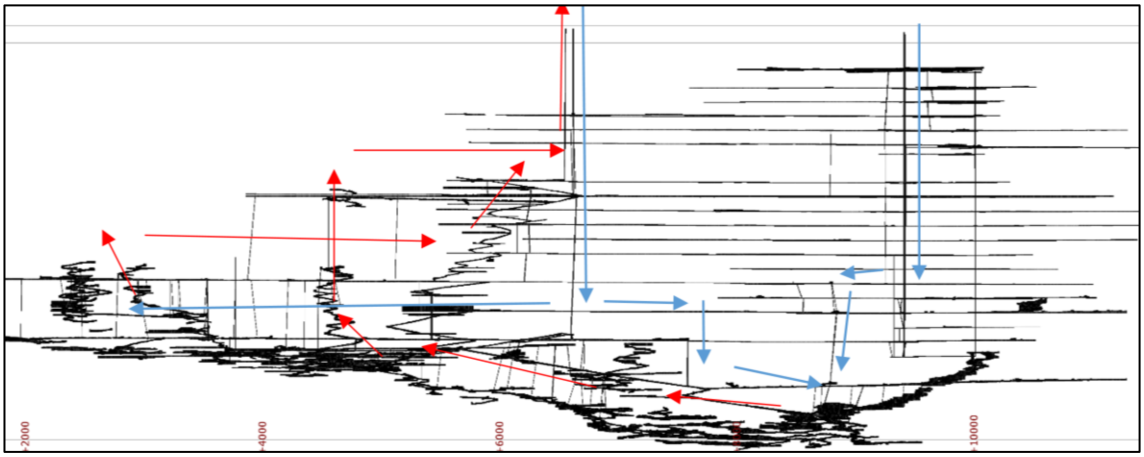


Figure 16.15 – Long section of El Mochito mine showing a simplified, existing mine ventilation network.

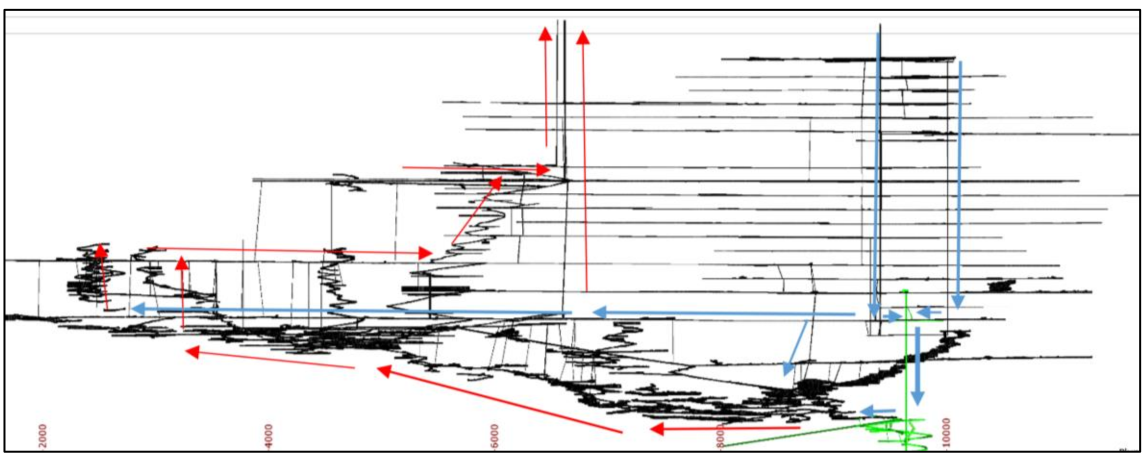


Figure 16.16 – Long section of El Mochito mine showing the proposed mine ventilation network, including the No. 8 shaft infrastructure

16.3 Upgrade in Pumping and Water Management System

The other main focus of the PEA Project is an upgrade in pumping capacity and water management. The mine currently pumps 750 L/s (12,000 gpm) through a series of pumps to a 3.9 km long drainage tunnel on 650L before being treated and released into the environment. The objectives of these upgrades are the following:

- Increase the pumping capacity from 750 L/s (12,000 gpm) to over 1,100 L/s (18,000 gpm), thereby reducing the risk of flooding a portion of the mine.
- Rationalize the number of pumps in use and simplify the existing system to reduce costs and improve efficiencies. The new system would run from the very bottom of the mine (3350L and 2100L) to the discharge elevation on 650L (Caliche Drainage Tunnel), thereby freeing up the historical system by pumpingcleaner water.
- Provide a new, completely independent pumping system from the existing system so that both can run in parallel at maximum capacity if needed
- Provide a level of redundancy with the two independent pumping lines to make future pumping increases possible. Additional pumps could be installed to run on a standby basis to cover maintenance needs without affecting the water volumes being pumped.

Figure 16.17 below shows the simplified layout and the proposed configuration for the new water management system.

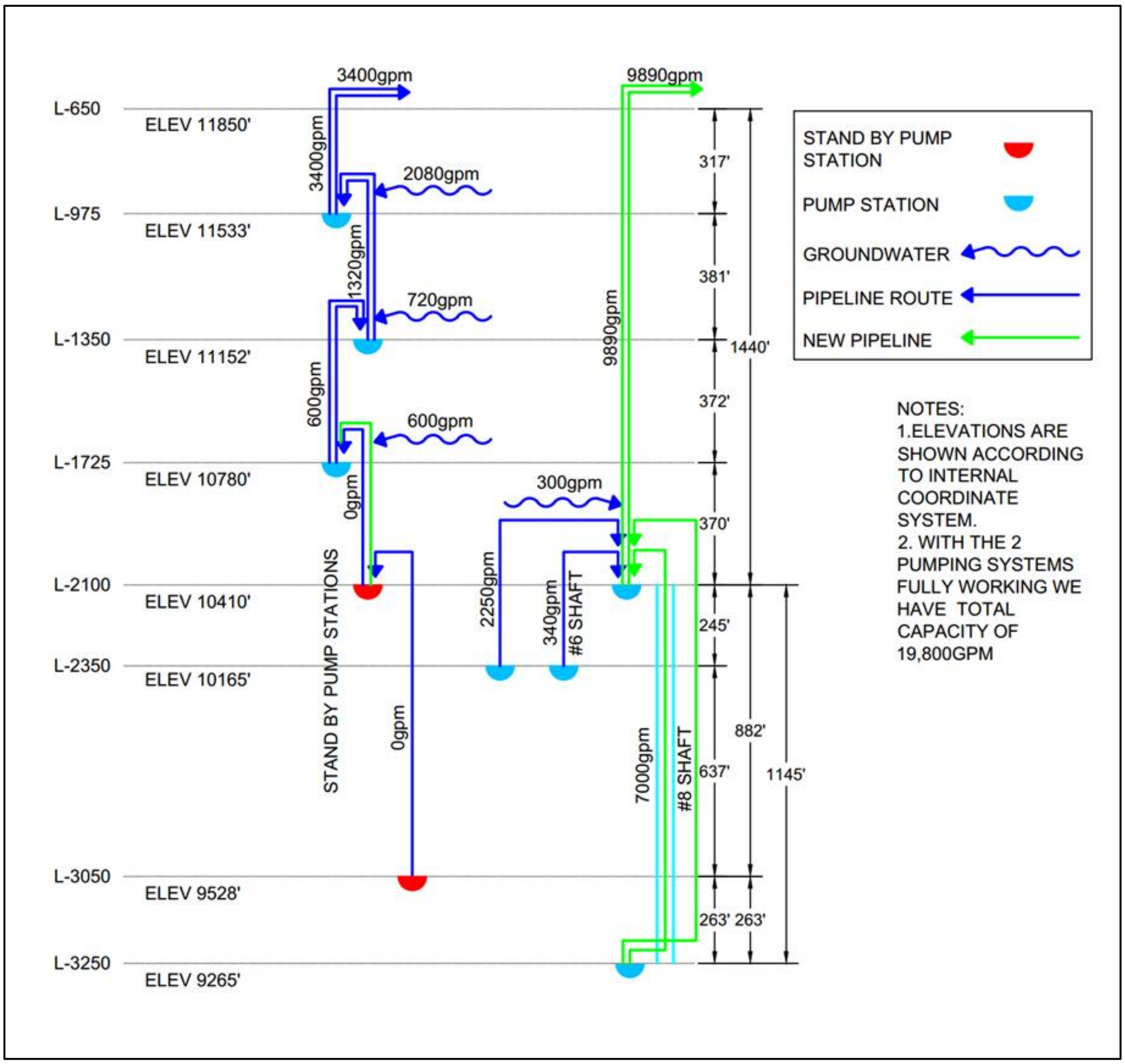


Figure 16.17 – New water configuration, Phase II, El Mochito mine

16.3.1 New pump station – 3350L

Install a new main pump station on 3350L, with an independent 18" line leading directly to 2100L, 291 m (1,250 ft) above, bypassing the pump stations on 3050L, 2680L and 2500L/2450L. This would be the new deepest pump station, situated 55 m (180 ft) above the No. 8 subvertical shaft bottom. This pump station would have a designed capacity of 221 L/s (3,500 gpm), with a spare 221 L/s (3,500 gpm) standby capacity for a total of 441 L/s (7,000 gpm).

16.3.2 New pump station – 2100L

A new high-lift pump station on 2100L would bypass the pumps of other stations on the four intermediate levels between 2100L and 975L. A new, independent 457 mm (18") steel line would bypass the line of pump stations and discharge directly into the Caliche Drainage Tunnel on 650L, a vertical distance of 442 m (1,450 ft). Later, a second 457 mm (18") line would be installed, bringing up the potential capacity and used as a spare.

Both new pump stations would be installed with water clarifying systems and mud pumps for cleaning the water settlers.

16.3.3 Water clarifiers

It is proposed that large, industrial water clarifiers be installed in two main areas of the mine. The first and largest clarifier tank would be positioned at the proposed new pump station near the bottom of the No. 8 shaft with a 221 L/s (3,500 gpm) capacity. Excavations would be planned and mined to allow the capacity to double to 441 L/s (7,000 gpm) in the future.

The second clarifier tank would be installed at or near the new 2100 L pumping station near the top of the No. 8 shaft with a capacity to treat 221 L/s (3,500 gpm) of dirty water coming in from the intermediate depths of the mine.

A common rule of thumb is that a pump running water with 30 ppm solids will have a service life in excess of over 30,000 hours, while a pump running over 150 ppm of solids has a service life of only 3,000 hours due to abrasion. The El Mochito mine typically spends between $2M/y and $3M/y on refurbishing and replacing its pumps. This cost could be significantly reduced if the pumped water is clean.

Additional benefits of underground clarifiers, apart from pumping clean water, would likely be the decommissioning of the environmental settling ponds at the Caliche Drainage Tunnel before the water discharges into the receiving environment. The positive impact of having clean water arrive at surface from underground would be significant from an environmental and social perspective.

16.4 Mine Access

El Mochito is an underground mining operation with primary access to the underground workings via the No. 2 and No. 3 vertical shafts. The No. 2 shaft, from surface to the 2475L (754 m below the shaft collar), is used for mineral hoisting. The No. 3 shaft, which also bottoms at 2475L, is used for waste hoisting and for personnel and material transport. Primary access to the main San Juan underground workshop is via the railed

2350L haulage (-716 m). A series of ramps connects the San Juan workshop to the lowermost workings. A historical ramp from 1100L to 2350L is maintained as a secondary access and airway. A system of ladderways and platforms in raises through the historical part of the mine, separate from the shafts, serves as an emergency escapeway from 2350L to surface.

Services, including power, compressed air and water, run through a network of raises and boreholes formed by the combination of the two shafts. Horizontal development is trackless with several ramps systems for each working area. Raise bore holes with diameters ranging from 2.4 m to 2.8 m extend from surface to the underground workings. In the mine, smaller raise bore holes are developed for ventilation purposes. A sandfill system used for backfilling open stopes is connected at a batch plant on surface and the fill is distributed via a piping system and ranges to where it is required to be placed.

The Expansion Project covered by this PEA does not change the principal accesses to the mine. The surface infrastructure layout remains the same apart from a few changes to the surface crushing and process milling arrangments. As detailed in Section 16.2, the changes apply to the underground operation only.

16.5 Geotechnical Considerations

A geotechnical report entitled "*Technical Note – NI Report for the El Mochito mine*" was prepared and submitted on October 19, 2018. This report was prepared by Ingeroc SpA based in Las Condes Santiago de Chile (www.ingeroc.com). This document has been prepared mainly from information provided by the El Mochito staff and the impressions of the author during a field visit in September 2018.

16.5.1 Deposit characteristics

The El Mochito mine extracts its mineralized material from a deposit that has been classified as a distal skarn, dominated by Zn-Pb mineralization. Its mineralization, described as polyphased with a complex history, is strongly controlled by its structural setting within the Mochito Graben.

Mineralization occurs as both bedding concordant near-horizontal sills (mantos) and near vertical chimneys, with this last type usually starting from mantos and in some cases, also finishing on mantos at upper levels. The cylindrical to tabular chimneys evidences contains higher than average grades of silver and a Pb:Zn ratio of about 1, whereas the mantos, many times larger in footprint than the chimneys, have a lower overall grade with a highly variable distribution that renders some portions non-economic, and a Pb:Zn ratio of <1. According to the mine production projections for 2018, the two types of mineralized environments (manto and chimney) are represented in roughly equal proportions. Figure 16.18 shows a perspective view of the mine and mineralized bodies.

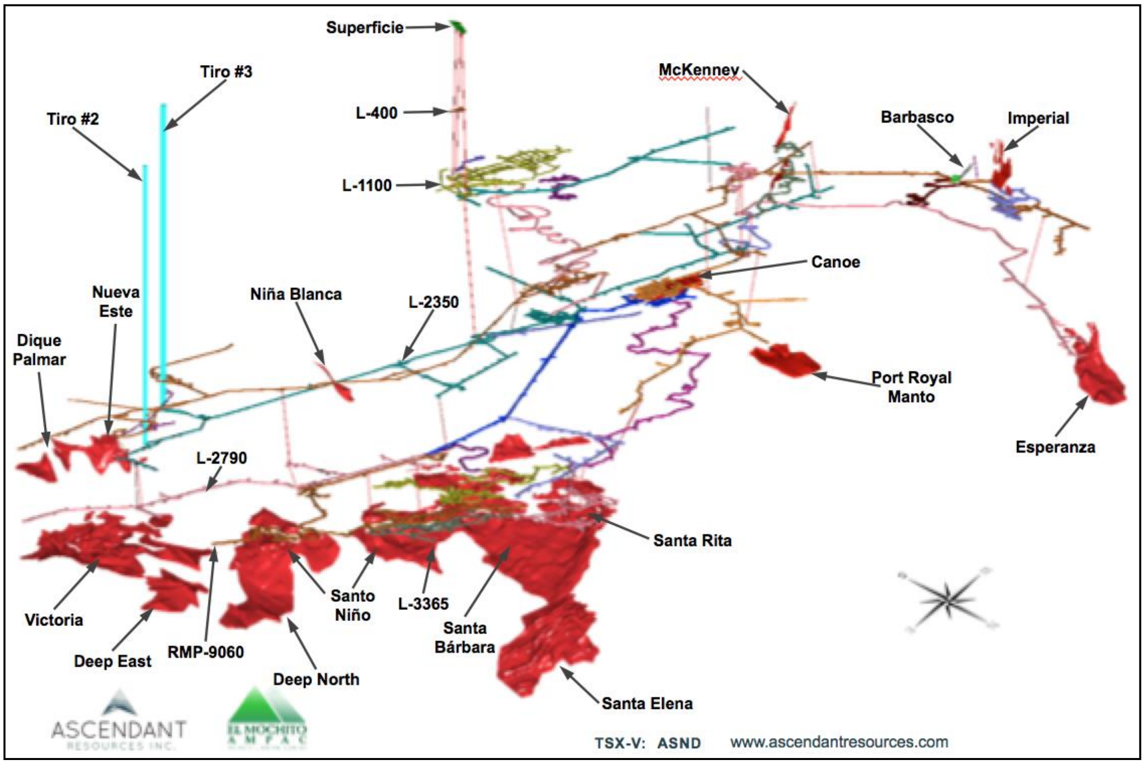


Figure 16.18 – Perspective view of the mine infrastructure (looking southwest) showing the main mineralized zones (red) in the 2018 budget (exploration and production)

16.5.2 Geotechnical laboratory tests

A laboratory test campaign developed by Rocklab (South Africa) has recently been completed. The campaign consisted of five uniaxial compression strength ("UCS") tests with elastic modulus and Poisson's Ratio (ν) measurements, using one sample for each geotechnical unit (Caliza, Todos Santos, Skarn Mineral and Dike), and 20 triaxial tests, four per unit, considering confining pressures of 10, 20, 30 and 40 MPa.

UCS tests results range between 77 MPa for Caliza, up to 295 MPa for Dyke, and the values of the other unit range between 109 MPa and 166 MPa showing that they have a rather competent intact rock strength. This author has recommended that additional laboratory tests be run at certified laboratories, including at least 10 UCS, 15 triaxial, 10 indirect tension and 5 direct shear tests per geotechnical unit, in order to improve the database for the mechanical properties of the intact rock at the mine.

16.5.3 Geotechnical domains and rock mass properties

From the available information, five main geotechnical domains have been defined for the mine, all of which are based on geology, structures and degree of fracturing ("RQD"), intact rock strength and the average rock mass rating ("RMR") of each unit. The five main geotechnical domains, and their environments, are as follows:

- Mineral: represents the mineralized host rock.
- Limestone: represents the host or wall rock when its lithology is limestone.
- Skarn: represents the host or wall rock when its lithology is the distal skarn.
- Dyke: represents the volcanic dyke environment, sometimes along the mineralized body.
- Sandstone: mostly found in the footwall of the base of the skarn mineralized bodies and defined by the sandstone formation.

The geotechnical characteristics of the five domains are presented in Table 16.2.

Table 16.2 – Average values for geotechnical characteristics by geotechnical domain

Geotechnical Domain	σc UCS (MPa)	RQD (%)	Q	RMR	GSI
Mineral	111.0	46	4.6	58	63
Limestone	77.6	48	2	41	49
Skarn	166.3	55	1.83	49	54
Dyke	295.6	84	7.88	55	60
Sandstone	109.3	59	1.22	42	53

Using the geotechnical classification systems, the laboratory tests results and the Hoek failure criteria (Hoek at. al., 2002), the rock mass parameters have been defined for each unit. The results are presented in Table 16.3.

Table 16.3 – Rock mass strength criteria by geotechnical unit

<table>
<tr><th colspan="3">Getotechnical Domain</th><th>Mineral</th><th>Limestone</th><th>Sandstone</th><th>Skarn</th><th>Dyke</th></tr>
<tr><td colspan="3">mi</td><td>20</td><td>12</td><td>21</td><td>32</td><td>25</td></tr>
<tr><td colspan="3">σc UCS (MPa)</td><td>111</td><td>77.6</td><td>109.3</td><td>166.3</td><td>295.6</td></tr>
<tr><td rowspan="9">Macizo Rocoso</td><td colspan="2">GSI</td><td>50</td><td>40</td><td>53</td><td>43</td><td>66</td></tr>
<tr><td colspan="2">σc, Global MR (MPa)</td><td>14.6</td><td>5.6</td><td>16.3</td><td>22.09</td><td>73</td></tr>
<tr><td rowspan="3">Hoek Brown</td><td>mb</td><td>1.02</td><td>0.337</td><td>1.28</td><td>0.9</td><td>73</td></tr>
<tr><td>s</td><td>0.0005</td><td>0.0001</td><td>0.000807</td><td>0.00024</td><td>0.0058</td></tr>
<tr><td>a</td><td>0.506</td><td>0.511</td><td>0.505</td><td>0.509</td><td>0.502</td></tr>
<tr><td rowspan="2">Mohr Coulomb</td><td>C (Mpa)</td><td>4.5</td><td>20.5</td><td>4.87</td><td>6.78</td><td>18.47</td></tr>
<tr><td>Phi (°)</td><td>26</td><td>18</td><td>28</td><td>26.9</td><td>36.3</td></tr>
<tr><td rowspan="2">Elastic Properties</td><td>Em (Mpa)</td><td>6000</td><td>2972</td><td>7131</td><td>4010</td><td>15071</td></tr>
<tr><td>v</td><td>0.38</td><td>0.3</td><td>0.25</td><td>0.25</td><td>0.3</td></tr>
</table>

16.5.4 Mining ground support regime

A system based on the Geological Strength Index ("GSI") classification system has been used to estimate support requirements at the mine, particularly for development work. This support system was originally developed from numerical methods and analytical calculations and is summarized in Figure 16.19. The figure describes the support scheme based on the GSI for mechanized areas.

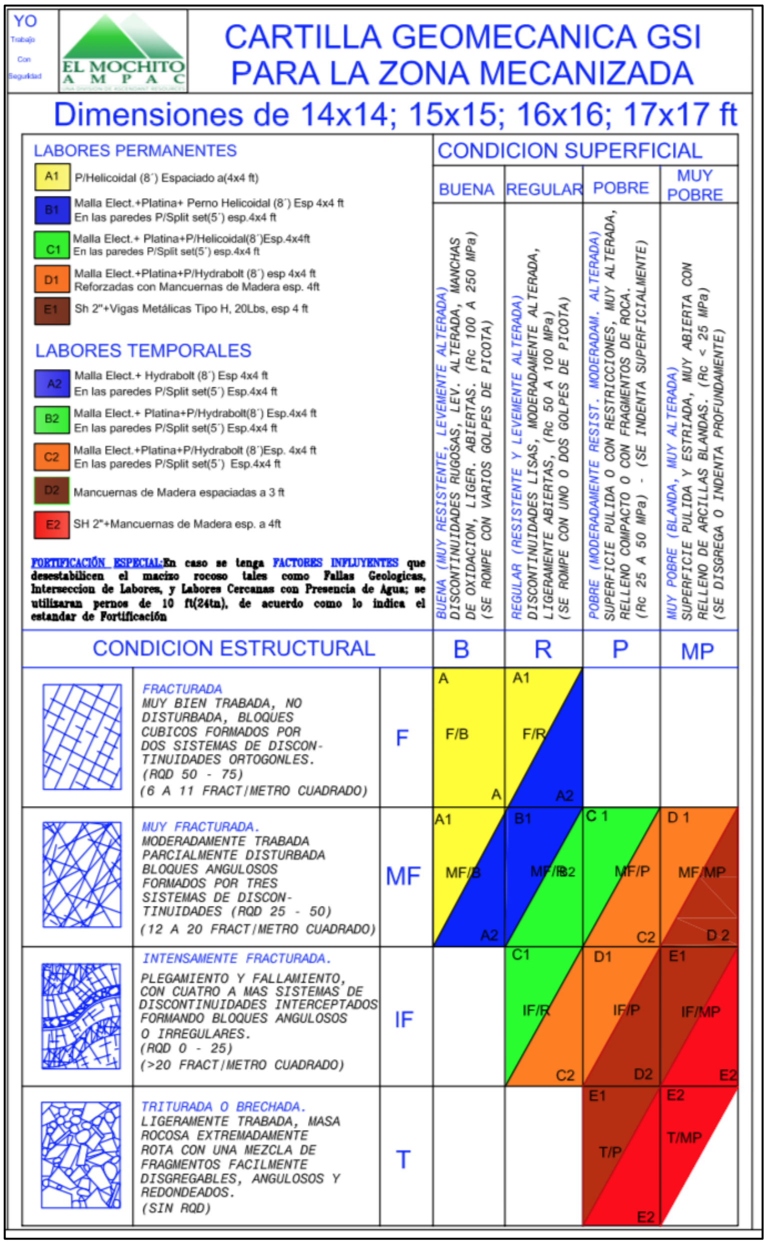


Figure 16.19 – Support scheme based on the Geological Strength Index created for and used in the mine

16.6 Development and Production Rates

16.6.1 Development rate

The expected daily advance rates for the development profiled in this PEA are provided in Table 16.4.

Table 16.4 – Estimated daily advance rates

Development (In either waste or mineral)	LOM plan description Type	Excavation size m (ft)	Advance m/d (ft/d)
Jumbo	Hz Development, Jumbo @ 15'×15'	4.47 m x 4.47 m (15 ft x 15 ft)	19.2 (63)
Jackleg	Hz Development, Jackleg @ 10'×12'	2.74 m x 2.74 m (9 ft x 9 ft)	6.4 (21)
	Subhorizontal Raise, Jackleg @ 6'×9'	3.66 m x 3.66 m (12 ft x 12 ft) W Slusher	5.5 (18)
	Sublevel, Jackleg @ 6'×6'	1.82 m x 1.82 m (6 ft x 6 ft) W Slusher	3.7 (12)
	Sublevel, Jackleg @ 9'×9'	2.74 m x 2.74 m (9 ft x 9 ft)	5.5 (18)
Raises	Subvertical Alimak, Stoper @ 8'×8'	2.44 m x 2.44 m (8 ft x 8 ft) W Alimak	2.1 (7)
	Subvertical Raise, Borer @ 5'Ø	1.52 m x 1.52 m (5 ft x 5 ft) W Raise	7.3 (24)
	Subvertical Raise, Stoper @ 5'×5'	1.52 m x 1.22 m 5 ft x 4 ft W Raise	3.0 (10)

The supporting equipment and availability needed to achieve these rates is shown in Table 16.5.

Table 16.5 – Mining supporting equipment

	Jumbo	Bolter	Scissor	Scoop	Trucks	Long hole drills
Number of Machines	7	2	6	10	10	4
Availability	81%	88%	82%	77%	84%	81%

16.6.2 Production rate (stoping)

The expected average production rates, mining recovery and mining dilution factors for the various mining methods profiled in this PEA are provided in Table 16.6. Note that the productivity, mining recovery and dilution assumptions are based on measured performance from mining operations and experience.

Table 16.6 – Stoping parameters

Stoping Methods	Productivity tpd	Mining Recovery %	Dilution %
Cut and Fill	337	92	10
Long Hole	1,152	90	18
Shrinkage	48	90	7
Conventional Stoping	622	92	10

16.7 Life-of-Mine Development and Production Quantities

The estimated annual quantities for mined waste and mineral at the El Mochito mine are presented in Table 16.7. Underground development quantities include allowances for miscellaneous excavations such as muck and safety bays, electrical substations, pump stations, powder magazines, service bays and shops, lunch/refuge stations, etc.

Table 16.7 – LOM development and production quantities

LOM Development quantities		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Development Lateral Jumbo												
Capex Waste	meters	2,981	3,176	2,377	2,067	3,008	2,487	2,414	1,501	1,652	379	**22,042**
Opex Waste	meters						All waste developments in Capex					
Opex Mineral	meters	1,851	2,015	2,603	2,602	2,926	2,920	2,960	2,201	3,563	3,371	**27,011**
Development Conventionnal												
Capex Waste	meters	1,100	448	-	-	-	-	-	-	-	-	**1,548**
Opex Waste	meters						All waste developments in Capex					
Opex Mineral	meters	2,850	2,797	1,955	2,117	2,524	1,003	1,384	2,371	1,905	1,783	**20,689**
Development Vertical												
Capex Waste	meters	1,223	633	685	171	639	274	831	155	717	-	**5,329**
Opex Waste	meters						All waste developments in Capex					
Opex Mineral	meters	229	223	168	189	238	381	271	229	207	146	**2,280**
LOM Production quantities		**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**Total**
Development lateral Jumbo												
Capex Waste	tonnes	145,668	155,216	116,189	100,995	147,142	121,551	117,976	73,363	80,736	18,531	1,077,367
Opex Waste	tonnes						All waste developments in Capex					
Opex Mineral	tonnes	130,822	141,710	183,476	185,062	205,882	204,763	209,290	156,152	252,606	239,136	**1,908,897**
Development Conventionnal												
Capex Waste	tonnes	27,303	11,149	-	-	-	-	-	-	-	-	**38,452**
Opex Waste	tonnes						All waste developments in Capex					
Opex Mineral	tonnes	57,789	54,650	34,509	39,050	44,162	18,418	25,813	42,330	34,228	33,081	**384,031**
Development Vertical												
Capex Waste	tonnes	8,609	3,561	4,139	982	3,148	1,527	4,132	761	3,586	-	**30,444**
Opex Waste	tonnes						All waste developments in Capex					
Opex Mineral	tonnes	1,795	1,739	1,313	1,494	1,859	2,969	2,131	1,802	1,633	1,153	**17,888**
LOM summary		2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**Total**
Total waste produced	tonnes	181,580	169,927	120,327	101,977	150,290	123,078	122,108	74,124	84,322	18,531	**1,146,263**
Total mineral produced	tonnes	789,509	895,066	976,847	993,008	1,003,166	995,514	1,007,445	997,880	998,247	999,091	**9,655,774**
Backfill required												
Total waste required for backfill	tonnes	216,867	202,949	143,711	121,795	179,496	146,996	145,837	88,528	100,709	22,132	**1,369,019**
Hydraulic backfill required @ 90% filled	tonnes	493,691	602,611	735,452	771,913	723,354	748,967	760,863	809,564	797,714	877,050	**7,321,177**
LOM volume of waste produced												
In situ @ 0.076 t/ft^3	ft^3	2,389,209 (67,707 m^3)	2,235,875 (63,362 m^3)	1,583,255 (44,867 m^3)	1,341,807 (38,025 m^3)	1,977,495 (56,039 m^3)	1,619,446 (45,893 m^3)	1,606,684 (45,531 m^3)	975,314 (27,639 m^3)	1,109,503 (31,442 m^3)	243,824 (6,910 m^3)	**15,082,411** (427,414 m^3)
Sponge @ 65%	ft^3	3,675,706 (104,164 m^3)	3,439,808 (97,479 m^3)	2,435,777 (69,027 m^3)	2,064,318 (58,500 m^3)	3,042,300 (86,215 m^3)	2,491,455 (70,604 m^3)	2,471,821 (70,048 m^3)	1,500,483 (42,522 m^3)	1,706,927 (48,372 m^3)	375,114 (10,630 m^3)	**23,203,710** (657,561 m^3)
Used for backfill sponge @ 0.059 t/ft^3	ft^3	216,867 (6,146 m^3)	202,949 (5,751 m^3)	143,711 (4,073 m^3)	121,795 (3,452 m^3)	179,496 (5,087 m^3)	146,996 (4,166 m^3)	145,837 (4,133 m^3)	88,528 (2,509 m^3)	100,709 (2,854 m^3)	22,132 (627 m^3)	**1,369,019** (38,796 m^3)

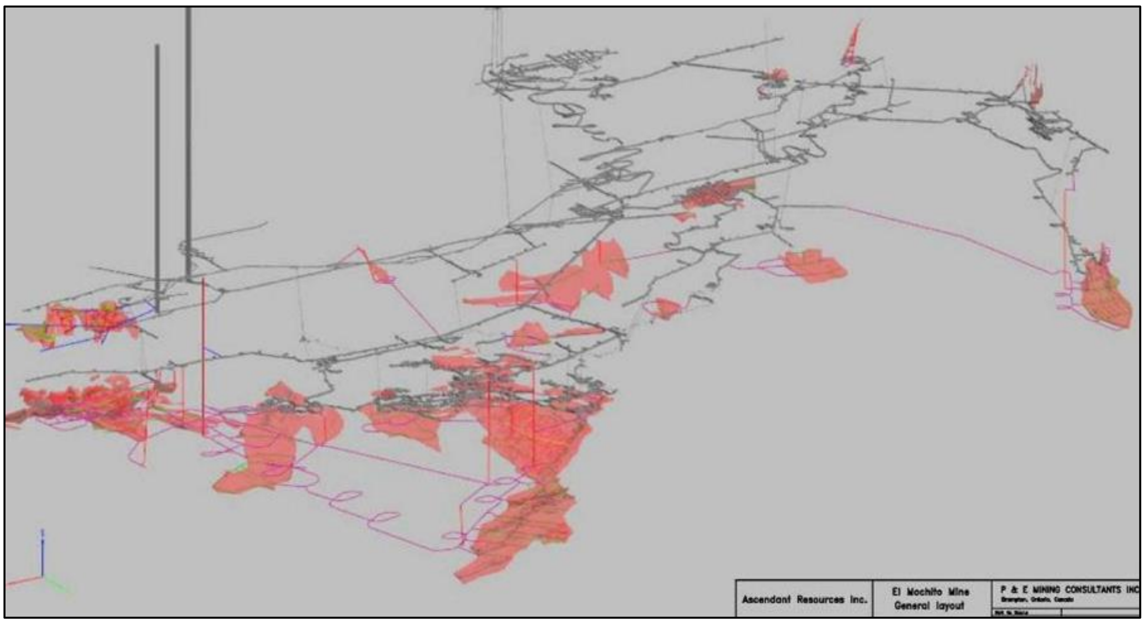
In summary, over the LOM, a total of 49,053 m of development will be done by Jumbo (mineral and waste combined) producing 1,077,367 t of waste and 1,908,897 t of mineral. Conventional development stands at 22,237 m (mineral and waste combined) producing 38,452 t of waste and 384,031 t of mineral. Vertical development stands at 7,069 m of which 30,444 t will be in waste and 17,888 t will be in mineral.

LOM mineral production will be 9,655,774 t of which 1,908,897 t will come from development and 7,746,877 t will from the stoping methods.

16.8 Development and Production Plan

Development and production quantities were provided in the previous section.

Figure 16.20 shows the location of these quantities.

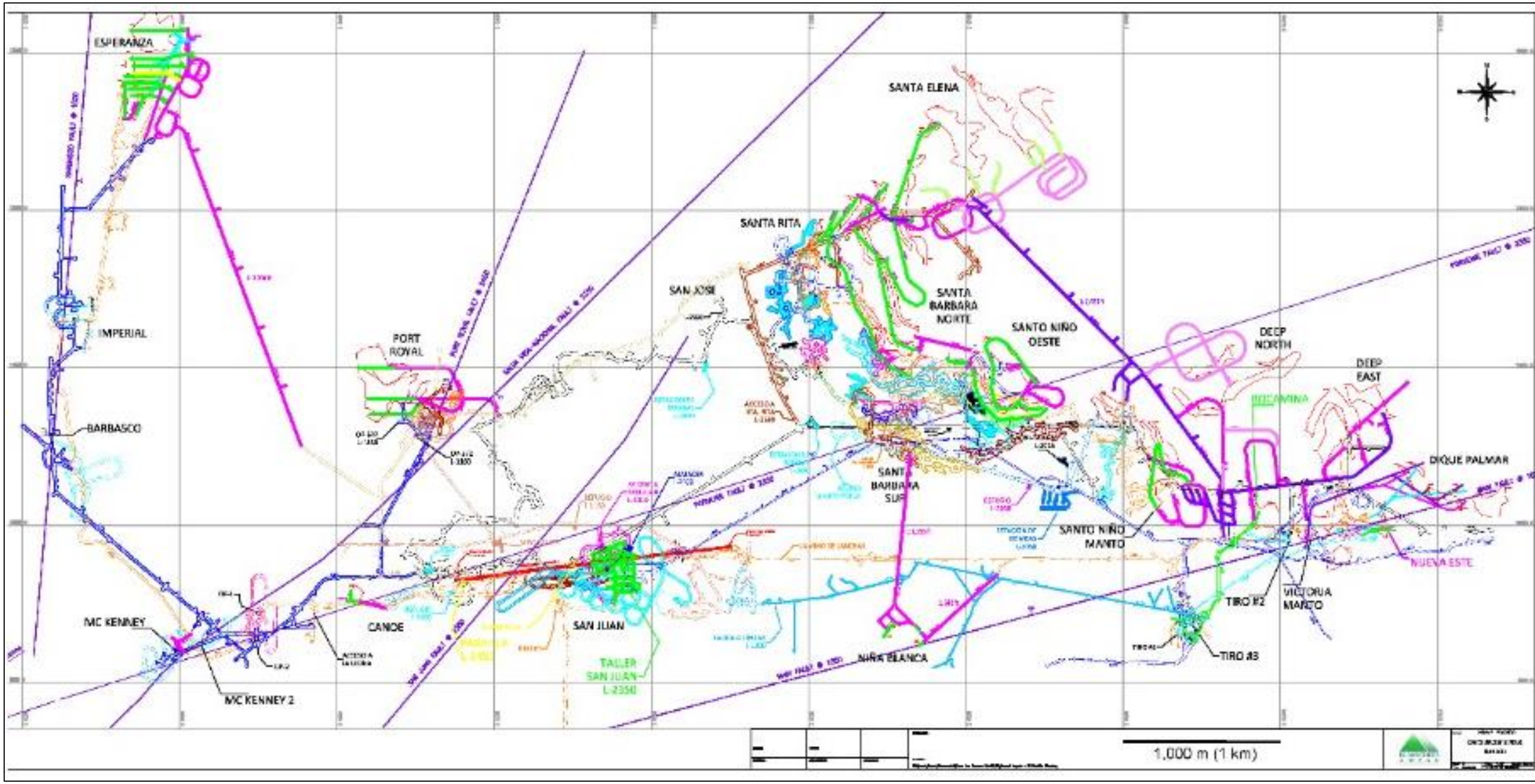


Source: El Mochito.
Note: Existing development is shown in gray and proposed development and stoping is shown in pink and red

Figure 16.20 – The proposed LOM development plan and existing underground layout

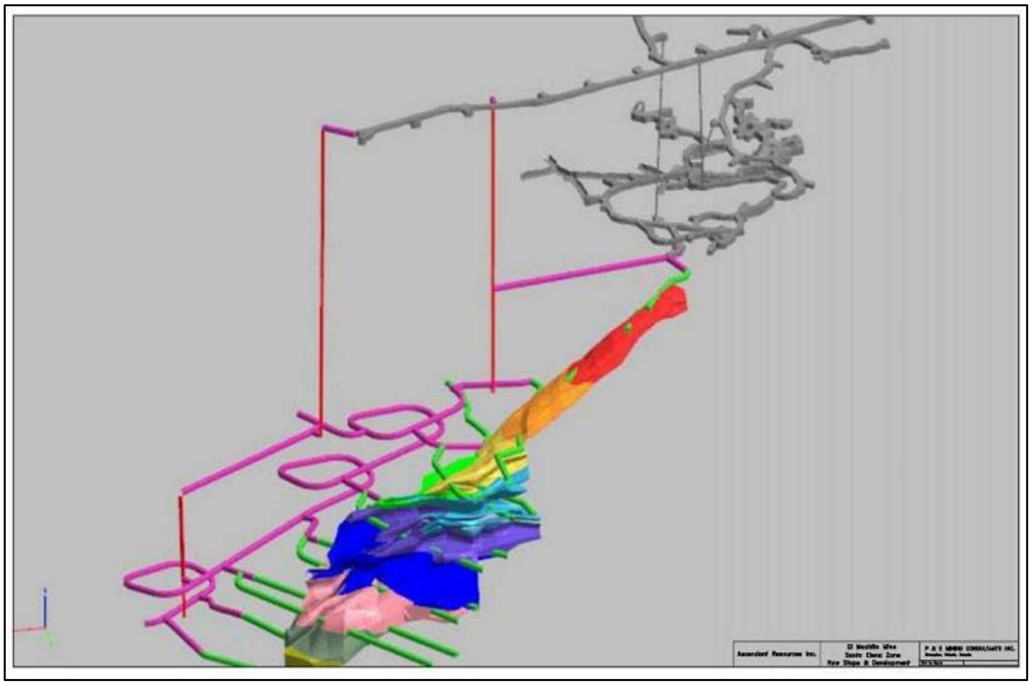
The following Figure 16.21 shows the extent of development to be done over the LOM.

