NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina

Prepared for

Josemaria Resources Inc.

Prepared by

srk consulting

SRK Consulting (Canada) Inc.
2CN027.004
November 2020

NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina

Prepared for

Josemaria Resources Inc.
2000–885 West Georgia Street
Vancouver, BC V6C 3E8
Canada

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Prepared by

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Effective Date: 28 September 2020
Issue Date: 5 November 2020

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Important Notice

This report was prepared as a National Instrument 43-101 Technical Report for Josemaria Resources Inc. ("Josemaria") by SRK Consulting (Canada) Inc. as part of a team of consultants contracted by Josemaria ("the Team"). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in the Team's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources as detailed herein, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Josemaria subject to the terms and conditions of its contracts with SRK and the Team and to the relevant securities legislation. The contracts permit Josemaria to file this report as a technical report with Canadian securities regulatory authorities, pursuant to National Instrument 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law or stock exchange rules, any other uses of this report by any third party are at that party's sole risk. The responsibility for this disclosure remains with Josemaria. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new technical report has been issued.

Currency is expressed in U.S. dollars and metric units are used, unless otherwise stated. The Report uses Canadian English.

Cautionary Statement

Certain information and statements contained in this report are “forward looking” in nature. Forward-looking statements include, but are not limited to: statements with respect to the economic and other parameters of the project; mineral resource and reserve estimates; the cost and timing of any development of the project; the proposed mine plan and mining methods; dilution and mining recoveries; processing method and rates and production rates; projected metallurgical recovery rates; infrastructure requirements; capital, operating and sustaining cost estimates; the projected life of mine and other expected attributes of the project; the net present value (NPV); taxation and royalties; capital; future metal prices; the project location; the timing of the environmental assessment process; changes to the project configuration that may be requested as a result of stakeholder or government input to the environmental assessment process; government regulations and permitting timelines; estimates of reclamation obligations; requirements for additional capital; environmental risks; and general business and economic conditions.

All forward-looking statements in this report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. In addition to, and subject to, such specific assumptions discussed in more detail elsewhere in this report, the forward-looking statements in this report are subject to the following assumptions:

- There being no signification disruptions affecting the development and operation of the project
- Exchange rate assumptions being approximately consistent with the assumptions in the Report
- The availability of certain consumables and services and the prices for power and other key supplies being approximately consistent with assumptions in the report
- Labour and materials costs being approximately consistent with assumptions in the report
- Assumptions made in mineral resource and reserve estimates, including, but not limited to, geological interpretation, grades, metal price assumptions, metallurgical and mining recovery rates, geotechnical and hydrogeological assumptions, capital and operating cost estimates, and general marketing, political, business and economic conditions.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, Andy Thomas do hereby certify that:

1. I am a Senior Geotechnical Engineer with SRK Consulting (Canada) with an office at 22nd Floor, 1066 West Hastings Street, Vancouver, BC, V6E 3X2, Canada.
2. I am a graduate of the University of The University of Adelaide in 2004 where I obtained a Bachelor of Engineering (Civil & Environmental) and a Bachelor of Science (Geology). I am also a graduate of The University of British Columbia in 2014 where I obtained a Master of Engineering (Geological). Aside from the time spent studying at The University of British Columbia, I have practiced my profession continuously since 2005. My relevant experience includes geotechnical and hydrogeological investigations and geotechnical design of open pits in Australia, North America and South America.
3. I am a Professional Engineer registered with the Engineers and Geoscientists British Columbia, license #44961.
4. I visited the property from 27 to 29 November 2018 and from 13 to 16 February 2019.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.19 (Pit Geotechnical), 1.20 (Pit Geotechnical), 15.2.2, 25.3, 25.9 (Pit Geotechnical), 26.2 (Pit Geotechnical), and 27, and I accept professional responsibility for those sections of the Technical Report.
8. I participated in the Prefeasibility Study for the Josemaria Project and was a co-author of the NI43-101 report with an effective date of 20 November 2018.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

"Signed and Sealed"

Andy Thomas, P.Eng.
SRK Consulting (Canada)

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: “NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina” prepared for Josemaria Resources Inc. (the “Issuer”) dated 5 November 2020, with an effective date of 28 September 2020 (the “Technical Report”).

I, Brian Johnston, P.Eng., do hereby certify that:

1. I am Technical Director with Fluor Canada Ltd. with an office at 700 – 1075 W. Georgia Street, Vancouver, BC, Canada V6E 4M7.
2. I am a graduate of the University of British Columbia with a Bachelor of Applied Sciences degree in Metallurgical Engineering in 1973 and Wilfrid Laurier University Master of Business Administration in 1993. I have practiced my profession continuously for 40 years and have been involved in metallurgical development, plant operations and the design of process plants.
3. I am a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of British Columbia, license # 21850.
4. I have not visited the project site.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (“NI 43-101”) and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.12, 1.17.2 (not including Mining, TSF or Concentrate Transport), 1.19 (Processing), 1.20 (Processing), 17.0 (in its entirety), 21.2.3, 21.2.5, 25.6, 25.9 (Processing), 26.4, and 27 and I accept professional responsibility for those sections of the Technical Report.
8. I have had minor prior involvement with the subject property, having performed a review of the Constellation project, which is Josemaria and Los Helados as a combined development project.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

“Signed and Sealed”

Brian Johnston, P.Eng
Fluor Canada Ltd.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, Bob McCarthy, P.Eng., do hereby certify that:

1. I am a Principal Consultant with SRK Consulting (Canada) Inc., with an office at 2200-1066 W. Hastings St., Vancouver, BC, Canada.
2. I am a graduate of the University of British Columbia with a Bachelor in Applied Sciences degree in Mining and Mineral Process Engineering in 1984. I have practiced my profession for 30 years. I have been directly involved in open pit mining operations and design of open pit mining operations in Canada, Brazil, Peru, Mozambique, Russia, and the United States.
3. I am a Professional Engineer registered with the Association of Professional Engineers & Geoscientists of British Columbia, license # 27309.
4. I visited the property from 2 to 3 February 2018.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.1, 1.11, 1.17 (Mining and Mineral Reserve), 1.19 (Mining and Mineral Reserve), 1.20 (Mining and Mineral Reserve), 2.0 (in its entirety), 12.0 (Mining and Mineral Reserve), 15.0 (not including 15.2.2), 16.0 (not including 16.1.3, 16.1.4 or 16.1.5), 18.2.2, 20.5.4, 21.1.8, 21.1.11 (Mining), 21.2.1, 25.2, 25.4, 25.9 (Mining and Mineral Reserve), 26.3, and 27 and I accept professional responsibility for those sections of the Technical Report.
8. I participated in the Prefeasibility Study for the Josemaria Project and was a co-author of the NI43-101 report with an effective date of 20 November 2018.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

"Signed and Sealed"

Bob McCarthy, P.Eng.
SRK Consulting (Canada) Inc.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: “NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina” prepared for Josemaria Resources Inc. (the “Issuer”) dated 5 November 2020, with an effective date of 28 September 2020 (the “Technical Report”).

I, Cameron Scott, P.Eng., do hereby certify that:

1. I am a Principal Consultant with SRK Consulting (Canada) Inc., with an office at 2200-1066 W. Hastings St., Vancouver, BC, Canada.
2. I am a graduate of the University of British Columbia with a Bachelor of Applied Sciences Degree in Geological Engineering in 1974 and a Master of Engineering Degree in Civil Engineering in 1984. I have practiced my profession for 45 years. I have been directly involved in waste rock management for open pit and underground mining operations in Canada, the United States and Chile.
3. I am a Professional Engineer registered with Engineers and Geoscientists British Columbia, license # 15523.
4. I visited the property from 12 to 13 April 2019.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (“NI 43-101”) and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 16.1.3, 16.1.4, 16.1.5 and 26.2 (not including Pit Geotechnical), and I accept professional responsibility for those sections of the Technical Report.
8. I had no involvement with project prior to my engagement on the Feasibility Study.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

“Signed and Sealed”

Cameron Scott, P.Eng.
SRK Consulting (Canada) Inc.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: “NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina” prepared for Josemaria Resources Inc. (the “Issuer”) dated 5 November 2020, with an effective date of 28 September 2020 (the “Technical Report”).

I, Daniel Ruane, P.Eng., do hereby certify that:

1. I am a Senior Engineer with Knight Piésold Ltd. with an office at 1400 – 750 W. Pender Street, Vancouver, BC, Canada V6C 2T8.
2. I graduated from the National University of Ireland, Galway with a Bachelor of Engineering in Civil Engineering in 2010 and from the University of Strathclyde and the University of Glasgow with a Master of Science in Geotechnics in 2011. I have practiced my profession continuously since 2011. My experience includes tailings and waste and water management for mining projects in North America and Europe.
3. I am a Professional Engineer registered with the Engineers and Geoscientists of British Columbia, License No. 42894.
4. I visited the project from 18 to 20 February 2020.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (“NI 43-101”) and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.13, 1.14.1 (Water), 1.16, 1.17 (TSF), 1.19 (TSF, Water Management, Environment), 1.20 (TSF, Water Management, Environment), 3.2, 4.5, 4.8, 4.10, 5.2, 18.3.2, 18.10, 18.13, 18.14, 18.15, 20.0 (in its entirety), 21.1.11 (TSF), 21.2.2, 25.7, 25.8, 25.9 (TSF, Water Management, Environment), 26.5, 26.9, and 27 and I accept professional responsibility for those sections of the Technical Report.
8. I have not had prior involvement with the subject property.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

“Signed and Sealed”

Daniel Ruane, P.Eng
Knight Piésold Ltd.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: “NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina” prepared for Josemaria Resources Inc. (the “Issuer”) dated 5 November 2020, with an effective date of 28 September 2020 (the “Technical Report”).

I, Fionnuala Anna Marie Devine, P. Geo., do hereby certify that:

1. I am a geologist with Merlin Geosciences Inc. with an office at 178 – 6th Street, Atlin, BC, Canada, V0W 1A0, telephone +1 250-651-7569, email fdevine@merlingeo.com.
2. I graduated in Geological Sciences from The University of British Columbia with a Bachelor of Science degree in 2002 and completed a Master of Science degree from Carleton University in 2005. I have practiced my profession continuously since 2005. During that time, I have been involved in mineral exploration for base and precious metals in a variety of deposit types in North and South America.
3. I am a Professional Geoscientist registered with Engineers and Geoscientists BC, license # 40876.
4. I have visited the project site from 13 January – 6 February 2014, 8-21 May 2014, 4-15 March 2018, and 9-27 April 2019.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (“NI 43-101”) and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 3.1, 4 (not including 4.5, 4.6, 4.8, 4.10), 5.1, 5.3, 5.4, 6.0 (in its entirety), 7.0 (in its entirety), 8.0 (in its entirety), 9.0 (in its entirety), 10.0 (in its entirety), 11.0 (in its entirety), 12.0 (Geology), 23.0 (in its entirety), 24.0 (in its entirety), and 27, and I accept professional responsibility for those sections of the Technical Report.
8. I have been involved in exploration of the property since 2014, including surface geological mapping and core reviews in 2014, 2018 and 2019.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Enderby, B.C., Canada.

“Signed and Sealed”

Fionnuala Anna Marie Devine, P. Geo
Merlin Geosciences Inc.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, Jeffrey B. Austin, P.Eng., do hereby certify that:

1. I am President of International Metallurgical and Environmental Inc. with an office at 906 Fairway Crescent, Kelowna, BC, Canada V1Y 4S7.
2. I am a graduate of the University of British Columbia where I obtained a Bachelors of Applied Science degree specializing in Mineral Process Engineering in 1984. I have practiced my profession continuously for 36 years and have been involved in the design, evaluation and operation of mineral processing facilities during that time. A majority of my professional practice has been the completion of testwork and testwork supervision in support of pre-feasibility and feasibility studies for projects involving flotation technology.
3. I am a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of British Columbia, License # 15708.
4. I have not visited the project site.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.9, 1.19 (Metallurgy), 1.20 (Metallurgy), 12.0 (Metallurgy), 13.0 (in its entirety), 25.5, 25.9 (Metallurgy), and 27, and I accept professional responsibility for those sections of the Technical Report.
8. I have not had prior involvement with the subject property.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Kelowna, B.C., Canada.

"Signed and Sealed"

Jeffrey B. Austin, P.Eng
International Metallurgical and Environmental Inc.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, James N. Gray, P.Geo, do hereby certify that:

1 I am President of Advantage Geoservices Limited with an office at 1051 Bullmoose Trail, Osoyoos, BC, Canada.

2 I am a graduate of the University of Waterloo in 1985 where I obtained a B.Sc in Geology. I have practiced my profession continuously since 1985. My relevant experience includes resource estimation work at operating mines as well as base and precious metal projects in North and South America, Europe, Asia and Africa.

3 I am a Professional Geoscientist registered with the Engineers and Geoscientists British Columbia, license # 27022.

4 I have not visited the property.

5 I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

6 As a qualified person, I am independent of the issuer as defined in Section 1.5 of NI 43-101.

7 I am a co-author of the Technical Report, responsible for sections 1.10, 1.19 (Mineral Resource), 1.20 (Mineral Resource), 12.0 (Mineral Resource), 14.0 (in its entirety), 25.1, 25.9 (Mineral Resource), 26.1, and 27, and I accept professional responsibility for those sections of the Technical Report.

8 I have not had prior involvement with the subject property.

9 As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.

10 I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Osoyoos, BC, Canada.

"Signed and Sealed"

James N. Gray, P.Geo
Advantage Geoservices Limited

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, Marcel Bittel P.Eng., do hereby certify that:

1. I am a Project Manager with Fluor Canada Ltd. with an office at 700 – 1075 W. Georgia Street, Vancouver, BC, Canada V6E 4M7.
2. I graduated from the University of British Columbia in 1988 with a Bachelor of Applied Science. I have practiced my profession continuously for 32 years and have been involved in various aspects of the study, design and construction of mining projects.
3. I am a Professional Engineer registered with the Association of Professional Engineeers and Geoscientists of British Columbia, licence # 18773.
4. I visited the project site from 12 to 13 April 2019.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.14 (not including 1.14.1 (Water) or 1.14.2 (Concentrate Transport)), 1.17.1 (not including Mining, TSF, Concentrate Transport or Owner's Costs), 18.0 (not including 18.2.2, 18.3.2, 18.10, 18.12.3, 18.13, 18.14, 18.15), 21.1 (not including 21.1.8, 21.1.9, 21.1.11 (Mining or TSF)), 26.6, 26.10, and 27, and I accept professional responsibility for those sections of the Technical Report.
8. I have not had prior involvement with the subject property.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

"Signed and Sealed"

Marcel Bittel, P.Eng
Fluor Canada Ltd.

CERTIFICATE OF QUALIFIED PERSON

To accompany the technical report entitled: "NI 43-101 Technical Report, Feasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina" prepared for Josemaria Resources Inc. (the "Issuer") dated 5 November 2020, with an effective date of 28 September 2020 (the "Technical Report").

I, Neil M. Winkelmann, FAusIMM, do hereby certify that:

1. I am a Principal Consultant with SRK Consulting (Canada) Inc., with an office at 2200-1066 W. Hastings St., Vancouver, BC, Canada.
2. I am a graduate of the University of New South Wales, Australia with a B.Eng. in Mining (1984). I am a graduate of the University of Oxford with an MBA in 2005. I have practiced my profession continuously since 1984 and I have 32 years' experience in mining. I have significant experience in the valuation of mineral industry projects accrued over the past 10 years.
3. I am registered as a Fellow of The Australasian Institute of Mining and Metallurgy (AusIMM, #323673).
4. I visited the property from 17 to 23 February 2017.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ("NI 43-101") and certify that by virtue of my education, affiliation to a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. As a qualified person, I am independent of the Issuer as defined in Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report, responsible for sections 1.14.2 (Concentrate Transport), 1.15, 1.17 (Concentrate Transport, Owner's Costs), 1.18, 1.19 (Concentrate Transport, Owner's Costs, Economics), 1.20 (Concentrate Transport, Owner's Costs, Economics), 4.6, 18.12.3, 19.0 (in its entirety), 21.1.9, 21.2.4, 22.0 (in its entirety), 25.9 (Concentrate Transport, Owner's Costs, Economics), 25.10, 26.7, and 26.8, and I accept professional responsibility for those sections of the Technical Report.
8. I participated in the Prefeasibility Study for the Josemaria Project and was a co-author of the NI43-101 report with an effective date of 20 November 2018.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the portion of the Technical Report for which I am responsible contains all scientific and technical information that is required to be disclosed to make the portion of the Technical Report for which I am responsible not misleading.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated this 5th day of November 2020 in Vancouver, B.C., Canada.

"Signed and Sealed"

Neil M. Winkelmann, FAusIMM
SRK Consulting (Canada) Inc.

Acronyms and Abbreviations

Distance	
µm	micron (micrometre)
mm	millimetre
cm	centimetre
m	metre
km	kilometre
in	inch
ft	foot
Area	
m^2	square metre
km^2	square km
ac	acre
ha	hectare
Volume	
L	litre
m^3	cubic metre
ft^3	cubic foot
Mbcm	million banked cubic metres
Mass	
kg	kilogram
g	gram
t	metric tonne
kt	kilotonne
lb	pound
Mt	megatonne
oz	troy ounce
wmt	wet metric tonne
dmt	dry metric tonne
Pressure	
psi	pounds per square inch
Pa	pascal
kPa	kilopascal
MPa	megapascal
Elements and Compounds	
Au	gold
Ag	silver
As	arsenic
Cu	copper
S	sulphur
CN	cyanide
NaCN	sodium cyanide

Other	
°C	degree Celsius
cfm	cubic feet per minute
elev	elevation
hp	horsepower
hr	hour
kW	kilowatt
kWh	kilowatt hour
M	million or mega
masl	metres above sea level
mph	miles per hour
ppb	parts per billion
ppm	parts per million
s	second
V	volt
W	watt
kV	kilovolt
$k	thousand dollars
$M	million dollars
tpa	tonnes per annum
tph	tonnes per hour
t/d	tonnes per day
mtpa	million tonnes per annum
Ø	diameter
ARS	Argentine peso
Acronyms	
SRK	SRK Consulting (Canada) Inc.
CIM	Canadian Institute of Mining
NI 43-101	National Instrument 43-101
ABA	acid- base accounting
AP	acid potential
NP	neutralization potential
CONAGUA	Comisión Nacional del Agua
ML/ARD	metal leaching/ acid rock drainage
PAG	potentially acid generating
NAG	non-acid generating
RC	reverse circulation
IP	induced polarization
COG	cut-off grade
NSR	net smelter return
NPV	net present value
LOM	life of mine
FS	feasibility study
Conversion Factors	
1 tonne	2,204.62 lb
1 oz (troy)	31.10348 g

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1 Executive Summary

1.1 Introduction

The Josemaria project (“Josemaria”, the “project” or “Project” or “Josemaria Project”) is a Feasibility Study stage copper-gold mining project entirely located within San Juan Province of Argentina. The project will employ conventional truck and shovel open-pit mining with conventional primary crushing, grinding and flotation at an average processing rate of 152,000 t/d. The operation will produce a clean copper concentrate with significant gold values. Through its subsidiaries, the Josemaria Project is wholly-owned by Josemaria Resources Inc. (“Josemaria Resources”) (TSX:JOSE).

In June 2019, Josemaria Resources contracted SRK Consulting (Canada) Inc., Fluor Canada Ltd. and Knight Piésold Ltd. to prepare a feasibility study (FS) on the project. This NI 43-101 Technical Report, with an effective date of 28 September 2020, discloses the outcomes of the FS.

1.2 Property Description, Location and Access

The Josemaria deposit is located 9 km east of the Chile-Argentina border in the Andes Mountains at elevations ranging from 4,000 to 4,900 masl. Topography is mountainous with broad, flat-bottomed valleys and moderately steep slopes. The entirety of the property and project is located within the San Juan province of Argentina.

Access to site will be a seven-hour journey from the city of San Juan along public two-lane paved roads, as well as a project developed and maintained gravel road. Access to site is wholly within the province of San Juan which is advantageous to regional stakeholders and is expected to be viewed positively during the project permitting process. Construction supplies will come to site via this road, and concentrate will be transported along this road to San Juan, where it will be loaded onto rail and taken to the port at Rosario for export to international smelters.

The climate in the project area is dry to arid and the temperatures are moderate to cold. Annual precipitation averages 105 mm and average temperatures are -1.9°C. The project is located in a seismically active zone.

1.3 Mineral Tenure and Surface Rights

Josemaria Resources holds an indirect 100% interest in the Josemaria deposit through its Argentine subsidiary Desarrollo de Prospectos Mineros SA (Deprominsa or DPM).

Josemaria Resources holds eight exploitation licences (minas) and one exploration licence (cateos). Total holdings cover an area of approximately 16,425 ha.

Josemaria Resources has an occupancy easement for the Batidero Camp at Josemaria, and a road right-of-way, which provides access to the work area. Part of the road right-of-way is within private property. The remainder of the road and the camp fall within the multiple usage area of the San Guillermo Provincial Reserve. Multiple usage allows mining activities.

1.4 History

Mineral rights for Josemaria were first acquired by Sr. Lirio in the early 1990s. Solitario Resources acquired these rights in 1993, with limited exploration occurring up to 2002 when Solitario (then called TNR Resource Ltd) signed an option agreement with Tenke Mining Corporation (now Josemaria Resources).

The Josemaria deposit was discovered during the initial drilling campaign in the 2003/2004 field season. The first hole drilled encountered 280 metres grading 0.61% copper and 0.51 g/t gold. It was targeted on coincident talus fine copper and gold geochemical and magnetic anomalies.

Work conducted by Josemaria and precursor companies has included reconnaissance prospecting; geological mapping; talus fines sampling; rock chip and trench sampling; ground-based magnetic, controlled source audio-magneto telluric (CSAMT) and induced polarization (IP)–resistivity geophysical surveys; reverse circulation (RC) and core drilling; and metallurgical testwork.

1.5 Geological Setting and Mineralization

Based on geological features and location, the Josemaria deposit is classified as a porphyry copper-gold system.

The copper-gold mineralization at Josemaria is hosted by a Late Oligocene porphyry system developed within Permian to Triassic basement rocks. The deposit area measures ~1500 m north-south by 1,000 m east-west and 600 to 700 m vertically from surface, within a larger alteration footprint of up to 4 km north-south by 2 km east-west. A variably-developed leached cap overlies part of the Josemaria deposit and is predominantly related to oxidation at and below the modern-day surface. The Josemaria deposit remains open to the south, beneath a thickening cover of post-mineral volcanic rocks and also at depth.

The leached cap, with underlying supergene copper enrichment, ranges from 10 to 150 m in thickness, with the thicker parts preferentially developed along structures. Mineral zones within the Josemaria deposit are defined by the relative abundance of chalcopyrite, pyrite and chalcocite, as well as the mode of occurrence of chalcocite (hypogene or supergene) and level of oxidation. Chalcopyrite and pyrite are disseminated through the potassic and overprinting chlorite-sericite zones, with minor bornite. Quartz–magnetite ± chalcopyrite veining occurs through much of the main mineralized zone, as discrete veins and locally as a more intense stockwork. Sulphide mineralization in the upper advanced argillic and sericitic domains includes a hypogene-enriched high-sulphidation assemblage of chalcocite with covellite, tennantite, and minor enargite, resulting in some of the highest hypogene grades in the deposit.

1.6 Exploration and Drilling

Work programs conducted by Josemaria Resources include geological mapping; soil, rock-chip and talus sampling; a number of geophysical surveys including IP–resistivity, magnetometer, and Mount Isa Mine’s Distributed Acquisition System methodology (MIMDAS) surveys; and RC and core drilling.

Eleven drilling campaigns have been carried out at the Josemaria deposit, from 2003 to 2020. Drilling at the Josemaria deposit to date totals 76,206 m in 190 drill holes, of which 48 holes (17,535 m) are RC holes, and 142 holes (58,671 m) are core holes, including 14 condemnation holes and 13 geotechnical holes inside the FS pit shell. More than 90% of the metres drilled were HQ (63.5-mm diameter core).

Core was photographed, logged for detailed lithology, alteration and mineralization features, and (RQD) and recovery data were collected. Several of the drill holes were also logged for geotechnical information.

Drill hole orientations are generally appropriate for the mineralization style. The Josemaria deposit is a porphyry system with disseminated mineralization and overlying supergene enrichment. Reported and described interval thicknesses are considered true thicknesses.

1.7 Sample Preparation, Analyses, and Data Verification

All drilling since 2009 has been core drilling. Core was sampled continuously from the beginning of recovery to the end of the hole. Samples are generally 2 m long. Drill core was cut in half using a circular, water-cooled rock saw. Half-cores are randomly weighed and compared to verify that 50% of the material was sampled. One half of the core was used as a geochemical sample and the other stored in boxes or trays for reference and future revisions.

A total of 14,419 core samples have been systematically analyzed for specific gravity (SG) since the 2011–2012 drilling program. Specific gravity was measured by Josemaria technicians using the water immersion method, either at the Batidero camp or at the Josemaria core logging and sampling facility in San Juan.

From 2009 to 2014, all core samples were analyzed by ACME Laboratories in Chile. ACME's accreditations have included ISO9001:2000 and ISO/IEC17025. Sample preparation was undertaken at ACME's sample preparation laboratory in Mendoza, Argentina, which holds ISO 9000:2001 accreditation. SGS Laboratories in Chile was used as an umpire laboratory during 2012-2013. At the time the analyses were performed, SGS held ISO/IEC17025 accreditations. ACME and SGS are accredited laboratories and independent of Josemaria Resources.

Beginning again in 2019, samples were delivered to the ALS preparation laboratory in Mendoza, Argentina where they were crushed and a 500 g split was pulverized to 85% passing 200 mesh. The prepared samples were sent to the ALS assay laboratory in Lima, Peru. ALS is an accredited laboratory and independent of Josemaria Resources.

Gold analyses were by fire assay fusion with AAS finish on a 30 g sample. Copper and silver were analysed by atomic absorption following a 4-acid digestion. Samples were also analyzed for a suite of 36 elements with ICP-AES and a sequential copper leach analysis was completed on each sample with ICP copper > 500 ppm Cu. Copper and gold standards, as well as blanks and duplicates (field, preparation and analysis), were randomly inserted into the sampling sequence for Quality Control. On average, 9% of the submitted samples are Quality Control samples. No data quality problems were indicated by the QA/QC program.

ACME and ALS were also used for surface sample analyses.

Prior to 2009, quality control was limited to the preparation and analysis of field duplicates from the drill samples.

A quality control protocol was implemented in the 2009–2010 season, beginning with JMDH08. The program, with some minor variations, has been followed since that date. The programs include blanks, duplicates and standard reference materials inserted in the sampling sequence. The programs included a total of seven quality control samples inserted for every 77 samples submitted to the laboratory to provide sufficient controls for the 78 and 36 element trays used in the laboratory.

Drill core is stored in a core storage warehouse in San Juan. Core is well organized and stored in racks, easily available for review. The laboratory returns the pulps and coarse reject for each sample that has been sent for analysis. These are stored at the San Juan facility.

The logging facility is fenced, locked when not occupied, and is secure. Samples are handled only by company employees or their designates (i.e., laboratory personnel). Samples are in the control of a Josemaria employee or contractor to Josemaria from the time they leave the site until they arrive at the San Juan lab.

1.8 Data Verification

Data verification has been conducted by an independent consultant, F Devine, a qualified person, in support of technical reports on the project. This work has included field visits (drill collar monumenting; location checks for selected drill collars); witness sampling; spot checks of the assay database against assay certificates; reviews of the lithology and alteration information in drill core against drill logs; reviews of collar elevations in the database against collar elevations in the digital elevation model provided by Josemaria Resources; downhole survey deviation reviews; reviews of QA/QC data including standard, blank and duplicate sample performances; and a review of check sampling on pulps completed by a check laboratory.

J. Gray, an independent qualified person, is responsible for the mineral resource estimate. As described in more detail in Section 14.8, J. Gray validated block model interpolations against drill hole composite grades and believes there to be a good correlation without showing any bias in model interpolations.

B. McCarthy, an independent qualified person, is responsible for the mineral reserve estimate. B. McCarthy oversaw the validation of the resource model declared herein, before using it to define the mineral reserves. Tonnages were compared between queries of the resource model and the stated resource, as part of standard model checking procedures.

1.9 Metallurgical Testing

Numerous metallurgical test programs have been completed on the Josemaria deposit over the last five years. Josemaria materials are amenable to conventional grinding and flotation processes and will produce a readily saleable copper concentrate. Minor differences in metallurgical response were observed within samples representing different zones of the Josemaria deposit.

The Josemaria deposit has been characterized based on rock type, namely: tonalite, rhyolite and porphyry. A zone of supergene copper enrichment is also present within the Josemaria deposit and was tested as a distinct zone. The distribution of the rock types within the deposit are:

- Tonalite: 46%
- Rhyolite: 34%
- Porphyry: 14%
- Supergene: 6%

Although these zones have differing rock types and mineralogical makeup, the metallurgical responses observed are similar, although minor changes in throughput and metal recovery are expected due to the natural variation in the composition of the ore. Ore hardness for the different zones has been considered when evaluating throughput, allowing for marginal increases in throughput when softer supergene and porphyry material are processed. Copper-bearing minerals within the Josemaria deposit include chalcopyrite, chalcocite and covellite.

There is a positive correlation between copper recoveries and copper head grades throughout the deposit. Average copper recoveries are expected to be 85% over the life of mine. Similarly, gold recovery is also shown to be strongly dependent on gold head grades and gold recovery is expected to be 63% over the life of mine. Silver recoveries were found to be consistent and will be 72% over the life of mine. Testwork resulted in an average copper concentrate grade of 27%, which has been used as the basis of this study.

Limited test work to evaluate the production of a molybdenum concentrate has been completed and this is considered a project opportunity for additional revenue that can be further evaluated during subsequent phases of project development.

1.10 Mineral Resource Estimates

The Mineral Resource estimate detailed in this Technical Report replaces the previous estimate, most recently documented in a Technical Report dated December 2018. An additional 29 holes have been drilled and are included in this update. Updated wireframe models of lithology, alteration and mineralization were used for control in the grade estimation process. Mineralization was used to control modelling of all variables except arsenic, for which grade interpolation was based on the alteration model.

A total of 156 holes (114 core and 42 RC) have been used for grade estimation. Grades were estimated for copper, gold, silver, molybdenum, arsenic, iron and sulphur. The first three of these are reported in the resource statement; the others were used in other aspects of project study and design. Assays for the revenue metals were capped prior to compositing in a conventional manner, based on the examination of histograms and probability plots. Sample grades were composited to a down-hole length of two metres as 87% of assay intervals are two metres in length and another 12% are one metre in length.

Grades for all elements were estimated by ordinary kriging into blocks with dimensions of 25 m x 25 m x 15 m (X/Y/Z). Density values were estimated by inverse distance squared weighting using the mineralization model for geologic control.

Based on current metallurgical testwork, the deposit/resource is divided into oxide and sulphide portions. The sulphide mineral resource is tabled based on a copper equivalent cut-off calculated by using the recoveries of copper, gold and silver that were used in the pit optimization and mine design process. The surficial oxide mineral resource is tabled by gold cut-off grade as gold is the primary economic metal within the oxide envelope. Engineering studies, in support of the mineral reserve estimate, have also generated a resource pit shell based on measured, indicated and inferred mineral resource blocks. That shell has been used as the basis of the mineral resource estimates presented in Table 1-1 (sulphide mineral) and Table 1-2 (oxide mineral).

Table 1-1: Josemaria 2020 sulphide mineral resource @ 0.1% CuEq cut-off for the Josemaria Project, San Juan province, Argentina 10 July 2020

Category	Tonnes (millions)	Grade				Contained Metal		
		Cu (%)	Au (g/t)	Ag (g/t)	CuEq (%)	lb Cu (billions)	oz Au (millions)	oz Ag (millions)
Measured	197	0.43	0.34	1.3	0.63	1.9	2.2	8.5
Indicated	962	0.26	0.18	0.9	0.36	5.5	5.6	26.6
Total (M & I):	1,159	0.29	0.21	0.9	0.41	7.4	7.8	33.5
Inferred	704	0.19	0.10	0.8	0.25	2.9	2.3	18.6

Table 1-2: Josemaria 2020 oxide mineral resource @ 0.2 g/t Au cut-off for the Josemaria Project, San Juan province, Argentina 10 July 2020

Category	Tonnes (millions)	Grade		Contained Metal	
		Au (g/t)	Ag (g/t)	oz Au (thousands)	oz Ag (thousands)
Measured	26	0.33	1.2	280	994
Indicated	15	0.28	1.3	132	632
Total (M & I):	41	0.31	1.2	410	1,585
Inferred	0				

Notes to accompany Josemaria Mineral Resource statement:
1. Mineral Resources have an effective date of 10 July 2020. The Qualified Person for the mineral resource estimate is Mr. James N. Gray, P.Geo
2. The mineral resources were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Definition Standards for Mineral Resources and Reserves, as prepared by the CIM Standing Committee and adopted by CIM Council.
3. Sulphide copper equivalence (CuEq) assumes metal prices of $3/lb copper, $1,500/oz gold, $18/oz silver.
4. CuEq is based on Cu, Au and Ag recoveries derived from metallurgical test work as applied in the pit optimisation and mine design process (average LOM recoveries used: 85.2% copper, 62.6% gold, 72.0% silver).
5. The copper equivalency equation used is: CuEq (%) = (Cu grade (%) * Cu recovery * Cu price ($/t) + Au grade (oz/t) * Au recovery * Au price ($/oz) + Ag grade (oz/t) * Ag recovery * Ag price ($/oz)) / (Cu price ($/t) * Cu recovery)
6. Mineral resources are inclusive of mineral reserves.
7. Mineral resources that are not mineral reserves do not have demonstrated economic viability.
8. All figures are rounded to reflect the relative accuracy of the estimate. Totals may not sum due to rounding as required by reporting guidelines.

1.11 Mining and Mineral Reserve Estimates

The Josemaria project is to be developed as a large-scale open pit mining operation. Over 1 billion tonnes of ore will be mined at average diluted head grades of 0.30% Cu, 0.22 g/t Au and a strip ratio of 0.98 over a 19-year mine life. Due to the continuous nature of the deposit and the low-grade mineralization that exists along much of the reserve boundary, the impact of both dilution and ore loss will be minimal to project economics.

Mining will occur with 15 m benches (often double benching) with average slope angles ranging from 37 to 43 degrees. Shallowest overall slope angles are in the north of the pit where there is a zone of lower rock mass strength at depth, requiring an angle of 34 degrees in that specific zone. Large electrically powered hydraulic shovels will be used in combination with ultra-class 360-tonne haul trucks. To maximize productivity, efficiency and safety in a high-altitude environment, haul trucks will be autonomously operated and drill functions will be autonomously operated as much as possible.

The mineral reserves for Josemaria are updated and stated in Table 1-3. Measured mineral resources and indicated mineral resources were converted to proven and probable reserves, respectively. Ore reserves used long-term metal price estimates of $3.00/lb Cu, $1500/oz Au and $18.00/oz Ag.

Table 1-3: Mineral reserve statement for the Josemaria Project, San Juan province, Argentina, 28 September 2020

Category	Tonnage	Grade			Contained Metal		
	(Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Cu (M lbs)	Au (M oz)	Ag (Moz)
Proven	197	0.43	0.34	1.33	1,844	2.14	8.43
Probable	815	0.27	0.19	0.85	4,861	4.87	22.29
Total Proven and Probable	**1,012**	**0.30**	**0.22**	**0.94**	**6,705**	**7.02**	**30.72**

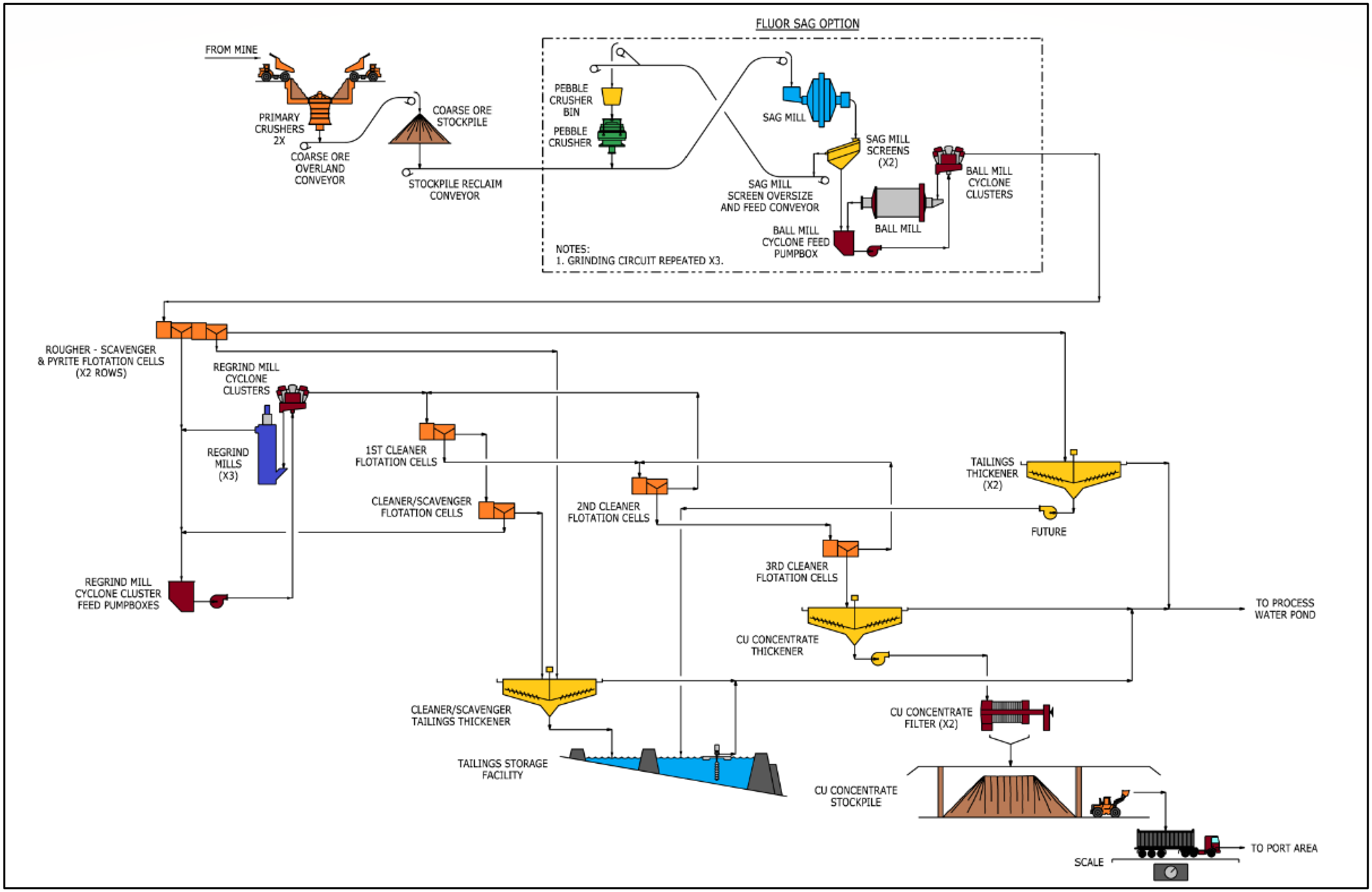
Notes to accompany Josemaria Mineral Reserve statement:

1. Mineral reserves have an effective date of 28 September 2020. The Qualified Person for the estimate is Mr. Robert McCarthy, P.Eng.
2. The mineral reserves were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Definition Standards for Mineral Resources and Reserves, as prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.
3. The mineral reserves were based on a pit design which in turn aligned with an ultimate pit shell selected from a Whittle™ pit optimization exercise. Key inputs for that process are:
   - Metal prices of $3.00/lb Cu, $1,500/oz Au; $18.00/oz Ag
   - Variable Mining cost by bench and material type. Average costs are $1.351/t, $1.36/t and $1.65/t for ore, NAG waste and PAG waste, respectively.
   - Processing costs vary by metallurgical zone, ranging from $3.77/t tonalite ore milled to $3.71/t supergene.
   - Infrastructure On and Off-site $0.43/t milled
   - Indirect Costs $0.46/t miled
   - Sustaining capital costs of $0.54/t milled for tailings management and $0.17/t mined for mining equipment
   - Pit average slope angles varying from 37° to 43°
   - Process recoveries for Cu and Au are based on grade. The average recovery is estimated to be 85.2% for Cu and 62.6% for Au. Ag recovery is fixed at 72.0%.
4. Mining dilution is accounted for by averaging grades in adjacent blocks across a thickness of 2.5 m into each block (5.0 m per block contact).
5. The mineral reserve has an economic cut-off for prime mill feed, based on NSR, of $5.22/t, $5.21/t, $5.18/t and $5.16/t milled for tonalite, rhyolite, porphyry and supergene material respectively and an additional $0.53/t for stockpiled ore.
6. There are 991 Mt of waste in the ultimate pit. The strip ratio is 0.98 (waste:ore).
7. All figures are rounded to reflect the relative accuracy of the estimate. Totals may not sum due to rounding as required by reporting guidelines.

1.12 Processing and Recovery Methods

The Josemaria process facilities are designed for a throughput rate of 150,000 t/d of tonalite material. Tonalite is the hardest of the different feed types for impact breakage in the SAG mills and when all metallurgical zones are considered, the average life-of-mine throughput is estimated to be 152,000 t/d. Facilities on site include crushing, grinding, flotation, concentrate and tailings thickening, concentrate filtration, storage and loadout. A flowsheet of the process is shown in Figure 1-1.

Run-of-mine material will be delivered from the open pit to two gyratory crushers with crushed ore transported via an overland conveyor to a coarse ore stockpile. Material will be reclaimed from the coarse ore stockpile and conveyed to three SAG mill/ball mill circuits, which will grind the material prior to flotation. Ball mill cyclone overflow or feed to the copper flotation process will have a P_{80} value of approximately 120 to 130 µm. Conventional copper rougher flotation, followed by concentrate re-grinding and copper cleaner flotation, will result in the production of a copper concentrate with a copper grade of 26% to 32% copper. The final concentrate will be thickened and filtered, ready for shipment.



Source: Fluor, 2020

Figure 1-1: Simplified process flow diagram

1.13 Tailings Management

Bulk tailings will be segregated in the process to form two tailings streams; low sulphur rougher tailings and high sulphur cleaner tailings. The tailings streams are segregated to assist with the management of potentially acid generating (PAG) material using a Best Management Practice approach. Thickened slurry tailings will be discharged in the tailings storage facility (TSF) located to the south of the process plant. Approximately one billion tonnes of thickened slurry tailings will be discharged over the life of the project within the TSF. The TSF impoundment requires three dams that will be constructed continuously from Years -3 to Year 18 to contain the tailings.

All mine contact water, which includes runoff from the plant site, TSF contributing catchment, waste rock storage facilities, tailings beaches, tailings slurry water, open pit mine dewatering flows and groundwater accumulating in the TSF will be collected, stored and managed within the project area. Seepage collected in collection ponds located downstream of the Main and South Dams will be pumped back to the plant site for reuse in processing. Contact water will not be discharged from the project site. Where it is physically practical, diversion ditches will be installed around the plant site, waste storage facilities, open pit, and TSF to convey non-contact freshwater around these disturbed areas. Water that accumulates on project infrastructure will be collected and diverted to the TSF for reuse in processing. No water that could have an adverse environmental impact will be discharged.

1.14 Project Infrastructure

Infrastructure for Josemaria has been separated into two main components: on-site and off-site.

1.14.1 On-Site Infrastructure

On-site infrastructure includes the road network, processing plant, mine support facilities, power and water supply and distribution, and water and sewage treatment facilities.

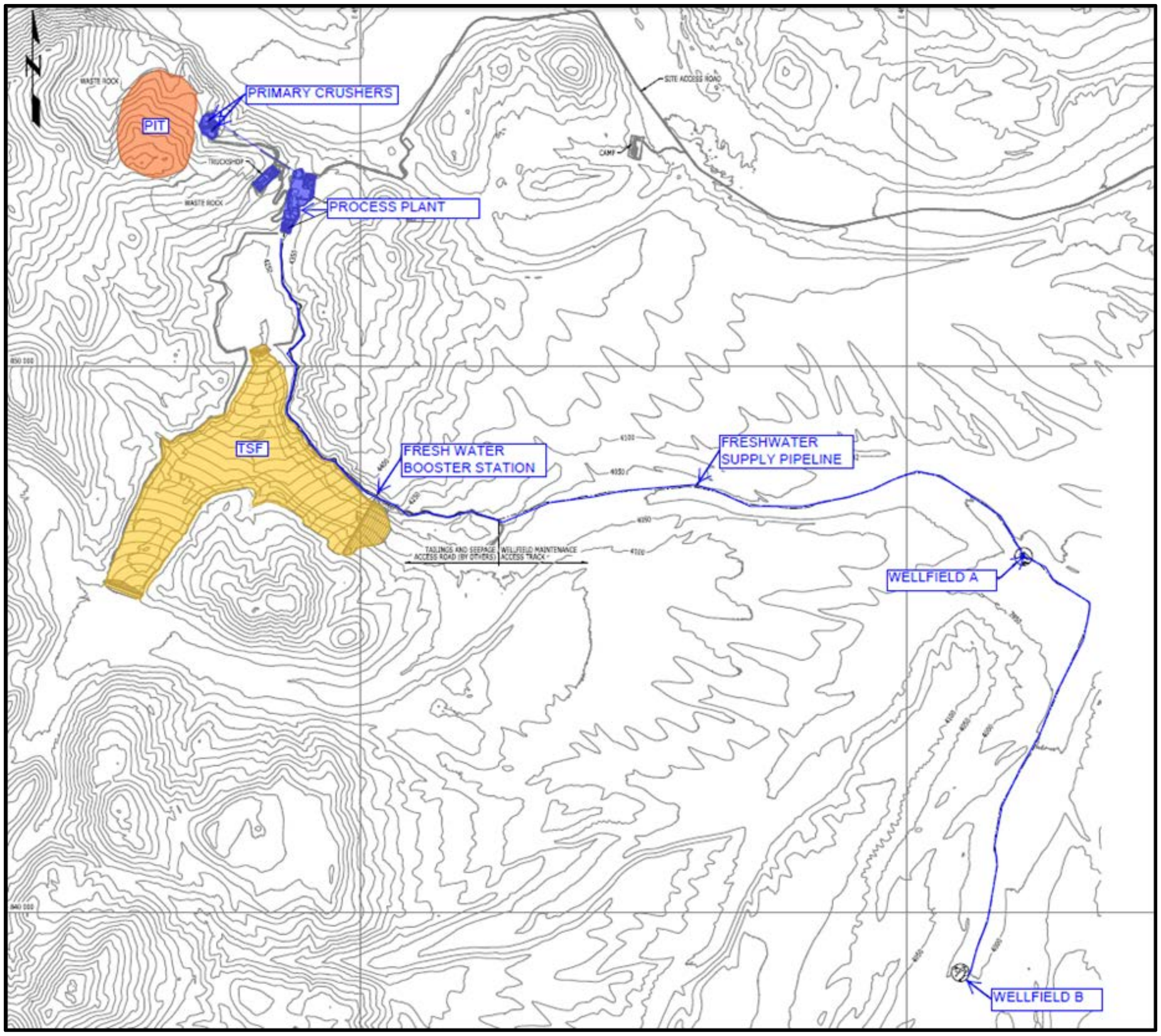
Water

Groundwater will be the primary source of freshwater supply to the plant site and ancillary facilities. Groundwater will be collected from two wellfields, A and B, that are spaced 9 km apart and situated 19 and 28 km, respectively, from the plant site freshwater storage pond. Wellfield A will be constructed to provide sufficient water for initial operations. Wellfield B will be constructed within the first five years of operation to provide supplementary water, as well as a reserve capacity for years with low precipitation. Figure 1-2 shows the overall arrangement of the water supply. The proven availability of freshwater supply is a major benefit to the project.

Water from the wellfield is pumped to a freshwater pond adjacent to the plant site. The freshwater will be distributed around the site from a storage tank, which also contains a dedicated firewater reserve to service the fire protection system. In addition to the freshwater supply, process water will be recycled from the tailings impoundment.

Power

Power from the incoming 220 kV line will be fed to the primary substation where two transformers will transform the voltage to 22 kV for on-site distribution. Load centres will drop the voltage to 4.16 kV and 400 V to feed the equipment busses. The total operating load will be 233 MW.



Source: KP, 2020
Figure 1-2: Water supply general arrangement

Five 2 MW diesel generators will provide initial construction power and will serve as emergency back-up during the operations phase to essential equipment and facilities in the event of a power failure.

The electrical design is based on IEC standards, with an equipment derating factor of 0.67 applied to high, medium, and low voltage equipment, due to the project's altitude.

Major Support Facilities

The mine truckshop will be a 52 m wide by 120 m steel structure enclosed with non-combustible insulated metal cladding roof and walls. The roof height will vary with the functionality of each area. The roof height in the main mine equipment service bays will be 21 m in order to service the ultra-class loaders and haul trucks. The truck shop will have six service bays for the Komatsu 980E mine haul trucks (or equivalent), two light-vehicle service bays, a warehouse, toolbox and tool crib area, first aid, administrative areas, lunchroom, washrooms and change rooms. These facilities will be used by both the mine maintenance and mine operations staff.

The administrative complex will be to the northeast of the process plant. The facilities in this complex will include an administration building, a lunchroom / change room, and an emergency response centre. The main administration building will consist of two modular sections (lunchroom and office sections) and one stick-built section (emergency response center). The building will have a disability access ramp.

The camp capacity for the construction phase of the project is estimated to be 4,800 people and will be built to meet the standard required by Argentina's building code and applicable work safety and hygiene codes. At the end of construction this camp will be converted for use by the operating personnel, which will reduce the occupancy to an expected 800 people or as determined by operational requirements at the time. During both construction and operations, the camp will provide a full range of facilities including kitchens and dining, recreation and laundry facilities.

The operation will have a full suite of communications methods including:

- VoIP telephone services and computer networking within buildings
- Handheld radios for remote operations within the plant area
- Local-area network (LAN)
- Wide-area network (WAN) connection to locations outside the plant (Internet service)

1.14.2 Off-Site Infrastructure

Off-site infrastructure includes the south access road, a 252 km high-voltage power line to the site, and the concentrate transport facilities.

Access Road

The south access road will be gravel surfaced, two-lanes and 244 km long. Secured entrance to the road will be located near the town of Rodeo. Construction of the road will be staged to support early works and will be improved over the duration of the project. The road will be able to accommodate oversized loads during construction and concentrate and other traffic during operation.

Power Supply

The 220 kV, single-circuit high-voltage transmission line will be 252 km long and follows the south access road corridor. The road and power line remain wholly in the province of San Juan. The line will have two conductors per phase of aluminum-steel-reinforced (ACSR) type with a 300/50 mm^2 cross-section for carrying 240 MW of power. Power supply will be from a substation, located near the town of Rodeo, which will be upgraded as part of the project.

Concentrate Transportation

Copper concentrate will be transported in bulk by road to a road-to-rail intermodal facility to be located in Albardon, San Juan, where it will be transferred to rail for transport to the Terminal Puerto Rosario (TPR) where it will be exported to smelters in Asia, Europe and elsewhere in South America. This facility will include a 15,000-tonne capacity concentrate shed, a scale and a cleaning bay. The shed will be kept under negative pressure to limit the loss of fugitive dust to the outside environment. Washdown water from the cleaning bay will be collected and treated prior to its release to the environment. There will also be a dedicated 45,000 tonne capacity concentrate storage shed at the port. Other infrastructure such as scales and ship loading equipment will be supplied by the port and used as required.

1.15 Market Studies and Contracts

The Josemaria mine will produce a conventional copper concentrate. This product is considered clean and is expected to be readily marketable and attractive to international smelters in Asia, Europe, and South America. Test results to date have typically yielded a 27% Cu concentrate and this study has used that grade as a base case for logistics and economic evaluation.

No contracts in relation to concentrating, smelting, refining, transportation, handling, sales and hedging, and forward sales, nor any other marketing arrangements are currently in place.

Pursuant to the terms of Josemaria's acquisition of its previous partner's (Japan Oil, Gas, and Metals National Corporation or "JOGMEC") 40% interest in the Josemaria project, JOGMEC holds an option to purchase up to 40% of the material produced from any mine on the property at benchmark market terms.

1.16 Environment, Permitting and Social

Josemaria Resources has developed a comprehensive environmental and social baseline, which forms the basis of the Environmental Impact Assessment currently in production. The environmental baseline has characterized the physico-chemical aspects of the project area, including water quality and quantity, geochemistry, and climate. Flora and fauna studies have identified species and their habitat that will require mitigation.

The socio-economic studies indicate that there are no communities or landowners proximate to the mining area, and that the project is generally well received by communities located along the transportation route. No registered indigenous peoples have been identified within the zone of influence of the project. There are no known environmental or social issues that could materially impact the ability of Josemaria Resources to extract the mineral resources of the project.

Closure and reclamation activities will adhere to the stricter of local regulatory standards and international standards for large mining projects. Objectives of the closure plan include: long-term (post-closure) geotechnical and geochemical stability; eventual return of the site to a self-sustaining environment similar to pre-mining usage and capability; protection of the downstream environment and management of surface water; salvage and re-use of materials and equipment where possible to avoid use of landfills; and transfer of useful infrastructure such as the access road, transmission line and substation to the province of San Juan. Closure also includes hand-over of key assets to the local community, including the south access road and the HV power supply and substations. The road and power supply will support access to regional parks for tourism and also for further economic development of this area.

1.17 Cost Estimates

1.17.1 Capital Cost Estimate

The capital cost estimate was prepared by Fluor with input from Josemaria, SRK and KP according to each party's scope of responsibility. Direct costs were estimated for the TSF area by KP; mine area and Owner's costs (with support from Josemaria) by SRK; and process, on-site infrastructure and the power supply portion and access road (with support from Josemaria) of the off-site infrastructure areas by Fluor.

The level of design definition, methodology and sources of information used to prepare this capital estimate adhere to the Association for the Advancement of Cost Engineering International (AACEI) Practice 47R-11 Cost Estimate Classification System – As Applied in the Mining and Mineral Processing Industries, to qualify as a Class 3 estimate with an accuracy classification of ±15% at the summary level.

The capital estimate is stated in United States Dollars (USD) at the currency exchange rate on the date of 23 October 2019 as shown in Table 1-4. The exchange rates were used to convert the currencies of origin from vendors and contractors to the reporting currency.

Table 1-4: Exchange rates

Code	Currency	1.00 USD =
USD	US Dollar	1.00
ARS	Argentine Peso	58.96
CLP	Chilean Peso	725.80
CAD	Canadian Dollar	1.31
EURO	Euro	0.90
AUD	Australian Dollar	1.46

The CAPEX is structured according to the project work breakdown structure (WBS) and also by prime account code. The total capital cost by WBS area and responsible party is summarized in Table 1-5.

Table 1-5: Total capital cost (US$M)

WBS	WBS Description	Fluor	KP	SRK	Owner	Total
1000	Mine	48		254		302
2000	Crushing	222				222
3000	Process Facilities	666				666
4000	Tailing Management	15	148			163
5000	On-Site Infrastructure	181	3			184
6000	Off-Site Infrastructure	190	2			192
	Subtotal Direct	**1,322**	**153**	**254**		**1,729**
7100	EPCM	271	18			289
7200	Temporary Facilities and Services	313		3		316
7300	Freight	86	5			91
7400	Spare Parts	17		5		22
7500	First Fill	4				4
7600	Vendor Representatives	27		1		28
7700	Pre-Operation/Commissioning	7	0.4			7
	Subtotal Indirect	**724**	**24**	**8**		**756**
	Contingency	319	20	10		348
	Owner's Costs				132	132
	Main Access Road				126	126
	Total Estimated Cost	**2,365**	**196**	**273**	**258**	**3,091**

1.17.2 Operating Cost Estimate

The project's estimated operating costs for the LOM are summarized in Table 1-6. These costs reflect the mine production plans, metal recoveries and processing. All costs are expressed in Q4 2019 US dollars with no allowance for escalation. These costs do not include costs for concentrate freight or smelter charges and fees, royalties or sustaining capital.

Low overall operating costs can be attributed to a low strip ratio, low fuel prices, a low cost of power and lower labour costs than in many other established mining jurisdictions.

Table 1-6: Operating costs (LOM)

Cost Centre	Avg Annual Costs (US$/a)	Unit Costs (US$/t ore processed)	In Concentrate ($/lb CuEq)
Mine	144,560,228	2.71	$0.34
TSF & Freshwater	1,188,105	0.02	$0.00
Process & Infrastructure	194,033,053	3.64	$0.46
G&A Miscellaneous	24,039,681	0.45	$0.06
Total	363,821,068	6.83	$0.86

1.18 Economic Analysis

The economic analysis indicates that the project has a positive economic return. The base-case after-tax net present value (NPV), evaluated at a discount rate of 8%, is $1.53 B. The after-tax internal rate of return (IRR) is 15.4%. The LOM operating margin averages 65% for the base case.

A summary of KPIs and economic analysis inputs is shown in Table 1-7. A positive valuation is maintained across a wide range of sensitivities on key assumptions such as prices, costs, metallurgical recoveries and schedule.

1.19 Risks and Opportunities

Subject matter experts from SRK (Mining, Geotechnical Engineering, Economics), Fluor (Processing, Infrastructure), Knight Piésold (Tailings Management) and representatives from Josemaria Resources (Geology, Environment, Permitting, Logistics, Marketing) attended a 2-day workshop from 30-31 July 2019 to discuss, review and rank risks and opportunities associated with the Josemaria project. The outcomes of the risk assessment workshop were updated in September 2020 to reflect new information and project understanding gathered during the FS process.

None of the risks identified ranked higher than "Moderate", with the highest risk scoring 10/100. This risk was associated with a 50% relative increase in the base rate for corporate income tax. In total, 25 risks were ranked as "Moderate" and the remaining 70 risks ranked as "Insignificant".

Four 'Moderate' category opportunities were identified (scoring 9/100). These were associated with variable grind size (as recovery is relatively insensitive to grind size), higher metal prices, construction of an airstrip reducing the risk associated with commuting along the construction access roads, and bulk ore sorting to remove waste material from the ore feed before it gets to the mill. All other opportunities (14 in total) were ranked as "Insignificant".

Table 1-7: Summary of project economics

Project Metric	Units	Value
Pre-Tax NPV @ 8%	$B	2.37
Pre-tax IRR	%	18.4
After-Tax NPV @ 8%	**$B**	**1.53**
After Tax IRR	**%**	**15.4**
Undiscounted After-Tax Cash Flow (LOM)	$B	6.36
Payback Period from start of processing (undiscounted, nominal after-tax cash flow)	years	3.8
Initial Capital Expenditure	$M	3,091
Life-of-Mine Sustaining Capital Expenditure (excluding closure)	$M	940
All-in Cash Costs (co-product excluding closure accrual)	$/lb CuEq.	1.55
Average Process Capacity	tonnes per day	152,000
Mine Life	years	19
Life-of-Mine Mill Feed	Mt	1,011.8
Life-of-Mine Grades (ROM)		
Copper	%	0.30
Gold	g/t	0.22
Silver	g/t	0.94
Life-of-Mine Waste Tonnes	Mt	992
Life-of-Mine Strip Ratio (Waste:Ore)	ratio	*0.98*
First Three Years Average Annual Metal Production		
Copper	tonnes per year	166,000
Gold	ounces per year	331,000
Silver	ounces per year	1,248,000
Life-of-Mine Average Annual Metal Production		
Copper	tonnes per year	131,000
Gold	ounces per year	224,000
Silver	ounces per year	1,048,000
Life-of-Mine Average Process Recovery		
Copper	%	85.2
Gold	%	62.6
Silver	%	72.0

1.20 Conclusions and Recommendations

It is the consensus of the authors of this report that this project has sufficient data available and has undergone the necessary rigour, with regard to technical planning and design, to proceed to the basic engineering phase with the expectation of moving to construction, should the Josemaria Board of Directors decide to approve project construction.

In order to proceed to the basic engineering phase efficiently, project systems and procedures need to be setup in advance with the chosen EPCM. Design criteria, design standards, standard specifications and applicable codes and regulations for adherence should be identified and agreed upon early on in this phase of work.

2 Introduction and Terms of Reference

2.1 Introduction

The Josemaria project is a Feasibility Study stage copper-gold mining project located in the Andes Mountains of San Juan Province, Argentina. The project will employ conventional open-pit mining with conventional flotation at an average processing rate of 152,000 t/d.

In June 2019, Josemaria Resources contracted the following parties to conduct a Feasibility Study for the project:

- SRK Consulting (Canada) Inc. – mine planning
- Fluor Canada Ltd. – processing, infrastructure
- Knight Piésold Ltd. – tailings management, freshwater supply and management

This technical report discloses the outcomes of the FS, including updated reporting of mineral resources and mineral reserves for the Josemaria project.

2.2 Responsibility

The FS Qualified Persons (QP), as defined by National Instrument 43-101 (NI 43-101), and their areas of responsibility are summarized in Table 2-1.

2.3 Prior Technical Reports

The following technical reports have been filed on the Josemaria project by Josemaria Resources, under the previous company name of NGEx Resources Inc.:

- Zandonai, G.A., Carmichael, R.G. and Charchaflié D., 2013: Updated Mineral Resource Estimate for the Josemaria Property, San Juan Province, Argentina: technical report prepared by Behre Dolbear and Josemaria Resources Inc., effective date 27 September 2013.
- Zandonai, G., 2013: Second Updated Mineral Resource Estimate for the Josemaria Property, San Juan Province, Argentina: technical report prepared by Behre Dolbear for Josemaria Resources Inc., effective date 27 September 2013, amended 24 March 2014.
- Ovalle, O., 2016, et al. 2016: Constellation Project incorporating the Los Helados Deposit, Chile and the Josemaria Deposit, Argentina NI 43-101 Technical Report on Preliminary Economic Assessment, prepared by Alfonso Ovalle, RM CMC; Cristian Quiñones, RM CMC; Cristian Quezada, RM CMC; David Frost, FAusIMM; and Vikram Khera, P.Eng., all of whom are with Amec Foster Wheeler International Ingeniería y Construcción Limitada; and by Gino Zandonai, RM CMC, of DGCS SA, filed under the Corporation's profile on SEDAR on 11 April 2016.
- SRK Consulting (Canada) Inc., 2018. NI 43-101 Technical Report, Prefeasibility Study for the Josemaria Copper-Gold Project, San Juan Province, Argentina. Technical report prepared for NGEx Resources Inc. with an effective date of 20 November 2018.

Table 2-1: List of QPs and responsibilities

Qualified Person	Company	Areas of Responsibility
James Gray	Advantage Geoservices Ltd.	1.10, 1.19 (Mineral Resource), 1.20 (Mineral Resource), 12.0 (Mineral Resource), 14.0 (in its entirety), 25.1, 25.9 (Mineral Resource), 26.1, 27
Fionnuala Devine	Merlin Geosciences Inc.	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 3.1, 4 (not including 4.5, 4.6, 4.8, 4.10), 5.1, 5.3, 5.4, 6.0 (in its entirety), 7.0 (in its entirety), 8.0 (in its entirety), 9.0 (in its entirety), 10.0 (in its entirety), 11.0 (in its entirety), 12.0 (Geology), 23.0 (in its entirety), 24.0 (in its entirety), 27
Jeffrey Austin	International Metallurgical and Environmental Inc.	1.9, 1.19 (Metallurgy), 1.20 (Metallurgy), 12.0 (Metallurgy), 13.0 (in its entirety), 25.5, 25.9 (Metallurgy), 27
Brian Johnston	Fluor Canada Ltd.	1.12, 1.17.2 (not including Mining, TSF or Concentrate Transport), 1.19 (Processing), 1.20 (Processing), 17.0 (in its entirety), 21.2.3, 21.2.5, 25.6, 25.9 (Processing), 26.4, 27
Marcel Bittel	Fluor Canada Ltd.	1.14 (not including 1.14.1 (Water) or 1.14.2 (Concentrate Transport)), 1.17.1 (not including Mining, TSF, Concentrate Transport or Owner’s Costs), 18.0 (not including 18.2.2, 18.3.2, 18.10, 18.12.3, 18.13, 18.14, 18.15), 21.1 (not including 21.1.8, 21.1.9, 21.1.11 (Mining or TSF)), 26.6, 26.10, 27
Daniel Ruane	Knight Piésold Ltd.	1.13, 1.14.1 (Water), 1.16, 1.17 (TSF), 1.19 (TSF, Water Management, Environment), 1.20 (TSF, Water Management, Environment), 3.2, 4.5, 4.8, 4.10, 5.2, 18.3.2, 18.10, 18.13, 18.14, 18.15, 20.0 (in its entirety), 21.1.11 (TSF), 21.2.2, 25.7, 25.8, 25.9 (TSF, Water Management, Environment), 26.5, 26.9, 27
Bob McCarthy	SRK Consulting (Canada) Inc.	1.1, 1.11, 1.17 (Mining and Mineral Reserve), 1.19 (Mining and Mineral Reserve), 1.20 (Mining and Mineral Reserve), 2.0 (in its entirety), 12.0 (Mining and Mineral Reserve), 15.0 (not including 15.2.2), 16.0 (not including 16.1.3, 16.1.4 or 16.1.5), 18.2.2, 20.5.4, 21.1.8, 21.1.11 (Mining), 21.2.1, 25.2, 25.4, 25.9 (Mining and Mineral Reserve), 26.3, 27
Andy Thomas	SRK Consulting (Canada) Inc.	1.19 (Pit Geotechnical), 1.20 (Pit Geotechnical), 15.2.2, 25.3, 25.9 (Pit Geotechnical), 26.2 (Pit Geotechnical), 27
Cameron Scott	SRK Consulting (Canada) Inc.	16.1.3, 16.1.4, 16.1.5, 26.2 (not including Pit Geotechnical)
Neil Winkelmann	SRK Consulting (Canada) Inc.	1.14.2 (Concentrate Transport), 1.15, 1.17 (Concentrate Transport, Owner’s Costs), 1.18, 1.19 (Concentrate Transport, Owner’s Costs, Economics), 1.20 (Concentrate Transport, Owner’s Costs, Economics), 4.6, 18.12.3, 19.0 (in its entirety), 21.1.9, 21.2.4, 22.0 (in its entirety), 25.9 (Concentrate Transport, Owner’s Costs, Economics), 25.10, 26.7, 26.8

Technical reports prepared prior to NGEx/Josemaria's involvement in the Josemaria deposit include:

- Chapman, J., and Harrop, J., 2004: Summary Report for the Batidero Project, San Juan Province, Argentina: report prepared by Tamri Geological Ltd and Cyberquest Geoscience Ltd. for TNR Gold Corp, 24 August 2004.
- Harrop, J., 2005: Summary Report for the Josemaria-Batidero Project, San Juan Province, Argentina: technical report prepared by Cyberquest Geoscience Ltd. for Tenke Mining Corporation, effective date 20 April 2005.
- Nilsson, J., and Rossi, M., 2006: Preliminary Resource Estimate for the Josemaria Project, San Juan Province, Argentina: technical report prepared by Nilsson Mine Services Ltd and Geosystems International for Tenke Mining Corporation, effective date 12 January 2006.
- Nilsson, J., and Rossi, M., 2007: Exploration Update for the Josemaria Project, San Juan Province, Argentina: technical report prepared by Nilsson Mine Services Ltd and Geosystems International for Suramina Resources Inc., effective date 15 June 2007.

2.4 Effective Date

The effective date of this report is 28 September 2020, after which date no additional material information has been collected or analyzed whose exclusion would invalidate the results of the technical study.

2.5 Qualifications of the Project Team

The SRK Group comprises over 1,400 professionals, offering expertise in a wide range of resource engineering disciplines. SRK has a demonstrated track record in undertaking independent assessments of mineral resources and mineral reserves, project evaluations and audits, technical reports and independent feasibility evaluations to bankable standards on behalf of exploration and mining companies and financial institutions worldwide. The SRK Group has worked with a large number of major international mining companies and their projects, providing mining industry consultancy service inputs. SRK has extensive FS experience for open pit projects, considerable cold weather/extreme environment project experience and significant South American experience.

Fluor Canada is part of Fluor Corporation, a global diversified engineering, procurement, construction and project management (EPCM) company providing consulting, project delivery and asset management solutions to the resources, energy and infrastructure sectors.

Knight Piésold is an international consulting company providing engineering and environmental services for the mining, power, water, transportation and construction sectors. Knight Piésold has significant experience with design, environmental assessment and permitting of mining projects in Argentina and throughout South America.

2.6 Site Visit

The list of QPs and dates of their site visits are summarized in Table 2-2.

Table 2-2: List of QPs and their site visits

Qualified Person	Company	Date(s) of Site Visit
James Gray	Advantage Geoservices Ltd.	Did not visit site as it was not required for the sections of the report for which responsible
Fionnuala Devine	Merlin Geosciences Inc.	13 January – 6 February 2014, 8-21 May 2014, 4-15 March 2018, 9-27 April 2019
Jeffrey Austin	International Metallurgical and Environmental Inc.	Did not visit site as it was not required for the sections of the report for which responsible
Brian Johnston	Fluor Canada Ltd.	Did not visit site as it was not required for the sections of the report for which responsible
Marcel Bittel	Fluor Canada Ltd.	12-13 April 2019
Daniel Ruane	Knight Piésold Ltd.	18-20 February 2020
Bob McCarthy	SRK Consulting (Canada) Inc.	2-3 February 2018
Andy Thomas	SRK Consulting (Canada) Inc.	27-29 November 2018, 13-16 February 2019
Cameron Scott	SRK Consulting (Canada) Inc.	12-13 April 2019
Neil Winkelmann	SRK Consulting (Canada) Inc.	17-23 February 2017

2.7 Declaration

The opinions of SRK, Fluor and Knight Piésold contained herein and effective 19 October 2020, are based on information collected throughout the course of our investigations, which in turn reflect various technical and economic conditions at the time of writing. Given the nature of the mining business, these conditions can change significantly over relatively short periods of time. Consequently, actual results may be more or less favourable.

This report may include technical information that requires subsequent calculations to derive sub-totals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, SRK, Fluor and Knight Piésold do not consider them to be material.

SRK, Fluor and Knight Piésold are not insiders, associates or affiliates of Josemaria Resources, and none of us nor any affiliate has acted as advisor to Josemaria Resources, its subsidiaries or its affiliates in connection with this project. The results of the technical review by SRK, Fluor and Knight Piésold are not dependent on any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings.

3 Reliance on Other Experts

The QPs have relied upon the following other expert reports, which provided information regarding mineral rights, surface rights, property agreements, royalties, and taxation of this Report as noted below.

3.1 Legal - Ownership, Mineral Tenure and Surface Rights

The QPs have not independently reviewed ownership of the project area and the underlying property agreements. The QPs have also not independently reviewed the project mineral tenure and the overlying surface rights. The QPs have fully relied upon, and disclaim responsibility for, information derived from Josemaria staff and legal experts retained by Josemaria Resources Inc. for this information relating to legal ownership, based on the following document:

- Nicholson y Cano Abogados – Title Opinion Letter to A. Lundin, 9 October 2020

This information is used in Section 4 of the Report and provides the ownership status to support the mineral resource estimate declared in Section 14, the mineral reserve estimate declared in Section 15 and the financial analysis described in Section 22.