Figure 16.22 and Figure 16.23 are typical isometric views views showing the proposed development plan and stope mining outlines for the Santa Elena zone and the Victoria zone.



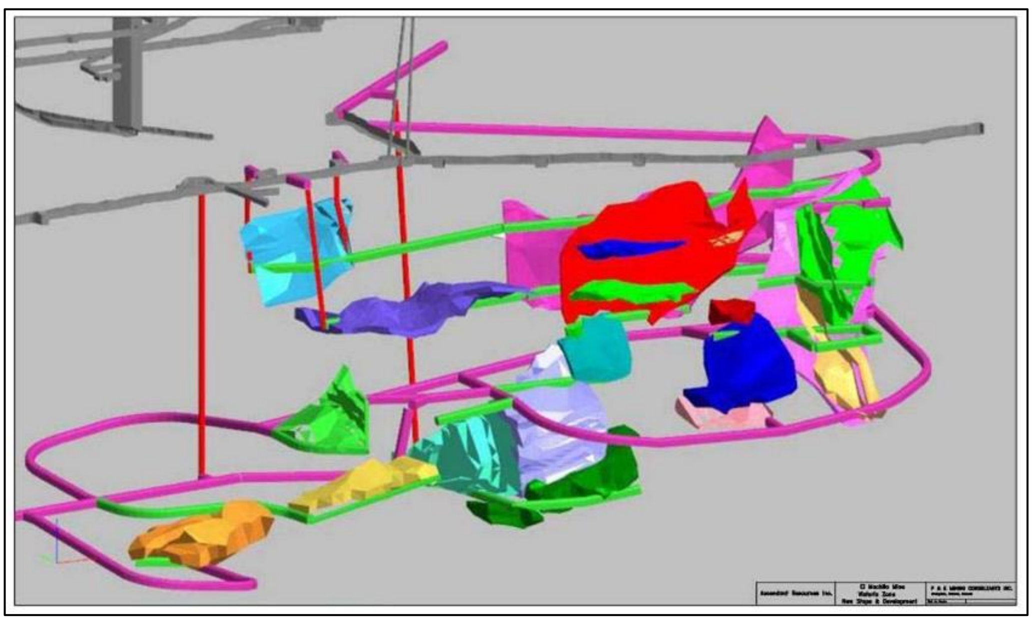
Source: El Mochito.
Note: Existing development is shown in gray and proposed development and stoping is shown in pink and red

Figure 16.21 – Development plan of the El Mochito mine showing existing and proposed development



Source: El Mochito:
Note: Existing development is gray, proposed development and stoping are coloured.

Figure 16.22 – LOM development plan and stope outlines for the Santa Elena zone, El Mochito mine



Source El Mochito
Note: Existing development is grey, proposed development and stoping are coloured.

Figure 16.23 – LOM development plan and stope outlines for the Victoria zone, El Mochito mine

16.9 Mining Methods

Four underground mining methods are proposed and planned for the El Mochito mine under the Expansion Project. The methods are as follows:

- Ramp Access Mechanized Cut and Fill,
- Long Hole Stoping,
- Shrinkage Stoping.
- Conventional Slusher/Panel mining

The Table 16.8 represents the tonnage extracted over the LOM from each mining methods.

Table 16.8 – Production by stoping methods including mineral development

	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Mineral Dev.	**kt**	**190.4**	**198.1**	**219.3**	**225.6**	**251.9**	**226.1**	**237.2**	**200.3**	**288.5**	**273.4**	**2,310.8**
	% Zn	3.42	4.02	4.04	4.62	4.80	3.92	4.76	3.97	5.32	4.98	4.45
	% Pb	1.76	1.36	1.10	1.79	1.98	1.02	1.62	1.07	1.33	1.22	1.42
	% Cu	0.06	0.06	0.09	0.15	0.10	0.09	0.13	0.13	0.10	0.05	0.10
	g/t Ag	46.19	46.58	23.52	35.16	39.51	22.59	29.63	20.61	33.23	27.41	32.20
	% ZnEq	5.55	5.82	5.28	6.61	7.01	5.08	6.53	5.15	6.90	6.38	6.10
C/F	**kt**	**54.1**	**87.7**	**83.7**	**173.1**	**139.1**	**211.9**	**125.0**	**156.4**	**149.3**	**81.8**	**1,262.0**
	% Zn	3.81	3.60	5.09	4.96	4.71	4.68	6.12	6.19	5.43	4.78	5.06
	% Pb	1.45	1.42	0.65	1.66	0.83	1.47	0.95	0.92	1.35	1.39	1.23
	% Cu	0.03	0.04	0.04	0.04	0.04	0.12	0.15	0.16	0.13	0.07	0.09
	g/t Ag	42.57	39.45	22.96	26.65	23.92	34.59	27.72	28.50	28.27	23.38	29.32
	% ZnEq	5.63	5.34	5.96	6.71	5.74	6.40	7.31	7.37	6.96	6.27	6.50
L/H	**kt**	**371.1**	**501.3**	**467.5**	**432.5**	**425.9**	**376.8**	**429.5**	**397.1**	**344.1**	**254.1**	**3,999.9**
	% Zn	4.62	4.60	5.05	4.82	4.55	5.49	4.64	5.47	4.60	4.61	4.85
	% Pb	1.98	1.81	1.45	1.61	1.21	1.11	1.51	1.19	1.13	1.09	1.43
	% Cu	0.05	0.06	0.07	0.09	0.05	0.06	0.09	0.09	0.07	0.04	0.07
	g/t Ag	54.21	58.63	31.74	26.43	22.83	25.00	24.02	23.92	24.94	22.28	32.25
	% ZnEq	7.05	6.95	6.70	6.53	5.88	6.77	6.23	6.79	5.89	5.83	6.50
SH	**kt**	**0**	**0**	**0**	**0**	**0**	**0**	**9.8**	**14.6**	**0**	**0**	**24.3**
	% Zn	0.00	0.00	0.00	0.00	0.00	0.00	5.64	5.64	0.00	0.00	5.64
	% Pb	0.00	0.00	0.00	0.00	0.00	0.00	4.29	4.29	0.00	0.00	4.29
	% Cu	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.32
	g/t Ag	0.00	0.00	0.00	0.00	0.00	0.00	76.75	76.75	0.00	0.00	76.75

	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
	% ZnEq	0.00	0.00	0.00	0.00	0.00	0.00	10.29	10.29	0.00	0.00	10.29
Conventional	**kt**	**173.9**	**108.0**	**206.4**	**161.8**	**186.3**	**180.6**	**206.0**	**229.4**	**216.4**	**389.8**	**2,058.7**
	% Zn	5.20	4.80	4.83	4.68	5.27	5.24	5.23	4.81	4.33	4.19	4.79
	% Pb	1.36	1.68	1.35	1.68	1.66	1.32	1.37	1.46	1.08	1.00	1.34
	% Cu	0.05	0.05	0.06	0.07	0.09	0.09	0.10	0.09	0.06	0.05	0.07
	g/t Ag	36.08	49.22	31.70	27.63	31.61	34.20	32.77	31.79	33.26	26.16	32.11
	% ZnEq	6.85	6.90	6.41	6.46	7.09	6.83	6.84	6.48	5.71	5.39	6.36
Total	**kt**	**789.5**	**895.1**	**976.8**	**993.0**	**1,003.2**	**995.5**	**1,007.4**	**997.9**	**998.2**	**999.1**	**9,655.8**
	% Zn	4.40	4.39	4.78	4.78	4.77	4.91	4.98	5.13	4.87	4.56	4.77
	% Pb	1.76	1.66	1.28	1.67	1.43	1.20	1.47	1.23	1.21	1.11	1.39
	% Cu	0.05	0.06	0.07	0.09	0.07	0.09	0.11	0.11	0.08	0.05	0.08
	g/t Ag	47.49	52.95	29.14	28.65	28.80	28.16	28.10	26.56	29.64	25.29	31.94
	% ZnEq	6.55	6.54	6.26	6.57	6.37	6.32	6.60	6.53	6.30	5.85	6.38

16.9.1 Ramp access mechanized cut and fill

This method is applied in Mantos Zones, for mineralized bodies 9.1 m (30 ft) to 12.2 m (40 ft) thick, and dipping ranges of 35° to 60°. There is also an option for bodies with hangingwalls or footwalls of very low geotechnical quality and where stability is compromised which allowing dilution. At Mochito, this method is applied in the Santa Rita, Santo Niño Oeste, Yojoa West, Port Royal Manto and Porvenir zone, among others.

The principle of this method is to drift around the mineralized bodies with a ramp at +15%. From this ramp, an access ramp of approximately 30 m at is mined at -15% is driven towards the mineralized bodies. A 5-m slice across the mineralized bodies is then mined out. This method can be used on narrow veins or in the wider mantos. In the case of a manto with relatively shallow dipping, this method becomes room and pillar. The jumbo cuts a 5-m slide leaving pillars according to rock mechanic requirements. Once the room is excavated, it is sandfilled to about 0.30 m from the roof. When the fill is considered competent enough, the jumbo re-starts another 5-m slice from the access ramp.

The following Figure 16.24 demonstrates the principle of this mining method.

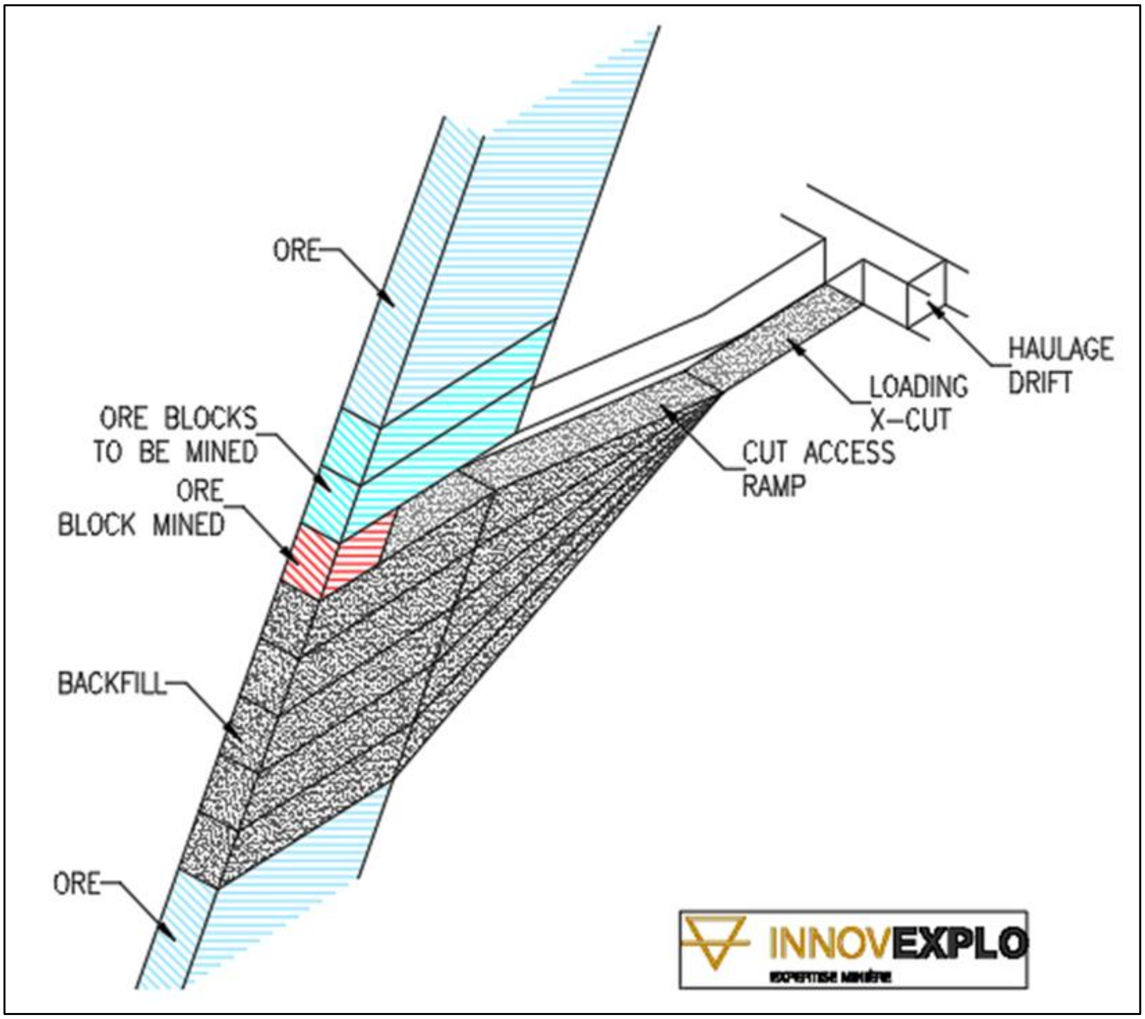


Figure 16.24 – Ramp access mechanized cut and fill mining method

16.9.2 Long hole stoping

Long hole stoping method consists of driving an excavation above and below the mineralized bodies, mining it out with long hole blasting between levels. A conceptual layout is shown in Figure 16.25. In the case of El Mochito, stope dimension varies according to zone, but a typical excavation is 7 m wide x 10 m high x 35 m long (20 ft x 35 ft x 100 ft). Production drilling is done by one of the longhole production drills listed in the equipment fleet (Section 16.13). Production drilling is scheduled to be done on 64 mm holes and the powder factor is approximately 0.86 kg/t. Loading takes place in through an access into the bottom of the stope with the help of a remote control. Once the stope has been mined out, a barricade is constructed at the bottom and the void is filled with development waste rock and sandfill.

This method can be used in steep narrow veins, pillar recovery or mantos when the mineralized zones are thick enough as shown in Figure 16.25. It is the cheapest and most common mining method at El Mochito.

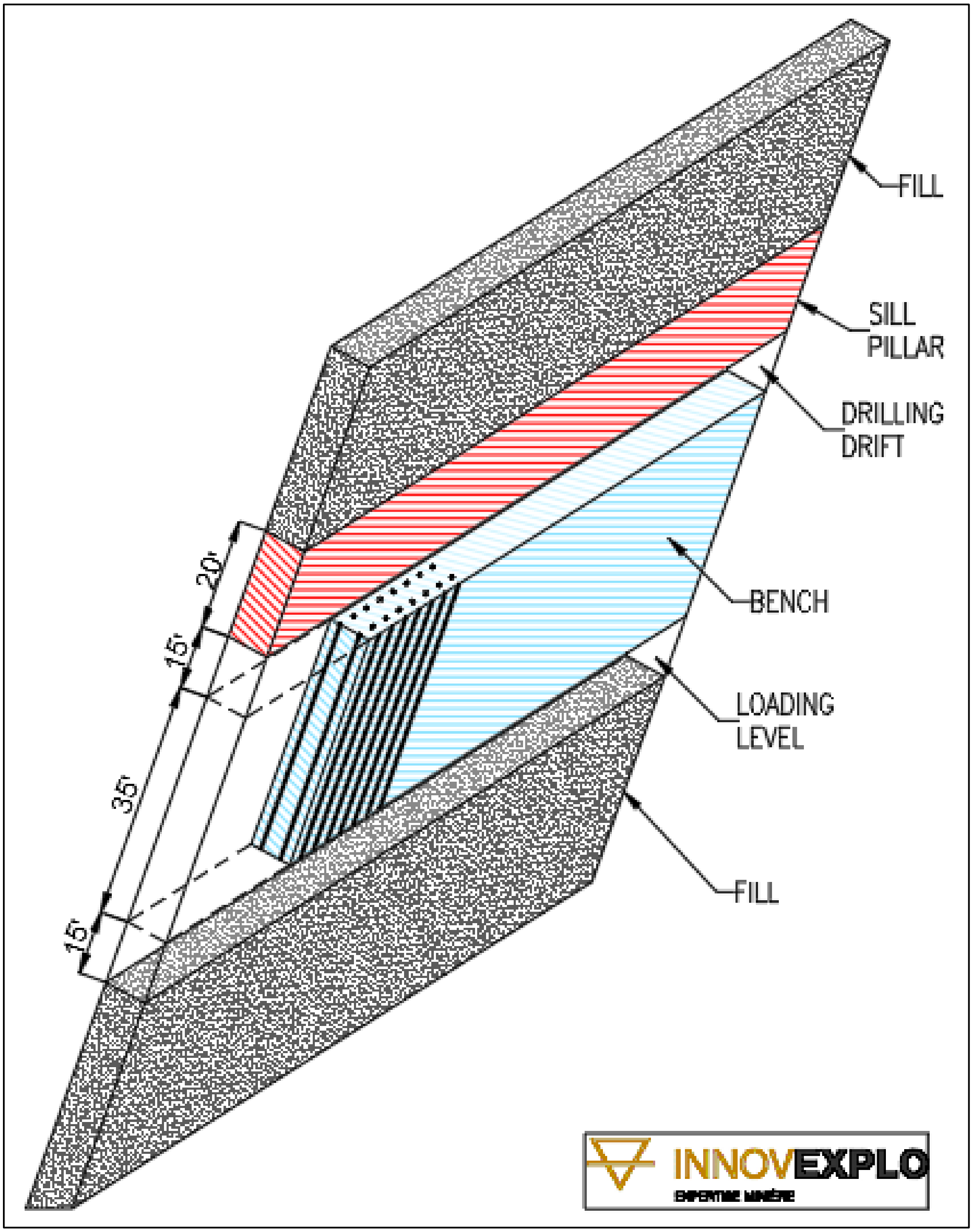


Figure 16.25 – Principles of the pillar recovery method

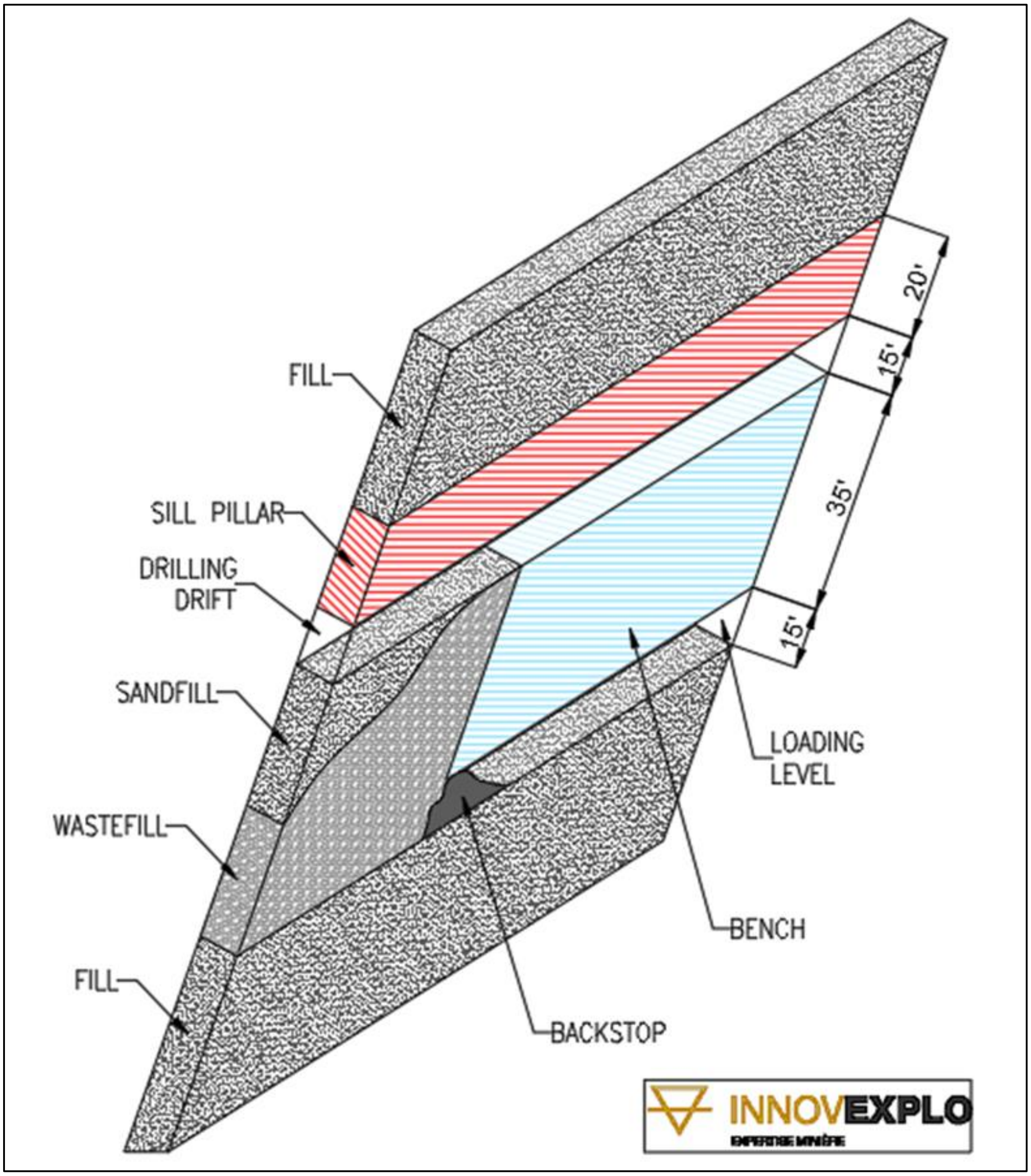


Figure 16.26 – Backfilling of an open stope

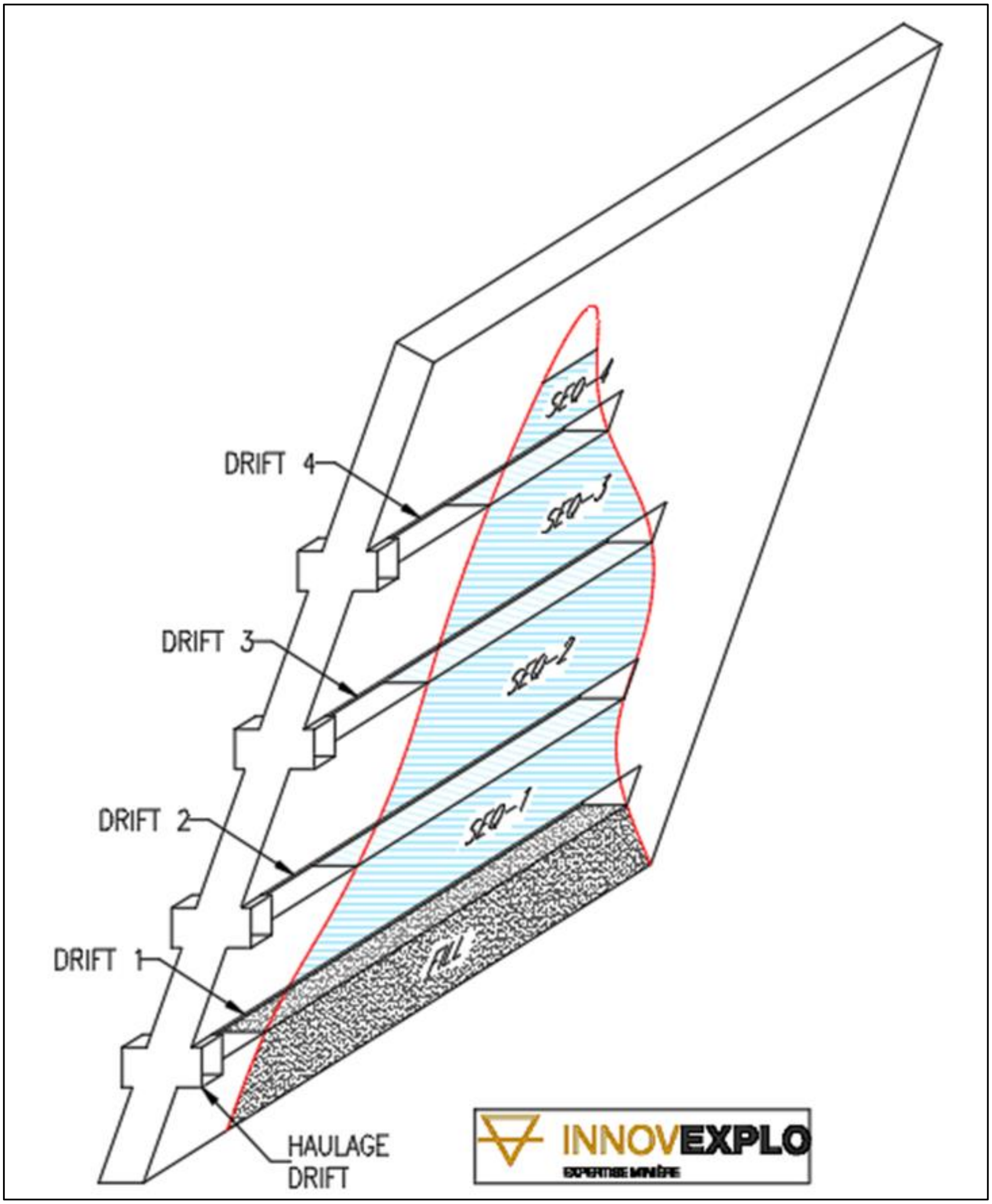


Figure 16.27 – Proposed mining sequence for vertical mineralized bodies and chimney-type mineralized bodies where mining starts from the bottom

The following sequence is proposed for mineralized bodies in mantos where primary and secondary stopes can be established. Prior to mining the secondary block, the primary one must be completely filled.

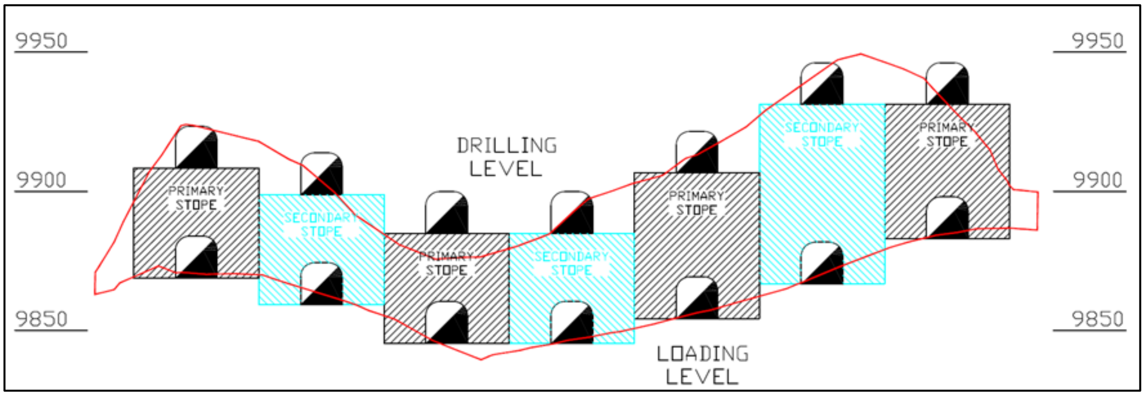


Figure 16.28 – Primary and secondary sequence for the long hole mining method

16.9.3 Shrinkage stoping

Shrinkage stoping is the most labour-intensive method at El Mochito and is focused strictly in the narrow, steep, very high grades section of the mine in which mineral cannot be extracted using trackless machines without incurring significant dilution. The principle is to mine the mineralized zone from inside the stope by drilling and blasting with a jackleg rock drills. The miners must keep approximately 70% of the mineral in the stope as it is used for working the next lift by drilling the hanging wall. Only the swell can be pulled out after blasting to allow access by men above the blasted material through travelling ways. The mineral also provides support while the stope is being developed. The stopes are usually up to 20 m (60 ft) long and between 0.8 m to 4 m (2 ft to 12 ft) wide and develop upwards for between 15 m to 40 m (45 ft to 125 ft) in height. Once the drilling and blasting of the entire stope is complete, the remaining mineral is drawn out, leaving an open stope which, in the case of El Mochito is only backfilled if mining is taking place nearby. Mucking can be by mucking from drawpoints all along the mineralized bodies as shown in the Figure 16.29 or from timber chutes which directly feed track-bound rail cars in the case of the older upper levels or in the conventional sections of the mine.

In the proposed LOM, only 24,374 t are mined with this method.

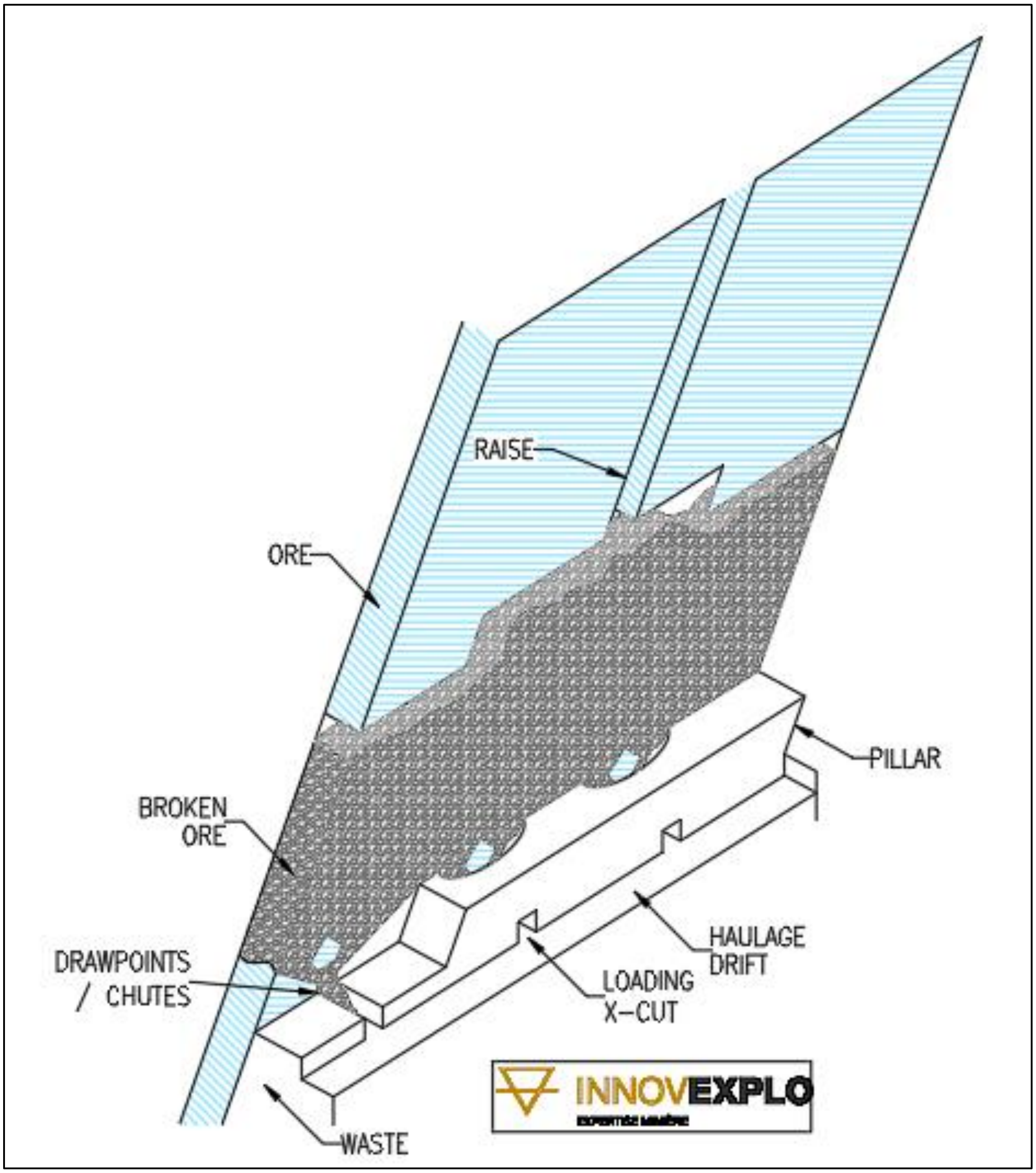


Figure 16.29 – Example of typical shrinkage mining method

16.9.4 Conventional slusher/panel mining

Conventional slusher stoping is used when the manto mineralization is less than 4 m (12 ft) thick and the dip is less than 40°. This mineralized material would otherwise be inaccessible or sterilized by dilution through employment of large, trackless machines. The method consists of jackleg mining of stope panels between pillars or backfilled areas and cleaning using scraper winches into parallel drifts situated within the mineral approximately 40 m (120 ft) apart. These drifts are mined by trackless machines and incur a level of dilution as they would generally be larger than the width of the mineralization. From the bottom drift, a raise of 2 m x 3 m (6 ft x 9 ft) high is excavated updip in mineral to join the other drift and is cleaned by a 37 kW, double-drum scraper winch installed in a cubby in the bottom drift (Figure 16.30). Mineral screped into the drift below is picked up and loaded into trucks with a LHD.

Once the raise has connected with the upper drift, providing through ventilation and a second escapeway, the mining sequence can begin by drilling slashing both sides of the raise. Two methods of excavation will be employeed. The first is downdip mining, where stope panels approximately 15 m wide (in plan, Figure 16.31) are separated by dip pillars of similar widths. A stiff support pattern of cable anchors and resin bolts are installed for local support, with the additional use of mine props where required. On completion of the primary extraction phase a backfill barricade is installed in the stop above the lower drift and the the stope is filled. Thereafter the pillars can be mined in a similar fashion, allowing close to 100% extraction.

The second method orientates the 15 m wide stopes and pillars on strike, with strike slusher scraping being required above pillars when applicable.

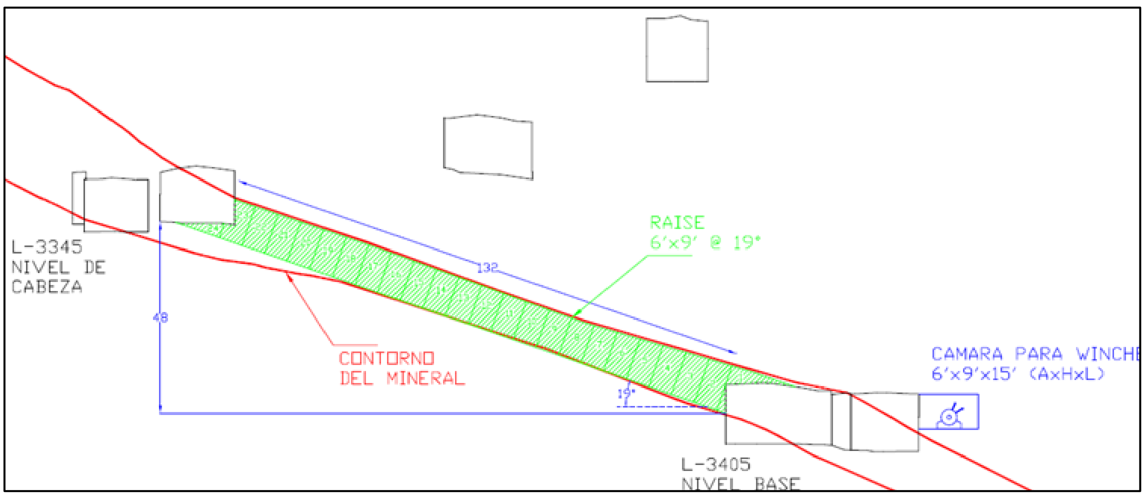


Figure 16.30 – Cross section of the wide stoping method

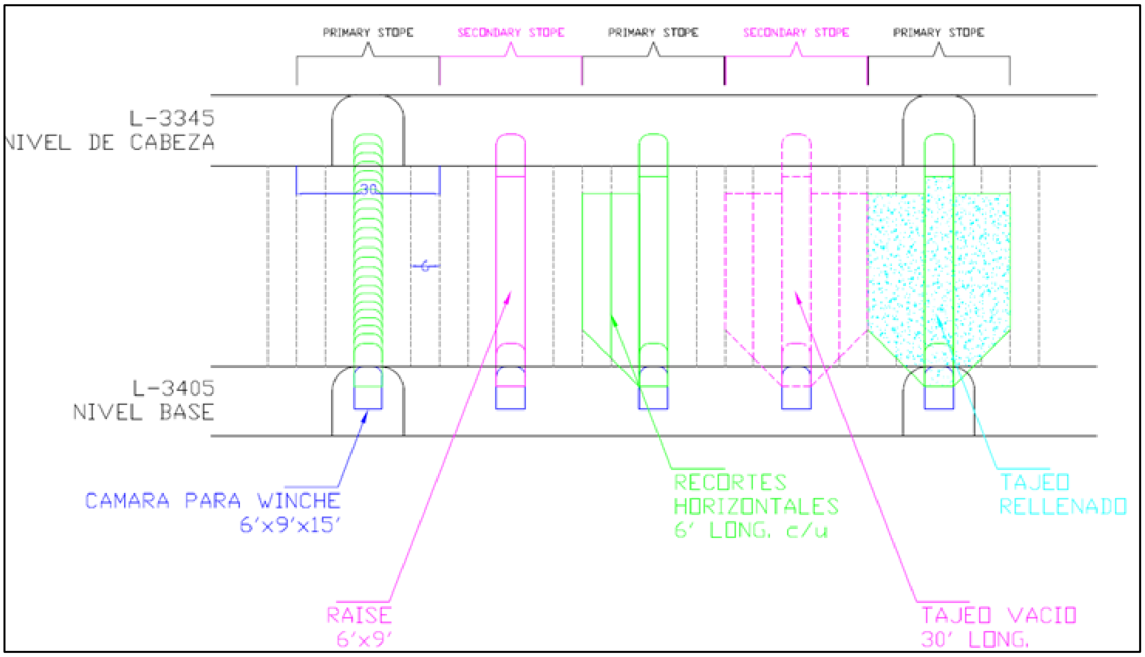


Figure 16.31 – Longitudinal section showing the wide stoping method

16.10 Mine Services

16.10.1 Electrical

In-mine power distribution is done by cables running down the No. 2 and No. 3 shafts, bore holes and raises. Mining equipment runs on a voltage of 440 V. Bore holes and raises are also used to bring power where needed in the mine. Several transformers electrical substations are installed along the way in the mine to transfer power and reduce it to 240 V and 110 V when necessary for welding and lighting, etc.