3.2 Environmental and Political

The QPs have reviewed and relied upon project environmental and political information including, but not limited to, the following document:

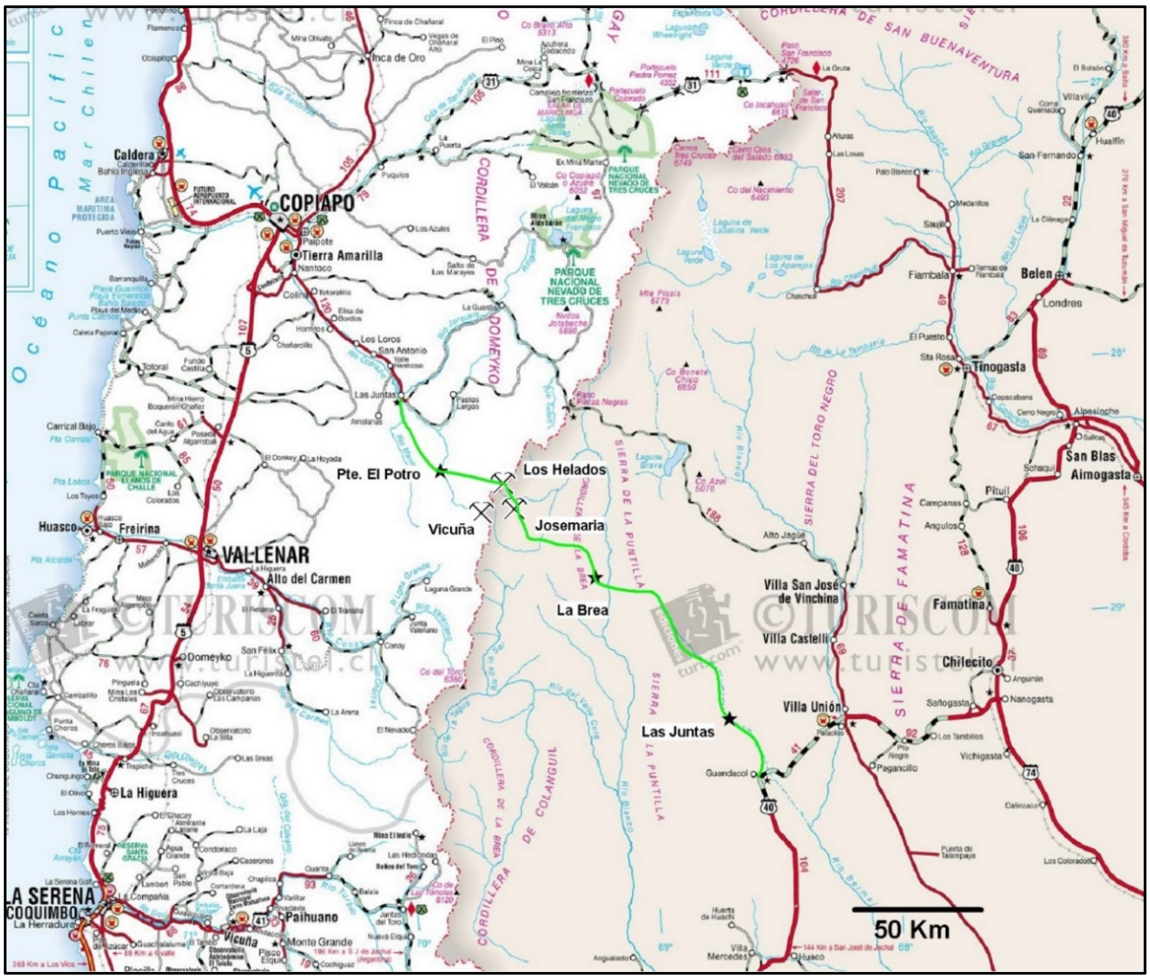
- Josemaria Copper-Gold Project, Feasibility Study Report - Chapters 10, 11 and 12 as written by Gonzalo Rios (Director – Environmental Affairs, Josemaria Resources Inc.), 28 September 2020

This information is used in Section 20 of the Report.

4 Property Description and Location

4.1 Location

The Josemaria deposit is located approximately 145 km southeast of the city of Copiapó, Chile, across the international boundary in San Juan Province, Argentina. The deposit is centred at 28.4359º S, 69.5486º W (Figure 4-1). The total area of the property is approximately 16,425 ha. There is some uncertainty as to the exact area due to the northern boundary, which is along the currently undefined border between La Rioja and San Juan provinces, but this does not impact the project area or any associated infrastructure.



Source: Josemaria, 2018

Figure 4-1: Project location and access map

4.2 Economic and Political Context

Argentina elected a new government in 2019 taking power on December 10. The government is a combination of Peronism and social democracy, considered to be centre-left/left wing on the political spectrum. Josemaria has engaged in positive dialogue with the government to date and by all accounts expects government support of the project. Mine permitting and public perception vary by province within Argentina, much more so than in other countries in South America. This is partially due to mineral resources being under provincial ownership and stewardship, with the extraction also being primarily regulated by the provincial authorities. The San Juan government is considered a mining-friendly jurisdiction within the context of Argentinian provinces, ranking 21 out of 76 in the annual survey of top mining jurisdictions from the Fraser Institute in 2019.

Argentina is currently experiencing hyperinflation climbing above an annualized rate of 50% in 2019. The country has experienced hyperinflation in the past including a period between 1975 and 1990 where it had an average annual inflation rate of 300%. While the government is taking steps to reduce inflation, it is not easy to forecast how successful the strategies will be. From January 2020 to July 2020, annualized inflation has progressively decreased from over 50% to 40% on an annualized month-to-month basis.

4.3 Ownership and Mineral Tenure in Argentina

4.3.1 Ownership

Ownership of the Josemaria project area, mineral tenure and surface rights was reviewed and confirmed by Nicholson y Cano Abogados in a letter titled “Mining properties of the Argentine subsidiary of Josemaria Resources Inc. Desarrollo de Prospectos Mineros S.A.(‘Deprominsa’) – Proyecto Josemaria – San Juan-Argentina” addressed to A. Lundin, dated 9 October 2020.

4.3.2 Mineral Tenure

The Josemaria Project is located in the Iglesias Department of the Province of San Juan, in the area called “Usos Multiples”, which is the marginal area of the San Guillermo Provincial Reserve where mining activities are fully authorized.

Under the Argentine Mining Code, two types of permits can be granted: exploration permits (cateos and Manifestaciones de Descubrimientos) and exploitation permits (concesións de explotación or minas).

Exploration Permit (Cateo)

Cateos typically are awarded in units of 500 ha, termed the measurement unit. Holders may acquire a maximum of 20 measurement units (10,000 ha), but may not hold, in aggregate, any more than 400 measurement units (200,000 ha) in any one Province.

Grant of an exploration permit gives the holder the right to explore and prospect within the measurement unit boundary, for a 150-day period. The term is extended by 50 days for each additional measurement unit that has been granted, with the largest possible term being 1,100 days. However, once 300 days have been reached, where the holding is over four measurement units the holder must relinquish half of the land. At the 700-day point, the holder must relinquish half of the remaining measurement units.

Prior to the grant of an exploration permit, holders must pay a one-off fee of ARS$400 for each measurement unit requested and provide a work plan and commit to starting that work program within 30 days of permit grant. Compensation must be paid to landowners inconvenienced by any exploration activities. An activities report must also be provided to the appropriate regulatory authorities within 90 days after expiry of the measurement unit.

Exploration Permit (Manifestación de Descubrimiento)

Manifestación de Descubrimiento (MD) is also an exploration license and the first step towards obtaining mining rights. The registration of the MD guarantees the right of the holder to have preference over the area. By petitioning an MD the holder is informing the Mining Authority that they have discovered a potentially economic mineral orebody (whether there was a prior cateo or not). The holder has 100 days (which may be extended) as from the registration to file the "labor legal", which is the location of the point of discovery within the area. The maximum area of an MD is 3,500 hectares. The mining fee ("canon") is AR$3,200 per 100 hectares per year and the obligation to pay begins three years after registration of the MD.

Exploitation Permit (Mina)

Exploitation permits allow for mining activity. Holders must initially apply for a discovery claim (manifestación de descubrimiento) and the application is advertised for public comment.

The measurement unit area for such claims, the pertenencia, will vary depending on the mineralization to be exploited. Claims over gold, silver, and copper, and, generally, hard rock minerals deposits (e.g., vein-style and discrete deposits) are typically 6 ha in extent; however, disseminated mineralization style deposits may see claim sizes reach a maximum of 100 ha. Exploitation permits can consist of one or more pertenencias.

Exploitation permit grant is contingent on a number of factors, including:

- Provision of official cartographic coordinates for the deposit and the area required for operating facilities
- Provision of a sample of the mineral discovered
- Approval of an Environmental Impact Assessment (EIA)

Approval and registration of the legal survey request by the relevant Provincial mining authority constitutes formal title to the exploitation permit. Assuming mining is active, and all other requirements are met, exploitation permits can have an indefinite grant period.

After three years from the date the discovery claim was registered, an annual fee (canon) becomes payable. The amount of the annual canon depends on the pertenencia size, and ranges from ARS$80 for the 6 ha pertenencias, to ARS$800 for the 100 ha pertenencias.

A further condition is required of a holder, which is to invest, at a minimum, 300 times the value of the annual canon in fixed assets on the exploitation permit over a five-year period. Twenty percent of the required investment must be made each year for the first two years of the designated investment period. For the final three years, the remaining 60% of the investment requirement is at the holder's discretion as to how it is expended. The exploitation permit can be cancelled if the minimum expenditures are not met in the manner stipulated.

Permits may also be cancelled if mining activity ceases for more than four years and the holder has no plans to reactivate mining within a five-year period.

Josemaria Mineral Tenure

The Nicholas y Cano letter confirms that eight mine concessions and one exploration concession (Table 4-1) are registered with the Mining Notarial registry of San Juan and owned by Deprominsa, a wholly-owned Argentinian subsidiary of Josemaria Resources. These concessions comprise the Josemaria deposit and the surrounding area, known henceforth as the Josemaria Project. Total holdings cover an area of approximately 16,425 ha.

Table 4-1: Mineral tenure – Josemaria

Concession	Type	Agreement	File Number	Area (Ha)	Mining Units	Annual Fee (ARS)	5 Year Investment (ARS)
Cateo	Cateo	Lirio	546.502-D-94	5,011			
Rio Blanco 1	Mina	Lirio	520-0347-D-99	271	3	9,600	2,880,000
Josemaria 1	Mina	Lirio	414280-L-04	1,222	13	41,600	12,480,000
Josemaria 2	Mina	Lirio	414281-L-04	1,500	15	48,000	14,400,000
Josemaria 3	Mina	Lirio	1124.284-D-14	2,054	21	67,200	20,160,000
Vicuña 4	Mina	Filo	520-0447-B-99	1,033	11	35,200	10,560,000
Nacimiento 2	Mina	Filo	1124-285-F-14	291	3	9,600	2,880,000
Batidero I	Mina	Batidero	425066-C-01	2,656	27	86,400	25,920,000
Batidero II	Mina	Batidero	425065-C-01	2,387	24	76,800	23,040,000

The Josemaria deposit itself is located almost entirely within the Josemaria 1 concession as shown in Figure 4-2. There is a very small portion of the ultimate pit that falls within the Batidero I concession.

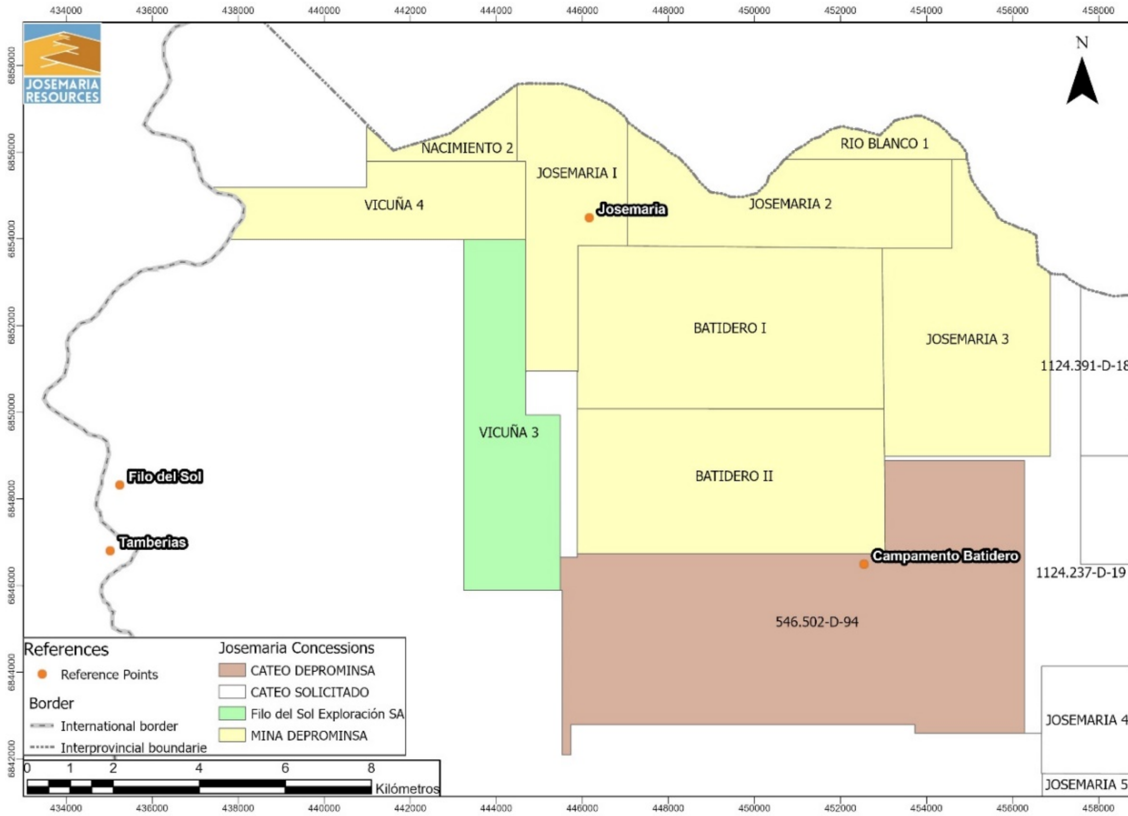
4.4 Surface Rights

The Argentine Mining Code (AMC) sets out rules under which surface rights and easements can be granted for a mining operation, and covers aspects including land occupation, rights-of-way, access routes, transport routes, rail lines, water usage and any other infrastructure needed for operations.

In general, compensation must be paid to the affected landowner in proportion to the amount of damage or inconvenience incurred. However, no provisions or regulations have been enacted as to the nature or amount of the compensation payment.

In instances where no agreement can be reached with the landowner, the AMC provides the mining right holder with the right to expropriate the required property.

Josemaria Resources currently has an occupancy easement for the Batidero camp and a road right-of-way, which provides access to the work area. Part of the road right-of-way is within private property. The remainder of the road and the camp fall within the multiple usage area that has been designated by the San Guillermo Provincial Reserve. Multiple usage includes allowances for mining activities.



Source: Josemaria, 2020

Figure 4-2: Mineral tenure map

4.5 Environmental Regulations

Minimum environmental standards are enacted federally, with Provincial governments able to enact supplementary legislation to these minimum standards. The AMC incorporates National Law No. 24.585, key features of which include:

- An environmental impact statement (EIS) must be filed with the relevant regulatory authority
- The AMC has adopted a sectorial approach, in that each mining stage, including prospecting, exploration, exploitation, development, extraction, storage and beneficiation phases, as well as mine closure, require separate environmental impact reports (EIRs), each of which are reviewed separately prior to any approval
- If the EIS meets the relevant requirements under National Law No. 24.585, an environmental impact declaration (EID, or DIA [Declaración de Impacto Ambiental] in Spanish) will be granted; this allows work to commence
- EIDs have a two-year duration, and a set of conditions and requirements that must be met to keep the EID current

Provinces may also have their own, additional, requirements relating to EIS preparation.

Provinces also regulate the generation of hazardous waste, water extraction for mining purposes, liquid effluent discharges, and soil protection. Some Provinces (e.g. Chubut and Mendoza) have banned open pit mining and/or the utilisation of cyanide and other chemicals in the mining process. Open pit mining and the use of cyanide are both permitted in San Juan Province.

4.6 Taxation, Royalties and Option Agreements

4.6.1 Corporate Income Tax

A corporate tax rate in Argentina of 25% was presumed to be in place when the project is in production.

4.6.2 Provincial Mining Royalties

There is a 3% pithead value royalty payable to the Province of San Juan. The pithead value is defined as the value obtained during the first selling stage, less the direct and/or operating costs necessary for taking the pithead mineral to such stage, except for the direct or indirect costs and/or expenses inherent to the extraction (mining) process. Costs that are deducted include: transport, freight and insurance costs of concentrate; concentrate selling costs; smelting and refining costs; crushing, milling and beneficiation costs; and administration costs. The cost to mine the material cannot be deducted nor can depreciation.

4.6.3 Option Agreements

The Josemaria project is subject to three underlying agreements: the Lirio agreement, the Batidero agreement and the Filo agreement. Table 4-1 indicates which concessions are incorporated in each agreement.

Lirio Property Agreement

The Lirio property was acquired from the Lirio family through an exploration agreement with an option to purchase, dated 15 July 2003. This option was exercised on 25 June 2009 for US$813,000.

Josemaria holds a 100% interest in the property, subject to a 0.5% net profit interest (NPI) royalty (for a period of 10 years), and an additional $2M payment within six months of the completion of the second full year of mine operations.

The Lirio property agreement covers the area of the mineral reserve estimate for the Josemaria deposit and has been applied to the economic model of the project.

Batidero Property Agreement

The Batidero property was acquired through an agreement with Compania Minera Solitario S.A. dated 1 July 2002 and transferred to DPM through public deed No. 01 dated 4 January 2013. Josemaria holds a 100% participating interest in the Batidero property, subject to a 7% net profit interest.

Only approximately 0.3% of the currently estimated mineral reserve for Josemaria falls within the Batidero property agreement. This portion of the mineral reserve is entirely within the final phase of the current mine plan. Due to the immateriality of the impact of this royalty on project economics, it has not been explicitly modelled within the current economic model. During the operation phase the area for this concession will be surveyed so that proper accounting procedures can be implemented to ensure the owner of this royalty is compensated appropriately according to the details of this agreement.

Filo Property Agreement

The Filo property was acquired from Filo del Sol Exploración S.A. through an agreement dated 11 January 2018. Josemaria holds a 100% interest in the Filo property subject to a 3.0% NSR royalty in favour of Filo del Sol. Josemaria has the right to buy back 2% of the NSR for $2 million.

The currently estimated mineral reserves for Josemaria do not fall within the Filo property agreement.

4.7 Josemaria Permits

Surface exploration work in the Josemaria area is permitted under a DIA. The original DIA application was submitted on 10 November 2006 for the Josemaria 1 and 2 exploitation concessions (minas) and was granted on 16 November 2010 under Resolution 287-SEM-2010.

On 20 November 2012, an amendment request was filed to include the Rio Blanco 1 exploitation concession (mina) in the DIA. The Environmental Impact Report for the Batidero exploitation concessions was filed on 30 April 2007, and the DIA was granted on 5 August 2008.

4.8 Josemaria Environmental Liabilities

Existing environmental liabilities are limited to those associated with exploration-stage properties and would involve removal of the exploration camps and rehabilitation of drill sites and drill site access roads.

4.9 Mining Integration and Complementation Treaty

On 29 December 1997, Chile and Argentina signed the "Tratado entre la República de Chile y la República Argentina sobre Integración y Complementación Minera" (Mining Integration and Complementation Treaty between Chile and Argentina; or the Treaty), in an effort to strengthen their historic bonds of peace and friendship and intensify the integration of their mining activities.

The Treaty provides a legal framework to facilitate the development of mining projects located in the border area of both countries. The Treaty objective is to facilitate the exploration and exploitation of mining projects within the area of the Treaty.

On 20 August 1999, Chile and Argentina subscribed to the Complementary Protocol and on 18 July 2001, an Administrative Commission was created. Additional Protocols have been signed between Chile and Argentina, which provide more detailed regulations applicable to specific mining projects.

One of these Protocols, and the first granted for exploration purposes, is Josemaria's "Proyecto de Prospección Minera Vicuña" (Vicuña Mining Prospecting Project), dated 6 January 2006. This Protocol allows for prospecting and exploration activities in the Josemaria area. The main benefit of the Vicuña Protocol is the authorization that allows for people and equipment to freely cross the border of both countries in support of exploration and prospecting activities within an area defined as an "operational area".

In September 2012, the "Proyecto de Prospección Minera Vicuña" was amended by the "Protocol of Amendment to Article 8". With this amendment, the defined "operational area" was expanded, enabling a new border crossing area to be demarcated.

4.10 Closure Considerations

Closure must be covered by submission of a new EIR, or an update/amendment to an existing approved EIR. The document must include details of the proposed environmental rehabilitation, reclamation or adjustment activities, and discuss how post-closure environmental impacts will be avoided. The EIR must include data on post-closure monitoring, but current regulatory requirements do not entail submission of formal closure plans.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Accessibility

5.1.1 Current Access

The Josemaria project area is accessed from San Juan by major provincial highways north through San Jose de Jachal to the town of Guandacol (in La Rioja Province) followed by approximately 150 km of regional unpaved roads and trails (Figure 4-1). Josemaria is approximately 10 hours drive from the city of San Juan.

Alternate access from Chile is provided through the Mining Integration and Complementation Treaty between Chile and Argentina. This treaty allows personnel and equipment to access the Josemaria area from Chile, providing that they also return to Chile and do not cross out of the Treaty area into Argentina. Josemaria is approximately four hours drive from the city of Copiapó.

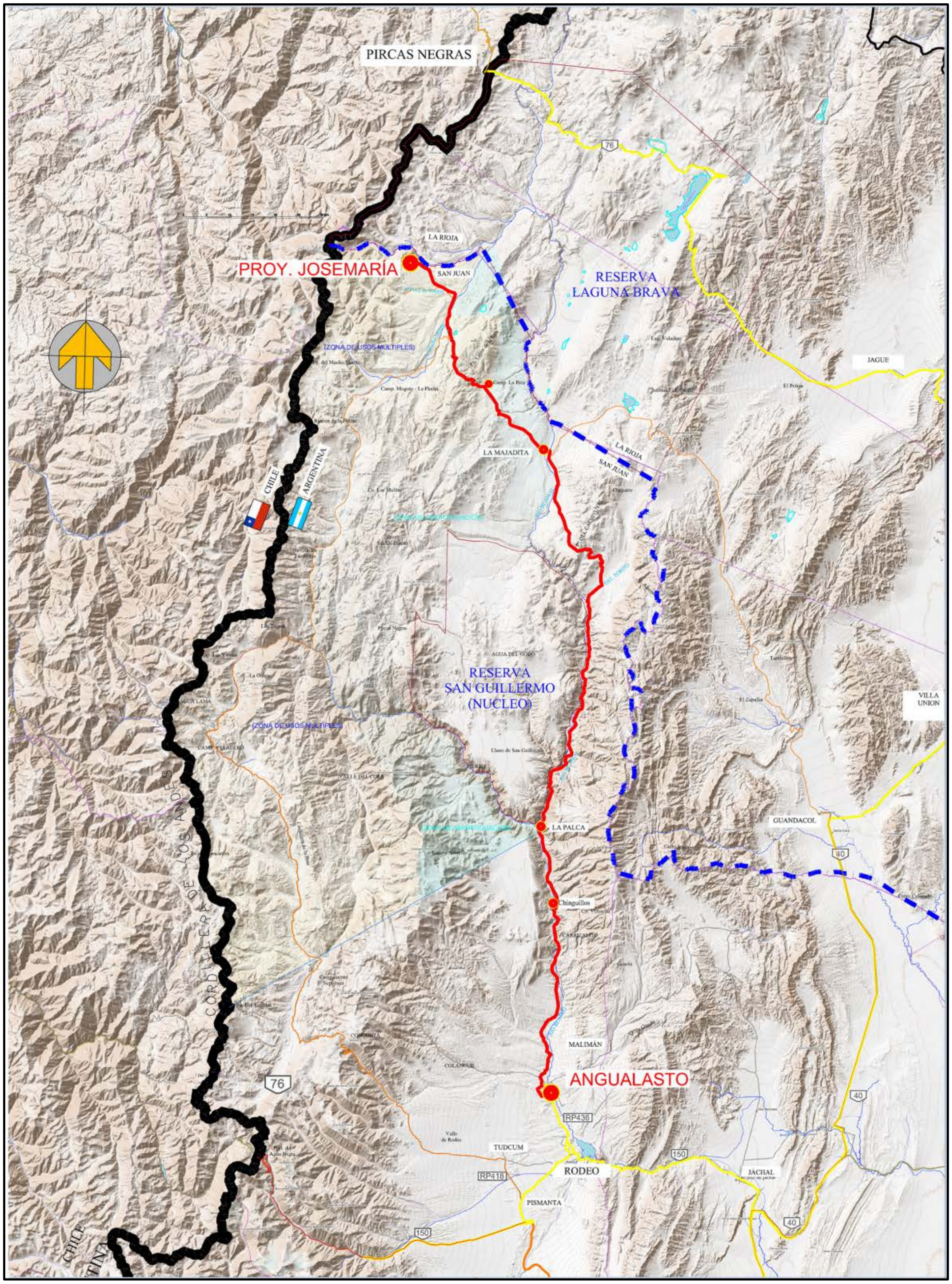
The C-35 paved road from Copiapó passes in a southeasterly direction through the town of Tierra Amarilla and Punta del Cobre, along the Copiapó River valley, through the small villages of Pabellon, Los Loros, La Guardia, and Iglesia Colorada. After these small villages, the road continues towards the El Potro bridge. At about kilometre 130, the paved road ends, and the remaining road to the project area is gravel. Access is generally possible during the summer months from September to May but may be curtailed if there is inclement weather.

5.1.2 Future Access (Construction and Operation)

The main access during construction and operations will be via a planned new 244 km access road that will connect the site to the town of Rodeo in Argentina, which is located close to the RN40 connecting to San Juan. The total driving distance from site to San Juan is approximately 460 km and will take approximately seven hours to traverse. This access road is planned to be the main access to site during construction and operations.

The main access road alignment is shown in Figure 5-1 below. This route passes along two-laned paved roads from San Juan to the north via RN40, turning off onto RN150 at San Jose to Jachal and then along to Rodeo. From Rodeo the route becomes two-lane gravel for the remainder of the distance to site. Construction supplies will be brought to site along this route and concentrate will be transported along this route during operations. In San Juan, trains will be loaded with concentrate on the Trenes Argentinos Cargas line and will be sent via Mendoza to the port at Rosario.

An airstrip was considered as an option for transferring personnel from San Juan and a suitable site is available, however the project has not considered an airstrip within the current scope.



Source: Ruiz, 2020

Figure 5-1: Access road alignment

5.2 Climate

The climate in the Josemaria area is dry to arid and the temperatures are moderate to cold.

Recent site-specific meteorological studies have been conducted for the project (Knight Piésold, 2019). A summary of the calculated climate metrics follows:

- The long-term mean annual temperature for the Project area is estimated to be -1.9 °C, with monthly mean temperatures ranging from a high of 7.3 °C in January 2017 to a low of -21.3 °C in June 1978
- The mean annual wind speed at the Project area is approximately 4.6 m/s, with wind speeds exceeding 7.5 m/s approximately 15% of the time. The prevailing wind directions during all seasons are the south, the west and the northwest, with the strongest winds typically out of the northwest and weakest out of the south.
- Maximum average incoming solar radiation occurs in December and minimum incoming solar radiation occurs in June, with respective rates of approximately 9.8 kWh/m2 and 3.5 KWh/m2
- Relative humidity is low all year round, with an annual average value of 23.6% and mean monthly values ranging from a low of 16.2% in December to a high of 30.5% in February
- Estimates of mean annual potential evapotranspiration for the project site vary considerably, ranging from 356 mm to 1,210 mm
- The mean annual precipitation during the period of 2015 to 2018 was 218 mm. Years 2015 and 2017 were likely influenced by an El Niño climate cycle, and thus the average from this period likely greatly overestimates long-term average conditions.
- The long-term average precipitation for the site is estimated to be approximately 105 mm, with annual totals over a 51-year period ranging from a minimum of 0 mm to a maximum of 590 mm. This average value is derived from a data over a period that contains many El Niño Southern Oscillation cycles and thus is assumed to be a reasonable long-term estimate.
- Precipitation is unevenly distributed throughout the year, with the majority of the precipitation falling during the austral winter months of May through to August
- The 100-year 24-hour precipitation is estimated to be 129 mm
- It is estimated that, on average, snow is present on the ground for approximately 5% to 20% of the year, with most of that time occurring during the austral winter months
- The mean annual sublimation for the project is estimated to be 69 mm, which is assumed to be distributed fairly evenly during the austral winter months of April to August

5.3 Local Resources and Infrastructure

The Josemaria project is a new minerals industry development. The most important logistics centre in the region is San Juan, which has a population of about 700,000 people. San Juan has a domestic airport with daily scheduled flights to Buenos Aires. The city of Mendoza, approximately 170 km (2.0 hours driving time) south of San Juan city, has an international airport with flights to Santiago and elsewhere internationally and within Argentina. The nearest city in Chile is Copiapó, which has approximately 175,000 people and is a regional mining hub with access to mining materials and skilled labour as well as a modern airport with several daily flights to Santiago.

There is no infrastructure in the immediate area except for Josemaria's Batidero exploration camp, which is located 7 km south of the Josemaria deposit at an elevation of approximately 4,000 masl. The camp consists of transportable accommodation, messing, office, storage and medical structures with associated infrastructure for septic, sewage disposal, water distribution and electricity generation. It is currently configured to house approximately 210 people but will be expanded to include an additional 100 beds during the early works program of the project.

5.4 Physiography

The Josemaria deposit is located in the high Andes within the San Juan province of Argentina, 9 km east of the Chile-Argentina border. The deposit is centred at 28.4359º S, 69.5486º W. Elevations range from approximately 4,000 metres above sea level (masl) at the valley bottom to 4,900 masl at the ridgetop immediately south of the Josemaria deposit. Topography is mountainous, typically comprised of broad, flat-bottomed valleys with moderately steep slopes.

Terrain in the Josemaria area and near the proposed processing plant site varies from broad flat alluvial plains one kilometre or wider, to rounded ridges and peaks with varying steepness. The plant site and infrastructure can be readily accommodated on the alluvial plains. Colluvial cover thickens on lower slopes and in places fresh outcrop is difficult to locate. The Josemaria deposit itself underlies a north–south-trending ridge that lies along the southern side of the broad Rio Blanco river valley.

6 History

There is no record of significant exploration activity at Josemaria prior to NGEx Resource's interest. The deposit was discovered by NGEx in 2004.

There is no reported production from the project area.

Prior to 2001 there is no known history of mineral exploration fieldwork or mining on the Josemaria property other than several regional prospecting programs conducted during the 1990s that probably collected talus or drainage samples, and a program of LANDSAT imagery interpretation, which identified a large area that had spectral response characteristics of hydrothermal alteration.

This activity prompted Sr. Lirio, a local landholder, to acquire the mineral rights for various areas, including Josemaria.

Rights to the Lirio holdings were acquired by Solitario Resources in 1993, and a small amount of prospecting work was completed in the claims area. At the time, the area was referred to as Cateo 17 or the Arroyo Batidero project.

During 1998, Toscana Resources Ltd, (later TNR Resources Ltd, and now TNR Gold Corp) took over Solitario. Exploration work recommenced in 2000, when Solitario had concluded a joint venture exploration agreement with Barrick Exploraciones de Argentina S.A. (BEASA). The agreement created a joint venture, Compania Minera San Juan S.A. (CMSJ). However, when the joint venture was dissolved in 2001, CMSJ was deregistered and the mineral tenure returned to Solitario's ownership.

In June 2002, the parent company of Solitario (then called TNR Resource Ltd) signed an option agreement with Tenke Mining Corporation (now NGEx Resources Inc.). In July 2019, NGEx Resources Inc. changed its name to Josemaria Resources Inc. and retained ownership of the Josemaria property.

The Josemaria deposit was discovered during the initial drilling campaign in the 2003-2004 field season. The first hole drilled encountered 280 metres grading 0.61% copper and 0.51 g/t gold. The initial exploration hole was targeted based on the coincidence of geochemical and geotechnical anomalies.

Work conducted by Josemaria Resources and precursor companies has included reconnaissance prospecting, geological mapping, talus fines sampling, rock chip and trench sampling, ground-based magnetic, controlled source audio-magneto telluric (CSAMT) and induced polarization (IP)–resistivity geophysical surveys, reverse circulation (RC) and core drilling, and metallurgical testwork.

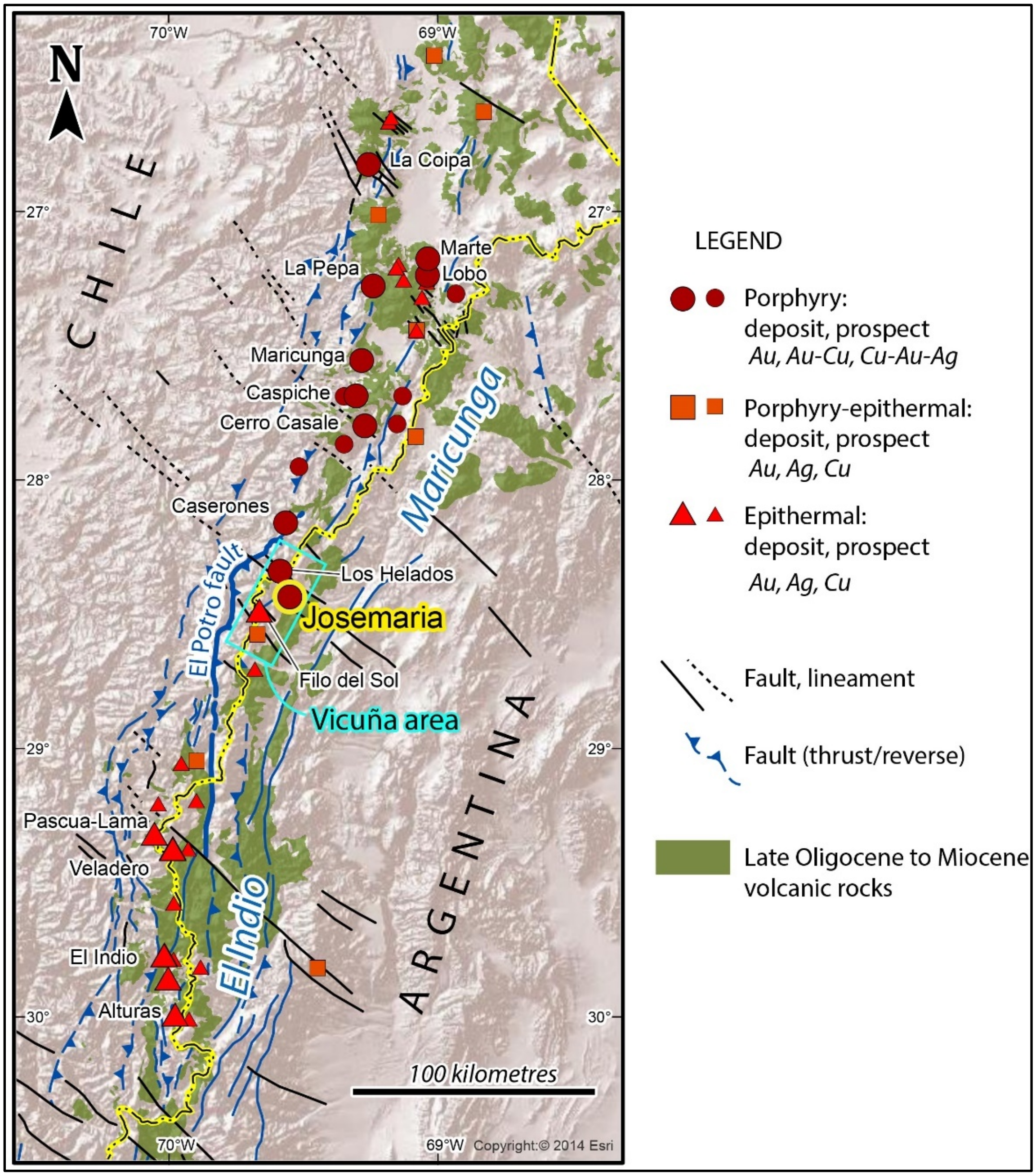
A resource estimate was completed in 2006 and updated in 2007, 2012, 2013, 2015 and 2016. A subsequent update is included in Section 14 of this Report.

Project engineering studies completed to date include a Preliminary Economic Analysis of a project that contemplated joint production of the Josemaria deposit and the Los Helados deposit (AMEC Foster Wheeler, 2016 - Project Constellation) in 2016, followed by a Pre-Feasibility Study (SRK, 2019b), which was completed in 2018, on a stand-alone operation at Josemaria.

7 Geological Setting and Mineralization

7.1 Regional Geology

The Vicuña area in the central Andes encompasses the crest of the range along the Chile-Argentina border and the area eastward into Argentina at approximately 28.5° N (Figure 7-1). It lies within the present-day non-volcanic segment of the Andes, correlative with the flat-slab portion of the subducted Nazca plate.



Source: Josemaria, 2019

Figure 7-1: Map showing part of the Late Oligocene to Miocene porphyry-epithermal belt

Basement rock in the area includes Permian-Triassic granitic and rhyolitic volcanic rocks, intruded by Triassic tonalite-diorite intrusive complexes. The Triassic extensional rift basin deposits and the Jurassic – Early Cretaceous backarc basin sedimentary rocks that are found farther north are not present in the area, and Eocene volcanic and intrusive rocks are preserved only to the east and north. Latest Oligocene to Miocene porphyry intrusions and associated porphyry Cu-Au and epithermal mineralization occur primarily within the Permo-Triassic basement rocks, but also locally within relatively small remnants of Late Oligocene to Miocene sedimentary and volcanic rocks where they have escaped erosion.

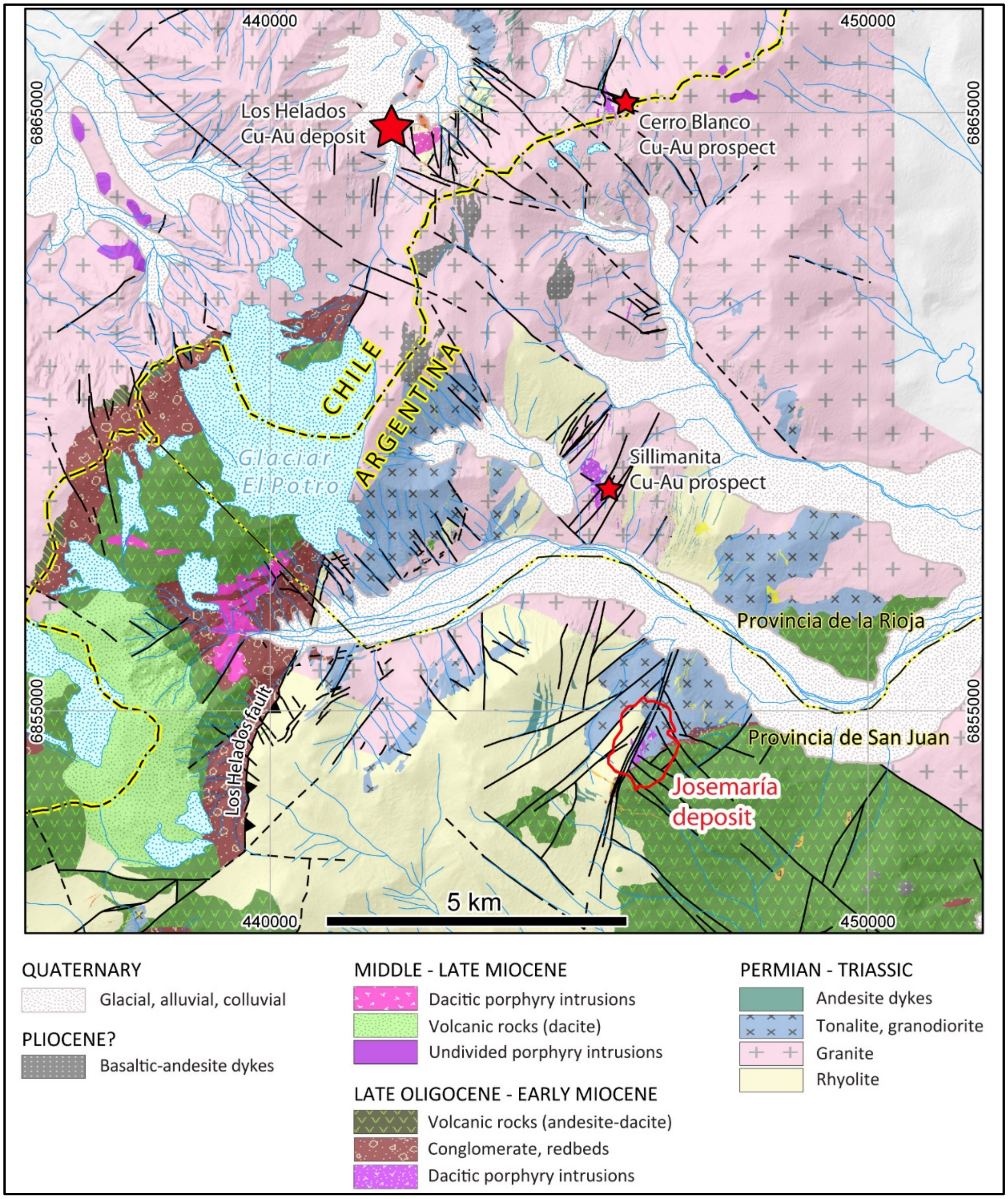
A high degree of tectonic inversion in the area has led to the predominant exposure of basement rocks, and the lack of preservation of overlying sedimentary and volcanic sequences. Faults related to extension during pre-Andean and early Andean arc development were reactivated as early as Late Oligocene, followed by a main pulse of compression and inversion as high-angle reverse faults in the Miocene. The Potro fault is a significant reverse structural feature in the region, responsible for a large degree of upthrow of the Paleozoic basement rocks to the west creating a juxtaposition with younger sedimentary units.

Mineral exploration is focused on copper and gold mineralization related to porphyry and epithermal systems developed during the Late Oligocene to Miocene compressive stages of Andean arc development. The Maricunga belt to the north is notable for its porphyry Au-Cu systems and the El Indio belt to the south, including Pascua Lama, hosts world-class high-sulphidation epithermal deposits. The Vicuña area has historically been overshadowed by these two high-profile metallogenic belts, partly due to the lack of preservation of extensive Miocene volcanic rocks, which was incorrectly interpreted by some to reflect a paucity of Miocene mineral deposits. Mpodozis and Kay (2003) proposed that the Vicuña area is in fact prospective for porphyry Cu-Au and epithermal systems, and subsequent work by Josemaria Resources has shown this to be the case, with the discovery of the Josemaria, Filo del Sol and Los Helados deposits with Late Oligocene to Late Miocene ages. While the contemporaneous volcanic rocks have been largely removed through erosion, the porphyry and local epithermal systems remain, although they are developed within the basement and older sedimentary rocks, rather than within Late Oligocene to Miocene volcanic sequences.

7.2 Project Geology

The Josemaria project area is underlain most extensively by Permo-Triassic rocks assigned to the Choiyoi Group, which forms the Andean basement in the region (Figure 7-2). They include volcaniclastic and ignimbritic rhyolites as well as broadly equivalent granites. Triassic intrusive complexes of tonalite, diorite and granodioritic composition intrude the rhyolites and granite. Swarms of andesite dykes, which are typical of the Permo-Triassic in this region, cut the older Permo-Triassic units.

Inferred Late Oligocene to Miocene sedimentary and volcanic rocks are located in the western part of the area, to the west of Josemaria, in the footwall of the Los Helados fault near the crest of the range. Similar Late Oligocene sedimentary and volcanic rocks also occur overtop and to the east of Josemaria, preserved in the relatively low-lying Macho Muerto basin.



Source: NGEx, 2018

Figure 7-2: Regional geological map of part of the Vicuña area

Regional faults, such as the Los Helados fault, were active as early as Late Oligocene, but particularly post-20 Ma (million years ago) when the most significant compressive stage of Andean mountain building began. The uplift due to this compressive event is responsible for the more deeply eroded nature of the area, exposing the basement rocks through erosion of the Late Oligocene to Miocene sequences.

Porphyry intrusive rocks and associated porphyry and epithermal mineralized systems are largely hosted within basement rocks. Late Oligocene systems form a north-south trend extending from

Josemaria to the Sillimanita and Cerro Blanco Cu-Au porphyry prospects formed around similar dacitic intrusions. Middle Miocene systems such as the Filo del Sol porphyry-epithermal Cu-Au-Ag deposit and the Los Helados porphyry Cu-Au deposit occur several kilometres westward.

7.3 Deposit Description

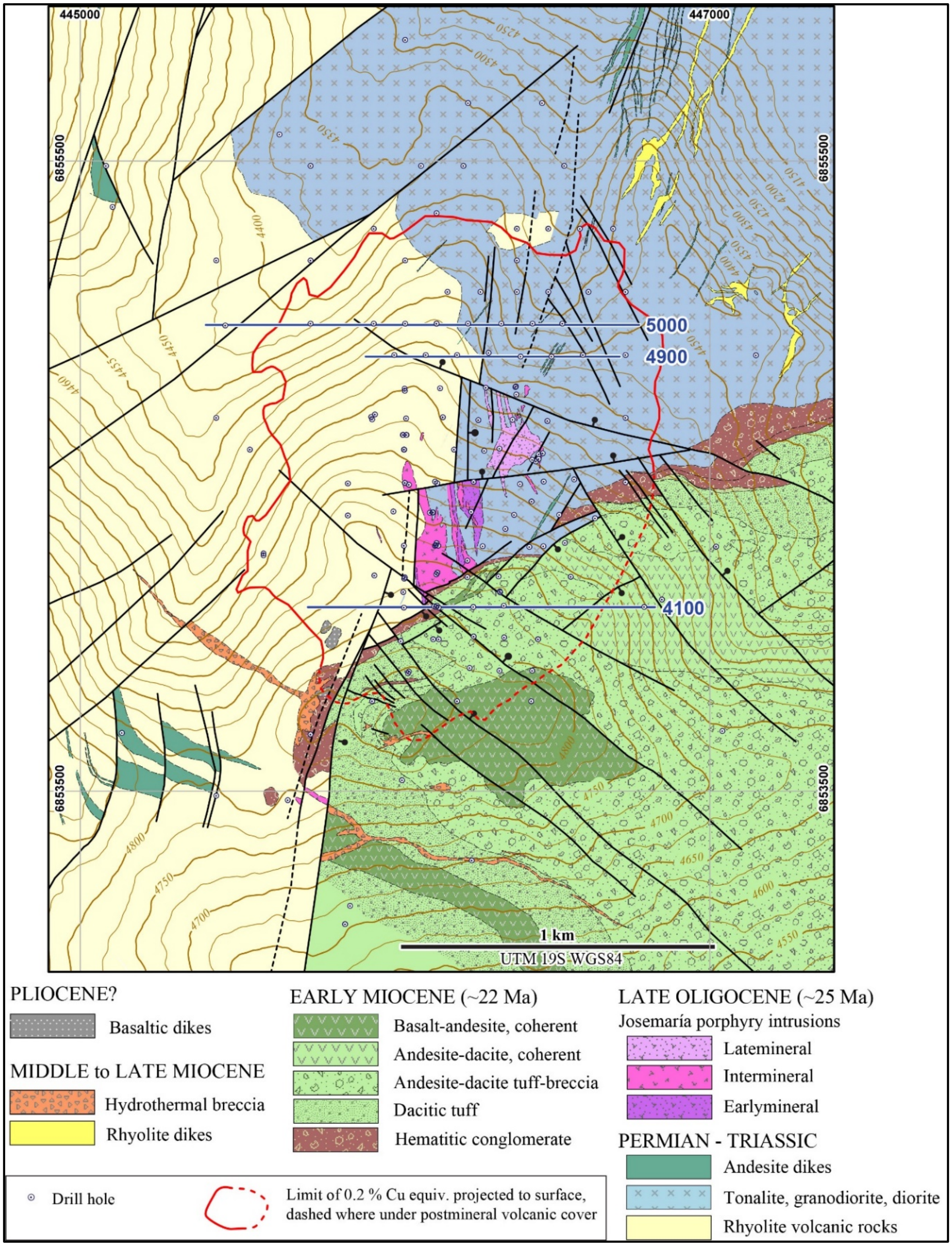
The Josemaria porphyry copper-gold deposit is centred on a Late Oligocene dacitic porphyry intrusive complex emplaced into Permo-Triassic rhyolite and tonalite (Figure 7-3). Porphyry ascent and localization appears to have been guided by a pre-existing north-south structural zone.

The deposit was developed within and around the upper parts of the porphyry intrusions at ~24.5 Ma (Sillitoe, et al., 2019). Disseminated and vein-related chalcopyrite with minor bornite occurs within the domain of sericite-chlorite-clay alteration overprinting earlier potassic, centred on a multiphase porphyry intrusive complex. The upper part of the deposit is enhanced by overprinting high-sulphidation mineralization including hypogene chalcocite and covellite, which upgrades the copper values and correlates with an increase in gold values.

Although the deposit formed at ~24.5 Ma, it was rapidly unroofed and overlain by a redbed conglomerate unit and post-mineral volcanic rocks by 22 Ma (earliest Miocene). This rapid unroofing is evident in the high degree of telescoping of alteration and mineralization within the system and the lack of a well-developed leached cap below the Late Oligocene erosional surface. The conglomerate at the erosional contact contains sulphide mineralized clasts that were not oxidized, an indication of lack of time for penetrative leaching. Deposition of the earliest Miocene post-mineral volcanic rocks effectively halted rapid erosion into the porphyry system. It remained buried beneath Miocene post-mineral volcanic cover until it was exposed during the recent development of the modern erosional surface.

A significant, post-mineral north-northeast fault system trends through the centre of the deposit. It is inferred to be a reactivated pre-mineral structure that guided porphyry emplacement, that now forms a structural zone with inferred early (pre-22 Ma) high-angle reverse motion, but most recent down-to-the-east normal displacement on the order of 100 to 200 metres. A set of northeast-trending faults have disrupted the contact between the mineralized rocks and the overlying post mineral sedimentary and volcanic rocks, with normal displacement down to the east. A series of northwest-trending faults also cut the overlying post-mineral volcanic rocks, with similar normal displacement to the northeast. These northwest-trending structures, while responsible for relatively minor recent offsets of the mineralized domains within the deposit, locally offset the supergene copper enrichment blanket, indicating relatively young displacement.

The majority of supergene copper enrichment has developed since the most recent erosion into the deposit through the post-mineral volcanic rocks. The supergene profile varies greatly in thickness and is most strongly developed within the main N-S structural zone through the central part of the deposit. Damage zones along faults allowed for downward flow of the copper-charged surface waters, whereas the areas away from faults remained relatively impermeable due to retention of sulphate veins or low fracture density. The supergene mineralization in the deposit developed immediately over top of the hypogene zones with little evidence for lateral transport or exotic copper mineralization.



Source: After Sillitoe et al., 2019; mapping by F. Devine, 2014, updated following geological modelling 2019.

Figure 7-3: Josemaria geology map

7.3.1 Lithologies

The host rock units in the Josemaria area are assigned to the Permo–Triassic Choiyoi Group. To the west of the main Josemaria NNE structure, rhyolite ignimbrite and tuff-breccia form the predominant unit at surface (Figure 7-4). Bedded volcaniclastic textures are mapped locally and welded, black to cream coloured, quartz and feldspar-phyric rhyolite with an aphanitic groundmass is common where primary textures are preserved. These volcaniclastic rhyolites overlie, and are interpreted to be intruded by, the tonalite-granodiorite unit.

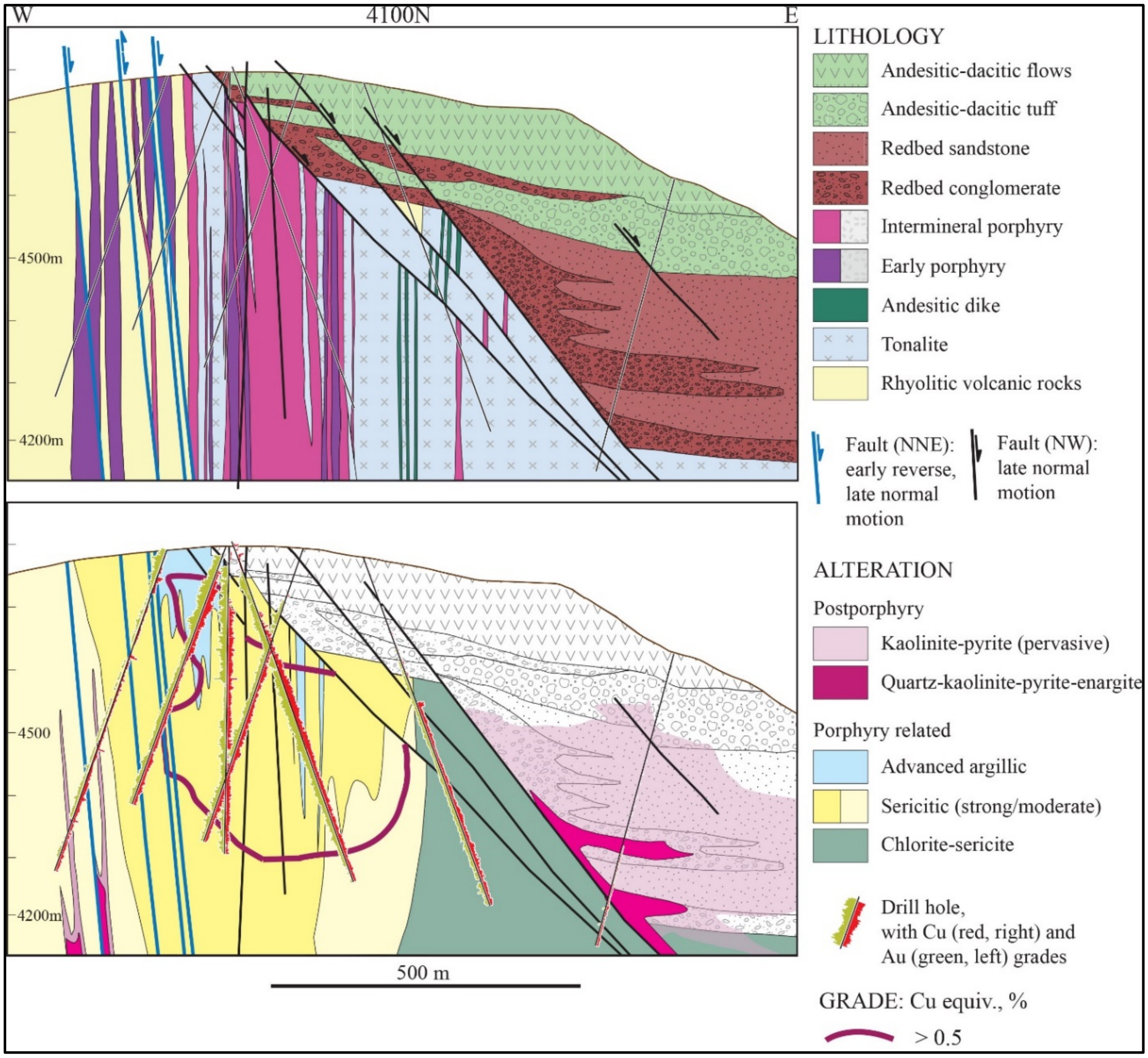
Tonalite, granodiorite, and diorite intrusive rocks are exposed on the northern and eastern sides of Josemaria. They are medium- to coarse-grained and equigranular with varying quartz content.

Andesite dykes ranging from sub-metre to 10 m wide cut both the tonalite and rhyolite, locally as dyke swarms with a northerly trend. These are similar to andesite dykes common in the Permo-Triassic basement rocks throughout the region.

The Josemaria Late Oligocene (~25 Ma) porphyry intrusions are centred on the upper part of the north-facing slope immediately below the height of land at Josemaria (Figure 7-4). They occur over an approximate 1000 m x 400 m area, on both sides of the main structural corridor, although predominantly to the east. They include a series of feldspar-quartz-hornblende-biotite-phyric dacitic intrusions that have been divided into three main phases based on their compositions as well as timing based on the presence of vein fragments and relative vein density and intensity of mineralization. The early-mineral porphyry intrusions are fine-grained and feldspar phyric with <5mm, lath-shaped feldspar phenocrysts and occasional small quartz phenocrysts. They can be difficult to distinguish from the host tonalite where it is strongly overprinted by porphyry-related alteration. The inter-mineral phase includes strongly quartz- and feldspar-phyric variants, with up to 50% feldspar phenocrysts, and round clear to grey quartz phenocrysts up to 1cm. The late mineral phases are quartz and feldspar porphyritic with an aphanitic groundmass.

The Late Oligocene erosional surface that cuts down into the porphyry system is overlain by a distinct, hematitic redbed conglomeratic unit. It is comprised of cobble conglomerate and wacke with a variety of clasts types, including a predominance of rhyolite clasts, but also mineralized porphyry intrusive clasts. The conglomerate is overlain by an andesitic to dacitic volcaniclastic and coherent volcanic package of earliest Miocene age (together referred to as the PMV, ~22 Ma).

Hydrothermal breccias (HBX), younger than the porphyry system and also younger than the post-mineral volcanic rocks, cut all units in the southern part of Josemaria. They are narrow, dominantly northwest-trending, quartz–alunite-cemented, polymictic breccias that expand in size where their trend intersects the Josemaria structural corridor but taper out into quartz–kaolinite-cemented dyke-like bodies laterally. Associated chalcedony-alunite and kaolinite alteration with pyrite-enargite mineralization is mapped more broadly around these bodies and extends along post-mineral volcanic layering; similar alteration and arsenic values are found within narrow, structurally controlled domains along the Josemaria structural corridor.



Source: NGEx, modified after Sillitoe et al., 2019.

Figure 7-4: Josemaria vertical section 4100N lithology and alteration

Fine-grained, northerly-trending rhyolite dykes are found on the northern slope of Josemaria, and locally within the deposit area. They are generally less than 10 m wide where intersected in drilling, and on the northern slopes form interconnecting dykes and intrusive bodies with domains up to 30 m wide. While relative age relationships particularly with the younger sedimentary and volcanic units at Josemaria are not conclusive, to the north of Rio Blanco similar rhyolite dykes are relatively young (Miocene?) and cut Late Oligocene mineralization.

Local, small basaltic plugs occur at the top of Josemaria. They are vesicular, black, and inferred to post-date all other local units.

7.3.2 Alteration

Alteration zonation within the Josemaria porphyry system is centred on the porphyry intrusions that underlie the top and uppermost northern slope at Josemaria (Figure 7-5). The alteration footprint of the system extends for ~2 km east-west, and ~4 km north-south and is covered by alluvium in the Rio Blanco valley to the north.

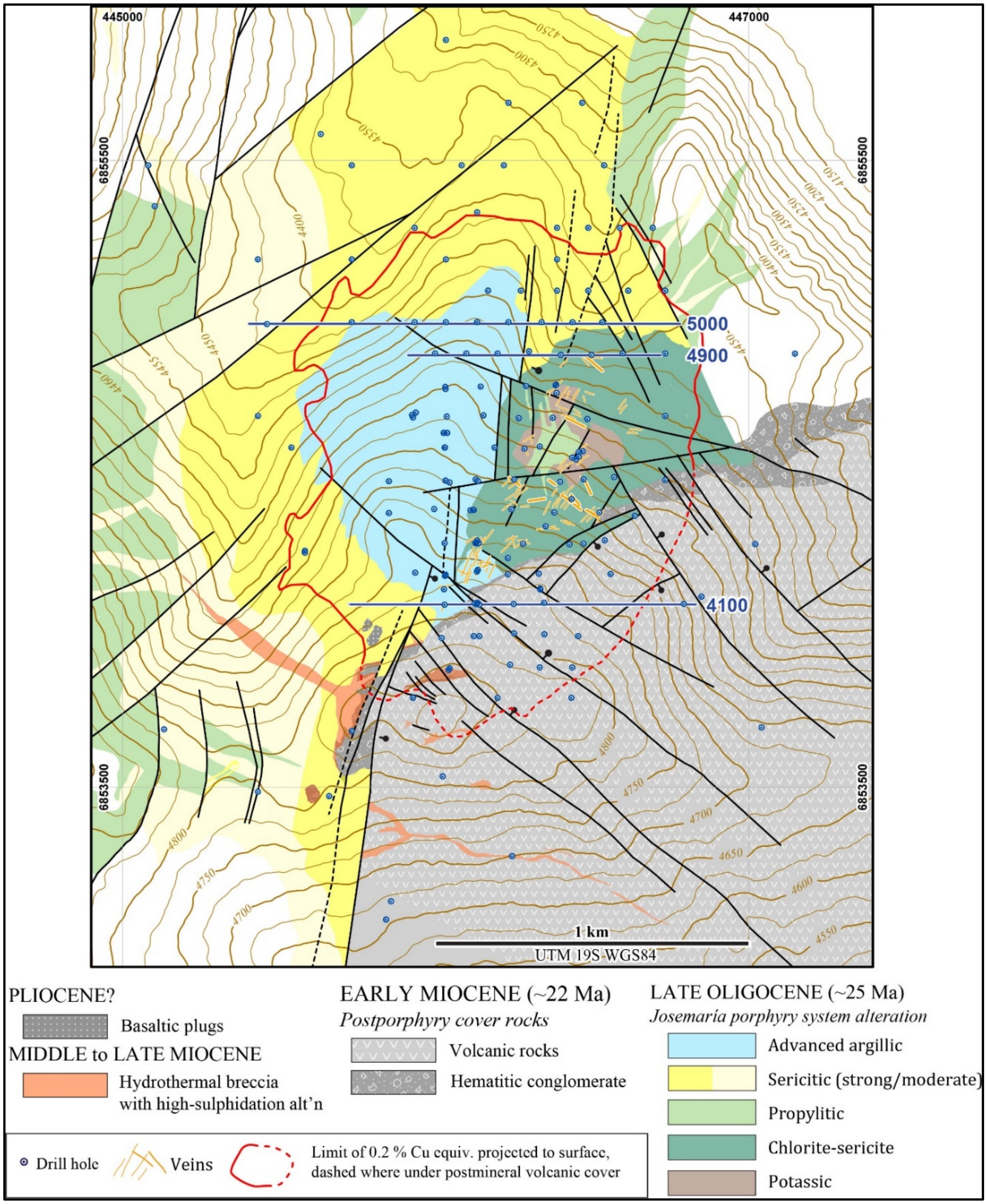
The deepest alteration is potassic, occurring in all holes in the central part of the system within the tonalite host rock 400 to 600 m below surface (Figure 7-6). A steeply inclined column of potassic alteration is also preserved around the late mineral porphyry intrusions in the northern part of the system. Fine-grained biotite with disseminated and vein magnetite define the mineralogy of the potassic zone, with some bleached feldspars indicating replacement by albite or K-feldspar alteration. Multidirectional quartz veinlets, mainly A-type chalcopyrite-magnetite veins, were introduced with the potassic event, with slightly more distal molybdenite B-type quartz veins.

Sericite-chlorite-clay alteration formed at the expense of potassic, with the intensity of the overprint decreasing with depth. Surface exposures in the central part of Josemaria, to the east of the NNE structural zone, are SCC altered (sericite-chlorite-clay), with distinctive mineralogy and hematitic overprint of magnetite. Potassic alteration is also preferentially preserved within the host rock andesite dykes, even where they are enclosed by SCC-altered tonalite.

High-sulphidation alteration and underlying sericitic alteration are best preserved to the west of the NNE structural zone, within the rhyolite host rock. However, the system displays significant telescoping of alteration within its centralmost part. Advanced argillic alteration has overprinted potassic alteration, most evident in the tonalite, early-, and inter-mineral porphyry phases that underlie the topographically highest part of the deposit. Advanced argillic alteration in the rhyolite includes quartz-pyrophyllite and local quartz alunite alteration, while related alteration within the more reactive tonalite is represented by sericitic alteration below the higher-level advanced argillic assemblage.

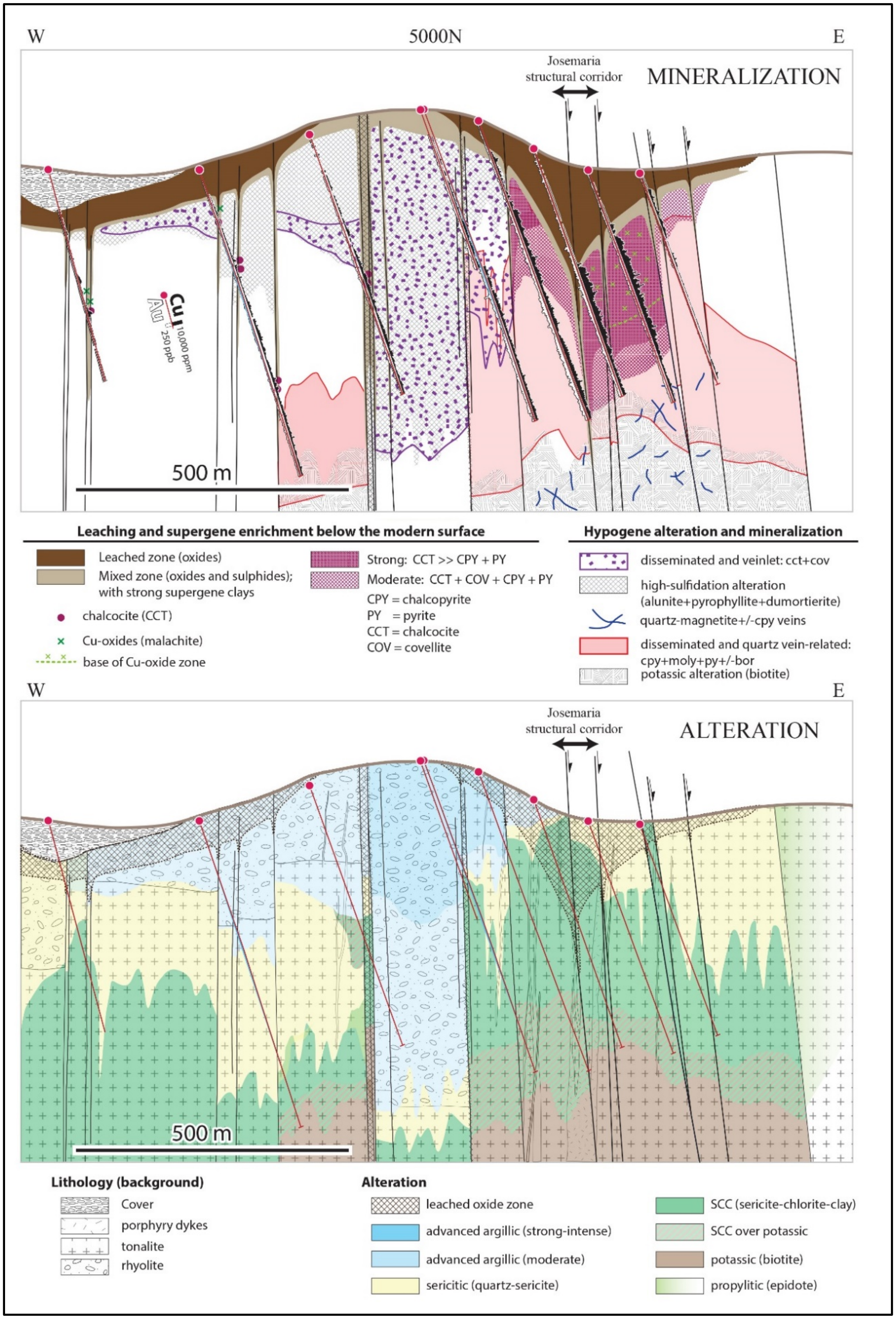
The porphyry intrusions also record progressive development of alteration within the system with the early mineral phase displaying strong potassic and SCC alteration, while the late mineral phase is only propylitic. A relatively weak sericitic and propylitic halo surrounds the deposit.

A second high-sulphidation alteration event post-dates the Josemaria system as well as the post-mineral volcanic rocks. It is associated with the quartz-alunite and quartz-kaolinite cemented breccia dykes, predominantly in the southern part of the deposit area. The breccias and related chalcedony-alunite-kaolinite-pyrite-enargite alteration invade the NW structures and locally the NNE and NE structures, and also the Late Oligocene unconformity.



Source: After Sillitoe et al., 2019; mapping by F. Devine, 2014, updated following geological modelling 2019.

Figure 7-5: Josemaria alteration map



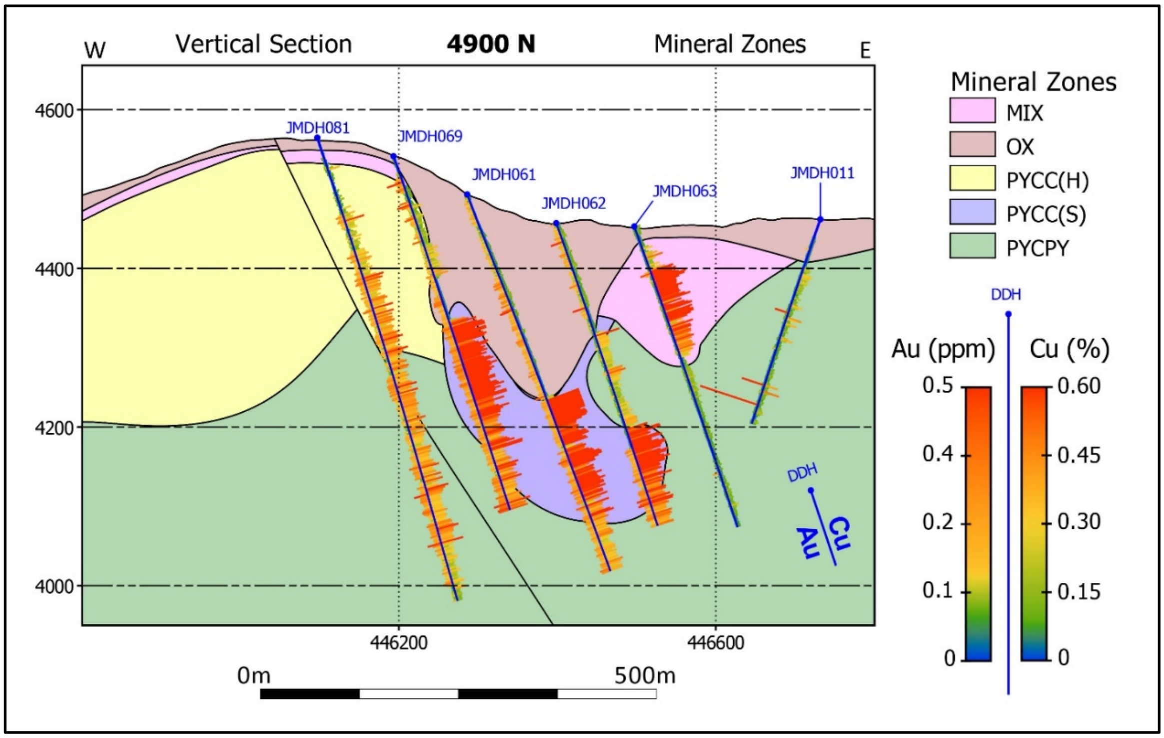
Source: NGEx, 2018

Figure 7-6: Vertical section 5900N interpreted alteration and mineralization

7.3.3 Mineral Zones

Mineral zones within the Josemaria deposit were defined by the relative abundance of chalcopyrite, pyrite and chalcocite/covellite, as well as the mode of occurrence of chalcocite/covellite (hypogene or supergene), and the level of oxidation. Five main zones were modeled and used to develop the resource estimate (Figure 7-7) as follows:

- Mixed sulphide and oxide (MIX)
- Oxide (leached cap) (Ox)
- Pyrite + hypogene chalcocite/covellite (PyCc(H))
- Pyrite + supergene chalcocite/covellite (PyCc(S))
- Pyrite + chalcopyrite (PyCpy)



Source: NGEx, 2013

Figure 7-7: Section 5800N mineral zones used in resource estimation

7.3.4 Mineralization

The Cu–Au mineralization at Josemaria is hosted within a porphyry system that includes two main types of hypogene mineralization. These two types occur in proximity to one another due to a high degree of telescoping of high-sulphidation alteration and mineralization over deeper mineralization related to potassic alteration. Late supergene enrichment within the northern part of the deposit has upgraded copper values over part of the system. Deposit dimensions, defined by the current resource, are ~1000 m east-west, ~1500 m north-south, and 600 to 700 m vertically.