The internal shaft proposed under the Expansion Project (the No. 8 Shaft) will allow power to be run down this new vertical access to feed the crushing and loading system installed on 3350L and below.

16.10.2 Communication

In-mine communication is done via a leaky feeder radio system. Cables are run along accesses and main ramps into working areas to extend the network. The development proposed in this PEA will include an extension of the communication system further into the mine as it progresses.

16.10.3 Fuel

The 2350L San Juan maintenance shop has a dedicated fuel supply area. The underground capacity of this facility is 5,450 L.

Fuel and lubricants are supplied from surface in batches, vertically through two dedicated lines in the No. 3 shaft and then horizontally through the main 2350L tunnel to the San

Juan workshop where the fuel storage and supply area is located. A new extension was recently commissioned to supply fuel to the Santo Niño workshop on 3300L, thereby avoiding the transport of fuel in drums which is a safety risk and reduces productivity.

16.10.4 Backfill

A sandfill batch plant is located on surface close to the entrance (adit) to the No. 3 shaft. The batch plant is connected to the underground mine via three bore holes. An extensive pipe system transports cycloned sandfill mixed with cement into working areas to be backfilled via ramps, drifts and raise-bore holes. Mine operation has dedicated teams einsuring that this activity runs around the clock. The capacity of the sandfill plant is approximately 1,200 tpd and is adequate to support the mine plan can be increased if necessary. All underground development waste is also used as waste fill underground.

16.10.5 Maintenance

Although several support maintenance workshops are present on surface, all underground mobile equipment is fully maintained in three underground workshops. The main workshop is the San Juan facility on 2350L. The shop is equipped with several bays, an overhead crane and various mechanical tools to service and repair all types of underground equipment. The fuel and lubricant depots are also located in the main workshop.

A remote workshop is located in the Santo Niño area on 3300L to provide basic service to the fleet assigned to the deep eastern part of the mine. Another remote workshop is being set up in the Esperanza area to service the fleet assigned to western areas of the mine. A new, smaller workshop will also be installed close to the No. 8 shaft tip as part of the Expansion Project.

16.11 Underground Haulage

The focus of the PEA is to shorten future haul distances and open the mine to capitalize on future exploration successes to the east of the current infrastructure. The PEA has determined that the construction of a new internal shaft (No. 8) and an underground crushing station would shorten average hauling distances from all areas by 26% over LOM, thus significantly lowering LOM operating costs. The long hauling distances result in higher operating costs in terms of diesel costs, ventilation needs, and fleet replacement and maintenance requirements.

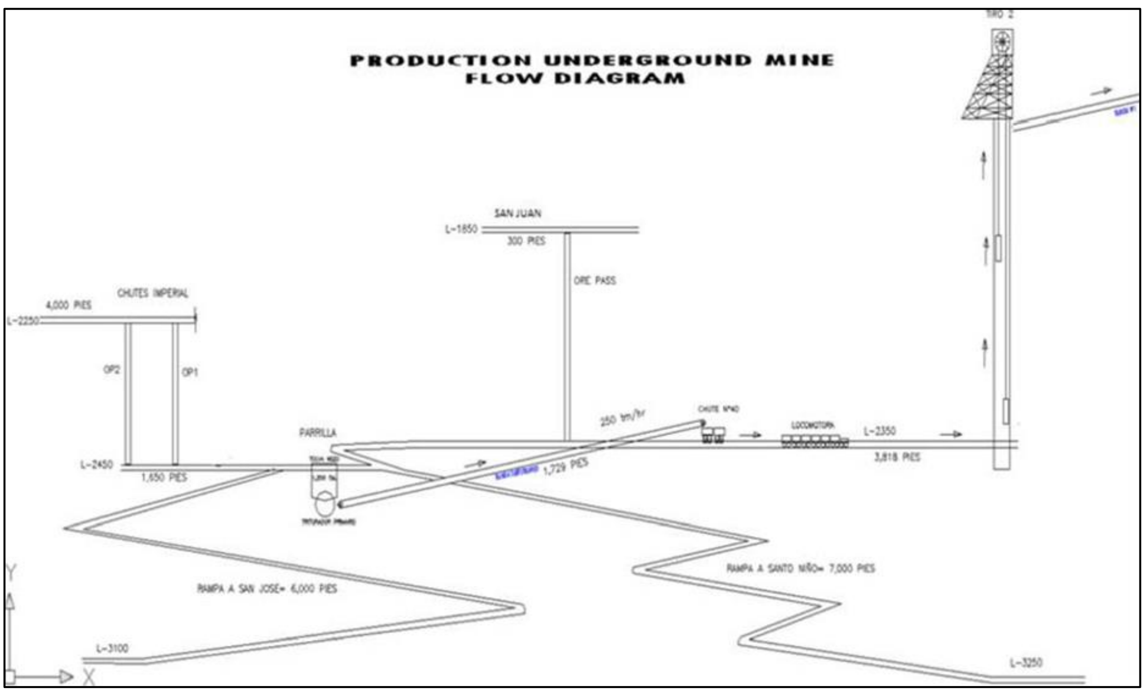
The bulk of the current mineral resources are located below the current shaft bottom and they remain open to the east. Mining this material requires a long ramp haulage system to deliver mineralized material to the main underground crusher and hoisting facilities.

Distances have been estimated throughout the LOM and can reach up to 3,510 m (11,529 ft) for a oneway trip of mineral. With the proposed expansion, the distance in this example is reduced to 1,673 m (5,429 ft). Waste displacement remains generally the same because waste mined in a certain area of the mine is used to backfill open stopes in the same vicinity. Mine operators are doing as much as possible to minimize waste transportation.

It should be kept in mind that travel distances will slowly increase over time as the mine gets deeper and further away from the new internal shaft (No. 8). The impact of this will be a slowly rising operating costs.

As detailed in Section 16.2.3, between 61% of all Measured and Indicated Resources and 45% of Inferred Mineral Resources (64% as a combined weighted average) will report to the No. 8 shaft system once commissioned. The remaining tonnage coming from the western portion of the mine and from above 2350L will use the original and current haulages routes in order to reach the No. 2 shaft.

The current route consists of transporting mineral to a storage bin excavated in rock that feeds the crusher on 2450L. From this crusher, the rock is then transported by a 533 m (1,750 ft) conveyor belt where mineral is stockpiled in an orepass raise. This orepass raise feeds two chutes that fill approximately 12 rail cars of 6 tons each that are pulled by a locomotive running off an electric trolley line. The locomotive pulls these cars towards another ore bin located next to the No. 2 shaft over a distance of 1,234 m (4,050 ft). The cars use a side dump system with a camel back ramp to be emptied into another orepass excavated in rock. From this orepass, a scraper winch system fills the two skips of the No. 2 shaft which are loaded and brought to surface. The schematic in Figure 16.32 shows the current haulage system.



Source: El Mochito.

Figure 16.32 – El Mochito underground haulage system

Figure 16.33 and Figure 16.34 show the route for the deeper zone compared to the route proposed by this PEA. The yellow line in Figure 16.34 will need to be extended towards the bottom as future zones are mined. In Figure 16.33, the yellow line is much closer to future mining areas.

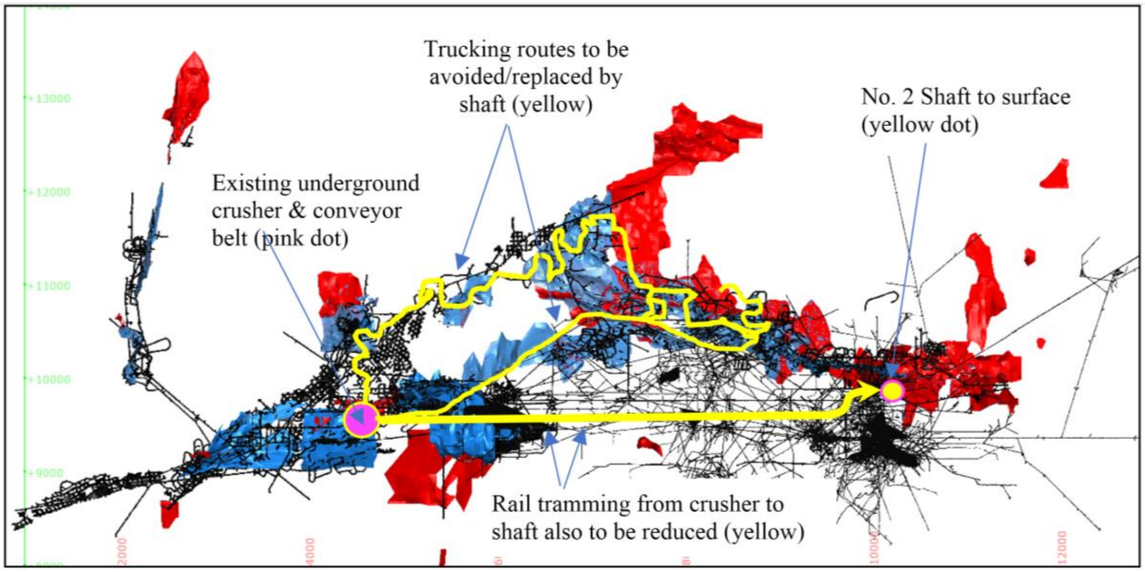


Figure 16.33 – Current Actual transportation routes to the crusher and rail tramming ramp and train combine (in yellow)

The following details are shown in Figure 16.34**:**

- Purple dot represents the position of the new crusher and No. 8 shaft (raise bored winze),
- Pink dot represent the position of the current crusher,
- Red stopes represent and future mining areas,
- Yellow lines represent the principle transportation route to bring back mineral to the No. 8 shaft.

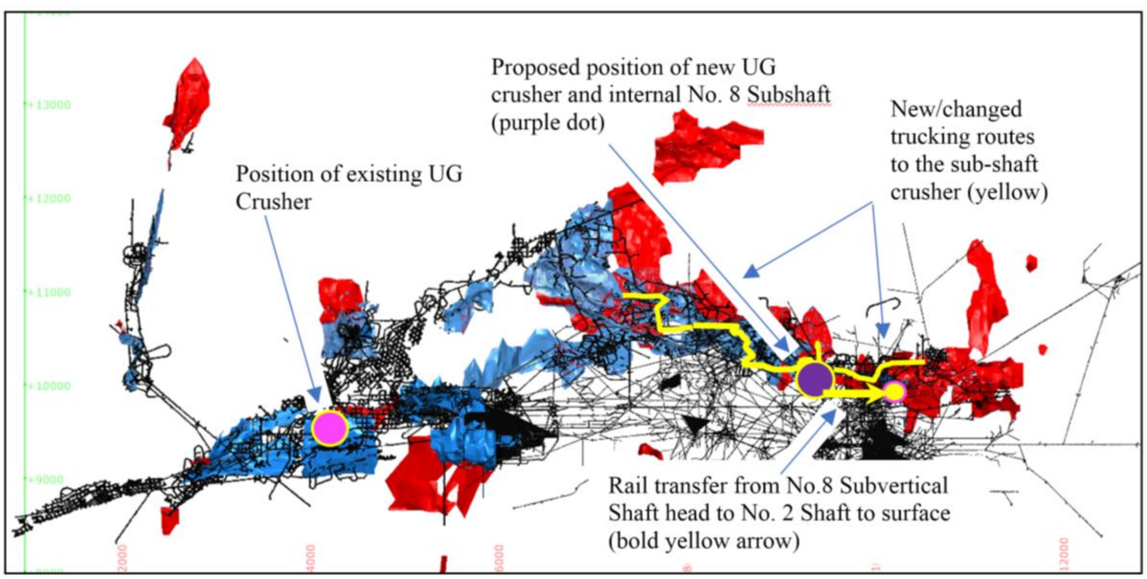


Figure 16.34 – Shorter proposed transportation route towards the new crusher and internal No. 8 shaft (in yellow)

As shown in Figure 16.33, the new internal shaft and crusher will manage all the mineral on the east side of the mine below 2350L. Trucking will be done over a much shorter distance, reducing the average one-way haulage distance by 46% to 1,430 m (4,690 ft) over LOM. This will free up the existing truck fleet, thereby increasing underground capacity to 2,800 tpd. Furthermore, the fleet size would not need to be augmented.

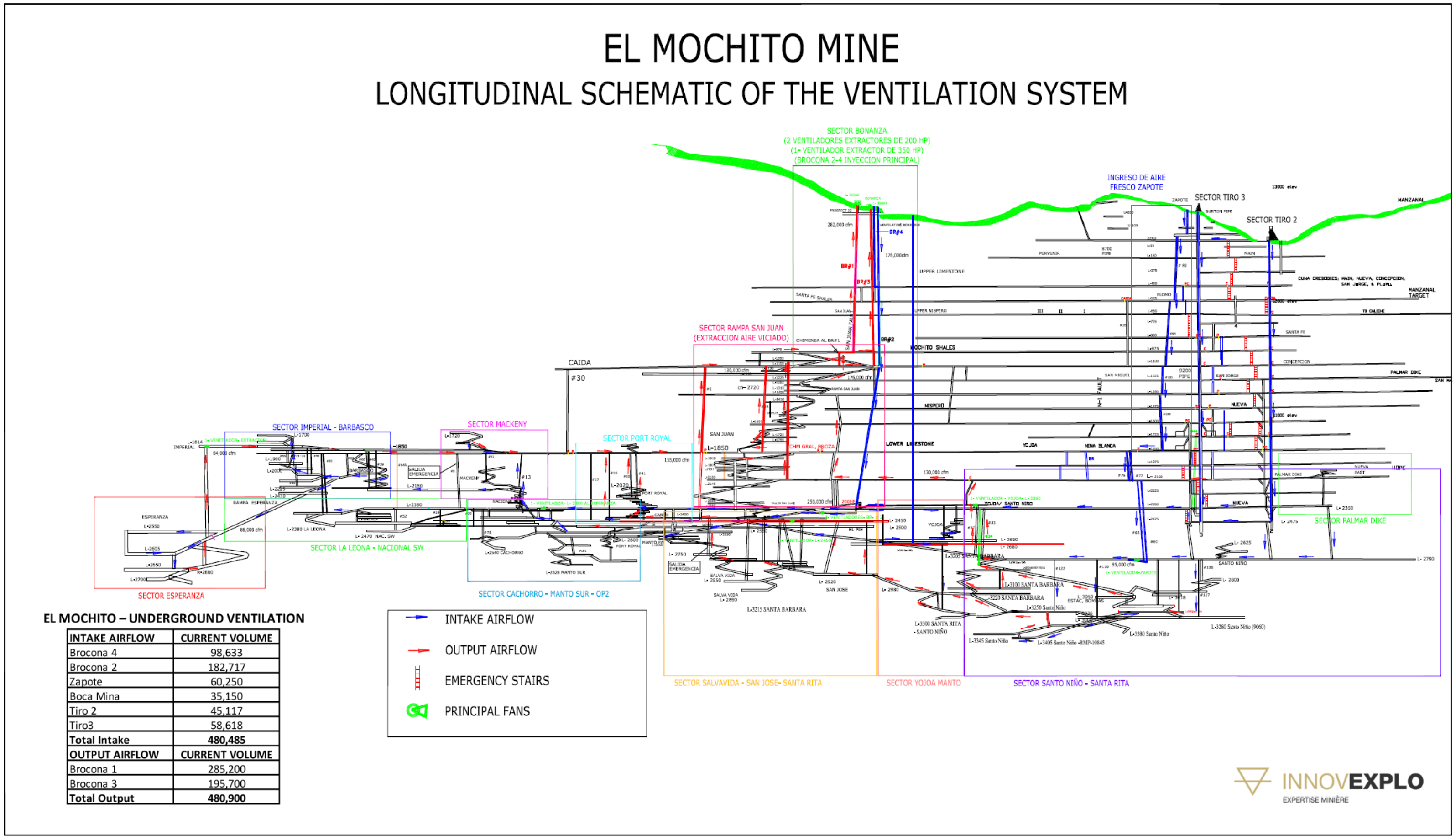
16.12 Ventilation

A schematic of the El Mochito Mine underground ventilation system is presented in Figure 16.35. The current fresh air intake is approximately 500,000 cfm and the current outflow is approximately 550,000 cfm. A summary of ventilation airflows is presented in Table 16.9. The mine working face temperature averages 33°C.

Table 16.9 – El Mochito underground ventilation

AIRFLOW BALANCE	CURRENT VOLUME (CFM)
Intake	
Raise bore 4	98,633
Raise bore 2	182,717
Zapote	60,250
Mine Entrance	35,150
No. 2 shaft	45,117
No. 3 shaft	58,618
Total Intake	**480,485**
Outflow	
Raise bore 1	258,520
Raise bore 3	195,700
Total Outflow	**480,900**
Face Temperature (Wet Bulb °C)	**33**

Source: El Mochito



Source: El Mochito.

Figure 16.35 – Longitudinal shematic of underground ventilation system, El Mochito mine

16.13 Underground Equipment Fleet

A list of the primary mobile trackless underground equipment for the El Mochito mine is presented in Table 16.10**Error! Not a valid bookmark self-reference.**. The fleet comprises 12 underground haulage trucks, 12 scooptrams, 1 rock bolter, 8 scissor lifts, 5 development jumbos and 3 long hole drills. In addition to the primary mobile trackless equipment, there is a fleet of tracked development and haulage equipment, miscellaneous trackless mobile service equipment, and other development equipment such as raise borers and Alimaks machines. All equipment is operated by the mine personnel.

Table 16.10 – Existing underground trackless mobile equipment

Type	OEM	Model / Capacity	Internal Number	Arrival Date	Arrival Condition
Haul Trucks	Sandvik	TH-320 / 20 Ton	V-62	2018-07-23	New
	Sandvik	TH-320 / 20 Ton	V-61	2018-07-22	New
	Sandvik	TH-320 / 20 Ton	V-60	2018-04-01	New
	Sandvik	TH-320 / 20 Ton	V-59	2018-03-07	New
	Sandvik	TH-320 / 20 Ton	V-58	2018-02-17	New
	Sandvik	TH-320 / 20 Ton	V-57	2017-10-24	New
	Atlas Copco	MT-2010 / 20 Ton	V-56	2017-10-23	New
	Sandvik	TH-320 / 20 Ton	V-55	2017-05-24	Used
	Sandvik	TH-320 / 20 Ton	V-54	2017-05-23	New
	Sandvik	TH-320 / 20 Ton	V-53	2015-09-16	New
	Sandvik	TH-320 / 20 Ton	V-52	2015-10-05	New
	Atlas Copco	MT-2010 / 20 Ton	V-49	2008-09-01	New
LHD Scooptrams	Sandvik	LH307	S-40	2018-03-12	New
	Sandvik	LH307	S-39	2018-01-15	New
	Sandvik	LH307	S-38	2017-10-27	New
	Sandvik	LH307	S-37	2017-07-01	New
	Sandvik	LH307	S-36	2017-06-20	Recon
	Caterpillar	R-1300G	S-35	2015-02-19	New
	Caterpillar	R-1300G	S-34	2015-02-19	New
	Atlas Copco	ST - 3.5	S-33	2011-01-01	New
	Atlas Copco	ST - 3.5	S-32	2008-10-16	New
	Atlas Copco	ST - 3.5	S-27	2008-10-02	New
	Wagner	ST - 6C	S-31	2007-02-01	Recon
Bolters	Sandvik	DS-311	DS-1	2018-03-06	New
	Sandvik	DS-311	DS-2	2013-05-07	New

Type	OEM	Model / Capacity	Internal Number	Arrival Date	Arrival Condition
Scissors	RDH	M40	Si-09	2017-08-02	New
	RDH	M40	Si-08	2017-08-01	New
	J&S Schmitz	J-1000-HS	Si-07	2010-07-01	New
	J&S Schmitz	J-1000-HS	Si-06	2008-08-01	New
	J&S Schmitz	J-1000-HS	Si-05	2008-08-01	New
	J&S Schmitz	J-1000-HS	Si-04	2008-06-01	New
	J&S Schmitz	J-1000-HS	Si-02	2007-08-01	New
Jumbos	Sandvik	DD311	J-11	2018-05-07	New
	Sandvik	DD311	J-10	2017-12-15	New
	Atlas Copco	RB-281	J-09	2014-06-15	Used
	Atlas Copco	S1D	J-05	2012-05-19	New
	Atlas Copco	RB-281	J-02	2008-08-22	New
	Atlas Copco	RB-281	J-01	2008-08-01	New
	Tamrock	MJM20B	J-07	2000-10-10	Recon
L/H Drills	Sandvik	DL-311	DL	2015-12-01	New
	Boart Longyear	Stopemate HX	Drill 4	2013-06-03	Used
	CMAC	Air Drill	Drill 3	2008-06-03	Used
	CMAC	Air Drill	Drill 2	2008-06-03	Used

Source: El Mochito; *OEM denotes "Original Equipment Manufacturer"

16.14 Manpower

The personnel required for the Expansion Project at the El Mochito mine is detailed in Table 16.11.

Table 16.11 – Manpower – Expansion Project

With Expansion	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Shared Services	175	194	197	177	174	174	174	174	174	174	174
Management	45	45	45	45	45	45	45	45	45	45	45
General Management	3	3	3	3	3	3	3	3	3	3	3
Community, Social and Government Relations	2	2	2	2	2	2	2	2	2	2	2
Central Control	8	8	8	8	8	8	8	8	8	8	8
Security	9	9	9	9	9	9	9	9	9	9	9
Camp Services	21	21	21	21	21	21	21	21	21	21	21
Business Improvement	2	2	2	2	2	2	2	2	2	2	2
Finance	42	46	48	45	42	42	42	42	42	42	42

With Expansion	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Procurement	4	5	5	4	4	4	4	4	4	4	4
Warehouse	15	18	20	18	15	15	15	15	15	15	15
IT	3	3	3	3	3	3	3	3	3	3	3
Environment	28	28	28	28	28	28	28	28	28	28	28
Land Management	18	18	18	18	18	18	18	18	18	18	18
Health and Safety	8	10	11	9	9	9	9	9	9	9	9
Safety Officers	5	7	8	6	6	6	6	6	6	6	6
Paramedics	3	3	3	3	3	3	3	3	3	3	3
HHRR	29	30	30	30	30	30	30	30	30	30	30
Human Resources	2	2	2	2	2	2	2	2	2	2	2
Hospital	14	15	15	15	15	15	15	15	15	15	15
School	7	7	7	7	7	7	7	7	7	7	7
Mochito Club and Hotel	6	6	6	6	6	6	6	6	6	6	6
Projects	38	50	50	35	35	35	35	35	35	35	35
Mine	403	460	460	463	463	463	463	463	436	436	423
Mine Administration	5	5	5	5	5	5	5	5	5	5	5
Training	1	2	2	2	2	2	2	2	2	2	2
Production	314	349	349	352	352	352	352	352	325	325	312
Sandfill Operators	18	29	29	29	29	29	29	29	29	29	29
Mine Services	56	66	66	66	66	66	66	66	66	66	66
Control Room and Assistants	9	9	9	9	9	9	9	9	9	9	9
Technical Services (Ops)	115	134	135	135	135	135	135	135	135	135	135
Technical Services	93	112	113	113	113	113	113	113	113	113	113
Geology Exploration (Surface)	2	2	2	2	2	2	2	2	2	2	2
Engineering and Planning	20	20	20	20	20	20	20	20	20	20	20
Maintenance	289	329	357	359	359	359	359	359	359	359	359
Maintenance Fixed Assets	191	229	257	259	259	259	259	259	259	259	259
Electrical Mine	35	40	46	46	46	46	46	46	46	46	46
Carpentry	3	6	6	4	4	4	4	4	4	4	4
Electrical Surface	16	16	16	16	16	16	16	16	16	16	16
Energy Generation	10	11	11	11	11	11	11	11	11	11	11
Industrial Maintenance	38	44	52	52	52	52	52	52	52	52	52
Central Shop	21	21	21	21	21	21	21	21	21	21	21
Motor Pool	8	9	9	9	9	9	9	9	9	9	9
Shafts	60	82	96	100	100	100	100	100	100	100	100

With Expansion	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Maintenance Mobile Equipment	98	100	100	100	100	100	100	100	100	100	100
Mills	132	132	132	136	136	136	136	136	136	136	136
Concentrator Admin	3	3	3	3	3	3	3	3	3	3	3
Concentrator Operations	33	33	33	37	37	37	37	37	37	37	37
ConcentratorPuerto Cortés	2	2	2	2	2	2	2	2	2	2	2
Chemical Lab	21	21	21	21	21	21	21	21	21	21	21
Mill Maintenance	28	28	28	28	28	28	28	28	28	28	28
Eletrical Mill Maintenance	15	15	15	15	15	15	15	15	15	15	15
TSF Operations	10	10	10	10	10	10	10	10	10	10	10
Grinder Operations	20	20	20	20	20	20	20	20	20	20	20
SUMMARY											
Shared Services	175	194	197	177	174	174	174	174	174	174	174
Mine Operations	807	923	952	957	957	957	957	957	930	930	917
Mine	403	460	460	463	463	463	463	463	436	436	423
Maintenance Fixed Assets	191	229	257	259	259	259	259	259	259	259	259
Maintenance Mobile Equipment	98	100	100	100	100	100	100	100	100	100	100
Technical Services	115	134	135	135	135	135	135	135	135	135	135
Mills	132	132	132	136	136	136	136	136	136	136	136
TOTAL HEADCOUNT	**1,114**	**1,249**	**1,281**	**1,270**	**1,267**	**1,267**	**1,267**	**1,267**	**1,240**	**1,240**	**1,227**
External Services – Sporadic Projects	235										

17. RECOVERY METHOD

17.1 Introduction

Run-of-mine (ROM) mineralized material (or “mineral”) is delivered to a crushing facility adjacent to the main El Mochito shaft No. 2 (Figure 17.1). The mineral is crushed to -¾ in (19 mm) and is transported 1.3 km north to the processing plant (concentrator) where it is ground to a fine size in a combination of rod and ball mills. Separate lead and zinc concentrates are produced by conventional froth flotation. These concentrates are dewatered, and bulk transported 164 km by truck as moist concentrates to the coastal port of Puerto Cortés. Process plant tailings are normally processed in a mine backfill plant located near the crusher plant and mine, and the remaining fines are returned to the process plant where they are pumped 4.5 km to a lined tailings management facility.

Source: P&E, Feb ‘18

Figure 17.1 – El Mochito No. 2 Shaft

The present processing facilities have a nameplate capacity of 2,200 tpd, however a normal process throughput of 2,450 tpd or more is frequently attained, and short-term milling rates of 2,700 tpd have been achieved (pers. comm., El Mochito Process Plant Manager, August 2018).

El Mochito proposes expanding the rate of mineral production and ROM delivery to the crusher facility. Several process bottlenecks and efficiency restrictions encountered in the El Mochito processing facilities will be addressed to provide a 20% expansion in capacity to 2,800 tpd over 355 operating days per year. An expanded throughput capacity of 3,000 tpd can be anticipated on an incidental basis. The important existing process bottlenecks and efficiency restrictions are as follows:

- Water saturated crusher plant feed – 10% moisture which restricts the operation of the crusher circuit and creates excess spillage;
- Oversize rocks (oversize rocks as they are called by El Mochito personnel) damage primary conveyors and plug the jaw crusher feed;
- Rod and ball mill grinding is at capacity and circulating loads are high;
- Flotation cells lack capacity and are performing poorly;
- Concentrate filtration capacity is limited and moisture content is sometimes above safe shipping transport limits;
- Tailings pumping lacks reliability due to frequent power interruptions and the pipeline is at capacity; and
- No capacity to recycle tailings pond water.

Additional process plant operational restrictions include frequent power outages, plastic debris in the feed, and a shortage of fresh water during the dry season.

Other than implementing a remedy for power outages, El Mochito proposes to eliminate the process plant bottlenecks and restrictions by implementing process and facility changes that will ensure a reliable and efficient operating plant with daily capacity of 2,800 tpd or more over 255 d/y. Short term throughputs of 3,000 t will be anticipated.

17.2 Overview of Current Process

As noted above, the crushing facility is located adjacent to the No. 2 Shaft which hoists all the El Mochito mineral. The nominally minus 10 in (250 mm) mineral is crushed to minus ¾ in (19 mm) and is hauled by truck to the process plant on a semi-continuous basis. The crushed feed is wet ground in open circuit with two rod mills in parallel followed by a secondary ball mill in open circuit and a tertiary ball mill in closed circuit. The overflows from the cyclones that separate ground material by particle size in the milling circuit report to the differential lead and zinc flotation circuits. Separate lead and zinc flotation concentrates are thickened, then filtered using vacuum disc filters with the concentrates being stored in a shed before being trucked to a concentrate warehouse at the port of Puerto Cortés.

Metallurgical recoveries are typically in the range of 74% to 78% for lead, 86% to 90% for zinc, and a total of 70% to 80% for silver (which reports to both lead and zinc concentrates).

The El Mochito processing facilities have a long history with many modifications implemented over decades of operations. P&E visted the exisiting process facilities in February 2018 and found them in reasonably good operating condition with a minimal amount of unused or derelict legacies. Housekeeping and worker safety were observed to be generally good with several targeted improvements in plant infrastructure identified by plant management. The crushing, milling and tailings facilities (including the laboratory) currently have a complement of 133 persons and operate on a daily 3-shift basis. A one day per month maintenance shutdown is scheduled. Unscheduled down-time is mostly due to shortages of crushed mineral and electric power interruptions from the Honduras power grid. Extensive site standby power is in place but this is dedicated to mine water pumping, ventilation and emergency needs.

The principal components of the processing facilities are outlined below. Where significant modifications are proposed to facilitate a substantial increase in the process capacity (tpd) or efficiency, these are described and assessed.

17.3 Crushing Facility

ROM material is hoisted in 10 t skips in the No. 2 Shaft and unloaded into a small surge bin as shown in Figure 17.2. The chute shown in the figure provides the option for ground dumping. Storage capacity is limited in this surge bin: surplus feed (in excess of crushing capacity) at the time of hoisting is stockpiled next to the mine skip surge bin or hauled to a separate storage location and later fed back into the crushing circuit by means of a front-end loader dumping onto conveyor belt #1.

Source: P&E Feb '18

Figure 17.2 – Mine skip surge bin

Mineralized material is drawn from the surge bin with a reciprocating feeder onto conveyor belt #1. This belt has a metal detector that stops the belt to allow manual metal removal. The mineralized material is transferred onto very the long conveyor #2 which discharges into the coarse ore bin. The coarse mineralized material feed bin draw is a vibrating grizzly feeder with a 2-in (50 mm) slotted opening (Figure 17.3a). The oversize is crushed in the primary single toggle jaw crusher and the undersize passes to conveyor #3 below. The jaw crusher reduces the feed to minus 2 in and the crushed rock discharges onto conveyor #3. A static magnet over conveyor #3 removes residual metal from the belt. Conveyor #3 discharges onto a bypass chute to conveyor #4.

As shown in Figure 17.3a, the feed is very wet, and as indicated Figure 17.3b, oversize rocks are found in the ROM feed and report to the primary crusher feed. The overall crushing circuit is shown in Figure 17.4 – a photograph taken by P&E in February 2018 of the crushing plant monitoring and control system screen. Conveyor #4 discharges onto #5, which feeds a double-deck vibrating screen with a 1-¼ in (32 mm) top deck and formerly a 5/8 in (16 mm) bottom deck. In February 2018, this 5/8" square slot bottom screen was replaced with a ¾" by 5" (19 mm by 127 mm) slotted screen to increase throughput. The ¾" screen is still frequently being plugged by the wet mineral. The ¾" screen undersize reports to conveyor #6 and when operating, the screen oversize reports to the tertiary 5-½ ft (1.7 m) Symons short-head cone crusher in closed circuit with the double deck screen. The 5-½ ft cone crusher product reports to conveyor #4. Conveyor #6 transports screen undersize to the five fine process plant feed bins across the road. Two 30 t capacity low-profile Dux trucks (Figure 17.5) transport the crushed feed 1.3 km by road from the fine feed bins to the process plant feed bin.

Source: P&E Feb '18

Figure 17.3 – (a) Jaw crusher grizzly feeder

(b) Oversize rock (>0.5 m) on conveyor #2

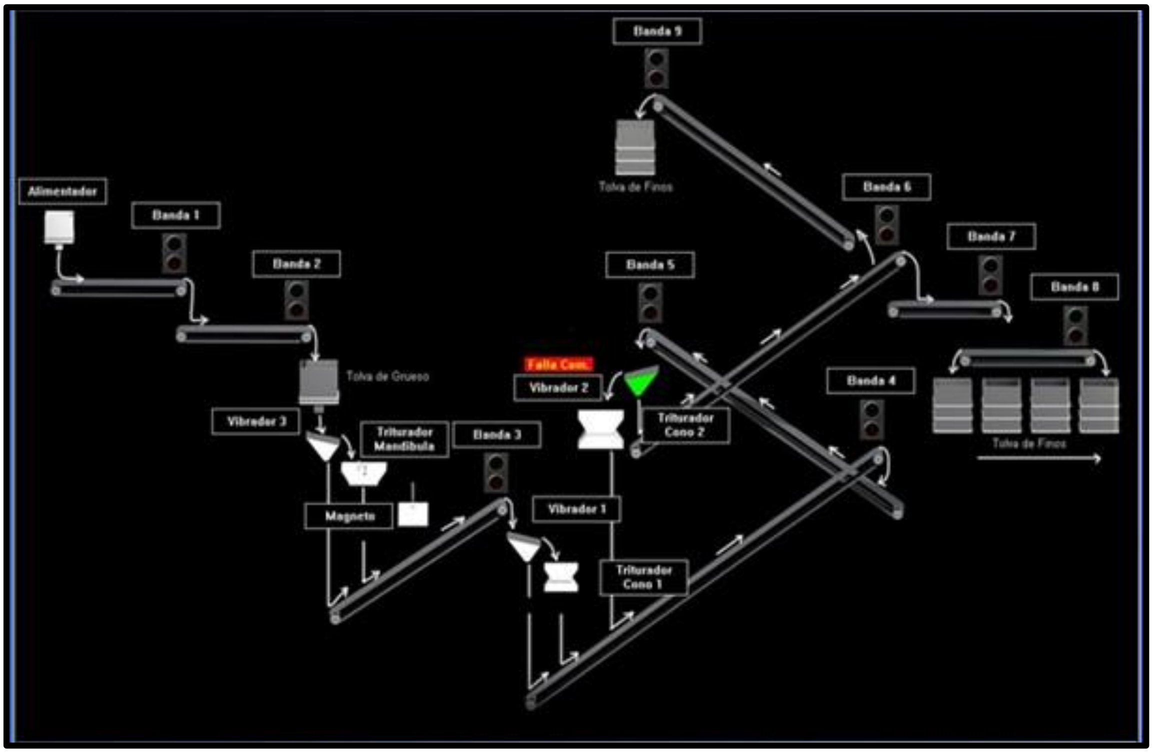


Figure 17.4 – Crusher plant control screen

As shown in Figure 17.4, the complete crushing circuit included conveyor #3 discharging onto a single deck vibrating screen with 50 mm (2 in) apertures with the screen oversize reporting to the secondary 1.2 m (4 ft) Symons standard cone crusher in open circuit and the screen undersize reporting to conveyor #4. The 1.2 m (4 ft) standard cone crusher product reports to belt #4. El Mochito has recently recommissioned this portion of the crushing circuit. The crushing plant operating data (provided by El Mochito) are summarized in Table 17.1.

Figure 17.5 – Fine mineral bins and Dux truck transporting material to process plant

Table 17.1 – El Mochito Crushing Circuit

ASPECTS	DETAILS	UNITS
Operating Time		11 h/d -usually much more
Max. Average Throughput		154 t/h
Mine Skip Bin Feeder	Reciprocating	10 HP
Coarse Material Feeder	Vibrating Grizzly, 30 HP (Figure 17.3(a))	2" (50 mm) bar gap
Primary Crusher	Pioneer 3042 Single Toggle Jaw Crusher, 150 kW	2" setting
Primary Screen	Single Deck Vibrating Screen, 10 HP	2" apertures
Secondary Crusher	4-foot Symons Standard Cone, 125 HP	Close Side Setting 1 in (25 mm) Coarse mantle liner
Secondary Screen	Double Deck Vibrating Screen, 30 HP	Top Deck 1 ¼"(32 mm), Bottom Deck 3/4" (19 mm)
Tertiary Crusher	5 ½ foot Symons Short-head Cone, 250 HP	Close Side Setting 3/4" Fine Mantle Liner

17.3.1 Crushing plant challenges

Mineral Feed Bins

Both the coarse and fine feed bins are flat bottomed and have single discharge points. Aggravated by the wet material conditions, the bins are believed to exhibit a considerable proportion of "dead zones" of immovable material. There are few practical solutions to this condition. However, should drier crushed mineral be realized, active bin capacity could be improved following "dead zone" disturbance by mechanical means.

Tramp Iron

Tramp iron detection and removal is normally effective. However, early in 2018, a large piece of iron jammed the primary crusher, destroying a bearing. This resulted in extended crusher and process plant shutdowns. To reduce this risk, more sensitive metal detectors and moving belt magnets are currently (September - October 2018) being installed.