The first and most widespread type of hypogene Cu and Au mineralization is associated with the upper parts of the potassic alteration zone (Min zone PyCpy). Disseminated and vein-style chalcopyrite mineralization is associated with an A-type quartz-magnetite veinlet stockwork in the area above and around the porphyry intrusions. Minor bornite is present, but in an approximate ratio of 30:1 (chalcopyrite:bornite) within the potassic zone.

Sericite-chlorite-clay alteration overprints potassic but was not grade-destructive and some of the best Cu grades are found in the SCC domain. Where overprinted, which is through much of the deposit, the sulphide assemblage has been variably reconstituted to pyrite-chalcopyrite with pyrite:chalcopyrite ratios of approximately 3-10:1. Copper and gold values are in the range of ~0.35% Cu and 0.2 g/t Au.

This Cu-Au mineralization is overlapped by a molybdenite-bearing annulus best developed on the northern and eastern sides, with grades averaging > 50 ppm Mo. It is related to molybdenite-bearing B-veins surrounding the central part of the system.

The second type of hypogene sulphide mineralization is located along the western and central parts of the system, associated with the advanced argillic domain and the underlying sericitic alteration (Min zone PyCc(H)). This high-sulphidation assemblage includes disseminated grains of pyrite rimmed by hypogene chalcocite, bornite and/or covellite with trace amounts of tennantite and enargite. Arsenic values are relatively low, in the range of ~10–100 ppm. Pyrite:copper-bearing sulphide ratios are roughly 10:1.

In the central part of the system, where the highest degrees of alteration telescoping are mapped, the high-sulphidation alteration extends downward over the potassic- and SCC-related chalcopyrite mineralization. In this area, the early potassic-related sulphide mineralization is reconstituted and upgraded by the high-sulphidation sulphide assemblage, reflected in higher gold and hypogene copper grades in the central part of the system. In places values of ~0.6% Cu and ~0.7 g/t Au are attained in the south-central, highest grade part of the system.

Supergene copper enrichment (PyCc(S)) is focused along the NNE structural zone through the northern part of the deposit. The Late Oligocene erosional event removed the upper parts of the mineralized system, but erosion took pace at a rapid rate that did not allow for development of an extensive leached cap or supergene enrichment at that time. Only more recently, likely during most recent glacially-aided erosion into the system, has a leached cap been developed over the system (Ox and Mix) with an underlying supergene enrichment zone. The leached zone ranges from 10–20 m in thickness over the relatively impermeable felsic volcanic rocks in the west to a maximum of 230 m within the Josemaria NNE structural corridor and the tonalite farther east where it was facilitated by damage zones along faults and increased permeability through groundwater removal of sulphate veins. The underlying supergene enrichment domain attains grades in the range of 0.8-1.5% Cu.

Appreciable oxide Cu (malachite and neotocite) mineralization is restricted to a small zone of fractures within the leached cap (Ox) in the northern part of the deposit. This is interpreted to be the result of leaching of the pyrite-poor potassic domain. Also, a significant Au-rich portion of the leached cap occurs along the centre of the deposit, between section lines 4100N and 4600N, with values averaging 0.35 g/t Au within the oxide zone. This area corresponds to the central, and perhaps deepest, parts of the advanced argillic alteration zone within the system.

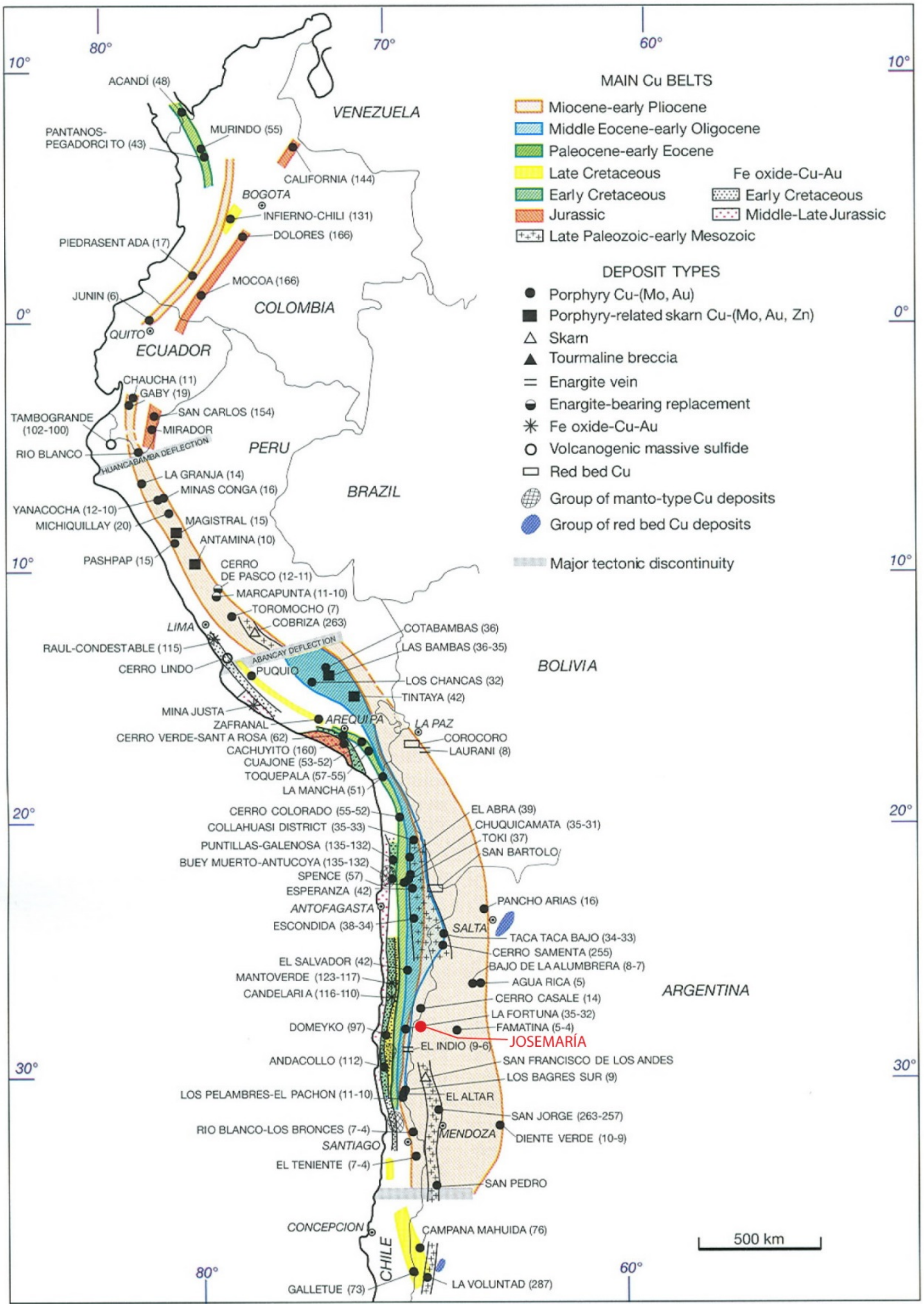
8 Deposit Types

Based on geological features and location, the Josemaria deposit is classified as a Cu–Au porphyry system. Porphyries are well documented along the Andes and represent a widespread type of deposit in Chile and Argentina (Figure 8-1).

Porphyry deposits in general are large, low- to medium-grade magmatic-hydrothermal deposits in which primary (hypogene) sulfide minerals occur as veinlets and disseminations within large volumes of altered rock that are spatially and genetically related to felsic to intermediate porphyritic intrusions (Seedorf et al., 2005). The large size and styles of mineralization (e.g., veins, vein sets, stockworks, fractures and breccia pipes), and association with intrusions distinguish porphyry deposits from a variety of other deposit types that may be peripherally associated, including skarns, high-temperature mantos, breccia pipes, and epithermal precious metal deposits. Secondary minerals may be developed in supergene-enriched zones in porphyry Cu deposits by weathering of primary sulphides. Such zones typically have significantly higher Cu grades, thereby enhancing the potential for economic exploitation (Sinclair, 2007).

Porphyry deposits occur throughout the world in a series of extensive, relatively narrow, linear metallogenic provinces. They are predominantly associated with Mesozoic to Cenozoic orogenic belts in western North and South America and around the western margin of the Pacific Basin, particularly within the Southeast Asian Archipelago. However, major deposits also occur within Paleozoic orogens in Central Asia and eastern North America, and to a lesser extent, within Precambrian terranes (Sinclair, 2007).

Porphyry deposits are large and typically contain hundreds of millions of tonnes of mineralization, although they range in size from tens of millions to billions of tonnes. Grades for the different metals vary considerably but generally average less than 1%. In typical porphyry copper deposits, Cu grades range from 0.2% to more than 1% Cu; Mo content ranges from approximately 0.005% to about 0.03% Mo; Au contents range from 0.004 to 0.35 g/t Au; and Ag content ranges from 0.2 to 5 g/t Ag (Sinclair, 2007).



Source: NGEx, October 2013; modified from Sillitoe and Perelló (2005)

Figure 8-1: Porphyry copper belts and major porphyry copper deposits in the Andes

9 Exploration

9.1 Grids and Surveys

Josemaria drill collar coordinates are reported using UTM coordinates.

The base topography used for mineral resource estimation was obtained from PhotoSat Information Ltd. in Vancouver who provided a 5-m digital elevation model (DEM) produced from stereo 2.5-m resolution satellite images.

9.2 Geologic Mapping

Several phases of geological mapping and revision have been completed at Josemaria, with each phase building on and refining the previous phase. The most recent map update incorporating all current information was completed by Fionnuala Devine in September 2020.

9.3 Geochemical Sampling

During the period 2003–2005, 315 rock chip and 459 talus fines samples were collected. A central feature of approximately 2.5 km in diameter was delineated by coincident gold, copper and molybdenum anomalies and encouraged further exploration studies. No surface geochemical sampling for exploration has been done since 2005.

9.4 Geophysics

Induced polarization (IP) surveys were completed at Josemaria during the 2003–2004, 2006–2007 and 2009–2010 field seasons. Magnetic surveys were done during the 2003–2004, 2004–2005 and 2006–2007 seasons. Other types of geophysical surveys completed include a CSAMT survey conducted in 2003 and a MIMDAS survey undertaken in 2008–2009.

The porphyry intrusive rocks closely correspond to magnetic (high) anomalies, and the main structural features are also outlined by magnetics.

IP chargeability shows a partial pyrite “ring” around the western and northern parts of the main deposit. The response to the south and east appears to be masked by the post-mineral volcanic cover and chargeability is generally low in this area.

9.5 Pits and Trenches

Trenches were completed primarily following road cuts. Samples were taken over a 3-m interval whenever possible, however, sampled lengths may not represent true lengths of mineralisation identified in the samples.

9.6 Exploration Potential

9.6.1 Josemaria Deposit

The Josemaria deposit remains open to the south, beneath a thickening cover of post-mineral volcanic rocks, and also at depth. Drilling was planned with a conceptual open-pit configuration in mind, and only two drill holes were extended beyond depths of about 600 m (JMDH06 and 07).

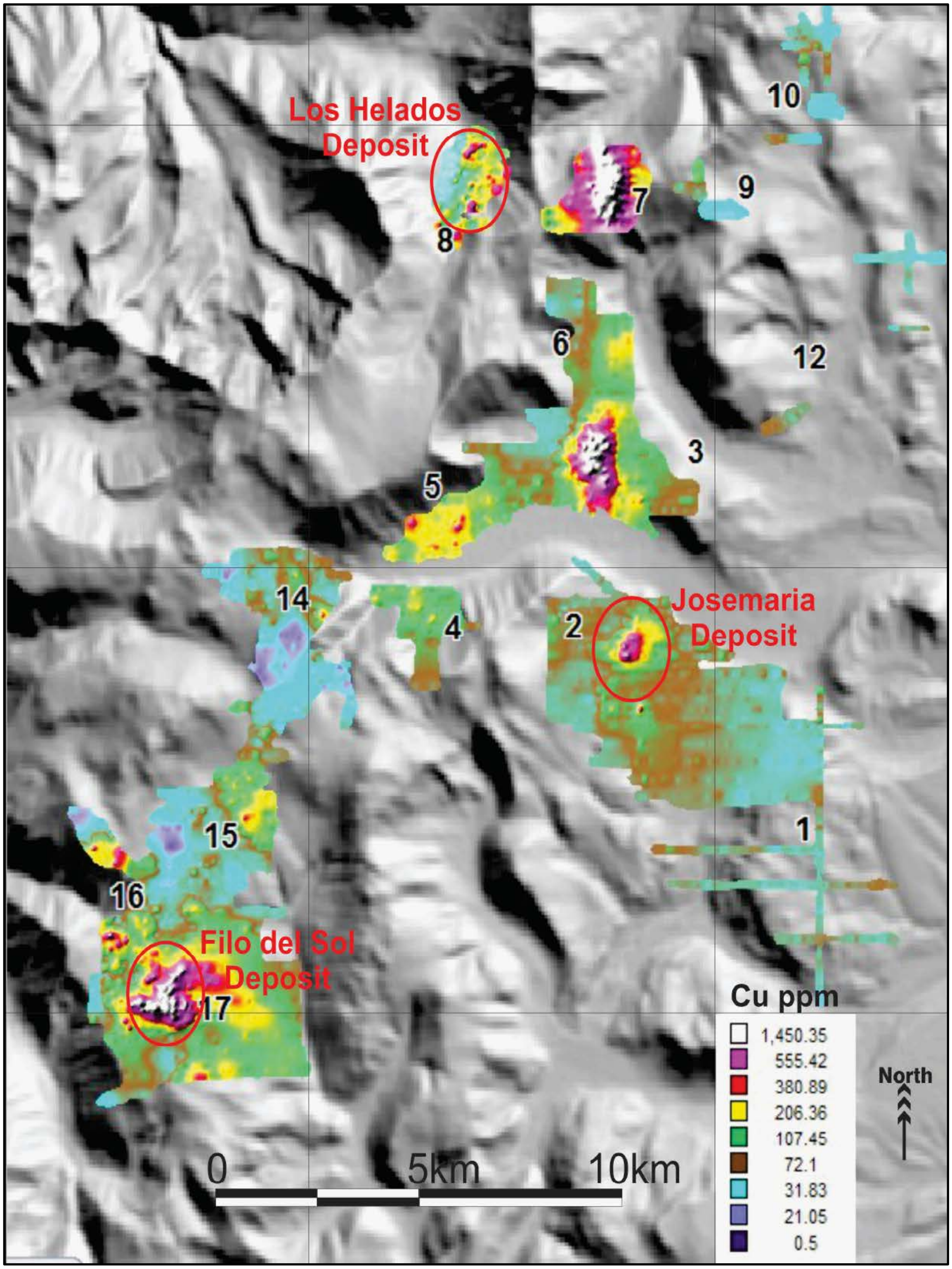
Both drill holes encountered lower-grade mineralization; however, they intersected the late mineral porphyry unit, which tends to be lower grade. Potential remains to extend the mineralization at depth within the tonalite unit.

9.6.2 Regional Targets

Several exploration targets were developed in the area during the surface exploration programs that led to the discovery of the Josemaria deposit. At that time, prior to the discovery of Josemaria, several targets were being advanced in parallel, ultimately resulting in the initial drill program. Once the main deposit was discovered, all the exploration effort shifted to deposit definition drilling, and exploration on the other exploration targets was suspended.

These additional targets include the southward extension of the Josemaria deposit, as well as a second major geochemical anomaly on the western side of the property, similar in size and tenor to the Josemaria deposit, that has alteration features consistent with porphyry-style mineralization. These targets, as defined by copper in talus fine samples, are shown in Figure 9-1.

Given that porphyry deposits occur in clusters, and the exploration targets are in the vicinity of the Josemaria deposit and other deposits in the region, there is excellent exploration potential to identify additional porphyry-hosted mineralization. Additional exploration work is recommended to continue to advance them.



Source: NGEx, 2015

Figure 9-1: Exploration targets (copper values from surface geochemical sampling)

10 Drilling

10.1 Summary

Eleven drilling campaigns have been carried out at the Josemaria deposit, from 2003 to 2020.

Core was photographed, logged for detailed lithology, alteration and mineralization features, and RQD and recovery data were collected. Several of the drill holes were also logged for geotechnical information and thirteen dedicated geotechnical holes were drilled.

Core recovery data were not systematically collected for holes drilled prior to the 2010–2011 campaign. Core recovery from holes drilled at Josemaria between 2011 and 2020 averages 94%.

Collar locations were surveyed using a differential global positioning system (GPS) instrument.

None of the RC holes were surveyed for down-hole deflection. Diamond drill holes were surveyed for the 2009-2010 season and then systematically starting with the 2011-2012 season. Down-hole surveys were carried out at 50 m intervals on average, using a Reflex multi-shot instrument during the 2011–2012 drilling campaign. For the 2012–2013 and subsequent seasons, an SRG-gyroscope survey was completed for each drill hole. On average, measurements were collected at 30-m intervals down the hole.

Drill hole orientations are generally appropriate for the mineralization style. The Josemaria deposit is a porphyry system with disseminated mineralization. Reported and described interval thicknesses are considered true thicknesses.

10.2 Drill Programs

Eleven drilling campaigns have been carried out at the Josemaria deposit, from 2003 to 2020. Drilling at the Josemaria deposit to date totals 76,206 m in 190 drill holes (Table 10-1), of which 48 holes (17,535 m) are RC holes, and 142 holes (58,671 m) are core holes, including 14 condemnation holes and 13 geotechnical holes inside the FS pit shell. More than 90% of the metres drilled were HQ (63.5-mm diameter core).

Table 10-1: Drill summary table – Josemaria

Year	RC Holes	RC Metres	Core Holes	Core Metres
2003–2004	10	3,475	—	—
2004–2005	21	7,822	5	2,406
2005–2006	—	—	2	1,700
2006–2007	17	6,238	0	—
2007–2008	—	—	—	—
2008–2009	—	—	—	—
2009–2010	—	—	7	2,253
2010–2011	—	—	8	2,419
2011–2012	—	—	39	19,236
2012–2013	—	—	19	8,241
2013–2014	—	—	14	7,310
2018-2019	—	—	29	10,620
2019-2020	—	—	19	4,487
Totals	**48**	**17,535**	**142**	**58,671**

10.3 Geological Logging

Drill core was transported by pick-up truck from the drill sites to the Josemaria camp. At the camp core logging facility, the core was photographed, logged for rock quality designation (RQD) and recovery, and a quick log of the key geological features was prepared. The core was then prepared for cutting and sampling. Prior to the 2011–2012 season, core was cut at the field camp, but during the 2011–2012 and 2013–2014 campaigns the core was cut at the NGEx sampling facility located in San Juan. Cutting was relocated back to the field camp for the 2018-2019 campaign. Detailed geological logging was also completed in San Juan.

10.4 Recovery

Core recovery data was not systematically collected on holes drilled before the 2011-2012 campaign but was systematically collected for all holes drilled between 2011 and 2020, and averages 94%.

Recovery was measured with a metric tape between drill core marks, annotated and the percentage recovery calculated. RQD was calculated as the total length of recovered core (measured from pieces) that exceeded or equaled 10 cm.

10.5 Collar Surveys

Drill sites were initially located in the field by a hand-held global positioning system (GPS) instrument and marked with stakes for the collar location and a front and back site indicating the azimuth. The drill was moved on to the site and then lined up with the stakes by the supervising geologist. Following completion of the drill hole, final collar locations were surveyed using a differential GPS instrument.

10.6 Downhole Surveys

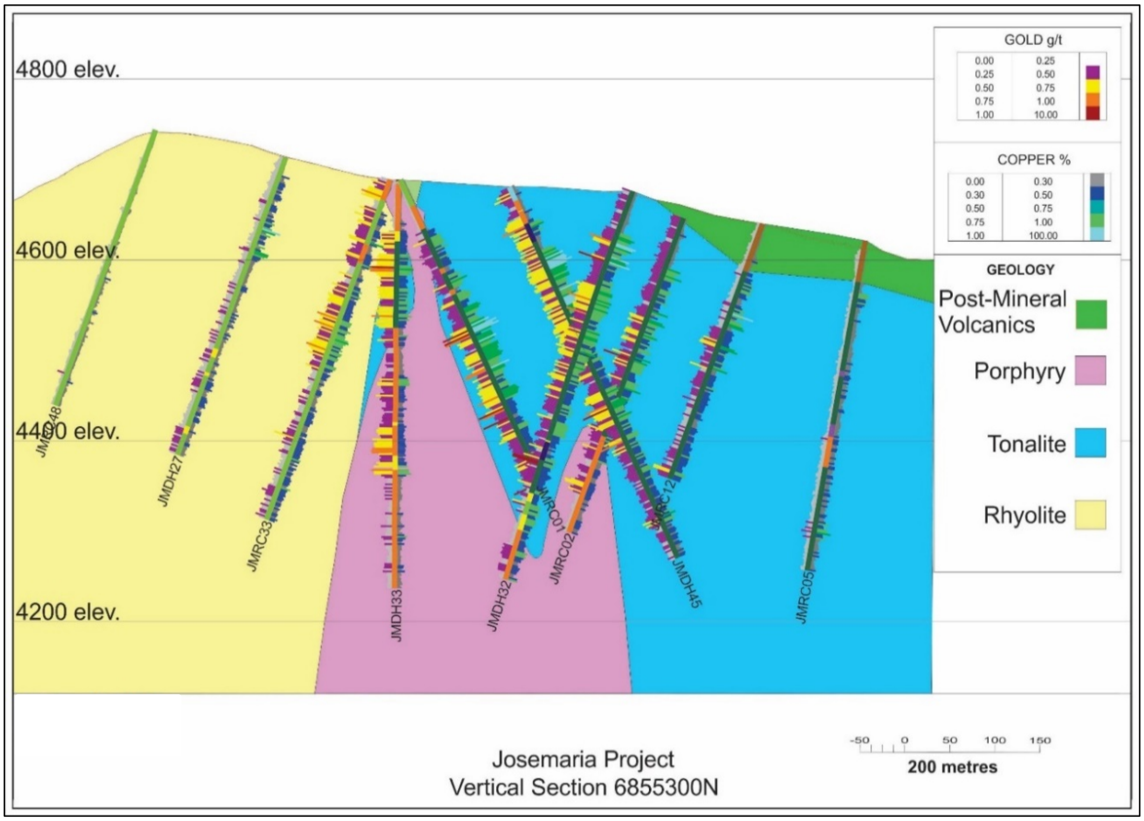
Beginning in 2009, downhole surveys were carried out using a Reflex multi-shot instrument at, on average, 50-m intervals within the hole.

For the 2012-2020 seasons, a SRG-gyroscope survey was completed for each drill hole, with measurements collected at 30-m intervals down the hole.

Earlier core and RC holes were not surveyed for down-hole deflection. Hole deflection is typically less than 0.001° per metre in dip and 0.01° per metre in azimuth. Given the low deflection of the holes and the continuous, disseminated nature of the mineralization, the lack of survey data from the RC holes is not considered to be a significant issue.

10.7 Sample Length/True Thickness

Josemaria is a porphyry deposit that contains disseminated mineralization. Reported and described interval thicknesses are considered true thicknesses. A drill section through the deposit illustrating the typical drill orientations in relation to the mineralization is illustrated in Figure 10-1.



Source: Josemaria, 2015

Figure 10-1: Example drill section 4400N (UTM), Josemaria

11 Sample Preparation, Analyses, and Security

11.1 Surface Sampling

Note: surface sampling and associated testwork were used only to guide the planning of exploration drilling and were NOT used directly for mineral resource estimation.

11.1.1 Talus Sampling

Sampling of talus fines was carried out using a compositing method that results in samples representative of 100 m along the sampling line. Talus fines were collected as composites of 10 sites located at 10-m intervals, centred if possible, on a 100-m line station.

11.1.2 Chip Sampling

Chip sampling followed conventional methods of following as close to the centre line of the sample as practical. Samples were chipped not cut. The majority of chip samples were taken along road-cut type trenches. Sample width was kept constant within each trench as much as possible.

11.2 Drill Sampling

11.2.1 Pre-2007 Drill Sampling

The entire length of the hole was logged on a systematic 2-m interval in the case of RC and on a systematic 1-m core length in the case of DDH holes. RC chips were collected at the drill in large sacks weighing about 40 kg. These were taken to the camp where they were weighed and run through a quartering and homogenizing process using riffle splitters that results in a 5-kg split for shipment to the lab. Representative samples are retained as a geological record of the hole and for re-assay.

The core intervals were split in half by saw with one half then being submitted for assay and the balance being stored in San Juan for reference. Also, from the saved one-half core, samples were taken for density measurements.

No geologic breaks dictated breaks in the uniform 2-m (RC) or 1-m (DDH) sampling, which is appropriate for a bulk tonnage, low-grade deposit. HQ diameter core was drilled to provide adequate sample weights. The average weight of a half core sample for a 2-m interval is 8.0 kg, and therefore a significant weight that provides for sample preparation and assaying.

The rock is generally very competent, and overall recoveries are in the order of 95% or better, with only very occasional fracture zones having recoveries of less than 70%.

11.2.2 Josemaria Resources Sampling

All drilling since 2009 has been core drilling. Core was sampled continuously from the beginning of recovery to the end of the hole. Samples are generally 2 m long (except for JMDH01 to 07 that were sampled on 1-m intervals). Drill core was cut in half using a circular, water-cooled rock saw. Half-cores are randomly weighed and compared to verify that 50% of the material was sampled.

One half of the core was used as a geochemical sample and the other stored in boxes or trays for reference and future revisions.

11.3 Density Determinations

A total of 14,419 core samples have been systematically analyzed for specific gravity (SG) since the 2011–2012 drilling program. Specific gravity was measured by Josemaria technicians using the water immersion method, either at the Batidero camp or at the Josemaria core logging and sampling facility in San Juan.

11.4 Sample Preparation and Analysis

11.4.1 Surface and RC Samples

Sample preparation included; drying the sample, crushing to >70% passing -2 mm mesh, and pulverizing to >85% passing -75 µm screen.

Gold was determined using an atomic absorption spectroscopy (AAS) finish on a 50-g sample. The detection limit and the upper range of this method was 0.005 ppm Au and 10 ppm Au, respectively.

The sample was also digested using a HF–HNO3–HClO4 acid digestion, HCl leach and finished using inductively coupled plasma – atomic emission spectroscopy (ICP-AES) for 27 elements. In addition, Hg was determined using an aqua regia digestion and cold vapour AAS.

11.4.2 Core

Sample preparation included drying the sample, crushing to better than 85% passing 10-mesh and pulverizing to 95% passing 200-mesh.

Sample digestion was done by a multi-acid attack with the exception of one submission during the 2009-2010 campaign. Gold was determined by fire assay with an AAS finish based on a 30 g sample. A suite of 37 elements, including copper, was determined by ICP-AES analyses.

Samples analyzed before the 2010-2011 campaign had copper re-assayed by AAS only if the ICP result exceeded the upper detection limit of 10,000 ppm. Beginning in 2010, all samples with copper grades over 5,000 ppm Cu were re-assayed by AAS. Starting in 2012, copper determinations in all samples were done by both ICP and AAS.

Beginning in 2019 all samples were also analyzed for acid- and cyanide-soluble copper using a sequential copper analysis. Mercury concentration was determined by cold vapour/AAS in all samples up to 2010.

11.5 Analytical and Test Laboratories

Surface and RC samples were analysed by ALS Chemex (ALS) in Chile. At the time of analysis, ALS held ISO9001 accreditations for selected procedures and is a laboratory independent of Josemaria Resources.

From 2009 to 2014, all core samples were analyzed by ACME Laboratories in Chile (ACME). ACME's accreditations have included ISO9001:2000 and ISO/IEC17025. Sample preparation was undertaken at ACME's sample preparation laboratory in Mendoza, Argentina, which holds ISO 9000:2001 accreditation and is a laboratory independent of Josemaria Resources.

SGS Laboratories (SGS) in Chile was used as an umpire laboratory during 2012-2013. At the time the analyses were performed, SGS held ISO/IEC17025 accreditations and is a laboratory independent of Josemaria Resources.

Beginning again in 2019 samples were delivered to the ALS preparation laboratory in Mendoza, Argentina where they were crushed and a 500 g split was pulverized to 85% passing 200 mesh. The prepared samples were sent to the ALS assay laboratory in Lima, Peru. ALS (Peru) is an accredited laboratory and independent of Josemaria.

Gold analyses were by fire assay fusion with AAS finish on a 30 g sample. Copper and silver were analysed by atomic absorption following a 4-acid digestion. Samples were also analyzed for a suite of 36 elements with ICP-AES and a sequential copper leach analysis was completed on each sample with ICP copper > 500 ppm Cu. Copper and gold standards, as well as blanks and duplicates (field, preparation and analysis), were randomly inserted into the sampling sequence for Quality Control. On average, 9% of the submitted samples are Quality Control samples. No data quality problems were indicated by the QA/QC program.

ACME and ALS were also used for surface sample analyses.

11.6 Quality Assurance and Quality Control

11.6.1 Surface and RC Sampling

There is only limited information on the overall precision of the assay data for surface and RC sampling, and no information regarding its accuracy. Duplicate samples were collected in the field and routinely examined using regression methods. A total of 447 duplicate samples were collected from drilling, including RC drilling, up to 2007. Statistical analyses made on these duplicates indicate that the overall precision of the samples was good or very good.

11.6.2 Core Sampling

A quality control protocol was implemented in the 2009–2010 season, beginning with JMDH08; the program, with some minor variations, has been followed since that date. The programs include blanks, duplicates and standard reference materials inserted in the sampling sequence.

The programs included a total of seven quality control samples inserted for every 77 samples submitted to the laboratory to provide sufficient controls for the 78 and 36 element trays used in the laboratory.

If any of the control samples returned results outside of the control criteria, the lab was contacted and the entire batch of samples was reanalyzed. Very few instances of this occurred over the various drilling campaigns, and the comprehensive program and follow up has ensured that the assay database is of high quality and the results can be relied upon for the evaluations documented in this Report.

The control samples consist of:

- Standard #1 (medium-grade, approximately deposit average grades)
- Standard #2 (low-grade, approximately equates to the cut-off grade used in estimation), implemented during the 2011–2012 campaign
- Blank (coarse material)
- Field duplicate (second half core)
- Preparation duplicate (second pulp)
- Assay duplicate (second assay

Standard Reference Materials

Certified reference materials (CRMs) utilized in the 2009–2010 and 2010–2011 campaigns were acquired from SGS in Argentina.

In September 2011, five standard reference materials (SRMs) were prepared by Josemaria Resources (then called NGEx Resources) using selected coarse rejects from the previous drill season at Los Helados and used during the 2011-2012 campaign. The samples were prepared by Vigalab SA (Vigalab; now part of the Intertek Group). At the time, Vigalab held ISO9001:2009 accreditation.

Five analytical laboratories located within the region were used to perform a round robin test of results: ACME, Activation Laboratories Ltd (Actlabs; at the time, Actlabs was ISO 17025 accredited and/or certified to 9001: 2008), SGS, ALS and Vigalab. Based on the round robin results, the SRMs were assigned an averaged best value.

Standards for drilling campaigns after and including 2018 were purchased from ORE Research & Exploration Pty Ltd (OREAS). Standards used were OREAS600, OREAS601, OREAS602 and OREAS620.

Coarse Blanks

Suitable blank material was obtained from an andesite outcrop located a few kilometres away from the deposit.

Duplicates

Field duplicates were obtained by cutting a half-core into quarter core to be analyzed independently.

11.6.3 External Assay Checks

A set of 183 coarse rejects from the 2012 drill campaign were selected for re-assaying at SGS Laboratories. Grades reported by ACME on the coarse rejects ranged from 0.093 to 11.10% Cu and 0.05 to 0.751 g/t Au.

Samples were submitted for preparation at the SGS facilities in San Juan, Argentina and assayed in Callao, Peru.

11.7 Databases

Drill hole data are stored in a GEOVIA GEMS database, which is a Microsoft Access database platform created and manipulated using GEMS.

Data stored for each drill hole includes collar information, downhole surveys, codes and comments for lithology, alteration and mineralization, assays, specific gravity, magnetic susceptibility, recovery, RQD and metallurgical sample information.

11.8 Sample Storage

Drill core is stored in a core storage warehouse in San Juan. Core is well organized and stored in racks, easily available for review. The laboratory returns the pulps and coarse reject for each sample that has been sent for analysis. These are stored at the San Juan facility.

11.9 Sample Security

The logging facility is fenced, locked when not occupied, and is secure. Samples are handled only by company employees or their designates (i.e., laboratory personnel).

Samples are in the control of a Josemaria employee or contractor to Josemaria from the time they leave the site until they arrive at the San Juan lab.

In the author’s opinion, the sample preparation, security and analytical procedures used to develop the drill hole database are adequate for use in this study and report.

12 Data Verification

F. Devine, an independent qualified person, is responsible for the Geology information included in the report. F. Devine was responsible for the 2014 surface mapping program, which included extensive traverses over, and peripheral to, the deposit area. Many drill sites were located and correlated with the surface maps and 3D database. Mapping of surface outcrop included lithology, alteration and mineralization features that were correlated with the drill database and sections previously developed by NGEx geologists. Updates to the geological model were completed by F. Devine following 7 days of core review in San Juan in May 2014, which included extensive review of assay data as well as 10 witness samples taken of quartered drill core. The values of the witness samples correlate well with the drill database. A 3D model of the deposit was developed following this work. An additional trip to the core facility in San Juan was undertaken in March 2018 to review drill core across several sections to work toward a co-authored peer-reviewed publication of the geology of the Josemaria deposit. F. Devine led the update of the 3D model of the Josemaria deposit following a trip to the core facility in San Juan in April 2019 to review new drilling and new geological insights. F. Devine has also made several trips to other deposits and prospects in the immediate district. In Devine’s opinion, the geological and geochemical data presented in this report is an adequate and accurate reflection of the geology of the Josemaria deposit.

J. Austin, P.Eng., an independent qualified person, is responsible for the metallurgical predictions contained within the report. He is very familiar with the ALS Kamloops laboratory, where the two most recent testwork programs were completed. He reviewed and approved the analytical results to provide the expected metallurgical recoveries and concentrate grades. The metallurgical data generated at ALS Metallurgy is believed to well represent the expected metallurgical performance of the orebody. The ALS Metallurgy laboratory test work, procedures and associated QA/QC is acceptable to support an NI 43-101 feasibility study.

J. Gray, an independent qualified person, is responsible for the mineral resource estimate. As described in more detail in Section 14.8, J. Gray validated block model interpolations against drill hole composite grades and believes there to be a good correlation without showing any bias in model interpolations.

B. McCarthy, an independent qualified person, is responsible for the mineral reserve estimate. B. McCarthy oversaw the validation of the resource model declared herein, before using it to define the mineral reserves. Tonnages were compared between queries of the resource model and the stated resource, as part of standard model checking procedures.

13 Mineral Processing and Metallurgical Testing

13.1 Previous Metallurgical Testwork

Five separate metallurgical test programs have been conducted on the Josemaria deposit. The initial program of metallurgical work was a scoping study conducted at SGS, Lakefield, Ontario (referred to as “SGS scoping”). The second and third programs (referred to as “SGS-1” and “SGS-2”, respectively) were conducted at SGS-Chile and the fourth and fifth programs (referred to as “ALS-1” and “ALS-2”) were conducted at ALS Metallurgy, Kamloops, BC. Data from the last four programs contribute to the metallurgical understanding of the deposit, which has steadily improved with earlier testwork guiding the latter programs.

The last three test programs have used lithological domain samples. There are four primary domains - tonalite, rhyolite, porphyry and supergene. The percentage of each domain within the deposit is:

- Tonalite: 46%
- Rhyolite: 34%
- Porphyry: 14%
- Supergene: 6%

There are also two minor copper and gold oxide ore domains, neither of which are considered in this FS. The division into lithological domains is valid for comminution purposes as the four primary domains have discreet hardness properties.

Testwork completed over the last five years has included:

- Chemical characterization
- Mineralogical analysis
- Comminution testing (SMC, BWI, RWI, AI, SPI, SG)
- Gold recovery by gravity
- Leaching for Cu and Au from the oxide domains
- Conventional flotation for recovery of Cu, Au and Ag
- Concentrate characterization (assay, mineralogy, settling, filtration, rheology, transportable moisture limit)
- Tailings characterization (assay, mineralogy, settling, rheology, environmental characterization, geotechnical characterization)

13.2 Recent Testwork

The 2020 ALS Feasibility Study metallurgical program was focused on the initial five years of ore to be processed, based on the current mining schedule for the deposit.

13.2.1 Sample Selection and Preparation

Core samples were selected from within the 5-year mine plan and cover the range of Cu, Au and S head assays from the five lithology-based domains (tonalite, rhyolite, porphyry, supergene – high grade north and supergene – high grade south). A total of 29 variability samples were generated (Table 13-1).

Table 13-1: Head assay for ALS 2020 variability samples

Sample	Assay (% or g/t)									
	%Cu	%Fe	%S(t)	Au	Ag	ASCu%	CNCu%	ResCu%	As	Mo
VTON-1	0.68	2.99	1.15	0.40	2	0.040	0.188	0.452	13	32
VTON-2	0.36	6.10	1.69	0.22	2	0.026	0.078	0.256	24	130
VTON-3	0.13	3.41	0.21	0.58	2	0.078	0.014	0.038	21	63
VTON-4	0.35	5.60	0.67	0.68	2	0.006	0.016	0.328	14	88
VTON-5	0.48	4.70	1.10	0.49	<2	0.006	0.012	0.462	4	66
VTON-6	0.31	4.70	0.03	0.25	2	0.278	0.008	0.024	5	19
VTON-7	0.53	2.91	1.36	0.38	2	0.022	0.080	0.428	37	88
VHGS-1	1.30	3.04	3.83	0.95	2	0.042	0.466	0.792	10	34
VHGS-2	0.86	3.38	0.43	0.31	2	0.182	0.486	0.192	6	45
VHGS-3	0.72	1.89	2.57	0.39	2	0.052	0.424	0.244	35	56
VHGS-4	0.51	3.02	2.58	0.45	2	0.024	0.156	0.330	23	35
VHGS-5	0.83	2.45	2.26	0.41	4	0.056	0.536	0.238	177	36
VHGN-1	0.78	2.48	0.62	0.24	2	0.090	0.496	0.194	7	209
VHGN-2	1.25	3.29	1.16	0.57	2	0.078	1.040	0.132	5	40
VHGN-3	0.96	4.30	1.67	0.18	2	0.142	0.732	0.086	38	72
VHGN-4	0.88	2.94	2.39	0.40	2	0.162	0.560	0.158	41	130
VHGN-5	0.86	2.16	0.58	0.21	2	0.098	0.680	0.082	22	106
VPOR-1	0.28	2.67	1.88	0.12	2	0.054	0.202	0.024	25	51
VPOR-2	0.32	3.30	0.78	0.10	2	0.084	0.124	0.112	15	26
VPOR-3	0.30	2.81	1.05	0.37	3	0.010	0.030	0.260	6	103
VPOR-4	0.45	2.91	3.71	0.25	2	0.046	0.297	0.107	17	35
VPOR-5	0.24	3.80	4.38	0.27	1	0.010	0.084	0.146	29	60
VPOR-6	0.33	2.87	2.29	0.19	1	0.032	0.110	0.188	15	84
VRHY-1	0.25	3.29	3.87	0.21	1	0.010	0.098	0.142	20	85
VRHY-2	0.25	2.92	3.56	0.19	1	0.022	0.156	0.072	46	101
VRHY-3	0.56	2.89	3.79	0.36	3	0.038	0.468	0.054	138	95
VRHY-4	0.31	4.2	4.52	0.36	2	0.012	0.207	0.091	81	45
VRHY-5	0.44	2.47	3.31	0.29	2	0.012	0.392	0.036	42	49
VRHY-6	0.24	2.87	3.78	0.19	2	0.012	0.174	0.054	115	53

Sample selection is considered adequate for characterization of a large porphyry deposit and sample intercepts of approximately 40 continuous metres were used in collecting approximately 120 kilograms of sample material for each variability composite. Direct comparison of the results of various metallurgical programs is imperfect, as sampling can be mine schedule specific and significant mineralogical differences are observed in upper zones of the deposit, as well as within the differing lithologies. The most recent ALS metallurgical test results form the basis of the FS.

The 29 variability samples were subsequently used to generate five Master Lithology Composites and four Annual Production Composites (Table 13-2). In the table, the term ASCu refers to Acid Soluble Copper in sequential leaching assays, CNCu to Cyanide Soluble Copper, and ResCu is the copper left in the residue after the ASCu and CNCu assays. The Master Composites are an equal blend of the variability samples of the same lithology, with the exception of TON, which excluded two oxide samples, and POR, which excluded one of the variability samples from above the oxide boundary. The supergene composites named VHGN and VHGS are "Very High Grade" ores, one from the north part of the pit and the other from the south part of the pit. The south sample is supergene enriched. The north sample is also supergene enriched but has a high sulphidation overprint typical for ores from this area. The Annual composites are blends of variability samples and a few additional samples to provide the correct blend of lithology and head grade within the respective year of mine production. The pilot sample is a broad selection of the coarse assay rejects from the 2018/2019 drill program. The sample was selected to be representative of the initial 5 years of ore by head grade (Cu, Au, S, As, Mo) as well as lithology and mineralization.

Table 13-2: Head assay for ALS 2020 master composites

Sample	Assay, % or g/t									
	%Cu	%Fe	%S(t)	Au	Ag	ASCu%	CNCu%	ResCu%	As	Mo
TON MC	0.49	4.35	1.21	0.39	4	0.019	0.080	0.391	20	83
RHY MC	0.33	3.01	3.80	0.28	2	0.018	0.247	0.065	78	73
POR MC	0.32	3.01	2.61	0.22	1.5	0.029	0.150	0.141	17	68
VHGS MC	0.86	2.90	2.47	0.52	1.5	0.070	0.425	0.365	47	48
VHGN MC	0.95	2.83	1.24	0.37	<1	0.107	0.665	0.178	22	87
Yr-1 MC	0.40	5.25	2.55	0.43	1	0.020	0.127	0.248	26	86
Yr-2 MC	0.43	3.53	2.03	0.31	1.5	0.032	0.177	0.216	21	86
Yr-3 MC	0.50	2.92	1.76	0.41	3	0.023	0.204	0.273	53	61
Yr-4 MC	0.47	3.41	2.93	0.31	2	0.031	0.266	0.168	61	86
Pilot	0.40	3.07	2.28	0.36	1	0.029	0.150	0.220	34	74

The laboratory test program had the following objectives:

- Sample characterization, chemical and mineralogical
- Conduct comminution testing to characterize the samples
- Confirm primary grind and regrind targets
- Rationalize the metallurgical approach between SGS-Chile and ALS
- Investigate Molybdenum recovery
- Investigate if a low sulphide NAG tailing can be produced
- Conduct Locked Cycle Tests (LCT) to produce metallurgical projections
- Obtain detailed concentrate analysis from the LCTs
- Produce samples for environmental characterization
- Conduct batch testing on the Variability samples
- Use numerical simulation to produce LCT type metallurgical projections

The program also included a pilot program with the primary objective of producing concentrate and tailings for physical and environmental characterization. The program included;

- Operate the circuit for four consecutive day shifts processing 4500 kg of feed
- Produce metallurgical balances from the testing
- Produce concentrate for characterization
  - Detailed assays and mineralogy
  - Settling, filtration and rheology testing
  - Transportable moisture limit
  - Rougher concentrate for regrind power requirement
- Produce tailings for characterization
  - Assays and mineralogy
  - Settling and rheology testing
  - Environmental characterization
  - Geotechnical characterization

13.2.2 Comparison of Test Conditions

The SGS test programs used aggressive conditions in rougher flotation to maximize recovery. The cleaner conditions were selective, which led to instability and mass conservation issues when they conducted LCTs. Several of the SGS LCTs did not come to stability and/or mass conservation and were therefore discarded from the sample set used to develop the project recovery models. The first ALS program commenced with conditions similar to SGS and found them to be inappropriate. ALS quickly moved to a more selective rougher flotation scheme to better limit pyrite flotation in roughing. All the ALS LCTs had excellent stability and mass conservation and thus the metallurgical projections are considered robust. The second ALS program LCTs were conducted after some batch testing and produced Cu metallurgy mostly in line with expectations, but with lower than hoped for gold recovery and at a higher cost compared to the SGS procedure. A modified procedure was developed to reduce operating costs and increase gold recovery.

Table 13-3 summarizes the test conditions from SGS-1 through to the ALS modified conditions. The SGS-2 conditions were far more aggressive for recovery than the SGS-1 program. The ALS modified conditions were focused on reducing the operating costs through reduced lime addition and reduced collector costs. The use of Sodium Isopropyl Xanthate (SIPX) was selected because it will float pyrite, but not as vigorously as Potassium Amyl Xanthate (PAX) would. Reasonable pyrite recovery is desirable for rougher gold recovery, but with limited evidence of improved final gold recovery. The modified ALS conditions become more like the SGS type conditions without the high rougher mass pull and use of an extremely long cleaner scavenger to achieve cleaner stage recovery.

Table 13-3: Summary of test conditions by program

Parameter	SGS-1	SGS-2	ALS	ALS Mod
Grind, um	130	130	130	130
Ro Time, min	10	20	10	10
Ro Collector, g/t	30	30	5-15	5-15
Collector	IPETC, PAX	IPETC, PAX, DTP	3418 (~DTP)	SIPX, DTP
Ro Mass pull, wt%	10	20	10	12
Ro pH	9	8	10.5	8-9
Ro depressant, g/t	0	100	0	0
Regrind, um	25	25	25	20
Cl 1 time, min	4	8	4	4
Cl Scav time, min	15	27	0	2
Cl collector, g/t	0	0	3-16	11
Cl pH	11.5	11.5	11	11
Cl depressant, g/t	0	50	0	0

13.2.3 Pilot Testing

A pilot plant campaign was conducted to produce concentrate and tailings for:

- Generation of samples for geochemical testing
- Generation of samples for environmental analysis
- Physical assessment (settling, filtering, transportable moisture, geotechnical)
- Determination of rougher concentrate re-grind power requirement

Samples were selected from the 2018/2019 drill season, which focused on the initial 5 years of the mine life, corresponding to the second ALS test program samples. Samples were taken from below the oxide boundary and were primarily composed of fresh ore (chalcopyrite rich). Samples often came from continuous intervals of > 100 m in length. The selection matched the expected head grade and lithology distribution for the initial 5-year mine plan.

The pilot plant was run over four consecutive day shifts at a rate of 125 kg/hr. The flowsheet is given in Figure 13-1 and mimics that used in the bench scale locked-cycle testing. The metallurgical results are given in Table 13-4 and include the LCT result for comparison. The pilot plant yielded slightly superior metallurgy than the LCT with higher recoveries at similar concentrate grades.

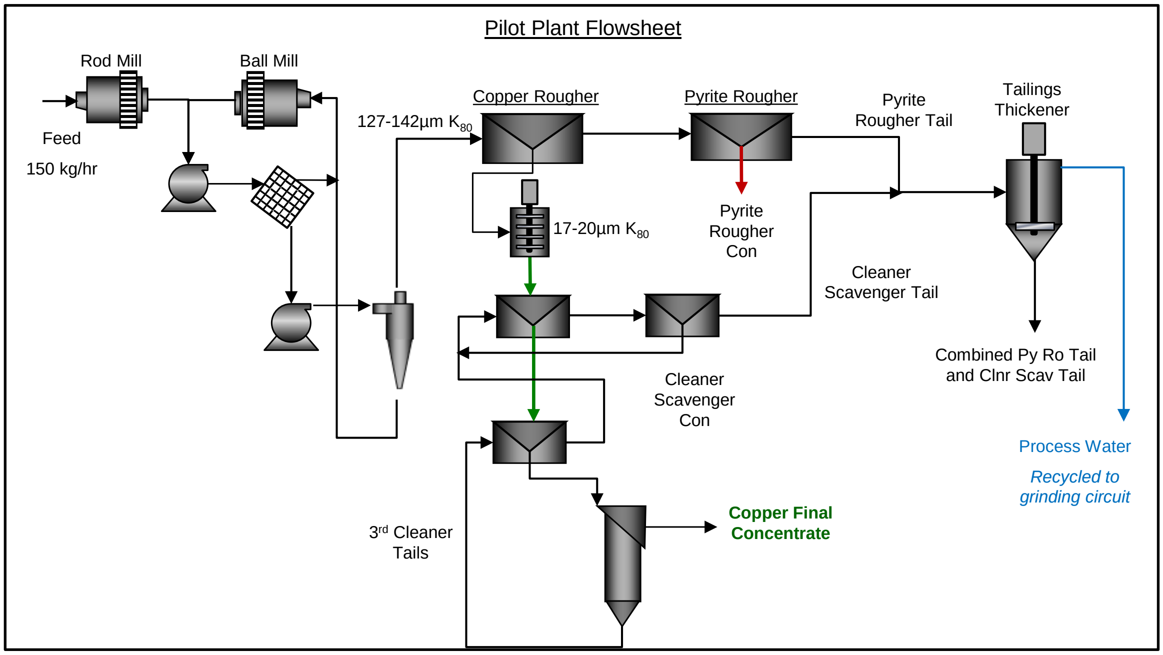


Figure 13-1: Pilot plant flowsheet

Table 13-4: Summary of pilot plant results

Product	Mass percent	Assay (%)						Distribution (%)					
		Cu	Mo	Fe	S	Au	Ag	Cu	Mo	Fe	S	Au	Ag
P1	1.17	26.7	0.16	21.5	29.7	16.0		78.5	26.7	7.6	15.4	63.5	
P2	1.24	27.5	0.16	23.3	30.1	14.3	66.8	82.1	23.9	8.5	16.4	61.9	76.9
P3a	1.35	26.1	0.19	20.8	28.9	14.2	67.3	84.1	34.1	8.4	16.8	67.8	83.0
P3b	1.43	22.6	0.26	21.3	29.3	12.2	58.5	83.3	47.3	9.1	18.6	66.0	82.4
P4	0.96	32.5	0.17	19.4	32.0	16.3	74.5	79.9	23.3	5.7	13.1	59.4	65.9
LCT-65	1.24	26.3		27.0	35.4	12.1	60	80.6		9.7	19.3	53.4	69.8

13.3 Mineralogy

Extensive mineralogical examination was conducted as part of the test program. This included QEMSCAN analysis of all head samples, gold mineralogy in master composite head samples and various metallurgical test products. The objectives of the mineralogy program were to understand:

- Copper deportment in the samples
- Textural and liberation characteristics of the sulphide minerals
- Nature of contaminants in concentrate
- Nature of copper and gold losses to tailings
- Nature of copper minerals reporting as acid soluble copper

The master composites were analyzed by ALS on a sized basis using the Particle Mineral Analysis (PMA) protocol of the QEMSCAN. The modal analysis for the Master Composites is summarized in Table 13-5. The composites are rich in quartz, mica and feldspar as expected for a porphyry deposit. Clay minerals vary from less than 1% to greater than 4%. The modals identified are consistent with previous studies.

Table 13-5: Modal mineralogy (%) for ALS-2 master composites

Mineral	Composite					
	TON	RHY	POR	VHGN	VHGS	Pilot
Cu-Sulphide	1.4	0.7	0.8	2.0	1.5	1.1
Pyrite	1.5	6.7	4.4	3.3	1.5	3.6
Other Sulfide	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FeOX	2.0	0.4	0.7	1.1	1.1	0.8
Feldspars	15.0	1.2	5.8	7.7	32.1	8.4
Quartz	43.0	58.3	49.0	56.2	34.2	49.4
Mica	25.0	25.9	29.2	24.9	20.2	26.8
Chlorite	9.2	0.2	2.1	2.5	6.3	4.3
Ti minerals	1.1	0.8	1.0	0.3	1.2	1.0
Clays	1.1	2.9	4.3	0.8	0.9	2.7
SO_4 minerals	0.1	2.1	1.5	0.8	0.6	1.1
Apatite	0.2	<0.1	0.1	0.1	<0.1	0.1
Other	0.3	0.7	0.9	0.2	0.4	0.8

13.3.1 Copper Deportment

The copper deportment data for the master composites is provided in Table 13-6 and summarized in Figure 13-2. Data from the SGS-2 and ALS-1 programs are included for comparison. All samples have a mix of chalcopyrite, bornite, chalcocite, covellite and the copper-arsenic minerals enargite and tennantite. The Tonalite samples all have a high level of chalcopyrite + bornite and lower levels of pyrite. The Rhyolite samples all have an elevated level of covellite, however the ALS-2 Rhyolite sample was notably higher in this mineral than the previous two test programs. It is also important to note that all the Rhyolite samples contain a high level of pyrite. The Supergene samples all have a broad mix of the copper sulphide minerals. In general, the ALS-2 samples have higher levels of secondary copper minerals than tested previously, reflecting that the samples have come from the upper part of the deposit, which will be mined in the initial five years of operation.

ALS was able to provide a preliminary deportment of arsenic in the samples. The data suggests that arsenic will occur primarily in the copper minerals enargite and tennantite and when present in these forms will report to the copper concentrate. There is minor arsenic as arsenopyrite and cobaltite that is not expected to report to concentrate.

Table 13-6: Master composite mineralogical copper deportment

Sample	Copper Sulphide Deportment (%(				
	Chalcopyrite	Bornite	Covellite	Chalcocite	En/Tt
SGS-2 TON	96.4	0.9	0.9	0.6	0.0
SGS-2 RHY	53.7	0.9	44.1	0.8	0.1
SGS-2 POR	82.3	1.5	12.5	0.5	2.4
SGS-2 SUP	51.9	5.6	7.5	33.6	0.1
ALS-1 TON	83.2	16.3	0.3	0.2	0.1
ALS-1 RHY	58.5	4.0	36.0	0.8	0.7
ALS-1 POR	89.4	2.4	6.9	0.5	0.7
ALS-1 SUP	35.9	4.9	40.3	18.6	0.3
ALS-2 TON	90.0	1.1	7.7	0.5	0.6
ALS-2 RHY	24.4	0.4	63.5	5.1	6.6
ALS-2 POR	52.9	8.9	28.5	9.3	0.4
ALS-2 HGN	12.4	3.6	16.8	67.0	0.2
ALS-2 HGS	48.2	2.4	27.0	21.4	1.0
ALS-2 Pilot	70.7	1.7	13.6	12.1	1.9

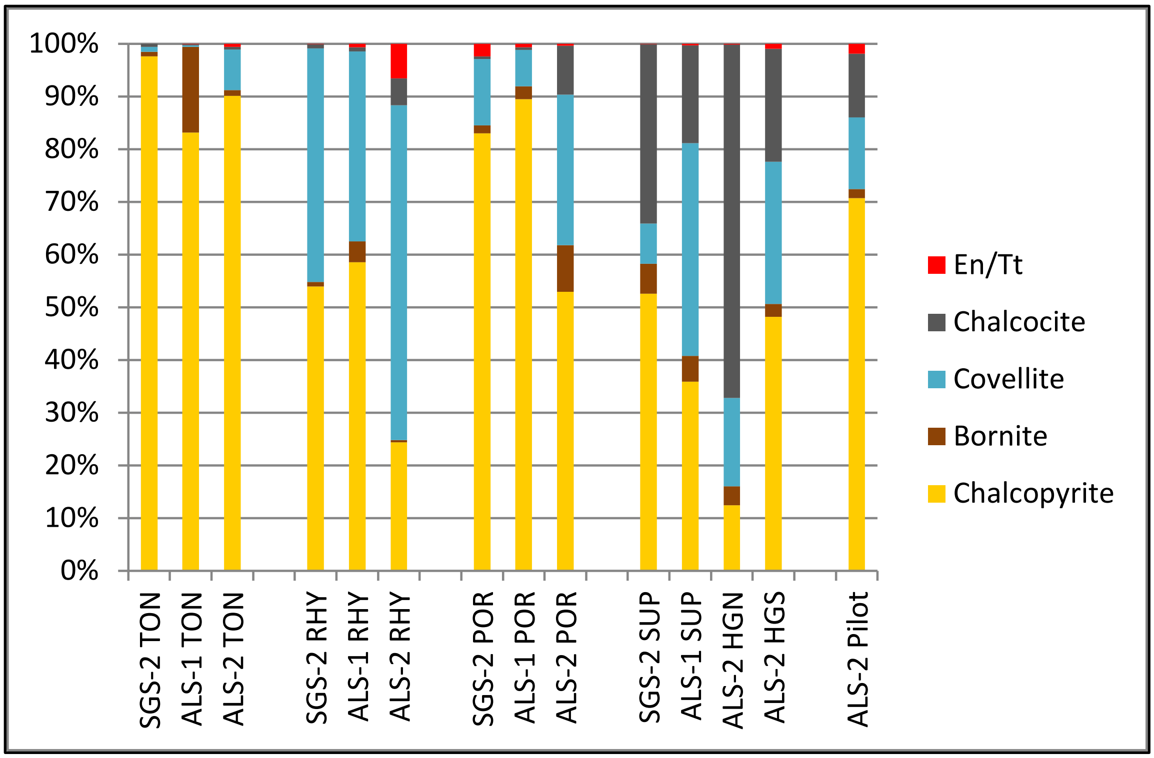


Figure 13-2: Copper deportment of master composites by test program

13.3.2 Gold Deportment

Terra Mineralogical conducted a study into the nature of observable gold in the Josemaria deposit. The five master composite samples were examined in multiple sections (Table 13-7). A total of 53 grains of gold mineralization were found from the five master composites. The gold is predominantly native gold (2 grains were electrum, 7 grains were gold-silver-telluride). Only 1 grain of liberated gold was found, but its size overwhelmed the volume statistics for the gold grains (54 microns).

Table 13-7: Summary of gold mineralogy

Mode of occurrence	# grains	Diameter (µm)	%Dist'n
Liberated	1	54.0	2
Attached - CuS	4	2.6	
Attached - Pyrite	4	3.9	
Attached - Gangue	3	2.2	
Total Attached	11	3.0	21
Grain Boundary - CuS	2	1.1	
Grain Boundary - Pyrite	9	1.4	
Grain Boundary - Gangue	15	2.0	
Total Grain Boundary	26	1.7	49
Inclusions - CuS	0	0.0	
Inclusions - Pyrite	15	1.4	
Inclusions - Gangue	0	0.0	
Total Inclusions	15	1.4	28
Total	53	2.9	
Liberated	1	54.0	2
Cu-S	6	2.4	11
Pyrite	28	1.6	53
Gangue	18	2.0	34

The non-liberated gold averaged 2 microns in diameter with only 2 grains being > 5 micron in diameter. The conclusion is that particulate gold is very fine. This corroborates the finding in SGS Phase I testing that there is little gravity recoverable gold in the deposit. Given that approximately 63 percent of the gold contained in the Josemaria deposit can be recovered to a final copper concentrate, a substantial fraction of the contained gold likely occurs as solid-solution gold contained within the copper minerals and is not observable in mineralogical work. Gold accounting in flotation test work, based on assay results, is relatively consistent and accurately reported. It is expected that fine-liberated gold will report to a final copper concentrate. The percentage this fine liberated or included gold represents is difficult to determine at this time but is likely a small fraction of the overall gold content.

13.3.3 Mineral Liberation

Figure 13-3 presents the ALS liberation data for the copper sulphide minerals at 130µm K80 primary grind size, while Figure 13-4 presents the estimated effect of primary grind size on copper sulphide liberation. At the 130µm K80 grind size, copper sulphide liberation ranges from 40% to 50% for the five composites. A 50% degree of liberation is generally targeted for good rougher flotation response. There is relatively little association of pyrite with the copper sulphides. It should be possible in rougher flotation to recover most of the copper sulphides with relatively low pyrite recovery. Most of the non-liberated copper sulphides were interlocked with non-sulphide gangue. On average, these particles were almost half copper sulphide with the remainder being gangue. These middlings would be expected to have sufficient surface exposure to allow flotation recovery of such particles. Reducing the primary grind sizing to 100µm K80 would increase copper sulphide liberation closer to an average of about 50 percent. Conversely, increasing the primary grind sizing would be expected to reduce copper sulphide liberation to under 40 percent for four of the composites. Based on the copper sulphide liberation data, 130µm K80 appears to be an appropriate primary grind sizing for this project.

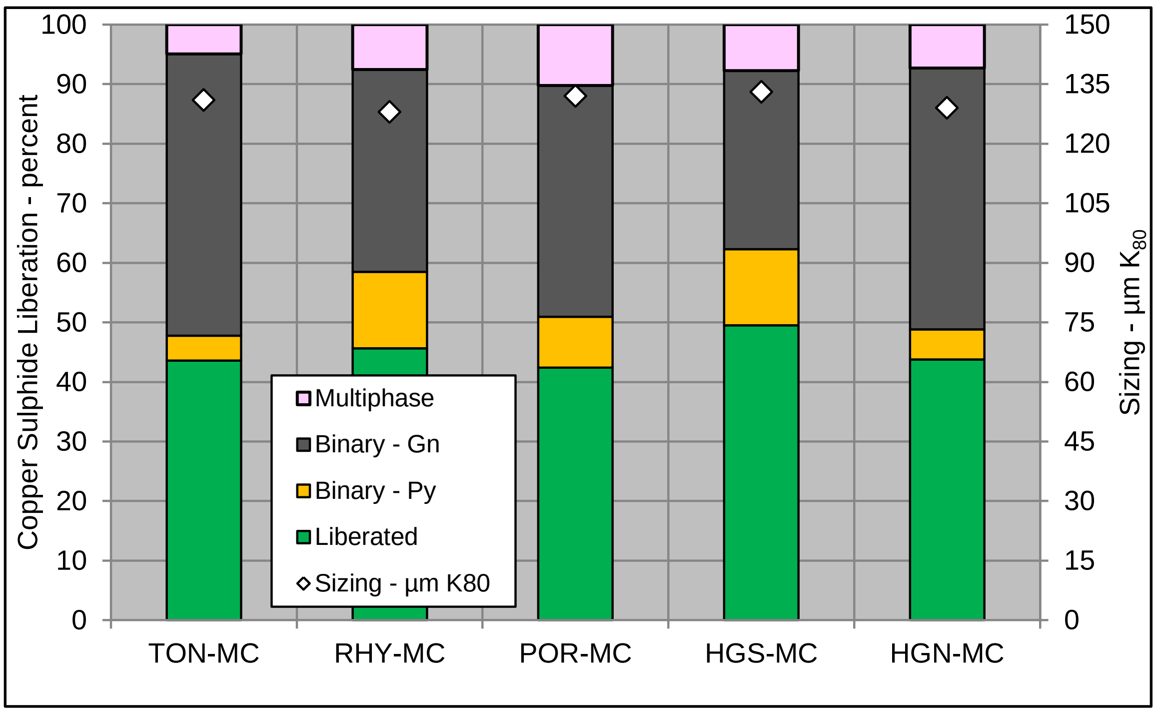


Figure 13-3: ALS liberation data for copper sulphide minerals

It is expected that the use of cyclone classification in the primary grinding circuits will benefit the liberation characteristics of the high-density copper sulphide minerals and should result in better liberation characteristics than that seen in laboratory testwork. The results of limited pilot plant testwork completed for this project where a cyclone classification circuit was employed showed elevated copper recovery in a majority of the metallurgical accounting. To be conservative, however, the project metallurgical accounting has been primarily based on laboratory locked cycle test results. The possibility of enhanced liberation in cyclone classification is a project opportunity going forward and should be examined in the next stage of work.

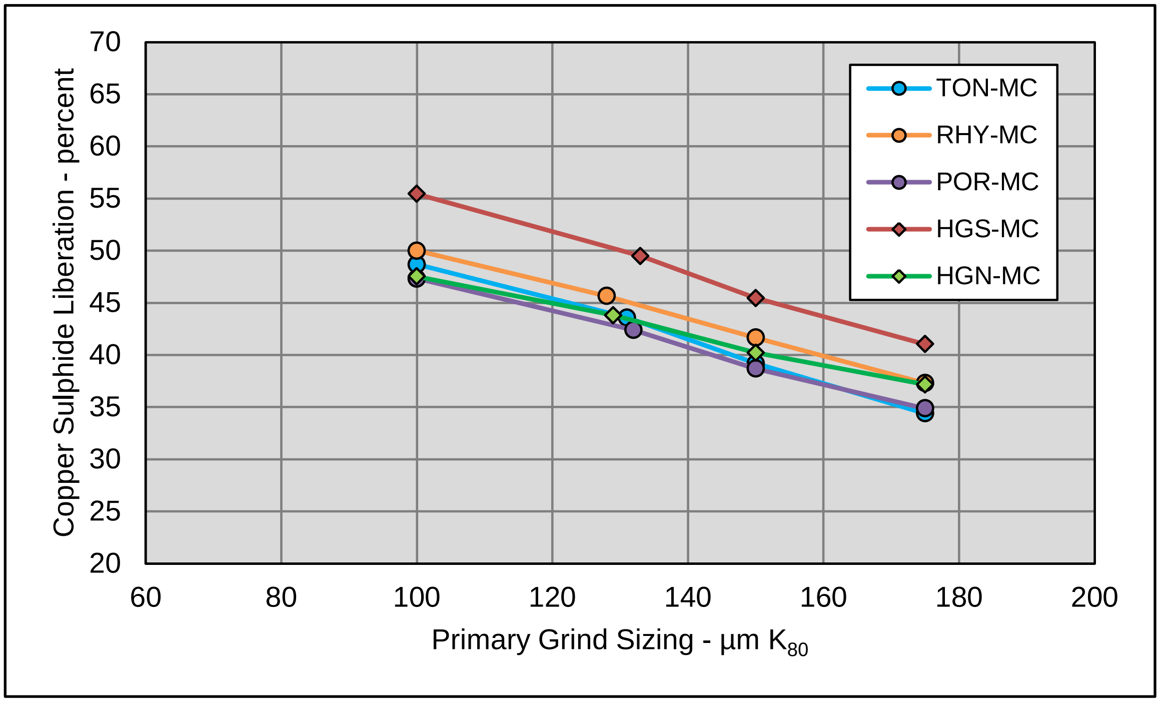


Figure 13-4: Estimated effect of primary grind size on copper sulphide liberation

13.4 Comminution

13.4.1 Comminution Testing

A total of 34 samples were tested in the ALS-2 program, 29 variability samples and 5 master composite samples used to prepare the Annual composites. All samples were subjected to SMC (19-22 mm fraction) and Bond Ball Mill Work Index (BWI, 100 mesh closing size) tests, while some samples were also subjected to Rod Mill Work Index tests (RWI). From the samples tested, the average SMC Axb value is 40.8 with a maximum (softest) value of 96.2 for an oxide Tonalite sample and a minimum (hardest) value of 23.1 for a Rhyolite sample. The average SAG Circuit Specific Energy (SCSE) is 10.7 Kwh/t. The average BWI is 11.9 with a minimum of 8.0 and maximum of 15.4. The average RWI is 12.8. Figure 13-5 presents the cumulative Axb frequency by lithology for all samples tested. SMC hardness tests (SAGability) indicate Rhyolite and Tonalite are the hardest while Porphyry is softer. The Supergene is softer still but has a broad distribution, as this material can be found overprinting any of the lithologies. Figure 13-6 presents the cumulative frequency of BWI by lithology for all samples tested. BWI hardness tests (ball mill hardness) indicate Tonalite is the hardest while Rhyolite is the softest. Table 13-8 summarizes the overall grindability data and provides a weighted average (by lithology) for the key comminution parameters.