Oversize Rocks

Not only are rocks (Figure 17.3b) destructive to conveyors #1 and #2, but they restrict jaw crusher feed as well. Proposed modifications underground (El Mochito July 2018) may not entirely eliminate the threat posed by oversize rocks. As an interim measure, early in 2018, when an oversize rock is observed on conveyors #1 or #2, these conveyors are stopped and the rock is broken by a hand-operated hammer. Mechanical removal (a dedicated grizzly) or the use of a hydraulically driven device could be considered to lift these rocks away from a conveyor for breakage with an appropriately-sized impact rock breaker.

Wet Crusher Plant Feed

The El Mochito mine is a very wet mine, collecting and discharging between 8,000 usgpm and 12,000 usgpm (1,800 m^3/h and 2,700 m^3/h) of water. The ROM moisture content is typically at maximum – often greater than 10%. Wet feed slows crusher plant operation and contributes to conveyor spillage, reduction in bin capacity (wet packing of ROM feed and crushed material) and packing screens and transfer points. Wet feed is expected to be an ongoing condition.

Paradoxically, the solution to handling wet feed in a crusher plant is to apply more water. In a typical fully saturated wet feed situation, fresh water sprays are used to flush out the finest wet fraction and transport these fines as a dilute slurry directly to the process plant circuits. The coarser fractions proceed to the normal crushing circuits where, following the first crushing step, as a result of expanded surface area, the crushed material becomes significantly below moisture saturation levels and is much freer flowing.

El Mochito has considered the design, engineering and installation of a ROM crusher feed washing system, and in consideration of site limitations has chosen a design that will wash the ROM feed in two stages. Normally a wash plant would be installed following the primary jaw crusher but this choice is logistically restrictive at the El Mochito crushing facility. A summary of the proposed El Mochito crusher feed washing circuit is outlined below.

17.3.2 Proposed washing circuit

A flowsheet of the proposed crusher feed washing circuit is shown in Figure 17.6. ROM material would be pressure-washed on a two-level vibrating finger grizzly positioned at the discharge point of conveyor #1. Conveyor #1 will be raised to permit the installation of a ‘trouser leg’ diversion chute. Washed plus 80 mm and 30 mm material will proceed to conveyor #2 and feed to the jaw crusher. Minus 30 mm solids will be washed on a 2 mm screen with the plus 2 mm also being transferred to conveyor #2. Slurry containing minus 2 mm particles will be cycloned and the cyclone underflow solids screened at 200 mesh with the plus 200 mesh transferred to conveyor #6, which feeds the fine process plant feed bins. Minus 200 mesh material will be pumped as a dilute slurry directly to the milling circuits.

A South African equipment supplier (Bond Equipment) has been identified to design, engineer and facilitate the washing installations as well as commission the facility. Local contactors will supply the civil works. The estimated cost is $2.1M and it will take 35 weeks to complete.

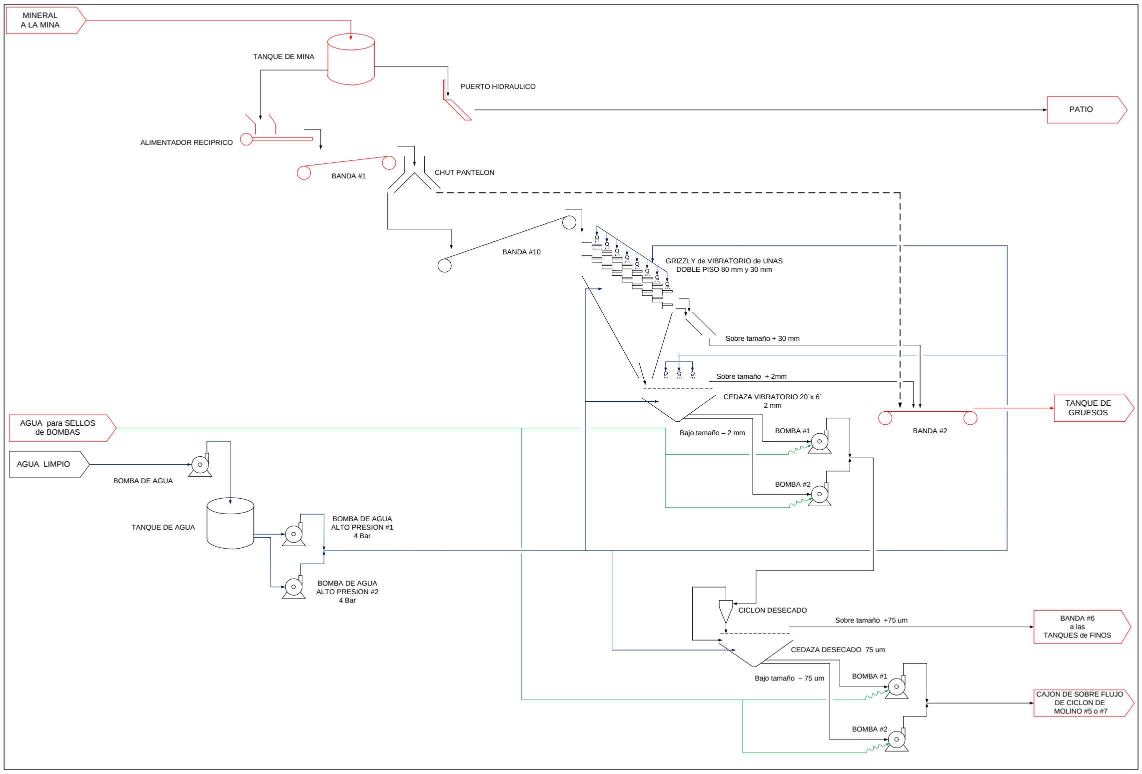


Figure 17.6 – Proposed El Mochito crusher feed washing circuit

17.3.3 Comments and recommendations, washing circuit

The installation and operation of the ROM washing circuit is considered essential for the smooth operation of the crushing plant as well as to increase the crushing rate. Specific benefits that can be reasonably expected are:

- Hourly crushing plant throughput will be increased, for example to 180 t/h[2], allowing sufficient daily downtime for maintenance;
- Final crushed process plant feed size can be reduced from current 19 mm (¾ in) size to 16 mm (5/8 in) or even 13 mm (1/2 in). This will facilitate a significant increase in daily grinding capacity; and
- Conveyor spillage, chute and screen blockage will be significantly reduced.

P&E has the following recommendations:

[2] Subject to shaft hoisting capacity

- Water conservation (recycling) should be considered;
- All spray water lines would benefit from the installation of fine trash screens in advance of the spray nozzles;
- Measures may need to be considered to prevent oversize rocks and mine debris from compromising the new trouser chute;
- Sprays and wash boxes should considered for the head pulleys of conveyors #1, #2 and #10. Wash box collections could be integrated into the washing circuit; and
- The engineering design needs to consider accounting of the tonnage and grade of fines delivered directly to the process plant.

17.4 Concentrator

17.4.1 General

The El Mochito process plant (concentrator) is a conventional facility that employs reliable rod and ball grinding of crushed feed, froth flotation and concentrate filtration to produce separate lead and zinc concentrates. Both concentrates contain payable concentrations of silver. The facility includes a continuously staffed control room for monitoring, control and equipment stop-start. Operation is continuous except for scheduled maintenance and for unscheduled shutdowns, principally caused by feed shortage or power interruptions.

17.4.2 Fine crushed process plant feed receiving

Crushed feed is delivered to the mill by two 30 t capacity Dux transporters on a relatively continuous basis from the crushing facility. The mill feed bin is relatively small with 2-4 hr live mill feed capacity.

17.4.3 Grinding

The minus 19 mm (¾ in) crushed feed is drawn out of the mill feed bin in parallel by feed chutes and conveyor belts to the two primary rod mills. Weightometers on each rod mill feed belt record the tonnes milled – samples are hand collected from these belts to determine feed moisture content. The rod mill grind, which is nominally minus 1mm, is sent to the primary Krebbs cyclone. Cyclone underflow is the fed to the secondary ball bill which operates in open circuit; cyclone overflow goes directly to flotation. The secondary ball bill combines with the discharge of the tertiary ball bill and is pumped to second Krebs cyclone. The underflow from the second Krebbs cyclone is fed to the tertiary ball bill in closed circuit and the cyclone overflows to lead flotation. The final grind target (cyclone overflow) grind is typically 80% minus 65 mesh (212 microns) and 54% minus 200 mesh (74 microns).

The current grinding circuit is represented in Figure 17.7 and in detail in Figure 17.8. Data provided by El Mochito on the grinding equipment are shown in Table 17.2.

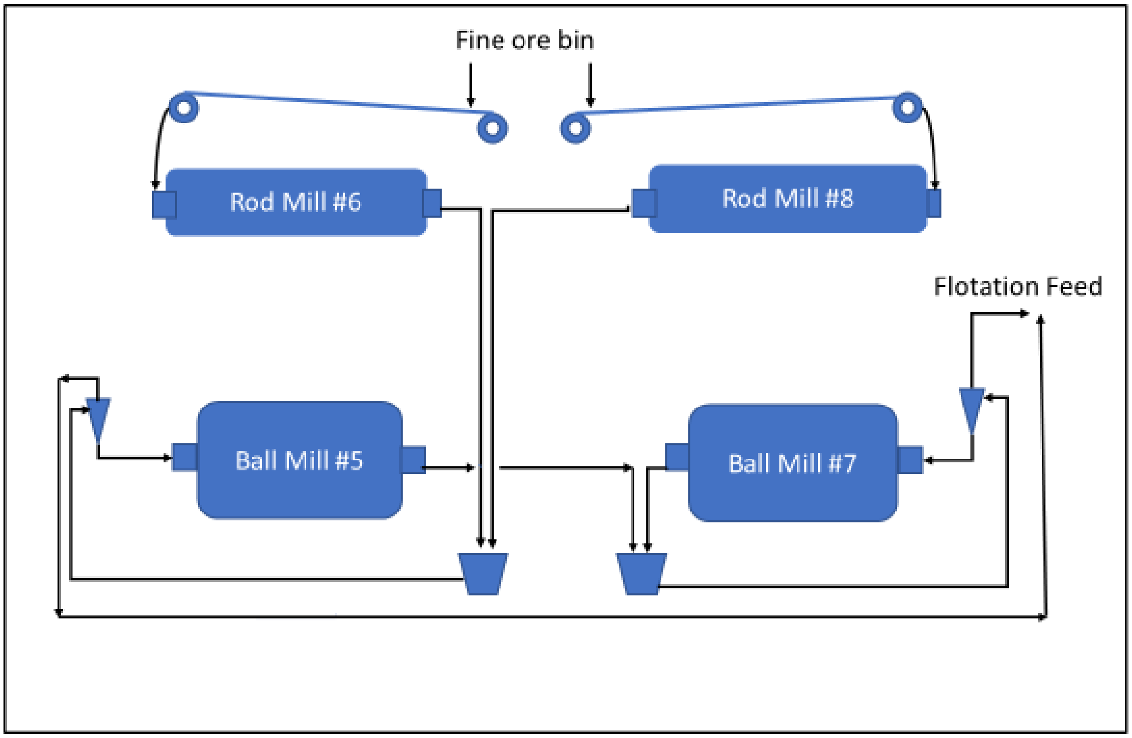


Figure 17.7 – Current El Mochito grinding circuit

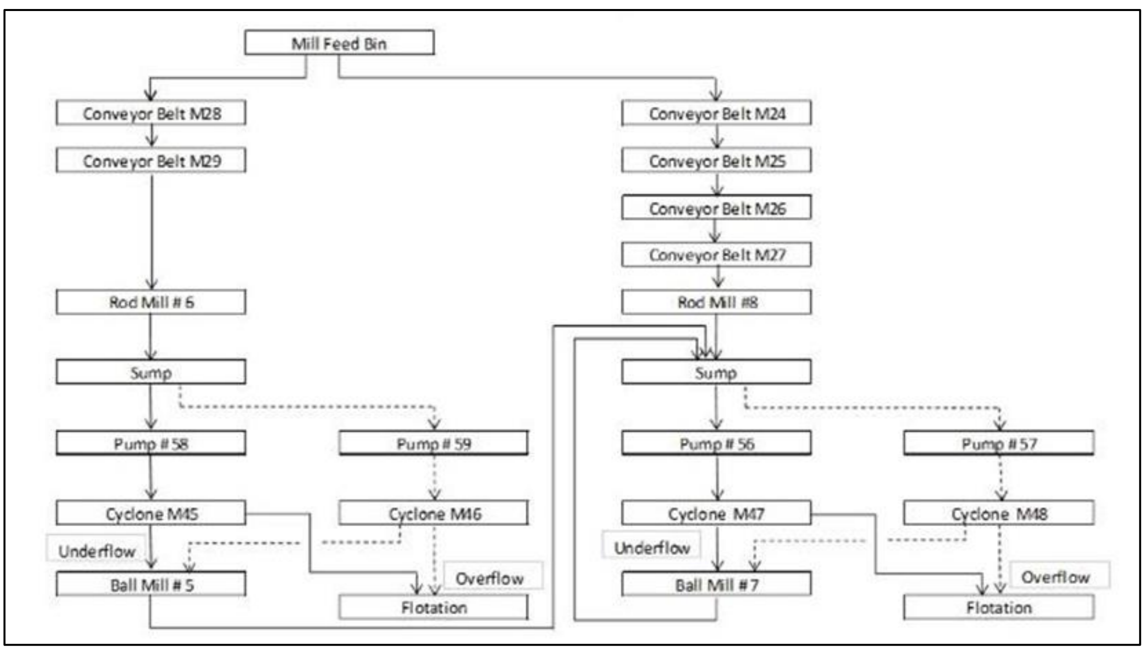


Figure 17.8 – Current grinding circuit with screens

Table 17.2 – El Mochito Grinding Circuits

Function	Primary Grind	Primary Grind	Secondary Grind	Tertiary Grind	Zinc Regrind
	Mill 6 (Rod)	**Mill 8 (Rod)**	**Mill 5 (Ball)**	**Mill 7 (Ball)**	**Mill 9 (Ball)**
Make	**Denver**	**Denver**	**Marcy**	**Marcy**	**Marcy**
Specific Gravity (g/cc)	3.34	3.34	3.34	3.34	3.34
Bond Work Index	6.55	6.55	6.55	6.55	
Diameter (ft)	6	6	9	8.5	7´6¨
Length (ft)	12	12	10	12	12
RPM Normal	20	20	20	20	22
Motor (HP)	200	200	500	500	300
Motor Voltage	2,300	2,300	2,300	2,300	2,300
Power factor	0.85	0.85	0.85	0.85	0.85
Motor Efficiency (%)	76.8	79.3	85.8	92.7	
Total volume (m^3)	7.93	7.93	15.7	14.73	12.83
Feed tph	47.82	47.82	240.71	186.63	
Energy consumed (kWh/t)	2.4	2.47	1.33	1.85	
Critical velocity (RPM)	31.28	31.28	25.54	25.54	27.8
Velocity (ft/min)	589.69	589.69	722.22	722.22	663.68
Critical Velocity (%)	63.93	63.93	78.3	78.3	79.15
Level of Balls / Rods,%	32.71	28.44	41.82	16,52	
Amperage, practical operation	42	41	91	91	48
Charge	Rods	Rods	Balls	Balls	Balls
Amperage, motor nominal	46	52	117	117	73.4
Rotation	Anti -clockwise	Clockwise	Clockwise	Anti-clockwise	Anti-clockwise
Liners	Steel	Steel	Rubber	Rubber	Rubber
Rod or ball size (in)	3.5¨ - 4¨	3.5¨ - 4¨	1.5¨ - 2¨	1.5¨ - 2¨	

17.4.3.1 Grinding circuit modifications

The simplification and streamlining of the El Mochito primary grinding circuit are proposed. These modifications are outlined in Figure 17.9. Two parallel grinding configurations will be arranged with rod mills in open circuit (as currently), each feeding a ball mill in closed circuit with spiral screens which are intended to replace the Krebbs cyclones. The screens will offer a much sharper cut and at a designated particle size. A slotted screen size – 200 by 600 microns, is proposed with the additional capacity to screen out plus 3mm mine-sourced trash (plastics) that interferes with flotation. The feed to flotation will be finer than the current grind – 100% minus vs 80% minus 212 microns.

The cost of these modifications is estimated to be $0.4M and the time from equipment order to operation is expected to be 38 weeks.

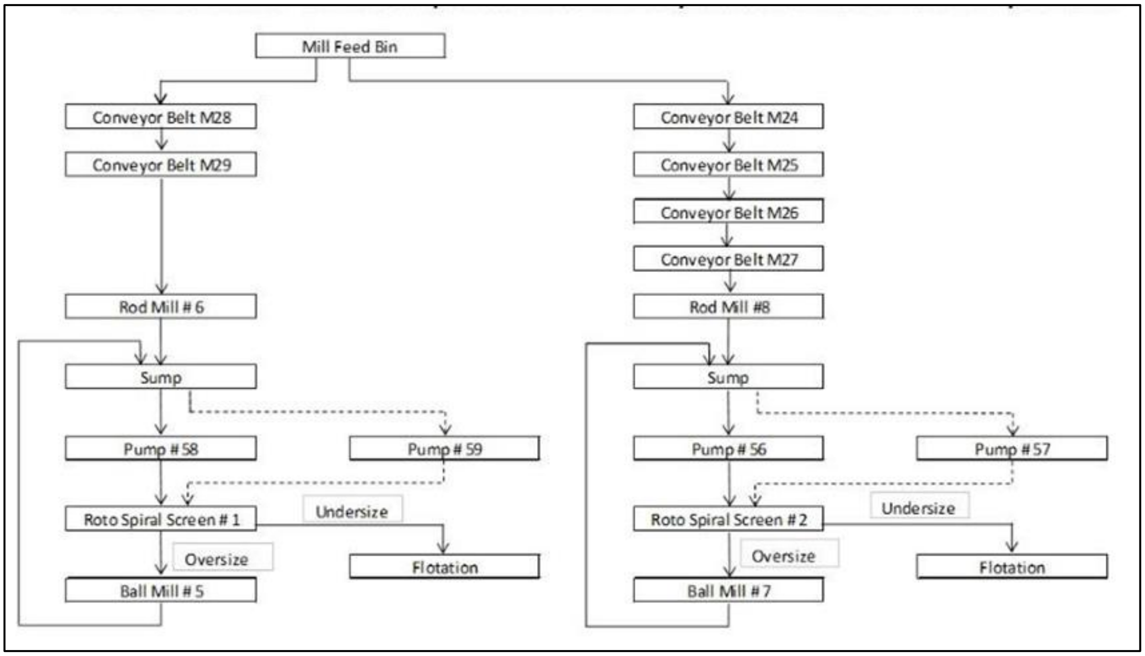


Figure 17.9 – Proposed grinding circuit

17.4.3.2 Comments and recommendations, grinding circuit modifications

El Mochito has provided calculations, based on recognized empirical models, that indicate each revised grinding circuit can readily process 1,400 dry tpd, or a total of 2,800 tpd. Adjusting the model inputs to 3,000 tpd indicate the capacity limit may be approached in the ball mills. However, with the circulating load decreased by the use of rotating screens, and the removal of fines at the washing plant, an increased grinding capacity of at least 3,000 tpd can be anticipated.

The screening out of mine-sourced plastic debris using rotary screens is an essential improvement. Stationary screens are an option for debris removal but are susceptible to plugging by the debris.

The current hydro-cyclones will remain in place and these can be used as a screen substitute when required.

P&E has the following recommendation and comment:

- The simplification of the grinding circuit in combination with spiral screen installation is warranted and represents low risk of process disruption; and
- While international experience with the rotary screens for grinding classification is somewhat limited, the projected screen performance and screen life are expected to meet El Mochito requirements.

17.4.4 Lead and zinc flotation

Conventional differential flotation is practiced at El Mochito with galena (Pb) being floated first following the depression of sphalerite (Zn) with a mixture of sodium cyanide and zinc sulphate. Zinc flotation from lead flotation tails follows by activating the zinc with copper provided by the addition of copper sulphate.

The lead flotation circuit, shown in Figure 17.10, currently consists of two 12 m^3 Gallagher Agitair roughers cells, two 12 m^3 Gallagher middling cells and four 12 m^3 Gallagher scavenger cells. The rougher concentrate is pumped to four Denver cleaner cells, the middling concentrate is pumped to the rougher feed and the scavenger concentrate is pumped to the middlings feed. The final lead concentrate from the cleaner cells is sent to the lead thickener. The tails from the cleaner cells are returned to the lead rougher feed.

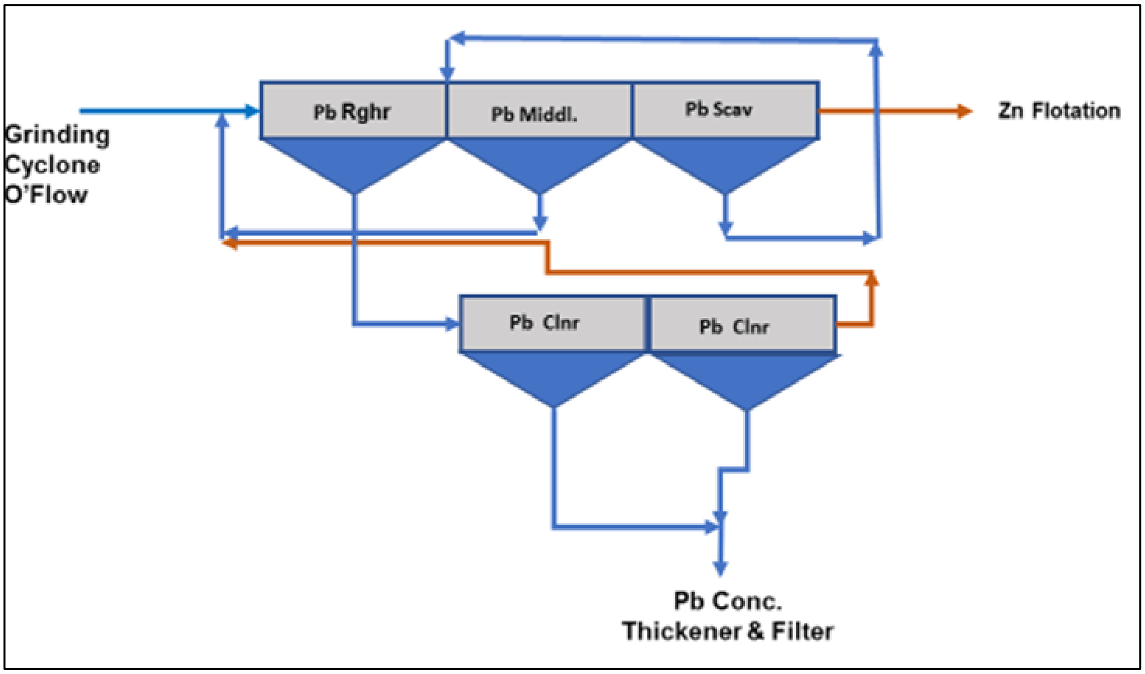


Figure 17.10 – El Mochito lead flotation circuit

The zinc flotation circuit shown schematically in Figure 17.11 consists of three Gallagher roughers, three Gallagher middling cells and four Gallagher scavenger cells – all cells are 12 m3. The rougher concentrate is pumped to the second bank of Denver cleaner cells and the middling concentrate and the scavenger concentrates are pumped to the first bank of Denver cleaner cells.

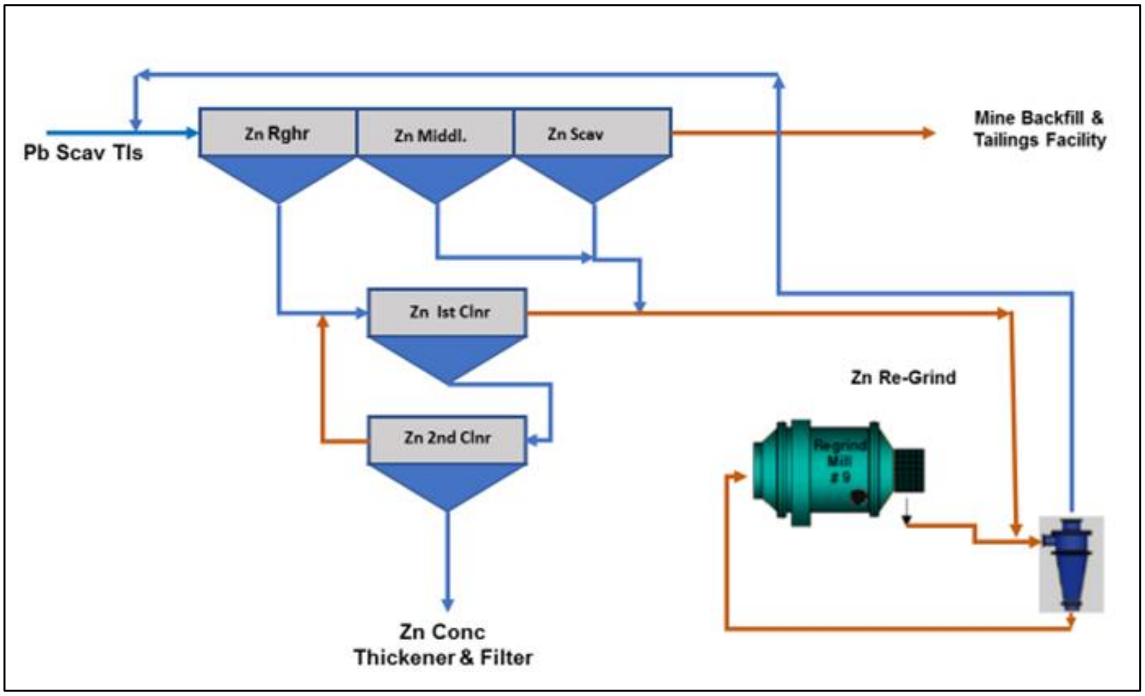


Figure 17.11 – El Mochito zinc flotation circuit

The concentrate from the final zinc cleaner cells flows by gravity to the zinc thickener and the tails from the final zinc cleaner cells are pumped to the feed of the secondary zinc cleaner cells. The tails from the primary zinc cleaner cells are pumped to the regrind ball mill discharge pump box. The regrind ball mill is in closed circuit with a cyclone with the underflow feeding the regrind ball mill and the cyclone overflow flows to the zinc rougher feed.

The performance of the large Gallagher cells is poor as recently outlined by El Mochito (July 2018): "*Some cells have a very pronounced wave action that washes slurry into the concentrate launders. Some cells do not agitate properly requiring the operator to open the air fully which then results in excessive turbulence in the froth zone. The cell level control is poor resulting in some cells having low levels with no froth overflow into the launders. The rotors and stators are in the bottom of the cells and the cells tend to sand up when there are power failures and the cells have to be drained and washed out to start them up again. This results in mill down time. There is a lot of wear on the rotors and stators resulting in some stators collapsing. The alignment of the stators around the rotors is not central resulting poor slurry flow patterns in the tank. The solid suspension is also poor as there is a lot of silting up in the cells*."

These descriptions are similar to observations made and video-recorded by P&E during an El Mochito plant visit in February 2018. At that time, deficiencies in launder, blower and reagent feeder operation were also noted. The currently installed flotation cells represent poorer earlier technology and the cell units are known to be difficult to control. The sustainability of the process plant operation suggests either major repair and upgrading of the existing flotation equipment or replacement. El Mochito prefers replacement.

17.4.4.1 Flotation cell replacement

Modern, advanced-design flotation cells have been identified as replacement for all of the existing flotation cells. These new cells would be manufactured and supplied by Ultimate Flotation Ltd of South Africa. P&E has reviewed the features and operating experience of these cells and has noted the following:

- Each cell has two agitators on each shaft: one for slurry suspension, one for air intake and dispersion;
- Each cell has a circular froth discharge perimeter that is enhanced by V-notch intrusions from the perimeter;
- Air blowers are not required;
- Drives are variable speed, assisting in the optimization of each cell's operation;
- Cells can be restarted without slurry pre-agitation (such as with an air lance) or without draining after shut-down (an important feature for El Mochito with the frequent power outages); and
- Cell units would be delivered complete and are reasonably priced.

A small number of large 30 m^3 cells is proposed for rougher-scavengers, 3 for Pb and 4 for Zn). Smaller (6 m^3) cells are proposed for cleaners (2 for Pb and 4 for Zn). New froth-compatible pumps will be acquired and two-stage slurry samplers will be built on site and installed. These samplers will increase the precision of metallurgical accounting.

The large cells would be situated in currently empty plant space and the lead cleaners placed where the spare bank of flotation cells is located. Adequate overhead crane hoisting capacity exists for installation of the large cells. The zinc cleaners will be installed where the current zinc roughers are located. The installations will be sequential and are intended to not disrupt plant operations. The estimated total cost is $1.8M and will take 9 months to complete.

17.4.4.2 Comments and recommendations, flotation cell replacement

Flotation cell replacement with modern, efficient equipment is a preferred option to a "patch and go" strategy. Lower operating costs (power) and improved metallurgical performance can be anticipated.

P&E has the following recommendations:

- Although more costly, a larger number of smaller Ultimate Flotation cells (e.g., 12 m^3) should be considered for the Pb and Zn rougher-scavenger units. This would reduce the potential for short circuiting and would allow one or more units to be bypassed for maintenance;
- The installation of reagent conditioning tankage in advance of the first rougher cell should be investigated (e.g., laboratory tests), particularly for the lead circuit where several reagents are required and could be sequentially added for maximum impact;
- Seven large-scale Ultimate Flotation installations are in place at mines in Africa. The risks to El Mochito for service and parts in the long term could be considered low, but

are not insignificant, and the large cells 30 m^3 are almost 5 m in diameter – large item shipment by road from the Port may be an extra cost.

17.4.5 Magnetite removal

Magnetite is a significant gangue mineral in the El Mochito mineralized resources which contributes the largest proportion of the 15% Fe content in the mineral. Magnetite typically contaminates both lead and zinc concentrates, reducing concentrate grade. In the past, magnetite concentrate was recovered from zinc flotation tails for sale, but markets have vanished. About 4,000 tpy @ 50% iron is estimated to have been produced. Idle magnetite recovery (magnetic drum separators) and handling facilities (thickening and filtration) remain in place in the process plant.

Consideration is being given to reviving the magnetic circuit, but this time removing magnetite in advance of lead flotation. The magnetic separators would be refurbished and installed along with an upgraded two-stage flotation feed sampler.

The magnetite concentrate could be stockpiled for sale or re-introduced into the flotation tailings that are pumped to the mine backfill plant. If magnetite buyers are found, it is anticipated that concentrate production and shipment would be revenue neutral.

The advantages of magnetite removal would be:

- Improved lead and zinc concentrate grade;
- Reduced flotation reagent consumption;
- Increased flotation cell retention time; and
- If a market is found for the magnetite, reduced strain on tailings pumping and tailings storage.

The estimated cost of this plant modification is $0.2M and would take 4 months to complete.

17.4.5.1 Comments, magnetite removal

Magnetite removal in advance of flotation is expected to improve flotation performance and concentrate grade. However, to be economically successful, the loss of lead and zinc to the magnetite concentrate must be small. A trade-off between small lead and zinc losses and improved concentrate grade will need to be evaluated. Two-stage, in-plant magnetic separation tests have been conducted using the plant equipment to evaluate lead and zinc distribution to the magnetics concentrate. While initial results may be less than optimum (re Pb and Zn content in the magnetite concentrate), several options exist to minimize potential Pb and Zn losses. This includes lower intensity magnetite fields to collect only 100% liberated magnetite and the selection of intermediate process streams as a “mag sep” feed. Small-scale tests at a commercial laboratory could be considered (it is assumed that the El Mochito metallurgical laboratory does not have magnetic equipment that would simulate the plant conditions).

17.4.6 Concentrate thickening and filtration

Conventional thickeners and vacuum disc filters are used for dewatering the concentrates at El Mochito. There is one thickener for lead concentrate with the underflow pumped to the single 5-disc filter. The filtered cake from the lead disc filter is transported by conveyor belt to the lead concentrate shed. The overflow from the lead thickener is pumped to the milling circuit and is used as process water.

There are two thickeners for zinc concentrate, a primary thickener and a secondary thickener for the overflow from the primary thickener. The underflow from the primary thickener is pumped to two Eimco 5-disc filters. The filtered cake from the zinc disc filters is transported by conveyor belt to the zinc concentrate shed. The overflow from the zinc thickener is pumped to the zinc flotation circuit and is used as launder spray water in the zinc circuit.

Flocculant is added to both thickeners. Typical filtered concentrate cake moisture levels are: lead concentrate 9.5% to 12.0%, zinc concentrate up to 11.5%. Moisture levels between 8% and 9% are preferred to ensure that concentrate fluidization in truck transport and in a ship's hold does not occur.

The disc filters are essentially worn out, requiring constant maintenance and are operating at capacity. The use of "hand-held beaters" is currently needed to remove filter cake from the cloth.

17.4.6.1 Vacuum disc filters with pressure plate filters

El Mochito proposes to replace the disc filters with pressure plate filters, a commonly accepted method for filtration of sulphide flotation concentrate. Consistently lower cake moisture contents are realized using pressure filters than obtained using vacuum disc filters. High moisture El Mochito concentrate has recently resulted in spills during truck transport to the port and efforts to dry wet concentrate at the port facility by moving it around with a front-end loader have only been partially successful.

A low-cost proposal has been received from a Chinese manufacturer, Yuzhou Sino Filtration: $54,000 for two filters (one for Pb and one for Zn), FOB, China.

The total estimated cost for the pressure filter installation is $0.4M and would take 6 months to complete.

17.4.6.2 Comments and recommendations, installation of pressure filters

The replacement of the vacuum disc filters with pressure filters can be considered a priority for the preparation of bulk concentrate for shipment. The disc filters are proposed to remain as standby facilities. This is a good strategy.

P&E has the following recommendations:

- Pressure filtration rates should be tested with selected cloths; and
- Due to the surprisingly low quoted capital costs, the Yuzhou Sino proposal could be re-examined for filter capacity, reliability and supplier support aspects.

17.4.7 Concentrate storage and shipment

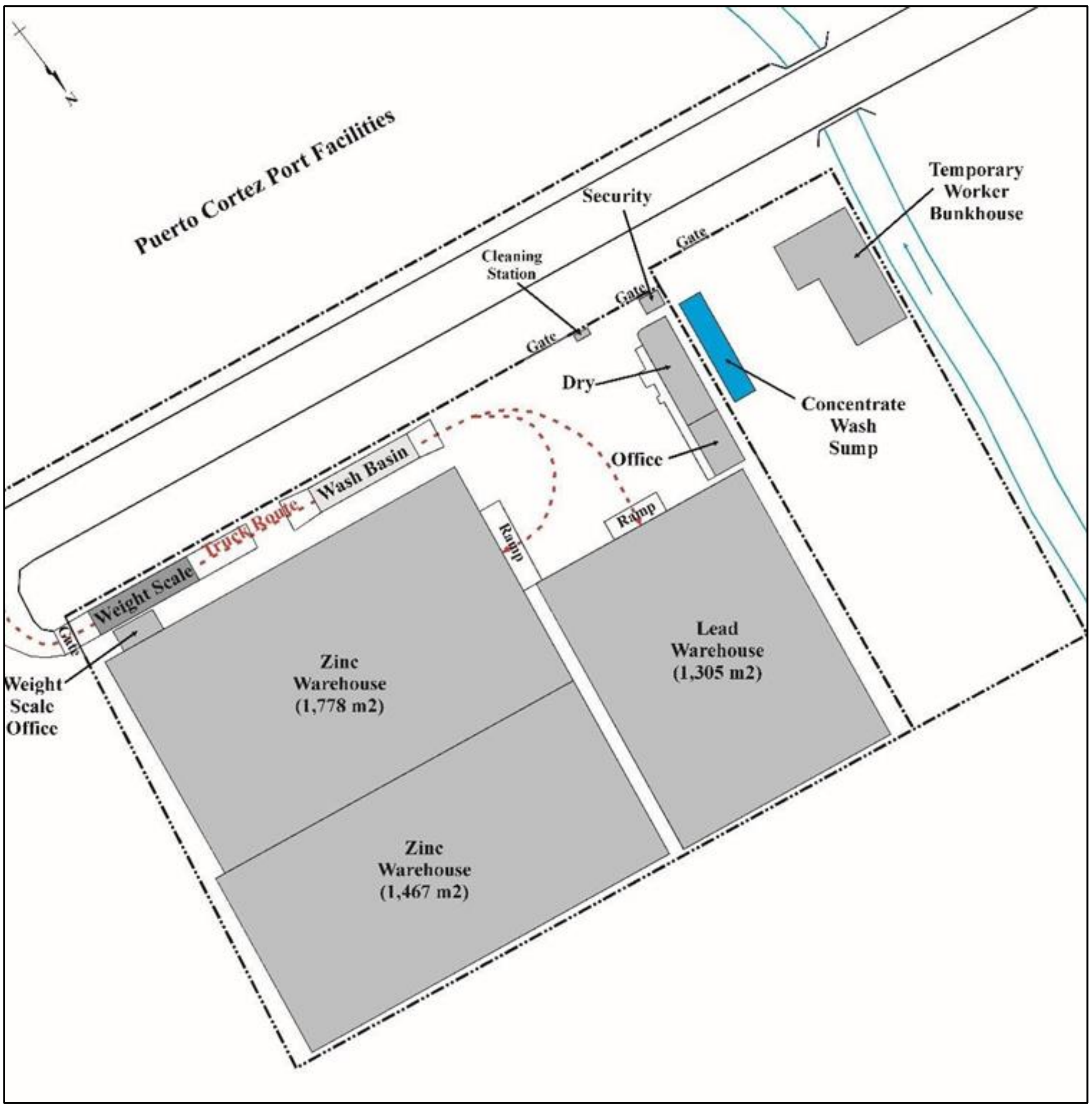
The concentrates are trucked from El Mochito to the warehouse in Puerto Cortés where they are accumulated prior to loading onto ships. Concentrates are trucked 6 days per week from the El Mochito warehouse to the warehouse at Puerto Cortés due to the limited concentrate storage space at the El Mochito site.

The lead and zinc concentrates are loaded into specially designed bins that are bolted to flatbed trucks. There are two bins per truck weighing a total of 24.5 t. The bins have a steel frame that is lined with conveyor belts (see Figure 17.12). Trucks are loaded by a front-end loader, with lead concentrate being loaded first, followed by the zinc concentrate. The loader bucket is cleaned before loading zinc concentrate. Each truck is weighed before and after loading. Each bin is statistically sampled and homogenized with the other bins to obtain an average grade and moisture of each of the concentrates. Each bin is then protected with a waterproof cover and is tied down for transport to the Puerto Cortés warehouse. There are usually 15 trucks dispatched per day, 6 days per week. All drivers sign off on their loads and no driver is permitted to transport concentrate two days in a row, for safety reasons

Figure 17.12 – Steel bins for concentrate transport

When the trucks arrive at the concentrate warehouse in Puerto Cortés, each truck is signed in and weighed on a truck scale. The trucks are then sent to either the lead concentrate warehouse or the zinc concentrate warehouse. The warehouses have a concrete floor and sides approximately two to three metres high. The lead warehouse is approximately 1,305 m^2 in area, and the zinc warehouse, which is split into two connected and covered sections is approximately 3,345 m^2. Figure 17.13 shows the layout of the Puerto Cortés concentrate warehouse.

The concentrate is hand-shoveled out of each truck bin onto the concrete floor. Once each truck is empty, it is moved to a wash bay where any loose concentrate is washed into a sump. The sump solids are pumped to a settling pond. The truck is then weighed and returns to the mine for the next trip. Once the trucks have left the warehouses, a front-end loader combines the concentrate into one large pile against a concrete wall. Workers sweep the floors, picking up the remaining concentrate each day.



Source: Ascendant 2018

Figure 17.13 – Puerto Cortés concentrate warehouse layout

The shipping agent arranges all port export permits, bills of lading and contracts. Concentrate lots being shipped are normally 5,000-6,000 WMT in size. Zinc concentrate is shipped approximately once every month, while lead concentrate is shipped typically once per quarter.

A series of flatbed trucks are contracted when the ship arrives at port and has berthed. Large steel bins (approximately 2 m wide by 3 m long and 2 m deep), with shackles on all four corners, are used to load out the concentrate (see Figure 17.14). The bins have a lower lip at one end to facilitate efficient unloading of the concentrate in the ship's hold. Each truck can carry two steel bins. The bins are loaded by the front-end loader from each of the large piles of lead or zinc concentrate. The trucks are weighed with empty bins and then with full bins. The trucks are washed before re-weighing. A representative sample is taken while loading each bin and combined with the other samples to get an average grade of the concentrate. Any spillage on the bins and trailer is cleaned up and a cover is secured over each bin. The trucks are signed out and leave the compound. They enter Gate 3 of the Puerto Cortés port facility, which is approximately 50 m east of the Ascendant warehouse.

In the port, each bin is lifted off the truck by a crane using chains connected to the four shackles and swung over into the ship's holds. Two of the chains at the front end of the bin are released and the concentrate is dumped into the hold. The two chains are reconnected to the bin and the empty bin is then placed back on the trailer of the truck. Once both bins are empty, the truck returns to the warehouse compound for another load and the process repeats itself until the warehouses are empty.

Source: Ascendant 2018

Figure 17.14 – Concentrate loadout bins at Puerto Cortés

A mobile tele-stacker conveyor belt is sometimes used to load the ships. Tipper trucks are hired to transport the concentrate from the warehouse onto the quay. The trucks tip the load into a funnel feeder with a conveyor belt below that transports the concentrate to the tele-stacker. The tele-stacker discharges into the hold of the ship. The tipper trucks are also cleaned, covered and weighed with each load.

17.4.8 Tailings pipeline upgrade and water recycling

The current 4.5 km tailings pipeline between the processing plant and the Soledad TSF tailings facility has been operating at or close to capacity. The line is buried, 1 m below surface to protect against vandalism and follows the access roads. The line profile includes a significant low zone that "sands out" on each extended power failure.

A new, larger diameter, tailings line sized to handle up to the equivalent of 3,000 tpd of process plant feed is proposed. This line would follow the current pathway and require a higher volume and pressure capable pumping system.

The current tailings line would be used for recycling tailings pond water to the plant for process use. The use of tailings recycled water in the plant would alleviate fresh water shortages during the dry season.

The estimated total cost for these two changes is $0.9M and both modifications could be completed simultaneously and would take 6 months to complete. No interruption of current operations is anticipated to facilitate these changes.

17.4.8.1 Comments and recommendations, tailings pipeline upgrade and water recycling

The tailings pipeline capacity upgrade appears to be an important consideration for increasing daily feed throughput. However, should the removal and sale of magnetite be successful (e.g., 10% mass reduction), some flexibility in the need for pipeline upgrade could be realized. High pressure pumps are typically piston pumps which are expensive to acquire and maintain; the selection of this type of pump should be avoided. A solution to the "sanding out" phenomenon could be the acquisition of a dedicated generator set (genset) for a three-stage centrifugal tailings pump arrangement (similar to the existing installation). The significant cost of such a genset complete with appropriate controls is recognized.

In advance of recycling tailings pond water, extensive laboratory scale tests should be performed to confirm that the recycled water does not negatively impact flotation performance. If an impact is found, treatment methodology would need to be developed which could simply be carbon absorption or a more complex chemical treatment. A reduction in the use of metabisulphite to destroy cyanide in the TSF is expected to be a benefit of tailings pond water recycling.

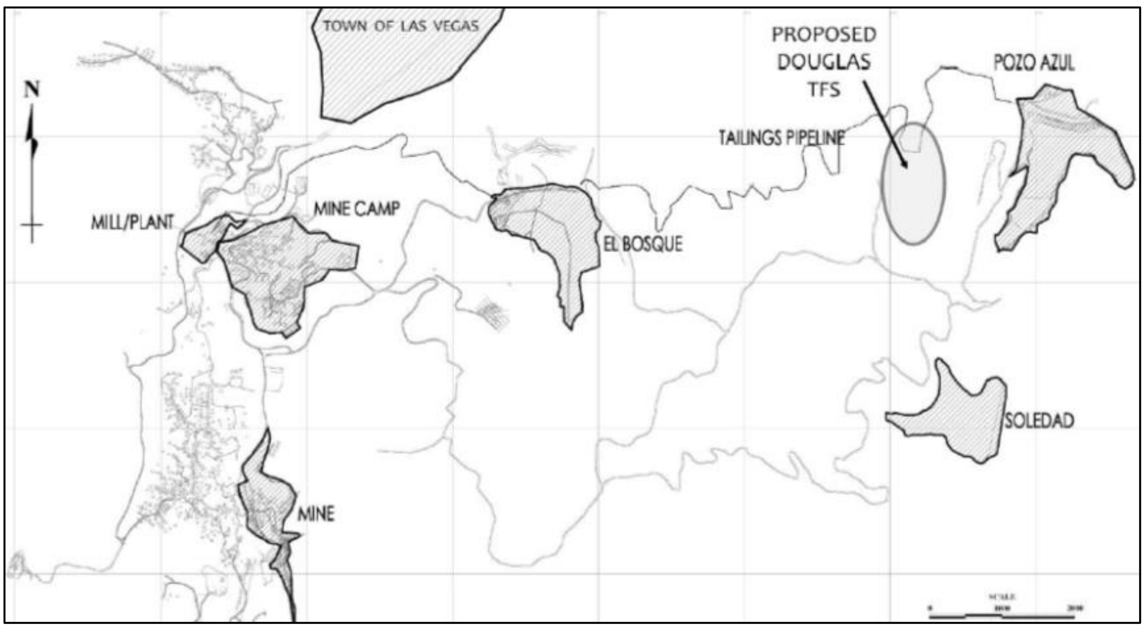
Another abundant source of water is mine water, which is currently discharged from the Caliche Tunnel. A fraction of the large volume of mine water could be pumped to surface near the crusher facility and used in the proposed crusher feed wash plant as well as supplying the process plant. Alternatively, mine water could be pumped to the process plant from the current Caliche mine water discharge location via an extension of the current tailings pipeline which will become available following a new tailings pipeline installation. The use of mine water in the process plant would also need to be tested for potential influence on flotation performance.

17.5 Tailings Management

The fine tailings from the mine backfill plant near No. 2 Shaft are pumped back to the concentrator where sodium metabisulfite is added to detoxify the residual cyanide and lime is added to maintain an alkaline pH. The tails are then pumped to the Soledad tailings storage facility. The tailings are discharged from the edge of the lined facility. Pond water is decanted from a floating barge and is tested at the El Mochito laboratory to ensure compliance with permit water quality conditions before discharge to the environment.

17.5.1 Historical tailings management

There are three tailings storage facilities (TSFs) on the El Mochito properties, El Bosque, Pozo Azul and La Soledad. Their locations relative to the process plant and mine are shown in Figure 17.15.



Source: Micon (2015)

Figure 17.15 – El Mochito Mine, mill and tailings locations

The Tierra Group International Ltd (USA) has designed all of the present TSFs at El Mochito. The El Bosque is the oldest major TSF from early 1970s and contains about 5 Mt of tailings. El Mochito tailings are neither acid generating nor metal leaching and a healthy natural vegetative cover has self-established. Remedial work to divert storm water and stabilize the main embankment has been completed.

The Pozo Azul TSF was used up to 2013 and contains about 10 Mt of tailings. The tailings surface has been capped and contoured, and the stabilization of the embankment toe has been completed. Closeout measures were completed in May 2018 with the creation of a rock armoured storm water channel and spillway (Figure 17.16).

Further details about El Bosque and Poszoal Asul TSFs are presented in Section 18.19 below.

Figure 17.16 – Pozo Azul TSF close out

17.5.2 Current tailings management

The La Soledad TSF is shown in Figure 17.17 and Figure 17.18. The La Soledad facility appears to be precisely engineered and is expected to contain tailings production for up to 3 more years at the current milling rate of 800,000 tpy. Options have been considered to increase capacity by cycloning tailings away from the edge or the use of thickened disposal to create a final tailings profile above the final embankment level.

Currently, consideration is being given to recycling tailings water to the process plant to eliminate potential fresh water shortages in the dry season. This project consists of pumping the water from the TSF using the existing submersible pump to an intermediate pump box which would deliver the water to the process plant water tank. It may be necessary to install an activated carbon column to absorb copper in the water if the copper proves to be a problem in the lead float. It may not be necessary to detoxify the process tailings if it is found that TSF water is returned to the process plant free of cyanide.

Figure 17.17 – La Soledad TSF (looking west)

Figure 17.18 – La Soledad Dam Raising and Lining

17.6 Metallurgical Accounting and Plant Performance

As a result of comprehensive and reasonably accurate measurement, sampling and assaying the El Mochito process plant metallurgical data was assessed by P&E to be credible and reasonably accurate.

17.6.1 Plant sampling and measurement

P&E had earlier (February 2018) reviewed the process plant tonnage measurement and sampling practices and protocols as well as sample preparation and analytical practices in the on-site laboratory. Processed tonnage is recorded by calibrated weightometers on the rod mill feed conveyors. Moisture content is determined by hand grab sampling once per shift. Moisture levels in the grinding feed typically ranges between 4.5% and 7% with infrequent moisture content as high as 10%. Rod mill feed size analyses are performed every second day. Mill discharges are hand sampled for Tyler screen analyses which are performed in the plant laboratory. The regular plant slurry sampling methods and locations are summarized in Figure 17.19. There are 3 automatic sampling locations in the plant. These samplers are single stage automatic samplers which make a cut every 20 minutes to produce an 8-hour composite of flotation feed and of lead and zinc concentrates.

The El Mochito chemical laboratory facilities and procedures had been reviewed by P&E in February 2018. Sample filtration is performed with sample source dedicated filters. Drying techniques were assessed to be appropriate, although one drier oven temperature controller appeared to need replacement.

Ten samples are collected in the plant every hour (Figure 17.19) and assayed by XRF. The hourly assay results, including pH for some samples, are reported on the process plant on a large white board on the flotation plant floor. This provides the operators with a relatively continuous record of flotation performance.

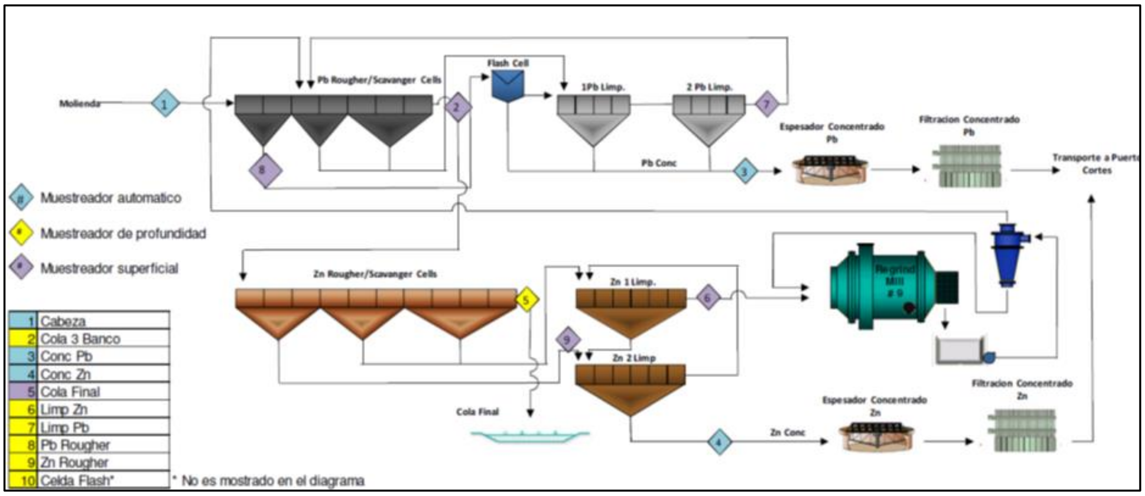


Figure 17.19 – Process plant sampling locations

Composite and critical metallurgical samples are assayed by AA following aqua regia dissolution. AA lamps are available for Pb, Ag, Bi, Zn Au and Fe. For every 12 samples, one analytical standard, one blank and one blind duplicate are inserted. The silver content of high silver samples is determined by fire assay.

About 30 rock fragment samples are obtained from geology per day. Crushing and grinding equipment is cleaned between samples by silica or glass fragments from acid bottles. A blank and a standard is included for every 10 ground geology samples, which are assayed by AA. Drill core samples are prepared and assayed at independent commercial facilities.

The El Mochito laboratory is adequately staffed with 20 people working three shifts. P&E observed that the facilities are clean, bright and physically well organized. Warranted improvements include dust collection for the geology sample preparation area and new oven controllers to prevent temperature excursions.

17.6.2 Metallurgical performance

Recent metallurgical performance is summarized in Table 17.3. In spite of head grade being less than budget expectations, recoveries have been better than budget and appear to be increasing. The following recoveries represent reasonably conservative expectations:

- Lead – 75%
- Zinc – 90%
- Silver – 52% with lead concentrate, 23% with zinc concentrate, 75% total

With the proposed process changes – grinding, new flotation cells and the removal of magnetite in advance of lead flotation, slightly improved recoveries can be expected as well as higher grade concentrates, in particular the zinc concentrate.

Table 17.3 – El Mochito Metallurgical Performance, 2017-18

	Budget 2017	Actual 2017	%	Budget Jan-August 2018	Actual Jan-August 2018	%
Tonnes Processed	690,630	656,292	(5)	533,795	513,606	(3.8)
% Pb	1.51	1.39	(8)	1.82	1.50	(17.3)
% Zn	3.58	3.50	(4)	4.16	4.24	1.8
g/t Ag	46.9	52.5	12	49	46	(6.6)
Recoveries & Concentrate Grade						
Pb Rec'y in Pb Conc	68.31	74.25	7	75.67	77.9	2.9
Pb Conc Grade				60.19	60.38	0.3
Ag Rec'y in Pb Conc	48.93	52.06	6	52.0	53.5	2.8
Zn Rec'y in Zn Conc	87.0	88.9	2	90.0	89.5	(0.4)
Zn Conc Grade				50.99	49.21	(3.5)
Ag Rec'y in Zn Conc	21.7	25.7	18	23.29	25.2	8.3
Total Ag Recovery	70.6	77.8	10	75.3	78.7	4.5

17.7 Reagents and Consumables

Steel and reagent consumptions are summarized in Table 17.4. P&E considers steel and reagent consumptions to be typical of Pb-Zn flotation plants. An opportunity may exist to reduce or eliminate metabisulphite consumption if tailings water is recycled following confirmation that recycling does not negatively affect flotation performance.

Table 17.4 – El Mochito Mill Grinding Media and Reagents

Area	**Grinding Media and Reagents**	2017 Consumption, g/t of Mill Feed
Rod Mills	Rods 3"	178
Ball Mills	Balls 1 1/2"	287
Ball Mills	Balls 2"	258
Flotation	Xanthate X-343	78
Special collector for Ag – Rod Mill	XL-067	11

Area	Grinding Media and Reagents	2017 Consumption, g/t of Mill Feed
Pb Float	Cytec Promoter 404	13
Pb Float	Sodium Cyanide	36
Pb Float	Zinc Sulphate	102
Zn Float	Copper Sulphate	158
Zn Tails	Sodium Metabisulphite	234
Flotation	Frother MIBC	50
All circuits	Hydrated Lime	617
Concentrate	Optimer Flocculant	5
Area	**Reagent**	**Addition Rate ml/min**
Grinding Mills	Collector XL 067	5 -7 per rod mill
Lead Bank 1	Collector XL 067	9
	Collector X343	210
	Frother MIBC	25
	Zn Depressant Mixture Lime/NaCN/$ZnSO_4$	1,550
Lead Bank 2	Collector X343	400
	Collector 404/453	6
Lead Bank 3	Collector X343	24
	Collector 404/453	7
Lead Cleaner	Lime NaCN/$ZnSO_4$ Zn Depressant Mixture	1,800
Zinc Bank 4	Collector X343	600
	Zn Activator Copper Sulphate	1,400
	Frother MIBC	5
Zinc Bank 5	Collector X343	350
Zinc Bank 6	Collector X343	300
Final tails	Metabisulphite (CN Detoxifier)	20

The process plant reagent mixing and handling distribution system operates by gravity flow with volume controlled by Clarkson feeders. The condition of the Clarkson feeders and distribution system had been observed (P&E February 2018) to be warranting an upgrade to remotely-controllable electronic feeders. Hydrated lime ($Ca(OH)_2$) is used for pH control and this material is significantly more costly than quick lime (CaO) but is much easier to handle and distribute. Lime distribution is by gravity flow to a stirred tank in the flotation section from where it is pumped to various points in the flotation circuit and to the final tails pump box. The use of about 300 t of lime per annum is below the economic threshold to justify the installation of a lime slaking (CaO to $Ca(OH)_2$) facility.

The mixing of lime, zinc sulphate and sodium cyanide was noted in February 2018. Lime is effective in reducing the toxicity (by volatility) of cyanide, but as a result of precipitation as zinc hydroxide, a high pH stream is likely to slightly reduce the effectiveness of the zinc sulphate in depressing sphalerite in the lead circuit. Separate addition of zinc sulphate in the lead float feed may be more effective (this can be readily confirmed by laboratory tests).

17.8 Summary – Proposed Processing Plant Infrastructure and Improvements to Increase Plant Capacity from 2,300 to at least 2,800

Seven major improvements and upgrades are proposed for the El Mochito processing plant and associated facilities. All of these will improve process efficiencies and are needed to facilitate a significant increase in processing capacity – about 20%.

These upgrades, summarized in Table 17.5 can be achieved with minimal disruption to the plant processes and are expected to be completed at reasonable cost in the third quarter of 2019. The use of in-house engineering and fabrication capabilities will be maximized. Suppliers are expected to provide assistance in engineering and start-up of the crusher feed wash plant, flotation cells and the pressure plate filters.

Table 17.5 – Summary of crushing and process plant upgrades to increase daily capacity to 2,800 tpd

<table>
<tr><th>Process Change</th><th>Cost $‘000s</th><th>Time to Complete Months</th><th>Specific Benefits</th><th>Risks (rating)</th><th>Recommendations</th></tr>
<tr><td>Crusher Feed Wash Plant</td><td>2,100</td><td>8.75</td><td>Increased crushing rate;
Much less spillage;
Less conveyor damage;
Finer crush size.</td><td>Washing circuit configuration (low);
Water management (low);
Accounting of fines grade and tonnage (low).</td><td>Essential – with or without mill expansion.</td></tr>
<tr><td>Simplify Grinding Circuits and Install Rotating Screens</td><td>400</td><td>4</td><td>Improve grinding rates;
Sharper and finer grind size cut;
Removes mine- sourced scrap (which interferes with flotation and samplers).</td><td>Screen wear (low – cyclones to remain on standby).</td><td>Recommended modification and installations.</td></tr>
<tr><td>Magnetite Separation</td><td>200</td><td>9</td><td>Increased Pb and Zn concentrate grades;
Increased flotation cell retention times;
If magnetite sold or separately disposed less tailings to pump and store.</td><td>Benefits of magnetite separation to exceed Pb and Zn losses to the magnetite conc. (Low to moderate).</td><td>Proceed with plant tests, possibly supported by commercial lab tests.</td></tr>
<tr><td>Replace Flotation Cells</td><td>1,800</td><td>9</td><td>Consistently improved flotation operations and metallurgical results;
Lower operating costs.</td><td>Relatively new design and new supplier (Low).</td><td>Proceed with replacement. Consider larger # of small cells in rougher scavengers.</td></tr>
<tr><td>Replace Disc Filters with Pressure Plate Filters</td><td>400</td><td>6</td><td>Lower concentrate moisture content;
Replace worn out units.</td><td>Equipment reliability (Low to Moderate).</td><td>The low-cost estimate suggests a review of supplier’s offer. However, pressure filters needed to achieve lower moisture.</td></tr>
<tr><td>New Tailings Line and Pumps</td><td rowspan="2">900</td><td>6</td><td>Upgrade capacity to meet volume requirements.</td><td>(Low).</td><td>If magnetite not removed and moved off site, the new line is essential.</td></tr>
<tr><td>Reclaim Tailings Water for Process</td><td>5</td><td>Relieves water shortage during dry season.</td><td>Potential negative effect on flotation performance but can be mitigated by simple treatment. (Low).</td><td>An important, positive improvement in water management;
Mine water is a possible substitute for tailings</td></tr>
</table>

Process Change	Cost $'000s	Time to Complete Months	Specific Benefits	Risks (rating)	Recommendations
					water.
EPCM	500				
Total	6,300				

18. PROJECT INFRASTRUCTURE

El Mochito is a producing zinc, lead, and silver underground mine located in northwest Honduras, near the town of Las Vegas, approximately 88 km southwest of San Pedro Sula and 220 km northwest of the capital city, Tegucigalpa. The mill processing nameplate capacity is 2,200 tpd. Production began in 1948 and has continued for 70 y almost continuously. The main infrastructure consists of an underground mine with shaft access and a concentrator producing separate zinc and lead concentrates. Concentrates are trucked daily to Puerto Cortés for storage and are shipped once sufficient material is stockpiled.

The mine site has two shafts: the No. 2 vertical shaft, which is 747 m (2450 ft) deep and has a production capacity of 3,500 tpd, and the No. 3 Shaft of the same depth, which is used for hoisting personnel and materials and has a rock hoisting capacity of approximately 500 tpd. Mineralized material is mined by trackless and conventional underground mining methods, transported, crushed underground and then hoisted largely through the No. 2 Shaft. Waste is largely repacked underground as waste-fill to augment cycloned tailings backfill and minimize hoisting costs.

Zinc and lead concentrates are produced by differential flotation methods and shipped to a warehouse at the port of Puerto Cortés, 35 km north of San Pedro Sula on the Gulf of Honduras, a distance of 164 km by paved road from the mine. Approximately 30% of process tailings are used as backfill for the mined stopes.

18.1 General Site Layout

Figure 18.1 is an image of the general layout of the El Mochito mine site complex showing the positions of the mine, plant and tailings dams relative to the town of Las Vegas. The figure shows the extent of forest cover at the El Mochito mine site.

Figure 18.1 – El Mochito general site layout, source: Google Earth 2018

The El Mochito mine complex covers a large area but can be separated into distinct zones (i.e., mine camp, mill, mine and tailings storage facilities). The mine complex includes a warehouse at Puerto Cortés where zinc and lead concentrate are stored before being shipped to an overseas refinery/smelter.

18.2 Site Access Road

The El Mochito mine and other concessions in the vicinity held by the issuer (see Item 4) are located adjacent to the town of Las Vegas, Santa Barbara Department. The capital city of Honduras, Tegucigalpa (population ~1.2 million) is situated 220 km to the southeast and the regional center of San Pedro Sula (population 1.2 million) is located 88 km to the northeast. Both are accessible from the mine site via paved highway CV-5 and associated secondary highways that connect the site with highway CV-5. Las Vegas (population ~35,000) is the residential community for most of the mine's work force.

Access to all facilities on the El Mochito mine site is gained through an extensive system of good quality gravel roads that are maintained by the issuer. Access to areas on the concessions away from the mine site is more limited and typically takes the form of single lane roads or farm trails.

18.3 Mine Site Entrance/Guardhouse

The mine surface infrastructure is illustrated in Figure 18.2, Figure 18.3 and Figure 18.4. The most prominent feature on the site is the No. 2 Shaft headframe. All personnel and equipment entering the underground mine must use the main portal (0 Level), which leads to the internal No. 3 shaft (see Figure 18.4).

Figure 18.2 – Mine infrastructure looking South with crusher and ore bins in foreground and No. 2 Shaft headframe in the background

The run-of-mine material is dumped from No. 2 Shaft into a 200 t shaft ore bin which feeds a series of conveyor belts leading to the coarse ore bin. Another series of conveyor belts deliver the mineralized material through the primary and secondary crushers to the fine ore bins. The crushed material is transported by trucks to the mill, which is 1.5 km away.

The on-site diesel power plant provides emergency backup power to the mine when there is a power outage on the electrical grid. The power plant also provides compressed air for underground operations.

The surface mechanical shop repairs underground equipment that cannot be serviced by the underground shops. The mine and time offices plan and coordinate the operations of the underground mine and workforce. The change room (dry) also houses the lamp room and safety office. The mine security office provides communication coordination of the underground workforce. All personnel entering the mine must pass a second breathalyzer test at the entrance to the mine.

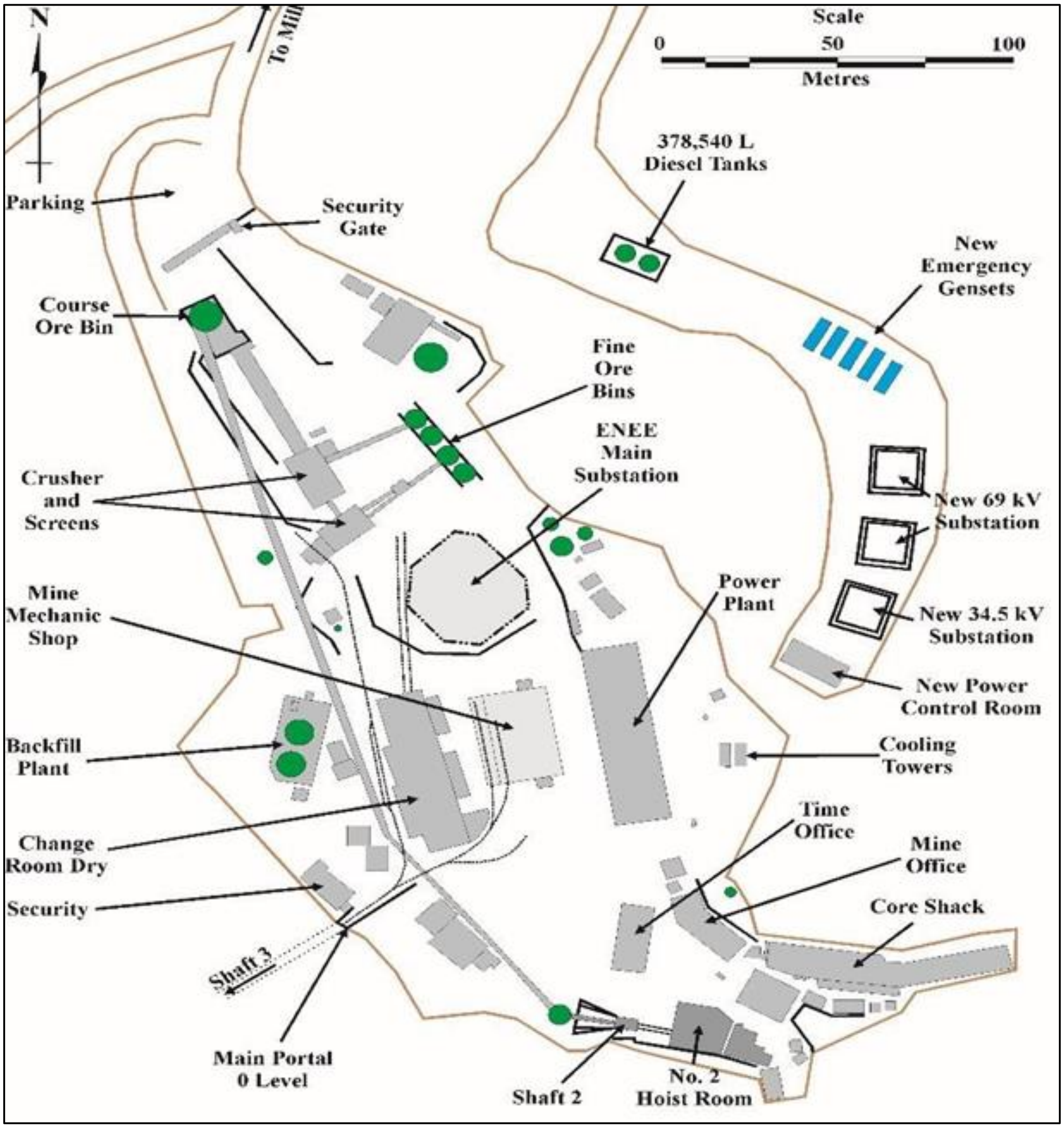


Figure 18.3– Mine surface infrastructure

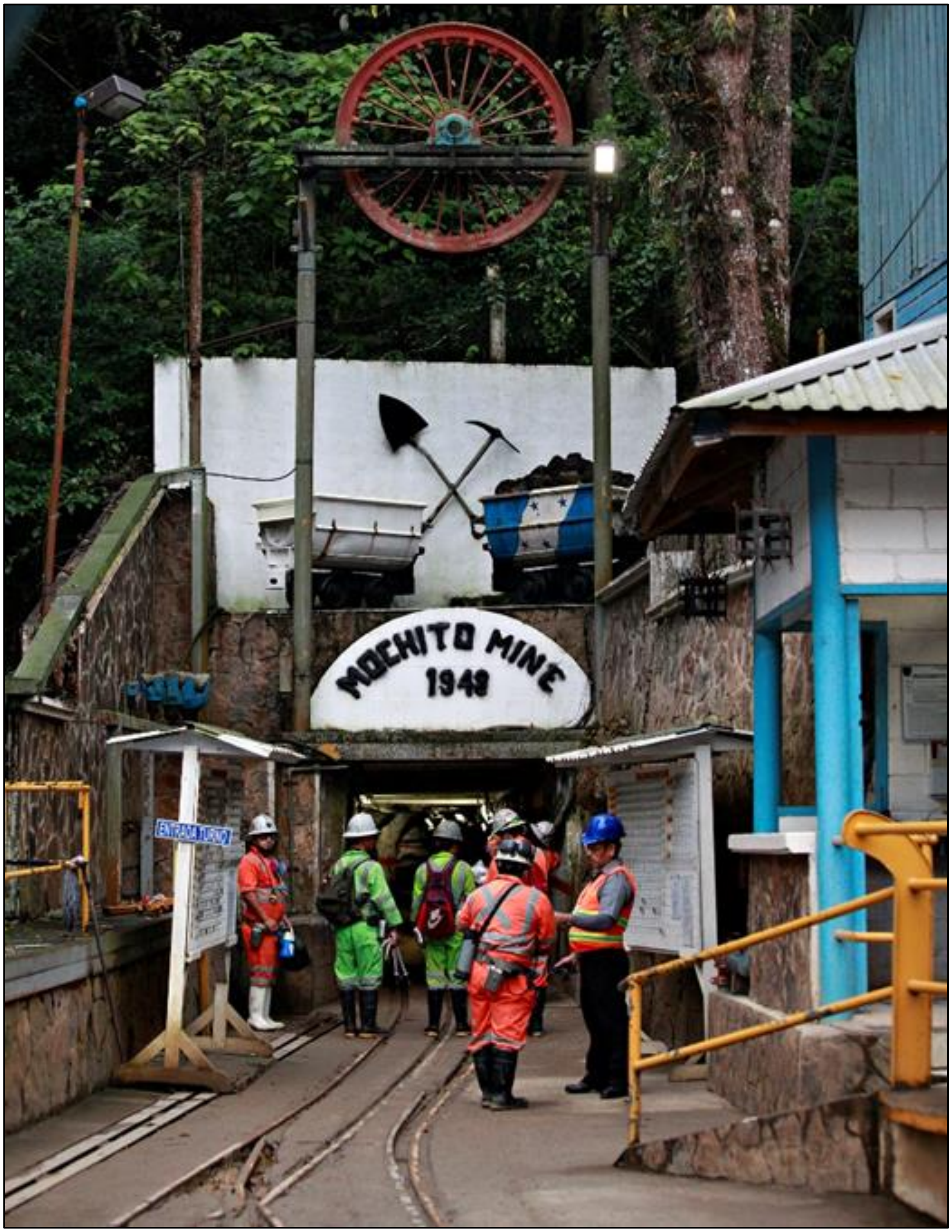


Figure 18.4 – Main mine portal with security and access control

The El Mochito mine complex has several entry points to cover the property. Security is insured by professionals working for an independent security company. Control of personnel and vehicle entry takes place at all access gates.

18.4 Surface Ventilation Facility

Mine ventilation raises exit on surface at Bonanza, about 1.5 km to the west of the shafts. Four raise-bore holes have been excavated here with the issuer's raise boring machines; two of the holes are used to down-cast fresh air and two have surface ventilation fans installed for the upcasting return airways.

Ascendant has decided to use one of these 2.7 m diameter raise bore holes as a service shaft. A small headframe has been installed along with a single drum hoist to lower equipment and material onto the mine (See Figure 16.13). The capacity of this hoist is 20 tons. This will allow the issuer to lower larger and longer equipment that previously had to be cut to fit down the 1.3 m to 1.5 m wide hoisting compartments of the No. 2 and No. 3 shafts. It would also free up more time at both shafts for other hoisting work.

– Shaft headframe installed over 2.7 m borehole - Bonanza raise bore hole (shaft) to 1100L (Figure 16.13)

18.5 Surface Electrical Installation, Distribution and Consumption

El Mochito currently has a maximum demand of 13.9 MW of electric power. The hydroelectric dam near the town of Cañaveral (26 MW) is the main source of power for the mine and the surrounding area. The mine is connected to the national grid through a 34.5 kV power distribution line run by the National Electric Power Company ("ENEE") of Honduras. It provides electricity to the surrounding cities and towns, as well as to the mine and is part of a ring system. ENEE has a substation for El Mochito within the mine compound (Figure 18.5).

The 34.5 kV distribution line has become increasingly overloaded due to the increase of retail consumers and complicated by the frequent electrical storms in the area which reduces the reliability of energy distribution to the mine. As a result, the mine suffers from approximately three to five power cuts per month. To compensate for this, the mine has seven diesel generator sets which are operated when a loss in power is experienced. The generators produce 4.5 MW of electricity for the mine, which is sufficient to keep the main mine water pumps and one hoist running. The cost of running these units is approximately $0.40/KWh.

The issuer has been in negotiations with the government and ENEE to provide the mine with more reliable and less expensive power. Negotiations include the connection to 69 kV with the 429-transmission line from Cañaveral which is installed in parallel to the original 34.5 kV distribution line. The 69 kV power line is connected to the Electrical Interconnection System of the Central American Countries (SIEPAC) as well as several new national generation plants including a 40 MW geothermal power station in the west of the country.

The mine has already partially built a new 69 kV substation (Figure 18.7), purchased the required equipment and built a new control room next to the mine. The mine has eight CAT 3516B backup generators to replace the old backup generators. The operation costs approximately $ 0.22 per kW/h. Ascendant has already invested approximately 60% of the total substation project cost and estimates that it will cost approximately $1.5M to complete it.

Figure 18.5 – 34.5 kV old substations

Figure 18.6 – CAT diesel generators

Figure 18.7 – 69 kV substation under constructions

18.6 Maintenance Workshops and Warehouses

Different types of workshops are located on surface (electrical, machine tool, mine, carpentry, mobile equipment), as shown in Figure 18.8 to Figure 18.12. These workshops provide services to mine operations, the concentrator plant, the camp and other departments.

Figure 18.8 – Carpentry workshop

Figure 18.9 – Mobile workshop

Figure 18.10 – Central mine workshop with change house and mine entrance to the left

Figure 18.11 – Electrical workshop

Figure 18.12 – Machine tool workshop

Due to the topography of the mine area, the mine has one general warehouse for controlling and receiving the material. It also has several lay down areas depending on the type of material and the department that it services.

18.7 Camp Complex and Hospital

The mine camp or village is a typical old mining company, self-sufficient, town. It was originally built by Rosario Resources Corp in the 1960s and is separated from the town of Las Vegas by the Raices river.

The mine camp area includes the general offices, over eighty houses and apartments for accommodation for staff and visitors, the company restaurant, a carpentry shop, a surface mechanical and transportation shop, hospital, pharmacy, a bilingual school (up to grade 9), a vocational school, and a privately-run gas station, bank and supermarket. The hospital itself has 58 beds, a day clinic, several wards including a pediatric ward, private rooms, a fully-equipped operating room and a delivery room. It is staffed with three doctors and five nurses and operates 24 hr per day

The Administration building contains a small bank and the following departments: General Manager, Finance, Human Resources, Environment and IT.

Figure 18.13 – Aerial view of the mine village

Figure 18.14 – Typical mine camp accomodation

The camp also has a soccer field, swimming pool, basketball court, tennis courts, gym and playground.

Armed security guards are present at every entrance to the mine, mill, mine camp, tailings ponds, warehouse and port facilities. Access control to the working areas includes the obligatory use of a breathalyzer before entry is permitted.