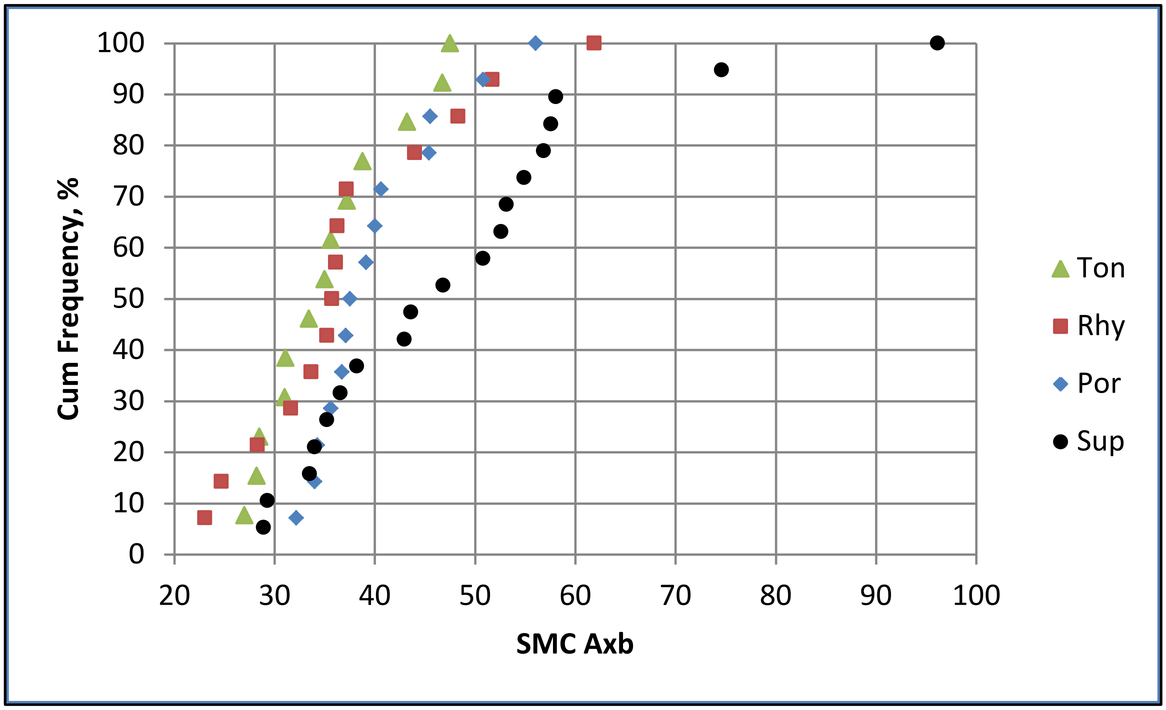


Figure 13-5: SMC Axb values by lithology

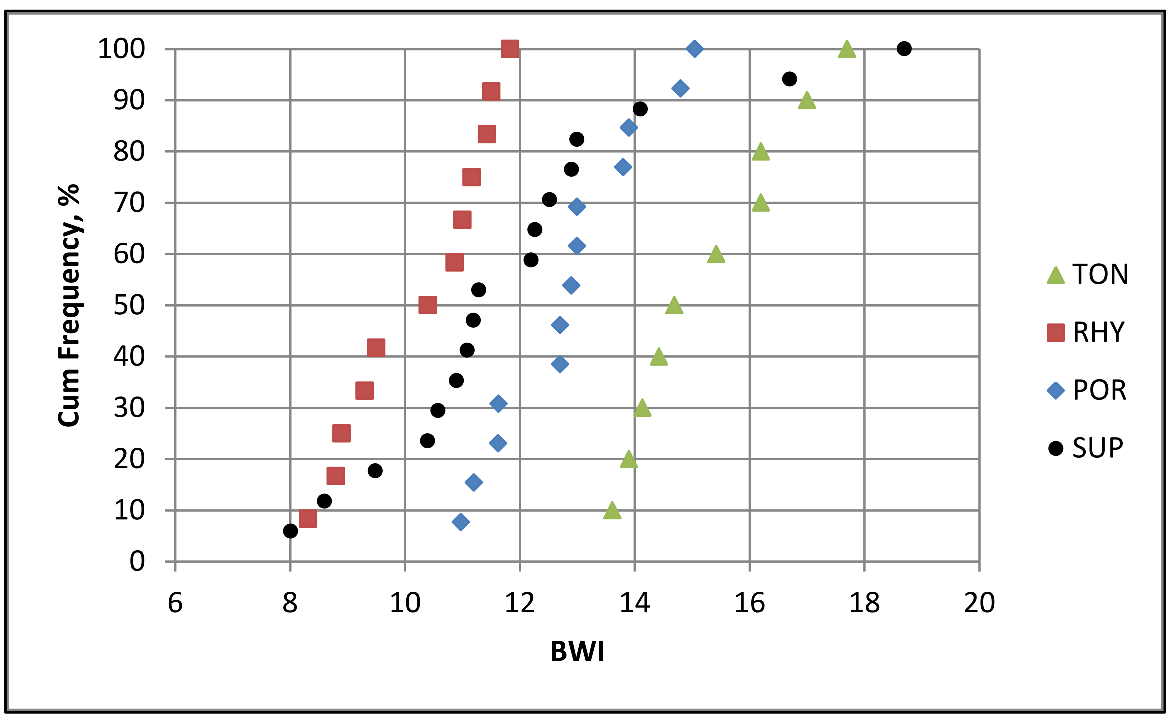


Figure 13-6: Bond Ball Mill Work Index values by lithology

Table 13-8: Comminution test results (ASL, 2020)

Sample	Axb	ta	SG	Mia	Mih	Mic	SCSE	RWI	BWI
VPOR-1	37.1	0.37	2.61	21.0	15.7	8.1	10.1	13.5	15.0
VPOR-2	34.3	0.34	2.60	22.3	16.9	8.7	10.4	14.2	11.6
VPOR-3	35.6	0.34	2.69	21.6	16.4	8.5	10.4	13.5	13.8
VPOR-4	56.0	0.53	2.75	15.0	10.4	5.4	8.6	13.2	11.0
VPOR-5	39.1	0.37	2.76	19.8	14.8	7.6	10.1	13.2	11.6
VPOR-6	32.2	0.31	2.71	23.3	18.0	9.3	11.0	14.2	12.9
Average	39.0	0.38	2.69	20.5	15.4	7.9	10.1	13.6	12.7
VRHY-1	24.7	0.23	2.80	28.5	23.4	12.1	12.9	15.4	11.2
VRHY-2	36.1	0.35	2.70	21.3	16.1	8.4	10.4	12.2	10.9
VRHY-3	33.7	0.32	2.76	22.2	17.1	8.8	10.9	12.2	8.3
VRHY-4	28.3	0.27	2.72	26.1	20.8	10.7	11.7	13.5	11.4
VRHY-5	31.6	0.30	2.72	23.7	18.5	9.5	11.1	13.5	10.4
VRHY-6	23.1	0.22	2.73	29.9	24.7	12.8	13.1	15.4	11.8
Y1-RHY	36.3	0.34	2.78	21.0	15.9	8.2	10.5		
Y3-RHY	37.2	0.36	2.70	20.6	15.5	8.0	10.2		
Average	31.4	0.30	2.74	24.2	19.0	9.8	11.3	13.7	10.7
VTON-1	31.1	0.31	2.63	24.2	18.8	9.7	11.0	13.3	13.6
VTON-2	28.2	0.27	2.68	26.2	20.8	10.8	11.6		15.4
VTON-4	33.4	0.32	2.67	22.8	17.4	9.0	10.7	13.8	14.7
VTON-5	43.2	0.42	2.67	18.3	13.3	6.9	9.5	13.8	14.1
VTON-7	35.0	0.36	2.54	22.0	16.5	8.6	10.3	13.3	11.3
Y1-TON	47.5	0.46	2.68	17.1	12.3	6.3	9.1		
Y2-TON	38.8	0.36	2.76	20.1	15.1	7.8	10.1		
Y4-TON	46.7	0.44	2.76	17.2	12.4	6.4	9.3		
VTON-3 oxide	96.2	0.94	2.64	9.7	6.0	3.1	6.9	12.3	12.3
VTON-6 oxide	28.9	0.30	2.53	25.9	20.2	10.5	11.2	12.3	14.4
Average *	38.0	0.37	2.67	21.0	15.8	8.2	10.2	13.6	13.8
VHGS-1	53.1	0.51	2.69	15.7	11.0	5.7	8.7	9.2	10.6
VHGS-2	34.0	0.34	2.61	22.3	16.9	8.8	10.5	12.1	12.5
VHGS-3	50.8	0.49	2.69	16.1	11.4	5.9	8.9	9.2	8.0
VHGS-4	58.1	0.56	2.71	14.6	10.0	5.2	8.4	12.1	11.1
VHGS-5	38.2	0.36	2.73	20.3	15.2	7.9	10.2		11.2
VHGN-1	57.6	0.59	2.53	14.9	10.1	5.2	8.3	10.8	10.9
VHGN-2	42.9	0.44	2.52	18.7	13.4	6.9	9.4	12.8	9.5
VHGN-3	56.8	0.58	2.52	15.0	10.2	5.3	8.3	10.8	8.6
VHGN-4	36.5	0.37	2.59	21.2	15.8	8.2	10.1	12.8	14.8
VHGN-5	43.6	0.45	2.50	18.6	13.3	6.9	9.3		11.5
Average	47.2	0.47	2.61	17.7	12.7	6.6	9.2	11.2	10.9
Overall Average	**39.4**	**0.38**	**2.67**	**20.7**	**15.6**	**8.1**	**10.1**	**12.8**	**11.8**

** oxides not included in TON averages*

13.4.2 Rougher Flotation Testing and Primary Grind Target

Rougher flotation tests were conducted on the five master composites at different grind sizes to generate recovery data as a function of grind size. The data shows a fairly consistent trend of approximately 0.03% to 0.04% change in recovery for every 1 micron change in grind size. The exception was the VHG-S sample with a 0.074% change in recovery for every 1 micron change in grind size, notably higher than for the other samples. There was no discernable change in gold recovery as a function of grind size.

The data from the previous SGS programs was also compared to the ALS-2 program (Table 13-9). There is good agreement between the SGS and ALS programs and thus the relationship between copper recovery slope vs. grind size should be considered well established. The average change in recovery for the three primary lithologies is 0.036% for every 1 micron change in grind size. Grind size has a more significant impact on copper recovery in the Supergene material, where a 1 micron change in grind size changes recovery by 0.056%.

Table 13-9: Copper recovery vs grind size

Composite	Program	Slope	Notes
TON	SGS-1	0.024	lower fresh
	SGS-2	0.035	
	ALS-2	0.031	
Average		0.030	
RHY	SGS-1	0.042	upper fresh
	SGS-2	0.047	
	ALS-2	0.037	
Average		0.042	
POR	SGS-1		
	SGS-2	0.050	
	ALS-2	0.024	
Average		0.037	
Overall Average (TON-RHY-POR)		0.036	
SUP	SGS-1	0.044	
	SGS-2	0.065	
	VHG-S	0.074	
	VHG-N	0.041	
Average (SUP)		0.056	

To determine the global economic optimum grind, the additional cost to grind finer is compared to the additional revenue gained from higher recovery. For this analysis, grinding costs were set at \$0.15/kWh, revenue was set to a \$3.00/pound copper price and NSR was set at 85% to simplify the calculations. The base grind was set to 180 micron, copper recovery slope was set to 0.03 (the average for the three primary lithologies in the ALS-2 program) and the BWI was set to 12 (the average from the ALS-2 program). Figure 13-7 shows an optimum economic grind at 130 microns for a plant feed containing portions of all lithologies.

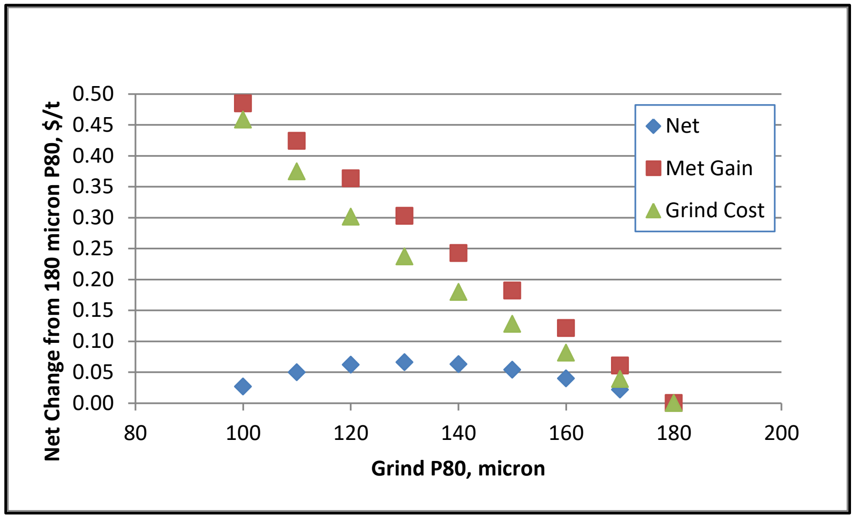


Figure 13-7: Relationship of grind size versus cost and revenue

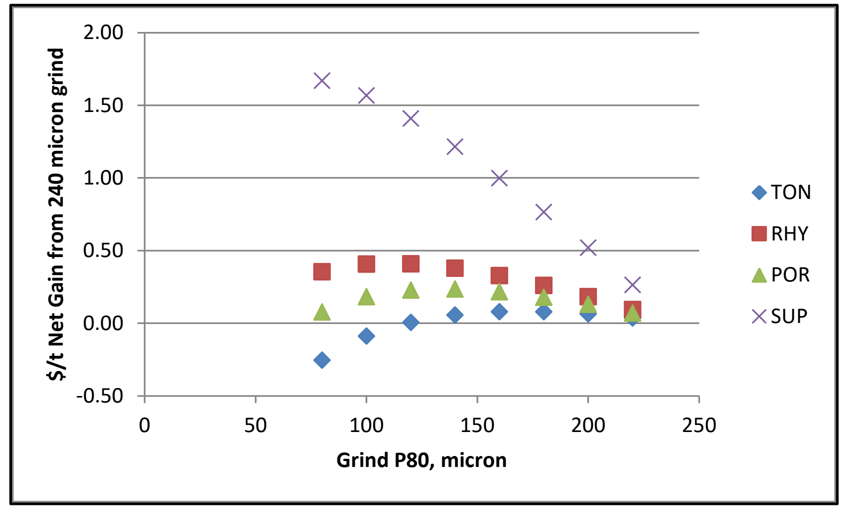


Figure 13-8: Optimum grind by lithology

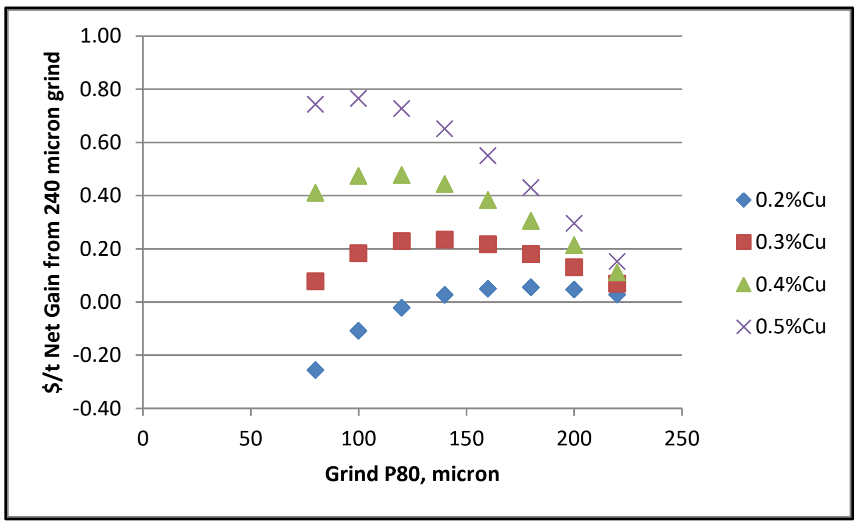


Figure 13-9: Optimum grind by copper head grade

Figure 13-8 summarizes the economic grind trade-off for each of the four lithologies. Each lithology has a different copper recovery slope, different average BWI and different head grade. The tonalite is expected to have an economic optimum grind of 160 microns with minimal effect from grinding finer as the higher BWI minimizes the impact of grinding finer. The porphyry sample has an optimum grind of 120 micron due to the lower BWI value and the rhyolite sample an even finer optimum grind of 110 micron due to an even lower BWI. The supergene material is projected to have a fine economic optimum grind due to a moderate BWI and higher copper head grade, indicating that the gains from copper recovery far outweigh the incremental grinding costs on a unit basis. Figure 13-9 presents the data as a function of head grade at a fixed BWI of 12. Low head grades have the economic optimum grind at a coarser grind size while higher copper heads (i.e., greater than 0.4% Cu) have the optimum grind closer to 100 microns.

13.5 Metallurgical Performance

Table 13-10 summarizes the LCT results from the ALS-2 program. A total of nine LCTs were conducted, with copper recovery varying from 80% to 87.4% and gold recovery varying from 50% to 70%. The three repeat tests (Tests 239, 240 and 241) improved upon the metallurgy from the initial LCTs.

Table 13-10: Results of Locked Cycle Tests

Stream	Mass	Assay (% or g/tonne)				Distribution (%)			
	%	Cu	S	Ag	Au	Cu	S	Ag	Au
TON-MC Test 60									
Rougher Feed	100	0.50	1.17	2.1	0.45	100	100	100	100
Copper Rougher Con	7.5	5.82	11.64	21.9	5.05	86.9	74.5	77.2	83.5
Copper 1st Clnr Tail	6.1	0.34	6.54	4.0	1.55	4.2	34.1	11.5	20.9
Copper 3rd Clnr Con	**1.4**	**29.9**	**34.1**	**101**	**20.5**	**82.7**	**40.4**	**65.7**	**62.6**
Pyrite Rougher Con	2.5	0.33	6.61	5.0	0.46	1.6	14.0	5.8	2.5
Pyrite Rougher Tail	90.1	0.06	0.15	0.4	0.07	11.5	11.5	17.0	14.0
TON-MC Test 239									
Rougher Feed	100	0.49	1.15	1.7	0.39	100	100	100	100
Rougher Tail	89.8	0.06	0.23	0.3	0.10	11.2	18.0	16.0	22.0
Rougher Concentrate	10.2	4.24	9.23	13.9	2.96	88.8	82.0	84.0	78.0
Cleaner Scav Tail	8.7	0.13	5.17	1.3	0.33	2.3	39.3	6.7	7.4
Final Concentrate	**1.5**	**28.5**	**33.2**	**88**	**18.5**	**86.5**	**42.7**	**77.3**	**70.5**
RHY-MC Test 61									
Copper Ro Feed	100	0.35	3.73	0.8	0.28	100	100	100	100
Copper Ro Con	7.9	4.05	28.9	8.9	2.58	92.9	61.5	83.7	73.8
Copper 1st Clnr Tail	6.8	0.27	27.2	1.0	1.04	5.4	49.9	8.1	25.6
Copper 3rd Clnr Con	**1.1**	**27.5**	**39.6**	**58**	**12.2**	**87.4**	**11.6**	**75.6**	**48.2**
Pyrite Rougher Con	5.0	0.18	22.3	1.0	0.67	2.6	29.9	5.9	12.1
Pyrite Rougher Tail	87.1	0.02	0.37	0.1	0.04	4.5	8.6	10.3	14.1
RHY-MC Test 240									
Rougher Feed	100	0.36	3.79	0.7	0.26	100	100	100	100
Rougher Tail	90.0	0.03	0.93	0.1	0.05	8.2	22.0	12.1	15.6
Rougher Concentrate	10.0	3.29	29.7	6.6	2.21	91.8	78.0	87.9	84.4
Cleaner Scav Tail	9.0	0.18	29.7	1.2	0.79	4.4	70.6	14.5	27.3
Final Concentrate	**0.9**	**33.6**	**30.4**	**59**	**16.0**	**87.3**	**7.4**	**73.4**	**57.1**

Stream	Mass	Assay (% or g/tonne)				Distribution (%)			
	%	Cu	S	Ag	Au	Cu	S	Ag	Au
POR-MC Test 57 *(with fuel oil)*									
Copper Ro Feed	100	0.35	2.56	1.0	0.22	100	100	100	100
Copper Ro Con	9.1	3.23	19.0	8.1	1.78	84.3	67.3	73.8	74.9
Copper 1st Clnr Tail	7.8	0.24	16.0	4.0	0.68	5.4	49.2	31.6	24.7
Copper 3rd Clnr Con	**1.2**	**22.2**	**37.6**	**34**	**8.8**	**78.9**	**18.1**	**42.2**	**50.2**
Pyrite Rougher Con	4.3	0.30	13.01	2.0	0.55	3.8	22.1	8.8	11.0
Pyrite Rougher Tail	86.6	0.05	0.31	0.2	0.04	12.0	10.6	17.4	14.1
POR-MC Test 72									
Copper Ro Feed	100	0.34	2.58	0.7	0.21	100	100	100	100
Copper Ro Con	8.9	3.29	15.9	6.2	1.60	85.2	54.9	80.4	66.5
Copper 1st Clnr Tail	7.8	0.24	13.1	2.0	0.65	5.4	40.0	22.7	23.8
Copper 3rd Clnr Con	**1.0**	**26.1**	**36.9**	**38**	**8.7**	**79.8**	**15.0**	**57.7**	**42.7**
Pyrite Rougher Con	4.6	0.27	19.13	2.0	0.52	3.6	34.2	13.4	11.2
Pyrite Rougher Tail	86.5	0.04	0.32	0.1	0.05	11.2	10.8	6.3	22.3
POR-MC Test 241									
Rougher Feed	100	0.33	2.60	0.7	0.20	100	100	100	100
Rougher Tail	88.1	0.07	1.00	0.3	0.07	19.5	33.9	35.5	30.7
Rougher Concentrate	11.9	2.23	14.4	4.0	1.17	80.5	66.1	64.5	69.3
Cleaner Scav Tail	10.9	0.14	13.1	1.4	0.38	4.8	55.2	20.6	20.7
Final Concentrate	**1.0**	**26.0**	**29.5**	**34**	**10.2**	**75.7**	**10.9**	**43.9**	**48.7**
HGS-MC Test 70									
Copper Ro Feed	100	0.88	2.39	1.5	0.50	100	100	100	100
Copper Ro Con	10.4	7.67	19.8	11.7	3.96	90.2	85.7	81.1	81.6
Copper 1st Clnr Tail	7.9	0.46	14.6	2.0	1.30	4.1	47.9	10.5	20.3
Copper 3rd Clnr Con	**2.5**	**30.3**	**36.1**	**42**	**12.3**	**86.0**	**37.8**	**70.6**	**61.3**
Pyrite Rougher Con	1.9	0.63	9.53	1.0	0.73	1.3	7.4	1.2	2.7
Pyrite Rougher Tail	87.8	0.09	0.19	0.3	0.09	8.5	6.9	17.7	15.7
HGN-MC Test 71									
Copper Ro Feed	100	0.97	1.19	1.2	0.33	100	100	100	100
Copper Ro Con	10.7	7.81	8.81	9.2	2.25	85.4	79.2	82.9	73.2
Copper 1st Clnr Tail	8.6	0.63	3.50	1.0	0.80	5.6	25.5	7.3	21.2
Copper 3rd Clnr Con	**2.0**	**38.4**	**31.5**	**44**	**8.5**	**79.8**	**53.7**	**75.6**	**52.1**
Pyrite Rougher Con	1.2	1.51	3.87	2.0	0.70	1.9	4.0	2.1	2.6
Pyrite Rougher Tail	88.1	0.14	0.23	0.2	0.09	12.7	16.8	15.0	24.1

For the TON samples, copper and gold recoveries improved 4% and 8%, respectively. For the RHY sample, copper recovery was the same, but the concentrate grade increased by 6% and gold recovery improved by 9%. The POR sample did not achieve any improvement in the metallurgy. The ALS modified procedure was able to improve the recovery through more aggressive rougher flotation and the addition of a cleaner scavenger to maximize cleaner recovery, all at a reduced operating cost due to reduced consumption of lime and the use of less costly collectors.

13.5.1 Copper Recovery

Copper recovery obtained from the ALS-2 test program is generally lower than achieved in the SGS-2 and ALS-1 programs (Figure 13-10). The data shows that higher levels of acid soluble copper (ASCu) result in higher tailings assays and hence lower recoveries.

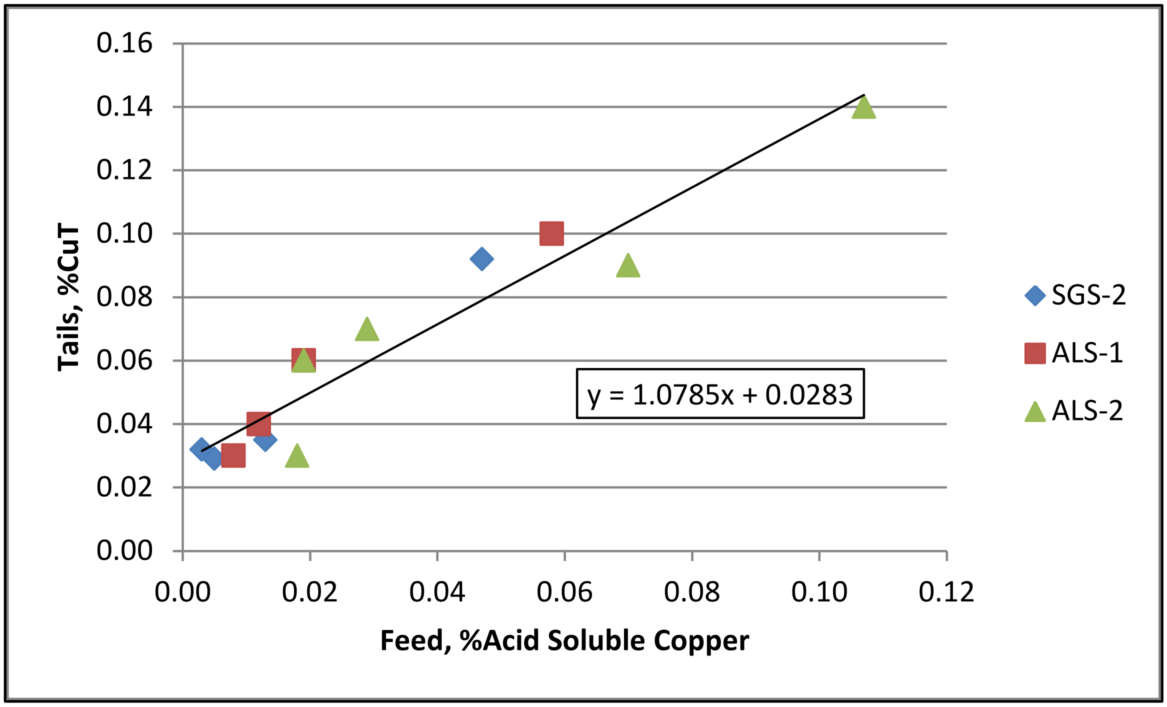


Figure 13-10: Copper in tailings (%) vs acid soluble copper (%) in feed

Samples near the oxide boundary, whether supergene enriched (high-grade samples) or not, have higher ASCu and will achieve lower recovery. Samples further from the oxide boundary are expected to have lower ASCu and will achieve higher recovery.

Most of the samples tested in SGS-2 and ALS-1 were low in ASCu and likely represent the bulk of the deposit. The samples in ALS-2 were generally from the initial 5 years of ore and hence were notably higher in ASCu than the previous programs.

13.5.2 Gold Recovery

Review of the gold recovery found that the rougher tailings were similar between SGS and the two ALS programs, and the difference was mostly in the cleaner losses. To better determine the nature of the gold losses, a series of diagnostic leaches were conducted in the ALS-2 program. The testing found that on average 85% of the gold in the cleaner tailing was cyanide soluble with only a few percent lost to the gangue. Further mineralogical examination of the gold losses in the cleaner tails of the pilot sample LCT and the actual pilot plant cleaner tail found limited gold grains. The conclusion of the examinations is that there was a lot less liberated gold in the pilot plant tail sample than the laboratory tail sample. This suggests that the main difference in recovery (10% difference between the LCT and pilot plant) is likely due to less liberated gold loss in the pilot plant.

13.5.3 Concentrate Grade

Re-grind was found to be an important variable for optimizing copper concentrate grade. The general observation was that any time concentrate grade was an issue, finer re-grind sizes always had a beneficial impact. Changes to other variables such as pH, collector dosage or time seldom had a similar impact on the concentrate grade.

The average re-grind from 31 to 22 microns resulted in concentrate grade improvement from 13% Cu to 22% Cu with no loss in recovery (Figure 13-11). A fine regrind for the Josemaria deposit is necessary to maximize copper concentrate grades. It is recommended that the re-grind targets for saleable concentrate production be in the range of 20 microns.

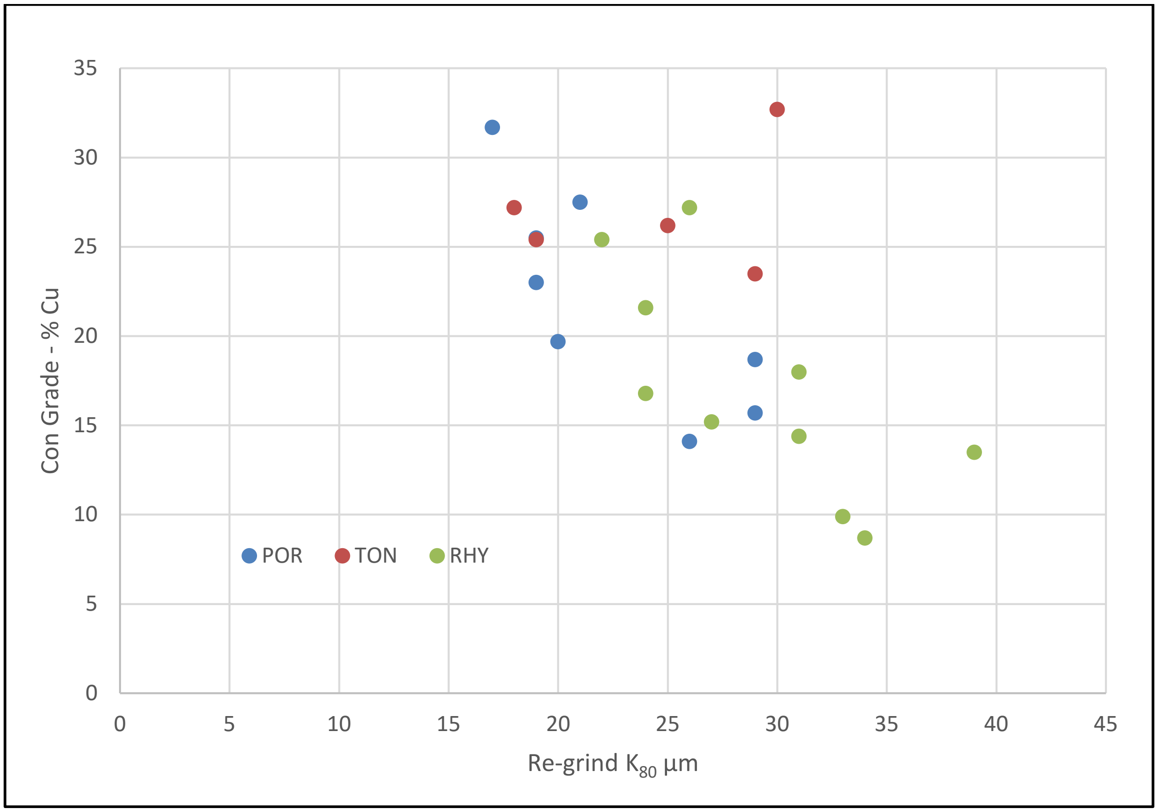


Figure 13-11: Relationship of re-grind (K_{80}) on copper concentrate grade

13.5.4 Concentrate Quality

Concentrate quality assays from the master composite samples and the pilot sample are summarized in Table 13-11.

Results indicate that Josemaria ore produces a clean globally marketable copper concentrate. The only element which could be problematic is arsenic, although levels are not expected to exceed 5000 ppm for concentrate shipments. Additional concentrate marketing information can be found in Section 19. The concentrate grades achieved from these tests were in line with other LCT testing conducted previously at ALS and SGS.

Some observations of the concentrate are as follows:

- Concentrate production is expected to be above minimum copper threshold levels for smelters
- Due to the presence of secondary copper mineralization, the concentrate grade from material out of supergene zone may result in a higher grade of copper in the concentrate
- The concentrate is expected to assay 10-15 g/t Au and 50-80 g/t Ag

Arsenic content is highest in the rhyolite lithology and mine planning activities will need to be aware of areas of high arsenic to reduce potential penalties from smelters

Table 13-11: Copper concentrate quality assays

Sample		TON	RHY	HGS	HGN	POR	Pilot Plant	Average
Test #		60	61	70	71	72		
Cu	%	29.9	27.5	30.3	38.4	26.1	26.2	29.7
Fe	%	27.5	26.0	25.9	19.5	27.7	21.7	24.7
S	%	34.1	39.6	36.1	31.5	36.9	30.0	34.7
Au	ppm	20.5	12.2	12.3	8.45	8.69	14.6	12.8
Ag	ppm	106	55	45	46	40	70	60.4
Al	%	0.49	0.57	0.42	0.76	0.95	1.2	0.7
As	ppm	659	4000	1290	495	558	2960	1660
Ba	ppm	50	130	70	60	80	210	100
Be	ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bi	ppm	8.7	10.7	3.7	2.7	8	9.6	7.2
Ca	%	0.05	0.12	0.05	0.06	0.12	0.1	0.1
Cd	ppm	93	15.8	15	6.3	27.2	40.1	32.9
Ce	ppm	15.1	27	11	29.5	16.2	26.7	20.9
Co	ppm	37	68	98	44	81	57	64.2
Cr	ppm	30	40	50	120	50	110	66.7
Cs	ppm	0.5	<0.5	0.5	0.7	<0.5	0.9	0.7
Ga	ppm	2.3	2	2	3.3	2.6	5.2	2.9
Ge	ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hf	ppm	<1	<1	<1	<1	<1	<1	<1
In	ppm	4.44	1.49	2.42	0.82	3.3	2.77	2.5
K	%	0.29	0.16	0.24	0.34	0.24	0.51	0.3
La	ppm	6	10	<5	11	6	11	8.8
Li	ppm	2	<2	<2	2	<2	4	2.7
Mg	%	0.14	0.02	0.05	0.13	0.06	0.09	0.1
Mn	ppm	110	20	50	100	80	110	78.3
Mo	ppm	2870	1500	1390	3620	2120	1925	2238
Na	%	0.02	0.02	0.03	0.1	0.03	0.08	0.0
Nb	ppm	1	<1	1	2	1	3	1.6
Ni	ppm	42	50	71	85	60	89	66.2
P	ppm	200	300	200	300	200	500	283
Pb	ppm	4970	161	169	84	514	1160	1176
Rb	ppm	11	7	9	14	10	14	10.8
Re	ppm	6.8	4.6	3.4	7.0	4.9	5.3	5.3
Sb	ppm	193	278	37	50	33	452	174
Sc	ppm	1	1	1	2	1	3	1.5
Se	ppm	80	70	70	70	60	70	70.0
Sn	ppm	26	16	19	7	5	8	13.5
Sr	ppm	11	60	53	28	55	125	55.3
Ta	ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Te	ppm	14.9	15.7	6	4.3	12.2	14.8	11.3
Th	ppm	2	7	3	3	3	5	3.8
Ti	%	0.06	0.03	0.05	0.14	0.07	0.11	0.1
Tl	ppm	0.6	1	1.1	0.9	0.9	1.4	1.0
U	ppm	<1	1	<1	1	1	1	1.0
V	ppm	14	20	11	57	44	39	30.8
W	ppm	1	1	1	1	1	2	1.2
Y	ppm	2	2	1	4	2	8	3.2
Zn	ppm	11600	480	960	290	4180	3770	3547
Zr	ppm	<5	<5	<5	9	<5	11	10.0
Cl	ppm	<50	110	110	<50	280	<50	167
F	ppm	130	110	120	200	160	200	153
Hg	ppm	1	<1	1	<1	<1	<1	1.0

13.5.5 Variability Testing

After the LCTs were conducted, an additional 29 variability composites and four annual composites were tested as variability samples in order to observe metallurgical response to changes within the orebody. The variability samples were the source materials for the generation of the five lithology master composites and part of the four annual composites. Head grade and mineralogical characteristics were described previously. Initial rougher testing used the original ALS test procedure. Rougher testing was repeated and followed by cleaner testing and some samples required a repeat cleaner test to improve the concentrate quality. The final results from the tests are summarized in Table 13-12. Overall copper recoveries varied from 52.6% to 93.3%, corresponding to concentrate grades that varied from 16.8% Cu up to 52.6% Cu. The losses to the rougher and final cleaner tailing are included in the table. The variability in recovery is due to losses in the rougher flotation stage. Cleaner copper losses are reliably 1.5% to 3% for all tests. The concentrate grade has significant variability due to the pyrite content of the different samples and no optimization test work was done to improve this aspect of the test result. It is expected that additional test work will improve the performance of the copper cleaning circuit and pyrite contamination will not be as significant as seen in the test work results.

One of the main conclusions of the variability testing is that some zones within the mine schedule will need to be discounted or rejected in terms of recovered copper value due to the acid soluble content and the impact on copper recovery. The average copper recovery for the variability samples is near that of the composite samples, ranging in the low- to mid-80% copper recovery. The copper recovery equation used in mine planning is based on acid soluble copper and had influence on the production schedule and cashflow analysis for the project.

Table 13-12: Variability sample metallurgy

Sample	Head Assay			Conc		% Recovery			
	%Cu	%ASCu	g/t Au	%Cu	g/t Au	Cu	Au	Cu Ro Tail	Cu Cl Tail
VPOR-1	0.28	0.054	0.13	19.7	7.4	64.9	54.6	27.4	3.1
VPOR-2	0.32	0.084	0.12	25.5	6.8	55.0	38.2	34.7	2.7
VPOR-3	0.30	0.010	0.28	27.5	15.1	81.0	49.3	11.6	1.9
VPOR-4	0.45	0.046	0.20	23.0	7.2	79.3	56.5	14.8	2.6
VPOR-5	0.24	0.010	0.22	18.7	9.6	72.6	41.9	21.5	2.4
VPOR-6	0.33	0.032	0.15	31.7	8.4	74.5	44.6	17.0	3.0
VTON-1	0.68	0.040	0.41	32.7	11.8	88.5	53.6	8.1	1.0
VTON-2	0.36	0.026	0.26	25.4	10.7	77.5	45.8	16.6	1.9
VTON-3	0.13	0.078	0.58	Oxide					
VTON-4	0.35	0.006	0.36	27.2	22.8	80.1	67.5	14.0	1.7
VTON-5	0.48	0.006	0.48	23.5	17.6	81.7	62.4	13.4	1.7
VTON-6	0.31	0.278	0.25	Oxide					
VTON-7	0.53	0.022	0.44	26.2	13.5	88.2	56.6	7.7	1.4
VRHY-1	0.25	0.010	0.20	21.6	7.5	79.8	34.1	9.0	3.7
VRHY-2	0.25	0.022	0.19	25.4	11.6	79.8	49.0	12.1	3.7
VRHY-3	0.56	0.038	0.35	27.2	11.5	89.4	60.6	5.4	2.5
VRHY-4	0.31	0.012	0.32	16.8	10.3	84.9	48.8	6.9	3.3
VRHY-5	0.44	0.012	0.26	18.0	7.9	92.3	64.6	3.8	1.6
VRHY-6	0.24	0.012	0.19	20.4	11.1	80.3	52.2	9.3	3.9
VHGS-1	1.30	0.042	0.81	25.3	11.5	93.3	72.0	4.0	1.0
VHGS-2	0.86	0.182	0.26	47.6	10.9	67.6	53.7	24.7	2.1
VHGS-3	0.72	0.052	0.38	28.9	10.4	91.3	65.4	5.7	1.2
VHGS-4	0.51	0.024	0.41	19.9	11.1	90.8	62.5	5.6	1.4
VHGS-5	0.83	0.056	0.42	25.5	10.1	87.9	72.6	7.3	1.8
VHGN-1	0.78	0.090	0.27	48.2	12.5	81.6	63.5	13.8	1.6
VHGN-2	1.25	0.078	0.45	43.3	9.1	87.7	51.7	7.9	1.3
VHGN-3	0.96	0.142	0.19	27.1	3.9	67.3	47.6	27.4	2.4
VHGN-4	0.88	0.162	0.34	24.0	7.8	74.7	63.7	18.2	3.5
VHGN-5	0.86	0.098	0.21	52.6	9.5	83.2	62.3	11.4	1.6

13.6 Recovery Modelling

13.6.1 Copper Recovery

Metallurgical testing indicated that copper recovery is correlated with copper head grade and weak acid-soluble copper. This is indicated below in Figure 13-12 and Figure 13-13. Note that the head grade plot has been binned into % acid-soluble copper (%ASCu) ranges to show the relationship at relatively constant %ASCu values.

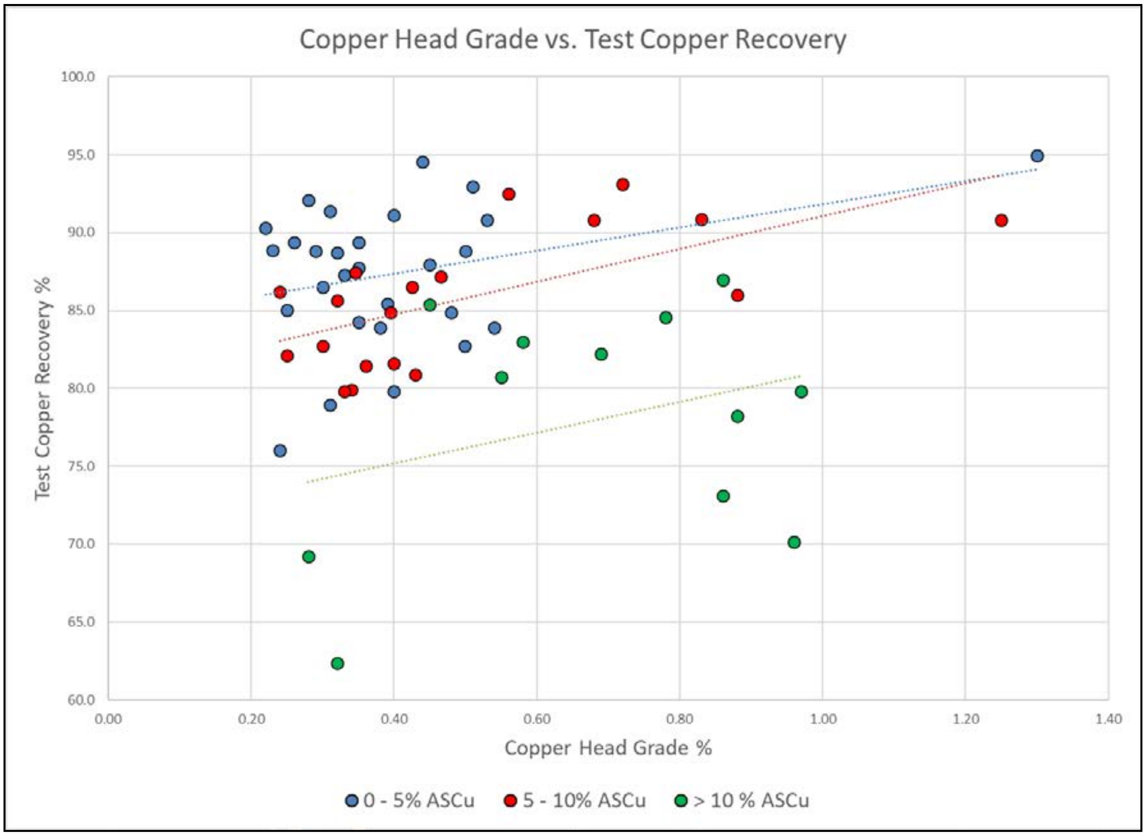


Figure 13-12: Relationship of copper recovery vs copper head grade

Following a detailed investigation of these relationships, the following equation was developed to model the copper recovery based on the two variables:

$$RecCu = 95.89 + (4.093 \times \ln(Cu\%)) – (1.043 \times \%ASCu)$$

It should be noted that there was a systematic difference between the acid-soluble copper assays between ALS, who analyzed the metallurgical samples, and SGS, who analyzed the drill core samples. This difference is due to the assay procedure (strength of acid, dissolution time, etc.) and is not unusual. As a result, the %ASCu constant in the equation is 1.043 when calculating copper recoveries from samples analyzed by ALS and 0.696 when calculating copper recoveries from drill core assays or resource model blocks. The SGS %ASCu are 50% higher than the ALS values.

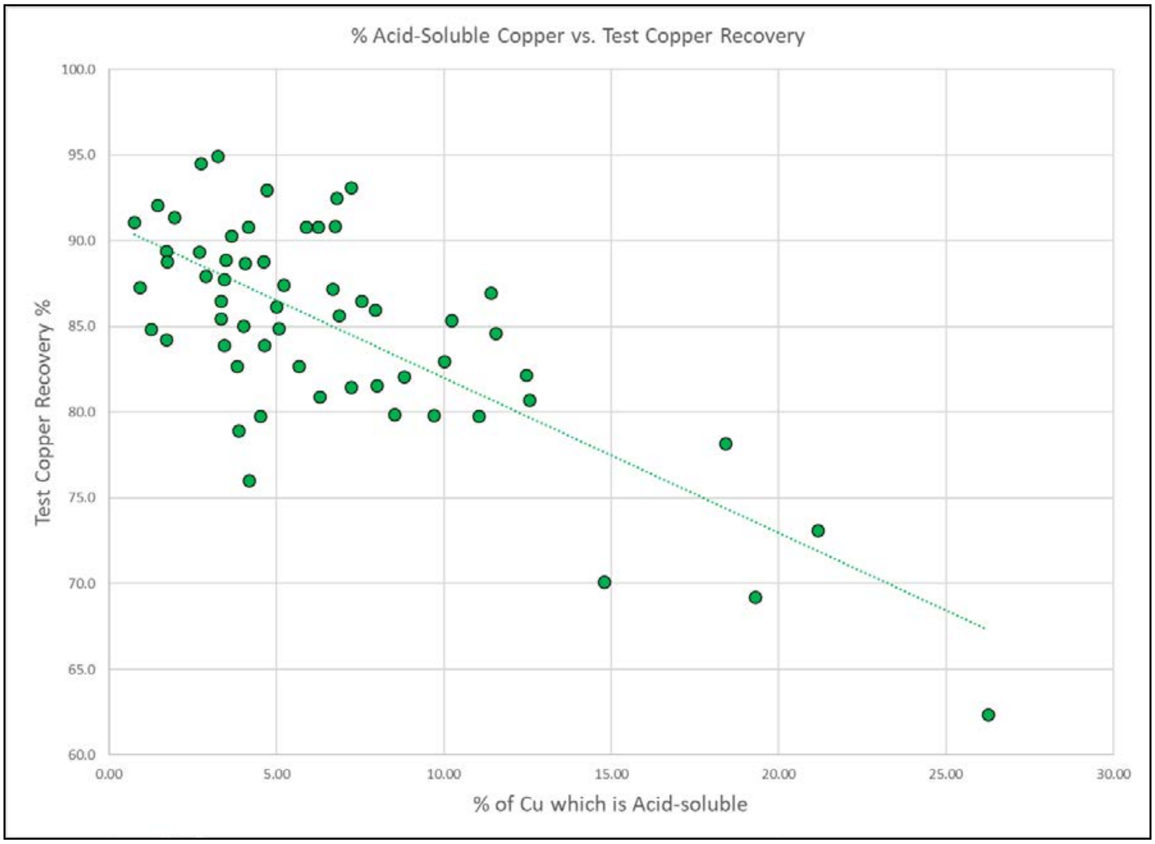


Figure 13-13: Relationship of copper recovery vs acid soluble copper content

Comparison between the test copper recovery values and the modelled copper recovery values indicates a reasonable fit, with a slope of 1.0048 (with the intercept set at zero) and an r-squared value of 0.46 (Figure 13-14).

Recoveries were added to the block model by first estimating copper head grade and %ASCu into the blocks and then applying the above formula.

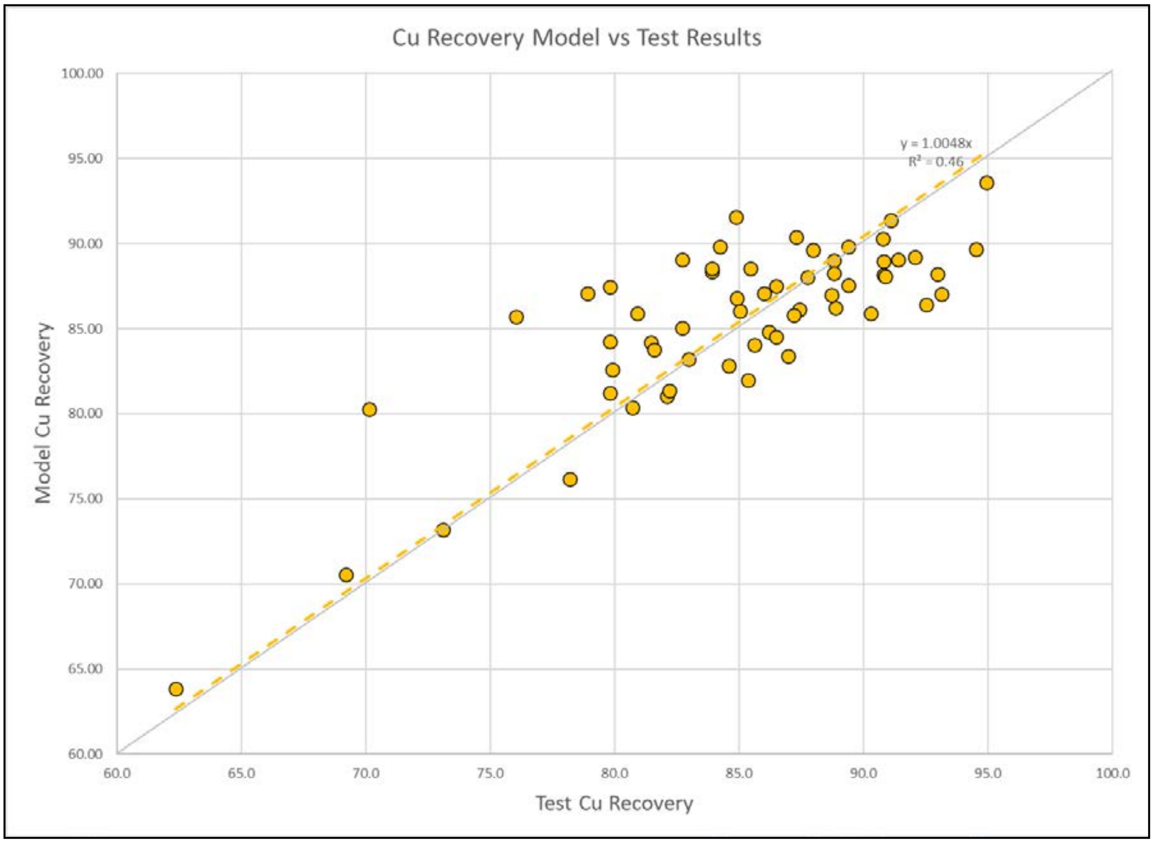


Figure 13-14: Modelled copper recovery vs test results

13.6.2 Gold Recovery

Metallurgical testing indicated that gold recovery is correlated with gold head grade, although there is a lot of scatter in the relationship. Various attempts to find other correlative factors were unsuccessful, and the final recovery model is based solely on head grade.

In order to simplify the relationship, samples were grouped by head grade values and plotted on top of individual samples. This approach provided a better relationship, which still honoured the general trend of the individual test data points. In addition, the line fit through the grouped points passes through the pilot plant data point as well as the average of all test data points (Figure 13-15).

The line through the grouped points is described by the equation:

$$RecAu = (31.561 * \text{Au head grade g/t}) + 53.989$$

This equation was used to calculate gold recoveries in the block model. It should be noted that the diluted grade was used to calculate the final recoveries. Comparison between the test gold recovery values and the modelled gold recovery values showed that the equation did a good job of predicting lab results.

Recoveries were added to the block model by applying the above formula to the diluted block gold grades.

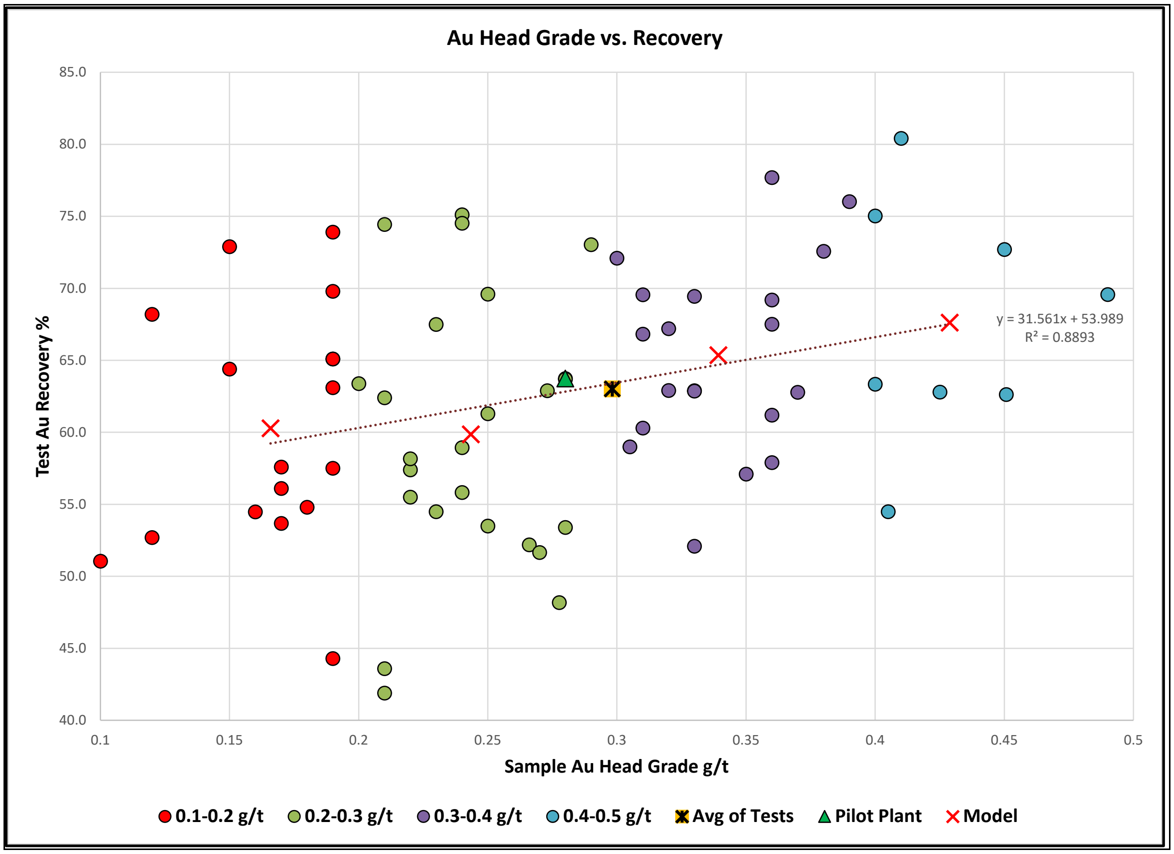


Figure 13-15: Modelled gold recovery vs test results

13.6.3 Silver Recovery

Silver recovery from the last three tests programs is summarized in Figure 13-16. The figure shows silver recovery is typically bound between 60 and 80% throughout the range of silver head grades tested. A similar approach to gold recovery was taken to simplify the recovery model, however for silver there was no discernable impact from head grade. Hence recovery was fixed to 72% for all silver head grades. The value is the average from all test programs, and very consistent between test programs.

Testwork samples were selected by qualified Josemaria geological staff providing suitable geospatial distribution of samples within the pit and adequately representing all lithologies over the five testwork programs. ALS-2 testwork samples are representative of the early payback years of the deposit and the number of variability tests conducted ensure metallurgical responses have been tested for a broad range of material characteristics that may be expected within the Josemaria deposit.

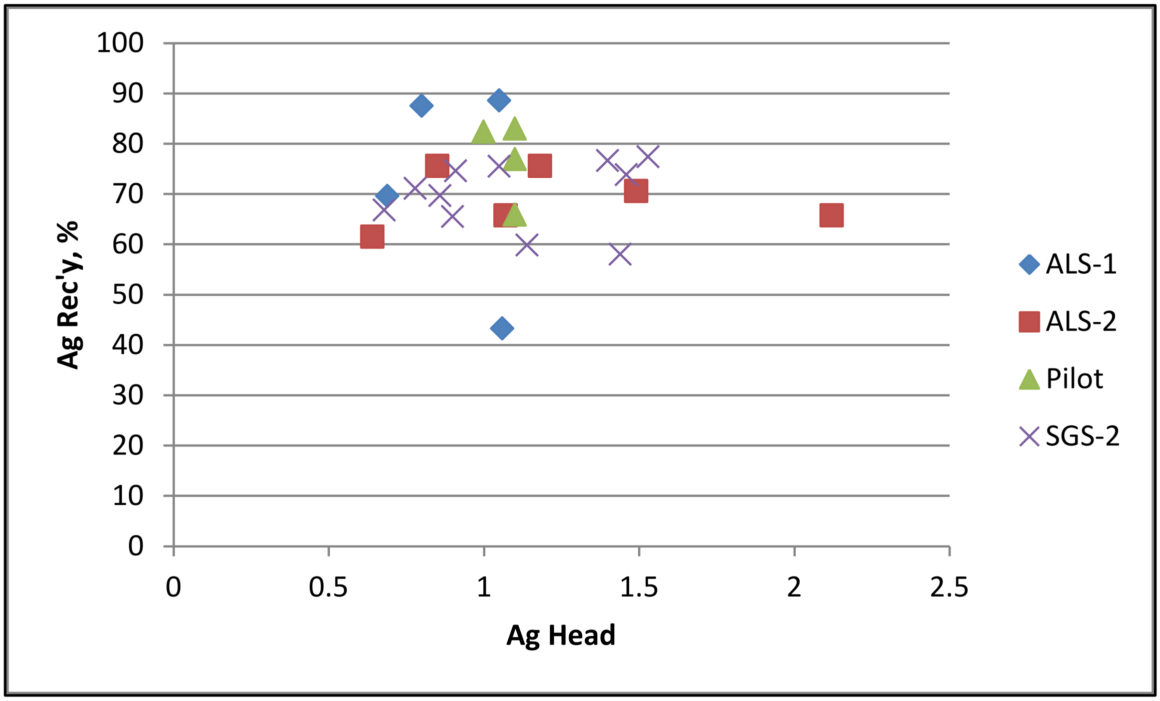


Figure 13-16: Silver head grade vs silver recovery

14 Mineral Resource Estimate

This mineral resource estimate is an update of, and replaces, the previous mineral resource estimate documented in the NI 43-101 Technical Report dated December, 2018. This update includes an additional 29 holes drilled since the previous estimate. Controls used in grade estimation are based on geologic models developed by Josemaria and their consulting personnel. Grades were estimated by conventional techniques. Currently revenue is anticipated from copper, gold, and silver; molybdenum could have the potential to add value pending further study. Arsenic was modelled as a potential deleterious element; iron and sulphur have been estimated for processing use.

This mineral resource estimate was completed using Geovia GEMS® software using industry standard techniques. The resource has been classified in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2014).

14.1 Available Drill Data and Model Setup

This updated mineral resource estimate is based on 156 holes totalling 67,600 m including all drilling completed to the end of the 2018/19 field season. Available drilling as well as the extents of the resource block model and the crest of the optimized resource pit shell, are shown in Figure 14-1. A breakdown of drilling within the limits of the resource block model, by season and drill type, is presented in Table 14-1; the majority of drilling is core.

Table 14-1: Available drilling

Season	Core		RC		Total	
	# holes	metres	# holes	metres	# holes	metres
03/04			10	3,475	10	3,475
04/05	5	2,406	19	7,518	24	9,924
05/06	2	1,700			2	1,700
06/07			13	5,210	13	5,210
09/10	6	1,953			6	1,953
10/11	3	1,050			3	1,050
11/12	39	19,236			39	19,236
12/13	18	8,228			18	8,228
13/14	12	6,234			12	6,234
18/19	29	10,623			29	10,623
Total:	**114**	**51,429**	**42**	**16,203**	**156**	**67,632**

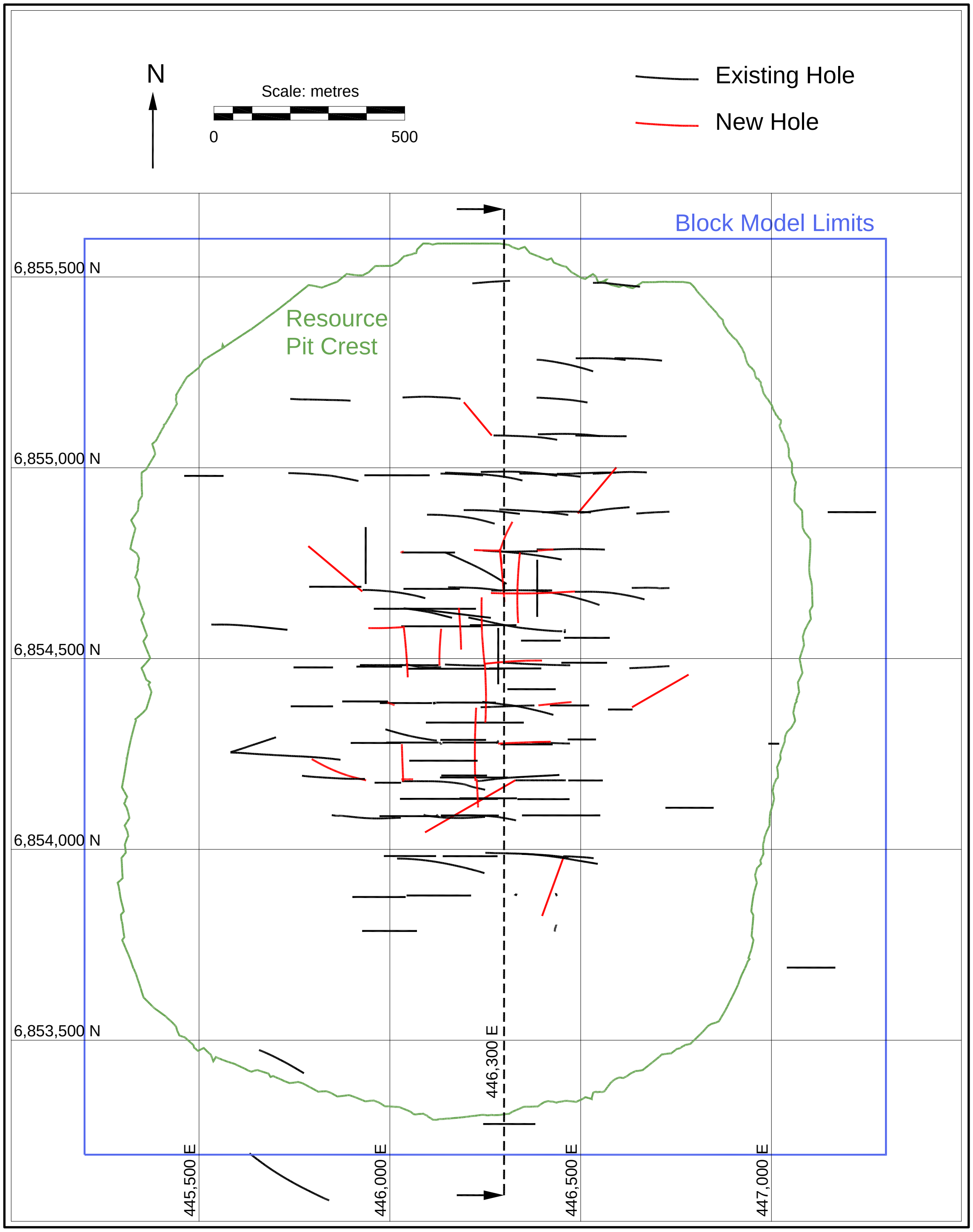


Figure 14-1: Josemaria exploration drilling and block model limits

Block dimensions are unchanged from the previous mineral resource estimate. The project has been converted to UTM NAD84 coordinates from the previous Gauss Krüger (Campo Inchauspe, Zone 2) system. Block model configuration details are listed in Table 14-2.

Table 14-2: Block model setup

Block:	X	Y	Z
origin(1)	445,200	6,853,200	5,000
size (m)	25	25	15
no.blocks	84	96	94
no rotation; 758,016 blocks			

(1) *SW model top, block edge*

14.2 Geologic Model

Three geologic models were interpreted by Josemaria Resources personnel and their consultant. Lithology, mineralization and alteration volumes were developed using Leapfrog® software. Assay statistics and contact plots for copper, gold, silver, molybdenum, arsenic, iron, and sulphur were examined based on the three geologic models; the goal of that examination being to aid in the determination of the most suitable approach to domaining the deposit as control in the grade estimation process.

For all elements except arsenic, the mineralization model was deemed most suited for use in grouping assay data for grade estimation. The alteration solids were used to control arsenic estimation due mainly to the correlation of high arsenic grades with the high-sulphidation alteration zone. Wireframe volumes modelled in the three geologic interpretations are listed in Table 14-3.

Table 14-3: Modelled geologic variables

MinCode	
100	Oxide
200	Mixed
300	Non-Mineralized
400	Pyrite Chalcopyrite
500	Pyrite Chalcocite (Supergene)
600	Pyrite Chalcocite (Hypogene)

AltCode	
10	Potassic
20	Sericite-Chlorite-Clay
30	Sericitic
40	Advanced Argillic
50	High Sulphidation
60	No Alteration

LithCode	
1	Porphyry-Early
2	Porphyry-Late
3	Rhyolite
4	Tonalite
5	Post Mineral Volcanics

14.3 Assay Compositing

Assays were composited to a constant length of two metres from hole collars. The composite interval was chosen based on the fact that 87% of assays are two metres in length and another 12% are one metre. Composites were back-tagged with integer codes reflecting the lithology, mineralization and alteration models by intersecting drillholes with the geologic solids.

In total, 33,750 composites were used for grade estimation. Thirty short composites, less than one metre in length occurring at hole bottoms, were removed from the dataset. Unassayed intervals were assigned default very low (non-zero) values during the compositing process.

14.4 Grade Capping

Grade capping is used to control the impact of extreme, outlier high-grade samples on the overall resource estimate. Grades were capped only for the revenue metals Cu, Au, Ag and Mo. Assays were examined in histograms and probability plots to determine levels at which values are deemed outliers to the general population. These cap values (Table 14-4) were applied by metal, by mineralized zone prior to compositing. Uncapped and capped composite statistics by MinCode are presented in Table 14-5 to Table 14-8. Arsenic, iron and sulphur were not capped (Table 14-9 to Table 14-11).

Table 14-4: Assay capping levels

MinCode		Cu (%)	Au (g/t)	Ag (g/t)	Mo (ppm)
100	Oxide	0.9	1.3	10.0	500
200	Mix	1.4	1.3	7.5	500
300	Non-Min	1.3	0.8	9.0	250
400	PyCpy	1.4	3.0	*uncap*	2000
500	PyCC(S)	2.4	1.4	13.0	*uncap*
600	PyCC(H)	*uncap*	*uncap*	13.0	700

Table 14-5: 2 m composite statistics - copper by MinCode

MinCode		Count	Cu(%)			CuCap(%)			
			mean	max	CV	#Cap	mean	max	CV
100	Oxide	3,428	0.10	1.98	1.4	10	0.09	0.90	1.4
200	Mix	1,940	0.27	2.25	0.9	2	0.27	1.40	0.9
300	Non-Min	4,743	0.09	3.42	2.0	6	0.08	1.30	1.8
400	PyCpy	11,713	0.30	2.45	0.6	7	0.30	1.40	0.6
500	PyCC(S)	2,375	0.69	11.11	0.6	7	0.69	2.40	0.5
600	PyCC(H)	9,551	0.22	1.93	0.8	0	0.22	1.93	0.8
Total		33,750	0.25			32	0.25		

Table 14-6: 2 m composite statistics - gold by MinCode

MinCode		Count	Au(g/t)			AuCap(g/t)			
			mean	max	CV	#Cap	mean	max	CV
100	Oxide	3,428	0.21	4.69	1.0	7	0.21	1.30	0.8
200	Mix	1,940	0.25	9.30	1.6	6	0.23	1.30	0.8
300	Non-Min	4,743	0.06	1.17	1.7	1	0.06	0.80	1.7
400	PyCpy	11,713	0.23	6.49	0.9	4	0.23	3.00	0.8
500	PyCC(S)	2,375	0.33	2.14	0.6	2	0.33	1.40	0.5
600	PyCC(H)	9,551	0.17	3.75	1.0	0	0.17	3.75	1.0
Total		33,750	0.19			20	0.19		

Table 14-7: 2 m composite statistics - silver by MinCode

MinCode		Count	Ag(g/t)			AgCap(g/t)			
			mean	max	CV	#Cap	mean	max	CV
100	Oxide	3,428	1.0	124.6	3.4	12	0.9	10.0	1.0
200	Mix	1,940	1.0	52.0	1.7	5	0.9	7.5	0.9
300	Non-Min	4,743	0.5	101.0	3.4	6	0.4	9.0	1.4
400	PyCpy	11,713	1.1	102.8	2.1	0	1.1	102.8	2.1
500	PyCC(S)	2,375	1.6	127.8	2.2	9	1.4	13.0	0.8
600	PyCC(H)	9,551	0.7	101.0	2.1	11	0.6	13.0	1.2
Total		33,750	0.9			43	0.9		

Table 14-8: 2 m composite statistics - molybdenum by MinCode

MinCode		Count	Mo(ppm)			MoCap(ppm)			
			mean	max	CV	#Cap	mean	max	CV
100	Oxide	3,428	51	682	1.0	3	51	500	1.0
200	Mix	1,940	55	550	0.9	1	55	500	0.9
300	Non-Min	4,743	18	432	1.8	8	17	250	1.7
400	PyCpy	11,713	66	2,394	1.2	1	66	2,000	1.2
500	PyCC(S)	2,375	86	1,563	1.0	0	86	1,563	1.0
600	PyCC(H)	9,551	48	1,060	1.2	3	48	700	1.1
Total		33,750	53			16	53		

Table 14-9: 2 m composite statistics - arsenic by AltCode

AltCode		Count	As(ppm)		
			mean	max	CV
10	Potassic	1,065	21	1,344	3.5
20	SCC	13,700	27	1,855	3.8
30	Sericitic	6,250	43	10,001	4.0
40	Adv. Arg.	7,161	51	2,462	2.0
50	HiSulph	1,181	337	10,001	1.9
60	No Alt	4,393	33	4,990	5.8
Total		33,750	47		

Table 14-10: 2 m composite statistics - iron by MinCode

MinCode		Count	Fe(%)		
			mean	max	CV
100	Oxide	3,428	3.92	18.40	0.4
200	Mix	1,940	4.23	16.05	0.3
300	Non-Min	4,743	3.28	10.45	0.5
400	PyCpy	11,713	3.89	8.86	0.3
500	PyCC(S)	2,375	3.68	9.50	0.3
600	PyCC(H)	9,551	3.72	20.88	0.4
Total		33,750	3.77		

Table 14-11: 2 m composite statistics - sulphur by MinCode

MinCode		Count	S(%)		
			mean	max	CV
100	Oxide	3,428	0.5	7.0	1.3
200	Mix	1,940	1.9	17.8	0.9
300	Non-Min	4,743	1.9	13.5	1.2
400	PyCpy	11,713	2.0	10.0	0.7
500	PyCC(S)	2,375	1.5	8.9	0.9
600	PyCC(H)	9,551	3.5	22.1	0.5
Total		33,750	2.2		

The impact of grade capping can be measured by comparing uncapped and capped estimated grades above a zero cut-off. Metal removed by capping is generally low reflecting the fact that relatively few assays were capped. Metal removed through capping amounts: 0.0% Cu, 1.0% Au, 8.5% Ag and 0.9% Mo.

14.5 Variography

Spatial continuity of capped composite data was analysed using Supervisor® software. Variogram models were fit for each metal in each of the geologic control domains: MinCode or AltCode (for arsenic). The variogram models used for estimation of the revenue metals are listed in Table 14-12 to Table 14-15.

Directions of continuity were determined from variogram maps. The nugget effect and sill contributions were derived from down-hole experimental variograms followed by final model fitting on directional variogram plots.

Table 14-12: Copper variogram models

MinCode	Axis	Direction (dip/azimuth)	Nugget Effect	Spherical Component 1		Spherical Component 2	
				Sill	Range(m)	Sill	Range(m)
100. Oxide	X	-17/327	0.07	0.18	45	0.75	410
	Y	-10/233			90		480
	Z	70/295			40		255
200. Mix	X	00/090	0.12	0.26	50	0.62	450
	Y	00/000			115		330
	Z	90/000			90		150
300. NMin	X	-02/150	0.08	0.37	130	0.55	190
	Y	20/060			25		300
	Z	70/235			20		215
400. PyCpy	X	72/309	0.10	0.24	45	0.66	465
	Y	10/188			35		435
	Z	15/095			25		300
500. PyCc(S)	X	38/177	0.22	0.33	55	0.45	130
	Y	-48/148			15		50
	Z	15/075			15		35
600. PyCc(H)	X	85/290	0.09	0.14	15	0.77	105
	Y	00/200			115		305
	Z	05/110			105		335

Table 14-13: Gold variogram models

MinCode	Axis	Direction (dip/azimuth)	Nugget Effect	Spherical Component 1		Spherical Component 2	
				Sill	Range(m)	Sill	Range(m)
100. Oxide	X	28/257	0.11	0.17	55	0.72	475
	Y	-10/173			85		325
	Z	60/100			15		285
200. Mix	X	00/000	0.10	0.10	105	0.80	485
	Y	00/270			55		265
	Z	90/000			10		120
300. NMin	X	68/352	0.07	0.16	15	0.77	425
	Y	09/238			115		515
	Z	20/145			95		165
400. PyCpy	X	69/351	0.16	0.15	75	0.69	500
	Y	14/219			60		205
	Z	15/125			35		190
500. PyCc(S)	X	60/026	0.16	0.26	40	0.58	150
	Y	30/218			190		415
	Z	05/125			40		105
600. PyCc(H)	X	00/015	0.06	0.12	50	0.82	385
	Y	75/285			25		175
	Z	15/105			60		355

Table 14-14: Silver variogram models

MinCode	Axis	Direction (dip/azimuth)	Nugget Effect	Spherical Component 1		Spherical Component 2	
				Sill	Range(m)	Sill	Range(m)
100. Oxide	X	03/061	0.24	0.29	35	0.47	200
	Y	40/328			20		175
	Z	50/155			30		150
200. Mix	X	00/015	0.26	0.19	50	0.55	270
	Y	00/285			30		270
	Z	90/000			15		90
300. NMin	X	-69/178	0.23	0.27	155	0.50	515
	Y	20/163			15		230
	Z	05/255			125		355
400. PyCpy	X	-15/058	0.57	0.32	75	0.11	255
	Y	72/022			40		310
	Z	10/145			65		190
500. PyCc(S)	X	04/059	0.29	0.40	30	0.31	95
	Y	-25/331			90		185
	Z	65/320			40		195
600. PyCc(H)	X	00/045	0.27	0.22	50	0.51	510
	Y	-20/315			50		520
	Z	70/315			65		275

Table 14-15: Molybdenum variogram models

MinCode	Axis	Direction (dip/azimuth)	Nugget Effect	Spherical Component 1		Spherical Component 2	
				Sill	Range(m)	Sill	Range(m)
100. Oxide	X	-05/295	0.16	0.20	30	0.64	250
	Y	00/205			100		305
	Z	85/295			20		165
200. Mix	X	04/350	0.19	0.17	60	0.64	200
	Y	03/260			70		225
	Z	85/130			10		75
300. NMin	X	03/335	0.22	0.06	25	0.72	350
	Y	-15/245			70		170
	Z	75/235			10		45
400. PyCpy	X	72/226	0.32	0.12	10	0.56	575
	Y	-10/167			60		455
	Z	15/080			55		260
500. PyCc(S)	X	80/225	0.41	0.20	10	0.39	335
	Y	-10/225			20		190
	Z	00/135			50		260
600. PyCc(H)	X	00/235	0.26	0.10	10	0.64	420
	Y	-55/325			60		580
	Z	-35/145			60		270

14.6 Grade Interpolation

Grades of all elements were interpolated by ordinary kriging (OK). The MinCode variable was used for geologic control for all elements except arsenic, where control was based on the AltCode variable. Grade and density values were estimated into partial (percent) block models based on the variable of geologic control (MinCode or AltCode). This method was used to preserve the volume influence of geologic units that was not adequately captured on a majority rules basis. Final block values were calculated based on the weighted average of grade/volume within the contained geologic units.

Contact plot were examined for all modelled elements for all combinations of geologic control. Table 14-16 provides details regarding geologic code matching for grade estimation.

Table 14-16: Geologic control for grade estimation

MinCode	Match Codes on Estimation							AltCode
	Cu	Au	Ag	Mo	Fe	S	As	
100 - Oxide	100	100,200,600	100,200 400,500,600	100,200 400,500,600	all	100	10,20	10 - Potassic
200 - Mix	200,600	100,200 400,600	100,200 400,500,600	100,200 400,500,600	all	200,400 500	10,20	20 - SCC
300 - Non-Min	300	300	300	300	all	300	30,40	30 - Sericitic
400 - PCCPy	400,600	200,400 500,600	100,200 400,600	100,200 400,500,600	all	200,400 500	30,40	40 - AdvArg
500 - PyCC(S)	500	400,500	100,200 500,600	100,200 400,500,600	all	200,400 500	50	50 - HighSulph
600 - PyCC(H)	200 400,600	100,200 400,600	100,200 400,500,600	100,200 400,500,600	all	600	60	60 - NoAlt

All grades were estimated by ordinary kriging in a single pass. The search for all elements except arsenic was non-rotated with X/Y/Z dimensions of 350 m x 350 m x 175 m. A minimum of two, maximum of 25, and a maximum of 10 samples per hole, were used for estimation.

Arsenic grades were estimated using a search elongate parallel to the high sulphidation alteration. X and Y search axes were 350 m in the directions (dip/azimuth) of 00/110 and -85/020, and 100 m across dip. Rather than cap arsenic grades, due to its deleterious nature, an outlier restriction was placed on the distance that higher grades would be used in the estimation process. A probability plot of arsenic composites suggested a change in grade distribution above 1,000 ppm. Indicator variograms at that threshold aided in the outlier search radii choice of 60 m x 60 m x 20 m. Beyond those search distances, the 180 arsenic composites ≥1,000 ppm, 0.5% of total composites, were not used in the kriging of arsenic grade. This estimation approach was used for all domains; the assumption being that arsenic is associated with the generally narrow high-sulphidation alteration, all of which may not have been captured by the geologic solids.

14.7 Density Estimation

There were sufficient number of density measurements to allow the interpolation of density values rather than the assignment of an average. Statistical evaluation of density by the various modelled geologic attributes indicated that density correlated most closely with the MinCode variable. Density measurement coded by the MinCode model are listed in Table 14-17.

Table 14-17: Available density measurements

MinCode	Count	Bulk Density (t/m^3)			Model Density
		Mean	Min	Max	(t/m^3)
100 - Oxide	1,151	2.52	1.29	5.23	2.52
200 - Mix	892	2.65	1.75	4.09	2.63
300 - Non-Min	2,333	2.57	1.45	5.30	2.57
400 - PyCpy	4,739	2.64	1.39	5.75	2.64
500 - PyCC(S)	859	2.60	1.61	5.38	2.60
600 - PyCC(H)	3,983	2.65	1.11	5.27	2.65
Total:	13,957	2.62			2.62

Density values were interpolated by inverse distance squared weighting (ID2). The same search was used as for grade estimation: 350 m x 350 m x 175 m non-rotated. Density values were estimated by a minimum of two, maximum of 50, and a maximum of 12 composites per hole; the estimate was hard-bounded by MinCode (no mixing across contacts). More samples were used than for grade estimation to generate a relatively smooth density model. Block densities that were not coded by the inverse distance squared (ID2) interpolation, were assigned the average, by MinCode, from Table 14-17; the right-most column of that table also lists the average interpolated density by MinCode.

14.8 Model Validation

Estimated grades for all elements were validated visually by comparing composite to block values in plan view and on cross-sections. Example vertical sections comparing drill hole composites with block grades for the copper, gold and silver estimates are shown in Figure 14-2 to Figure 14-4, respectively. There is good visual correlation between composite and estimated block grades for all modelled elements.

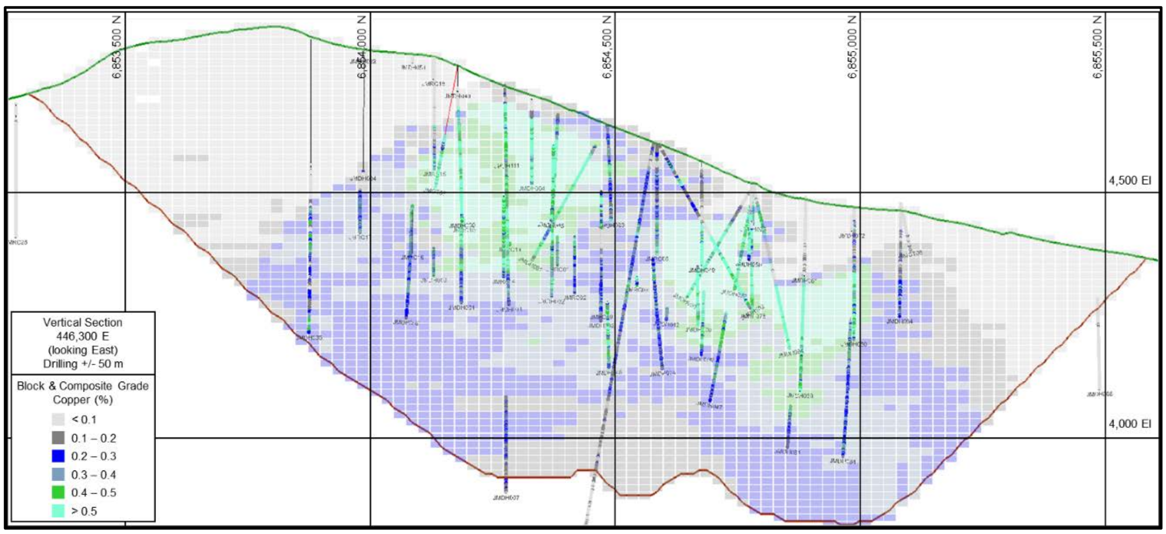


Figure 14-2: Section 446,300 E - Copper block and composite grades

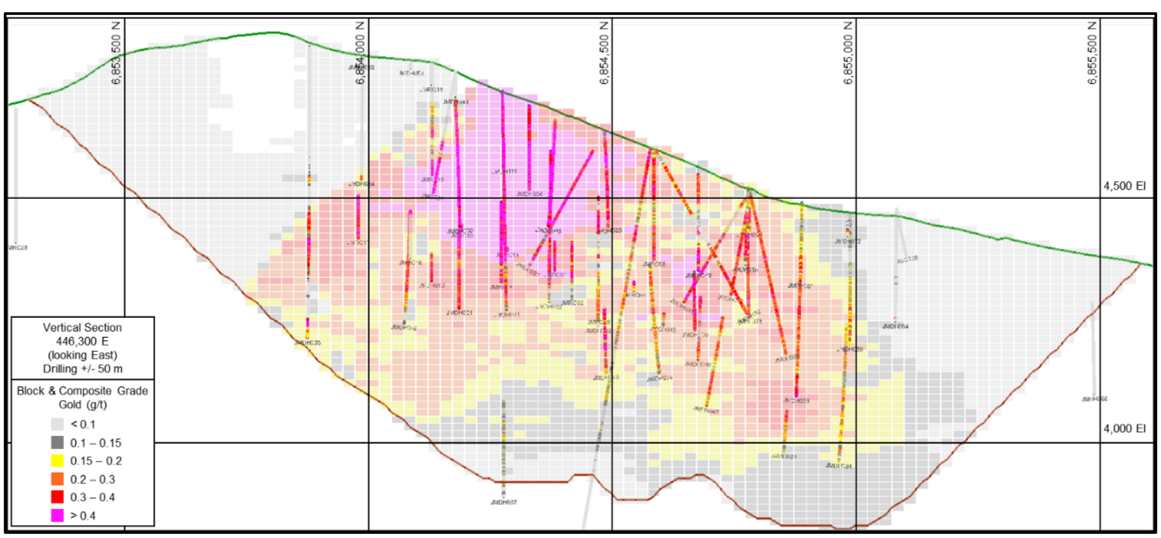


Figure 14-3: Section 446,300 E - Gold block and composite grades

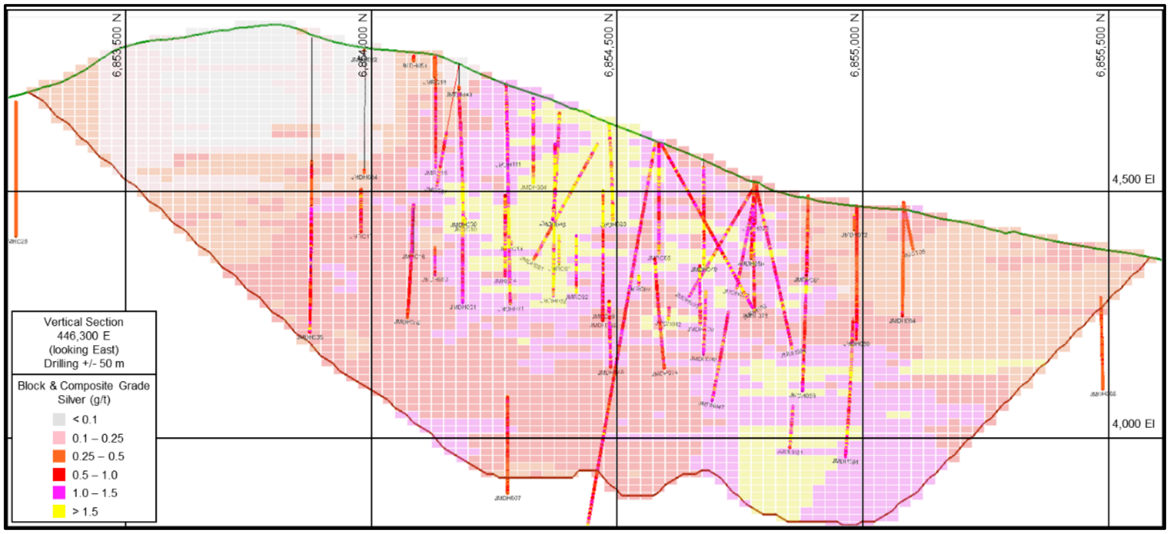


Figure 14-4: Section 446,300 E - Silver block and composite grades

Nearest neighbour (NN) and ID2 validation models were also estimated for all metals using parameters consistent with those used for ordinary kriging. The NN estimate used a set of 15 m composites to appropriately match block height.

Grade models were compared spatially against NN and ID2 estimates using swath plots. Example plots for the copper estimate are included in Figure 14-5; the figure includes blocks classified before pit optimization. The OK estimates are appropriately smooth in comparison to the nearest neighbor models. Globally, model average grades above zero cut-off (shown on plots) compare very closely indicating no bias.

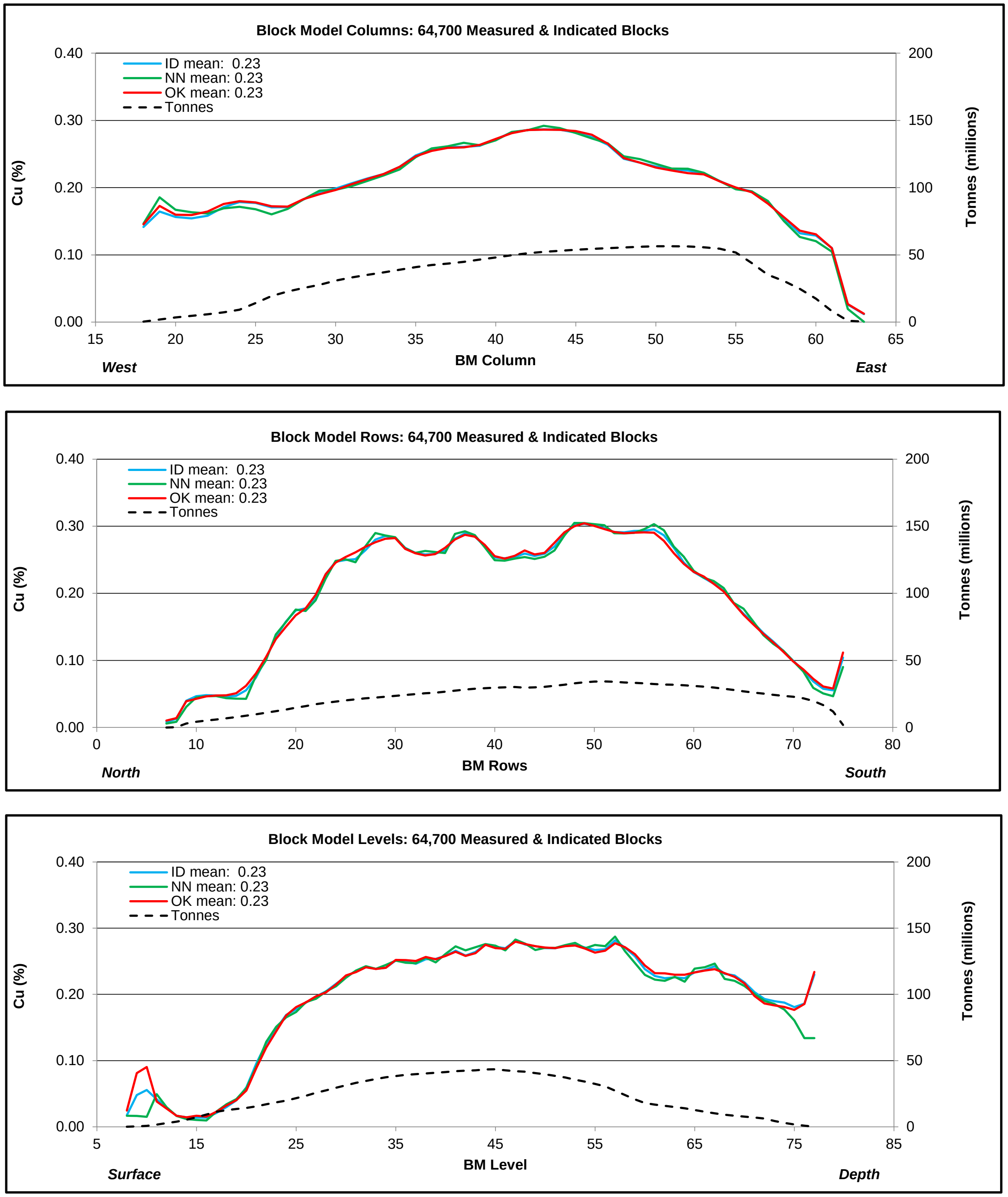


Figure 14-5: Copper swath plots comparing OK, NN and ID estimates

14.9 Resource Classification and Tabulation

The mineral resource is classified based on spatial parameters related to drill density and configuration and the generation of an optimised pit. To ensure appropriate classification of contiguous blocks, classification was homogenized within solid volumes. A section showing drilling relative to block classification is included as Figure 14-6.

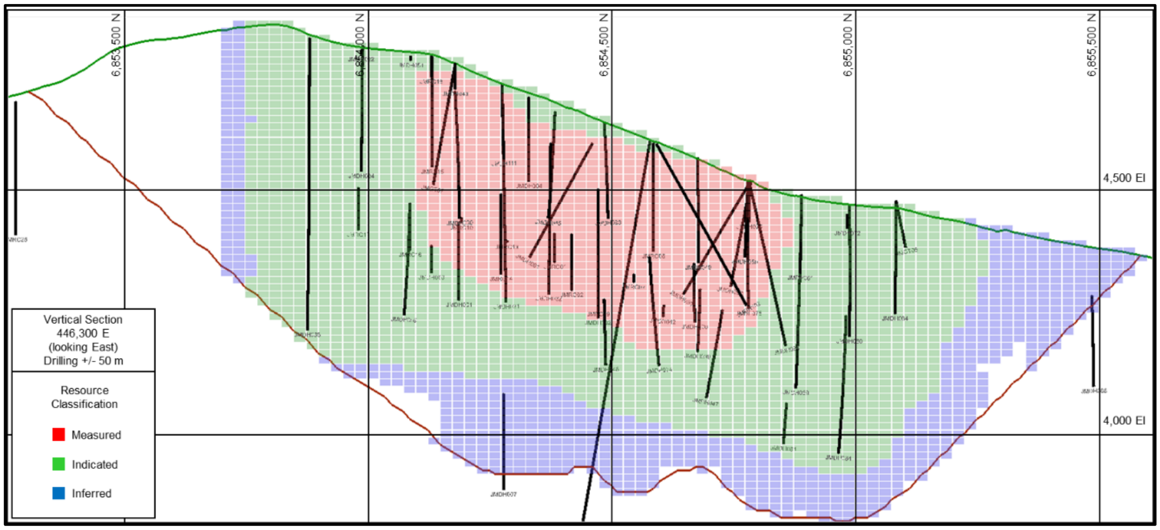


Figure 14-6: Section 446,300 E - Resource classification

Block models were run to record various parameters including:

- Distance to the 1st, 2nd, and 3rd closest hole
- Number of holes within a 150 m spherical search
- Number of holes, samples, and octants used to estimate grade

After visual inspection of these models, blocks were classified as:

- Inferred, where estimated by two or more holes or samples in 2 or more octants and the closest hole within 150 m
- Indicated, where three or more holes are within 150 m
- Measured, where 14 or more holes are within 150 m

Measures were taken to ensure the mineral resource meets the condition of “reasonable prospects of eventual economic extraction”. Pit optimization and engineering studies were carried out by SRK supporting the mineral reserve calculation. An optimised resource pit shell was generated using Whittle® software, based on Measured, Indicated and Inferred Mineral Resource. That pit shell was determined based on NSR; the optimization being driven by economics of the sulphide resource. Supporting documentation of the NSR calculation is included in the mining sections of this report; support for the processing inputs can be found in the mineral processing section. Block NSR was applied based on variable copper and gold recoveries. Silver recovery was applied as a constant. Table 14-18 lists basic optimization parameters, average recoveries and average NSR for the sulphide material. Current plans are that the oxide material will be stockpiled as it is excavated in the course of stripping sulphide material and will therefore have essentially no attributable mining cost; heap leach gold recovery is anticipated at 60% based on current test results, however heap leaching is not a part of the current plans for Josemaria. Only blocks within optimized pit volume are included in the Mineral Resource Statement detailed in Table 14-19 for sulphide material and in Table 14-20 for the oxide.

Table 14-18: Sulphide pit optimization parameters

Metal	Metal Price	Av.Recovery
Cu	US$ 3.00/lb	85%
Au	US$ 1500/oz	60%
Ag	US$ 18.00/oz	72%
Av. Mining Cost:	$ 1.55 / tonne	
Av. Process Cost:	$ 5.21 / tonne	
Average NSR:	$18.85/tonne	
Pit slope:	33° - 45° depending on pit sector	

Table 14-19: Josemaria 2020 sulphide mineral resource @ 0.1% CuEq cut-off for the Josemaria Project, San Juan province, Argentina 10 July 2020

Category	Tonnes (millions)	Grade				Contained Metal		
		Cu (%)	Au (g/t)	Ag (g/t)	CuEq (%)	lb Cu (billions)	oz Au (millions)	oz Ag (millions)
Measured	197	0.43	0.34	1.3	0.63	1.9	2.2	8.5
Indicated	962	0.26	0.18	0.9	0.36	5.5	5.6	26.6
Total (M & I):	1,159	0.29	0.21	0.9	0.41	7.4	7.8	33.5
Inferred	704	0.19	0.10	0.8	0.25	2.9	2.3	18.6

Table 14-20: Josemaria 2020 oxide mineral resource @ 0.2 g/t Au cut-off for the Josemaria Project, San Juan province, Argentina 10 July 2020

Category	Tonnes (millions)	Grade		Contained Metal	
		Au (g/t)	Ag (g/t)	oz Au (thousands)	oz Ag (thousands)
Measured	26	0.33	1.2	280	994
Indicated	15	0.28	1.3	132	632
Total (M & I):	41	0.31	1.2	410	1,585
Inferred	0				

Notes to accompany Josemaria Mineral Resource statement:
1. Mineral Resources have an effective date of 10 July 2020. The Qualified Person for the mineral resource estimate is Mr. James N. Gray, P.Geo
2. The mineral resources were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Definition Standards for Mineral Resources and Reserves, as prepared by the CIM Standing Committee and adopted by CIM Council.
3. Sulphide copper equivalence (CuEq) assumes metal prices of $3/lb copper, $1,500/oz gold, $18/oz silver.
4. CuEq is based on Cu, Au and Ag recoveries derived from metallurgical test work as applied in the pit optimisation and mine design process (average LOM recoveries used: 85.2% copper, 62.6% gold, 72.0% silver).
5. The copper Equivalency equation used is: CuEq (%) = (Cu grade (%) * Cu recovery * Cu price ($/t) + Au grade (oz/t) * Au recovery * Au price ($/oz) + Ag grade (oz/t) * Ag recovery * Ag price ($/oz)) / (Cu price ($/t) * Cu recovery)
6. Mineral resources are inclusive of mineral reserves.
7. Mineral resources that are not mineral reserves do not have demonstrated economic viability.
8. All figures are rounded to reflect the relative accuracy of the estimate. Totals may not sum due to rounding as required by reporting guidelines.

The sulphide mineral resource is quoted at a copper equivalent cut-off grade of 0.1%. At the copper price of $3.00/lb, used in the engineering work, this equates to $6.61/tonne and is deemed sufficient to cover mining and sulphide mineral processing. The oxide mineral resource is quoted at a cut-off of 0.2 g/t Au. Again, at the gold price used in subsequent work of $1,500 per ounce, the cut-off equates to $9.65/tonne – a value that will sufficiently cover mining and heap leaching. A range of cut-off grades are shown in Table 14-21 (sulphide) and Table 14-22 (oxide) to quantify cut-off grade sensitivity with the base case highlighted in each table. All mineral resource estimates provided by cut-off grade meet conditions to be considered to have reasonable prospects for economic extraction.

Table 14-21: Josemaria 2020 sulphide mineral resource estimate at range of CuEq cut-off grades

Cut-off (%CuEq)	Measured Tonnes (millions)	Measured Cu (%)	Measured Au (g/t)	Measured Ag (g/t)	Measured CuEq (%)	Indicated Tonnes (millions)	Indicated Cu (%)	Indicated Au (g/t)	Indicated Ag (g/t)	Indicated CuEq (%)
0.1	197	0.43	0.34	1.3	0.63	962	0.26	0.18	0.9	0.36
0.2	195	0.43	0.34	1.3	0.63	843	0.28	0.19	0.9	0.39
0.3	188	0.44	0.35	1.4	0.65	636	0.32	0.21	1.0	0.44
0.4	171	0.46	0.36	1.4	0.68	346	0.36	0.25	1.1	0.51
0.5	142	0.49	0.39	1.4	0.72	136	0.44	0.30	1.2	0.60

Cut-off (%CuEq)	Measured + Indicated Tonnes (millions)	Measured + Indicated Cu (%)	Measured + Indicated Au (g/t)	Measured + Indicated Ag (g/t)	Measured + Indicated CuEq (%)	Inferred Tonnes (millions)	Inferred Cu (%)	Inferred Au (g/t)	Inferred Ag (g/t)	Inferred CuEq (%)
0.1	1,159	0.29	0.21	0.9	0.41	704	0.19	0.10	0.8	0.25
0.2	1,038	0.31	0.22	1.0	0.44	465	0.23	0.13	1.0	0.30
0.3	824	0.35	0.24	1.1	0.49	220	0.27	0.16	1.1	0.36
0.4	516	0.39	0.29	1.2	0.57	33	0.32	0.26	1.1	0.47
0.5	278	0.47	0.35	1.3	0.66	7	0.39	0.37	1.0	0.59

Table 14-22: Josemaria 2020 oxide mineral resource estimate at range of Au cut-off grades

Cut-off (g/t Au)	Measured Tonnes (millions)	Measured Au (g/t)	Measured Ag (g/t)	Indicated Tonnes (millions)	Indicated Au (g/t)	Indicated Ag (g/t)
0.1	36.6	0.28	1.1	40.7	0.19	1.0
0.2	26.4	0.33	1.2	14.7	0.28	1.3
0.3	12.9	0.42	1.3	4.3	0.38	1.7
0.4	6.1	0.49	1.3	1.3	0.46	1.8
0.5	2.5	0.57	1.2	0.4	0.54	1.8

Cut-off (g/t Au)	Measured + Indicated Tonnes (millions)	Measured + Indicated Au (g/t)	Measured + Indicated Ag (g/t)	Inferred Tonnes (millions)	Inferred Au (g/t)	Inferred Ag (g/t)
0.1	77.3	0.23	1.0	1.1	0.12	0.4
0.2	41.1	0.31	1.2	0.0		
0.3	17.2	0.41	1.4	0.0		
0.4	7.5	0.48	1.4	0.0		
0.5	2.8	0.57	1.3	0.0		

15 Mineral Reserve Estimates

15.1 Introduction

SRK was contracted by Josemaria Resources to conduct the mine engineering and mineral reserve estimation for the Josemaria project. SRK adopted standard mine planning processes to determine the mineral reserve estimate for this surface mineable project. The following describes those processes, their inputs and the mineral reserve outcome.

15.2 Key Assumptions, Parameters and Methods

15.2.1 Economic Limit Definition

To determine the economic limit of surface mining for Josemaria, and thus the basis for the mineral reserve, SRK utilized GEOVIA's Whittle™ software, which is based on the industry standard Lerchs Grossmann (LG) pit optimization algorithm. SRK collaborated with Josemaria and other consulting team members to derive the key inputs for the pit optimization, including metal pricing, metal recoveries, and operating costs.

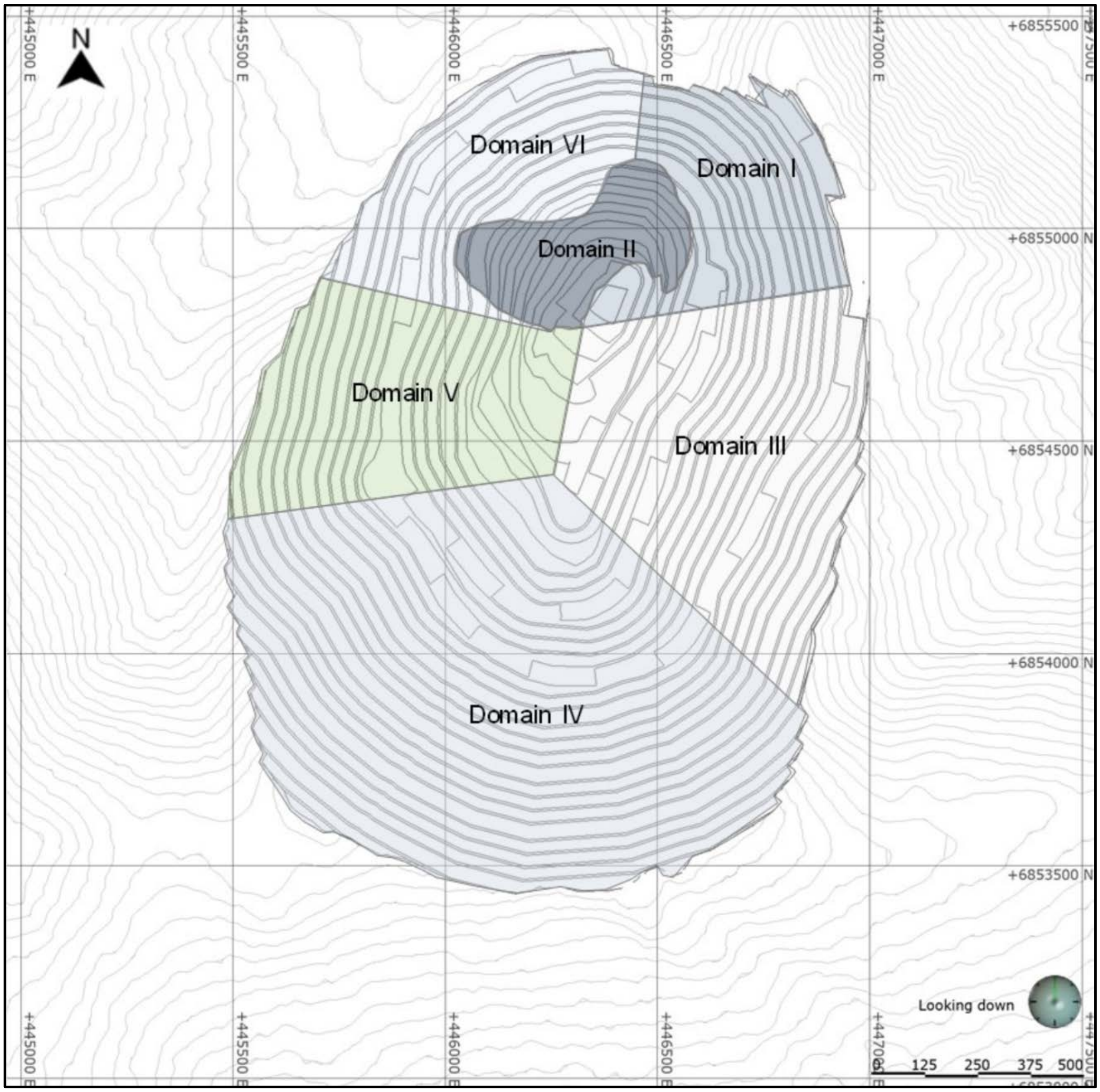
Several rounds of pit optimization took place in the execution of the FS. The remainder of this section describes the inputs to the pit optimization process as used in the final pit optimization runs.

15.2.2 Geotechnical Pit Slope Assessment and Design Guidance

The FS field investigation program included outcrop mapping, core logging, field and laboratory geomechanical testing, hydraulic packer testing, downhole televiewer survey and installation of vibrating wire piezometers. Drillholes were HQ-sized triple-tube diamond cored with orientation. Seven holes were drilled in the 2018/2019 field season for a total of 4,051 m. Four holes were drilled in the 2019/2020 field season for a total of 2,151 m. Core logging was done in accordance with the SRK logging procedures for the Bieniawski (1989) rock mass rating system.

The rock mass and strength data were analysed via histograms and statistics considering lithology, alteration and mineralization types. Rock mass ratings of the major units were in the 'fair' to 'good' categories. Distinctly different was rock within a 'low-RQD' zone (Domain II) at depth in the north. The geometry of this zone was modelled using data from resource drilling. Rock mass ratings in this zone were largely in the 'poor' category. SRK found that the geomechanical control on this zone was both alteration and structure.

SRK constructed a 3-D geotechnical model of the deposit in Leapfrog Geo™ software. It comprised models of lithology, alteration and structures which were provided by Josemaria and refined with SRK. Nine geotechnical 'domains' of similar characteristics were identified and used to generate a 3-D rock mass model. Representative geomechanical property values were selected for each domain. Of these nine domains, six were selected to be representative of the range of slope orientations, rock type distribution, structural geology, hydraulics, and design sectors in the ultimate pit walls (Figure 15-1).



Source: SRK, 2020

Figure 15-1: Josemaria pit slope design domains

For the selected domains, overall pit slope stability was analysed using numeric limit equilibrium software Slide™. The analyses considered rock mass and structurally controlled mechanisms. SRK found that rock mass is not expected to cause instability outside the area of Domain II. Design in Domain II is defined by rock mass strength and a flatter overall slope angle is required to manage this.

Structurally controlled failure is a risk in the north and especially the northwest of the pit where major structures have the potential to daylight into the pit or continue into Domain II. There is low confidence in the continuity of these structures and further investigation will be required to finalize the design for implementation. Due to the low confidence level, they were not considered in the FS design. If further investigations find that these structures are extensive, daylight into the pit, or persist into the low RQD zone, then flatter slope angles in this area may be required.

The overall slope angles are constrained by benchmarking against published deep open pits. Should the slopes perform well during the mining of interim cuts, the analyses indicate the potential to steepen the design of the ultimate pit walls.

Slope design recommendations are summarized in Table 15-1 for the design sectors shown in Figure 15-1.

Table 15-1: Slope design recommendations

Domain	BFA (°)	Bench Face Height (m)	Bench Width (m)	IRA (toe to toe) (°)	Stack Height (m)	Geotechnical Berm Width (m)	Maximum Overall Slope (toe to crest) (°)
I	70	30	16.5	48	120	35	45
II	70	15	16.5	34	75	35	34
III	70	30	20.0	44	120	30	42
IV	70	30	20.0	44	120	30	42
V	70	30	20.0	44	120	30	42
VI	70	30	16.5	48	120	35	45
Weathered	70	15	8.0	-	-	-	-

The slope design recommendations are assuming the use of low-energy pit limit blasting techniques, and that Domain II is effectively depressurized. For this domain, the design considered passive drainage via a system of horizontal drains. The analyses showed that slopes in Domain I, II and VI are sensitive to piezometric surface level higher than that in the SRK model. Groundwater levels around the pit will need to be measured during excavation to monitor the effectiveness of natural drainage and confirm depressurization targets. Such monitoring is typically done via a network of vibrating wire piezometers (VWPs), which can be installed in drillholes in upcoming field programs.

It is important that the benches are cleared and that the bench faces are cleaned so that they remain functional during mining. Detailed geotechnical mapping should be conducted after clean-up to verify the competency of the rock mass, and the orientation, population and location of critical joint sets.

Data from pit development will be used for ongoing slope stability analyses and design optimization. A pit slope monitoring program will be required. It will include frequent inspections of benches and crests for tension cracking and other signs of instability. It will also need to include survey scanning, movement detection systems, and groundwater monitoring. The monitoring system should be set up with priority given to the higher risk areas, and configured for the anticipated instability mode/s.

15.2.3 Mine Design Model

The mineral resource model upon which the pit optimization was based is described in Section 14. SRK reviewed the data on which the mineral resource estimate was based. SRK accepted the analytical data and deemed it appropriate to support mineral reserve estimation.

The mineral resource model was converted to a mine design model by including pit slope domains (Section 15.2.2), dilution and ore loss (Section 15.2.4), metallurgical recoveries (Section 15.2.6), as well as estimates of net smelter return (Section 15.2.7).

15.2.4 Dilution and Ore Loss

Josemaria is a disseminated orebody with relatively clear ore/waste contacts. In consideration of blast movement and ore boundary uncertainty, a mixing zone was applied along each of the sides in the mine design model blocks to account for dilution. Only those block sides within a bench were influenced by the dilution calculation; the top and bottom sides of blocks are not used in the dilution calculation. For the four sides involved, a mixing zone thickness of 2.5 m per block, equivalent to 5.0 m between adjacent blocks is used. Within the mixing zones, the grades of adjacent blocks are averaged and then the grade of the original block is re-calculated based on the four mixing zones and the unimpacted core. Between ore blocks, this results in no net loss or gain of metal; however, where ore blocks are adjacent to waste blocks, the mixing zone will lose metal, thereby causing dilution of the entire block.

On top of dilution, ore loss of 0.5% was applied in pit optimization to account for losses in blasting and loading and mis-routed material.

15.2.5 Pricing and Off-Site Costs

SRK confirmed metal pricing assumptions with Josemaria Resources. The metal prices used in pit optimization are provided in Table 15-2.

Table 15-2: Metal price assumptions for pit optimization

Metal	Units	Value
Copper	US$/lb	3.00
Gold	US$/oz	1,500
Silver	US$/oz	18.00

15.2.6 Metallurgical Recoveries for Mine Planning

The metallurgical recoveries for Josemaria are derived for copper as a function of diluted copper grades and acid-soluble copper grades and for gold as a function of diluted gold grades.

Copper and gold recoveries are calculated per the formulas below, while silver recovery is a constant 72%. The resulting average recoveries are summarized in Table 15-3.

$$CuRec = 95.89 + \left(4.093 * Ln(Cu\%)\right) - (0.696 * ASCu\%)$$

$$AuRec = 53.988 + (31.564 * Au\ gpt)$$

Table 15-3: Average metal recoveries

Metal	Average Recovery, %
Copper	85.2
Gold	62.6
Silver	72.0

15.2.7 NSR Calculation

As there are multiple metals in the Josemaria project, with varying metallurgical recoveries, payable terms, and treatment and refining costs, NSR was used to assign values to the resource blocks for use in pit optimization and mine scheduling.

In addition to the previously discussed metal prices, recoveries and dilution/ore loss, the off-site parameters provided in Table 15-4 were used to calculate NSR values for each of the blocks in the mine design model.

Table 15-4: Off-site pit optimization parameters

Parameter	Units	Value
Concentrate Transport		
Concentrate Moisture	%	10.9
Trucking	US$/wmt	82.00
Ocean Freight	US$/wmt	38.40
Port Handling	US$/wmt	19.00
Weighing, Assaying and Insurance	US$/wmt	11.08
Copper Concentrate Off-sites		
Concentrate Grade	%	27
Cu Payable	%	96.3
Concentrate Treatment Charge	US$/dmt	74.98
Cu Refining Cost	US$/pay lb	0.075
Gold Off-sites		
Au Payable	%	97
Au Refining Cost	US$/oz	5
Silver Off-sites		
Ag Payable	%	90
Ag Refining	US$/oz	0.46

15.2.8 Cost Inputs for LG Shell Optimization

For pit optimization studies, operating and sustaining capital costs are required inputs. Initial capital costs do not play a role in the LG algorithms, though they are considered in the full economic analysis.

Mine Operating Costs

Based on the 2018 PFS and strategic mine planning related to this FS, a mining cost model was developed by bench and by material based on ore, non-acid generating (NAG) rock and potentially acid generating (PAG) rock material routing. The mining cost reflects the change in haul distance for the material types required to be hauled to specific destinations in certain periods of the mine plan. The bench and material specific mining costs were coded into the block model.

Mill Operating Costs

Based on the latest available information at the time of optimization, a base mill operating cost of $4.68/t milled was assumed for pit optimization. This base operating cost was adjusted for each metallurgical zone based on the modelled variable throughput (Table 15-5).

Table 15-5: Mill operating costs

MetZone	Fixed Component ($/t milled)	Variable Component ($/t milled)	Total Cost ($/t milled)
Porphyry	3.81	0.83	4.64
Rhyolite	3.81	0.86	4.67
Supergene	3.81	0.81	4.62
Tonalite	3.81	0.87	4.68

The base unit cost of $4.68/t milled is made up from $3.77/t for crushing/processing/tailings, plus $0.43/t for infrastructure (on and off-site) and $0.46/t indirect costs.

Sustaining Capital

A sustaining capital cost of $0.54/t milled, as estimated by Knight Piésold, was used to account for progressively raising tailings facility embankments as this is the largest sustaining capital expenditure on the project. For mining equipment sustaining capital, $0.17/t mined was used.

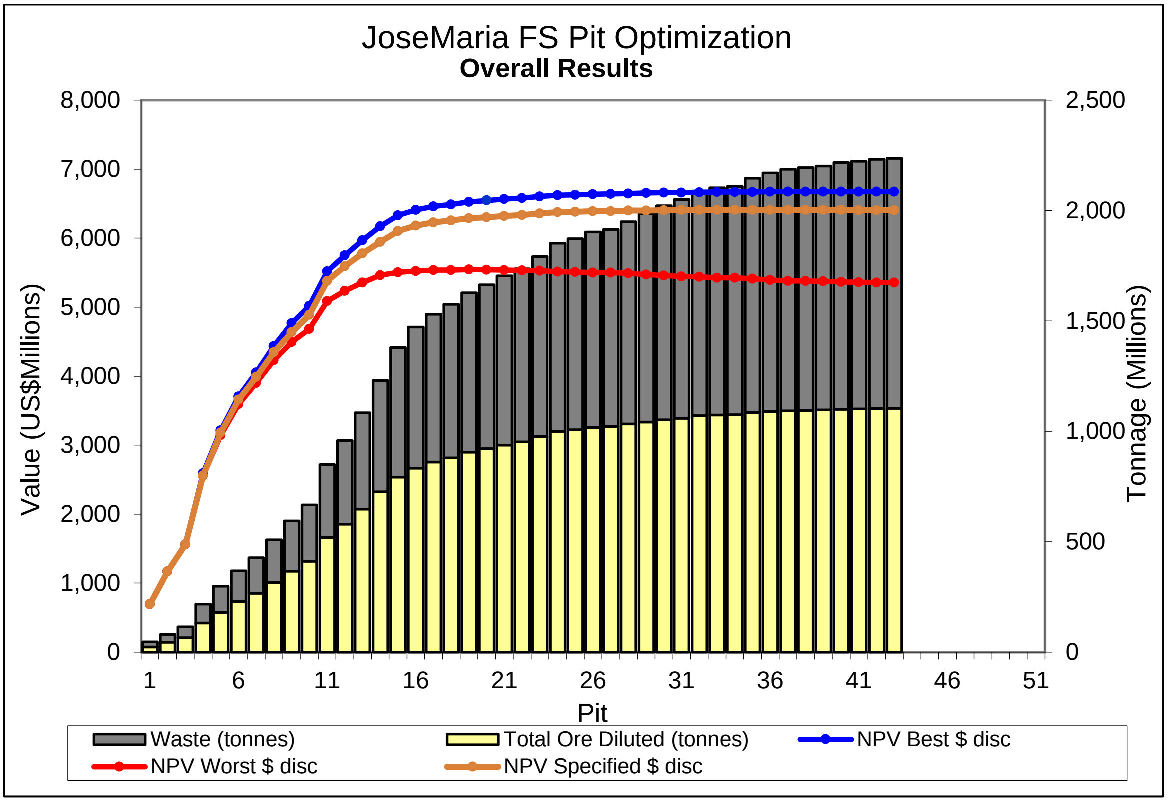
It should be noted that many of the cost inputs used for pit optimization were subsequently refined over the course of the FS, and final FS values used in the economic analysis may differ. However, the difference in costs used for pit optimization compared to economic analysis was assessed and considered acceptable for the purposes of the FS.

15.3 Pit Optimization

As part of the FS, multiple pit optimizations were conducted. The foregoing parameters and costs were the basis of what is ultimately presented in this section. However, earlier optimization runs interrogated incremental changes from the 2018 prefeasibility study to current in order to understand project drivers. Progressive introduction of the new geotechnical parameters (Section 15.2.2) and dilution (Section 15.2.4) further evolved the pit optimizations and understanding of various influences on mineral reserves.

15.3.1 Optimization Results

Using the foregoing input parameters, the pit optimization results in Figure 15-2 were derived. The chart presents the impact of increasing revenue factors (metal prices) on pit size and pit value. The base metal price assumptions represent the revenue factor 1.0, corresponding to pit shell 42. Each pit shell represents a 2% increment in revenue factor, from 0.19 to 1.05.



Source: SRK, August 2020

Figure 15-2: Pit optimization results

The histogram bar portion of the chart shows the pit shell quantities, with diluted ore in yellow and waste in grey. The lines represent variations of pit net present value (NPV) before initial capital cost based on metal price assumptions and discount factors. The Best Case line (blue) shows the NPV if each pit shell is mined incrementally up to the current pit shell, while the Worst Case line (red) shows the NPV if the current pit shell is mined a bench at a time. While neither one of these cases is realistic, with appropriate pit phasing, mine planners are typically able to achieve value curves between the two, and closer to the Best Case. That was the objective of the third line, the Specified Case (orange).

The Specified Case here used a series of selected pit shells as phases to be mined sequentially to derive a mine schedule. Phase shells 4, 9, 14 and 20 were selected to provide an indication of the NPV that can be achieved.

15.3.2 Ultimate Pit Shell Selection

In assessing the pit optimization results, SRK selected pit shell 27 (revenue factor 0.73) as the ultimate pit and basis of mineral reserves. This represented a pit size that achieves close to the maximum value for the Best Case pits. This pit shell contains over 1 billion tonnes of material above cut-off grade, which demonstrates the scale of the proposed mine. The quantities for pit shell 27 are provided in Table 15-6.

Table 15-6: Ultimate pit quantities

Parameter	Units	Value
Diluted Ore	M tonnes	1,022
Waste	M tonnes	893
Strip Ratio	w:o	0.87
Average Copper Grade	%	0.31
Average Gold Grade	g/t	0.22
Average Silver Grade	g/t	0.95
Average NSR	$/t	20.25

15.4 Reserve Pit Design

15.4.1 Parameters Relevant to Mine Design

Selective Mining Unit Size

During the 2018 PFS, SRK conducted a heterogeneity study on drill core data to assess the impact of mining scale on parameters such as average grade above cut-off and percent waste entrained in ore. The conclusion of the study was that the Josemaria project was relatively insensitive to mining scale, with at most 6% waste in ore at a mining scale (bench height) of 15 m. Smaller benches reduced this diluting effect, but only by a percent or two and do not allow for the productivity necessary for a large operation like Josemaria.

This study was not repeated at the FS stage, but the results were reviewed and accepted as definitive. As a result, bench heights of 15 m continued to be used for the FS.

Geotechnical Pit Wall Design

The FS-level pit wall design criteria for this study were provided above in Table 15-1 and Figure 15-1. These criteria have been followed in pit design.

Haul Road Design

Haul roads within the open pit were designed according to international mine design standards for safe and productive haulage, whereby the road running surface is 3.0 times the width of the widest vehicle using the road. A safety berm on the downslope side of the road is designed to be 75% of the height of the tire of the largest vehicle on the road and an additional allowance is left on the upslope side of the road for a drainage ditch and running utilities lines, including pit dewatering pipes. The parameters used in the haul road design are summarized in Table 15-7 and a typical road cross section is illustrated in Figure 15-3 below.

Haul roads are designed at a maximum gradient of 10% throughout the majority of the pit.

Table 15-7: Two-way haul road design parameters

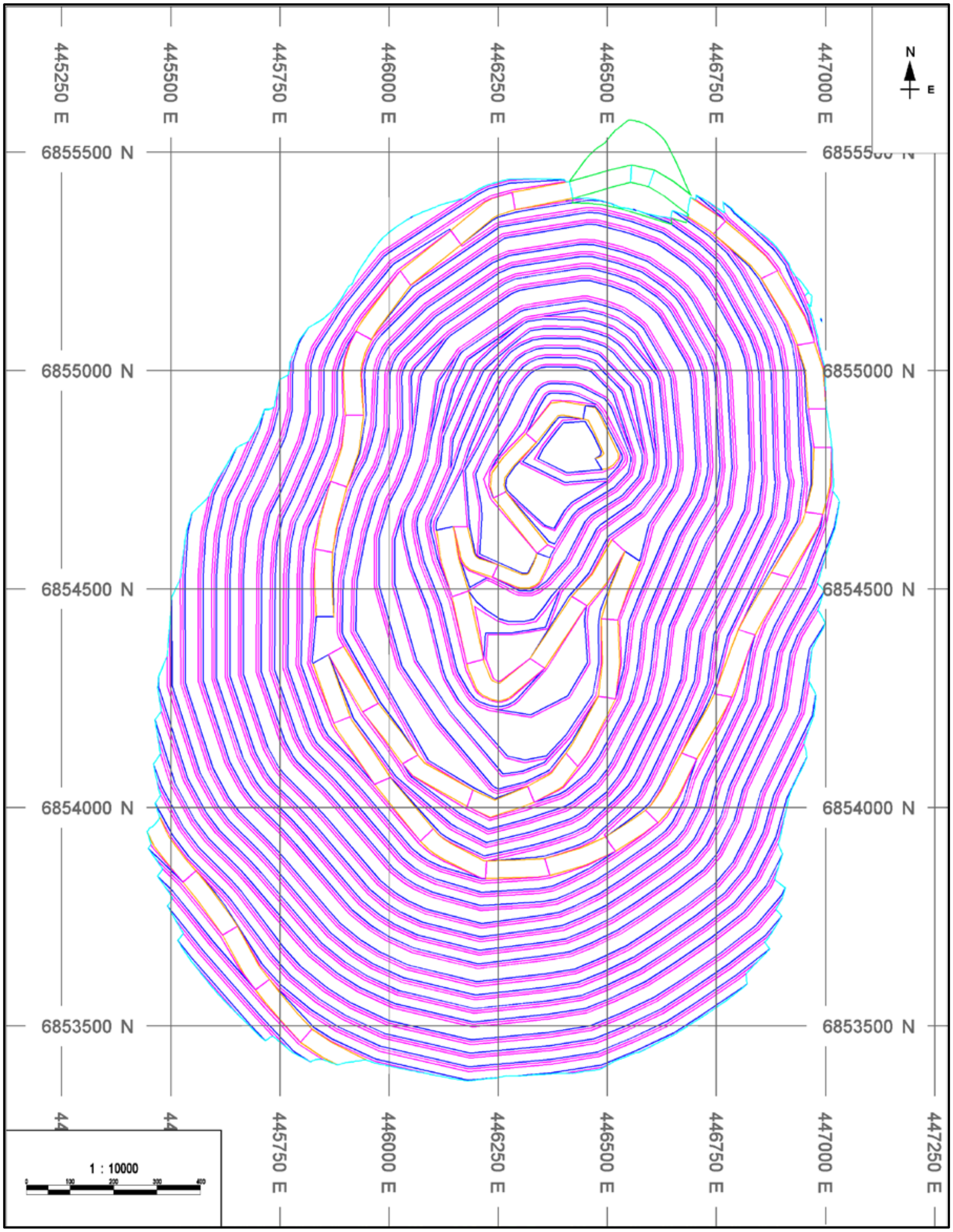
Parameter	Units	Value
Haul Truck Model		Komatsu 980E
Haul Truck Width	m	10.0
Tire Spec		59/80R63
Tire Outer Diameter	m	4.02
Berm Height	m	3.0
Berm Width	m	7.0
Ditch Width	m	3.0
Running Width	m	30.0
Total Design Width	m	40.0

Figure 15-3: Typical haul road cross-section

The haul road layout strategy objectives include creating productive pit access for ore on the east side of the pit and for waste on the west and south sides of the pit. The ultimate pit is designed to minimize the amount of ramp left in the final wall to maximize the final overall pit slopes; however, a two-access ramp system is designed from the lower pit rim at 4445 m elevation, down to 4250 m elevation in order to provide improved productivity and safety. A single ramp strategy is used below 4250 m elevation. In the final three benches of the ultimate pit design, the access ramp is reduced to single-lane width and steepened to 12% as the final benches are small, primarily ore and require lower productivity.

15.4.2 Reserve Pit Design

SRK designed the ultimate pit for Josemaria reserves in alignment with pit shell 27 from the pit optimization analysis. The design is provided in Figure 15-4. Compared to pit shell #27, the ultimate pit design has 11% more waste and 1% less ore, which are considered acceptable variances in such designs.



Source: SRK, 2020

Figure 15-4: Josemaria ultimate pit design

15.5 Mineral Reserve Estimate

15.5.1 Cut-Off Grade

The cut-off grade for Josemaria determines what material is processed as ore versus what is disposed of as waste. The grade in this instance is the NSR of the material and the cut-off NSR is the amount at which the value of the ore is more than the cost to process it and pay for G&A and associated sustaining capital costs. In this case, the cut-off grade for material direct to the mill is variable as the processing cost is variable by metallurgical zone. The cut-off grades for material direct to the mill are summarized in Table 15-8 below.

Table 15-8: Cut-off grade by MetZone

MetZone	NSR Cut-off Grade ($/t)
Porphyry	5.18
Rhyolite	5.21
Supergene	5.16
Tonalite	5.22

On occasion, more material will be mined above the NSR cut-off grade than the mill can process. When this occurs, the material must be stockpiled. Stockpiling incurs a cost that must be accounted for in determining what constitutes ore. Consequently, SRK has added $0.53/t to account for stockpiling and reclaiming costs. Thus, material that cannot be fed directly to the mill must have an NSR value of at least the variable NSR cut-off listed above plus $0.53/t to be placed in a long-term low-grade stockpile as ore.

15.5.2 Mineral Reserve Estimate

The mineral reserve estimate for Josemaria, provided in Table 15-9, is based on the resource model documented in the mineral resource estimate (Section 14). The mineral reserves are calculated using a combination of the ultimate pit design (Section 15.4.2), cut-off grade (Section 15.5.1) and production schedule (Section 16.2).

Table 15-9: Mineral reserve statement for the Josemaria Project, San Juan province, Argentina, 28 September 2020

Category (all domains)	Tonnage	Grade			Contained Metal		
	(Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Cu (M lbs)	Au (M oz)	Ag (Moz)
Proven	197	0.43	0.34	1.33	1,844	2.14	8.43
Probable	815	0.27	0.19	0.85	4,861	4.87	22.29
Total Proven and Probable	**1,012**	**0.30**	**0.22**	**0.94**	**6,705**	**7.02**	**30.72**

Notes to accompany the Josemaria Mineral Reserve statement:

1. Mineral reserves have an effective date of 28 September 2020. The Qualified Person for the estimate is Mr. Robert McCarthy, P.Eng.
2. The mineral reserves were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Definition Standards for Mineral Resources and Reserves, as prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.
3. The mineral reserves were based on a pit design which in turn aligned with an ultimate pit shell selected from a Whittle^{TM} pit optimization exercise. Key inputs for that process are:
   - Metal prices of $3.00/lb Cu, $1,500/oz Au; $18.00/oz Ag
   - Variable Mining cost by bench and material type. Average costs are $1.351/t, $1.36/t and $1.65/t for ore, NAG waste and PAG waste, respectively.
   - Processing costs vary by metallurgical zone, ranging from $3.77/t tonalite ore milled to $3.71/t supergene.
   - Infrastructure On and Off-site $0.43/t milled
   - Indirect Costs $0.46/t miled
   - Sustaining capital costs of $0.54/t milled for tailings management and $0.17/t mined for mining equipment
   - Pit average slope angles varying from 37° to 43°
   - Process recoveries for Cu and Au are based on grade. The average recovery is estimated to be 85.2% for Cu and 62.6% for Au. Ag recovery is fixed at 72.0%.
4. Mining dilution is accounted for by averaging grades in adjacent blocks across a thickness of 2.5 m into each block (5.0 m per block contact).
5. The mineral reserve has an economic cut-off for prime mill feed, based on NSR, of $5.22/t, $5.21/t, $5.18/t and $5.16/t milled for tonalite, rhyolite, porphyry and supergene material respectively and an additional $0.53/t for stockpiled ore.
6. There are 991 Mt of waste in the ultimate pit. The strip ratio is 0.98 (waste:ore).
7. All figures are rounded to reflect the relative accuracy of the estimate. Totals may not sum due to rounding as required by reporting guidelines.

16 Mining Methods

Being a large, near-surface orebody, the Josemaria project will be developed as an open pit mining operation. Waste and ore will be drilled and blasted, loaded by hydraulic shovels and loaders, and transported by haul trucks to external waste storage facilities (WSF), long-term stockpiles, or a run-of-mine (ROM) pad where it is fed to a primary crusher for mineral processing.

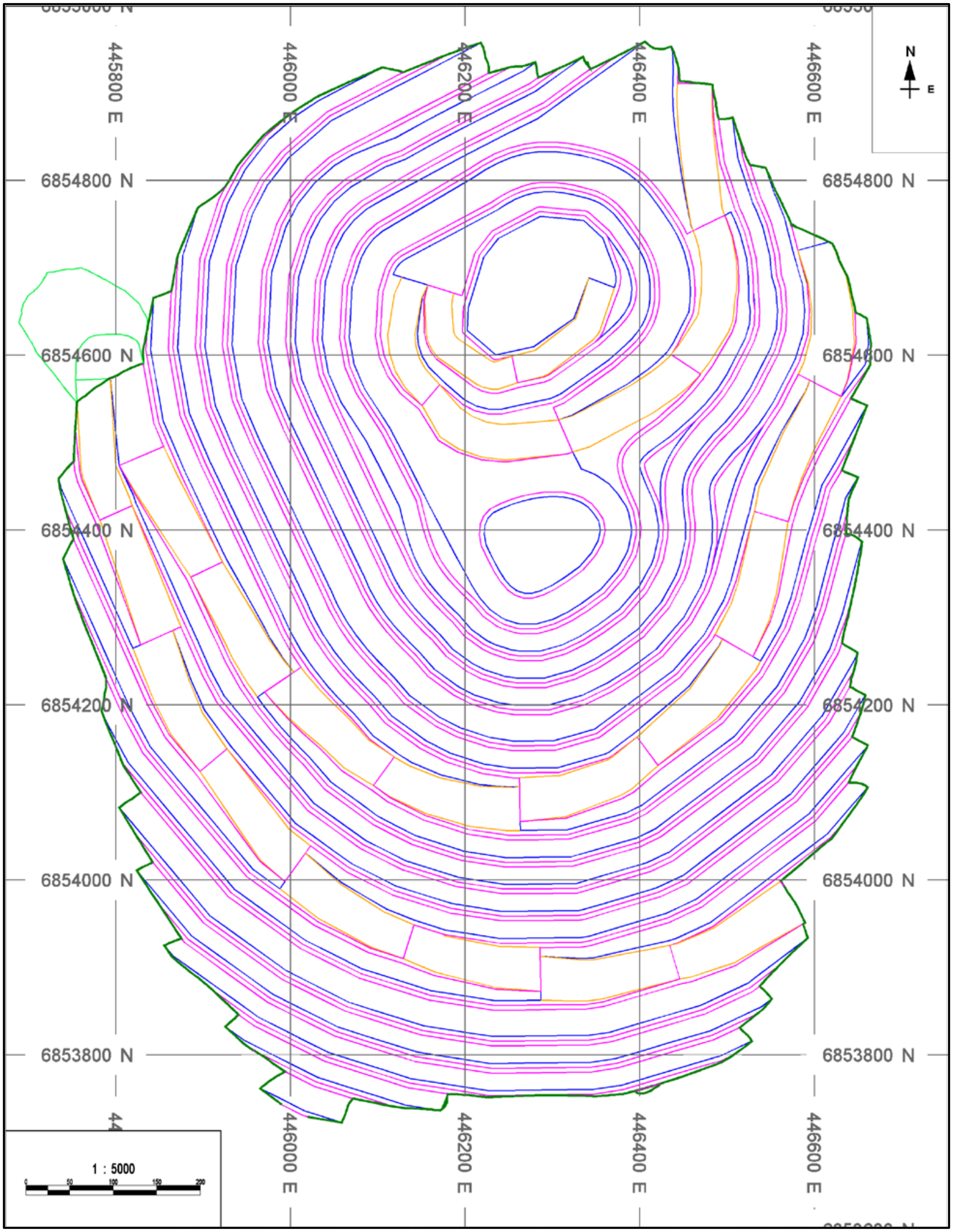
The results of a mine planning study completed prior to the 2018 PFS (SRK, 2018) established that an optimal processing throughput rate was 150,000 tonnes per day (tpd). This throughput rate became the basis of all subsequent mine planning. Following initial mine planning for the FS, metallurgical studies identified opportunities whereby certain geo-metallurgical domains may be processed at marginally higher throughputs. This has been incorporated into the mine production scheduling and processing costs. The project has several stockpile facilities in order to allow for an increase in mining capacity to forward higher grade material to the mill while stockpiling low-grade material.

The FS considers only one mineral processing flowsheet, which is comminution-flotation. Gold-bearing oxide materials, while present at Josemaria, do not have sufficient value to offset the capital expenditure required for leach gold extraction. Thus, the current FS calls for grade control to only differentiate waste from ore and direct feed ore from stockpiled ore. Josemaria may elect to pursue the option of oxide processing at some point in the future should conditions warrant.

16.1 Mine Design

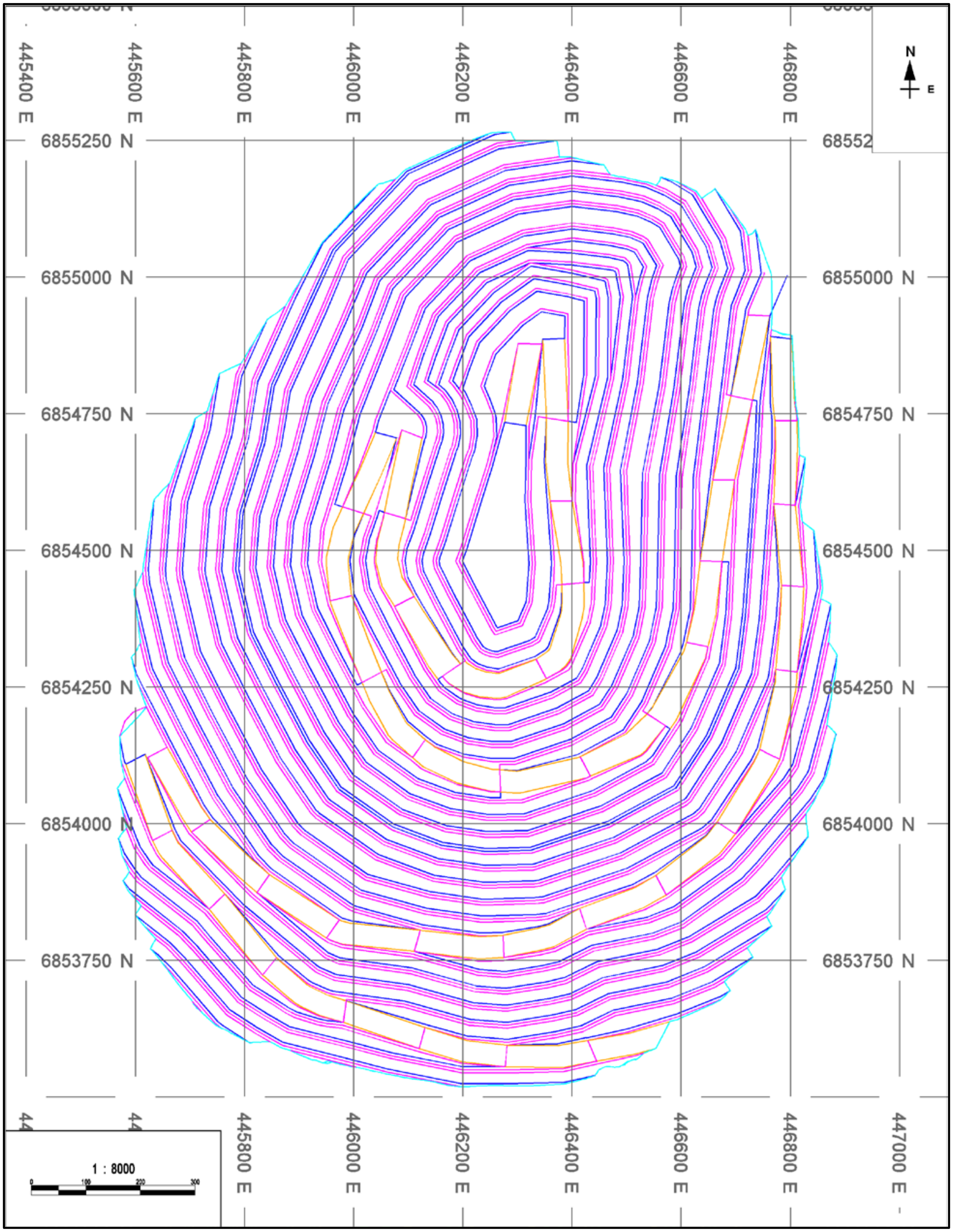
16.1.1 Pit Phase Designs

SRK has designed pit phases to facilitate the early and smooth release of higher-grade ore material. There are to be three phases in all. These are illustrated in Figure 16-1 to Figure 16-3. A longitudinal section showing all three phases is provided in Figure 16-4 (location of cross-section is on Figure 16-3).



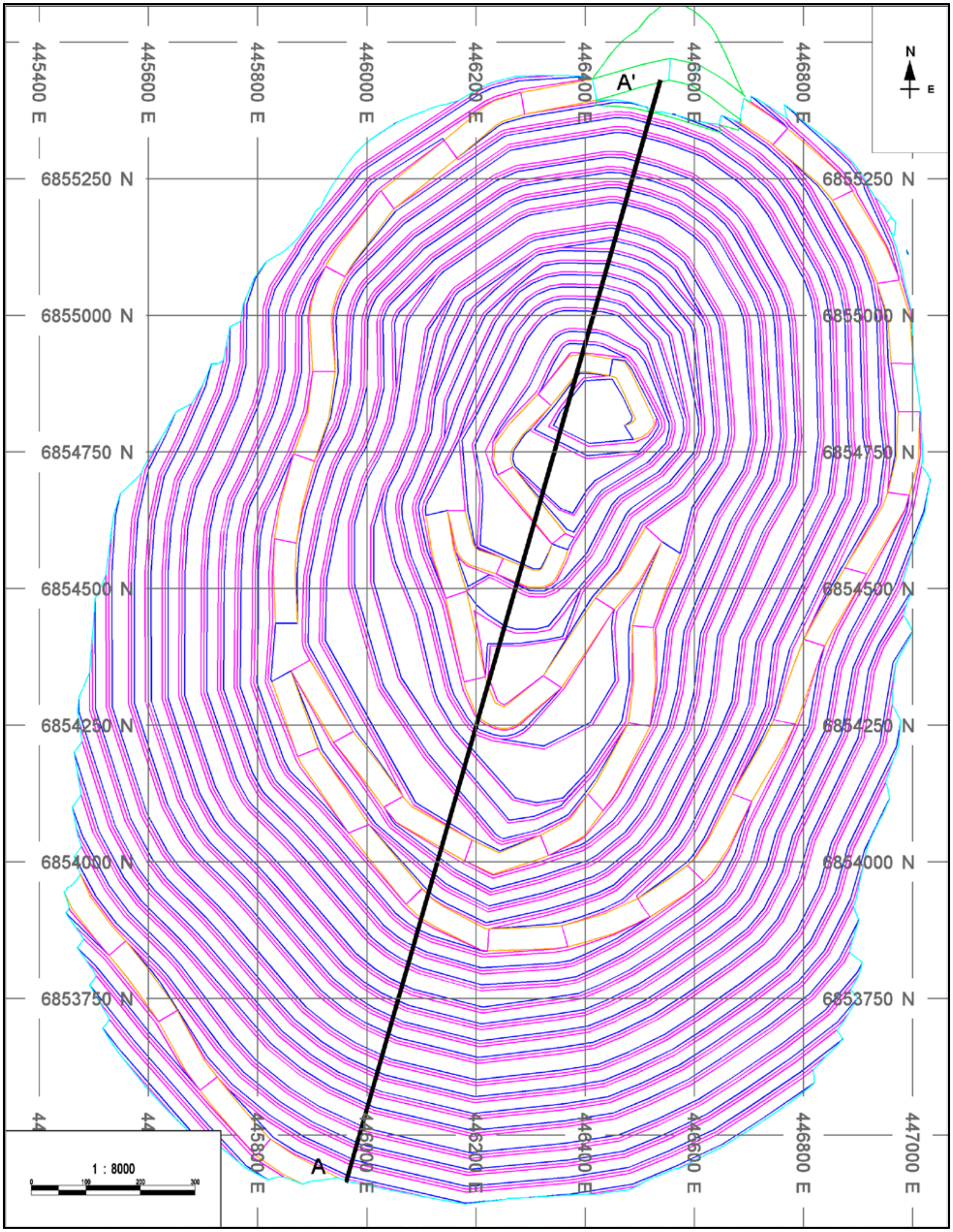
Source: SRK, 2020

Figure 16-1: Josemaria Phase 1 pit design



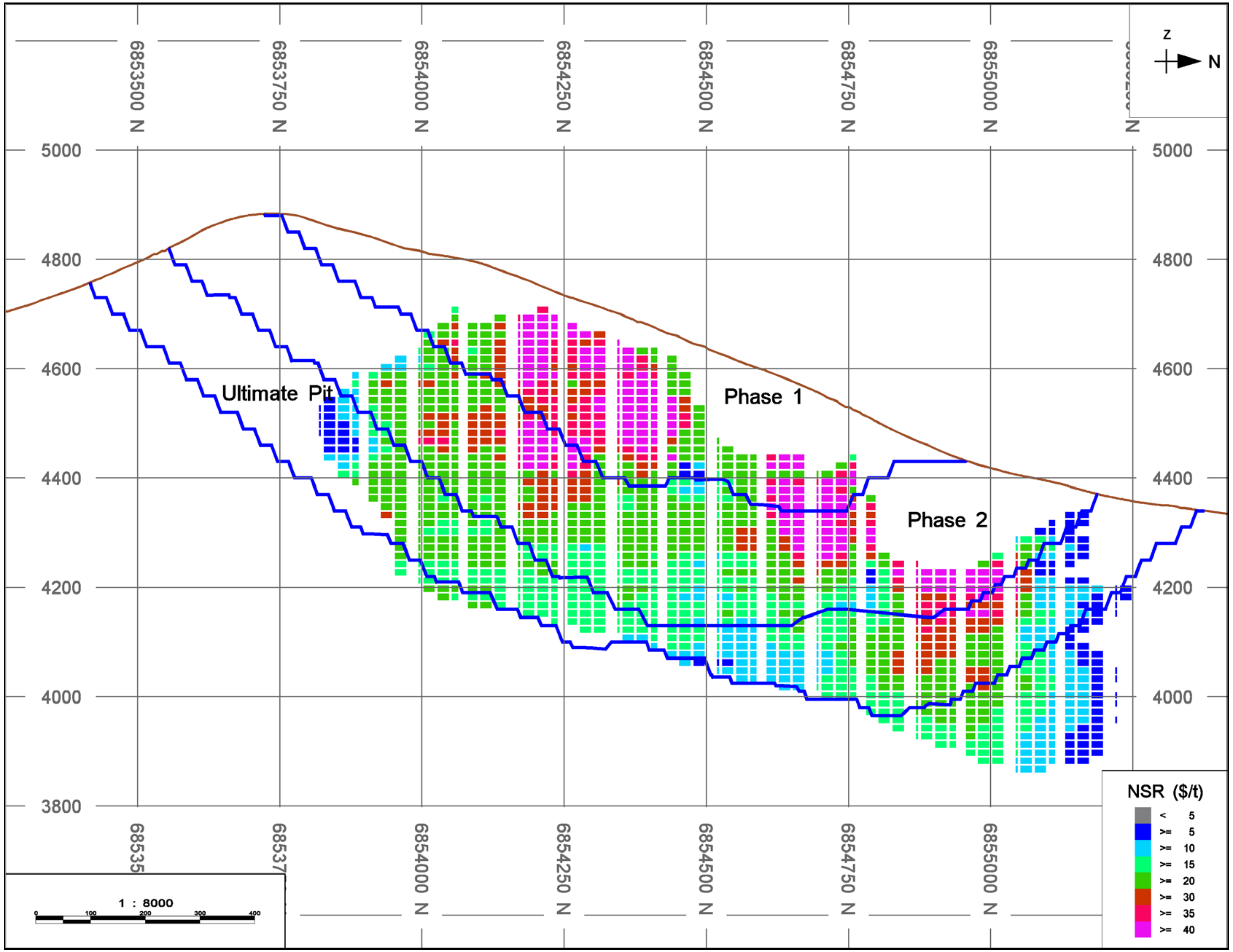
Source: SRK, 2020

Figure 16-2: Josemaria Phase 2 pit design



Source: SRK, 2020

Figure 16-3: Josemaria ultimate pit design



Source: SRK, 2020

Figure 16-4: Josemaria longitudinal section (A-A') of pit phase designs

16.1.2 Mine Access

Access haul roads between the primary crusher, waste rock storage facilities and active mining areas are designed according to two-way haul road parameters described in Section 1.5.1. One difference is that 3.5 times the largest haulage vehicle width was used to have an overall width of 45 m for haul roads external to the pit.