18.8 Communication and IT

The site has both land line and satellite communication access with full telephone, fax and internet services.

Communication in the mine is done by a leaky feeder system and covers pretty much all working areas.

18.9 First Aid / Emergency Services

Mine site has a safety department working closely with mine and processing operations., Regular inspections are done in the mine and around the surface installations. Two mine ambulances are in use, one stationed at the mine, the other at the hospital.

Trained personnel with first aid training are amongst the workforce and ready to respond in case of an emergency, as well as qualified paramedics in an underground first aid station, 24 hr a day. The site also trains personnel for mine rescue and voluntary surface firefighters.

18.10 Explosives Plant and Storage

The mine uses approximately 900,000 kg of ammonium nitrate fuel oil (ANFO) explosives each year. It has the equipment to produce and bag ANFO explosives. It used to produce ANFO several years ago, until the Honduran military assumed the control of all explosives in the country. The military now imports explosives from Costa Rica and re-sells them to end-users, including the El Mochito mine, at $1.58/kg. The Costa Rican explosives are apparently of poor quality compared to the ANFO originally produced at the mine.

Ascendant is in negotiations with the Honduran government and the military to restart the production of ANFO, utilizing the explosive production equipment at the mine. The mine would produce and bag the ANFO for its own use, selling any surplus to the military, which would re-sell it to other end-users.

18.11 Fuel Delivery and Storage

Diesel fuel is delivered to the site regularly using a third party vendor. The issuer has storage capacity for 265 kl (70,000 US gal) near the surface generators and at the surface mobile equipment workshop and typically maintains it at 75%-95% capacity. Diesel is primarily used for the mobile equipment on surface and underground, but also for the standby generators when necessary. The site capacity is sufficient to allow the diesel generators to operate continuously for up to four days.

Diesel and lubricants are dispensed underground from surface by means of special pipelines connecting with special tanks installed in the underground workshops on 2350L and 3300L, improving dispensing safety and reducing logistics challenges and costs of lowering diesel through the shaft hoisting system.

18.12 Site Utilities

Fire Water and Fire Fighting System

The camp site contains several water tanks connected to a system of piping and fire hydrants. The mine site area contains a water tank of 125,000 gallons with a reserve kept at all time and connected to a fire pump for prevention, in case of fire. All electrical stations, hoisting systems and conveyor belts are secured by a fire suppression system.

Process Water Source and Usage

The process plant and camp are fed by water from a potable fresh water spring, which is located approximately 1.5 km away, inside the issuer's fully-owned surface rights. A small dam regulates the storage volume releasing excess water to the environment on occasion. As part of the issuer's corporate social responsibility, part of the water source has been developed to supply over 7000 residents in the Las Vegas community. The rest of the community receives water from elsewhere. The average consumption by the mine over the last three years is 1.5 m^3 per tonne milled.

Potable Water

Central freshwater supply and sewage collection systems serve the mine, office and accommodation sites and are operated and maintained by the issuer under the terms of applicable government water use permit.

Sewage Treatment

The mine complex does not have a wastewater treatment plant. Domestic effluent is treated in a series of septic tanks throughout the complex with biodigestors. These tanks are regularly cleaned and the solids disposed of in a wastewater treatment facility in San Pedro Sula. There are also biodigesters located at the mine yard and the Port facilities to treat effluents

18.13 Waste Stockpile

The mine does not have a permanent waste stockpile as almost all waste produced it is mainly repacked underground. Nevertheless, when there is a specific necessity to hoist waste to surface, it is sent to surface dumping areas adjacent to the haul road where it is temporarily stored to be re-used around the mine or to repair roads serving various nearby communities. All hoisted waste is in the form of unmineralized limestone and is not acid generating.

18.14 Mineralized Material Stockpile

As the process plant exceeds the current mining production, a mineral stockpile is not required. Mineralized material is hoisted to a 2,200 t shaft bin which feeds the conveyor belts leading to the 3,000 t coarse ore bin. When the plant shuts down for overall maintenance activities, mineralized material is hosted and discharged from the No. 2 shaft bin onto a temporary surface stockpile adjacent to the shaft, to be later loaded onto the belt with a front-end loader when the crushing section is back on production. This area is contained, and surface water runoff is collected and fed into the milling circuit.

18.15 Process Plant

The general mill layout and essential mill equipment are illustrated in Figure 18.15. The complex includes the mill itself, mine/mill assay laboratory, concentrate storage and truck weigh scale.

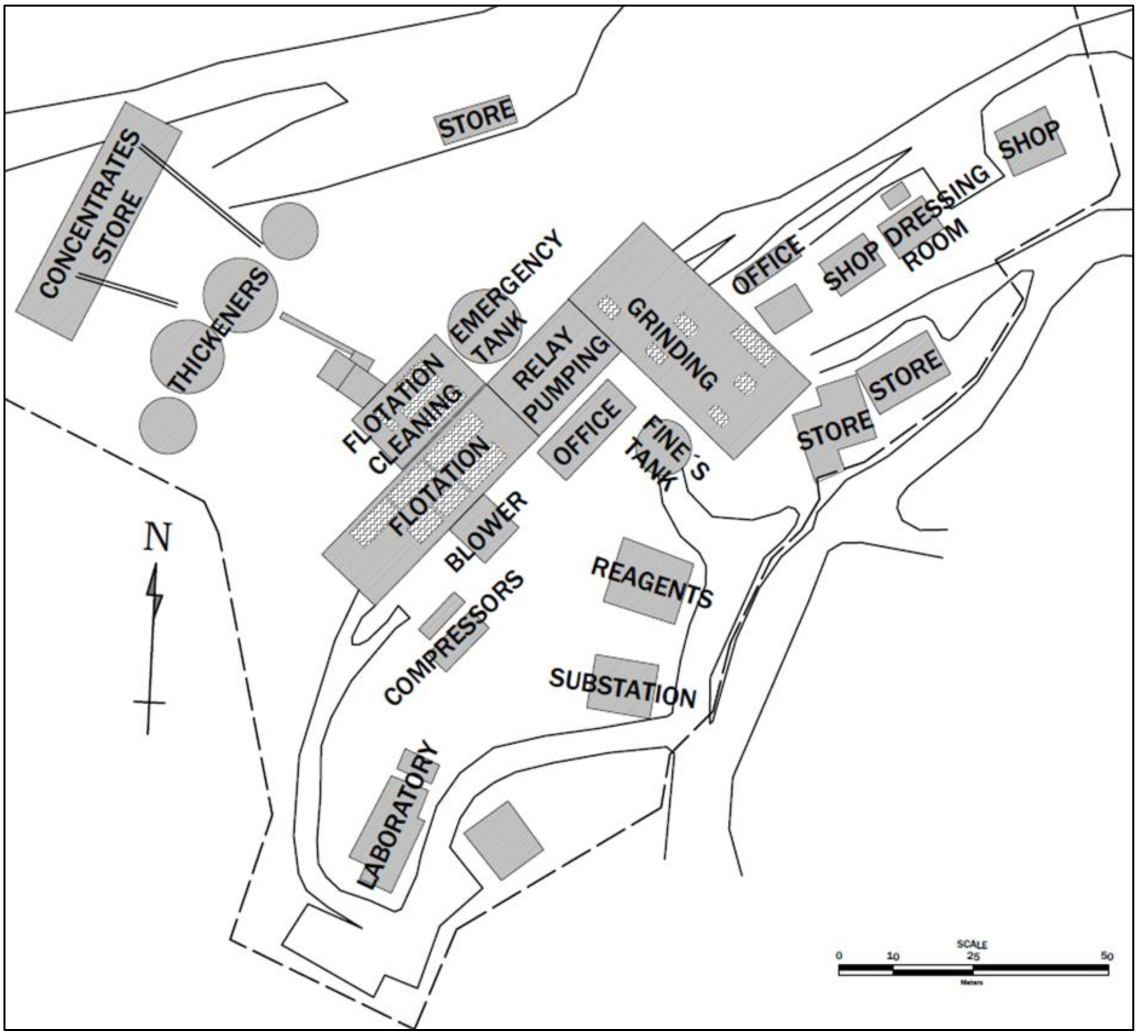


Figure 18.15 – Layout of the concentrator plant

18.16 Underground Water Management

Mine water is pumped up to the 650L drainage tunnel (Caliche level), approximately 220 m below the shaft collar, where it flows naturally out to the Caliche surface portal. This portal is used as the main drainage for the mine, as well as being an integral part of the ventilation system of the mine and an alternate emergency escape way. Water exits the portal and is funneled through a trash screen and into a 61 cm diameter HDPE discharge pipe.

A concrete spillway has been constructed beside the trash screens to handle water volumes that may exceed the discharge pipe capacity. The end of the discharge pipe flows into a settling pond. A concrete diffuser bank is used to decrease the velocity of the discharged water. Suspended solids have time to settle before the water is discharged through a concrete spillway and into the environment. A second and third identical and parallel settling pond has been built and are now operating with the same purpose, along with a concrete channel splitter, to handle the volume of water from Caliche. The three ponds allow more time for suspended solids to settle before being discharged to the environment.

As per the mine water, there are several settling ponds as well as pump stations underground that helps clean the water pumped to the Caliche level.

Regular monitoring of the treated water is carried out by the Mining Authority as well as the municipality.

18.17 Water Treatment and Settling Ponds

18.17.1 Treatment strategy and water quality

El Mochito Mine has different effluents which are constantly monitored, with the objective of preventing environmental impact to the natural resources and the communities in the area of influence, through the improvement of the processes of the operation.

18.17.2 Treatment facilities

The mine has built three tailings storage facilities ("TSFs") over the years (see next section for details). Only the Soledad facility is currently in use and is anticipated to be adequate for the next 8 y of operation. Tailings pumped to the TSF are free from chemicals harmful to the environment and contains only suspended solids. Cyanide is used in the flotation process to depress the zinc in the lead flotation step but is destroyed in tailings before leaving the plant. Once in the pond, the solids settle in the tailings and the excess clean water is discharged into the environment as provided for in the operating permit and Environmental Impact Assessment.

Regular monitoring of the treated water is carried out by the Mining Authority as well as the municipality.

18.18 Tailing Storage Facitilies

The three TSFs on the property are El Bosque, Pozo Azul and Soledad (see Figure 17.15 and Figure 18.1 for locations).

18.18.1 El Bosque (closed)

The El Bosque TSF is the oldest (1970s to 1980s) and holds approximately 5 Mt of tailings. The surface of this TSF is revegetated. The TSF has an underground decant system and settling pond at the toe of the dam. The rehabilitation of this TSF included the installation of a new spillway and the capping and re-contouring of the tailings surface, so that surface water will flow towards the spillway and away from the dam. A

175-m long retaining wall was built downstream of the toe of the dam to prevent possible soil erosion from flooding of the Quebrada Raices river. The wall also strengthens the embankment against a possible breach of the dam during a major seismic event. The top end of a historical landslide on the west abutment of the dam was removed and a new upstream dyke was installed. The complete closure of the El Bosque TSF is scheduled for 2019. This will entail closing the decant tower with cement, complete the cross-section diversion channel and capping the TSF with soil to the final elevation to divert water to the diversion channel.

18.18.2 Pozo Azul (closed)

The Pozo Azul tailings dam was started in the early 1980s. The TSF was initially used in the early 2000s but a failure in the lining of the Soledad TSF in 2007 necessitated recommissioning of the Pozo Azul TSF and increasing its original capacity. It finally ceased receiving tailings in 2013, and now holds approximately 10 Mt of tailings. The dam was engineered to withstand the seismic conditions in the region. There are several piezometers strategically located to measure the subsurface water environment. A spillway has been constructed and rehabilitation has been completed by capping and contouring the tailings area, so that surface water is diverted toward the spillway and away from the dam.

18.18.3 Soledad (currently in use)

The Soledad is the active TSF for the El Mochito operation. It was initially constructed in 2004 and four stages have been complete as of July 2018. The TSF is lined with a 60 mil LLDPE plastic geomembrane liner. There is an under-drain and a chimney drain that discharge into a settling pond and weir box. There are north and south diversion channels to capture surface runoff before it enters the TSF. There are also several piezometers installed in and around the TSF structure to measure the subsurface water conditions.

The dam was originally designed in four stages (Figure 18.16).

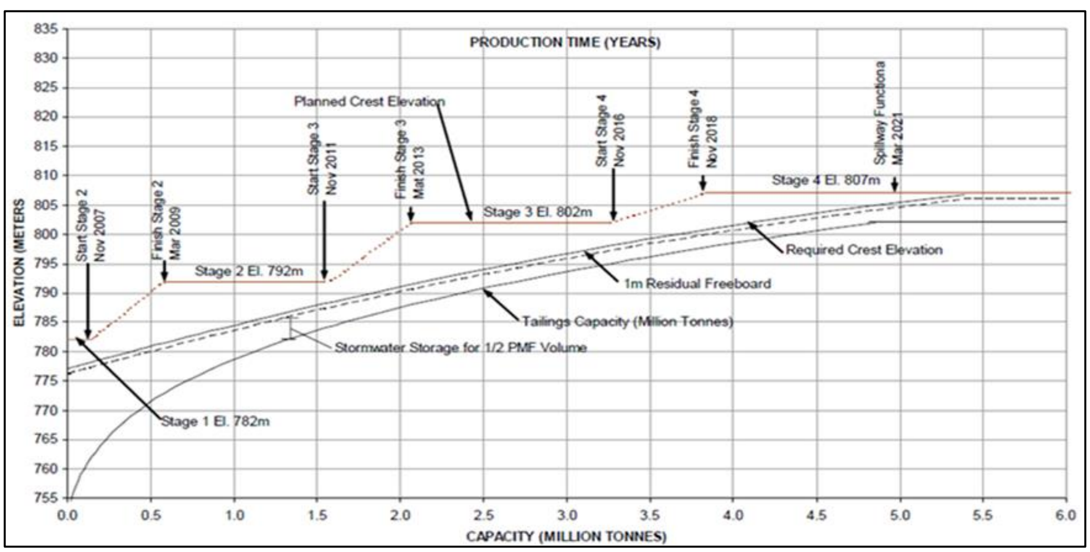


Figure 18.16 – La Soledad TSF capacities

The Stage 4 lift to 807 m elevation was completed in July 2018 providing a total capacity of 5.5 Mt. According to the water balance, Stage 4 (1.4 Mt) will be depleted on February 2021.

The design process to raise the Soledad dam 17 m to 824 elevation in three additional downstream lifts, is underway and the geotechnical campaign has been completed. The basic design for Stage 5 is underway. This Stage 5 lift will provide an additional capacity beyond Stage 4 of 2.5 Mt and represents 3.8 y of storage capacity (according to the 2018 LOM).

The Stage 5 lift will require the relocation of the existing offices, electrical installations, access road, tailings distribution pipelines and partial modification to the north and south diversion channels. A further Stage 6 and 7 lift to 821 m elevation are also being considered and will be assessed during the development of the detail engineering of Stage 5.

Figure 18.17 – Soledad TSF and Stage 4 wall lift, looking East

18.18.4 Potential future Douglas TSF

The Douglas TSF (Site 4) was a result of a trade-off evaluation of 22 different potential tailings pond sites and is considered an alternative to the additional lifts of Soledad TSF. The chosen site is between the El Bosque and Pozo Azul TSF´s. It has a potential life of 6.3 y, based on trade-off studies report (Tierra, 2014). It is estimated to cost approximately $17.5M to construct. The Douglas dam would be built in two stages. The basin would have an underdrain system and be lined with a 60 mm LLDPE plastic geomembrane liner. Geotechnical investigation has already been undertaken at the site and several piezometers have been installed. The detail engineering process has been postponed due to the opportunity of a additional lifts the in existing Soledad dam, but the permitting process has already been advanced and can be reconsidered at a later stage.

18.18.5 Tailing pipelines

The tailings from the process plant is delivered to the Soledad TSF through an HDPE pipeline (8" and 10") with a total length of 5 km. This line is installed beneath the access road from the plant to Soledad.

18.18.6 Reclaim water

A discussed in Section 17.4.8, a tailings water reclamation project is being considered to pump clear water from the La Soledad TSF back to the process plant to be used as process water. The existing submersible pumps in the TSF would pump water to a new transfer pump box located adjacent to the existing No. 2 siphon break box, from where it would be pumped again to the highest elevation position near to the existing No. 1 siphon break box. From there, water will gravitate to the process plant water tank. This project will significantly reduce the mines reliance on fresh spring water, and potentially increases the potential benefit of providing fresh water by at least 50% from the issuer's potable water spring for other social purposes.

18.19 Concentrate Shipment

Lead and zinc concentrates are trucked from the El Mochito process plant to the dock-side warehouse in Puerto Cortés where they accumulated before loading onto ships. Due to the limited concentrate storage space at the El Mochito site, concentrates are transported by truck 6 days per week from the El Mochito process plant warehouse to the warehouse at Puerto Cortés.

Storage and shipment details are outlined in Section 17.4.7 above.

19. MARKET STUDIES AND CONTRACTS

Zinc, lead and copper concentrate offtake agreements are in place with Nyrstar Sales and Marketing Ag, a large diversified resource conglomerate and commodity trader, for a period of 10 y from December 2016 at international benchmark terms, as defined by average respective commodity price on the London Metal Exchange for the relative shipping period. InnovExplo has not reviewed these contracts.

Based upon a review of relevant market study reports, the issuer and InnovExplo have concluded that zinc macro-fundamentals are positive.

Mine Closures and Environmental Regulation Driven Concentrate Stocks To 10-Year Lows

Fundamentals continue to point towards a structural deficit in zinc metal due to lack of sufficient zinc concentrate supply to bring the market into long-term balance. On the supply side, mine closures in the last several years, such as the Century, Lisheen, Iscaycruz, McArthur River and Mount Isa mines, have curtailed the production of concentrates. At the same time, new environmental and health and safety legislation drove a number of small Chinese zinc mines to suspend production between 2015 and 2017 with cutbacks in Inner Mongolia and Guangxi province being particularly significant. The net result has a swift reduction in concentrate stocks to levels considerably below the long-term average of around 45 d of consumption, now near a 10-year low. These supply deficits drove prices to 10-year highs of 1.63 $/lb in January 2018.

Modest global growth expectations of 2% to 3% for GDP imply a strengthening demand of ~400,000 tpy of additional new supply required to feed the 12.6 Mt global market for zinc metal. Some of this may be addressed by several large projects that are coming on stream or ramping up. New Century, the tailings reprocessing operation in Australia, is ramping up, Glencore is increasing output at Mount Isa and McArthur River, as is MMG at Dugald River. These are widely broadcasted events within the industry. Commodities analysts also predict in their assessments of market balance that Chinese mines will also scale up production to close the gap between demand and supply figures.

Estimate Risk Is Weighted to The Supply Side

What is clear is that the risk to the forecast to the market balance is on the supply side. If there are project delays at the largest new operations (New Century has already announced a delay earlier this year) or if Chinese mines fail to turn their production back on in the face of higher costs due to environmental regulation, the gap will not be filled. This scenario would be supportive of higher prices in the near-term. It seems that there is more likely a chance for the market to beat these forecasts than not over the next few years.

The price of silver appears to be the most volatile of the three metals produced by the El Mochito mine with large price swings largely due to its small relative size to other commodity markets. During the past 5 y, the metal has been as low as 14 $/oz and as high as 30 $/oz with a 52-week low of 13.98 $/oz and 52-week high of 17.54 $/oz. Global silver industrial fabrication demand returned to growth in 2017, increasing 4% to 599.0 Moz.

The LOM metal prices of zinc, lead and silver used in the current project economic analysis and in the calculation of resource and reserve cutoff grades are average values provided to the issuer and reviewed and accepted by InnovExplo. The pricing assumptions used are zinc 1.21 $/lb, lead 1.09 $/lb and silver 15.00 $/oz.

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Studies

No recent environmental baseline studies have been conducted at El Mochito. However, El Mochito has a comprehensive environmental management program to manage wastes, monitor effluents, manage site forests and biology.

Air quality has not been monitored on an annual basis this is because, according to prior legal requirements, the mine emissions did not reach the minimum time established to carry out measurements according to previous legal requirements. Now, however, a new regulation has been released that requires air quality monitoring regardless of the duration of the emissions. Currently the site is working on a monitoring plan to be implemented in the first half of 2019.

20.2 Water Quality and Management

An important environmental aspect at the mine is the quality of the surface water and groundwater. Water sampling is carried out daily from the mine and mill discharge points, the discharge locations for each tailings storage facility ("TSF") and the receiving creeks. Water quality samples are also taken daily for internal control and all samples are sent to the mill assay laboratory, which contains a section devoted to water chemistry. Analyses and results are submitted in semi-annual reports to the Ministry of the Environment and bimonthly to the Mining Authority. All the analyses reported correspond to the weekly, monthly and bimonthly water sampling. These samples are sent to external laboratories for physicochemical analyses. Regular reports are also sent to the municipality of Las Vegas.

The two largest water quality concerns are the total suspended solids ("TSS") and the total lead ("PbT") concentrations in the mine water discharge. Due to the limestone lithology and mineralization, there is no concern of acid rock drainage ("ARD") or metal leaching ("ML"). The water is naturally alkaline due to the geology of the region. PbT is associated with high TSS.

To mitigate these issues, the mine has constructed several settling ponds at all mine, mill and TSF discharge points. The settling ponds are sized to meet the retention time required to adequately decrease the TSS and, hence, the PbT to surface water quality standards. The mine is presently constructing a second, parallel settling pond to handle excess mine water from the Caliche portal. Water from every settling pond discharge point is sampled daily. This mitigation strategy has reduced the TSS from 100 ppm to less than 50 ppm on average. The water turbidity average for 2017 was 57 NTU.

20.3 Waste Management

Non-hazardous waste such as wood, roofing sheets and empty drums are recycled wherever possible. The mine camp has a recycling program for plastic and other saleable products, which are sent to a recycling company near San Pedro Sula. Normal rubbish is disposed of in the La Vegas municipal landfill site.

Hazardous and industrial wastes are temporarily stored on site at a secure location. Third party licenced operators remove and dispose of the waste. Liquid organic waste is either sent to the local cement production facility and used as fuel or removed to a certified landfill site, depending on the type of waste. El Mochito has procedures for the handling and remediation of hazardous waste spills of substances such as used oil, diesel fuel and mill chemicals.

The issuer has 137 ha of land in a single area as a protected natural forest and biodiversity area. A spring in this area provides potable water to over 7,000 inhabitants of Las Vegas with the municipality responsible for its treatment.

20.4 Flora and Fauna Management

The Forest Management Plan includes the protection of the water, flora and fauna of the Manantiales river basin. Both the mine and the Las Vegas municipality jointly work on this plan. El Mochito manages approximately 500 ha of forest and has its own nurseries.

The pine trees in Honduras have been hit hard by the Pine Beetle infestation. Approximately 2 ha to 3 ha of Ascendant's forested land has been lost to this pest, however these areas will be reforested in 2018.

A coffee plantation is active on El Mochito lands and operates independently of the mine. The plantations provide income for area residents as part of the mine's community social responsibility program. The plantations reduce soil erosion and discourage illegal squatters.

El Mochito does not permit hunting or fishing anywhere on its property. Workers are counselled to preserve the natural environment and to report incidents.

20.5 Monitoring of the Tailings Storage Facilities

Each of El Mochito's TSFs are inspected on an annual basis by External consultants and an audit report is issued after each visit. The Honduras Ministry of the Environment also inspects the TSFs every two years and the Mining Authority on a bimonthly basis.

Water quality samples are taken at each decant discharge location. The analytical results are reported to the mine, the Honduran government and the municipality of Las Vegas. The Soledad tailings pond water is decanted to the Quebrada Raices stream as required to maintain a secure freeboard. In June 2018, the water met the discharge quality criteria as shown in Table 20.1.

Table 20.1 – Water discharge analysis – June 2018

Total ppm						
	pH	**CN**	**Pb**	**Zn**	**Cu**	**Fe**
Limits	6-10	0.500	0.500	2.00	0.500	1.00
Actual	7.6	0.060	0.11	0.14	0.14	0.77

20.6 Environmental Education Initiatives

El Mochito's environmental staff regularly informs its employees, their families and the citizens of Las Vegas on good environmental practices and the environmental performance at the mine. Environmental concerns raised by citizens are answered as quickly and accurately as possible. The environmental department visits schools in the area to educate the children on environmental and conservation issues. Tours are given of the mine's plant nurseries. The most popular is the orchid nursery.

20.7 Inspections

The Governent of Honduras inspects the mine facilities on a regular basis. The Secretary of Natural Resources and Environment ("SERNA") carries out a general inspection every 2 to 3 y. The Honduran Institute of Geology and Mines performs bi-monthly inspections. The Municipality of Las Vegas through their environmental unit conducts a bi-monthly inspection. The National Institute for Conservation and Forest Development also performs a yearly inspection.

20.8 Environmental Legislation

The El Mochito mine has been in operation for 70 y, commencing well before environmental regulations came into effect in Honduras. The mining industry in Honduras is still small in comparison to other countries and for this reason the legislation that governs it is not as comprehensive. The environmental laws tend to be vague and do not specifically address mining issues. Consequently, few environmental issues are regulated or require permits. Nevertheless, the issuer prides itself on its low environmental impact over many years and continues to manage its environmental obligations to international standards.

Honduran government agencies are often understaffed and may lack the specific experience related to mining projects. Despite these challenges to exchange information on mine-related projects and to obtain official approvals, El Mochito has a good working relationship with the Government of Honduras and its many agencies.

20.9 Environmental Permits

There are specific environmental permits covering different areas of the mine complex. Permits are a combination of a certificate and a contract. The contract outlines the requirements that the permit holder must comply with to adhere to the certificate.

20.9.1 Water use permit

The General Directorate of Water Resources ("DGRH", a division of SERNA) is charged with the responsibility of the utilization and management of water resources. DGRH has given a resolution approving the issuance of the permit for the mine. This permit is currently being renewed for another five years.

20.9.2 Mining operations environmental permit

This permit, issued by SERNA, covers the mine, mill, workshops, El Bosque TSF and Pozo Azul TSF. The application process for the permit commenced in 2003. The contract between the government and AMPAC, the subsidiary of Ascendant, was signed off in 2006 and the environmental agency carries out inspections to verify the compliance of every mitigation measure. The contract outlines the inspections, monitoring and reporting of the environmental conditions of this area, and is primarily focused on water quality which is part of the formal mitigation plan approved by the government. The contract has no expiry date. The mine has continued to follow the plan and submit biannual reports to the government, as required.

SERNA issued the *Environmental Certificate for Mining Operations* on May 8, 2018. This permit was granted for an indefinite period. El Mochito checks with SERNA on a regular basis to confirm compliance.

20.9.3 Environmental licence for La Soledad TSF

An environmental licence for the La Soledad TSF was issued by SERNA in 2004. The licence expired in 2006 and a renewal request was filed and received by SERNA before the expiry date. The renewal was approved in 2016 and the mitigations measures were also updated with no major changes. The TSF follows the formal mitigation plan agreed to by the government, which includes inspections, monitoring and reporting of the environmental conditions. The mine has continued to follow the plan and submit reports to the government.

20.9.4 Concentrate storage building permit

El Mochito owns a concentrate warehouse in Puerto Cortés. This facility has an environmental licence granted by the Municipal Environmental Department of the Port, which was issued in 2014 and is valid for five y.

20.9.5 Forest management plan

The Honduran forestry industry is primarily regulated through the *Forest Law*, which was amended in 2008 as an attempt to better regulate forestry activities. The National Institute for Conservation and Forest Development, Protected Areas, and Wildlife ("ICF") was also created by this law. ICF has approved AMPAC's Forest Management Plans and revisions are made every five years. One of the approved plans is valid through 2045 while the other two are being renewed.

20.9.6 TSF closure requirements

The closure of the El Bosque and Pozo Azul TSFs are essentially complete, with minor reclamation activities planned for 2019. Seepage and runoff water qualities are continuously monitored.

The estimated undiscounted asset TSF retirement costs as of March 31, 2018 were $11.75 million, however a study is underway to confirm a reduction to approximately $3M to $5M given that the El Bosque and Pozo Azul TSFs are largely closed already.

21. CAPITAL AND OPERATING COSTS

21.1 Basis of Capital and Operating Cost – Estimates and Discussion

The capital and operating cost estimate presented in this PEA for the Expansion Project including a new internal shaft (the No. 8 Shaft), upgrading the underground pumping and water management system and process plant from over 2,200 tpd (796 ktpy) to 2,800 tpd (1,000 ktpy).

The estimate of the site's capital (CAPEX) and operating (OPEX) costs was developed using first principles and applying direct applicable project experience and avoiding the use of general industry factors. The site OPEX is based on owner-owned and operated mining/services fleets. All the estimate inputs were derived from engineers, contractors, and suppliers who have provided similar services to existing operations and have demonstrated success in executing the plans set forth in this study.

All costs are presented in 2018 USD on a calendar year basis. No escalation or inflation is included. Operating costs were estimated using the 2018 actual operating costs as a base, with projected cost savings calculated from the anticipated improvements arising from the Expansion Project.

CAPEX is divided into two sections. The first is Sustaining Capex, which is the annual capital expenditure in maintaining and sustaining ongoing operations every year in the traditional sense. These expenses are incurred concurrently with the Expansion Project which takes place in parallel. The second is the Expansion Project Capex (or Project Development Capital Cost), which encompasses all capital expenditures occurred in addition to Sustaining Capex during the first two years but specifically related to the Expansion Project, including:

- The construction and commissioning of the No. 8 subvertical shaft;
- The underground pumping and water management system upgrade; and
- The modification of the processing facilities to accommodate the anticipated increase in production from the mine, including surface crushing, concentrator, flotation, filtration and tailings disposal sections.

21.1.1 Operating costs

Total OPEX is estimated to be 61.85 $/t after commissioning of the Expansion Project, and 63.55 $/t milled including variable and fixed costs over the life of mine. Table 21.1and Table 21.2 provide a breakdown of the mining operating cost parameters.

Table 21.1 – El Mochito – total fixed and variable operating costs

	Units	2019-2020 Construction	2021-2028 Steady State	Total / Average	% of Total
Milled tonnes	kt	1,685	7,971	9,656	-
Yearly Production Rate	ktpy	842	996	966	-
OPEX					
Fixed mining	$/t milled	33.14	27.84	28.77	45%
Variable mining	$/t milled	16.11	14.53	14.81	23%
Mining Subtotal	$/t milled	49.26	42.37	43.57	69%
Fixed processing	$/t milled	7.54	6.42	6.61	10%
Variable processing	$/t milled	3.39	3.39	3.39	5%
Processing Subtotal	$/t milled	10.92	9.80	10.00	16%
General and Administration	$/t milled	11.41	9.67	9.98	16%
TOTAL OPEX	**$/t milled**	**71.58**	**61.85**	**63.55**	**100%**
TOTAL OPEX	**$ '000**	**120,586**	**493,033**	**613,619**	**100%**

21.1.2 Mining operating costs

The LOM average mining operating cost is estimated to be 43.57 $/t milled including variable and fixed costs. Table 21.2 below provides a breakdown of the mining operating cost parameters.

Table 21.2 – El Mochito – Mining fixed and valiable operaring costs

	Units	2019-2020 During Construction	2021-2028 During Steady State	Total/ Average	% of Total
Milled tonnes	kt	1,685	7,971	9,656	
Yearly Production Rate	ktpy	842	996	966	
Mining Fixed OPEX					
Labour	$ '000	22,012	108,739	130,750	**31%**
Power	$ '000	17,706	77,487	95,193	**23%**
Pumping maintenance	$ '000	4,681	2,800	7,481	**2%**
Services, Maintenance and infill drilling	$ '000	11,431	32,906	44,336	**11%**
Subtotal	**$ '000**	**55,830**	**221,931**	**277,761**	**66%**
	$/t milled	**33.14**	**27.84**	**28.77**	**66%**

	Units	2019-2020 During Construction	2021-2028 During Steady State	Total/ Average	% of Total
Mining Variable OPEX					
Mineral Development Cost	$ '000	4,598	21,774	26,373	**6%**
Direct Stoping Cost	$ '000	7,266	38,973	46,240	**11%**
Hauling Cost (Mineral)	$ '000	8,268	26,866	35,133	**8%**
Mobile Maintenance Cost	$ '000	7,012	28,221	35,233	**8%**
Subtotal	**$ '000**	**27,144**	**115,834**	**142,978**	**34%**
	$/t milled	**16.11**	**14.53**	**14.81**	**34%**
TOTAL Mining OPEX	**$ '000**	**82,974**	**337,765**	**420,739**	**100%**
	$/t milled	**49.26**	**42.37**	**43.57**	

21.1.3 Stoping costs

Based on the production plan and the unit cost estimated for each mining method, a summary of the stope mining OPEX costs per tonne is presented in Table 21.3.

Table 21.3 – El Mochito – fixed and variable stoping OPEX estimates per tonne milled

Stoping Method	Prod. Plan (t)	Variable ($/t)	Fixed ($/t)	Total Opex ($/t)
Cut and Fill	1,261,957	9.13	28.77	37.89
Long Hole	3,999,940	3.83	28.77	32.60
Wide Stoping (Panel)	24,374	7.92	28.77	36.68
Shrinkage	2,058,682	9.33	28.77	38.09
Mineral Development	2,310,816	11.41	28.77	40.18
Weighted average stoping cost	9,655,774	7.52	28.77	36.29

These OPEX estimates include weighted average variable costs of 7.52 $/t and fixed costs of 28.77 $/t for a total weighted average stoping OPEX of 36.29 $/t. Fixed costs were derived from actuals of 2018 and includes recognition for labour, power, pumping, maintenance are adjusted by engineering for the life of mine to include savings from the the expansion and water management projects including the new No. 8 Shaft.

21.1.4 Processing costs

Processing costs are based on year to date 2018 actual costs. Variable costs remain the same 3.39 $/t over the LOM while annual average fixed costs are estimated to drop to 6.61 $/t over the LOM (including an annual increase of 1.5% per year from 2020 onwards for increased operational maintenance costs), principally as a result of the higher throughput. Total average annual milling cost per tonne is expected to drop to 9.80 $/t after 2020. Costs include labour, power, consumables, and mineral transport and dispatch. Concentrate transport costs are being transferred to selling costs in 2019 – hence the drop in process costs from 2018 to 2019.

21.1.5 Energy / power

The power consumption for the mine is expected to increase by 1 MWh during the raise boring of the No. 8. Shaft, and this additional power draw would continue once the new hoist is operational. Additionnally it is expected than another 1 MWh of power will be consumed by increased mine pumping, partially offset by the reduced power consumption of just over 1 MWh gained from the implementation of the proposed water clarification and management system, which partially kicks in during 2020 and takes full effect the year after. The reason for this delay is to account for time required for the completion of clearing of settled solids throughout the system. Net power costs at the mine increase by approximately 1M $/yr and this increase is accounted for in the mining fixed unit costs.

21.1.6 General and administration

Mine site general and administration (“G&A”) costs are expected to decrease to 9.67 $/t after 2020 due to the increase in tonnage throughput after 2021 and would be 9.98 $/t for the LOM including the first two years of construction.

21.1.7 Discussion of operating cost reductions

The implementation of the Expansion Project has the effect of reducing operating costs per tonne mined in the following ways:

- Underground truck hauling variable costs reductions, due to materially lower haul distances;
- Labour cost reductions through improved tonnage efficiencies (26% increase in tonnes milled);
- Pumping & power cost reductions as a result of the reduced number of pumps and lower pumping efficiencies generated by the improved water management and clarification systems;
- Increased production revenue as a result of the higher throughput.

The above savings are partially offset by:

- Higher power usage costs from increased volumes mined and 8% increase volumes pumped as the mine grows;
- Higher labour costs during construction and partially higher after commissioning due to the increase in conventional mining methods;
- Higher overall mining and maintenance costs as a result of increased utilization of equipment, even though unit maintenance costs per tonne will be lower.

Table 21.4 is an estimation of the cost savings derived from the Expansion Project post commissioning in 2020.

Table 21.4 – Average annual operating cost savings estimate

Average savings on a $/t basis with vs without the Expansion Project infrastructure			
Mining	Fixed	8.81	Increased volumes, lower pumping costs.
Mining	Variable	5.46	Shorter hauling distance
Process	Fixed	2.18	Increased volumes
Process	Variable	0.00	Negligible change
G&A	Fixed	1.31	Increased volumes
Total Savings		**17.76**	

Variable mining costs drop as soon as the new shaft and crushing is commissioned, which reduces the underground truck haulage and all associated costs by 5.46 $/t (27%) on a post-construction average annualized basis.

Fixed processing and G&A costs are reduced as a result of the increased throughput. While it is expected that there may be some variable costs savings from the implementation of more power efficient flotation cells in the concentrator, these are expected to be negligible. The improved crushing circuit would also have a positive impact on the variable costs, but given that these are difficult to quantify, they were excluded from the financial modelling process.

21.2 Capital Costs

21.2.1 Summary

Total LOM CAPEX for El Mochito amounts to $162.5M and includes Site Sustaining Capex of $129.7M as well as the Expansion Project CAPEX or Development Capital Cost estimate of $32.8M over the first two years of the anticipated 10-year LOM.

Figure 21.1 presents the planned annual and cumulative capital cost profile.