A crusher access pad consisting of NAG material will fill the valley between the crusher and the pit to facilitate haulage (Section 16.1.9). Additional waste is mined adjacent the crusher to allow traffic to avoid the area on a bypass road.

The initial haul road network will be designed as primarily fill roads using run-of-mine NAG waste rock material for construction and bedding. The roads are designed to contour up the existing topography at a maximum gradient of 10%.

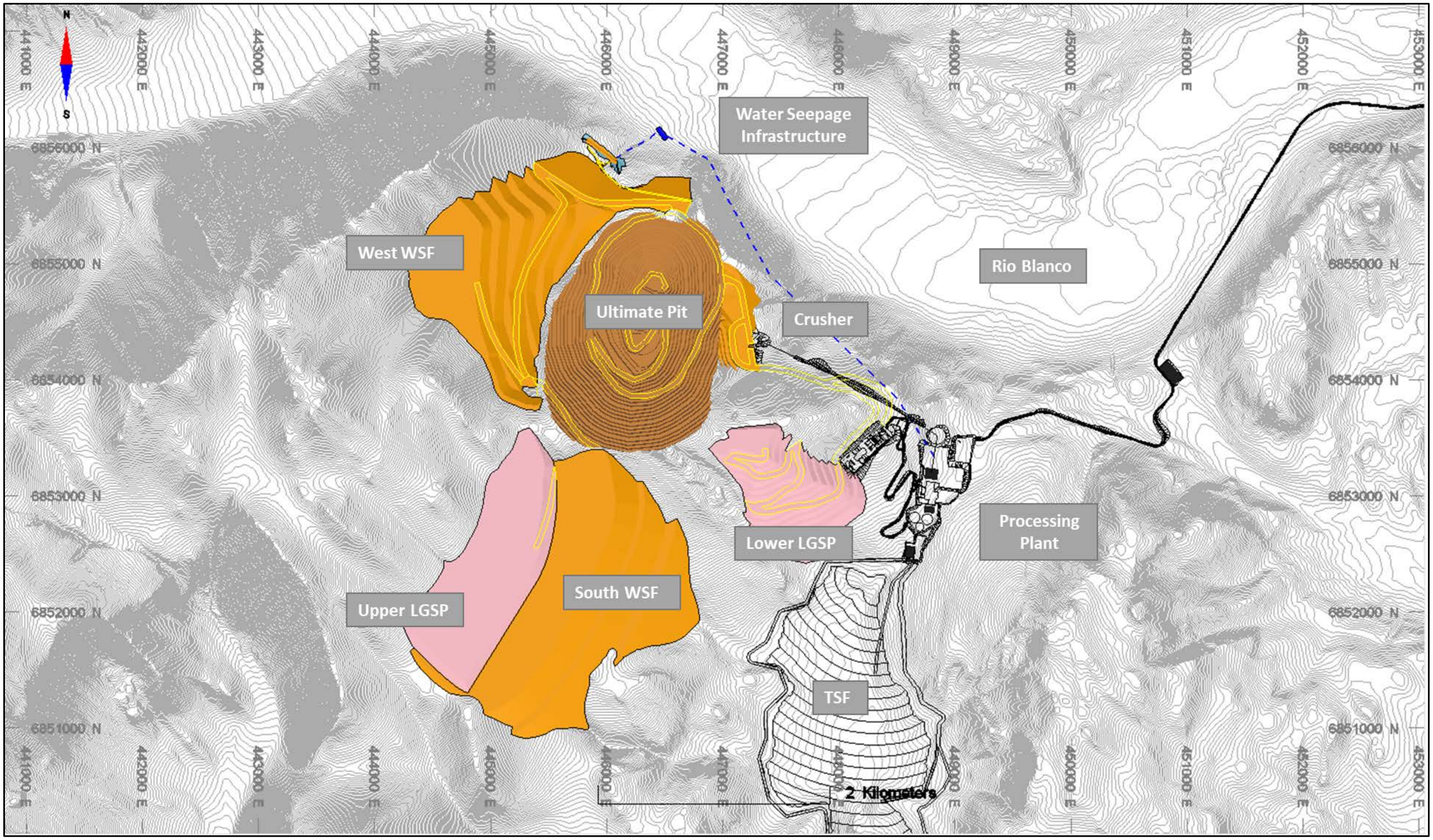
A small fill ramp will be built in the northern section of the ultimate pit in a local topographic depression to allow haul trucks to continually gain elevation as they travel to the West WSF.

16.1.3 Waste Storage Facility Designs

There are two main waste storage locations to the west and south of the pit. Secondary destinations of waste include the crusher access pad (CAP), fill ramps and backfill for a water management trench, and fill ramps supporting the lower low-grade stockpile (LGSP). The largest of these waste storage destinations are summarized in Table 16-1. A site plan of these destinations is shown in Figure 16-5.

Table 16-1: Storage destination details

Characteristic	West WSF	South WSF	Lower LGSP	CAP
Uppermost Elevation	4,760 m	4,750 m	4695 m	4,445 m
Maximum Height, Crest to Toe	440 m	430 m	400 m	~100 m
Waste capacity (tonnes)	399,125,000	588,963,000	-	12,863,000
Maximum Slope Angle	21° (~2.6H:1V)	23° (~2.4H:1V)	22° (~2.5H:1V)	37° (~1.3H:1V)
Inter-bench Slope Angle	~37°	~37°	~37°	No benches
Number of Benches	6	3	~12	N/A
Bench Spacing	~60 m	1 at ~215 m and 2 at ~100 m	~30 m	N/A
Typical Bench Width	60 m	~50 to 80 m	~25 m	N/A



Source: SRK, 2020

Figure 16-5: Josemaria site plan

16.1.4 Material Characteristics

SRK was provided an assessment of the acid rock drainage (ARD) potential of mined material (pHase and Lorax, 2019). NAG or PAG material was classified based on geochemical testing by lithology, alteration and mineralization units. Post mineralization volcanics (PMV) material, which constitutes nearly half the waste rock on site, is the greatest source of NAG material. This unit has a low sulphur content and slightly higher neutralization potential (NP) relative to other units, and some of this is classified as NAG based on the neutralization potential ratio of samples tested in the program and the sulphur content estimated in the block model. All other units are classified as PAG.

Based on the characterization of mined units, Josemaria, with support from pHase Geochemistry, developed sulphur cut-off criteria for geochemical waste units. With the exception of the PMV material, most units were classified as PAG given the very limited neutralization potential. Rock classified as Weakly PAG and PAG were both assumed to require ARD management. Due to the slightly higher NP in the PMV unit, a higher sulphur criteria could be applied to that unit than others while still being classified as NAG.

There are only limited instances early on in the mine life where NAG material is segregated due to its non-acid generating properties, otherwise NAG and PAG are not segregated and are stored in the same facilities, which are designed to manage ARD runoff.

Metal solubility as indicated by leach extraction tests and humidity cell testing in the geochemical characterization program indicated that concentrations of Cd, Co, Cu, Mn, Ni, Zn and SO_4 were often elevated relative to typical water quality guidelines and may represent constituents of interest. In general, acidic pH values were associated with higher metal concentrations in the leachate. Samples from the PMV lithology generally indicated a relatively lower risk for metal leaching.

16.1.5 WSF Stability Analysis

Stability analyses were completed at the West WSF, South WSF, Lower LGSP and CAP to assist with the slope design at each of these facilities. Multiple design scenarios were addressed for each facility to determine which slope angles and bench configurations provided the optimal blend of acceptable safety factors and facility economics.

Slope stability was analyzed for the following conditions:

- Static assessment for drained conditions with effective shear strength parameters
- Seismic assessment under pseudo-static conditions and drained shear strength parameters. Undrained loading conditions were excluded since fine-grained materials below the water table were not encountered.

Surficial slip surfaces were not considered in this analysis. Minimum slip surfaces were set to a 10 m depth. The minimum factor of safety, FoS_{min}, adopted for the WSFs were as follows:

- FoS_{min} = 1.4 for static loading conditions
- FoS_{min} = 1.1 for pseudo-static loading conditions linked to the design seismic event

The calculated FOS for static loading conditions met or exceeded the FoS_{min} criterion at all sections, except the 1.3H:1V slope of the CAP. For pseudo-static loading conditions, the calculated FOS met the FoS_{min} criterion for two of seven sections. The FoS_{min} criterion was not met at one section at the South WSF, two at the Lower LGSP and two at the CAP.

Comments related to the pseudo-static analyses at these four cross-sections are as follows:

- For the sake of simplifying the modeling, the pseudo-static approach assumes that the waste rock and stockpile facilities will behave as rigid bodies (which they will not) and the accelerations developed during the earthquake will be uniform throughout the cross-section (which they will not).
- In light of the limited time period over which the LGSP will be in place, it is considered reasonable to accept an FOS below the FoS_{min} criterion
- The CAP is significantly smaller than the other facilities and will be well suited to remediation in the event deformations are significant. It is therefore considered reasonable to accept an FoS below the FoS_{min} criterion for pseudo-static loading.
- At the South WSF and CAP, the calculated FOS is only marginally less than the FoS_{min} criterion, i.e. a calculated FOS of 1.0 versus the 1.1 criterion. It is anticipated that seismically induced deformation is manageable in both facilities.
- To confirm the acceptability of the design slopes at the South WSF, lower LGSP and CAP, a deformation analysis should be undertaken for each facility as part of detailed engineering or other future work programs

16.2 FS Mine Scheduling

To direct detailed mine planning, a preliminary stage of strategic mine planning (SMP) was performed upon completion of initial pit designs. SMP schedules were costed using the previous pre-feasibility study cost model and run through economic analysis to gauge the impact of the new resource model and metallurgical recoveries on the project. This prompted several rounds of SMP, where a series of mine schedules were run to gauge the impact of different key drivers on the project.

Activities and strategies were used during SMP to arrive at a preferred mining scenario on which to perform detailed scheduling.

16.2.1 Scheduling Approach

The production schedule for the FS mine plan was developed using Hexagon Mining's MinePlan Strategic Optimiser (MPSO). The optimizer simultaneously schedules material movement between the pit, stockpiles and the crusher as well as balancing the shovel and haul truck fleets.

The scheduling software uses the pit design solids developed in MineSight™ 3D design software cut into benches and then each bench is divided into cut solids. The software also uses 3D waste rock stockpile designs that are designed in lifts where possible, and where required, the dump solids are designed to reflect the sequence of dump development where one heading (lift) advances over a lower lift.

The pit and dump solids are linked by a MS Haulage™ haulage network. The haulage network is a series of polylines and nodes which connect source areas to destinations. Based on the distance and gradients of the network segments, MS Haulage™ estimates cycle times and haul truck productivity. The cycle times and haul fleet productivity calculated in haulage are used in the MPSO software to model and manage the required mining fleet.

Constraints were placed on tonnes mined from various phases, tonnes delivered to various destinations and truck fleet hours in order to produce an optimized and smooth schedule which achieves the objectives laid out from the SMP exercise. The constraints applied period by period reflect the waste deposition strategy with respect to NAG and PAG rock restrictions and also mill delivery targets along with the low-grade stockpiling strategy.

16.2.2 FS Production Schedule

The feasibility study mine production schedule includes six quarters of pre-production before the processing plant begins operation. The first three quarters consist of pioneering activities with small equipment and are not included in the MPSO schedules. However, the next three quarters of pre-production are included in the MPSO LOM schedule. Starting at Year 1, the schedule is planned on a monthly basis for two years, followed by three years planned quarterly and then annually to the end of the mine life. The mine schedule is summarized in Table 16-2 and details of the plant feed are provided in Table 16-3. A chart of mill feed NSR and stockpile inventories is provided in Figure 16-6.

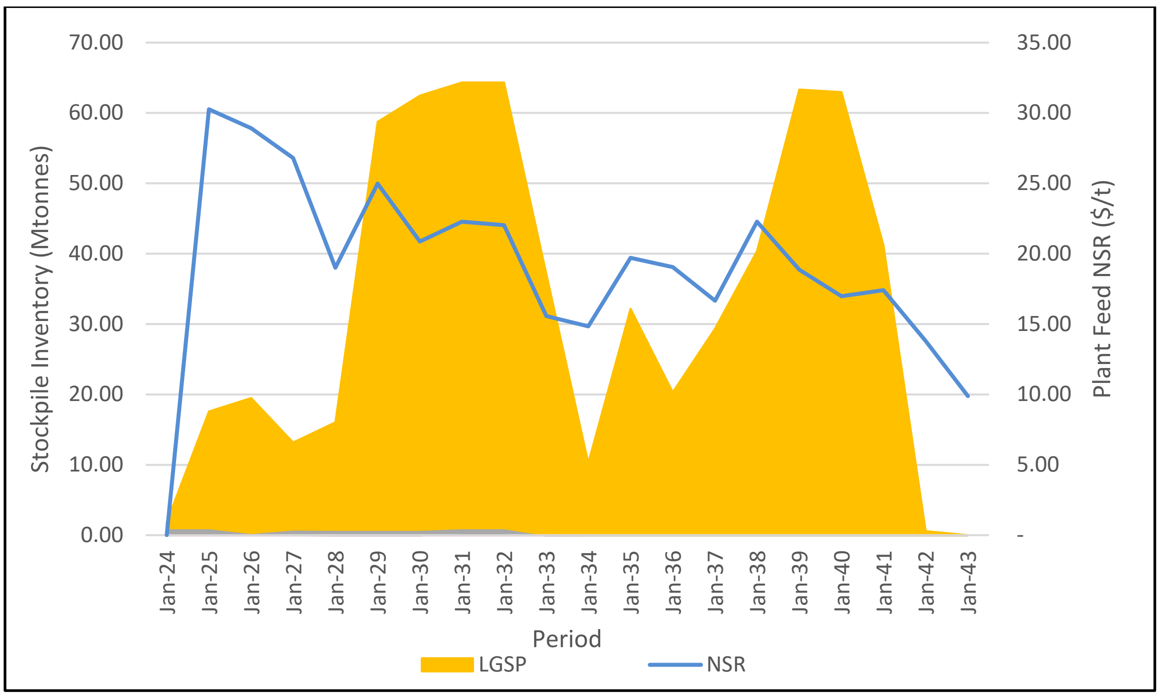


Figure 16-6: FS mine plan mill feed NSR and stockpile levels

Table 16-2: Mine schedule summary

		Grand Total	Y-1	Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y08	Y09	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19
Direct Mill Feed	(M tonnes)	695.6	0.0	37.3	48.5	45.9	40.7	53.2	54.6	54.7	54.5	6.2	19.5	45.9	23.0	35.1	45.3	55.5	32.5	32.8	10.4	0.0
Stockpile Reclaim	(M tonnes)	316.2	0.0	5.5	7.0	10.0	14.9	2.1	0.8	0.8	1.0	49.0	35.9	10.3	32.0	20.3	10.3	0.0	23.0	22.6	44.7	26.0
Total Mill Feed	**(M tonnes)**	**1,011.8**	**0.0**	**42.8**	**55.5**	**55.9**	**55.6**	**55.4**	**55.3**	**55.5**	**55.5**	**55.2**	**55.4**	**56.1**	**55.0**	**55.4**	**55.6**	**55.5**	**55.5**	**55.4**	**55.1**	**26.0**
Ore to Stockpile	(M tonnes)	316.2	2.6	22.4	8.2	7.9	19.0	46.2	6.6	2.9	1.0	21.8	9.0	32.2	20.2	29.3	31.8	28.1	26.2	0.9	0.0	0.0
Waste to South Dump	(M tonnes)	589.0	20.4	42.1	75.5	37.1	10.3	14.0	39.2	67.6	73.3	47.3	12.0	4.8	58.8	49.2	19.8	12.2	3.4	1.4	0.4	0.0
Waste to West Dump	(M tonnes)	397.9	13.0	33.7	20.5	53.2	70.1	29.5	38.8	14.0	10.2	10.6	63.5	40.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste to Crusher Area	(M tonnes)	15.5	13.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Material Moved	**(M tonnes)**	**2,330.4**	**49.5**	**143.0**	**159.7**	**154.0**	**155.0**	**145.1**	**140.0**	**140.0**	**140.0**	**135.0**	**140.0**	**134.0**	**134.0**	**134.0**	**107.2**	**95.8**	**85.1**	**57.7**	**55.5**	**26.0**

Table 16-3: FS plant feed detail

		Grand Total	Y-1	Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y08	Y09	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19
Plant Feed	(M tonnes)	1,011.8		42.8	55.5	55.9	55.6	55.4	55.3	55.5	55.5	55.2	55.4	56.1	55.0	55.4	55.6	55.5	55.5	55.4	55.1	26.0
NSR	($/t)	20.2		30.3	28.9	26.8	19.0	25.0	20.9	22.3	22.0	15.6	14.8	19.7	19.0	16.7	22.3	18.9	17.0	17.4	13.8	9.9
Cu Head Grade	(%)	0.30		0.40	0.41	0.39	0.26	0.33	0.30	0.33	0.34	0.24	0.22	0.30	0.29	0.25	0.35	0.30	0.28	0.27	0.22	0.16
Cu Recovered Grade	(%)	0.26		0.34	0.35	0.33	0.22	0.29	0.26	0.28	0.29	0.20	0.19	0.26	0.25	0.22	0.30	0.26	0.24	0.23	0.19	0.13
Au Head Grade	(g/t)	0.22		0.38	0.33	0.29	0.24	0.30	0.24	0.24	0.22	0.17	0.17	0.19	0.20	0.17	0.21	0.18	0.15	0.17	0.13	0.10
Au Recovered Grade	(g/t)	0.13		0.26	0.22	0.19	0.15	0.20	0.15	0.15	0.14	0.10	0.10	0.12	0.12	0.10	0.13	0.11	0.09	0.10	0.08	0.06
Ag Head Grade	(g/t)	0.94		1.01	1.15	1.33	0.69	1.03	0.85	1.02	1.05	0.72	0.69	0.85	0.82	0.78	1.02	0.95	1.09	1.17	0.93	0.64
Ag Recovered Grade	(g/t)	0.68		0.73	0.83	0.95	0.50	0.74	0.61	0.73	0.76	0.52	0.50	0.61	0.59	0.56	0.74	0.68	0.79	0.84	0.67	0.46
Fe	(%)	3.77		3.98	4.16	3.72	4.20	4.20	3.69	3.60	3.56	4.09	3.93	3.71	3.85	3.50	3.57	3.68	3.58	3.30	3.64	3.75
S	(%)	2.50		2.40	2.03	2.04	3.53	3.09	2.72	2.30	1.97	2.85	3.22	2.75	2.83	3.08	2.01	2.27	1.82	1.41	2.22	3.28
S-Cu Ratio	(%:%)	11.15		11.35	7.55	8.47	16.07	11.98	10.08	7.61	6.85	15.31	18.74	13.83	10.76	12.99	7.01	8.40	9.35	5.88	11.81	25.48
As	(g/t)	41.0		39.1	30.1	45.4	59.4	41.5	40.7	41.2	31.5	32.0	48.5	44.7	44.1	56.3	48.4	40.6	31.6	32.4	31.6	37.4

Over the life-of-mine, a total of 1,012 million tonnes of plant feed are delivered to the primary crusher with an average head grade of 0.30% Cu, 0.22 g/t Au and 0.94 g/t Ag. There is a total of 992 million tonnes of waste rock mined, resulting in an average strip ratio of 0.98 w:o. However, an additional 10 million tonnes of waste in the production schedule is moved in the pre-production period to build pads and pioneer access roads (cut and fill) from the pit to the crusher, stockpiles and waste dumps to prepare the operation for production. This amount is not included in the calculation of the overall strip ratio because it is outside of the pit. Throughout the mine life, a total of 316 million tonnes of ore are delivered to the low-grade, medium-grade or high-grade stockpiles before being delivered to the mill. The total mine life is 19 years.

16.2.3 End of Period Plans

End of period plans for Years 0, 5, 10, 15, 19 are included in Figure 16-7 to Figure 16-11.

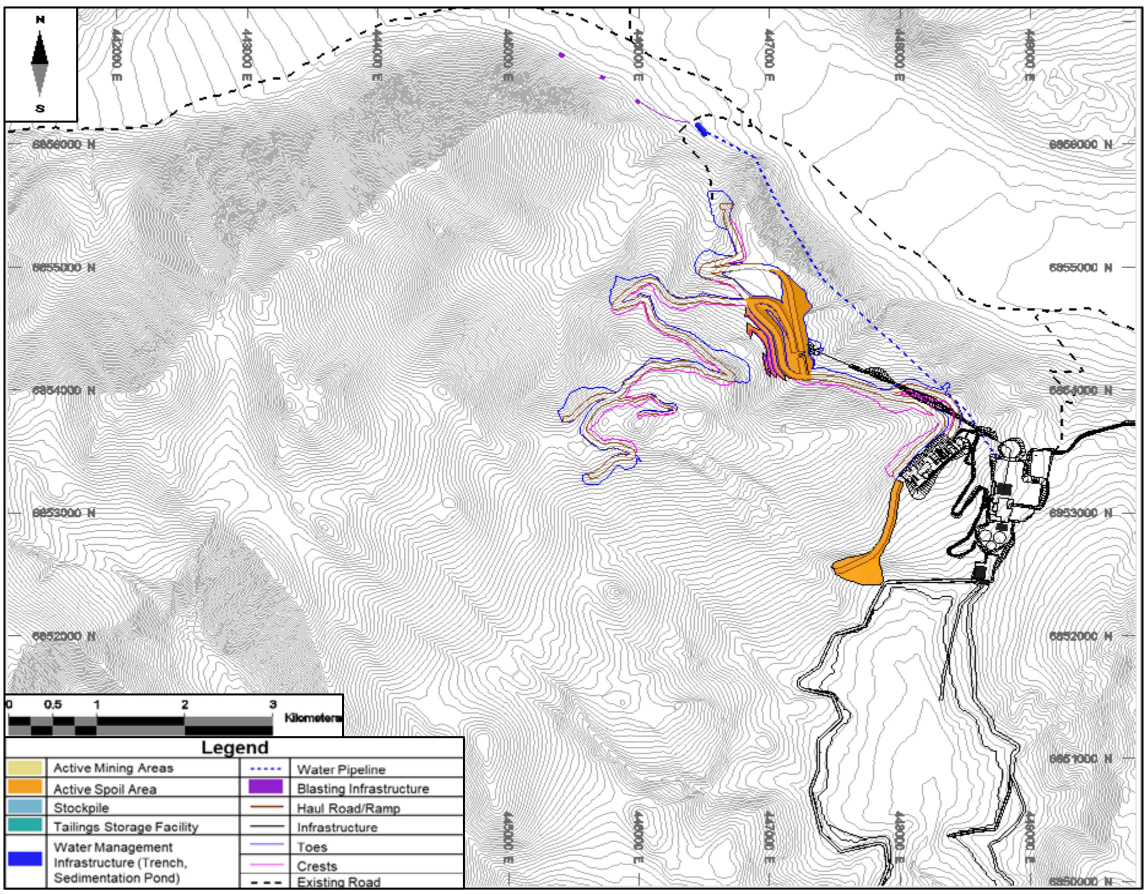


Figure 16-7: End of period plan (Year 0)

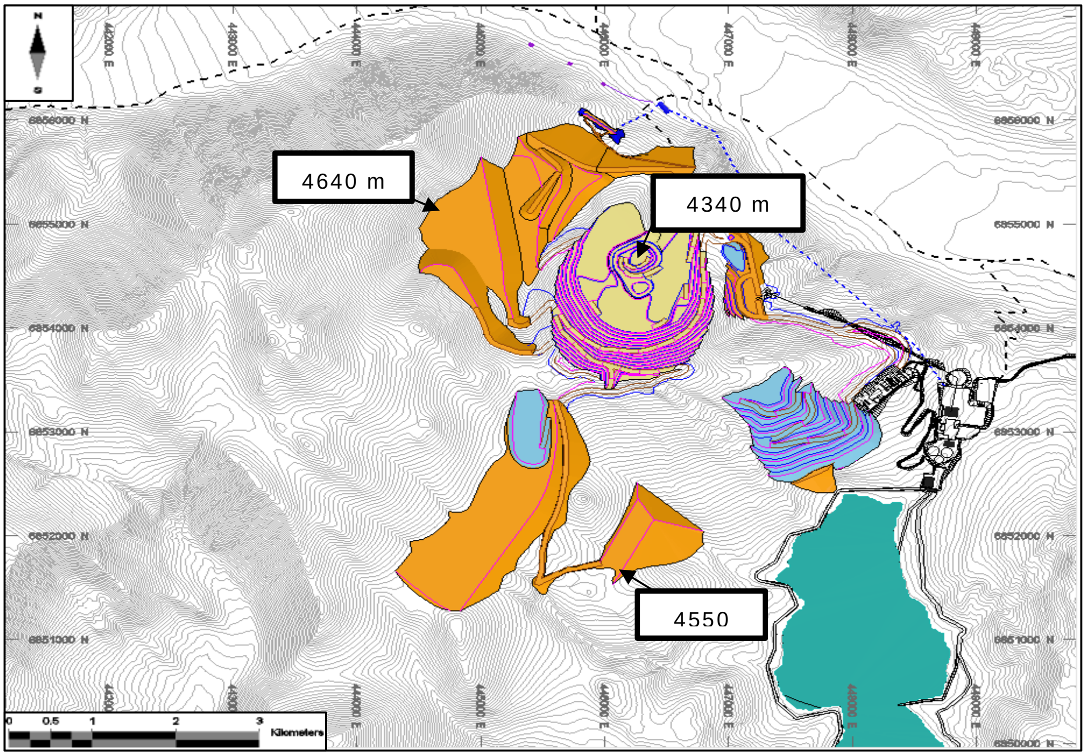


Figure 16-8: End of period plan (Year 5)

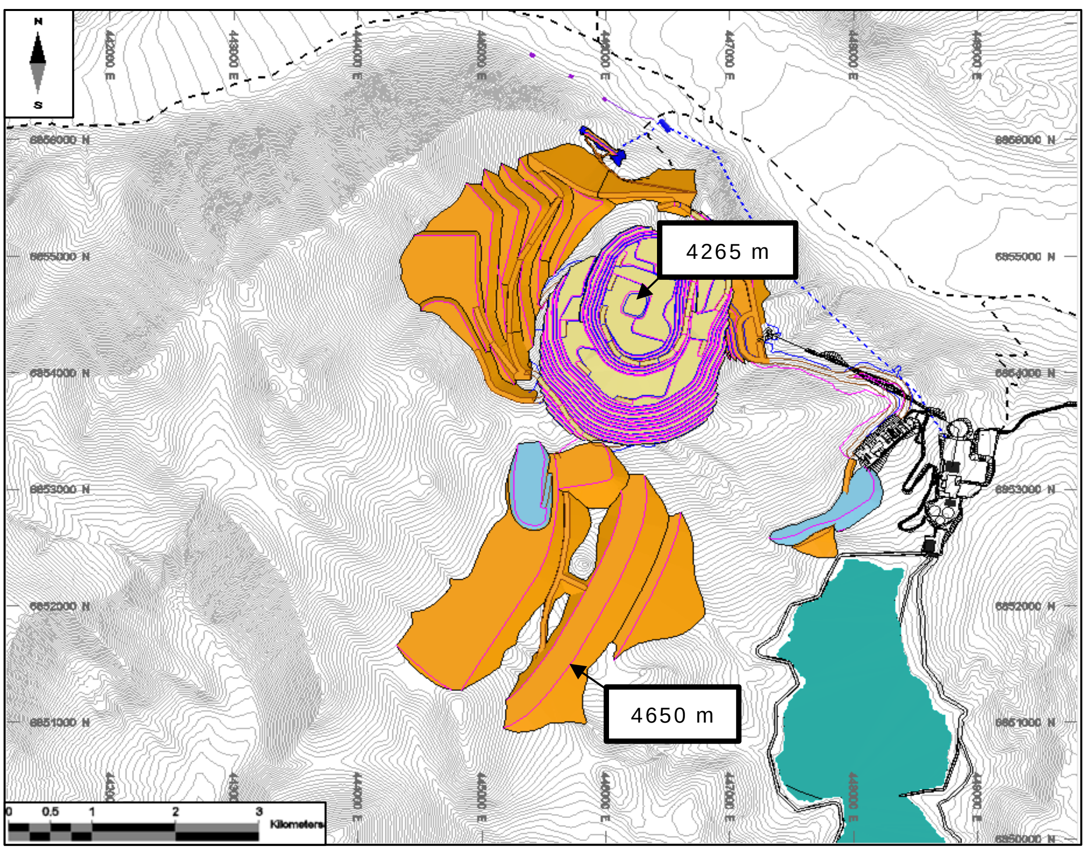


Figure 16-9: End of period plan (Year 10)

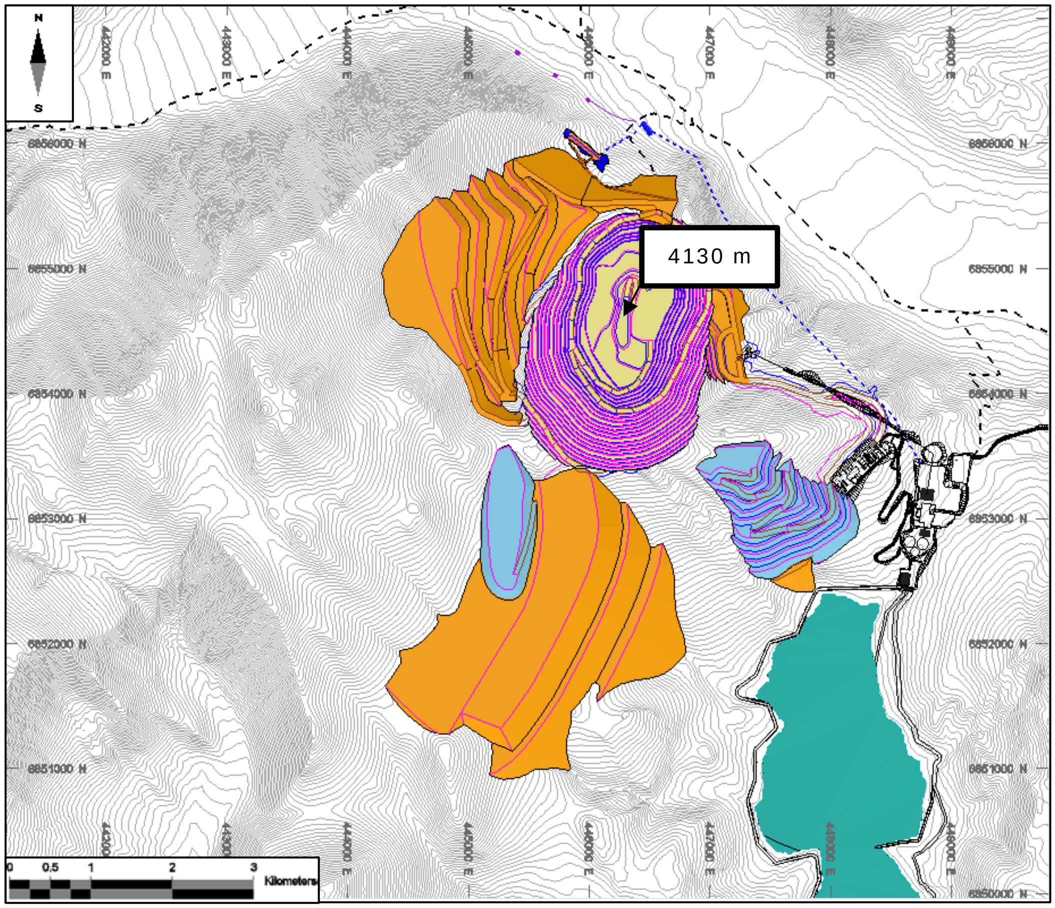


Figure 16-10: End of period plan (Year 15)

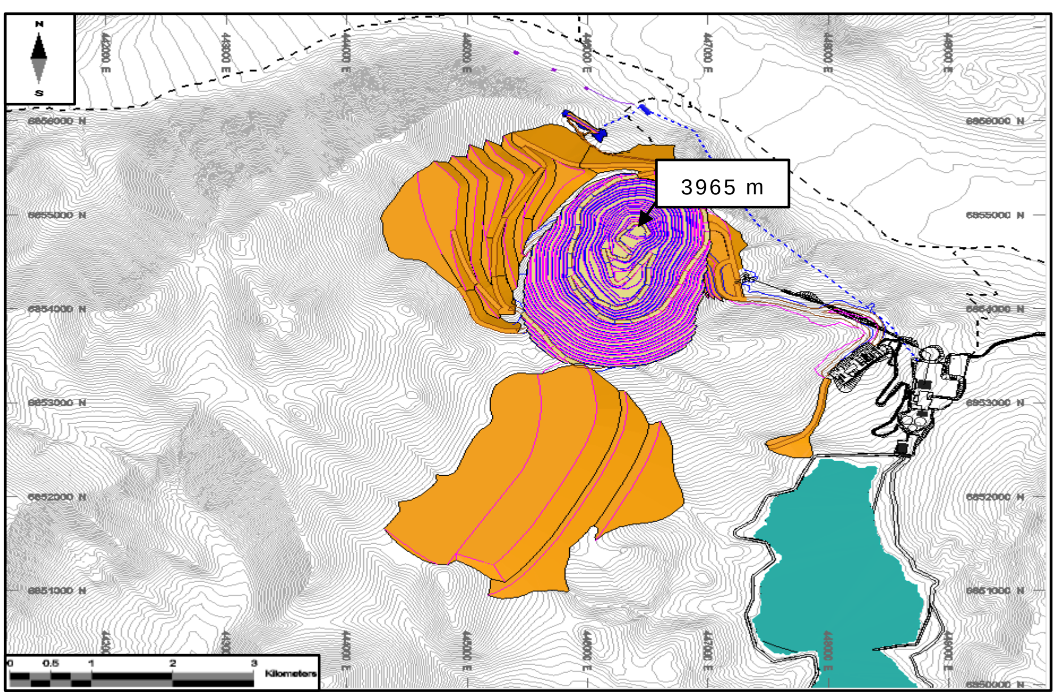


Figure 16-11: End of period plan (Year 19)

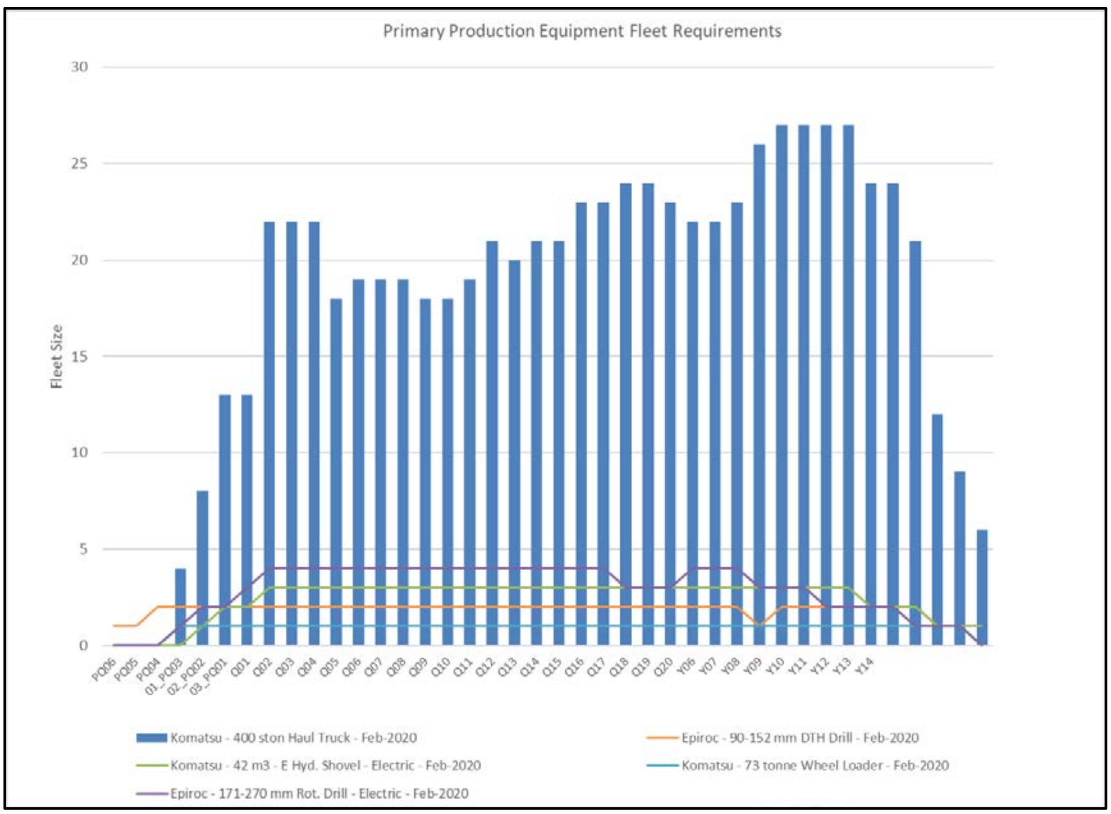
16.3 FS Mine Equipment and Labour

Equipment selection has been based on both engineering judgement and cost analysis. Facilitating this was a vendor solicitation exercise whereby select equipment vendors were approached to provide equipment specifications, capital cost, and operating cost information.

16.3.1 Equipment Fleet Requirements

The primary production equipment requirement for the FS is provided in Figure 16-12.

There is a plateau of maximum material mined from Year 1 to Year 4 averaging 157 Mtpa and reaching a sustained maximum of 160 Mtpa. This early high mining rate was necessary to bring forward higher grade material to the mill and to leave low-grade material to stockpiles. From Year 6 on, the mining rate was sustained at a maximum of 140 Mtpa, however fleet requirements increased as haulage distances grew due to increasing depth of the pit and height of the waste storage facilities.



Source: SRK, 2020
Figure 16-12: Case 19D mine equipment fleet requirements

16.3.2 Support Equipment

The fleet requirements for support equipment are provided in Table 16-4 for when the mine is at maximum production in Year 4 (2029).

Table 16-4: Support equipment requirements at maximum production (2029)

Equipment Description	# Units
41 t Loader	1
455 kW Track Dozer	4
640 kW Track Dozer	1
90-tonne (7 m^3) Backhoe	1
560 kW Wheel Dozer	2
7.3 m Grader	4
40,000 USgal Water Truck	3

16.3.3 Ancillary Equipment

The ancillary equipment in Table 16-5 was selected for the Josemaria project.

Table 16-5: Ancillary equipment requirements for Josemaria

Equipment Description	# Units
Gravel truck, 13 m^3 (blast stemming)	1
Portable crusher (blast stemming)	1
Trailer mounter lights, 4-1000W, 6 kW generator	Up to 8
Sump pump, 94 kW	Up to 14
Articulated truck, 40-tonne	2
Backhoe, 1.9 m^3	1
Transporter, 135-tonne	1
Flatbed truck, 150,000 lb GVW	1
Fuel truck	2
Field service truck	2
Tire service truck	1
Welding truck	2
Crane, 50-tonne	1
Forklift, 5.5-tonne	1
Tire manipulator (Cat 988 class)	1
Pickup trucks	Up to 29
Crew Van	Up to 5

16.3.4 Labour Requirements

Mine operating labour requirements are largely driven by equipment usage. Specifically, the operating shifts for each equipment type and class are determined, and a corresponding operator is assigned for these shifts. Then, to account for the crew roster (2 weeks in, 2 weeks out, day and night), the number of operators is rounded up to the nearest four headcount. Beyond this broad approach, the following specifics were applied in the FS:

- Autonomous drilling is adopted whereby one drill controller is able to monitor/operate the four large production drills. As well, the two smaller drills are managed by a second controller on shift.
- To maintain truck loading throughout a 12-hour shift, the number of loading operators was factored up by 50% to ensure constant coverage during breaks and shift changes
- Autonomous haulage will result in no truck drivers being required for the large production haul trucks
- A vacation-sick-absenteeism (VSA) factor of 15% is applied to the base operators per shift before rounding up for the 4 crews. The headcount for operators is costed at the median operator pay rate.

Mine maintenance labour requirements were estimated by factoring the equipment count across distinct maintenance roles. The resulting crew headcount was then rounded up by a factor of four to account for the four crews.

Salaried staff includes frontline supervision, management, administrative and technical personnel that support the mining operations. Roles and numbers were identified based on engineering judgement and experience. Default headcount numbers were identified per role which apply at steady state operations. For ramp-up and tail-off of operations, percent of complement were estimated, although these were applied as integer steps in headcount with a minimum headcount per role assumed.

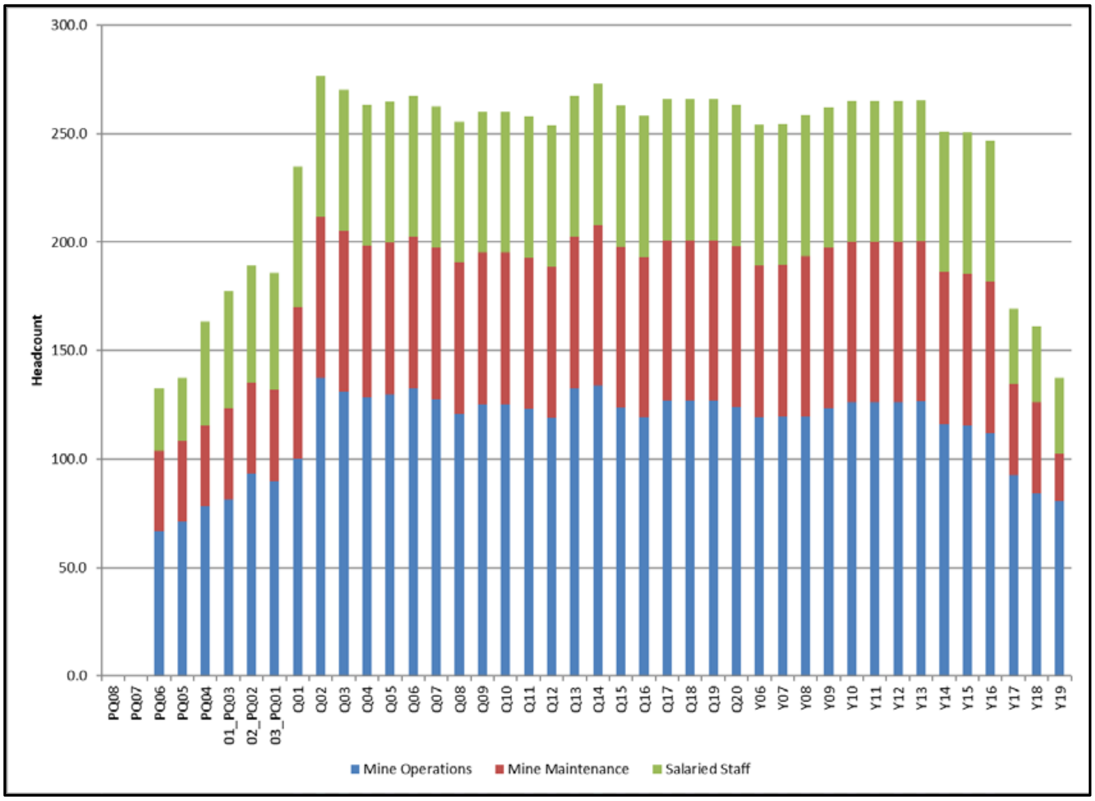
The resulting headcount for mine operations, mine maintenance, and salaried staff is provided in Figure 16-13. After the initial ramp-up, the headcount shows moderate variation on a quarterly basis. More detailed evaluation and management strategies may seek to smooth this out.

16.4 Mining Operations

16.4.1 Pre-Production Activities

Pre-production development activities associated with the mining operations will consist of:

- Pioneering access/haulage roads to the top of the Phase 1 pit and from there up to the South and West WSF areas
- Establishing initial access to the ROM pad for ore haulage
- Cutting/filling material as required to establish ROM pad in front of primary crusher
- Expanding a temporary pad west of the ROM pad for equipment erection and subsequent stockpiling
- Preparing low-grade stockpile area by constructing a lower waste rock platform
- Establishing the accesses and pads for the explosives facility and powder magazine
- Pre-stripping 47 Mt of waste (and 2 Mt of ore to stockpile) from Phase 1 to set up for consistent ore release (10 Mt of the pre-production waste is from outside of the pit and is related to development of access roads and pads)



Source: SRK, 2020

Figure 16-13: Josemaria mining operations headcount

Pre-production mining activities occur in two stages: first with a fleet of small equipment and then with the full-size equipment utilized in the remainder of the mine life. For the FS, it was assumed the former would be accomplished with a combination of leased and owned equipment, with the owned equipment continuing into the mine life to provide operations support (i.e., backhoe and two articulated trucks). The leased equipment consists of an additional 90 t backhoe, six 40 t articulated trucks, two 233 kW track dozers (Cat D8 size), and a 4.9 m grader (Cat 16 size).

16.4.2 Drilling

Production Drilling

Production drilling of waste and ore is predominantly handled by a large drill capable of drilling 12.25-inch (31 cm) holes (e.g., Epiroc PV271 XC). Of all production drilling, 95% is handled by this drill fleet with the remainder going to the smaller drill, which drills a 6.25-inch (16 cm) hole (e.g., Epiroc Flexiroc D65).

Both drills have autonomous or teleremote capability. Up to five of the larger drills can be managed by a single operator (controller), though only four drills are required to meet production requirements. Two of the smaller drills, as required for Josemaria, can be teleremote operated by a single operator.

Wall Control Drilling

Wall control blasting is to be by a combination of buffer blasting, where two rows on decreased burden and spacing patterns are inserted between the production blasting and final wall, and pre-split blasting, where a single row of closer spaced holes are drilled on the final wall toe line. All wall control drilling is to be handled by the smaller drill.

Horizontal Drain Drilling

To ensure pit wall stability, wall depressurization is required for the Josemaria pit. SRK has assumed horizontal drain drilling on one third of the benches to achieve this depressurization. This is to be more focused in the lower benches in the north (where a low RQD rubble zone exists), but for costing, this was more evenly distributed.

Fifty-metre long holes are spaced every 25 m along one third of the pit phase wall perimeter length. All horizontal drain drilling is accomplished by the smaller drill.

16.4.3 Blasting

Blasting operations are envisioned to be handled through a contracted blasthole loading service. Bulk explosives are to be mixed at facilities on site and delivered to blast patterns by special shot loading trucks. The explosives supplier would be responsible for all aspects of blast design, loading and shooting.

16.4.4 Loading

Waste and ore loading is to be handled primarily by large 42 m^3 hydraulic shovels. The fleet size is capped at three units, which requires supplemental loading capacity. This supplemental loading capacity is to be provided by a large 36 m^3 front end loader. The loader performs 18% of all waste and ore loading.

16.4.5 Hauling

Haul roads are designed at 40 m wide in-pit and 45 m wide ex-pit at a maximum grade of 10% to facilitate 363 t autonomous haul trucks to operate in two-way traffic. Rolling resistance was assumed to be 3% in-pit and on dumps, and 2% elsewhere. A haulage network was created and imported into MS Haulage to facilitate scheduling.

16.4.6 Support

Support equipment operations include:

- Track dozer cut and fill during the pre-production period to pioneer initial roads and drill patterns
- Track dozer support in road and dump maintenance
- Rubber tire dozer support for loading as well as road and dump maintenance
- Grader road maintenance
- Water trucks for dust suppression
- Backhoes for sumps and utility work around the mine

16.4.7 Dewatering

Mine operations are expected to experience water incursions into the open pit. The source of this water is rainfall, snowmelt and groundwater. By far, the biggest contributor is precipitation that has been observed at rates that could mean 150,000 m^3/day (28,000 US gpm) over the total pit area (3.15 Mm^2). SRK estimated the pit surface areas in Years 5, 10, 15 and 19. These estimates were used to interpolate the expected rain event impacts over the life of mine.

Dewatering pumps, each capable of pumping 2,000 US gpm at 2000 feet head (10,902 m^3/day at 610 m head), were determined for each mining period. A maximum of 14 pumps were specified for operation. These pumps require electrical hook-up to the mine power distribution system.

16.4.8 Grade Control

Grade control is required at Josemaria to segregate ore from waste and low-grade from medium-grade and high-grade ores. Blast holes are to be regularly sampled for on-site assaying. All blast holes in anticipated ore zones are to be sampled for grade control. A portion of the holes in waste are also be sampled.

In addition to sampling for grade control, waste holes, particularly in PMV for the first two years of operation, are to be sampled for geochemical assessment. This is to ensure that only NAG rock is placed in locations where water treatment options do not exist either temporally, before such is in place, or spatially where potential waste run-off is not treated.

Between grade control and geochemical assessment, 60% of anticipated waste rock is to be sampled.

16.4.9 Reclamation

Progressive reclamation of dump faces and facilities, including re-sloping to 2H:1V, will occur throughout mine life where possible, including the lowest lifts of the West WSF and all of the South WSF, with the exception of the initial lift at the 4750 m elevation which is later extended and re-sloped.

In closure, the remaining lifts of the West WSF, as well as other facilities such as the crusher pad and the Lower LGSP platform will be re-sloped to 2H:1V.

Due to the topography and climate of the Josemaria site, there is no topsoil to be stockpiled at the outset of mining and thus none to be placed at closure.

Water management infrastructure located north of the West WSF will direct water to the pit via boreholes.

16.5 Mine Infrastructure

16.5.1 Explosives Facilities

Explosives facilities are to be provided by the explosives contractor. These are anticipated to include:

- Ammonium Nitrate storage
- Diesel fuel storage
- Cap and powder explosives storage
- Maintenance and office facilities

These facilities are to be located to the north and west of the West WSF. The closest planned structures to these facilities are the West WSF cut-off trench and catchment pond. The location and separation of these facilities from each other and from possible public access are to be guided by Argentinian regulations. At minimum, 325 m of separation is to be adhered to with additional barricades/fencing to keep the public away.

16.5.2 Fuel Storage and Distribution

It is currently envisioned that fuel for mining operations, particularly haul trucks, is to be stored and dispensed at the maintenance area. Area is limited nearer to the pit; however, opportunities should be sought in future to site a tank farm closer to the pit without being compromised by blasting or traffic flow to the ROM crusher or Lower LGSP. Fuel trucks are also employed to provide fuel for less mobile equipment.

16.5.3 Communications

For voice and data communications, the mine operations will utilize the sitewide system being specified for the project. In addition to this, a dedicated and proprietary communication and control system is to be set up for the autonomous haulage system.

16.5.4 Stockpiles

There are four stockpiles used in the FS, including the Upper LGSP, Lower LGSP, Medium Grade Stockpile (MGSP) and the High Grade Stockpile (HGSP) (see Figure 16-8). The latter two stockpiles are the smallest stockpile facilities and are partially located inside the Phase 2 pit footprint, and as such they are depleted by Year 10. SRK assumed a loose density for stockpiled material of 2.0. Further detail on stockpiling scheduling is included in Section 16.2.2.

17 Recovery Methods

The Josemaria process facilities are designed for a throughput rate of 150,000 t/d of tonalite at the 75th percentile hardness. Softer ores will be treated at a higher rate, up to 160,000 t/d.

The process facilities include the infrastructure, equipment and systems required for crushing, grinding, flotation, concentrate and tailings thickening, concentrate filtration, storage and loadout.

Major process unit operations are:

- Primary crushing
- SAG milling and pebble crushing
- Ball milling
- Flotation and regrind
- Copper concentrate thickening
- Tailings thickening and distribution
- Concentrate dewatering, storage and loadout

17.1 Process Plant Design Criteria

The process plant design is based on the metallurgical performance and ore characterizations described in Section 13. Feed samples chosen for the design of the feasibility metallurgical testwork programme were largely representative of the first five years of operation. Previous testwork programmes used samples that represented the orebody after this initial period.

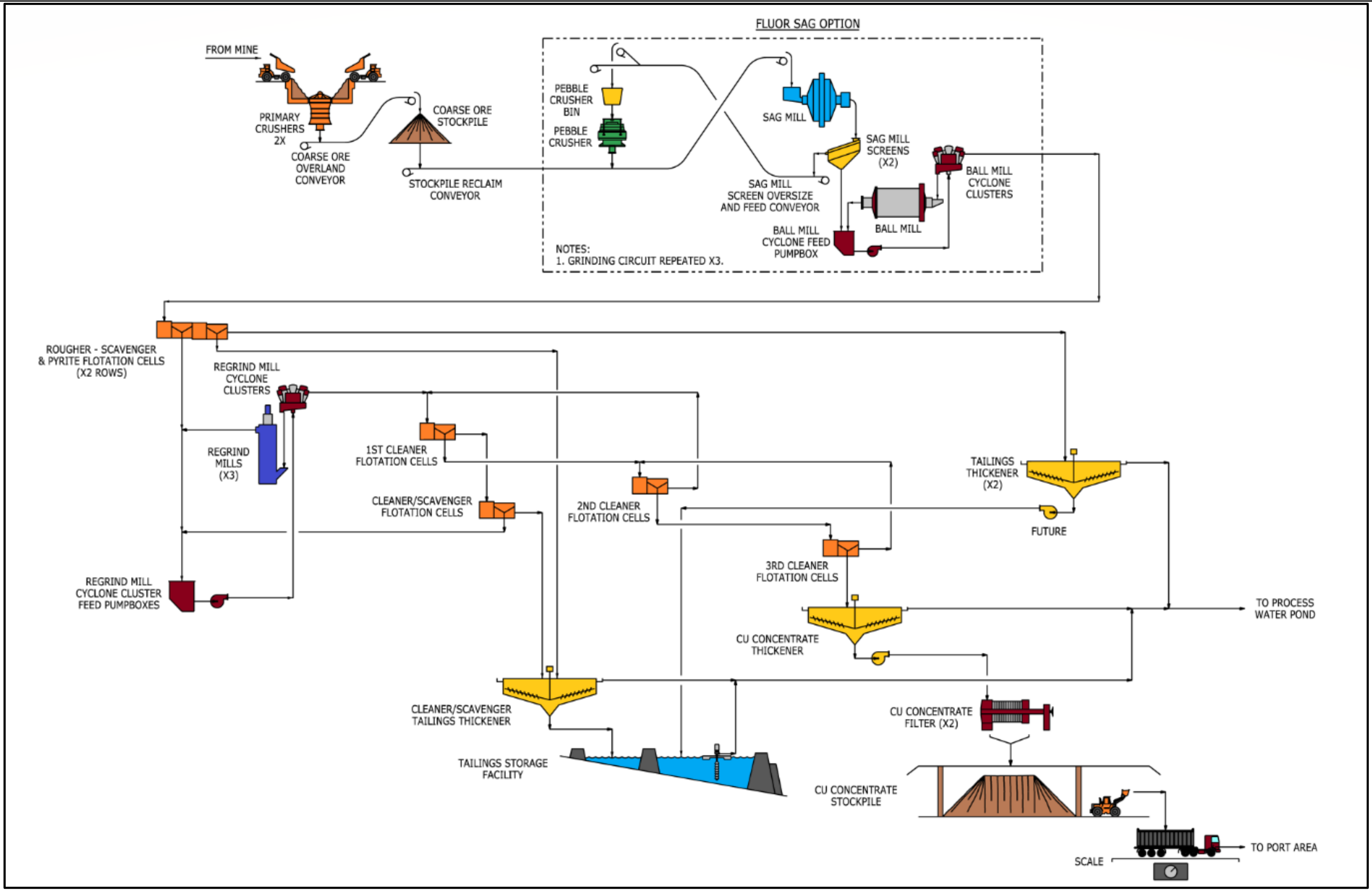
Selected process design criteria are presented in Table 17-1 and Figure 17-1 shows the simplified process flow diagram for the process plant.

17.1.1 Head Grade for Process Design

The feed head grade (0.47 % copper) is derived from the average of the first four years of composites and serves as the design basis for the process design. The mine plan indicates a LOM copper grade of 0.301%. The design basis is thus greater than the LOM feed grade and potentially results in the oversizing of the second and third cleaner flotation cells. However, this extra capacity can treat high-grade supergene when it is encountered in the early years and allows for processing higher-than-nameplate throughput rates during periods when softer-than-average ore is mined.

Table 17-1: Selected Process Plant Design Criteria

Description	Value	Source
Operating data		
Plant design capacity	54.75 Mt/a	Supported by trade-off study
Plant design capacity	150 kt/d	Supported by trade-off study
Primary crushing availability	75%	Fluor in-house data
Grinding and flotation availability	92%	Fluor in-house data
Concentrate filter availability	80%	Benchmark
Coarse ore stockpile live volume	8 hours	Fluor design
Coarse ore stockpile cover	yes	Concerns with wind and dust
Ore characteristics		
Ore specific gravity	2.67	SGS Phase II testwork
Ore moisture content	3%	Fluor in-house data
JK SMC test parameters, A x b	32.8	SGS Phase II testwork (25th percentile)
Bond rod mill work index	13.3 kWh/t	SGS Phase II testwork (75th percentile)
Bond ball mill work index	14.7 kWh/t	SGS Phase II testwork (75th percentile)
Bond abrasion index	0.187 g	SGS Phase II testwork (75th percentile)
SAG milling		
Target P_{80}	1000-1300 µm	Fluor in-house data
Recirculating load	17%	Fluor in-house data
Ball milling		
Target P_{80}	130 µm	ALS testwork 2019
Recirculating load	300%	Fluor in-house data
Flotation		
Average copper head grade	0.47	Year 1-4 balance
Mass pull to final concentrate	1.6% of new feed	Pilot Plant Balance
Rougher residence time	20 minutes	ALS testwork 2019
Cleaner 1 residence time	12 minutes	ALS pilot plant
Cleaner scavenger residence time	6 minutes	ALS pilot plant
Cleaner 2 residence time	27 minutes	Lip transport controlled
Cleaner 3 residence time	28 minutes	Lip transport controlled
Regrind target P_{80}	20-25 µm	ALS testwork 2019
Thickeners		
Settling rate - concentrate	0.13 m^2 /t/d	Pocock Industrial
Settling rate - rougher tailings	0.10 m^2 /t/d	Pocock Industrial
Settling rate - high sulphide	0.175 m^2 /t/d	Pocock Industrial
Concentrate thickener underflow	63%	Pocock Industrial
Tailings thickener underflow	58%	Pocock Industrial
High-sulphide thickener underflow	45%	Pocock Industrial
Filters		
Filtration rate	220 kg/h/m^2	Pocock Industrial
Final concentrate moisture content	10.9%	Pocock Industrial



Source: Fluor, 2020

Figure 17-1: Simplified Process Flow Diagram

17.1.2 Recoveries

LOM recoveries in the current mine plan at the average head grades are 85.2% for copper, 62.6% for gold and 72% for silver.

17.1.3 Circuit Design

The process circuit employs a standard semi-autogenous ball mill crusher (SABC) configuration, followed by a flotation circuit based on the testwork results from the reagent suite and pilot plant (2019) developed by ALS.

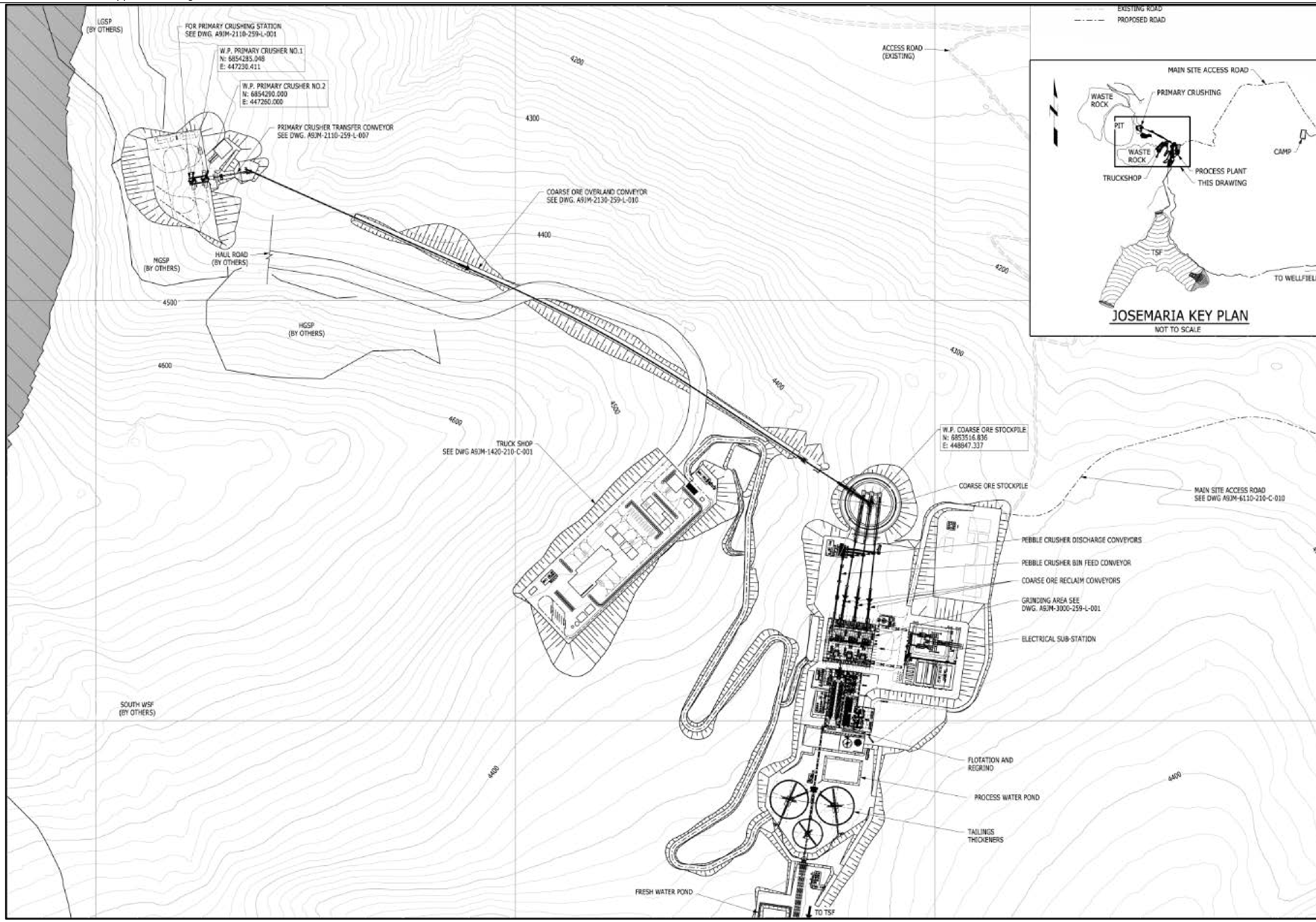
17.2 Process Plant Description

Figure 17-2 and Figure 17-3 show the site plot plan and general arrangement of the process plant. Site selection criteria and information pertaining to the infrastructure are described in Section 18.

17.2.1 Primary Crushing & Coarse Ore Handling

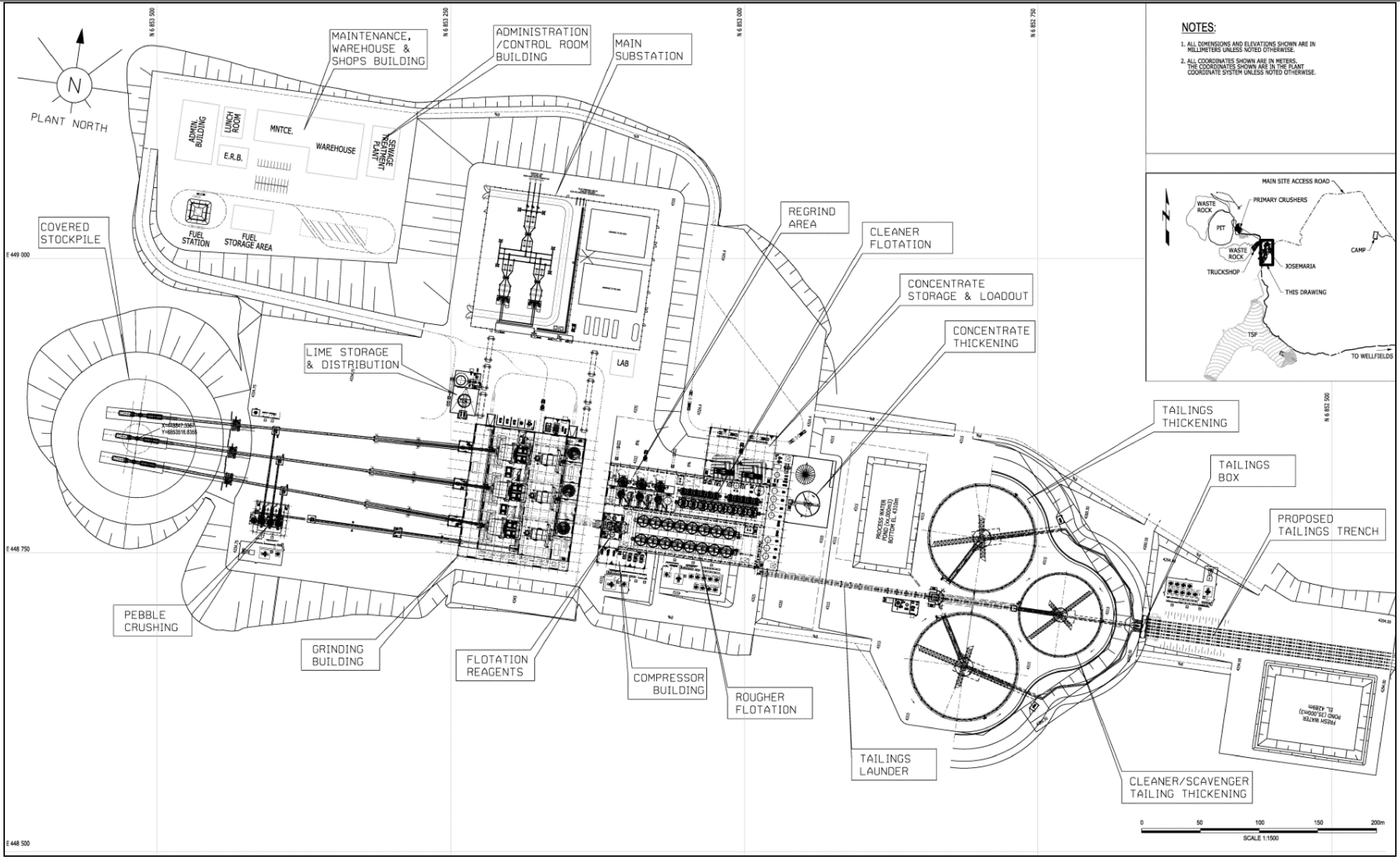
The primary crushing and coarse ore handling circuit (Figure 17-4) consists of a merged primary crusher station housing two 1600 mm x 2260 mm Metso Mark III gyratory crushers and a 1.8 km conveying system from the crusher station to the 60,000 tonne live capacity covered coarse ore stockpile and reclaim area.

Product from the primary crushers will be transported along the coarse ore stockpile conveyor to the coarse ore stockpile. The stockpile will have eight hours of live storage (equivalent to 60,000 tonnes) and will be covered for protection from high winds. From the stockpile, three stockpile reclaim systems will feed three identical SAG mill grinding circuits.



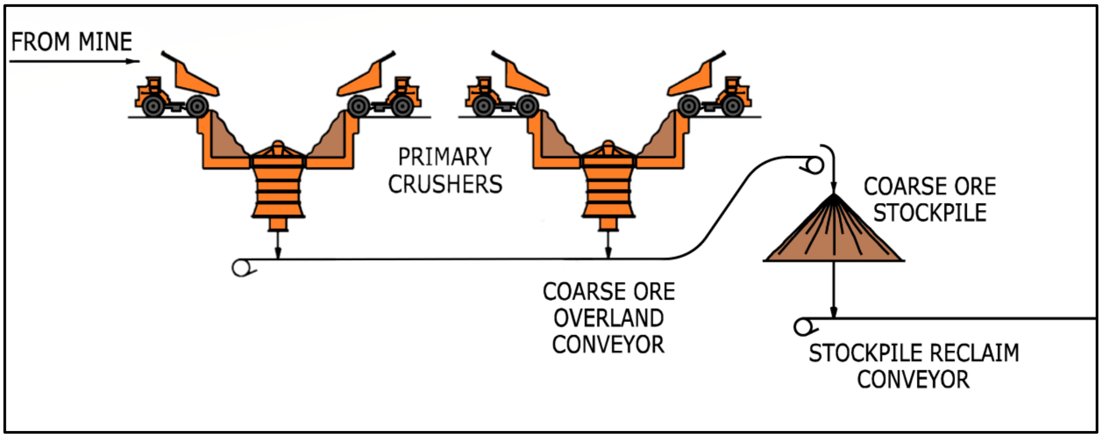
Source: Fluor, 2020

Figure 17-2: Process plant plan



Source: Fluor, 2020

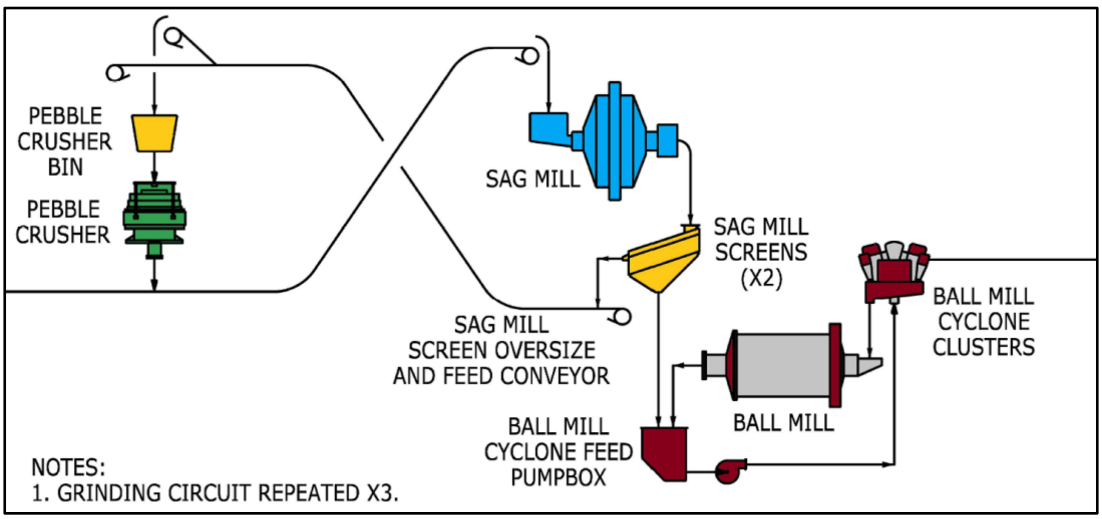
Figure 17-3: General arrangement - concentrator



Source: Fluor, 2020
Figure 17-4: Primary crushing and coarse ore handling

17.2.2 Comminution

The grinding circuit consists of three identical processing lines, each line containing SAG milling, ball milling, sizing classification and pebble crushing (Figure 17-5).



Source: Fluor, 2020
Figure 17-5: Comminution circuit

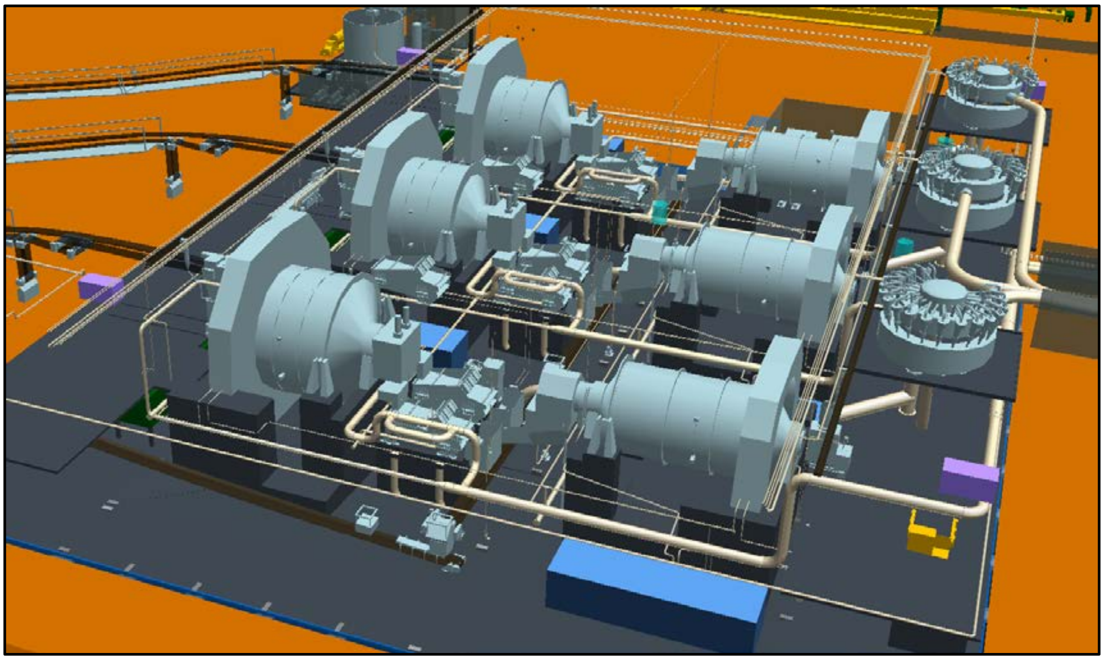
The comminution circuit will reduce crushed ore from a nominal feed size of 80% passing (F80) 137 mm to the target flotation feed size of P80 130 µm. The nominal operating rate is 8,300 t/h total (based on tonalite). The grinding circuit is capable of operating at higher tonnages than the nominal operating rate when processing the other, softer ores.

SAG Mills

The SAG mills will be fed by one of three coarse ore reclaim conveyors. Process water will be added at the mill feed in order to produce a SAG mill discharge slurry density of about 75%

solids by weight. Each mill will be 12.8 m diameter with an 8.8 m effective grinding length (EGL) and will have a 28 MW variable speed gearless drive ring motor. The SAG mills are specified to produce ore to the target transfer size (T80) of 1,000 to 1,300 µm.

Figure 17-6 shows a model of the grinding building, which houses the SAG and ball mills. A flow diagram of the SAG mill ball handling system is shown in Figure 17-7. As shown on Figure 17-8, the SAG mills will be supported on large reinforced concrete piers extending from 3 m thick mat foundations located on solid rock.

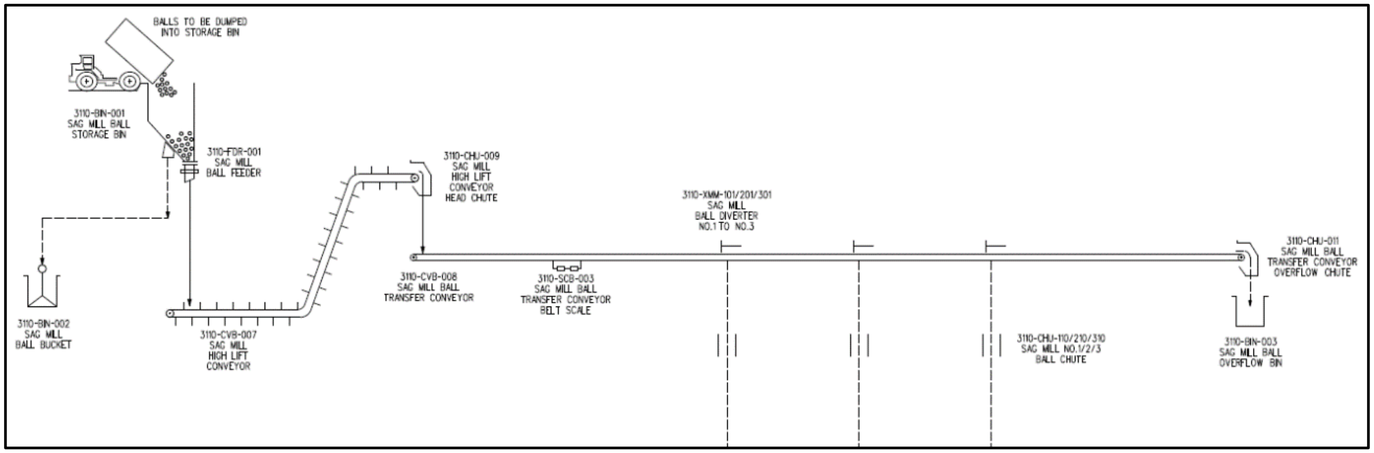


Source: Fluor, 2020
Figure 17-6: Model view of grinding building

Mill maintenance support equipment will include a SAG mill liner handling machine and bolt removal tools. This equipment will be shared between the SAG mills. A forklift will be used for loading liners to and from the liner handler. The liner handler itself will have the capacity to manipulate and place liners up to 3,500 kg, allowing the use of large liners. With fewer pieces, liner change-out times will be minimized, contributing to higher overall availability.

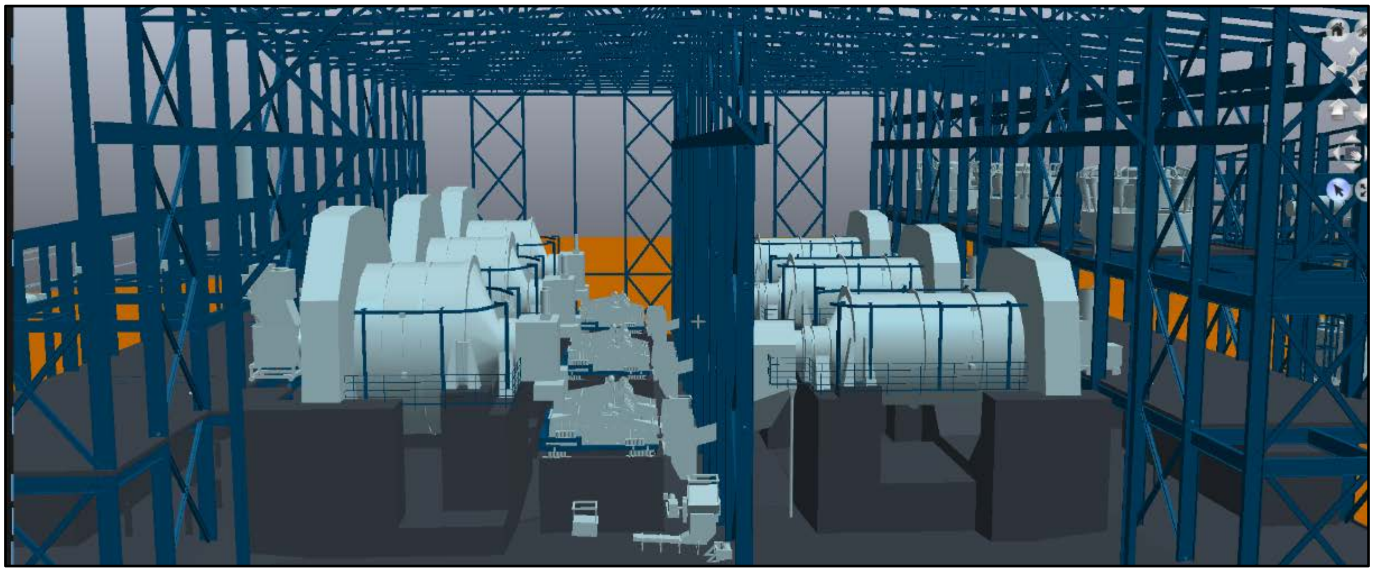
SAG Mill Discharge Screens

Each SAG mill will discharge through a distribution box controlled by dart valves onto two double-deck screens. The screens will be vibrating, double-deck, banana-type screens with wash water systems to aid the flow of material through the screens. Each screen will have a top deck aperture size of 50 mm and bottom deck size of 10 mm. The screens will be supported on the concrete primary cyclone feedbox.



Source: Fluor, 2020

Figure 17-7: PFD of the SAG mill ball handling system



Source: Fluor, 2020

Figure 17-8: SAG mill foundations

The screen oversize material (pebbles P_{80} of 50 mm) will discharge to the SAG screen oversize discharge conveyor for recycling at the pebble crusher. The nominal and the design pebble production rates are 17% and 19% of fresh SAG feed, respectively. The screen undersize will fall by gravity into the primary cyclone feedbox.

Two uninstalled spare screens will be stored between the SAG mills to allow rapid change-out of the screen, minimizing circuit downtime and allowing major screen maintenance to be done off-line and in favourable working conditions. Figure 17-9 shows the configuration of the screens with the spare screens in view.

Source: Fluor, 2020
Figure 17-9: SAG mill screen layout

Pebble Crushing Conveying

The SAG mill oversize conveyor is 90 m long and runs through the grinding building to receive oversize material from the six SAG mill screens. The conveyor will have a belt width of 1,372 mm and a nominal capacity of 1,400 t/h. The conveyor will have a fluid coupling for start control and will have three belt scales (one after each SAG) for measuring the oversize material from each SAG mill. There will be a fixed belt magnet with manual cleaning at the head end of this conveyor for removing tramp metal.

The SAG mill oversize conveyor feeds the 65 m long pebble crusher bin feed conveyor, which is an elevating conveyor (1,067 mm belt width) that carries the oversize material to the pebble crushing building. The pebble crusher bin feed conveyor will have a metal detector and self-cleaning magnet at the head end of the pebble crushing bin feed conveyor.

At the top of the pebble crushing building the pebble crushing bin feed conveyor will transfer the material onto the pebble crusher bin feed tripper conveyor. The tripper conveyor will have a double pant-leg tripper to feed the material into the pebble crusher bin.

Pebble Crushers

Pebble crushing will be performed in a pebble crushing building that houses three Metso MP800 crushers, each treating a nominal 385 t/h of SAG screen oversize. The crushers are fed by three pebble crusher feeders that draw material from the pebble crushing bins.

Cyclones & Cyclone Feed Pumps

Each SAG mill will feed one ball mill through an independent, but identical, process flow. SAG mill screen undersize will discharge by gravity into a primary cyclone feedbox where the variable-speed primary ball mill cyclone pump will feed the slurry to its associated hydrocyclone cluster. The cyclone feed pump will be located adjacent to the SAG mills and will be serviced by the SAG mill overhead crane. A single ball mill primary cyclone feed pump will be installed for each cluster; however, two uninstalled spares will be available to replace the installed pump in any line.

Ball Mills

Each of the three grinding lines will have one 8.3 m diameter x 13.7 m EGL ball mill with a 19.5 MW (22 MW peak) gearless drive ring motor. Normal operation will be at 77% of critical speed (CS). The nominal ball mill operating point will be 34% ball charge load volume. Ball size will be 50 to 75 mm.

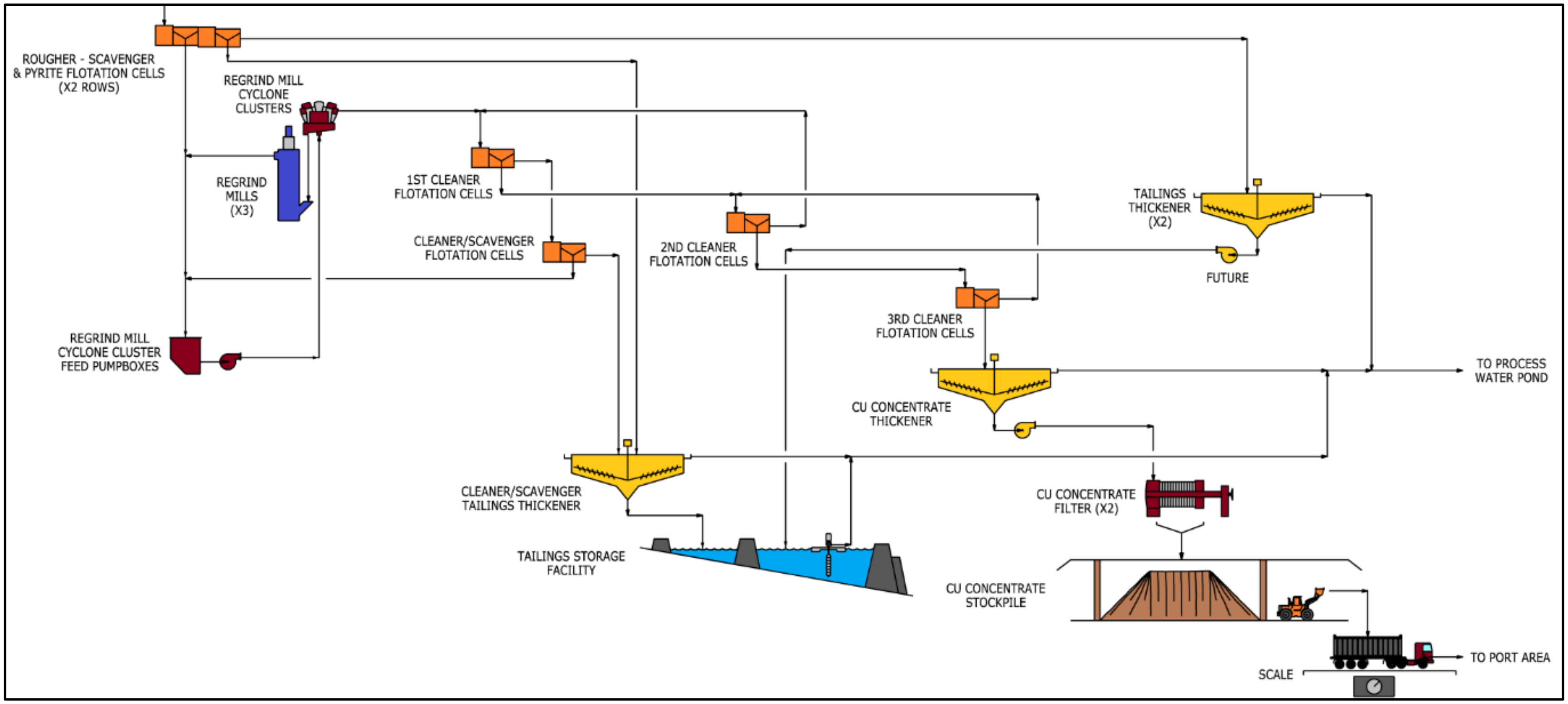
The ball mills will be equipped with an automated ball handling and charging system similar to the SAG ball handling system. The discharge from the ball mill will flow by gravity back to the ball mill cyclone feed pumpbox via the ball mill discharge launder.

17.2.3 Copper Flotation & Regrind

The flotation and regrind facilities will be installed in an enclosed, insulated, clad building. The bulk flotation and regrind circuits consist of three distinct areas: rougher-scavenger flotation, regrind milling and cleaner flotation (see Figure 17-10).

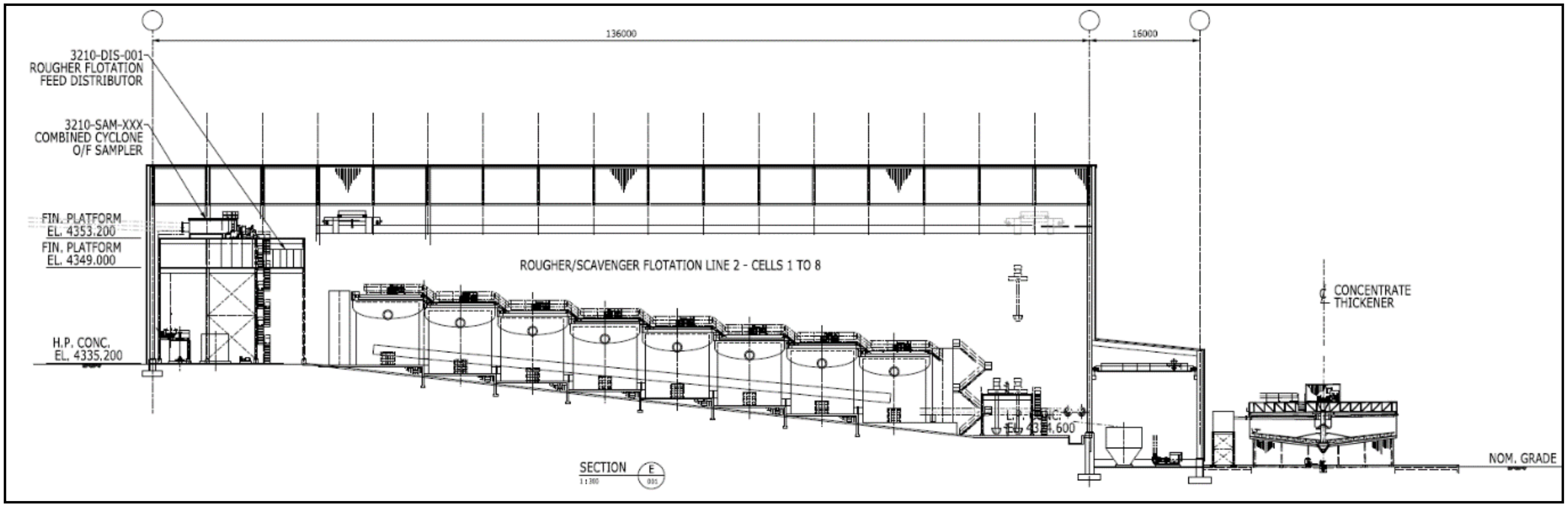
The ball mill cyclone overflow is fed into the rougher flotation feed distributor that splits the flow equally between two banks of conventional rougher-scavenger flotation cells. Each rougher-scavenger line has six 600 m^3 cells followed by two 600 m^3 pyrite flotation cells. Figure 17-11 shows the arrangement of the cells. The pyrite concentrate is floated to reduce the ARD potential in the rougher tailings. Copper concentrate averaging 2.74% Cu is recovered and collected from the rougher-scavenger circuit and transferred to the regrind circuit.

Rougher tailings from each row of cells will flow by gravity via a carbon-steel, rubber-lined pipe through a sampler for on-stream analysis and collection of shift samples. After sampling, the tailings will be combined in a distributor and flow by gravity to two 90 m diameter tailings thickeners. The combined concentrate is processed in the regrind mills and is classified in the regrind circuit cyclone clusters.



Source: Fluor, 2020

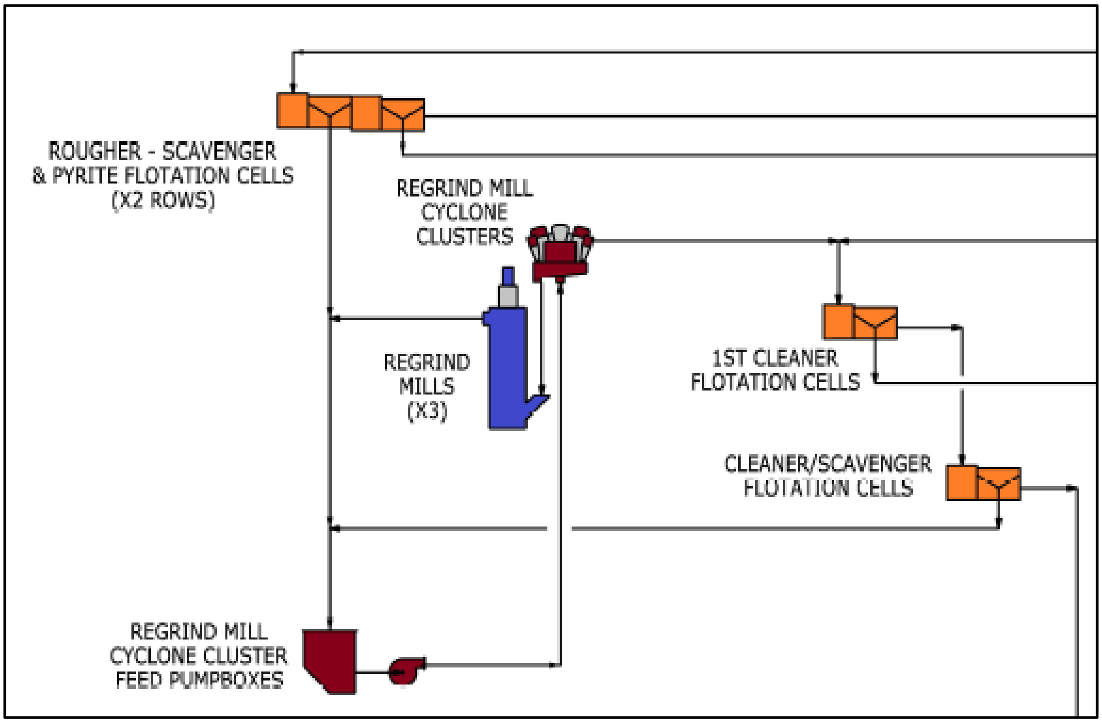
Figure 17-10: Copper flotation and regrind PFD



Source: Fluor, 2020

Figure 17-11: Section view of rougher and pyrite flotation cells

The regrind milling circuit is illustrated in Figure 17-12 and is based on the Metso VTM-4500-C model. Target product size is 20 to 25 µm. The resulting overflow is gravity discharged into the cleaner circuit.



Source: Fluor, 2020
Figure 17-12: Regrind process diagram

The cleaner circuit consists of first cleaners, cleaner-scavengers, and second and third cleaners, each as a single row. The final concentrate product from the third cleaner circuit will target a concentrate grade of 25-27% Cu. Final cleaner-scavenger tailings leave the flotation circuit into the cleaner-scavenger tailings thickener.

17.2.4 Reagents

Reagent mixing, storage, and distribution systems will be provided near their areas of use. Facilities for the collectors and frother will be near the rougher-scavenger flotation area; lime facilities will be adjacent to the grinding area; and flocculants will be adjacent to their respective thickeners. The filter plant will have a flocculant preparation plant. All reagent mixing and storage areas will be curbed for containment and recovery of potential spillage.

The reagent storage will be 12 m wide by 15 m long and located inside the flotation building at the southwest end. It will be a stick-built area, as it is part of the flotation building with a single skin cladding roof cover.

Due to the hazardous nature of its contents, the reagent storage area will have the following safety features:

- Anti-slip floor near spill-prone areas
- Safety showers, located uniformly throughout the reagent storage area
- Hazardous waste handling and disposal equipment
- Adequate ventilation to minimize fumes

The primary reagents being used are:

- Lime
- Flocculant
- Primary collector (SIPX)
- Secondary collector (Aero 3477)
- Frother (glycol – DF 250 equivalent)

17.2.5 Concentrate Dewatering & Handling

The final concentrate is pumped from the third cleaner flotation circuit to the 20 m diameter high-rate copper concentrate thickener. Dewatered concentrate at a target of 10.9% moisture will discharge by gravity to a 10,000-tonne capacity storage area below the filters. The storage capacity of the area can be extended to 15,000 tonnes by moving the concentrate around using the front-end loader.

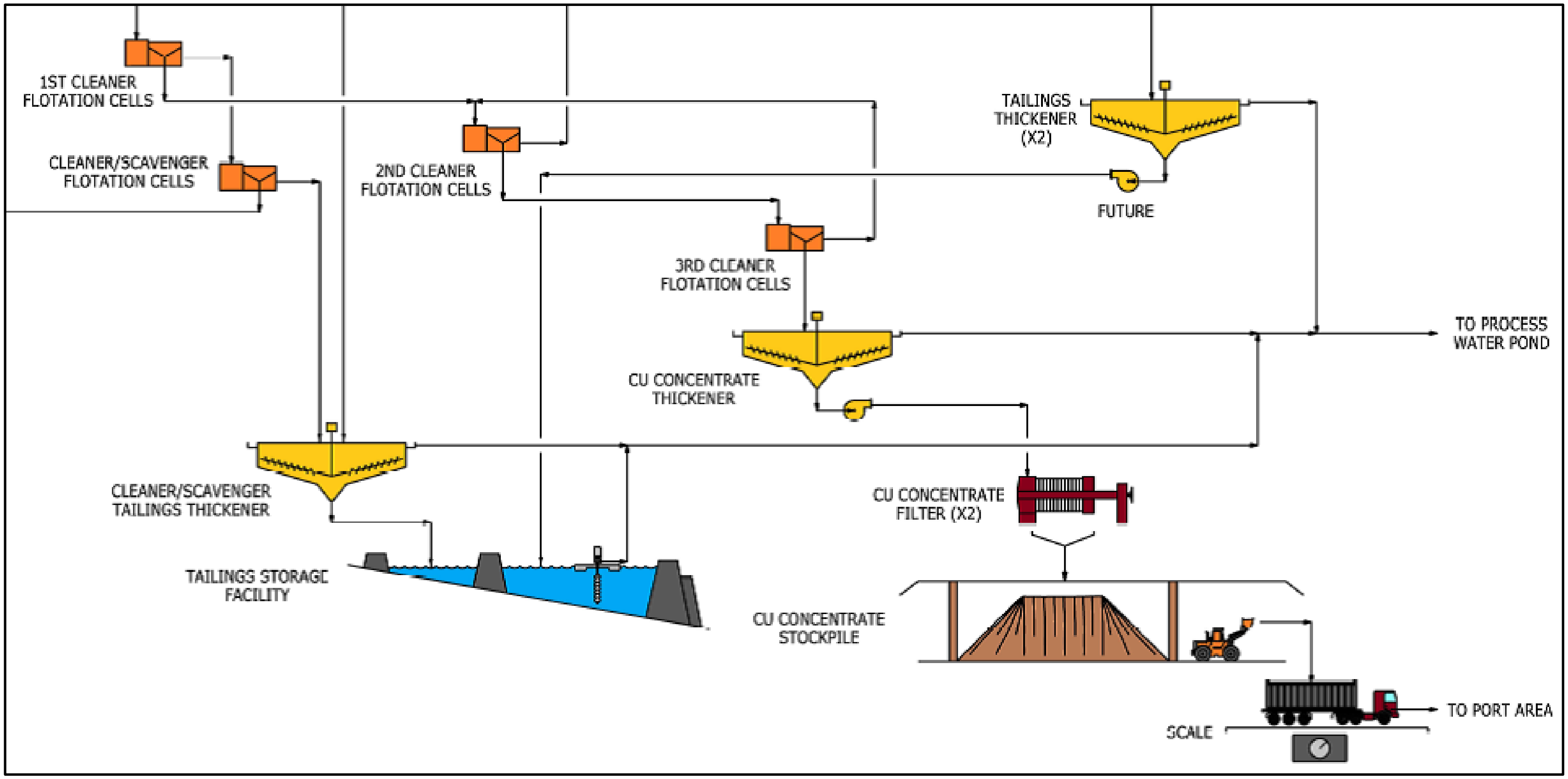
The stored concentrate will be loaded by front-end loader into trucks for transport to the port. The trucks will pass through a truck scale control point. The concentrate shipment in each truck will be sampled, and the tare and loaded weight for each will be recorded.

Figure 17-13 shows the process flow sketch for the dewatering and concentrate handling circuit.

17.2.6 Tailings Thickening

The tailings equipment from both the tailings thickening area and the cleaner-scavenger thickening area will be used to recover process water back to the process water pond and prepare a high-pulp density slurry that will be fed into the TSF.

Tailings from each of the two rows of flotations cells will flow by gravity through automated samplers where a sample will be directed to a multi-stream analyser prior to tailings thickening. The resulting thickened slurry underflow will be gravity fed into a tailings underflow box prior to the TSF. The thickener overflow will report by gravity to the process water pond to be reclaimed and recycled back into the process.



Source: Fluor, 2020

Figure 17-13: Process flow sketch of the dewatering circuit

Similarly, tailings from the cleaner-scavenger cells and the concentrate from the pyrite flotation circuit will flow to the cleaner-scavenger thickener via the cleaner-scavenger tailings deaerator after a sample is taken to the multi-stream analyser. The resulting thickened slurry underflow will be gravity-fed into a dedicated area of the TSF designed to hold the high-sulphide-containing cleaner-scavenger tailings. The thickener overflow will also flow by gravity to the process water pond located downstream of the tailings thickeners.

Any spillage in the thickener underflow chambers will be directed into the multi-plate tunnel housing the underflow pipes via concrete on-grade spillways into the tailings box.

Figure 17-14 shows the process flow schematic for the tailings thickening area.

17.3 Sampling

The sampling philosophy is shown on Figure 17-15. On-stream sampling and analyser systems are incorporated for the purposes of:

- Sampling
- Elemental analysis
- Particle size analysis

Slurry samples are collected from the critical streams on a continuous basis. Slurry is directed to the multi-stream analyser or particle size analysis system as required. Composite samples are generated for metallurgical accounting and plant monitoring purposes.

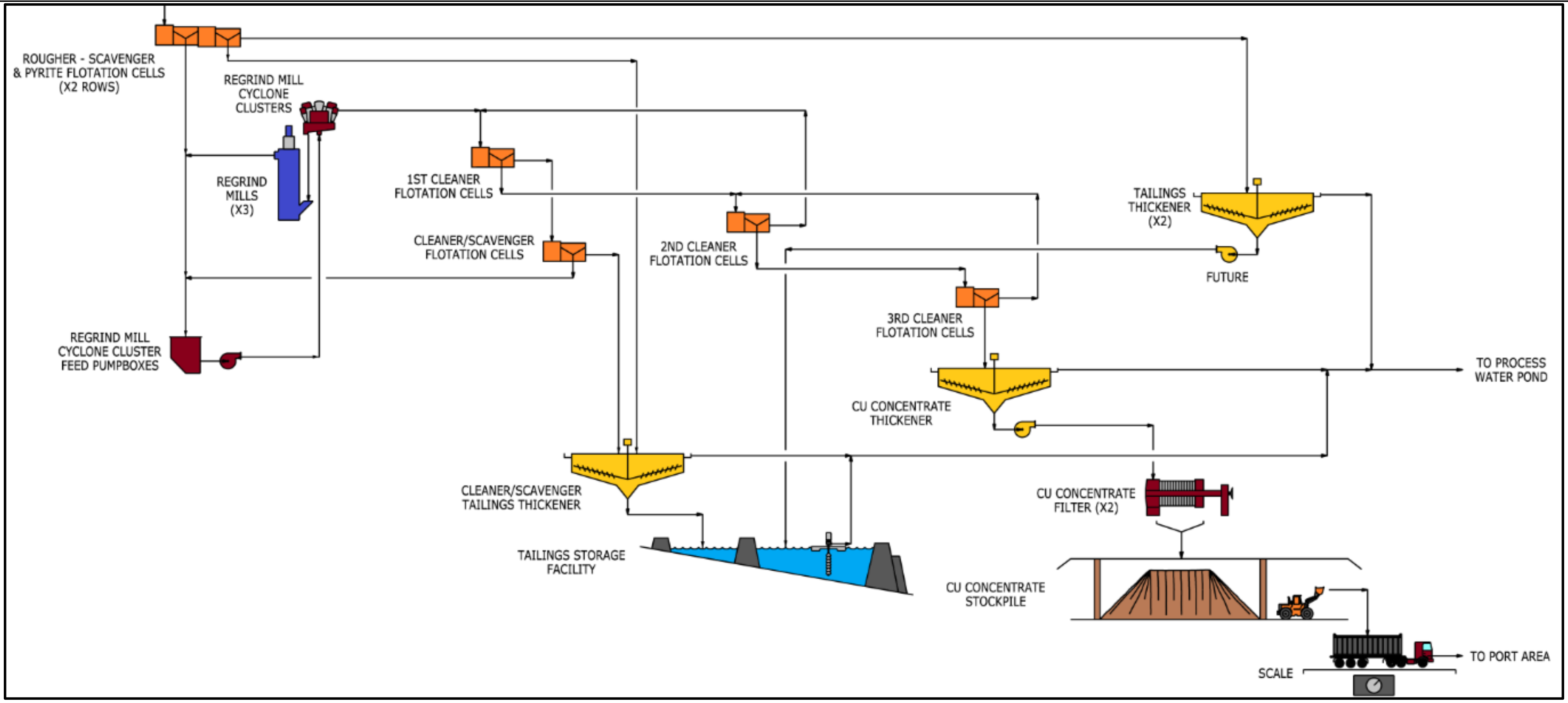
17.4 Plant Services

17.4.1 Plant & Instrument Air

Plant and instrument air will be provided by three air compressors. Receivers for remote areas, such as shops and laboratories, will be located in those areas. Instrument air will be cooled and dried before being distributed.

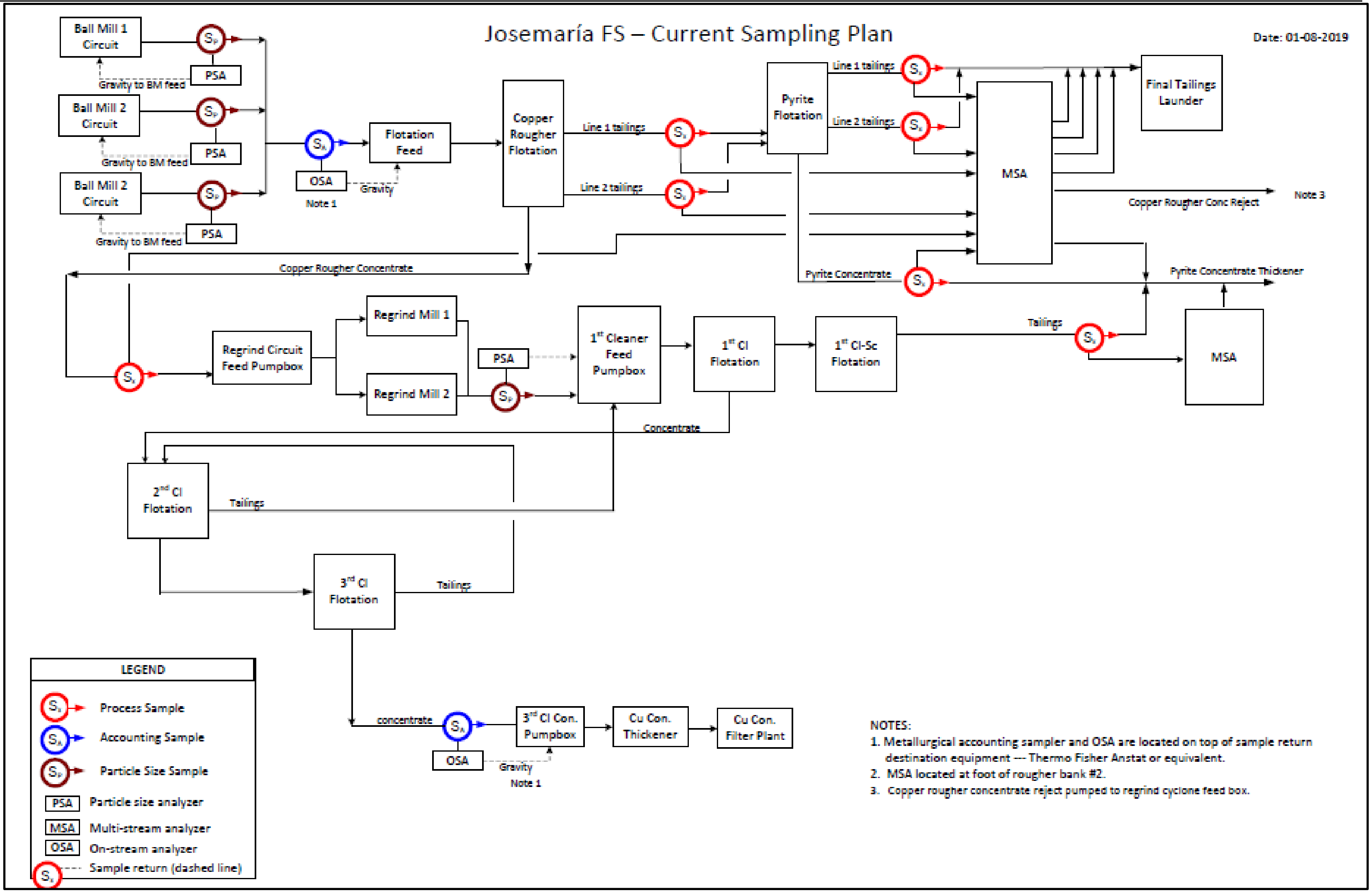
A separate air compressor will be provided for compressed air requirements at the pebble crushing plants. Five separate dedicated blowing air compressors will provide compressed air for the pressure filters and filter building.

Two separate dedicated air compressors will provide the compressed air requirements for the pressure filters, as this will be an area of high use, and effective filtration is dependent on adequate air supply volume and pressure.



Source: Fluor, 2020

Figure 17-14: Process flow schematic of tailings thickening area



Source: Fluor, 2020

Figure 17-15: Sampling system

17.4.2 Process Water

Process water will be utilized throughout the facility for the purposes of:

- Dilution and density control
- Floor wash and slurry line flushing

Process water will be stored in a 35,000 m^3 process water pond. The water will be collected from process thickener overflows and pumped by the process water pond pumps to the concentrator facility for distribution throughout the plant.

Process water will be collected from the following sources:

- Copper concentrate thickener overflow
- Tailings thickener overflow
- Cleaner-scavenger water overflow
- Freshwater make-up

Water will be pumped through a looped and dead-end distribution piping system. The main distribution header will be organized as one main loop with a crossover located inside the main process plant, while local users will be supplied with branches off this main.

17.4.3 Freshwater

The freshwater system will supply areas throughout the site. Freshwater uses include:

- Reagent and flocculant mixing
- Gland water
- Feed to the potable water treatment plant
- Site dust suppression
- Ancillary mining operation users
- Firewater
- Plant make-up water

Raw water will be sourced from two wellfields in the surrounding area and stored in the 35,000 m^3 freshwater pond.

Water from the pond will be pumped to the fresh/firewater tank for the primary crushing area and the truckshop, and to the fresh/firewater storage tank for all other process operations. Both fresh/firewater tanks will supply fresh water to separate potable water treatment plants for potable water services.

These potable water services include:

- Camp potable water
- Safety showers and eyewash stations

Freshwater will be available prior to treatment as make-up water to the process plant and for commissioning purposes.

17.4.4 Cooling Water

Process water will supply cooling water to the heat exchanger vendor packages that provide recirculating cooling water for the ball and SAG mill lube units, ball and SAG mill motors, and the ball and SAG mill cycloconverters. The vendor packages will include treatment of the cooling water to inhibit scaling.

18 Project Infrastructure

This section describes on-site and off-site infrastructure. On-site infrastructure includes the road network, processing plant, mine support facilities, power and water supply and distribution, and water and sewage treatment facilities. Off-site infrastructure includes the south access road, high voltage (HV) power line to the site and the concentrate transport facilities. The TSF is also discussed in this section

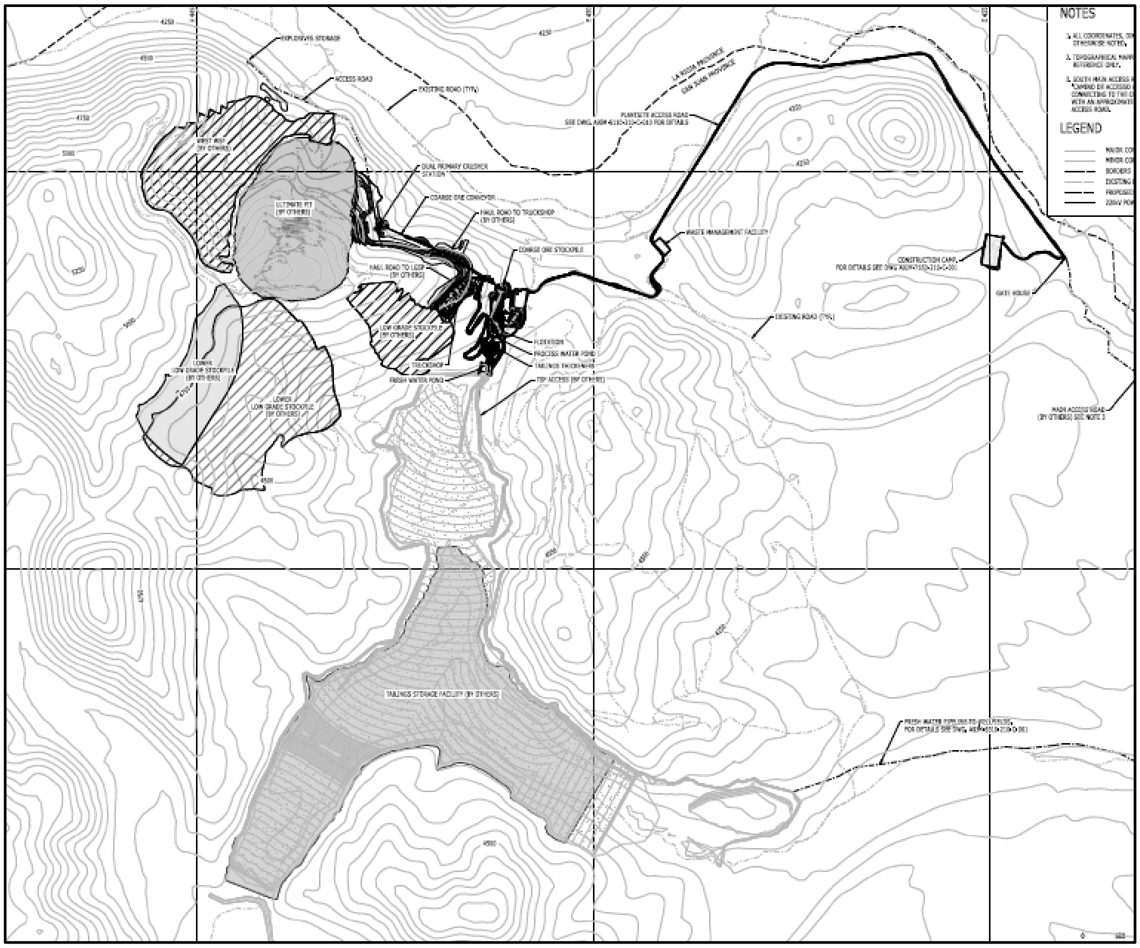
18.1 General Site Layout

General site conditions were established based on local and meteorological data collected during the feasibility study and historical data obtained in the pre-feasibility study. The process plant will be situated between the primary crushers at the open pit mine and the tailings storage facility (Figure 18-1).

The site location was selected to provide a relatively direct flow of material from mine to tailings storage. The plant facilities were arranged to minimize civil work and locate major equipment in areas with favourable geotechnical characteristics while maximizing gravity-assisted material flow where possible.

Major design objectives influencing the site location and arrangement were as follows:

- Major equipment should be located on sound and competent bedrock, away from active faults or unstable features. Subsurface conditions must be competent enough to support the heavy static and dynamic loads from the crushing and milling equipment, especially considering the magnitude of seismic events observed in the region.
- The concentrator location should be sufficiently large to accommodate the infrastructure in a contiguous area (allowing connected terraces to minimize earthworks) and minimize the distance between the facilities
- The facilities should be as compact as possible to minimize capital and operating costs
- The coarse ore stockpile should be located away from and downwind of dust-sensitive facilities, such as offices, plant facilities and the electrical substation
- The facilities should be located to prevent interference with ultimate pit limits, anticipated waste dumps and potential low-grade ore stockpiles. Arrangement of the facilities will promote segregation between mining and concentrator traffic during both construction and operation for safety and congestion considerations.
- The facilities must be a minimum of 500 m from the mine pit limits (blast radius)



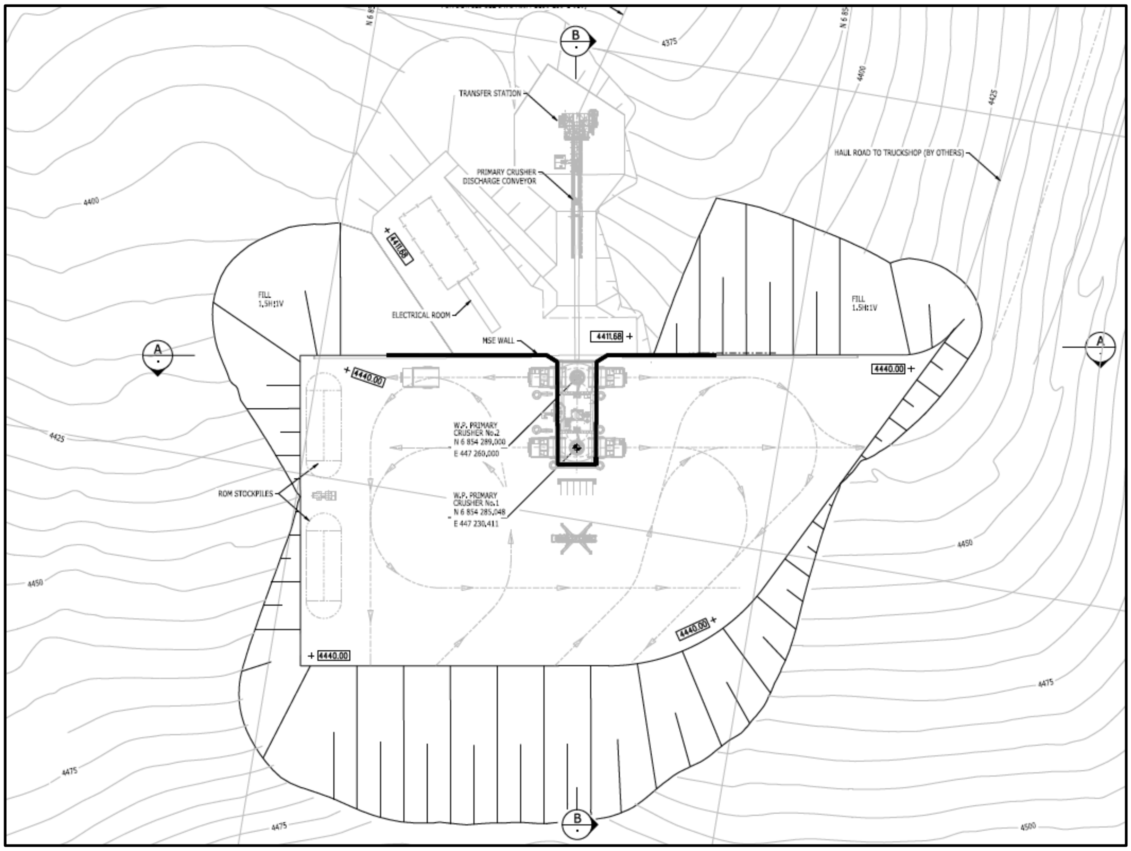
Source: Fluor, 2020
Figure 18-1: General site layout - Josemaria project

The location of the primary crushing station will take advantage of the natural terrain and near-surface bedrock for the foundation (Figure 18-2). It will be located close to the open pit exit ramp location and elevation but will not conflict with waste dump and ore stockpile extents.

The concentrator area will be situated on a gentle, natural slope bounded by two local peaks (rising an additional 100 m in both cases). The sloped terrain allows gravity flow of the major process streams through the in-line plant and provides near-surface bedrock for major equipment foundations. Terraces will be used to minimize civil excavation and structural fill.

The administration complex will be located on the highest terrace, separated by grade from the process facilities, and the lowest platform is at the freshwater pond and tailings discharge pumpbox. This allows the large, multiple pipelines from tailings discharge, reclaim, and seepage return to enter and exit the plant site without interfering with process piping.

Traffic logistics were a major consideration in configuring the plant facilities. Heavy and regular truck deliveries, such as grinding media, lime and other reagents, were all directed to the north side of the concentrator, as was concentrate truck traffic.



Source: Fluor, 2020

Figure 18-2: Plan view of primary crusher station (truck dump level)

18.2 On-Site Roads

Light vehicles roads will connect all facilities for maintenance and to support operations. Heavy-vehicle roads will connect the pit to the primary crushing facilities, waste dumps, ore stockpiles, and provide access for heavy-vehicle services, including the fuel dispensing station and truck shop. Light-vehicle and heavy-vehicle roads will be separate for safety reasons.

18.2.1 On-Site Light-Vehicle Roads

The main on-site, light-vehicle road connects the plant site to the mining facility truck shop. The truck shop access road will be 2.5 km in length with three switchbacks to maintain the longitudinal grade below the maximum design criteria (8% preferred, 10% maximum) over the elevation gain from 4,314 to 4,445 masl. The road platform will be made up of two 3.5 m lanes (one in each direction), two usable shoulders of 0.5 m each, and room for a cut-side ditch. As a result, the total platform width will be 10.6 m.

A tee-junction turnoff to the fuel storage facility will be located approximately 600 m prior to the truck shop. The fuel storage facility access road will be 250 m in length. This access road will be considered as a secondary road and is therefore only 7 m wide.

All light-vehicle roads will be topped with 0.2 m thick granular surface course.

18.2.2 On-Site Heavy-Vehicle Roads

Haul roads within the open pit were designed according to international mine design standards as described in Section 15.4.1.

18.3 Structural Design

The Josemaria project site is located in Argentinian Seismic Zone III. This is a highly seismic zone, equivalent to International Building Code IBC-2018 Seismic Design Category D. Seismic design parameters govern the design of most of the on-site building infrastructure—except for smaller buildings, which are governed by wind speeds, and structural members in the grinding building, which are governed by crane load.

High prevailing winds of 16.6 km/h (67.3 km/h maximum) and low winter temperatures (-19.2°C low and -1.9 C average) prompted the decision to enclose buildings throughout the site. These enclosures provide protection from blowing dust and snow and allow the ambient temperature of working and wet areas to remain above freezing. This in turn will help maintain the productivity of personnel who are already subjected to the rigors of working in a high-altitude environment.

The 50-year return period wind three-second wind gust (144 km/h) governed the design of some structural components (roof purlins, wall cladding girts, etc.). The 150-ton crane in the grinding building is the primary structural design consideration. Snow load is minimal and does not dictate structural design.

18.3.1 Ground Conditions

The primary crushing station will be located east of the open pit on an eastward facing slope with a grade of 20% to 40%. The design elevation of the crusher base is 4,404 masl. The foundation for the crushers will be established by excavating into rock, as these are heavy foundations. Excavations are anticipated to be in the range of 20 m.

The plant site is located on the west slope of an arroyo southeast of the open pit and will comprise ore stockpile, SAG/ball mill, flotation circuit, tailings thickeners and substation.

The design grade of the plant site ranges from approximately 4,295 to 4,350 masl. The SAG/ball mill and flotation circuit, tailings thickeners and ore stockpile facilities all target bedrock foundations. The substation will be founded on a fill platform up to approximately 20 m thick.

The truck shop area is located on an eastward-facing slope with an approximately 10% grade. The design elevation for the truck shop site is approximately 4,445 masl. There will be a fill platform to the south of the truck shop and a cut platform beneath the truck shop, warehouse and change/dry administration building.

18.3.2 Seismic Conditions

Knight Piésold (KP, 2019b) conducted a detailed seismicity assessment to determine appropriate seismic design parameters for the Josemaria project. Seismic ground motion parameters (including peak ground acceleration, spectral accelerations, and earthquake magnitude) were determined from probabilistic and deterministic seismic hazard analyses.

Historically, seismic activity is highest along the coastal region of Chile, where earthquakes are generated by the Nazca (oceanic) plate subducting under the South America (continental) plate. This seismicity is associated with interface subduction earthquakes, intraslab earthquakes in the subducted oceanic tectonic plate, and shallow crustal earthquakes on fault systems related to the tectonic pressures and crustal flexure caused by the subducting Nazca plate (KP, 2019b).

Appropriate design earthquakes and seismic design parameters have been provided for the TSF using the results of the seismic hazard analyses together with the dam classification defined for the facility according to the CDA Guidelines.

Parameters were provided for the seismic design of building structures using the International Building Code. The maximum earthquake ground motion for seismic design considered for the Josemaria project has been defined as the ground motion with a 2% probability of exceedance in 50 years (return period of 2,475 years), in accordance with the International Building Code (IBC).

Site-specific seismic parameters for use with IBC are:

- Seismic coefficient, SS = 1.85 g
- Seismic coefficient, S1 = 0.61 g
- Peak ground acceleration = 0.87 g

These acceleration values correspond to a reference ground condition defined as the boundary between Site Class B (rock) and Site Class C (very dense soil and soft rock) corresponding to a Vs30 value of 760 m/s.

For constructing the design response spectrum, an appropriate long-period transition period (TL) for the project site is 16 seconds. This is based on the ASCE-7 standard value provided for regions of the U.S. (subduction zone regions of Cascadia and Southern Alaska) with tectonically similar characteristics to the coastal subduction zone of western South America (KP, 2019b).

18.3.3 Frost Susceptibility

There is a low frost hazard potential at the Josemaria plant site, because the majority of the foundations are on bedrock and because water is not readily available for the formation of ice lenses in the frost-susceptible fill. It is recommended that foundation drains are installed to drain excess water away from the foundations.

18.4 Site Buildings

Fluor performed a review of Argentina’s building code and applicable work safety and hygiene codes. Input on local building practices was also received from the supplier of the existing 250-person exploration camp. This information was used to establish the design criteria and applicable specification for fit-for-purpose facilities.

18.4.1 Process Buildings

Process buildings include the primary crusher station, grinding building and flotation building. The craneage requirements in these areas drive large spans and bigger steel sections, which require a stick-built construction methodology.

The process buildings will be enclosed with non-combustible insulated metal cladding on the roof and walls. Translucent panels will be provided on exterior walls to allow natural light inside the building. Equipment roll-up doors will have electrical and manual operating systems.

The buildings will be designed and equipped with plumbing, electrical, lighting, data/communications, UPS, fire and HVAC systems. Means of egress will be designed per the governing building codes/regulations. All personnel exit doors and main entrances will have steel-framed canopies for icicle/debris fall protection. Roof safety fall arrest systems and caged ladders will be installed to support roof maintenance after construction.

18.4.2 Mine Service Facilities

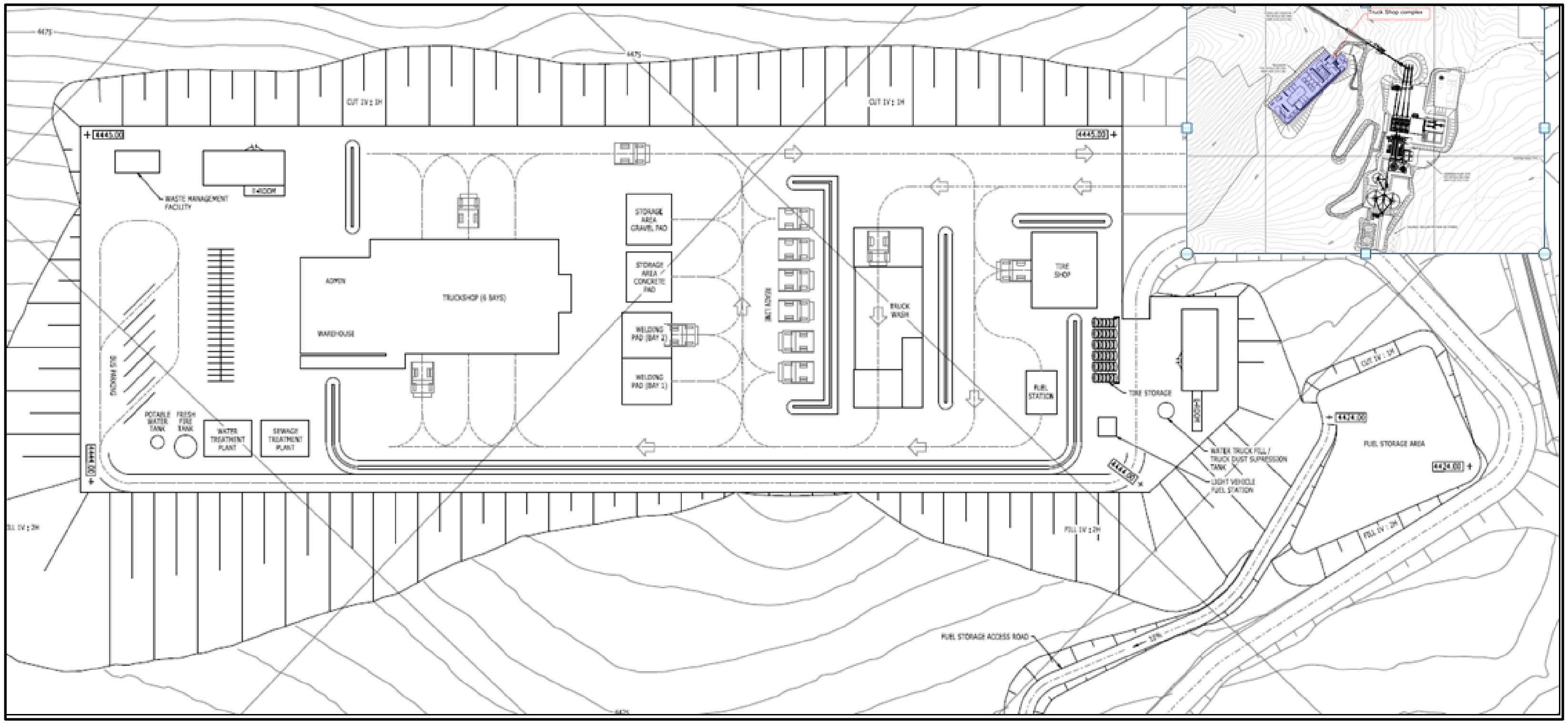
The truck shop maintenance area is located northwest of the process plant. The area can be accessed from the north by the haul truck road and from the south via the light-vehicle truck shop access road. Figure 18-3 shows the location of the truck shop and associated facilities, as well as the general arrangement of the area.

The facilities include the following:

- Mine truck shop
- Warehouse and tool area
- Tire shop
- Truck wash
- Fuel storage
- Waste management facility
- Septic tank
- Water treatment facility
- Other facilities not detailed during this project phase

The truck shop will be a combined modular and stick-built steel building with six heavy-vehicle bays, two light-vehicle service bays, a warehouse, toolbox and tool crib area, first aid, administrative areas, lunchroom, washrooms and change rooms. The facilities are used by both the mine maintenance and mine operations staff.

The truck shop will have six service bays for the Komatsu 980E mine haul trucks (or equivalent), loaders, bulldozers, and other heavy and light vehicles. It will be a steel structure enclosed with non-combustible insulated metal cladding roof and walls. The truck shop will be 52 m wide by 120 m long, with a maximum 21 m eave height.



Source: Fluor, 2020
Figure 18-3: Truck shop complex general arrangement

The building will be equipped with plumbing, electrical, lighting, data / communications, UPS, fire and HVAC systems. Means of egress will be provided per the governing building codes/regulations. All personnel exit doors and main entrances will be equipped with steel-framed canopies above the exterior walls for fall protection from icicles and debris. A roof safety fall arrest system and caged ladder will be installed to support roof maintenance activity after construction.

18.4.3 Ancillary Facilities

Administrative Complex

The administrative complex will be northeast of the process plant, as shown in Figure 18-4. The facilities in this complex include the following:

- Administration building
- Lunchroom / change room
- Emergency response centre
- Maintenance shop and plant warehouse
- Local septic tank
- Light vehicle fuel station

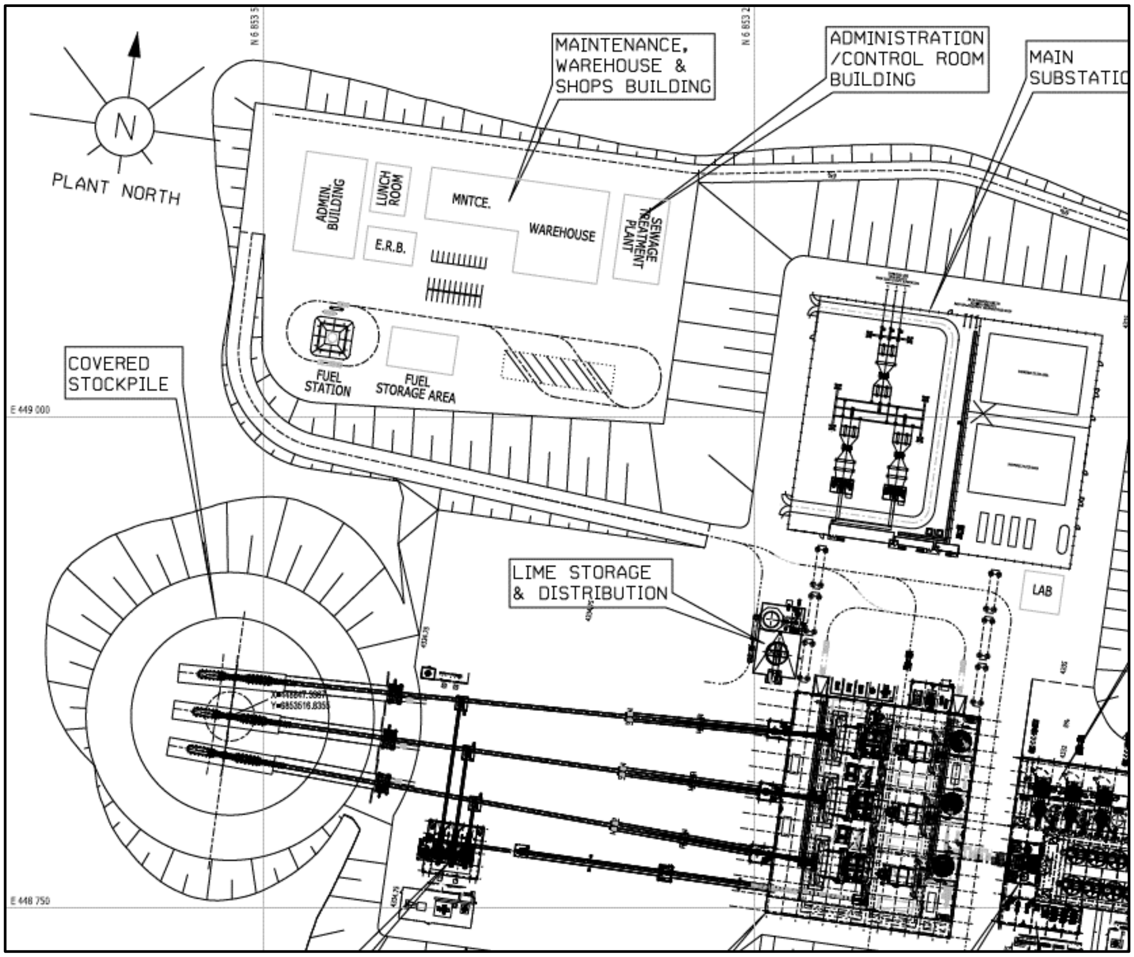
The main administration building will be comprised of two modular sections (lunchroom and office sections) and one stick-built section (emergency response centre). The three sections will be interconnected by a covered walkway. The building will have a disability access ramp.

The administration office will be a modular building 32 m by 49 m long by 5.5 m (eave height) with a total area of 1,568 m^2. It will be comprised of 27 offices, 60 workstations, 4 meeting / training rooms, 1 centralized mine control room, 1 centralized process control room, and various service rooms. The building will be used by both the mine and plant operations groups. The building will accommodate approximately 34 mine technical and supervisory personnel per shift. Two separate main entrances will be provided for the two groups of personnel and washrooms and connecting corridors will be shared.

The mine and plant control rooms are adjacent to each other at the centre of the building and are equipped with an elevated service floor.

Gatehouse/Security Building

The modular gatehouse/security building will contain a security control/checking room, washrooms, a guard/PPE room, lunchroom, and orientation room. Disability access for visitors will be included in the design as required. The building will be equipped with stairs, platforms, walkways, plumbing, electrical, lighting, data / communications, fire, HVAC and security systems, as necessary for the function of the building.



Source: Fluor, 2020
Figure 18-4: Administrative complex general arrangement

Employee Accommodation

The camp capacity requirement for the construction phase of the project is estimated to peak at 4,800 people. An existing 250-person exploration camp already exists near the Josemaria project site. The exploration camp will be used during construction, reducing the requirement for new accommodations to 4,550 people. The camp accommodation will have different room types for executives (5%), supervisors (10%) and tradespersons (85%). It is estimated that the operations camp will require 800 beds.

18.5 Heating, Ventilation and Air Conditioning

The site ambient outdoor design temperatures used for heating and cooling calculations are -19.2°C dry bulb temperature in the winter (July) and +19.6°C dry bulb temperature in the summer (January). The ambient air is dry and often dusty. Precipitation and snow level are not significant. The average annual temperature is 5°C.

Heating systems will maintain a minimum air temperature of 5°C in process buildings that are infrequently occupied. A minimum room temperature of 20°C and maximum of 24°C will be maintained in the administration buildings, control rooms, electrical rooms, laboratories, and all other human-occupied spaces.

A maximum room temperature of 30°C will be maintained in the electrical rooms. All air-conditioned spaces will be maintained within a relative humidity of 25% to 65%.

Office and control room air conditioning units will use economizers to utilize “free cooling” as the first stage of cooling, whenever outside ambient conditions permit. Mechanical cooling will be the next stage and will start after the economizer reaches full capacity.

Ventilation for occupied, non-process buildings (administration, offices, warehouses, etc.) will be based on ANSI/ASHRAE Standard 62.1.

Heat recovery fans in high buildings will be used for transferring warm air from the roof underside to lower areas through distribution ductwork. In the event of a fire, the supply air fan serving the affected area will shut down automatically. Ducts penetrating areas of fire separation will have fire dampers.

18.6 Dust Control

Dry dust collection and dust suppression will be used to control dust emissions and meet applicable air pollution regulations. Dry cartridge-filter-based dust collection systems will be used as a first choice where practical for dust control. Dust and fume control systems will include hoods and enclosures designed to contain contaminants at the source. Hoods and enclosures will be connected via ductwork to the dust collection equipment.

Dust collectors will remove dust via hoods and ductwork from the strategically located areas listed below:

- Primary crusher belt feeder and tail end of the primary crusher transfer conveyor
- Reclaim ore belt feeders and tail end of the conveyors for each of the three reclaim tunnels
- Reagent storage areas (primary/secondary/tertiary collectors, frother and flocculent systems)
- Lime silo building (bin vents will be installed on the lime silos, and tank bin vents will be provided for reagent tanks in reagent building)
- Metallurgical lab

Dust suppression systems that employ fog and/or spray mechanisms will be used where air volume or access make dry dust collection impractical (i.e., primary crusher truck dump pockets, pebble crushing area, coarse ore stockpile, concentrate loadout area). This system will be operational from temperatures slightly below 0°C and higher.

The coarse ore stockpile will be fitted with a dome to prevent wind-generated dust.

18.7 Fire Detection and Protection

Fire protection facilities will incorporate both passive and active systems. Passive systems are features that, by nature of design, resist heat damage, facilitate safe evacuation of people, and aid fire suppression operations. Active systems involve the use of systems and equipment specifically intended to extinguish or control fires, protect people or surrounding property from fire, and warn of a fire emergency. Examples of both types of systems are listed in Table 18-1.

Table 18-1: Passive versus active fire protection systems

Passive	Active
Spatial separation	Fire detection (heat/smoke)
Drainage	Fire water systems, hoses, hydrants, sprinklers, monitors hoses
Fire separation	CO_2 gas suppression
Materials of construction	Fire alarms
Grounding	

General design features are as follows:

- Smoke detectors and CO2 hand-held fire extinguishers will be installed in all electrical rooms, VFD rooms, and control rooms. Fire protection for “mission critical” electrical rooms will utilize clean agent (gaseous) fire suppressant room flooding.
- Electrical rooms will have two-hour fire separations
- Hand-held, all-purpose standard ABC fire extinguishers will be provided in all buildings for local emergency firefighting
- Smoke and heat detectors will be installed in all occupied areas not equipped with sprinklers
- Duct smoke detectors will be installed in all air-handling units. Once a duct smoke detector is activated, the associated air-handling unit will shut down.

Firewater will be available at facilities and buildings by wet standpipes, sprinklers, and yard hydrants connected to the firewater loop, so that all areas of the facility are within reach of a hose stream. Monitors mounted on hydrants will allow water to be directed to specific hazards, such as the transformers. The firewater loop will be designed so that water can be provided from both directions.

Firewater will be supplied from the freshwater pond to two combined fresh / firewater storage tanks. Each tank will have sufficient volume to supply the highest calculated fire flow for the area (sized for 120 minutes including hose allowance). One 1,020 m^3 capacity tank will be located in the mine truck shop area to protect the truck shop and primary crushing areas. The other tank has a minimum firewater reserve of 510 m^3 and will be located on the east side of the flotation building to protect the stockpile, process area, and administration buildings. Recharge pumps will be capable of refilling the firewater component of the combined storage tank within eight hours.

There will be two firewater pump stations. One station will serve the truck shop and primary crusher area at a flow capacity of 680 m^3/h, while the other will serve the process plant area at a flow capacity of 340 m^3/h. Each fire pump station will consist of one electric-driven firewater pump, one standby diesel-driven firewater pump, and one electric-driven jockey pump.

For fuel storage tanks, foam fire suppression systems and a firewater distribution ring main with yard hydrants around the perimeter of the bermed containment area will be provided. Yard hydrants will be located at sufficiently spaced intervals along the ring main to cover all sides of each fuel storage tank.

One fire vehicle will be available for mobile firefighting.

18.8 Electrical Distribution System

Tie-in to the power grid will be at Rodeo, a town located 252 km from the Josemaria plant site. A high-voltage (HV) transmission line will be constructed from the Rodeo utility station to the Josemaria main substation for distribution to the plant facilities.

The operating plant load is 233 MW, including electrified mining equipment. The SAG and ball mill GMDs require a higher short circuit value than what is currently available from the Argentinian grid. The electrical design includes capacitors to condition the power supply to meet this need.

Power to the concentrator plant and other facility loads will be distributed on 22 kV rated power cables run along six 22 kV overhead power lines.

The on-site electrical design was developed by Fluor, and the off-site, high-voltage power supply design was developed by ESIN, a local electrical engineering firm. Fluor reviewed the work by ESIN and agrees with the analysis and resulting design.