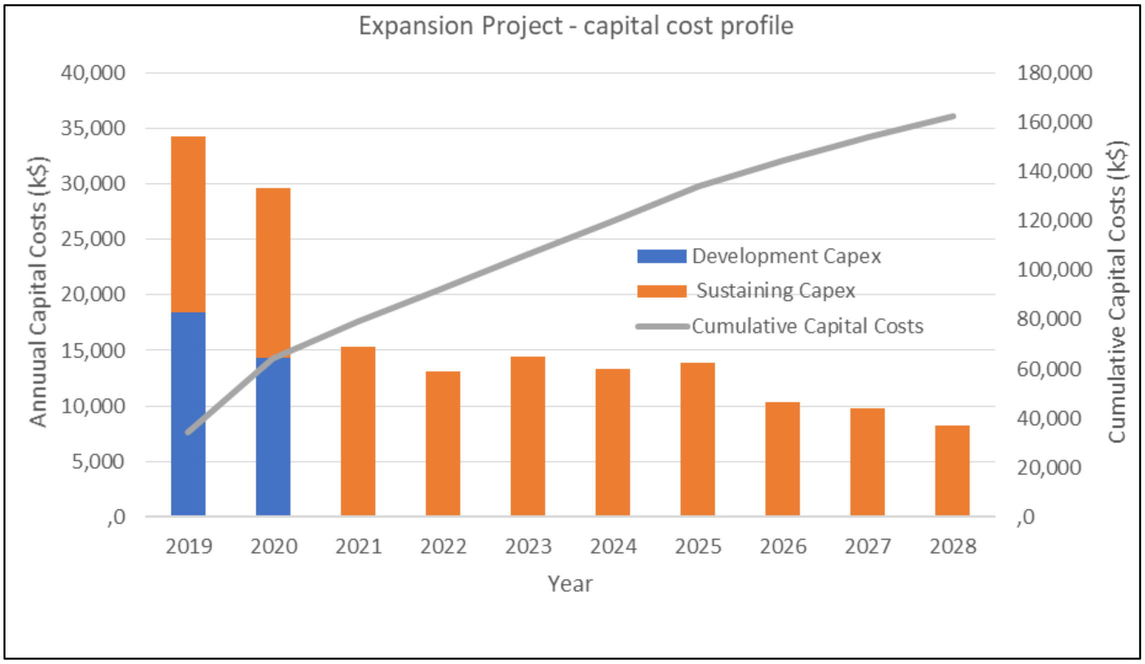


Figure 21.1 – Expansion Project – Capital Cost Profile

21.2.2 Project development capital costs

The total capital cost for the Expansion Project is $32.8M including a $4.3M contingency. This expenditure is expected to take place over the first 24-month development period after financing and includes funding for the construction of the new subvertical shaft which will open the door to a ramp-up in production volumes, an improved underground water pumping system, and processing upgrades.

The capital costs presented in this report have been estimated in conjunction with El Mochito management, operation team, engineering department and several manufacturers, contracting and consulting groups that have provided quotes for specific portion discussed in this report.

A summary of capital costs for Expansion Project is presented in Table 21.5.

Table 21.5 – El Mochito – Capital Costs Expansion Project

	Capital Costs Expansion project	Millions ($)
Subvertical Shaft & Crusher	Civil	0.6
	Mechanical	0.7
	Structural	2.0
	Electrical & Instrumentation	0.8
	Piping	1.3
	Winding System	4.8

	Capital Costs Expansion project	Millions ($)
	Raiseboring and Development	5.2
	Mining Project Management	0.4
	Subtotal Subvertical Shaft and Crusher	15.7
U/G Pumping & Water Management	EPCM	0.2
	Pumps, Pipes & Clarifiers	4.7
	Electrical Works	1.5
	Subtotal Pumping and Water Management	6.4
Process Plant	EPCM	0.5
	Crushing	2.1
	Grinding	0.4
	Magnetite Recovery	0.2
	Flotation	1.8
	Filtration	0.4
	Tailings Line and Reclaim Water	0.9
	Subtotal Process Plant	6.3
	Contingency	4.3
	TOTAL CAPEX	32.8

21.2.2.1 Subvertical shaft & crusher

WorleyParsons were appointed by El Mochito to conduct a conceptual study on the proposed new No. 8 internal shaft complex in relation to the following:

- General arrangements and layouts of equipment and related infrastructure; and
- Basic design calculations to ensure designs are workable and within required parameters.

The capital cost includes expenditures for engineering, design, procurement, fabrication, delivery, mining, shaft sinking (raise boring) and fabrication and commissioning of the shaft and related equipment. Included is the total estimated cost of the rock winder and stage hoists from design to commissioning. Additional allowances are made for equipment delivery, mining and construction costs, shaft sinking and commissioning of equipment including direct and indirect costs.

21.2.2.2 Underground pumping and water management

The issuer conducted a conceptual study and proposal for the upgrade of the pumping and water management system such as mentioned in Section 16.3.

A summary of the capital costs for the upgrade in pumping and water management is presented in Table 21.6.

Table 21.6 – Capital Costs – Upgrade to Pumping and Water Management System

Component	Units	2019	2020	Total
Engineering	USD	20,000	0	20,000
Consultants/Vendors	USD	20,000	0	20,000
L-3250 Pump Station	USD	1,600,800	801,000	2,401,800
PO Pumps	USD	336,000	336,000	672,000
PO Pipes and Accessories	USD	440,000	180,000	620,000
PO Electrical Panels and Frec Var	USD	540,000	180,000	720,000
High Rate Clarifiers	USD	75,000	25,000	100,000
Mine H Development	USD	9,800	0	9,800
Civil Works	USD	60,000	0	60,000
Mechanical Installation	USD	90,000	30,000	120,000
Electrical Works	USD	50,000	50,000	100,000
L-2100 Pump Station	USD	125,600	2,195,000	2,320,600
PO Pumps	USD	0	1,160,000	1,160,000
PO Pipes and Accessories	USD	0	340,000	340,000
PO Electrical Panels and Frec Var	USD	0	450,000	450,000
Mine H Development	USD	24,500	0	24,500
Mine V Development	USD	101,100	0	101,100
Civil Works	USD	0	80,000	80,000
Mechanical Installation	USD	0	60,000	60,000
Electrical Works	USD	0	105,000	105,000
Berrinche 69kV Surface Electrical Sub station	USD	1,500,000	0	1,500,000
EPCM	USD	91,600	64,400	156,000
Project Management	USD	48,000	32,000	80,000
Engineering and Drafting	USD	24,000	16,000	40,000
Indirects	USD	9,600	6,400	16,000
Commissioning	USD	10,000	10,000	20,000
Total for pumping upgrade	**USD**	**3,338,000**	**3,060,400**	**6,398,400**

21.2.2.3 Process plant

Based on site observations and information provided by El Mochito management, seven (7) major components for the plant expansion are deemed necessary if additional processing capacity, improved metallurgical efficiency and concentrate moisture reduction are to be achieved. Preliminary engineering and logistics considerations have been adequate, and no significant interruptions of milling operations are anticipated during installation. The costs are estimated to be $6.4M over approximately 16 months. This cost estimate is considered accurate within 5%.

21.2.3 Sustaining Capex

The average Sustaining Capex over the mine life is estimated to be 13.43 $/t milled or 12.35 $/t milled after commissioning the Expansion Project (Table 21.7). Sustaining Capex includes the ongoing operations and waste development required to support the LOM.

Table 21.7 – Sustaining Capex Breakdown

	Units	2019-2020 During Constr.	2021-2028 During Steady State	Total/ Average	% of Total
Milled tonnes	kt	1,685	7,971	9,656	
Yearly Production Rate	ktpy	842	996	966	
CAPEX					
Development waste	$ '000	12,746	39,461	52,208	40%
Fleet rebuild and maintenance	$ '000	7,024	11,861	28,884	23%
Tailings dam	$ '000	3,400	12,250	15,560	12%
Shafts and Infrastructure	$ '000	3,080	12,906	15,986	12%
Pumping and water management	$ '000	2,607	5,626	8,233	6%
Exploration infill drilling	$ '000	751	3,003	3,754	3%
Mill maintenance	$ '000	370	925	1,295	1%
Other	$ '000	1,291	1,408	2,699	2%
TOTAL CAPEX	**$ '000**	**31,269**	**98,440**	**129,709**	**100%**
TOTAL CAPEX	**$/t milled**	**18.56**	**12.35**	**13.43**	

The following sections provide the basis for the capital cost estimates for the major component costs.

21.2.3.1 Development

Costs are based on LOM development planning and unit cost estimates in USD/t ($/t).

Unit costs include the direct costs for drilling and blasting (mined), ground support (fortification) and mucking.

Table 21.8 below presented unit cost estimates in $/t.

Table 21.8 – Development unit costs

Data LOM				**Mined**	**Ground Support**	**TOTAL**
Waste Development	**ft**	**t**	**$/ft**	**$/t**	**$/t**	**$/t**
Hz Development, Jackleg @ 10'×12' Scoop	2,274	20,655	74.75	8.20	9.22	**17.42**
Hz Development, Jackleg @ 10'×12'	1,225	11,127	118.23	12.96	9.22	**22.19**
Hz Development, Jumbo @ 14'×14'	72,317	1,072,861	121.94	8.19	6.43	**14.62**
Sub-Horizontal Raise, Jackleg @ 6'×9'	1,032	4,218	50.15	12.22	9.22	**21.44**
Sublevel, Jackleg @ 6'×6'	314	856	40.57	14.83	9.22	**24.05**
Sublevel, Jackleg @ 9'×9'	235	1,441	61.71	10.02	9.22	**19.25**
Sub-Vertical Alimak, Stoper @ 8'×8'	685	3,318	46.23	9.50	9.22	**18.73**
Sub-Vertical Raise, Borer @ 5'Ø	11,787	22,304	282.74	160.00	0.00	**160.00**
Sub-Vertical Raise, Stoper @ 5'×5'	5,012	9,484	37.19	19.57	0.00	**19.57**
Weight Media	94,881	1,146,263	122.87	11.31	6.35	**17.66**
Mineral Development	**ft**	**t**	**$/ft**	**$/t**	**$/t**	**$/t**
Hz Development, Jackleg @ 10'×12' Scoop	2,216	25,458	77.23	6.70	4.93	**11.64**
Hz Development, Jackleg @ 10'×12'	1,193	13,705	121.12	10.51	4.93	**15.45**
Hz Development, Jumbo @ 15'×15'	88,618	1,908,871	129.21	5.98	4.77	**10.76**
Sub-Horizontal Raise, Jackleg @ 6'×9'	55,778	288,356	51.36	9.91	4.93	**14.84**
Sublevel, Jackleg @ 6'×6'	2,520	8,685	41.37	11.97	4.93	**16.90**
Sublevel, Jackleg @ 9'×9'	6,169	47,838	63.53	8.17	4.93	**13.10**
Sub-Vertical Raise, Stoper @ 5'×5'	7,480	17,903	37.75	15.73	0.00	**15.73**
Weight Media	163,974	2,310,816	116.48	6.65	4.76	**11.41**

21.2.3.2 Pumping

Underground water pumping costs are based on actual 2018 costs and are expected to decrease in 2021 due to the upgrade of the underground pumping system. The cost to purchase replacement pumps would be reduced by over 50% as the number of pumps is reduced, the old pumps and lines being replaced by newer, more efficient pumps, and they would pump clean water treated by the planned installation of a new water clarification system and settlers. A decrease in general service maintenance costs (of which 30% are pumping related), electrical workshop costs (of which 80% are pump motor related) and mine industrial maintenance costs (of which over 50% are in pump repairs) is expected.

21.2.3.3 Life of mine and closure costs

The mine life of 10 y is based on a mine plan that depletes Mineral Resources inclusive of Inferred Mineral Resources and naturally excludes any expected additional Mineral Resources to be added from the current exploration program or from any planned future drilling. El Mochito has had a very high rate of conversion of Inferred Mineral Resources into Measured and Indicated Mineral Resources. The mine plan was stopped at 10 y on the basis that any scheduling beyond that point would have little economic impact on the project. Inferred Resources are not necessarily economic and especially that far out in the plan would be subject to significant based on new information obtained closer to the time.

The closure cost of $11.75M, as accounted for in the issuer’s financial statements, was excluded from this Technical Report given that the 10-year mine plan used does not deplete all available Mineral Resources, and consequently the timing of the closure and reclamation expenses are indeterminable.

22. ECONOMIC ANALYSIS

22.1 Assumptions and Basis

The economical/financial assessment of the Expensaion Project was carried out using a discounted cash flow approach on a pre-tax and after-tax basis on the incremental production against the same mine plan at current production rates. An exchange rate of CAD1.30 = USD1.00 was assumed to convert Canadian cost components into US dollars.

The financial assumptions for the financial model LOM plan are summarized in Table 22.1

Table 22.1 – Financial Assumptions

Key Assumptions	units	Metal price assumed
Zinc	$/lb	1.21
Lead	$/lb	1.09
Silver	$/oz	15
CAD/USD Exchange Rate	-	1.30

Lead and zinc concentrate NSR estimates are based on produced lead concentrate grades of 60% Pb and zinc concentrate grades of 51% Zn. Zinc concentrate NSR calculations are based on the parameters presented in Table 22.2 and the lead concentrate NSR parameters are presented in Table 22.3.

Table 22.2 – El Mochito Mine – Zinc Concentrate NSR Calculation Parameters

Element	Metal Price	Concentrate Recovery	Smelter		Refining Chg.
	$Us/Lb or Oz	%	Payable %	Deduct g	$Us/Lb or Oz
Zn	$1.21	88.9%	85%		$0.00
Ag	$15.00	26%	70%	93.0	$0.00

Zinc concentrate treatment charge of 147 $/t (DMT)
Zinc concentrate shipping charges of USD 55 $/t (DMT)

Table 22.3 – El Mochito Mine – Lead Concentrate NSR Calculation Parameters

Element	Metal Price	Concentrate Recovery	Smelter		Refining Chg.
	$Us/Lb or Oz	%	Payable %	Deduct g	$Us/Lb or Oz
Pb	$1.09	75%	95%		$0.00
Ag	$15.00	52%	95%	50.0	$1.50

Lead concentrate treatment charge of 99 $/t (DMT)
Lead concentrate shipping charges of 55 $/t (DMT)

22.2 Taxation & Royalties

The Project is subject to a Honduran federal tax rate of 25%. It is estimated that approximately $25.4M in federal income taxes will be paid over the life of mine on the taxable income. The Project is also subject to a 5% NSR royalty. It is estimated that approximately $51.2M in royalties is expected to be paid based on assumed metal prices less applicable treatment charges and refining charges. The 5% royalty is payable as follows:

- a 2% security fee paid to the General Treasury of the Republic;
- a 1% payable to the national mining authority (INGHEOMIN); and
- a 2% to the municipality of Las Vegas where the operations are situated.

These taxes are generally re-directed into local road and infrastructure improvements as determined by the municipality.

22.3 Mineral Resources

The economic analysis is based on Mineral Resources considered in the mine plan.

Inferred Mineral Resources have a lower level of confidence than that applied to an Indicated Mineral Resource. It is reasonably expected that most of the Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration and definition drilling.

Mineral Resources were depleted to the end of 2018 based on actual and projected production rates to reflect a life of mine plan from January 1, 2019.

22.4 Economic Results

An 8% discount rate was applied to the cash flow to derive the incremental NPV for the Expansion Project on a pre-tax and after-tax basis. The after-tax financial model resulted in an incremental project internal rate of return (IRR) of 58% and an incremental project NPV of $83.0M with a discount rate of 8%.

Key economic results of the incremental contribution of the Expansion Project are displayed in Table 22.4 below.

Table 22.4 – Economic Results of the Expansion Project

Key Highlights of the El Mochito Expansion Project	Value Units
Project IRR after taxes and royalties	58 %
Project NPV (8%) after taxes and royalties	83.0 M$
Project undiscounted after-tax cash flow	146.5 M$
Project construction period	2 y
Project Payback period	2 y
Life of mine (including currents operations)	10 y
LOM Metal Prices	
Zinc	1.21 $/lb
Lead	1.09 $/lb
Silver	15 $/oz
LOM Process recovery	
Zn	90 %
Pb	75 %
Ag	75 %
Average LOM Annual Metal Production	
Zinc	41 kt
Lead	10 kt
Silver	742 koz
Zinc Equivalent (ZnEq)	120 Mlbs
Total LOM Production (payable)	
Zinc	352 kt
Lead	96 kt
Silver	5.9 Moz
Zinc Equivalent (ZnEq)	1,038 Mlb
Project Development Capital Expenditures	32.8 M$
LOM Sustaining Capital Expenditure (excluding closure)	129.7 M$
Post Project Construction and Commissioning:	
Average annual operating costs	61.85 $/t milled
Average annual operating costs after construction	0.58 $/lb ZnEq payable
Average annual All-in Sustaining Cost (AISC) after construction	0.97 $/lb ZnEq payable

Figure 22.1 shows the projected LOM cumulative cash flow for the Expansion Project for on a pre-tax and after-tax basis.

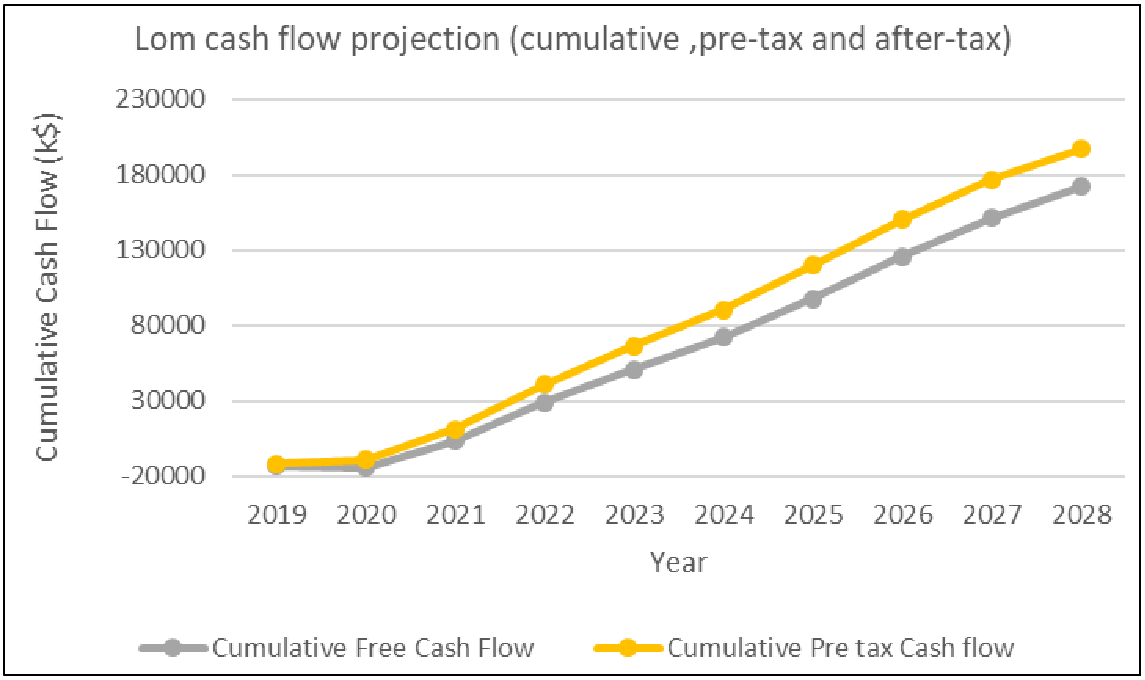


Figure 22.1– Cumulative cash flow for the Expansion Project

The summary of the financial evaluation of the Expansion Project is presented in Table 22.5 and the base case without the Expansion Project in Table 22.6.

Table 22.5 – Life of mine financial model for the project with expansion

Years	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Production summary												
Milled Tonnes	kt	790	895	977	993	1,003	996	1,007	998	998	999	**9,656**
Zinc grade	%	4.40	4.39	4.78	4.78	4.77	4.91	4.98	5.13	4.87	4.56	**4.77**
Lead grade	%	1.76	1.66	1.28	1.67	1.43	1.20	1.47	1.23	1.21	1.11	**1.39**
Silver grade	g/t	47.49	52.95	29.14	28.65	28.8	28.16	28.1	26.56	29.64	25.29	**31.94**
ZnEq Head Grade	%	6.80	6.80	6.50	6.80	6.60	6.50	6.80	6.70	6.50	6.00	**6.60**
Metal in Concentrate												
Zinc Production	kt	31.2	35.3	41.9	42.6	43	43.9	45.1	46	43.7	40.9	**413.6**
Lead Production	kt	10.4	11.1	9.4	12.4	10.8	9	11.1	9.2	9.1	8.3	**100.8**
Silver Production	koz	902	1,140	685	684	695	674	681	637	712	608	**7,417**
ZnEq Production	G lbs	100.1	114.1	119.5	127.1	124.7	123	129.8	127.6	123.1	114.3	**1203.2**
Payable												
Zinc Sales	kt	26.5	30	35.6	36.2	36.5	37.3	38.3	39.1	37.1	34.8	**351.5**
Lead Sales	kt	9.9	10.6	8.9	11.8	10.2	8.5	10.5	8.8	8.6	7.9	**95.8**
Silver Sales	koz	721	912	548	547	556	539	545	510	569	486	**5,934**
ZnEq	G lbs	86.5	98.5	103	110.1	107.7	105.9	112.1	109.9	106	98.4	**1038.1**
Costs												
Mining Costs	$/t milled	51.4	47.36	42.29	41.18	41.52	42.47	42.09	42.57	43.51	43.34	**43.57**
Processing Costs	$/t milled	11.37	10.53	9.93	9.83	9.76	9.81	9.73	9.79	9.79	9.79	**10.00**
G&A Costs	$/t milled	12.13	10.77	9.87	9.71	9.61	9.68	9.57	9.66	9.66	9.65	**9.98**
Cash cost per tonne	$/t milled	74.89	68.66	62.09	60.72	60.89	61.96	61.39	62.03	62.96	62.78	**63.55**
Direct Production Costs	$000's	59,127	61,459	60,657	60,292	61,085	61,683	61,851	61,898	62,849	62,718	**613,619**
Total - Smelter Proc. And Freight	$000's	18,429	20,691	23,230	24,356	24,117	24,018	25,065	24,921	23,947	22,648	**231,423**
Royalties	$000's	4,314	4,923	5,070	5,440	5,310	5,209	5,529	5,402	5,215	4,821	**51,232**
Mine Site Income Statement												
Gross Sales	$000's	104,711	119,145	124,628	133,165	130,324	128,196	135,644	132,953	128,238	119,069	**1,256,073**
NSR	$000's	81,967	93,531	96,328	103,369	100,896	98,969	105,049	102,631	99,077	91,599	**973,417**
EBITDA	$000's	22,841	32,072	35,671	43,077	39,811	37,287	43,198	40,733	36,228	28,881	**359,798**
Operating Income	$000's	18,460	22,966	22,193	29,276	25,953	22,797	28,133	24,373	18,999	9,931	**223,082**
Taxes Paid	$000's	1,737	3,476	2,635	4,361	3,503	2,547	3,767	2,492	913	-	**25,431**
Net Income	$000's	16,723	19,490	19,557	24,915	22,450	20,251	24,366	21,882	18,086	9,931	**197,651**
Plus: Depreciation	$000's	4,381	9,105	13,478	13,801	13,858	14,489	15,065	16,360	17,229	18,950	**136,716**
Less: Development Capex	$000's	18,412	14,351	-	-	-	-	-	-	-	-	**32,763**
Less: Sustaining Capex	$000's	15,933	15,336	15,282	13,159	14,414	13,340	13,872	10,368	9,795	8,211	**129,709**
Cash Flow												
Pre-tax cash flow	$000's	-11,505	2,385	20,389	29,918	25,397	23,947	29,326	30,365	26,433	20,670	**197,326**
Afterr tax cash flow	$000's	-13,241	-1,091	17,754	25,557	21,894	21,400	25,559	27,873	25,520	20,670	**171,895**
Cumulative after-tax cash flow	$000's	-13,241	-14,333	3,421	28,978	50,872	72,272	97,832	125,705	151,225	171,895	

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Table 22.6 – Life of mine financial model for the project without expansion

Years	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Production summary												
Milled Tonnes	kt	790	792	795	798	794	796	796	796	796	796	**7,949**
Zinc grade	%	4.40	4.43	4.68	4.65	4.72	4.65	4.89	4.83	4.94	4.76	**4.70**
Lead grade	%	1.76	1.68	1.30	1.63	1.54	1.46	1.28	1.38	1.21	1.18	**1.44**
Silver grade	g/t	47.49	50.95	28.38	28.97	28.86	28.42	28.77	27.80	26.27	29.55	**32.53**
ZnEq Head Grade	%	6.8	6.9	6.4	6.6	6.6	6.5	6.6	6.6	6.5	6.4	**6.6**
Metal in Concentrate												
Zinc Production	kt	31.2	31.5	33.4	33.3	33.6	33.2	35.0	34.5	35.3	34.0	**335.2**
Lead Production	kt	10.4	10.0	7.8	9.7	9.1	8.7	7.6	8.2	7.2	7.0	**85.9**
Silver Production	koz	902	970	543	556	551	544	551	532	503	566	**6,218**
ZnEq Production	G lbs	100.2	101.3	95.8	99.7	99.1	97.3	99.1	99.1	98.3	100.2	**985.9**
Payable												
Zinc Sales	kt	26.6	26.8	28.4	28.3	28.6	28.2	29.7	29.3	30.0	28.9	**284.9**
Lead Sales	kt	9.9	9.5	7.4	9.3	8.7	8.3	7.2	7.8	6.8	6.7	**81.6**
Silver Sales	koz	722	776	434	445	441	435	441	426	402	453	**4,975**
ZnEq	G lbs	86.6	87.5	82.7	86.3	85.7	84.1	85.4	85.5	84.7	82.7	**851.2**
Costs												
Mining Costs	$/t milled	51.40	53.11	54.04	55.43	56.21	56.38	57.41	57.43	57.94	58.24	**55.76**
Processing Costs	$/t milled	11.37	11.39	11.54	11.69	11.77	11.92	12.05	12.18	12.31	12.44	**11.87**
G&A Costs	$/t milled	12.13	11.04	11.00	10.96	11.01	10.99	10.99	10.99	10.99	12.13	**11.11**
Cash cost per tonne	$/t milled	74.89	75.54	76.58	78.08	79.00	79.29	80.45	80.59	81.23	74.89	**78.74**
Direct Production Costs	$000's	59,163	59,824	60,880	62,307	62,725	63,112	64,036	64,153	64,662	65,008	**625,871**
Total - Smelter Proc. And Freight	$000's	18,441	18,451	18,665	19,139	19,099	18,836	19,261	19,235	19,277	18,725	**189,129**
Royalties	$000's	4,317	4,370	4,068	4,265	4,232	4,148	4,203	4,212	4,160	4,064	**42,039**
Mine Site Income Statement												
Gross Sales	$000's	104,777	105,857	100,020	104,432	103,737	101,798	103,322	103,478	102,482	100,006	**1,029,909**
NSR	$000's	82,019	83,036	77,287	81,028	80,407	78,814	79,858	80,030	79,044	77,217	**798,740**
EBITDA	$000's	22,856	23,212	16,407	18,721	17,682	15,702	15,822	15,878	14,382	12,209	**172,869**
Operating Income	$000's	20,157	19,234	10,800	12,041	10,160	7,000	6,108	4,770	1,810	-3,109	**88,972**
Taxes Paid	$000's	2,157	3,768	1,688	1,702	1,040	0	0	0	0	0	**10,355**
Net Income	$000's	18,000	15,466	9,111	10,339	9,120	7,000	6,108	4,770	1,810	-3,109	**78,617**
Plus: Depreciation	$000's	2,699	3,978	5,607	6,680	7,521	8,702	9,713	11,108	12,572	15,317	**83,898**
Less: Development Capex	$000's	-	-	-	-	-	-	-	-	-	-	**-**
Less: Sustaining Capex	$000's	15,933	14,724	14,770	14,147	16,152	15,078	14,860	11,756	11,183	8,599	**137,204**
Cash Flow												
Pre-tax Cash flow	$000's	6,923	8,488	1,636	4,574	1,529	624	962	4,122	3,199	3,609	**35,665**
After Tax Cash flow	$000's	4,766	4,720	-52	2,873	489	624	962	4,122	3,199	3,609	**25,311**
Cumulative after-Tax cash flow	$000's	4,766	9,486.04	9,434	12,307	12,796	13,420	14,381	18,503	21,702	25,311	

Mine "cash cost" or Direct Operating Cost ("DOC") includes principally the cost of mining, processing and G&A. All-in Sustaining Cost ("AISC") is a non-GAAP measure that includes mine direct operating production costs (mining, processing, administration and other mine related costs incurred such as variation in inventory) plus smelter treatment and refining charges, freight costs, royalties and sustaining capital costs. The measure does not include depreciation, depletion, amortization and reclamation expenses.

All costs are expressed per tonne milled, or when in metal produced terms, per zinc equivalent payable pound produced, which includes the recovered value of lead and silver metals expressed in equivalent terms of zinc using the price and recovery assumptions for each period.

The LOM direct operating cost is 0.58 $/lb ZnEq payable after construction and the LOM AISC is expected to be 0.97 $/lb ZnEq payable after construction.

The undiscounted minesite pre-tax cash flow is $197.3M, after-tax cash flow is $171.9M and when discounted at 8% has an NPV of $100.4M with an IRR of 83%.

Initially whitout expansion the undiscounted pre-tax cash flow was $35.6M, after-tax cash flow was $25.3M and when discounted at 8% has an NPV of $17.3M with an IRR of 61%.

The project NPV (8%) after tax is the result of incremental cash flow from the Expansion Project if we compare the cash flow generated in each case. Table 22.7 below present the results.

Table 22.7 – NPV 8% Incremental Project

NPV 8% Operation (expanded)	$ 000's	100,382
NPV 8% Operation without expansion	$ 000's	17,316
NPV 8% Incremental (Project)	$ 000's	83,025

22.5 Sensitivity Analysis

A financial sensitivity analysis was conducted on the incremental (with expansion) after-tax NPV and IRR, by varying the metal price, Development Capex, Sustaining Capex and Opex.

The results for the incremental project NPV and IRR are based on the sensitivities assumed in Table 22.8.

Table 22.8 – Sensitivity of the NPV and IRR (after tax) to Financial Variables

INCREMENTAL NPV 8% ($ 000's)					
Change	**-15%**	**-5%**	**0%**	**5%**	**15%**
Metal Price	826	68 019	83 025	86 614	95 599
Dev. Capex	87 478	84 493	83 025	81 558	78 622
Sust. Capex	92 479	86 103	83 025	80 021	73 890

INCREMENTAL NPV 8% ($ 000's)					
OPEX	79 666	81 621	83 025	79 094	51 371
INCREMENTAL IRR (%)					
Change	**-15%**	**-5%**	**0%**	**5%**	**15%**
Metal Price	8%	50%	58%	61%	67%
Dev. Capex	68%	61%	58%	55%	51%
Sust. Capex	62%	59%	58%	57%	55%
OPEX	58%	58%	58%	55%	38%

The graphical representations of the financial sensitivity analysis are depicted below in Figure 22.2 for the project's NPV and Figure 22.3 for the project's IRR.

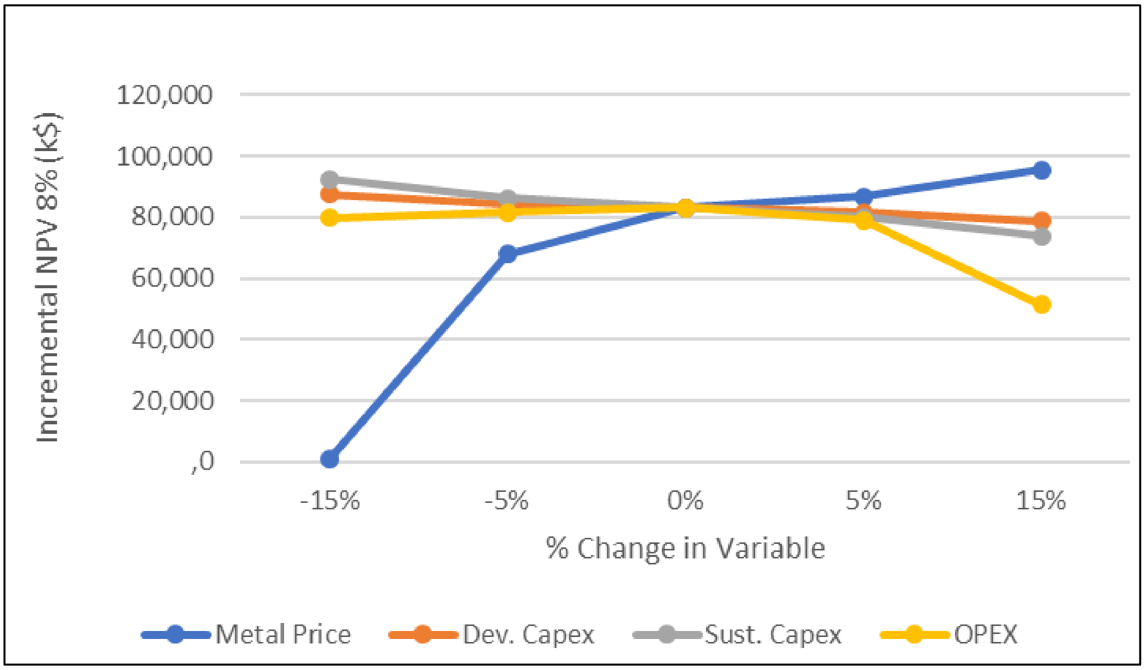

Figure 22.2 – Sensitivity of the net present value

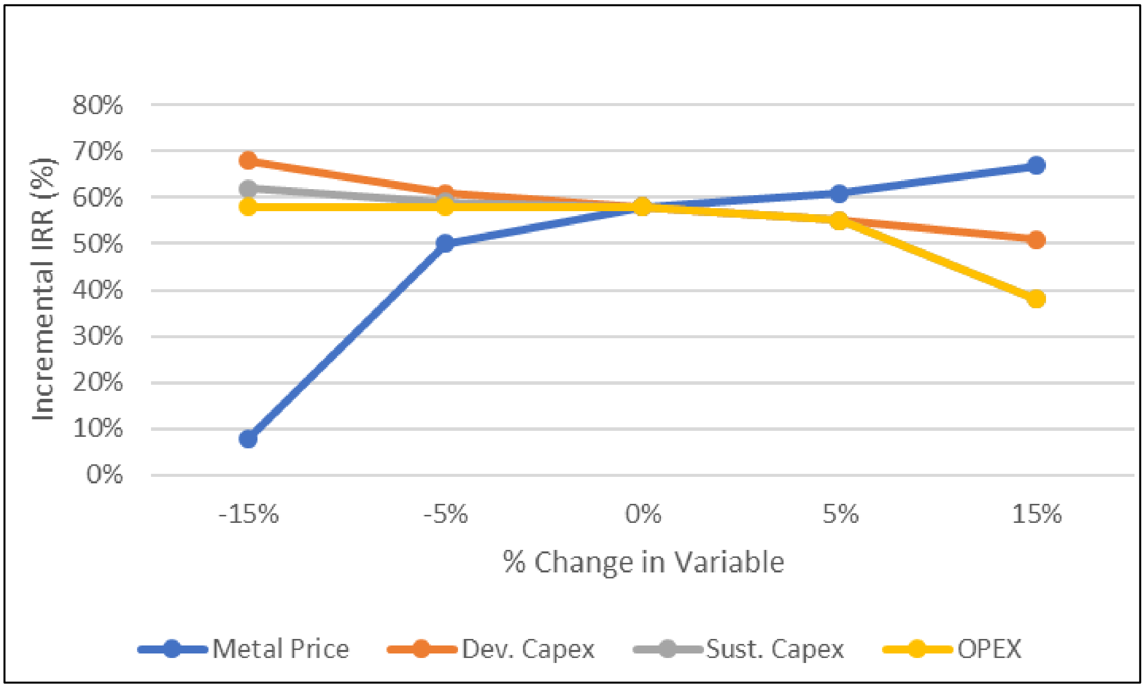

Figure 22.3 – Sensitivity of the internal rate of return

The sensitivity analysis reveal that the metal price has the most significant influence on both incremental NPV and IRR compared to other parameters. The project's NPV was less affected by variations in capital costs and operating costs, given the sensitivity is based on a comparison between two production cases. The negative impact of variations in the capital cost will not be significant on the economic viability of the project given that the expanded production case (2,800 tpd) has significantly more robust economics than the base case of 2,200 tpd.

23. ADJACENT PROPERTIES

The authors are not aware of any adjacent properties as defined under NI 43-101 that are material to the Mineral Resource Estimate and PEA content of this Technical Report.

24. OTHER RELEVANT DATA AND INFORMATION

The effective date of the Mineral Resource Estimate is January 1, 2018 as reflected in Table 14.7. For the purposes of the LOM, this Mineral Resource Estimate was depleted with actual and forecasted production to the end of 2018 (Table 24.1). Actual production was depleted first up to the end of August 2018, and then mining face positions were projected to December 31, 2018 in the applicable block models and depleted, per the mine plan as of August 2018. The LOM plan was completed in September 2018 in preparation for this report.

Table 24.1 – Actual and Forecasted Production in 2018 which was Removed/Depleted from Available Mineral Resources Ahead of the LOM Planning Process

Category	Units	Measured Mining Production (Jan-Aug 2018)	Forecast Mining Production (Sep-Dec 2018)	Total 2018
Mined	kt	515	254	769
Zinc Grade	%	4.3	4.0	4.2
Lead Grade	%	1.6	1.7	1.6
Silver Grade	g/t	45	52	48

The term date of both the PEA and the LOM in this Technical Report is ten years, commencing January 1, 2019. For greater clarity, the cash flow analyses included in this Technical Report commence on the January 1, 2019 as well and not to be confused with the Effective Date of this PEA Technical Report, which is October 22, 2018, as described in Section 2.7. The LOM plan of the PEA considers the Mineral Resources associated with the Table 24.1 schedule as being mined out at January 1, 2019 and not available for inclusion in the PEA.

25. INTERPRETATIONS AND CONCLUSIONS

25.1 Mineral Resource Estimate

The current Mineral Resource Estimate prepared by Mercator in conjunction with Ascendant staff during the August 2017 through January 2018 period established a substantial new Mineral Resource base for the El Mochito Mine. The new Mineral Resource Estimate represents a significant increase in global tonnage and a slight increase in ZnEq grade in comparison with the historical Mineral Resource base present at the time of Ascendant's acquisition of the mine from Nyrstar in late 2016. The increase in Mineral Resources reflects substantial expenditure by Ascendant, particularly related to underground delineation, infill and step out drilling in near-mine areas such as Imperial-Barbasco (Esperanza), Salva Vida, Victoria, Porvenir and Santa Elena.

Mercator believes that near-mine strike extensions of the main mineralized zones along their currently defined trends represent the highest priority and lowest risk exploration target areas for continued near-term definition of new Mineral Resources at the El Mochito Mine. Very good exploration opportunities also exist along the known mineralized corridors at substantial distances from the operating mine, as exemplified by earlier success at the Big Fuzzy target area on the Victoria trend in 2007. Additional surface exploration to assess such areas away from mine targets, initially sited along the strike extensions of the main mineralized corridors, could result in the discovery of completely new mineralized centres having the potential to be similar in size and metal grades to those mined to date. These targets could be efficiently tested from surface using drilling equipment owned by Ascendant and should be systematically pursued in the future. Careful interpretation of mineralizing system proximity indicators that are currently being collected by El Mochito staff, such as zonation trends in metals, calc-silicate mineral assemblage ratios, calcite fluorescence mapping and pyroxene mineral chemistry, may also play key roles in the development and assessment of new exploration drilling targets. These should be collectively applied to maximum advantage.

Sustained access to both surface and underground core drilling meterage on a yearly basis will be required to properly address ongoing Mineral Resource definition, infill, step-out and exploration requirements at the El Mochito Mine. Continuation of core drilling programs at the current level of approximately 40,000 m per year will be necessary to keep pace with planned production and associated depletion of Mineral Resources. This level of drilling is fully warranted, based upon the demonstrated strong potential for both the expansion of Mineral Resources and the discovery of entirely new mineralized zones in and around the El Mochito Mine.

25.2 Mining

Today, the El Mochito Mine is in its 70th year of operation and the mining infrastructure is expansive.

Exploration drilling has demonstrated that the mineral resources are expected to increase in the eastern part of the mine as shown in Figure 16.1 and Figure 16.2. These new horizons are below the current shaft bottom of the No. 2 and No. 3 Shafts.

In the last 18 months the issuer has made substantial progress in reducing cost by over 30% as mentioned in the October 22, 2018 press release concerning the Expansion Project of the El Mochito mine.

The Expansion Project presented in this PEA concerns the following three principal areas of development:

- Installing a new 442-m subvertical (or internal, vertical) rock-only hoisting shaft that will shorten the average underground truck hauling distances by 26% and increase hoisting capacity, access to ventilation, services, and mining capacities. Shorter distances translate into additional trucking capacity and the underutilized drilling and blasting equipment would be able to increase production by 26% without the need for additional mining equipment.
- Upgrading the underground pumping and water management system, reducing overhead costs by changing and reducing the number of pumps, rationalizing pumping columns and installing an effective water clarification system to pump clean water.
- Upgrading the crushing circuit, process plant, and tailings handling capacity to meet the increased production from the mine.

The objective of the Expansion Project is to continue the optimization and growth strategy of the issuer.

With a 26% production increase in tonnes milled to 2,800 tpd or 1 million tonnes per year, an average annual operating cost saving of 17.76 $/t is anticipated against actual figures. This Expansion Project represents a significant opportunity to reduce the All-In Sustaining Costs down to less than 0.97 $/lb zinc equivalent per pound payable by two years after the commencement of construction. Other benefits include the pumping of clean water from undergrounfd requiring less or no treatment on surface, and increased employment opportunities for the local population.

25.3 Risks and Opportunities

Table 25.1 identifies the significant internal risks, potential impacts and possible risk mitigation measures that could affect the future economic outcome of the Project. The list does not include the external risks that typically apply to all mining projects (e.g., changes in metal prices, exchange rates, availability of investment capital, change in government regulations, etc.).

Significant opportunities that could improve the economics, timing and permitting are identified in Table 25.2. Further information and study would be required before these opportunities can be included into the project economics.

Table 25.1 – Risks for the Project

RISK	POTENTIAL IMPACT	POSSIBLE RISK MITIGATION
Lack of commitment to detailed core drilling to define local grade and tonnage aspects of Mineral Resource areas slated for	Inability to meet future grade and tonnage levels as set out in the mine plan, resulting in a lack of economic viability	Completion of detailed in-fill drilling of Mineral Resource areas as far in advance as possible of the conversion of these areas into Mineral Reserves; this will confirm

RISK	POTENTIAL IMPACT	POSSIBLE RISK MITIGATION
conversion to Mineral Reserves		local details of Mineral Resource zone outlines and grades, provide better definition of related Mineral Reserves and result in a more reliable mine plan
Problems / delays in mine development	Delay in available stopes for production	Prioritize specific headings, use of contractors, special development crews, equipment availability
Problems / delays in mine development	Delay in the construction of infrastructure related to the No. 8 Shaft	Prioritize specific headings, use of contractors, special development crews, equipment availability
Sandfill system may be inadequate to meet increased production	Not being able to supply sandfill when required, leaving open stopes unsupported, thereby negatively impacting productivity by reducing tonnage available for extraction	Implement a sandfill committee; develop alternative ranges for sandfill to minimize downtime due to blockages
Problems / delays with contractors, manpower, equipment	Delay in the excavation of raisebore hole and/or all related shaft infrastructures	Have specific persons in charge of contractors; hold regular meetings; maintain open, frank lines of communication to discuss the real issues
Stability issues related to shaft-bottom infrastructure excavated in Todo Santos sandstone may result in delayed construction period and or additional support costs	Delays in shaft related infrastructure installations. Delays to the completion of the project	Increase ground support and/or bring forward the development program. Alternative contingencies should be developed in order to achieve the objective
Using the conventional slusher as a new mining method	Reduced productivity and monthly production from this mining method	Trial stopes underway to prove method; Develop alternative methods where possible.

Table 25.2 – Opportunities for the Project

OPPORTUNITIES	EXPLANATION	POTENTIAL BENEFIT
Continued exploration for near-mine deposit extensions and deposits away from mine new discoveries	The scale of the mineralizing system of the El Mochito deposit is very large and the project is open in a number of directions, controlled by abundant structural features; good opportunities exist for substantial new discoveries on the El Mochito Mine property	Exploration success in near-mine areas and those away from the mine could materially extend mine life or increase the head grade.
Mine dewatering program	Pursue the recommendation of identifying water inflow and implement a dewatering program, especially on the upper levels	Drastic reduction in mine pumping costs by reducing water inflow
Sandfill system	Implement a sandfill system with back up lines at all times	Improved efficiency in the stope mining cycle allowing for more flexibility in the mine plan
Use the Bonanza raisebore hole as a long-term	The headframe installed over the Bonanza raisebore is required for	Improved shaft availability for the No. 2 and No. 3 shafts which would allow

OPPORTUNITIES	EXPLANATION	POTENTIAL BENEFIT
alternative access for lowering materials	lowering larger equipment from surface. It could be used to the lowering of other materials too on a more regular basis.	easier/more men & material access and increased production (rock hoisting) capacity.

InnovExplo concludes that this PEA can advance to detailed design and construction, given that the mine is already producing and has the management team and thrid party support to execute on the project.

26. RECOMMENDATIONS

26.1 Mineral Resources

The following recommendations reflect the results of the current El Mochito Mineral Resource Estimate, the associated technical reviews and the site visits, all of which were carried out by Mercator:

- Near-mine Mineral Resource expansion opportunities should continue to be systematically developed through underground core drilling to establish drilling intercepts at short step-outs from the existing Mineral Resource solid limits. Priority should be the manto extensions due to their larger surface areas before moving on to chimney definition where positive indications are present. The high-priority areas are the northern extent of the Imperial-Barbasco-Esperanza trend, the eastern limits of the SalvaVida and Porvenir trends, and along the southeast limits of the Victoria trend.
- Non-mine areas along all major mineralized structural corridors should be evaluated for surface drilling opportunities.
- A planning program should be undertaken to assess the optimal locations for underground drilling stations for future drill testing of the major mineralized trends, with priority given to those mentioned above. This should include an assessment of old workings above the Mochito Shale that could be refurbished to provide favourable drilling equipment positioning.
- Funds should be budgeted on a yearly basis to cover the drifting and crosscutting required to access the optimal underground core drilling setups.
- The current QAQC protocol should be reviewed and possibly amended to include periodic systematic checks on pulp split carried out at a fully accredited independent laboratory to monitor primary laboratory results.
- The current density determination protocol should be reviewed to assess its potential for streamlining. A study of exceptionally high and low values should be conducted onsite using core samples.
- The current use of calcite fluorescence and garnet mapping should be assessed to ensure that maximum benefit is being realized from these potentially important vectors to mineralization. A study to assess the routine application of pyroxene chemistry as a vector is also advisable. All such results should be fully integrated in future exploration planning strategies.
- Results of the currently ongoing surface exploration programs and the compilation of old mine workings should be incorporated with 3D structural modelling of the El Mochito district to better define new regional and mine scale exploration opportunities.
- Detailed assessments of all significant known mineralized surface prospects should be carried out to clearly establish their potential and exploration significance.
- Downhole survey data are currently subject to magnetic field interference that can result in erroneous azimuths being recorded in areas of high magnetite or pyrrhotite content. This results in hole trace inaccuracies and difficulties in interpreting the drilling results, particularly for long exploration holes. To counter this problem, consideration should be given to use of a multi-shot gyroscopic system not affected by variations in magnetic susceptibility.

26.2 Mining

The cost estimate for the proposed No. 8 Shaft is based on several quotes dating from spring of 2018. With this PEA demonstrating positive results for the expansion and optimization of operations, these quotes and execution timing from all contractor should be reviewed. Contacting other contracting firms may be warranted to reposition the costs and schedule for job completion.

The bottom portion of the No. 8 shaft including shaft orepasses, belt level and shaft bottom will be excavated in Todos Santos sandstones, which presents some geotechnical challenges. Mining development into this type of ground, will have to be done at a slow pace, over short blast advances, and adequately supported to suit the poorer ground conditions. The use of shotcrete in these types of permanent excavations are strongly recommended. This may increase ground support costs and the time to completion compared to standard ground support in more competent ground.

The planned transport of the mineralized material by rail from the No. 8 shaft discharge bin to the No. 2 shaft bin (as described in Section 16.2.3) could possibly be replaced with a conveyor belt instead and should be analyzed. Horizontal movement of mineralized material on 2350L level has traditionally been by track and train, wich requires manpower. Mine personnel are subjected to shift changes resitrictions and must be evacuated when blasting occurs in the mine. The use of an alternative system like a conveyor belt could improve productivity and further reduce cost. This alternative could be suitable given the distance is short (approximately 200 m) between the two shafts and could be operated from the surface control room under camera surveillance.

Development rates used in this PEA reflect what is currently achieved by mining operations.

– Estimated daily advance rates **(Table 16.4)**

Development **(In either waste or mineral)**	**LOM plan description** **Type**	**Excavation size** **m (ft)**	**Advance** **m/d (ft/d)**
Jumbo	Hz Development, Jumbo @ 15'×15'	4.47 m x 4.47 m (15 ft x 15 ft)	19.2 (63)
Jackleg	Hz Development, Jackleg @ 10'×12'	2.74 m x 2.74 m (9 ft x 9 ft)	6.4 (21)
	Subhorizontal Raise, Jackleg @ 6'×9'	3.66 m x 3.66 m (12 ft x 12 ft) W Slusher	5.5 (18)
	Sublevel, Jackleg @ 6'×6'	1.82 m x 1.82 m (6 ft x 6 ft) W Slusher	3.7 (12)
	Sublevel, Jackleg @ 9'×9'	2.74 m x 2.74 m (9 ft x 9 ft)	5.5 (18)
Raises	Subvertical Alimak, Stoper @ 8'×8'	2.44 m x 2.44 m (8 ft x 8 ft) W Alimak	2.1 (7)

Development	LOM plan description	Excavation size	Advance
	Subvertical Raise, Borer @ 5'Ø	1.52 m x 1.52 m (5 ft x 5 ft) W Raise	7.3 (24)
	Subvertical Raise, Stoper @ 5'×5'	1.52 m x 1.22 m 5 ft x 4 ft W Raise	3.0 (10)

In order to sustain theses rates over the LOM, mechanical availability will be very important. The percentage of availability mentioned in section 16.6.1 will decrease as years pass. Machines will be rebuilt over the LOM, but naturally they are never in the same condition as a new machine. In order to maintain the availability suggested in this PEA, considerable effort will have to be made by management, mechanics, warehouse to old parts. Mine operation will have to make sure that proper training is given to operators in order to use the equipment within normal conditions. Continuous improvement and preventive maintenance instead of reactive maintenance should be in constant development. This concept applies to all equipment fixed equipment, mobile equipment and smaller machines such as hand-held jacklegs, scraper winches and Alimak machines.

Three mining methods are used in this PEA for production from stoping. Over the LOM, the long hole method will account for 54.5% of the total stoping tonnes, cut and fill method 17.2%, and conventional slusher stoping method 28%. The contribution from shrinkage mining is negligeable.

Table 26.1 – Prodution by stoping methods including mineral development

	Mineral Development t	Cut and Fill t	Long Hole t	Shrinkage t	Conventional t	Total t
2019	190,406	54,046	371,147	-	173,909	**789,509**
2020	198,099	87,717	501,295	-	107,955	**895,066**
2021	219,298	83,668	467,507	-	206,375	**976,847**
2022	225,605	173,095	432,535	-	161,773	**993,008**
2023	251,902	139,085	425,861	-	186,318	**1,003,166**
2024	226,149	211,883	376,833	-	180,648	**995,514**
2025	237,234	124,975	429,514	9,750	205,972	**1,007,445**
2026	200,284	156,387	397,139	14,624	229,445	**997,880**
2027	288,467	149,284	344,052	-	216,444	**998,247**
2028	273,370	81,817	254,058	-	389,846	**999,091**
Total	**2,310,816**	**1,261,957**	**3,999,940**	**24,374**	**2,058,686**	**9,655,774**
% Total (t)	**23.90%**	**13.10%**	**41.40%**	**0.30%**	**21.30%**	**100.00%**
% Stope (t)	**N/A**	**17.20%**	**54.50%**	**0.30%**	**28.00%**	**100.00%**

The conventional slusher stoping method has proven itself over the years and is still used in several countries. It is applicable to the mantos when the dip is too shallow for long hole mining, too steep for trackless entry, or too narrow. This method is also recognized as having lower productivity. Given that this method will comprise up to 28% of the LOM volume of mineralized material mined, it is imperative that planning and extraction be sufficiently detailed. The mining operations team must understand the importance of every step-in development and mining when using this method. Ventilation will be very important as the stopes become longer and move farther away from the access drifts. The success of the backfill barricades and the backfill itself will be important for the extraction of secondary blocks and pillars. Becoming adept and proficient at this method will be key. Where possible, more productive/mechanized alternatives should be contemplated in some portions of the mine to minimize the risk of missing production targets and to ensure that the conventional slusher stoping method will produce its required share in the overall production plan.

The geotechnical report issued by Ingeroc in October 2018 (Section 16.5.2) contains the following statement : "Although this test campaign is a step in the correct direction, further tests including additional UCS, triaxial tests, direct shear on discontinuities and indirect tension (brazilian test) must be undertaken by the Company. This Consultant has suggested further laboratory tests be conducted, which must be made by certified laboratories, and including at least 10 UCS, 15 triaxial, 10 indirect tension and 5 direct shear tests per geotechnical unit, in order to provide a better database for the mechanical properties of the intact rock at the mine". These recommendations should be followed to improve geotechnical control measures and support regimes at El Mochito.

In the same report, the geotechnical consultant also observed that a scheme based on the Geological Strength Index ("GSI") created for the mine has been used to estimate support requirements, particularly for development works. The GSI was developed using numerical methods and analytical calculations, and the support scheme based on the GSI classification system is shown in Figure 16.19 of Section 16.5.4.

The geotechnical staff at the mine has defined support standards from this system for both mechanized and conventional mining environments and has used it in making recommendations about temporary and permanent support for these workings. Although not wrong, the Ingeroc consultant has suggested a review of the support system based on the following points:

- Numerical methods are a good tool to define support requirements, but they only consider the specific analyzed case. As it is unproductive to model each section with its particular conditions, the tool should be used just for particular cases of complex structural condition, particular geometry, etc.
- Deriving a support scheme from previously analyzed case studies as with the GSI system is not a recommended solution because, the database for such a task is still too small. It is recommended instead to implement a more adequate support system using one of the most commonly used support systems for underground excavations, the Q-Barton System.
- Particular cases, such as complex structural environments, geometry, specific support for production areas, etc., must be developed in every case regarding each particular local condition.

Backfilling or sandfill in the case of the El Mochito mine is a key performance area for success. A review of the year to date information reveals that although there has been a a gradual improvement over the course of the year, the mine has nevertheless fallen behind by almost 40,000 t of sandfill after eight months of production.

Table 26.2 – Sandfill data for 2018

Sandfill	Budget	Real
2018	**t**	**t**
January	26,951	13,506
February	25,372	22,736
March	28,921	28,072
April	27,644	26,044
May	33,070	28,279
June	36,115	20,030
July	27,900	25,072
August	27,900	30,305
Total:	**233,873**	**194,044**
Difference		**39,829**

It is estimated that 751 kt of mineral will be extracted from El Mochito in 2018. With the production increase stated in this PEA to reach 2,800 tpd or close to 1 million tonnes per year (1 Mtpy), the sandfill operation will have to be closely examined.

We recommend that a steering committee be put in place combining engineering and operations to analyse and address potential deficiencies in the current backfill system and make the necessary changes to be able to meet the higher production rates anticipated in this expansion PEA. Specifically, the committee should investigate the installation of secondary and tertiary backfill ranges for continuouos distribution to mitigate risk to the system.

It is encouraging that at the time of writing, the mine has a qualified backfill engineer to address these challenges.

As for the excavation of the three orepasses raises (Figure 16.5 of Section 16.2.2), caution is warranted as the type of ground might not be suitable for the blasting of three orepasses in such close proximity to one another. The concern is that they might join due to spalling and become one big orepass. The raise that feeds the crusher should be the last to be blasted to understand and react to the local conditions and what type of ground support it will require. Shotcrete, cables, long rock bolts, or even a combination may be necessary. It is possible that raise boring might be preferable to conventional blasting to reduce blasting stresses in the rock mass. Since a large tonnage is expected to pass through these orepasses over the LOM, the appropriate measures need to be taken to protect them.

26.3 Upgrade of Pumping and Water Management System

The main objective of the upgrade to the pumping and water management system (see Section 16.3) is to reduce costs and provide additional pumping capacity to address a possible increase of water inflows as mining progresses. Specifically, the focus is to rationalize the number of pumps, simplify the existing system, and reduce the number of pumps by using newer, more efficient pumps.

In September 2018, the site was visited by Michael Verrault, a mining hydrology specialist with Hydro Resources, who laid out a number of recommendations in his report that should be thoroughly analyzed.

Dewatering the mine from a sequence of planned drain holes above the future workings and from wells drilled beneath the deepest parts of the mine should be considered from an engineering and geological perspective. Infiltration from surface into the upper levels, including from drainage tunnel on 650L (Caliche Tunnel) should be captured on the upper levels and diverted to the nearest pump station before the water has to be pumped from a lower elevation. The mine should create a special committee with independent hydrologists and structural geologists to focus on understanding water inflow in the El Mochito Mine and to implement a plan that would reduce and control groundwater within the mine.

26.4 Processing Methods Recommendations

With respect to the crusher feed and washing circuit, P&E considers the installation and operation of the mineral washing circuit as essential for the smooth operation of the crushing plant and to increase the crushing rate. Specific benefits that can be reasonably expected are as follows:

- Hourly crushing plant throughput will be increased, for example to 180 t/h[3], allowing daily downtime for maintenance;
- The final crushed process plant feed size can be reduced from the 19 mm (¾ in) to 16 mm (5/8 in) or even 13 mm (1/2 in). This will facilitate a significant increase in daily grinding capacity; and
- Conveyor spillage, chute and screen blockage will be significantly reduced.

P&E has the following recommendations:

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[3] Subject to shaft hoisting capacity

- Water conservation (recycling) should be considered;
- All spray water lines would benefit from the installation of fine trash screens in advance of the spray nozzles;
- Measures may need to be considered to prevent oversize rocks and mine debris from compromising the new trouser chute;
- Sprays and wash boxes should considered for the head pulleys of conveyors #1, #2 and #10. Wash box collections could be integrated into the washing circuit; and
- The engineering design needs to take into consideration the tonnage and grade accounting for the fines delivered directly to the process plant.

With respect to the grinding section of the process plant, P&E considers the screening out of mine-sourced plastic debris using rotary screens an essential improvement. Stationary screens are an option for debris removal but are susceptible to plugging by the debris

The current hydro-cyclones will remain in place and these can be used as a screen substitute when required.

P&E has the following recommendation and comment:

- The simplification of the grinding circuit in combination with spiral screen installation is warranted and represents a low risk of process disruption; and
- While international experience with the rotary screens for grinding classification is somewhat limited, the projected screen performance and screen life are expected to meet El Mochito requirements.

With repect to the flotation circuit, P&E has the following recommendations:

- Although more costly, a larger number of smaller Ultimate Flotation cells (e.g. 12 m^3) should be considered for the Pb and Zn rougher-scavenger units. This would reduce the potential for short circuiting and would allow one or more units to be bypassed for maintenance;
- The installation of reagent conditioning tankage in advance of the first rougher cell should be investigated (e.g. laboratory tests), particularly for the lead circuit where several reagents are required and could be sequentially added for maximum impact.

With respect to the magnetite removal circuit, P&E considers that magnetite removal in advance of flotation is expected to improve flotation performance and concentrate grade. However, to be economically successful, the loss of lead and zinc to the magnetite concentrate must be small. A trade-off between small lead and zinc losses and improved concentrate grade will need to be evaluated. Two-stage, in-plant magnetic separation tests have been conducted using the plant equipment to evaluate lead and zinc distribution in the magnetics concentrate. While initial results may be less than optimal (re Pb and Zn content in the magnetite concentrate), several options exist to minimize potential Pb and Zn losses. This includes lower intensity magnetite fields to collect only 100% liberated magnetite and the selection of intermediate process streams as a “mag sep” feed. Small-scale tests at a commercial laboratory could be considered (it is assumed that the El Mochito metallurgical laboratory does not have magnetic equipment that would simulate the plant conditions).

With respect to the new concentrate filtration, P&E has the following recommendations:

- Pressure filtration rates should be tested with selected cloths; and
- Due to low quoted capital costs of the Yuzhou Sino proposal, it could be re-examined for filter capacity, reliability and supplier support aspects.

P&E considers the anticipated tailings pipeline capacity upgrade to be an important consideration for increasing daily feed throughput. However, should the removal and sale of magnetite be successful (e.g., 10% mass reduction), some flexibility in the need for a pipeline upgrade could be realized. High pressure pumps are typically piston pumps which are expensive to acquire and maintain; the selection of this type of pump should be avoided. A solution to the “sanding out” phenomenon could be the acquisition of a dedicated generator set (genset) for a three-stage centrifugal tailings pump arrangement (similar to the existing installation). The significant cost of such a genset complete with appropriate controls is recognized.

In advance of recycling tailings pond water, extensive laboratory scale tests should be performed to confirm that the recycled water does not negatively impact flotation performance. If an impact is found, treatment methodology would need to be developed which could be simply carbon absorption or a more complex chemical treatment. A reduction in the current use of metabisulphite to destroy cyanide in the TSF is expected to be a benefit of tailings pond water recycling.

Another abundant source of water is mine water, which is currently discharged from the Caliche Tunnel. A fraction of the large volume of mine water could be pumped to surface near the crusher facility and used in the proposed crusher feed wash plant as well as suppling the process plant. Alternatively, mine water could be pumped to the process plant from the current Caliche mine water discharge location via an extension of the current tailings pipeline which will become available following a new tailings pipeline installation. Mine water use in the process plant would also need to be tested for potential influence on flotation performance.

26.5 Recommendations Costs Estimate

InnovExplo has prepared a cost estimate for the recommended two-phase work program. The budget for the proposed program is presented in Table 26.3. Expenditures for Phase 1 are estimated at $80,000 (incl. 15% for contingencies).

The recommended work is to analyze water inflow throughout the mine. A special committee regarding this operation should be established in conjunction with experts in mine hydrology. All water inflows affecting the mine need to be surveyed and studied, including the influence and possible downward leakage of water from the Caliche Tunnel on 650L.

Expenditures for Phase 2 are estimated at $100,000 (incl. 15% for contingencies). The grand total is $180,000 (incl. 15% for contingencies). Phase 2 would be contingent upon the success of Phase 1.

Table 26.3 – Estimated costs for the recommended work program

	WORK PROGRAM	BUDGET COST $
PHASE 1		
	Analyze water inflow, creation of special committee to survey mine water	Included in Expansion budget
	Rock mechanic laboratory testing, increase testing as suggested in report	60,000$
	Sandfill review, create special in-mine commmitte to review the entire mine sandfill distribution system in order to reduce risk to the operation	20,000$
	Phase 1 subtotal:	**80,000$**
PHASE 2		
	Implement dewatering program	Included in Expansion budget
	Implement de-risking analysis, extra boreholes, piping, by pass lines	100,000$
	Phase 2 subtotal:	**100,000$**
	TOTAL (Phase 1 and Phase 2):	**180,000$**

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APPENDIX I – LIST OF MINING TITLES

INNOVEXPLO

List of Polygonal Mining Concessions

Concession	UTM East (m) NAD 27-16P	UTM North (m) NAD 27-16P	Area (Hectares)
El Mochito 1			**8,199.56**
Corner 1	382,704	1,646,346	
Corner 2	384,241	1,646,143	
Corner 3	384,247	1,646,333	
Corner 4	386,400	1,646,111	
Corner 5	386,393	1,645,952	
Corner 6	386,952	1,645,940	
Corner 7	386,800	1,645,203	
Corner 8	387,949	1,644,225	
Corner 9	389,556	1,646,702	
Corner 10	390,108	1,646,308	
Corner 11	388,514	1,643,850	
Corner 12	389,162	1,643,399	
Corner 13	385,923	1,638,173	
Corner 14	385,688	1,638,332	
Corner 15	384,302	1,636,298	
Corner 16	381,244	1,638,223	
Corner 17	380,600	1,637,198	
Corner 18	378,297	1,638,665	
Corner 19	379,180	1,640,142	
Corner 20	377,573	1,642,225	
Corner 21	377,351	1,642,377	
Corner 22	380,780	1,647,800	
Corner 23	382,501	1,646,714	
Corner 24	382,405	1,646,543	
Corner 25	382,704	1,646,346	
El Mochito 2			**600**
Corner 1	373,000	1,654,000	
Corner 2	373,001	1,650,999	
Corner 3	371,000	1,651,000	
Corner 4	371,000	1,654,000	
El Mochito 3			**600**
Corner 1	373,000	1,649,900	
Corner 2	373,000	1,646,900	
Corner 3	371,000	1,646,900	

Concession	UTM East (m) NAD 27-16P	UTM North (m) NAD 27-16P	Area (Hectares)
Corner 4	371,000	1,649,900	
El Mochito 4			**600**
Corner 1	373,000	1,645,000	
Corner 2	373,000	1,641,999	
Corner 3	371,000	1,642,000	
Corner 4	371,000	1645,000	
El Mochito 5			**770.18**
Corner 1	359,700	1,630,250	
Corner 2	360,300	1,627,350	
Corner 3	357,829	1,626,692	
Corner 4	357,035	1,629,066	
Corner 5	357,791	1,629,324	
Corner 6	357,847	1,629,155	
Corner 7	358,100	1,629,250	
Corner 8	357,800	1,629,850	
El Mochito 6			**229**
Corner 1	376,400	1,641,000	
Corner 2	374,000	1,641,000	
Corner 3	374,000	1,643,000	
Corner 4	374,700	1,643,000	
Corner 5	374,400	1,642,400	
Total			**10,998.74**

INNOVEXPLO

APPENDIX II – TITLE OPINION LETTER

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Tegucigalpa, 6 March, 2017

Eight Capital
1 Adelaide Street East
Suite 2200
Toronto, Ontario
M5C 2V9

Canaccord Genuity Corp.
2100-609 Granville St.
Vancouver, British Columbia V7Y 1H2

GMP Securities LP
145 King Street West Suite 300
Toronto, Ontario
M5H 1J8

Cassels Brock & Blackwell LLP
Suite 2100, Scotia Plaza
40 King Street West
Toronto, Ontario
M5H 3C2

Re: Corporate, Title and Real Property Opinion AMPAC.

Dear Sirs:

This is a Corporate and Real Property Title Opinion regarding the Honduran company denominated *American Pacific Honduras, S.A. de C.V.* ("AMPAC"), its subsidiaries and real property located in the Republic of Honduras.

For the purposes of rendering this opinion we have examined and relied upon originals or copies certified or otherwise identified to our satisfaction of the following documents, as well as personal searches in public registries:

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1. Articles of incorporation in public document form of the Honduran company *American Pacific Honduras, S.A. de C.V.* registered under #2, Volume 399 of the Public Corporate Registry of Tegucigalpa, Honduras and amendments thereof to the corporation articles, as well as a search of the registration entry for this company in the corporate registry cited above.

2. Certified list of Mining Zones granted to AMPAC as evidenced in the Mining Registry kept by the Honduran Institute of Geology and Mines (INHGEOMIN).

3. Property deed contained in public instrument number 24 evidencing the transfer of property from Rosario Resources on October 16, 1987 in Las Vegas, Santa Barbara in favor of AMPAC;

4. Public deeds registered in the Property Registry of Santa Barbara (#36, Volume 722) and under #63, Volume 732 evidencing transfer of lots; and *in situ* search in the property public registries of Santa Barbara and Puerto Cortés, Honduras.

In stating our opinion, we have assumed the genuineness of all signatures on original or photocopies deemed relevant and necessary as the basis for the opinions set forth below.

Corporate Opinion:

We are of the opinion that: American Pacific Honduras, S.A. de C.V. ("AMPAC") is variable capital corporation duly incorporated, registered and existing in the territory of Honduras. The company was incorporated on 19 December, 1997, having its legal domicile located in Tegucigalpa, Honduras. The principal activities of the corporation are: recognizance, exploration and exploitation of mineral resources, ownership and possession of quarries and mines, both open or underground; acquisition control and possession of moveable and real property, permits, licenses, contracts, concessionary rights and other intangible assets of a similar nature for the support and development of mining activities as well as any other legal business activity permitted by Honduran laws. AMPAC has all requisite corporate power under the laws of Honduras to carry on its business as presently carried on and to own its properties. To this date there is no petition of dissolution and/or liquidation filed at the Corporate Mercantile Registry of Tegucigalpa, Honduras.

The authorized share capital of AMPAC consists of 15,582,586 common shares which are registered in the name of Morumbi Resources, Inc. (now known as

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Ascendant Resources, Inc.) and are registered in the Share Registry Ledger kept by AMPAC.

Furthermore, AMPAC has four (4) fully owned subsidiaries in the territory of Honduras named below, whose existence we confirmed at the Public Mercantile Registry in Tegucigalpa. We are of the opinion that:

- *El Mochito Agroindustrial, Sociedad Anónima de Capital Variable* (EMAI); is a variable capital corporation duly incorporated, recorded and existing in Honduras, has its legal domicile in Tegucigalpa. The company's principal activities according to the incorporation documents is the cultivation, production, marketing of agricultural or animal products including horticulture, fruit growing, fishery, beekeeping and in general any product related services purposes and any other legal activity allowed by Honduran law, related to the main activity of the corporation; incorporated in 1997;

- *Corporación Minera "Nueva Esperanza Sociedad Anónima de Capital Variable or Nueva Esperanza Mining Corporation, Sociedad Anónima de Capital Variable*" (CMNE) is a variable capital corporation duly incorporated, recorded and existing in Honduras, has its legal domicile in Tegucigalpa, and its principal activity according to its corporate docuemnts are the recognizance, exploration and exploitation of mineral resources, ownership and possession of quarries and mines, both open or underground; acquisition control and possession of moveable and real property, permits, licenses, contracts, concessionary rights and other intangible assets of a similar nature for the support and development of mining activities as well as any other legal business activity permitted by Honduran laws incorporated in 1994; CMNE has all corporate power under the laws of Honduras to carry on its business as presently carried on and to own its property.

- *Servicios de Logística, Sociedad Anónima de Capital Variable* (Servilogística, S.A. de C.V., is a variable capital corporation duly incorporated, recorded and existing in Honduras, has its legal domicile in Tegucigalpa, it was created to provide services of logistics and management, import/export of materials and supplies in general, incorporated in 1996. This company was originally incorporated as "Compañía de Explosivos Austin-Ampac, S.A. de C.V." It is our understanding is that this company is not operational;

- *Servicios Logísticos de Centroamérica, Sociedad Anónima de Capital Variable* (Servilogística C.A., S.A. de C.V. **"SCASA"**), originally incorporated as Austin-Ampac, S.A. de C.V. (1996) for the manufacture, distribution, export/import of commercial explosives and necessary accessories, is a variable capital

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corporation duly incorporated, recorded and existing in Honduras, has its legal domicile in Tegucigalpa. SCASA has all corporate power under the laws of Honduras to carry on its business as presently carried on and to own its property.

From our review of the Share Registry Ledger, and the companies' incorporation documents and amendments thereof of all the companies involved in this transaction, we can opine that the authorized capital and chain of ownership of equity in the companies is that stated in the chart below.

Company	**Jurisdiction**	**Authorized Capital / Number of Shares Issued and Outstanding**	**Registered Shareholders**
American Pacific Honduras, S.A. de C.V. (Owner of El Mochito mine)	Honduras	L.1,558,258,600.00 / 15,582,586 issued common shares	Morumbi Resources, Inc. (now known as Ascendant Resources Inc.) 15,582,586 common shares
El Mochito Agroindustrial, S.A. de C.V.	Honduras	L.25,000 / 250 issued common shares	American Pacific Honduras, SA de CV -246 common shares Morumbi Resources, Inc. (now known as Ascendant Resources Inc.) - 4 common shares
Corporación Minera Nueva Esperanza, S.A. de C.V.	Honduras	L.25,000 / 250 issued common shares	American Pacific Honduras, SA de CV -246 common shares Morumbi Resources, Inc. (now known as Ascendant Resources Inc.) - 4 common shares
Servicios de Logística, S.A. de C.V.	Honduras	L.25,000 / 250 issued common shares	American Pacific Honduras SA de CV- 246 common shares Morumbi Resources, Inc.

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Company	Jurisdiction	Authorized Capital / Number of Shares Issued and Outstanding	Registered Shareholders
			(now known as Ascendant Resources Inc.) – 4 common shares
Servicios de Logística Centroamérica, S.A. de C.V.	Honduras	L.25,000 / 250 issued common shares	American Pacific Honduras SA de CV– 249 Morumbi Resources, Inc. (now known as Ascendant Resources Inc.) 1 common share

Title and Real Property:

From the documents provided by AMPAC's legal counsel and our *in situ* search in the property public registry of Santa Barbara and Puerto Cortés we can determine the following related to the AMPAC's real property:

1. On April 9, 2003, AMPAC gathered all of their real property located in Las Vegas, Santa Barbara into one (1) lot; which was re-measured, resulting a total verified area of 2,597.805555 hectares of land. This public deed, #16, was duly registered in the Property Registry of Santa Barbara (#36, Volume 722). Of this total area approximately 25 lots with an area of about 11,746.16 mts2 have been sold to the El Mochito Security Company. All sales have been duly registered at the Property Registry of Santa Barbara, as verified by our search.

2. AMPAC also transferred to the Municipality of Las Vegas approximately 48.634311 hectares located in "El Mocho" and 22.208593 hectares of land located in "Barrio San Juan" for the construction of Mining Camps. This transfer was duly registered under #63, Volume 732 of the Property Registry of Santa Barbara.

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3. All real estate property of AMPAC was transmitted by Rosario Resources through public deed number 24 on October 16, 1987. This transfer included all real property of Las Vegas, Santa Barbara identified above and two (2) lots of land located in the port city of Puerto Cortes were AMPAC currently keeps its warehouses. This transfer was duly registered in the Property Registry of Santa Barbara (#62, Volume 183) and Property Registry of Puerto Cortes (# 92, Volume 119).

4. Our search at the Property Registry in Puerto Cortes did however identify a lien and mortgage registered to the property in favor of Banco Sogerin. This Bank went out of business in the year 2003; we believe that all obligations with this Bank were complied but the cancelation of the mortgaged deed was never filed for registration at the Registry. Since 13 years have elapsed we consider there are no issues with these lots.

We can confirm that real property title to the properties described from 1 through 4 which cover the surface rights for the El Mochito mine and related infrastructure, above are certain, however the exact area cannot be specifically stated due to the sales made to the municipality and the Security Company which only indicate approximate areas.

Additionally, AMPAC holds a total of 64 mining right zones, 31 which are registered and 33 unregistered.

The properties are divided in three groups as follow:

1. El Mochito which has rights to 53 mining zones, of these 33 of the mining zones do not have a real property registration. Local counsel provided information regarding these 33 mining zones, which were granted by the Environmental Authority in several agreements during a period comprising from 1967 to 1970, no evidence of such agreements was provided;
2. El Níspero with 5 mining zones; and
3. Grupo Rosario y Aurora with 6 mining zones.

The registered mining zones described above are duly registered at the corresponding Property Institute of Santa Barbara, Honduras on behalf of The New York and Honduras Rosario Mining Company, as required in the past.

We can confirm that from our review of the INHGEOMIN (the Honduran Mining Authority) records that AMPAC has 6 valid mining concessions comprising the El

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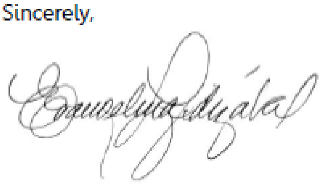
Mochito property (which includes El Mochito 1, El Mochito 2, El Mochito 3, El Mochito 4, El Mochito 5, and El Mochito 6) each of which is registered solely in the name of AMPAC, is in good standing, not expired; and is free and clear of any liens or restrictions of any type, as evident in said registry held by the competent authority.

Therefore, we can state that with the exception of the identified lien over the lots located in Puerto Cortes, to date, we have not identified any material issues regarding the properties located in Las Vegas, Santa Barbara. They are free and clear of any lien, encumbrance, limitation of domain, security interest, claim, lawsuit or restrictions of any type. That the mining rights over the zones were transferred by the New York and Honduras Rosario Mining Company (original mining company in Honduras) to the American Pacific Honduras, Inc. and later on to American Pacific Honduras, S.A. de C.V.

Should you have any further questions, please do not hesitate to contact us.
Sincerely,



Evangelina Lardizábal
Partner

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