The electrical design for the concentrator and other facility loads will be based on IEC standards. Due to the high altitude (4,330 masl) of the plant site, all selected electrical equipment will be de-rated for voltage, current and temperatures in accordance with the standards and Argentina's electrical code. Altitude de-rating or correction factors will be applied to high-, medium- and low-voltage electrical equipment.

Two 40 MVAr static VAR compensators will be installed in the Josemaria main substation to mitigate voltage surges generated due to switching, lightning strikes and power system faults.

18.9 Instrumentation, Control and Communication Systems

Josemaria instrumentation and controls will incorporate conventional 4-20 mA analog with highway addressable remote transducer (HART) control and 24 VDC discrete control signalling. Field devices will be connected to field remote input/output I/O (RI/O) panels, which will then connect via industrial Ethernet over single-mode, fibre-optic cable to process control system (PCS) controller panels located in the electrical room. The controller panels will contain redundant power supplies and controllers and will connect to redundant control system network core switches and process controller server equipment located in a central control room and adjacent control system server room. The control system cable network will consist of optical ground wire (OPGW) run on overhead powerlines to off-site locations and conventional fibre cabling distributed throughout the concentrator process areas using armoured cable and cable tray. Both modes will be part of the plant-wide integrated fibre backbone network.

Internet communications fibre will be included in a 24-strand OPGW cable to be run with the incoming site power line from Rodeo.

Industrial Ethernet will be used for control system interfaces with motor starters and variable frequency drives. The central control room will contain three operator HMI control stations and two engineering workstations. Two remote control cabs provided at each primary crusher will contain a single operator workstation in each. Vendor-supplied PLC control systems will connect to the PCS via industrial Ethernet fibre cable.

The PCS will be based on a distributed control system platform. This plant-wide system will include redundant controller panels, remote I/O panels, human machine interfaces (HMIs), peripherals, networks and complete logic and control screen(s) graphic development.

Plant LAN communications racks, including business and process Ethernet network equipment, will be installed in identified electrical rooms and process and office buildings. Fibre distribution panels will be integrated into these racks to provide interconnection of the network switches and dedicated interconnection of various process, business and fire detection systems. Voice and data systems will be integrated using VLAN separation.

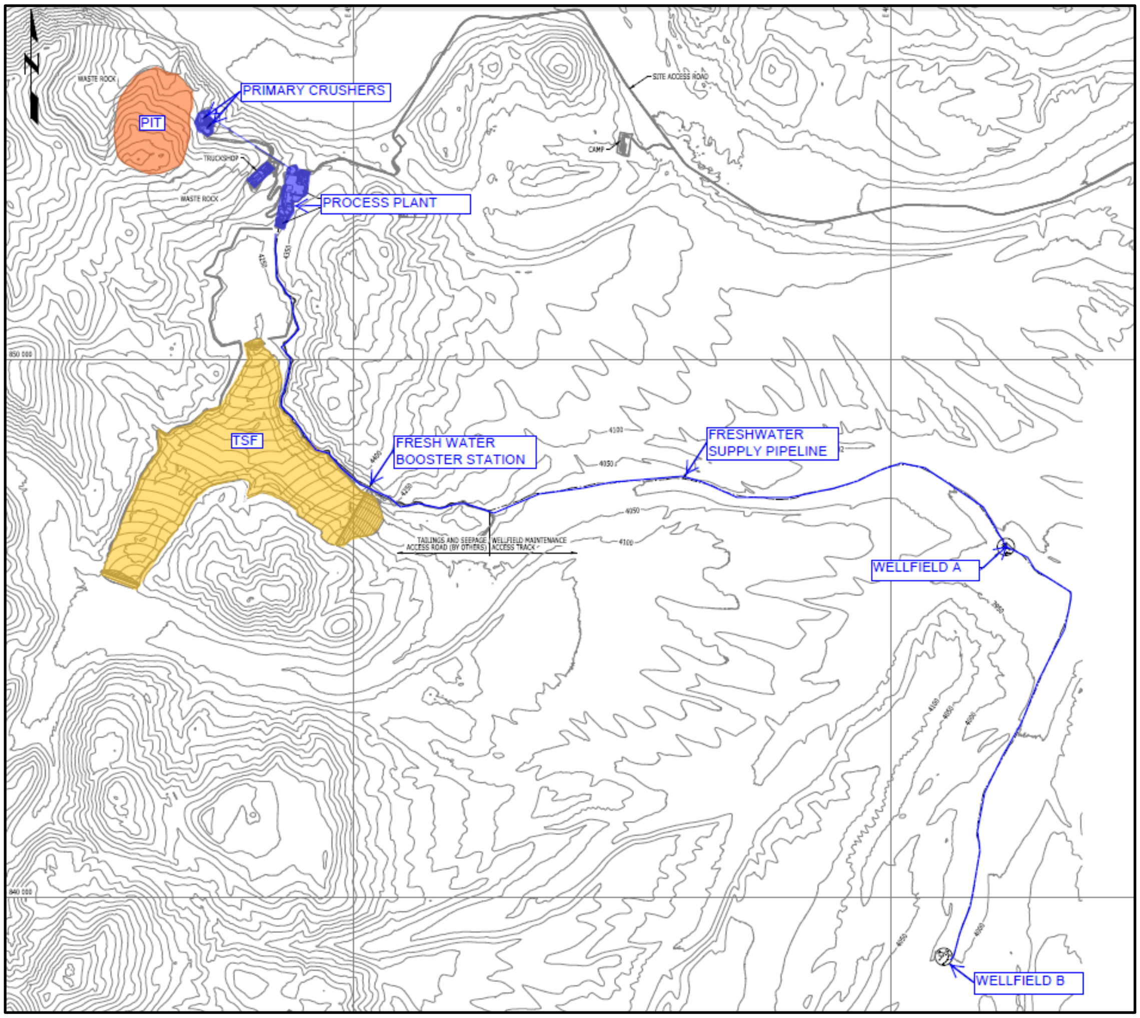
Various types of systems will support different operations and business needs, as follows:

- VoIP telephone services and computer networking within buildings
- Handheld radios for remote operations within the plant area
- LAN
- Wide area network (WAN) connection to locations outside the plant (Internet service)

18.10 Water Supply and Distribution

External make-up water will be sourced from groundwater well fields to supplement process water requirements. The well fields have been designed to a maximum pumping rate of 660 L/s. The amount of external make-up water required depends on the phase of the Project. It will be the greatest during the peak tailings production period, when make-up water rates range between 500 L/s (1,800 m3/hr) to 660 L/s (2,376 m3/hr). External make-up water requirements will be lower during the ramp-up and ramp-down tailings production periods as a result of the process water requirement being lower.

Two promising groundwater well field locations were identified, approximately 25 km from the plant site, to supply production water. Well Field A is located on Arroyo Pircas de Los Bueyes and Well Field B is located on Rio del Macho Muerto. Figure 18-5 shows the location of the wellfields.



Source: KP, 2020
Figure 18-5: Freshwater supply system general arrangement

A field investigation program was carried out in 2019/2020 to determine aquifer yield and confirm if make-up water requirements can be provided from these locations. Preliminary hydrological characterization and pump testing carried out during the field program indicates that the required large volumes of water can be extracted from the aquifers successfully over a long period of time.

Well Field A will need to be constructed in Year -2 to start supplementing the TSF supernatant pond for Plant start-up. Construction of Well Field B can be deferred to production Year 4. The well fields are designed to provide a maximum pumping rate of 660 L/s from each well field.

Freshwater transfer tanks 1 and 2 will have a common suction header to connect with the freshwater transfer pump station. The pump station will be able to pump up to 4,800 m^3/h to an intermediate freshwater booster tank and pump station (4,258 masl). From there, water will be pumped to the freshwater storage pond (4,300 masl) located at the southern end of the plant site. The pipeline will be routed along an existing wellfield exploration track. The freshwater pipeline will be routed to the TSF main embankment on a 3.5 m wide gravel surfaced track/piping corridor elevated 0.6 m above the surrounding grade.

The process water storage pond has a working volume of 35,000 m^3. It collects water from the TSF seepage return and reclaim lines, as well as water recovered from the tailings thickener overflows. The pond has an adjacent pump station to direct process water to the process water storage tank by the flotation building. The tank has a 30-minute capacity. This network is distributed within process facilities.

18.11 Sewage Treatment / Water Treatment

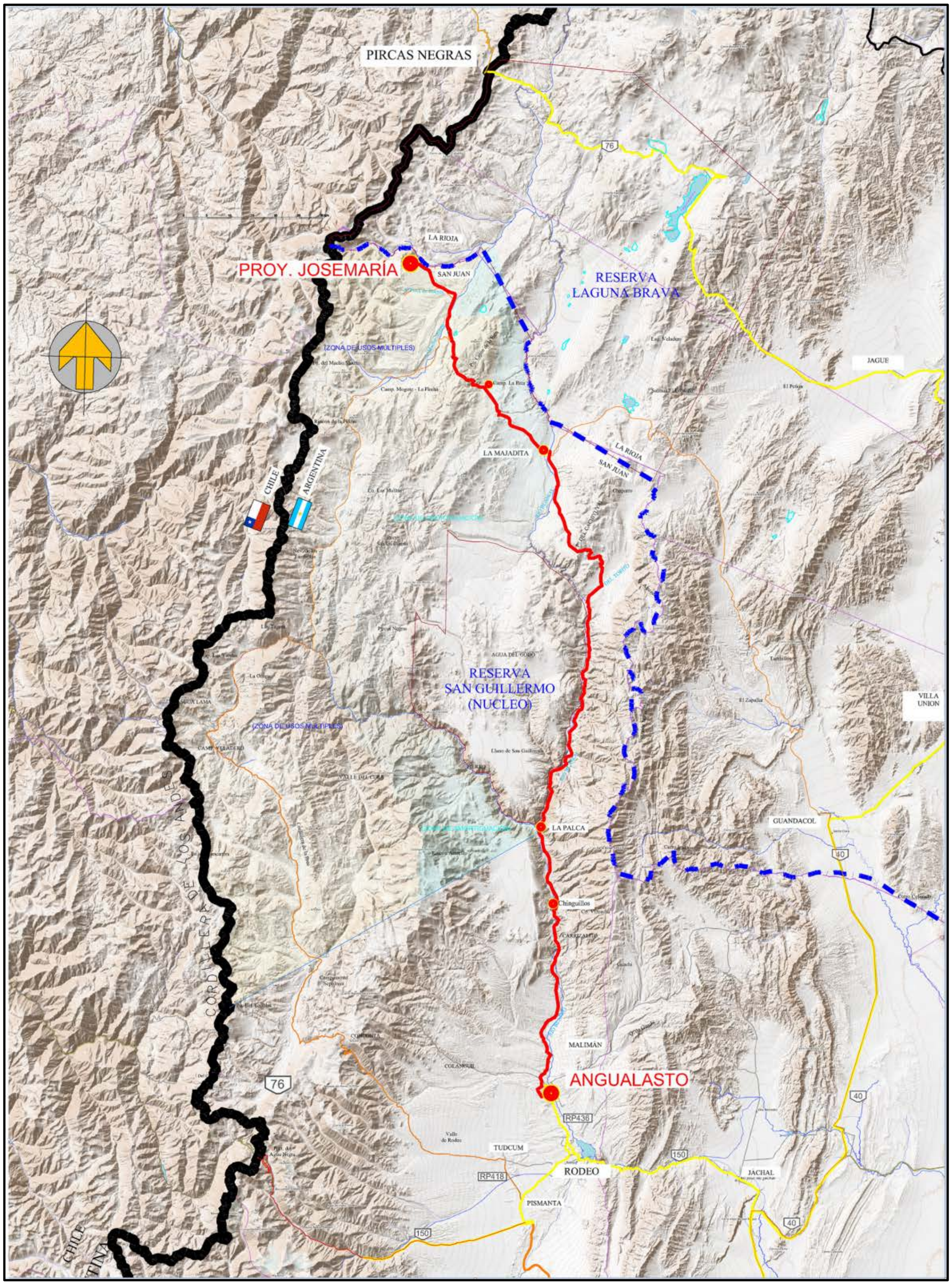
A sanitary sewage system will collect domestic waste originating within the plant site and truck shop facilities. Wastewater will be treated in a local sewage treatment plant. The treated effluent from each plant will be pumped to the main access road or haul road dust suppression tanks for the plant site and truck shop facilities, respectively. The dust suppression tanks are topped up with water for dilution and then discharged over roads for dust control and management. The solids will be trucked off site to a municipal waste processing centre.

18.12 Off-Site Infrastructure

18.12.1 Access Road

Access to the plant site will be from the south via Rodeo over a 244 km access road, which improves and integrates existing portions of road with newly established connector sections to complete the full route. Josemaria engaged Ruiz and Associates, an experienced local road design firm, to establish a road alignment, estimate a unit cost rate per kilometer to build the road (divided along 10 sections of the route), and provide a construction schedule. Fluor has reviewed the report produced by Ruiz and believes it has been performed by knowledgeable designers and engineers. The work is considered to be at a scoping level of detail and relies on Ruiz's local knowledge of existing conditions and regional practices (including a site visit), and a 5 m topographic survey. A future phase of the project will require an upgraded topographic survey to 1 m accuracy, and potentially some geotechnical and geohazard analysis, pending further review by the road designer. This work will allow a more detailed cut and fill analysis to be performed, resulting in a higher accuracy cost estimate. Ruiz has allowed for a 20% contingency to reflect the level of work performed.

The access road will be constructed by upgrading existing primitive roads and building new sections. Road construction will be staged to support early works and will be improved over the duration of the project. The road will be able to accommodate oversized loads during construction and concentrate and other traffic during operations, Traffic volumes during operations will average a total of 100 vehicles per day. Emergency response in case of an accident or an environmental incident will be based at the mine and at Rodeo. Containers positioned every 5 km will provide refuge for drivers and passengers if events such as severe rainfall, landslide, or a white-out force prolonged closure of the road. Figure 18-6 shows the access road routing.



Source: Ruiz, 2020

Figure 18-6: Access road routing

18.12.2 High Voltage Power Supply

The 220 kV, single-circuit HV transmission line will be 252 km long and tie into the existing utility substation at Rodeo. This substation will be suitable to supply power to the facility. The Rodeo substation is scheduled to have additional capacity (500 kV) added within the next 30 months. It currently supplies power at 500 kV and 132 kV and the project will install one 350 MVA, 500-220 kV, three-phase, 50 Hz autotransformer. This will feed a newly constructed, 220 kV single-circuit transmission line. The expansion of the Rodeo substation will be carried out under the initiative and responsibility of the Josemaria project.

The HV line follows the same general corridor as the south access road described above. The line will have two conductors per phase of aluminum-steel-reinforced (ACSR) type with a 300/50 mm^2 cross-section for carrying 240 MW of power. One reason for installing two conductors per phase is to distribute the high field gradient and control its value below threshold to prevent corona discharge.

Initial design of the 220 kV transmission line includes 678 structures. The structures will be made from cross-linked steel or mono-tubular steel. The design of the 220 kV transmission line will be divided into two sections: a ~165 km section located below 3,400 masl and an ~85 km long section above 3,400 masl. The transmission line design for higher altitude will be more stringent, as the conductors will be more spaced out to compensate for the lower dielectric strength of air. The design of the transmission line takes into consideration ambient temperature, wind speed and ice formation. The steel used for the towers will be suitable for low temperature applications.

A 24 single-mode optical ground wire fibre cable will be installed on the transmission line to carry the protection, control, automation and communication signals.

18.12.3 Concentrate Transport System

Concentrate will be transported from the mine to the intermodal facility in Albardon by a fleet of tandem tractor-trailer haul trucks (B-trains), each having a maximum gross vehicle weight (GVW) of 75 tonnes and a maximum payload capacity of 50 tonnes. The trailers will be equipped with covers to reduce the loss of fugitive dust during transit. The concentrate trucking operation will be owned and operated by a third-party logistics service provider.

On departing the mine the haul truck will turn due south on the 244 km long mine access road to Angualasto (just north of Rodeo), where it will connect with the local highway system for the remainder of its trip to the road-to-rail intermodal facility at Albardon, an additional distance of approximately 200 km.

The haul truck roundtrip time will be approximately 22 hours. At an estimated peak production rate of close to 800,000 t/a of concentrate, the fleet of 50 haul trucks will make approximately 16,000 roundtrips per year between the mine and the intermodal facility at Albardon.

The proposed site for the intermodal facility is approximately 23 ha adjacent to the Albardon Station and will be owned and operated by a third-party logistics service provider. On arrival at the inter-modal facility, each haul truck will be inspected and weighed. On completion of the arrival inspection, the haul truck will enter the 15,000-tonne capacity concentrate storage shed and will unload the concentrate to the shed floor. On exiting the storage shed, the empty haul truck will be weighed, washed down and inspected prior to its release for the return trip to the mine. The shed will be kept under negative pressure to limit the loss of fugitive dust to the outside environment. Fugitive dust will be collected and placed on the stockpile. Washdown water will be collected and treated prior to its release to the environment.

Upon arriving at the intermodal facility, an empty train will wait ahead of the storage shed on one of two 1,110 m long sidings. A front-end loader (FEL) will remove the wagon covers. The locomotive will index the wagons into the storage shed where the FEL will reclaim the concentrate and load it directly into a wagon. Prior to departing the intermodal facility for the port, the FEL will replace the wagon covers and each wagon will be washed down to remove any fugitive dust. Washdown water will be collected and treated prior to its release to the environment.

Concentrate will be exported through the TPR terminal in Rosario. TPR is approximately 1,120 km by rail from Albardon. The roundtrip travel time by rail between Albardon and the port will be approximately 15 days. Each train will have 60 wagons and a total payload of 3,000 tonnes. At the estimated peak production rate of close to 800,000 t/a of concentrate, 13 train sets will make a total of 270 roundtrips per year. The rail operator, Trenes Argentinos Cargas (TAC), will be responsible for transporting concentrate from Albardon to TPR.

Upon arrival at the port, a terminal locomotive will index the wagons into a 45,000-tonne capacity concentrate storage shed where a backhoe mounted over the rail track will unload the concentrate to the shed floor. Upon exiting the storage shed, the empty wagon will be weighed and the wagon cover will be placed back on the wagon. Prior to the port releasing the train for the return trip to Albardon, each wagon will be washed down to remove fugitive dust. The storage shed will be kept under negative pressure to limit the loss of fugitive dust to the environment. Fugitive dust will be collected and placed on the stockpile.

TPR uses rotating-container technology to load concentrates and other minerals at its general cargo berth. The maximum size vessel to be loaded with concentrate at the TPR berth will be 50,000 DWT bulk carriers. An FEL will reclaim concentrate from the stockpile and load one of two 25-tonne capacity containers mounted on a trailer. Once both containers are loaded, a terminal tractor unit will move the containers from the storage shed to its designated position alongside the vessel. A crane equipped with a spreader that is designed to lift the container into the ship’s hold, will rotate the container so the concentrate empties into the hold. The tractor unit will then return the containers to the storage shed to be re-loaded with concentrate. Upon completion of loading, the crane will lift a bobcat into each hold to trim the cargo in preparation for the ship’s departure.

This system of loading vessels achieves an average loading rate of 10,000 t/d. The parcel size will vary from between 10,000 and 45,000 tonnes with an average parcel size of 20,000 tonnes. At the estimated peak production rate of close to 800,000 t/a of concentrate, approximately 40 vessels will call at TPR to load concentrate; these vessels collectively will occupy the berth for approximately 80 days, with a berth occupancy rate of 22%.

18.13 Tailings Management

18.13.1 Overview

Bulk tailings will be segregated in the process to form two tailings streams; low sulphur rougher tailings and high sulphur cleaner tailings. The tailings streams are segregated to assist with the management of the PAG material using a Best Management Practice approach. The geochemical testwork program concluded the tailings have very little ability to neutralize acidity produced due to sulfide oxidation. Therefore, the following is anticipated:

- Cleaner scavenger tailings will produce acid quickly upon exposure to oxygen
- Rougher tailings will likely produce acidity if exposed beaches experience long-term oxidation
- A combined, or bulk tailings stream will produce acidity

Given the above, the following strategies were incorporated in the design:

- Keeping the cleaner tailings and rougher tailings discharge separate
- Discharging the cleaner tailings to one portion of the TSF where they will remain saturated and discharging rougher tailings in a designated line for beach development and capping of cleaner tailings
- Inclusion of a dedicated pyrite scavenger cell at the end of the rougher circuit to remove as much of the pyrite as possible
- Plan for covering or capping of tailings beaches to minimize oxygen ingress to the tailings

18.13.2 Site Selection and Tailings Technology

A tailings alternatives assessment was conducted for the project to determine the location of the TSF and best available tailings technology. Four tailings storage technologies were considered in the study: conventional slurry tailings, thickened slurry tailings, ultra-thickened (paste) tailings, and filtered tailings. The assessment considered these tailings technologies and alternative site locations. The assessment included consideration of safety, technical and financial aspects, and the implications on environment, health, social, heritage and economic values.

The assessment concluded the preferred site is in the Pirca de Los Bueyes basin located south of the plant site with segregated thickened tailings as the preferred tailings technology for tailings disposal. The main factors for this conclusion are as follows:

- Tailings deposition and water management is operationally simpler than the other candidates
- Process and runoff water is contained within the same facility. Water for mill reclaim is sourced from the supernatant ponds in the TSF
- Thickening increases water recovery in the plant compared to conventional slurry tailings and reduces water make-up requirements
- Thickening can be cost effective over conventional slurry tailings as it reduces the size of the tailings and reclaim mechanical systems and hence the capital cost. The capital cost reduction in mechanical systems offsets the cost of the thickeners resulting in net project savings.

- No additional mill processes are required
- There is a lower risk of operational problems (complications due to climatic conditions and remoteness)
- A greater ability to mitigate acid rock drainage/metal leaching (ARD/ML) generation potential with continuous tailings deposition, wetting of the beach surface and maintenance of a pond within the facility

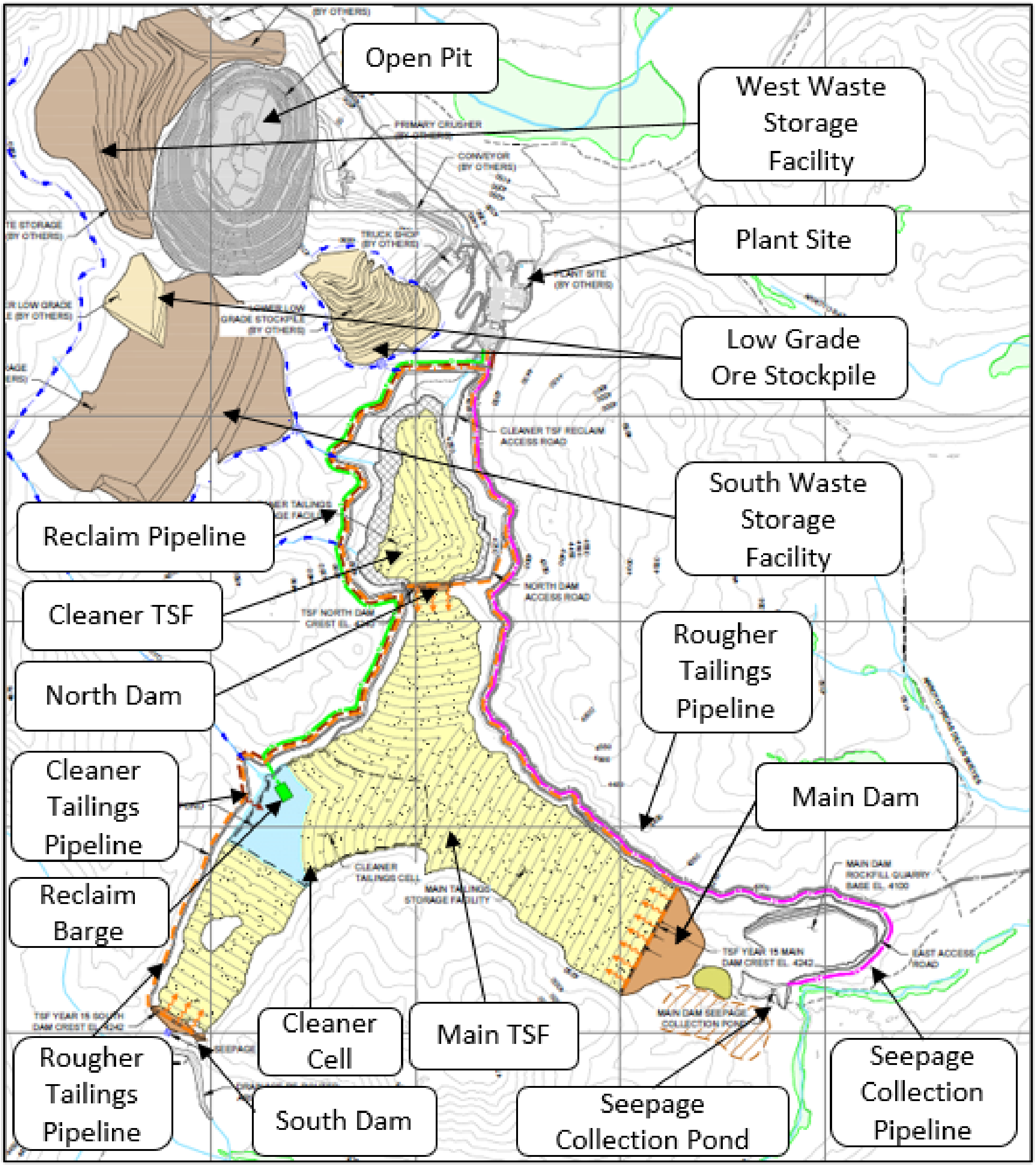
18.13.3 Tailings Storage Facility Design

Approximately 1 Billion tonnes of thickened slurry tailings will be discharged into the tailings storage facility (TSF) located to the south of the process plant over the life of the project. The TSF impoundment strategy requires that three dams be constructed continuously from Years -3 to Year 18 to contain the tailings. The foundation conditions at the TSF Dams and TSF basin generally consists of alluvium/colluvium consisting of gravels and sands overlying bedrock. The thickness of the alluvium/colluvium material varies across the site and is generally thicker in the valley bottom compared to the valley slopes.

The low sulphur rougher tailings will be thickened to 60% solids by weight in deep cone tailings thickeners and delivered to the Main TSF in a rougher tailings pipeline. The high sulphur cleaner tailings will be thickened to 40% solids by weight in tailings thickeners and will be delivered to the TSF in a cleaner tailings pipeline and managed sub-aqueously. The TSF is partitioned into two TSFs to manage high sulphur cleaner tailings, low sulphur rougher tailings and to achieve water management objectives at start-up. Rougher tailings will be managed in the Main TSF through the life of the project. Cleaner tailings will be managed in the Cleaner TSF from Years 1 to 3 and in a Cleaner Cell in the Main TSF from years 4 to 19. The General Arrangement for Year 15 of operations is shown on Figure 18-7.

The Cleaner TSF will provide containment for the first three years of high sulphur cleaner tailings within a HDPE geomembrane lined facility. The tailings will be deposited sub-aqueously in the facility to manage the acid generating potential of the tailings materials. The Cleaner TSF will initially be used to provide storage for 5 Mm^3 of process water for mill operations at start-up. The lined facility will serve as a water supply pond to prevent losses to the alluvium foundation. The Cleaner TSF will be the primary control point for contact water management on site. It will receive inflows from the Main TSF, Main Dam Seepage Collection Pond, Open Pit dewatering system, run-off from Waste Rock Management Facilities, and Well Field Water Supply Systems. It will be a main source of recycle water for the Process Plant and will provide water to the process water pond as needed.

A reclaim barge will be established in the Cleaner TSF at start-up and will supply the mill with process water. The Cleaner TSF will be used as a water storage reservoir for mill operations until Year 15 of operations. The reservoir will provide secure containment of surface water run-off and water pumped from the well fields. Sustainable pumping from the well fields will be staged at the Cleaner TSF so water can accumulate and provide additional water supply during extended dry periods.



Source: KP, 2020
Figure 18-7: General arrangement (Year 15)

Rougher tailings will be managed in the Main TSF for the entire life of the project. The Main TSF is designed as a free draining facility, utilizing the thick alluvium foundation as a drain to promote tailings consolidation. Rougher tailings will be strategically deposited over the first three years of operations to form a thick blanket of low permeability tailings over the alluvium foundation. This low permeable blanket will reduce seepage flows leaving the facility and facilitate the development of a supernatant pond in the Main TSF basin to recover process water. A permanent reclaim barge will be installed in this pond as soon as practical. Temporary pump stations will be required in the Main TSF basin in Year 1 to boost water to the Cleaner TSF for reuse in processing. This system will be installed in the Main TSF Collection Trench which will be constructed to promote process water collection from tailings deposition at the Main Dam.

Cleaner tailings will be sub-aqueously discharged within a Cleaner Tailings Cell in the Main TSF supernatant pond from Year 4 to Year 19 within a designated area. This area is referred to as the Main TSF Cleaner Tailings Cell. Rougher tailings will be discharged at the north of the facility in Year 16 to regrade the tailings surface to meet closure objectives and to encapsulate the Cleaner TSF with a cover of rougher tailings. The encapsulation of the cleaner tailings with rougher tailings will provide geochemical stability at closure.

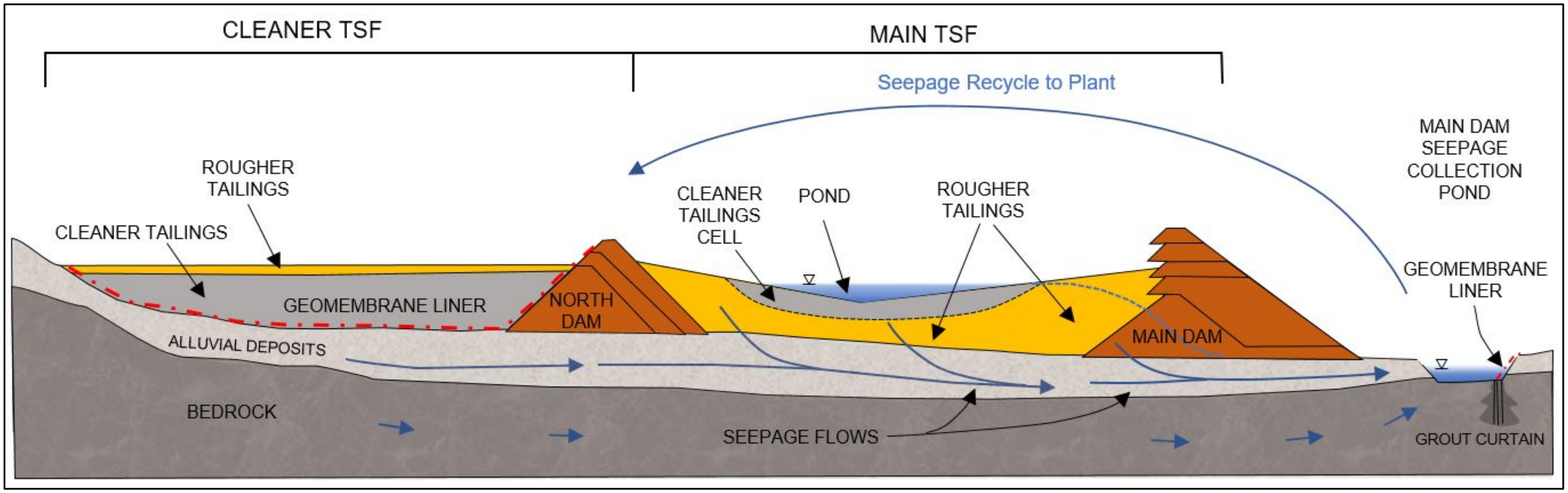
The Josemaria Project is located in an arid climate and maximizing water recovery is a primary design objective. The foundation conditions at the TSF comprise of a thick free draining layer of alluvial overlying bedrock. This alluvial foundation material provides a natural under drainage collection system which promotes consolidation of the tailings mass. A flow through embankment design is an innovative design measure that utilizes and takes advantage of the existing permeable foundation conditions in the TSF basin to promote consolidation, maximize the collection of tailings seepage water and increase overall stability.

The Main Dam is designed as a fit for purpose flow through structure utilizing a seepage collection system downstream for efficient recovery of groundwater. A drained flow through embankment promotes efficient seepage recovery, tailings consolidation, maximizes water recovery and increases available storage capacity within the impoundment. The centreline construction method was selected as the most economical solution for raising the Main Dam without sacrificing stability of the structure. A combination of earthfill/rockfill from a local borrow and quarried rockfill (depending on availability) will be used to complete ongoing raises of the Main Dam.

The design includes a Main Dam Seepage Collection System (MDSCS) located downstream of the Main Dam. The objective of the MDSCS is to capture and recover seepage from the impoundment basin and return it to the plant for reuse. The Main Dam is underlain by up to 30 m thick alluvium. This alluvium will convey seepage from the impoundment basin and through the Main Dam to the MDSCS. The MDSCS is situated in a narrowing portion of the main valley drainage and is designed to intercept, collect and recover seepage. A schematic section through the Cleaner TSF, Main TSF and MDSCP is shown in Figure 18-8.

Stability analyses were carried out to confirm the stability of the embankments under both static and seismic loading conditions. These analyses comprised checking the stability of the embankment for the following cases:

- Static conditions during operations and post-closure.
- Earthquake loading from the operating basis earthquake (OBE) and the maximum design earthquake (MDE).
- Post-earthquake conditions using residual (post-liquefaction) strengths.



Source: KP, 2020

Figure 18-8: Schematic section through TSF - Year 15 (not to scale)

The stability analyses results satisfy the factors of safety design criteria in accordance with the Canadian Dam Association (CDA) "Dam Safety Guidelines" and shows the proposed design meets both short term (operational) and long term (post-closure) stability criteria. The seismic analyses indicate embankment deformations during earthquake loading from the OBE, MDE, and 1-in-10,000 year event would be minor and would not have a significant impact on the available embankment freeboard or result in any loss of embankment integrity. The embankment design is not dependent or reliant on tailings strength to maintain overall stability and integrity.

Instrumentation will be installed at the embankments to measure displacements, seepage rates and water levels. The instrumentation will be monitored as part of the detailed monitoring plans to be developed for the TSF.

18.14 Site Wide Water Balance

A site-wide water balance model was developed to support the Feasibility Study. The model was used to assess process water requirements throughout the mine life, as well as to simulate the major mine facility water supply and demand. The results indicate that the TSF will operate in a deficit during all phases of operations and under the full range of variable climatic conditions, including prolonged wet and dry cycles. Water losses will be mainly due to the physical entrainment of water within the tailing solids in the TSF. Much smaller amounts will be lost to evaporation and the copper concentrate. Make-up water to supplement process water requirements during operations will be sourced from groundwater well fields.

18.15 Surface Water Management

All mine contact water, which includes runoff from the plant site, TSF contributing catchment, waste rock storage facilities, tailings beaches, tailings slurry water, open pit mine dewatering flows and groundwater accumulating in the TSF will be collected, stored and managed within the project area. Seepage collected in collection ponds located downstream of the Main and South Dams will be recovered for reuse in processing. Contact water will not be discharged from site.

Diversion ditches will be installed around the plant site, waste storage facilities, open pit, and TSF to convey clean or non-contact freshwater around these disturbed areas, where it is physically practical. Water that accumulates at project infrastructure will be collected and pumped to the TSF for reuse in processing. No water will be discharged to the environment that would have an adverse environmental impact.

The water management plan maximizes the collection of run-off from upstream catchments to increase the amount of water reporting directly to the TSF to reduce the make-up water requirements and provides site contact water containment for large storm events.

19 Market Studies and Contracts

19.1 Concentrate Product

The product of the mine will be a conventional copper concentrate. This product is considered clean and expected to be readily marketable and attractive to international smelters in Asia, Europe and South America. Test results to date have typically yielded a 27% Cu concentrate and this FS has used that grade as a base case for logistical considerations and economic evaluation. Gold and silver grades are expected to average 14.2 grams and 71.7 grams per tonne of concentrate, respectively. The concentrate is expected to be within Chinese import limits for much of the mine life without the need for blending to address arsenic concentrations.

The concentrate specifications summarized in Table 19-1 have been forecast based on testwork described in Section 13.

Table 19-1: Concentrate specifications (average)

Element/mineral	Units	LOM average
Concentrate production	DMT	590,000
Cu	%	27
Au	ppm	14.22
Ag	ppm	71.65
As	ppm	2491
Al_2O_3	%	1.32
CaO	%	0.13
Cl	ppm	167
F	ppm	144
MgO	%	0.16
Ni	ppm	62
Pb	ppm	1180
S	%	35.6
Sb	ppm	118
Se	ppm	70
Zn	ppm	3502
Fe	%	25.3
Bi	ppm	7
Si	%	12
Mo	ppm	2300
Cd	ppm	31
Hg	ppm	1.0
Co	ppm	66
MgO	%	0.16

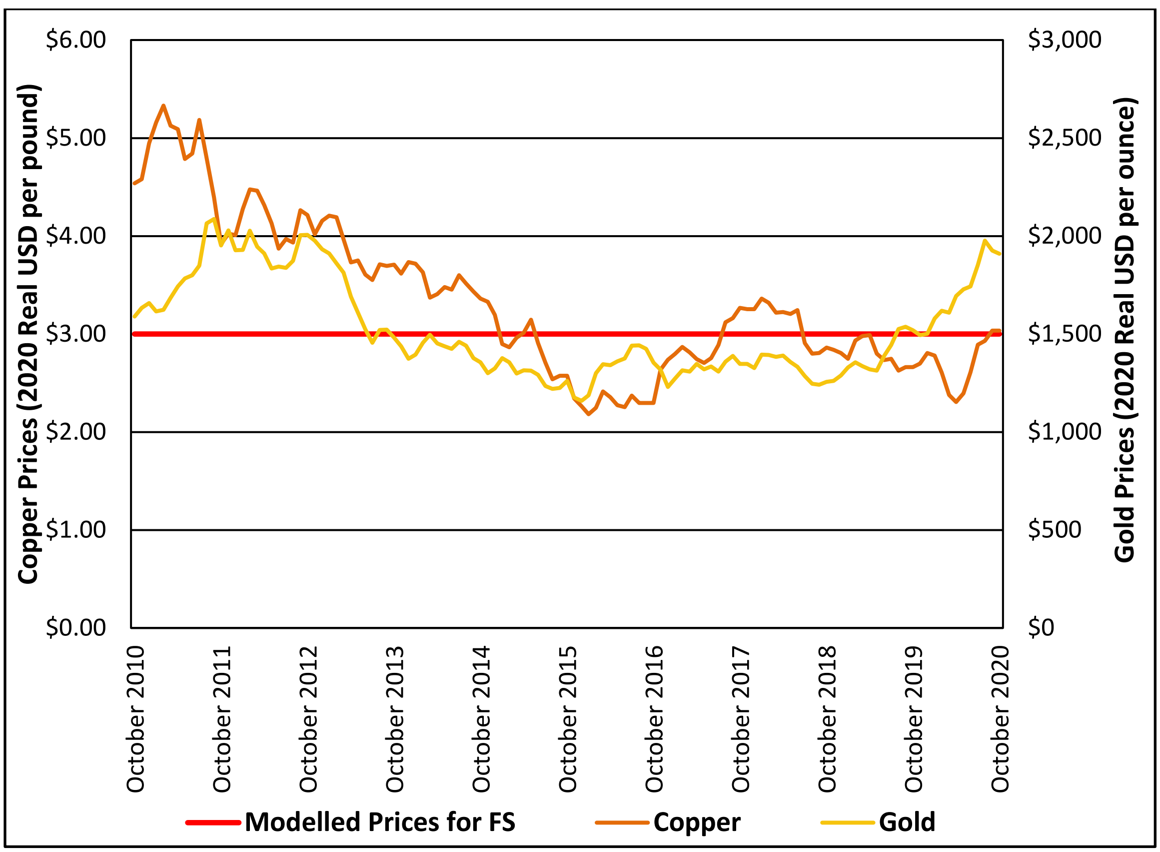
The constituents of most significance are expected to be copper, gold and silver as payable elements and arsenic as a potential penalty element. The operation is expected to be able to maintain arsenic concentrations in the concentrate at low or below penalty levels during most of the mine life.

The concentrate is generally considered to be marketable in a conventional manner, with fixed price per tonne of concentrate assumed for treatment.

The price assumptions used for this study are shown in Table 19-2. These prices are in accordance with consensus market forecasts and are consistent with historic prices for these commodities (see Figure 19-1 for historic copper and gold prices; silver represents a very small portion of project revenue (1.5%) and is not shown graphically). SRK also considers the prices used in this study to be consistent with the range of prices being used for other project studies.

Table 19-2: Commodity price assumptions

Commodity	Units	Price
Copper Price	$/lb	3.00
Gold Price	$/oz	1,500
Silver Price	$/oz	18.00



Source: SRK, 2020

Figure 19-1: Historic copper and gold prices (inflation adjusted to 2020 USD)

19.2 Potential Customers and Contracts

The expected concentrate produced by Josemaria should prove to be a highly attractive material for smelters and traders. It is expected that the majority of concentrate will be tied to long term off-take agreements to satisfy lender requirements, however it is likely that a small proportion could be made available to traders and sold in the spot market. It is anticipated that concentrate will be sold to smelters in China, South Korea, Japan and Brazil, although it could also be sold to smelters in Europe and India if terms are favourable.

As a result of its previous ownership interest in the project, the Japan Oil, Gas and Metals National Corporation (JOGMEC) has the right to purchase up to 40% of the concentrate at the prevailing market price.

Expected contract terms, also used in the FS economic analysis (Section 22), are shown in Table 19-3.

Table 19-3: Expected contract terms

Item	Unit	Value
Target concentrate grade	%	27
Concentrate moisture content	%	10.9
Cu % payable	%	Deduct 1% from conc grade @ 27% Cu
Au % payable	%	97
Ag % payable	%	90
Treatment charge	$/dmt	78.22
Cu refining charge	$/lb	0.078
Au refining charge	$/oz	5.00
Ag refining charge	$/oz	0.46
As penalty (per tonne of concentrate)	per 0.1% above 0.2%	2.50
Weighing, assaying and insurance	$/wmt	6.56
Concentrate loss during transport	%	0.3

The rates in this study are based on an average annual production of 590 kt, distributed as 120 kt to Paranapanema (Brazil), 120 kt to XGC (licensed blending station in Qingdao China), 100 kt to PASAR (Philippines), 80 kt to Birla (India) and 170 kt to Chinese traders and spot sales.

19.3 Product Transport

Concentrate will be trucked in bulk via B-train along the access road from site to Rodeo and then on to San Juan where it will be loaded to rail. The train will take the concentrate to Puerto Rosario where it will be loaded to ship. Costs to haul concentrate on road and rail average $82/wmt. Logistics for concentrate transport were discussed in Section 18.2.

Costs for ocean freight in this study are based on current freight rates (plus 10% contingency) using 30,000-tonne parcels. Average costs of $42.33/wmt for ocean freight were used in addition to expected port costs of $19/wmt.

19.4 Supply and Demand Forecast

19.4.1 Copper Concentrate Market

Freeport McMoRan Inc. (Freeport) and Antofagasta Minerals SA (Antafogasta) have recently and alternately led copper concentrate benchmark treatment charge and marketing terms negotiations. This was achieved by agreeing to terms with one of the lead Chinese smelters, nominated by the China Smelters Purchase Team (CSPT - normally Jiangxi Copper) followed swiftly by settlements with the Japanese and European smelters.

Other major copper miners such as Teck, Codelco, Vale and MMG also generally follow these terms. Glencore, which is both a mining and smelting company, refrains from setting a benchmark and is similarly a follower.

Smaller mines and smelters tend to simply reference these benchmark terms (rather than negotiate) in their contract agreements. BHP however, has uniquely diverged from settling terms annually based on a negotiation of benchmark terms and instead has set a new path for its long-term supply contracts, based upon a spot/mid-term pricing structure that can be continually price-referenced by independent organizations such as Metal Bulletin. This applies to all of its mines, but foremost amongst them is the global number one copper producing mine, Escondida.

Most direct contracts with smelters (especially those associated with project financing) will include some form of benchmark pricing mechanism and therefore the pricing that Josemaria achieves will be dependent on market supply/demand dynamics and annual decisions made by other larger mines producing copper concentrate. This study has therefore assumed that 60-70% of sales for Josemaria would be made based on benchmark long-term sales. For short term (1-3 years) contracts or spot sales, traders will often pay a premium of between 10% and 20% to benchmark terms to secure supply. The actual discount will be dependent on market conditions (in a weak market the former, in a tight market the latter).

19.4.2 Copper Metal and Market Outlook

Prices for copper are affected by unpredictable events, such as the recent tempering of demand in China during the US-China trade war or the further deterioration in the world economies following the aftermath of the COVID-19 virus. Despite these set-backs to the global economy, it is expected that global economies, will continue their steady growth in industrial production absent further set-backs from the COVID-19 virus.

ASEAN countries are still expected to increase consumption of copper units (per person) at a much greater rate than their western counterparts, and combined with the change in the growth in electric vehicle manufacturing will increase at a markedly higher rate than in the last decade, boosting demand for copper. But it is also likely that greater recycling of copper containing materials, commensurate with a higher price environment, will create additional supply units.

Combined with the greater use of Autonomous equipment in the mining world, allowing for lower grade ore exploitation and greater production levels, demand will be somewhat tempered, leading to a lower risk of price spikes as we saw in the last price cycle.

Mining majors have modified their practices associated with capital spending following the recession of 2008 and are more disciplined than in previous cycles. They are considered less likely to pursue the irrational expansions that beset the industry in the previous cycle, curbing the increase in supply necessary to offset mine closures and an increase in demand, likely resulting in a sustained or increasing price of copper in the long term. An estimate of the supply/demand balance for copper is shown in Figure 19-4. It is therefore expected that copper prices will elevate quietly but steadily over the next five to ten years, though any final settlement of trade war tensions will likely see an immediate, though unsustainable, short-term spike in prices.

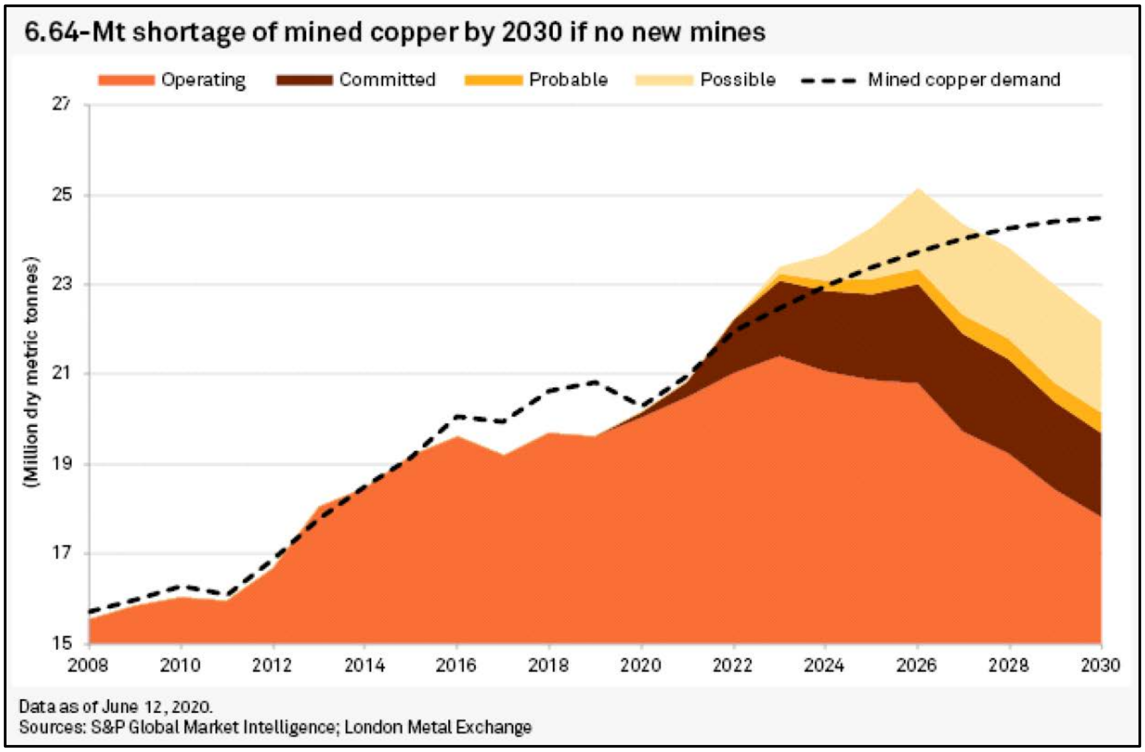


Figure 19-2: Historical and projected supply/demand for copper

Copper generates approximately 71.0% of the project revenue at base case assumptions for grades, process recoveries, metal prices and concentrate marketing terms.

19.4.3 Gold

Weak consumption from the jewellery and technology industries is currently being more than offset by higher investor demand due to stock market risk and low opportunity cost resulting from a low yielding bond market. Spot prices of approximately $1900 per ounce in the second half of 2020 were higher than the base case forecast for the project. With central banks engaging in growth of the money supply, gold's role as a hedge against currency depreciation, arguably is again becoming more relevant.

Gold generates approximately 27.5% of the project revenue at base case assumptions for grades, process recoveries, metal prices and concentrate marketing terms.

19.4.4 Silver

Due to the Covid-19 pandemic, temporary mine closures in South Africa, Peru and Mexico have resulted in lower silver production than originally forecast for 2020. This has been offset somewhat by a reduction in industrial demand. The recent increase in the price of silver can be attributed to the increase in physical demand and delivery of futures contracts as well as institutional and generalist investment in parallel to gold.

Silver generates approximately 1.5% of the project revenue at base case assumptions for grades, process recoveries, metal prices and concentrate marketing terms.

19.4.5 Silica Content

The concentrate is relatively high in insolubles (mainly silica). Ordinarily, silica is added to the smelter feed to help form (at high temperature) a siliceous membrane between the molten matte and slag, aiding and abetting the migration of both copper and precious metals from slag to matte and vice versa iron to slag. A certain amount of silica in concentrate can therefore be an advantage, but too much and the molten slag will increase in viscosity, absorbing heat and altering recovery dynamics. Ordinarily silica is therefore not penalized, but those smelters with a high overall silica load in feed grade may be put off by the relatively high silica content of the Josemaria concentrate. Silica needs to be considered but is not expected to incur any penalties during concentrate marketing activities and in some cases may garner a premium.

19.4.6 Arsenic Content

The arsenic level in the concentrate is likely to be variable over the life of mine, but is expected to almost always remain below the current Chinese import regulations of 0.5% which would incur only mild penalties from most western/Tier 1 Chinese smelters and limited or no penalties by Tier 2 Chinese state-owned enterprise smelters. This penalty will vary between smelters, some triggering at 0.2% and others at 0.3%. This study has assumed therefore that all smelters will charge a penalty of $2.50 per 0.1% of arsenic quantity (by mass) above 0.2% content. However, it is expected that potential penalties associated with arsenic may be reduced by way of careful mine planning activities. To provide some contingency, some additional variability was introduced into the forecast arsenic concentrations in the mine plan as part of the economic analysis and estimated penalties remained small.

There are otherwise no significant levels of deleterious elements in the concentrate that would give concern. In fact, aside from arsenic and silica (potentially), the material can be described as very low in deleterious elements. It is likely that this material will not only be acceptable to be processed at most smelters but will also be sought after due to the low penalty elements and high precious metal content, allowing Josemaria to engage with a large number of smelters during product marketing.

20 Environmental Studies, Permitting, and Social or Community Impact

Josemaria has made considerable efforts to undertake environmental studies and community engagement to facilitate advancement of the Josemaria project. The following presents a summary of the environmental aspects, permitting and social/community impacts to date.

20.1 Regulatory Framework and Permitting

The legal and institutional framework for mine permitting in Argentina is derived mainly from the second section of the Mining Code, its supporting National Law No. 24.585 and General Environmental Law 25.675. Technical Support for the process is provided by the National Mining Secretariat; the technical evaluation is completed by the CIEAM (Comisión Interdisciplinaria de Evaluación Ambiental) which is a special commission in charge of evaluating the Environmental Impact Studies of large mining projects in the Province of San Juan. This commission is composed of different national and provincial institutions including governmental authorities, universities, and quasi-governmental entities.

Decree 1815/04 establishes a public participation stage to take place as part of the review process of the EIA, as required by National Law 25.675. The public participation must be open and provide access to all relevant information, including the full environmental impact study. The CIEAM must have access to and consider the opinion and comments of the public before rendering their opinion.

The law dictates that an “Informe de Impacto Ambiental” or Environmental Impact Assessment (EIA) must be submitted and approved by the provincial authority prior to commencement of operations. Upon successful review of the EIA, provincial authorities issue a “Declaración de Impacto Ambiental” (DIA), which serves as the overarching environmental license. Annex III of Law 24.585 establishes the minimum contents of an EIA, which are:

- General Information
- Environmental Description
- Project Description
- Impact Assessment
- Environmental Management Plan
- Emergency Response Plan
- Methodology
- Applicable norms and laws

The complementary Law 6.571 from San Juan Province has similar requirements, which are accommodated at the same time as the federal EIA.

An EIA and its subsequent DIA are also required for the exploration phases of mineral development. The Josemaria Project has maintained all previous exploration activity permits in good standing, each of which required the submission of an EIA and receipt of a DIA. The DIAs obtained are listed in Table 20-1.

Table 20-1: Project DIAs

EIA (IIA)	Presentation Date (yyyy-mm-dd)	Permit Number (DIA)	Approval Date (yyyy-mm-dd)
EIA Exploration Phase	2006-11-10	Res Nº287-SEM-2010	2010-11-16
1st Update - EIA Exploration Phase	2012-11-20	Res Nº201-MM-2018	2018-02-22
2nd Update - EIA Exploration Phase	2019-08-09	Res Nº165-MM-2020	2020-02-12

Josemaria Resources has indicated that it plans to submit the EIA for mining in Q1 of 2021, and a 12-month review is expected leading to its approval. Development of the supporting studies and analyses for the EIA was initiated in 2017, with some investigations starting as early as 2013. The reporting is expected to be substantially complete by the end of 2020, allowing for submission in early 2021.

In addition to the DIA, several sectoral permits, licenses, and authorisations will be required to proceed with the construction and operation of the project. Most of these are similar to those already in possession as part of exploration requirements, although they will have to be expanded, renewed, and attached to the exploitation DIA.

Primary permits include:

- Water rights and hydraulic structures
- Tailings storage facility
- Right-of-way for access road
- Certificate of Hazardous Waste Management
- Registration as consumer of liquid fuels
- Certificate of Non-Existence of Archaeological and Palaeontology Remains
- Registration as explosives user
- Medical service
- Construction – water transport aqueducts
- Construction – easements in general
- Construction – roads
- Construction – borrow materials (quarries)
- Mining production
- Radio frequency and equipment

- Mining wastes
- Solid wastes in or near the project area
- Environmental insurance
- Mineral transportation
- Power line

In addition to the permit approvals listed above, there are certain requirements established by law such as audits, monitoring plans, samples control, reports and others that must be complied with to keep those permits valid and in good standing.

The long lead applications for the sectoral permits above can be submitted during the EIA process and reviewed by regulators concurrently. Upon approval of the EIA, sectoral permits can be issued.

20.1.1 Argentine Mining Regulations

Mining activities in Argentina are governed by the National Mining Code and National Law No. 24.585 (Environmental Protection Law for Mining Activity). Legal provisions are included in Title 13, Article 2 of the Mining Code, which is enforced countrywide. The Province of San Juan adheres to Law No. 24.585 by Provincial Decree No. 1.426/96. Furthermore, Provincial Decree No. 589/96 and Provincial Law No. 504-L, appointed the Ministry of Mining as the applicable authority of National Law No. 24.585/95.

Pursuant to the abovementioned legislation, minerals belong to the provinces or the nation depending on whether they are located on Provincial or National land, except for certain types of mineral occurrences that belong to the surface owner, such as quarry products (limestone, construction materials and ornamental rocks). Royalties are paid either to the Province or to the federal government, and the procedures for obtaining such rights are processed by the Province or the National Government depending on the location. In the case of Josemaria, mining rights are under the purview of the Province of San Juan.

There are three different types of rights under Argentine mining regulations – cateos, manifestaciones de descubrimiento and minas/mining permits. These are discussed in more detail along with the current mineral tenure for the Josemaria project within Section 4.3.2.

20.1.2 National Mining Investment Regulations and Permitting

National Law N° 24.196 establishes a general Regulation for Mining Investments and provides for certain tax benefits to promote mining investments. Mining companies based in Argentina may apply for the benefits established under the mining investment by formally registering before the Mining Investment Record kept by the National Secretary of Mining.

The financial incentives granted are the following:

- Special provision for the deductibility of expenditures related to the definition of the technical and economic feasibility of the project
- VAT tax credits resulting from exploration activities to be reimbursed within twelve months following relevant expenditure
- Fiscal and exchange stability for a term of 30 years from submission of a feasibility study
- Accelerated depreciation for new mining projects or for expansions
- Exemption from import duties on imported capital goods, special equipment or spare parts for such goods and equipment
- Income derived from contributions involving mines/mining rights is exempt from income tax
- up to 50% of mining reserve appraisals may be capitalised (subject to prior approval)

Law 26.639, enacted on October 28, 2010, established the minimum basis for protection of the glaciers and periglacial environment, with the aim of protecting them as strategic water reserves. The law requires that an inventory of glaciers and periglacial environment is made and periodically updated by a governmental agency within the National Ministry of Environment. The inventory was made public in May 2018. As per Section 6, the following activities are forbidden in glaciers and periglacial environments:

(a) Mineral and hydrocarbon exploration and exploitation

(b) Release of contaminants, chemical products and residues

The following activities are forbidden on glaciers:

(c) Carrying out of infrastructure works

(d) Development of works or industrial activities.

Within the project's area of influence, there are no glaciers or periglacial environments listed in the inventory.

20.2 Environmental Design Basis

Josemaria Resources is committed to responsible and sustainable mining development as laid out in its Responsible Mining Development Policy (RMDP[1]). The RMDP commits the company to the following:

- Design projects to the extent possible to avoid, minimise, mitigate and if necessary, offset adverse environmental impacts
- Incorporate water and energy efficiency in project design, implementation and continuous improvement
- Conserve biodiversity and ecosystem services in the regions hosting our projects as much as possible

[1] https://www.josemariaresources.com/RMDP

The RMDP further obligates the company to follow good international industry practices (GIIP) and recognised sustainability standards. The GIIP for the mining industry are defined by the International Finance Corporation Environmental Health and Safety Guidelines for Mining as:

> *"…the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility".*

Key aspects of GIIP that will be incorporated into the project design include:

- Minimise the project footprint (surface area) to the extent possible
- Avoid to the extent possible sensitive areas, such as vulnerable habitat used by species in conservation categories, archaeological sites, legally protected features
- Maximise diversion of non-contact water around the project footprint
- Identify any sources of potentially acid generating material, and include measures to minimise, isolate, and control runoff from such sources in the design
- Minimise water needs maximise water reuse and recycle
- Design tailings impoundment structures according to specifications of internationally recognised standards based on a risk assessment strategy, with incorporation of appropriate independent review
- Include measures to reduce emissions of dust, noise and vibration within the design
- Design with a view to the closure and post-closure situations

Josemaria Resources also commits to work with the relevant authorities to meet all environmental design requirements set forward by federal Argentinian law and the laws of the Province of San Juan. Some examples of requirements include:

- Argentina Decree N°1426, Argentinian Norms for Water Quality
- Argentinian Decree 638/90, Industrial Effluent Standards to Rivers, Streams, Irrigation Tracts
- Provincial Law N°348-L, Preservation of Water, Soil and Air Resources and Contamination Control
- Provincial Law N°606, protect, conserve, propagate, repopulate, generate and promote the sustainable use of flora, wild fauna, fish fauna as well as the creation, control and development of natural protected areas in order to preserve biodiversity and ecosystems throughout the territory of the Province of San Juan
- National Law N°26.639, minimum budget regime for the preservation of glaciers and the periglacial environment

Where there is no host country legislation on a specific aspect, international good practice will be used or legislation from neighbouring countries with a well-developed mining industry will be evaluated and if applicable, adopted. One specific example is the design parameters for the tailings storage facility; Argentina does not have a law or decree specific for design and safety of dams so the Josemaria Project will use the Canadian Dam Association (CDA) classification.

20.3 Environmental Studies

A summary of the results of the environmental studies conducted to date is provided below.

20.3.1 Meteorology

Recent site-specific meteorological studies have been conducted for the project (Knight Piésold, 2019). A meteorological station was installed at Josemaria in April 2014 at an elevation of 4,448 masl; however, data for this station only became available starting in late January 2015. Additionally, two other climate stations were installed in the vicinity of the project, at the neighbouring Los Helados and Filo del Sol projects. The Los Helados weather station is located at an elevation of 4,974 masl and was installed in late January 2015. The Filo del Sol climate station is located at an elevation of 5,012 masl and was also installed in late January 2015.

All three stations collected air and soil temperature, precipitation, wind speed and wind direction, relative humidity, snowpack depth, albedo, barometric pressure and long- and short-wave solar radiation data. Information on snow cover conditions is also collected using the satellite photographic register of the area. The assessment of meteorological conditions in the project area is primarily derived from the three-year (2015-2017) record collected at the Josemaria climate station and is supported by data collected at the other two stations. In particular, weather data from the Los Helados station were used to fill in gaps of missing temperature and precipitation data at the Josemaria climate station.

There are several weather stations managed by Dirección General de Aguas (DGA) in Chile, as well as Servicio Meteorologico Nacional (SMN) and Instituto Nacional de Tecnología Agropecuaria (INTA) in Argentina, that either are operating or have operated in the regional vicinity of the project area. All the regional stations are located at elevations in excess of 2,000 m lower than the project, and as such, have different climate conditions. However, the regional climate data are well correlated with the project data, and it is on this basis that long-term climate values were generated. Climate data from the Lautaro Embalse weather station operated by DGA were used to develop long-term synthetic estimates of temperature and precipitation for the Josemaria climate station. The Lautaro Embalse weather station is located approximately 66 km northwest of the project at an elevation of 1,110 masl.

A summary of the calculated climate metrics follows:

- The long-term mean annual temperature for the Project area is estimated to be -1.9 °C, with monthly mean temperatures ranging from a high of 7.3 °C in January 2017 to a low of -21.3 °C in June 1978
- The mean annual wind speed at the Project area is approximately 4.6 m/s, with wind speeds exceeding 7.5 m/s approximately 15% of the time. The prevailing wind directions during all seasons are the south, the west and the northwest, with the strongest winds typically out of the northwest and weakest out of the south.

- Maximum average incoming solar radiation occurs in December and minimum incoming solar radiation occurs in June, with respective rates of approximately 9.8 kWh/m2 and 3.5 KWh/m2
- Relative humidity is low all year round, with an annual average value of 23.6% and mean monthly values ranging from a low of 16.2% in December to a high of 30.5% in February
- Estimates of mean annual potential evapotranspiration for the project site vary considerably, ranging from 356 mm to 1,210 mm
- The mean annual precipitation during the period of 2015 to 2018 was 218 mm. Years 2015 and 2017 were likely influenced by an El Niño climate cycle, and thus the average from this period likely greatly overestimates long-term average conditions.
- The long-term average precipitation for the site is estimated to be approximately 105 mm, with annual totals over a 51-year period ranging from a minimum of 0 mm to a maximum of 590 mm. This average value is derived from a data over a period that contains many El Niño Southern Oscillation cycles and thus is assumed to be a reasonable long-term estimate.
- Precipitation is unevenly distributed throughout the year, with the majority of the precipitation falling during the austral winter months of May through to August
- The 100-year 24-hour precipitation is estimated to be 129 mm
- It is estimated that, on average, snow is present on the ground for approximately 5% to 20% of the year, with most of that time occurring during the austral winter months
- The mean annual sublimation for the project is estimated to be 69 mm, which is assumed to be distributed fairly evenly during the austral winter months of April to August

20.3.2 Noise & Vibration

Baseline noise and vibration measurements were carried out in February of 2014 (Métodos Consultores Asociados, 2014a, Métodos Consultores Asociados, 2014b). Ambient noise levels are generally low. Higher decibel readings of up to 53 dBA were associated with strong winds. Outside of the mineral exploration activity, there was no human-caused noise generation. In the baseline condition, ground vibrations were negligible. Given that there are no communities or any human settlements near the project area, the noise and vibration resulting from the project are unlikely to affect human receptors. Mitigation for controls to wildlife will be implemented.

20.3.3 Ecosystems

The project is located within the High Andean Ecoregion, commonly referred to as paramo, or alpine desert. In general, the area is characterized by rocky terrain with entisolic soil, and a resultant scarcity of vegetation. The dominant vegetation is characterized by xerophytic grasses such as Stipa spp, dispersed in isolated clusters within the rocky or gravel matrix (Figure 20-1). Patches of low bush steppe vegetation dominated by Adesmia *spp* in the lower elevation areas of the project area are also present. No persistent vegetation was observed above 4,700 masl.

Figure 20-1: Typical steppe habitat dominated by Stipa *spp.* grasses

Wetlands, or vegas, are found in valley bottoms where hydrologic conditions allow. Throughout the Ecoregion, vegas represent a small proportion of the area (approximately 1%); however, they have high productivity, and they provide sustenance to the diverse trophic levels within the ecosystem. Vegas were dominated by rushes and graminoids; primarily *Oxychloe castellanosii* (Figure 20-2), *Deyeuxia curvula*, and *Deyeuxia eminens*. Although they occupy a very small proportion of the area in the Ecoregion (< 2%), they have high productivity.

Faunal diversity is limited by the extreme habitat. This results in a relatively low diversity of terrestrial vertebrate wildlife and a unique species composition, adapted to these extreme environmental conditions.

The highest abundance of wildlife was associated with vega habitat. This included several waterfowl species, passerine birds, and small mammals. Groups of guanaco and vicuña were noted along the access road corridors.

As a unique ecosystem, it is necessary to implement a high standard of environmental management during project development. It is believed that the necessary standard of care will be met during construction, operations and closure, and any impacts to the environment will be suitably mitigated or where that is not possible, compensated to minimize the overall impact of the project on the environment in the project area.

Figure 20-2: Vega in upper Rio Pirca de los Bueyes dominated by *Oxychloe Castellanosii*

20.3.4 Archaeology

A baseline study of the area was conducted in 2020 that identified 54 archaeological sites of varying significance within the general project area. The sites were generally composed of rock formations (circles, semi-circles, or walls), with some associated with lithic material. The spatial distribution of the archaeological sites clearly corresponds to the availability of water resources, since almost all of them are located in the river basins associated with ravines, meadows, bodies of water, wetlands and valleys; up to an approximate altitude of 4,300 masl. A smaller percentage is located on hills and plateaus from where there is great visibility of the environment and the basins. These strategic locations could be related to the activity of camelid hunting in ancient times, since it is worth noting that in all these sites the remains of lithic carvings were found.

The study area was known and used by different societies over the past millennia, including (from oldest to most recent) prehistoric hunter-gatherers, La Fortuna Culture, Los Morrillos, Ansilta Culture, the La Aguada Culture, and the Angualasto period. This long history is described in the literature (e.g., Durán et.al., 2014).

Based on the results of this study and considering that the current state of the tracks and roads on site is not definitive, a plan detailing measures to protect the area's archaeological sites will be developed as part of the overall project development documentation. The specific requirements for rescue of any sites necessary is determined by the Cultural Heritage Directorate of San Juan. On July 8, 2020 Josemaria Resources submitted a cultural heritage report with suggestions of how to rescue the potentially impacted sites. It is not anticipated that rescue of any archaeological sites in the project area will cause delay or lead to alterations of the current project plan.

20.3.5 Glaciology and Cryology

The 2010 Federal Argentine Glacier Protection Law (Ley 26.639) is very broad in its definition of a "glacier" and includes any perennial ice mass (covered or uncovered) and permafrost. It establishes a national glacier inventory, with the objective of protecting "strategic hydrological reserves". Mining activity is prohibited where it negatively affects glaciers identified in the inventory. The mining property area of the Josemaria Project falls within the ING (Inventario Nacional de Glaciares, National Glacier Inventory) classification of Desert Andes (IANIGLA, Instituto Argentino de Nivología, Glaciología y Ciencias, Argentine Institute of Nivology, Glaciology and Sciences 2018). The ING did not identify any glaciers that would be affected by the project.

In San Juan, the 2010 Provincial Glacier Protection Law (Ley 8144) provides similar definition of what types of ice masses are protected but does not explicitly prohibit mining activity. A provincial inventory is mandated as part of the law. This inventory is in progress, but to date has not been published. Activities that destroy, reduce, or interfere in the advance of glaciers are prohibited. As part of the Law, an Environmental Assessment is required to determine if a proposed activity will impact the glaciers or permafrost.

To understand the cryosphere appropriately, Josemaria contracted BGC Ingenieria Ltda. (BGC) to undertake annual glacial and periglacial studies, with the first investigations starting in 2013. Their work produced a probabilistic permafrost distribution model and initiated a cryosphere monitoring program, including an analysis of satellite imagery and groundtruthing of glacial and periglacial cryoforms. The cryosphere monitoring program consists of continuous monitoring of weather conditions, ground surface temperatures, ground thermal regimes, and stream flows, together with time-lapse photogrammetry of selected cryoforms.

Within the project footprint a permafrost-influenced geoform was identified and the location of infrastructure (including the waste dumps) was designed to avoid impacting this geoform. A buffer around the geoform of 200m has been implemented in order to minimize any potential impact; this is not foreseen to result in any issues or delays to the permitting process. For the EIA a cryo-hydrological study was commissioned, to be conducted by BGC; the purpose is to determine whether there is any contribution of water from this geoform into the micro basin. It is estimated that the potential contribution, if any, would be very low, therefore making any potential impact to this geoform insignificant to the capability of the water basin.

20.3.6 Hydrology

The project sits at the upper boundaries of both the Upper Rio Blanco and the Upper Arroyo Pircas de los Bueyes watersheds. The Arroyo Pircas de los Bueyes watershed flows into the Macho Muerto River, which ultimately feeds into the Rio Blanco, which in turn drains to the Rio Jachal, one of the principal rivers of the San Juan province in Argentina.

Many streamflow studies have been conducted in the past. The mean unit runoff varies substantially in the region. In many streams the maximum and minimum flows differ by as much as an order of magnitude, with high flows resulting from snowmelt due to periods of relatively warm temperatures and high incoming solar radiation, and very low flows occurring during freezing conditions. Streamflow in the project area is highly influenced by snowmelt, with the highest flows usually occurring after big snowfall events between February and May. Inter-annual variability in streamflow records can be largely attributed to El Niño southern oscillation climate events.

The measured average runoff based on seasonal data collected in the Upper Rio Blanco River is 0.293 m^3/s, which corresponds to a unit runoff of 5.05 $L/s/km^2$ (160 mm) and supports the conclusion that runoff in the project area is low.

20.3.7 Water Quality

Sites throughout the area and in downstream catchments were sampled for water quality and for invertebrates and phytoplankton. Results indicate that waters in the upper Rio Blanco are acidic, with pH values averaging 4.5. The pH values increased at lower elevations, becoming alkaline (up to pH 8.4) downstream of its confluence with the Rio Macho Muerto. Elevated metals were similarly found in the upper watershed, including aluminum, arsenic, barium, beryllium, boron, cadmium, zinc, cobalt, cadmium, iron, manganese, and vanadium. Metals concentrations decreased downstream.

Water samples from Arroyo Pircas de Bueyes and Rio Macho Muerto had neutral pH, and generally low concentrations of metals, with the exception of arsenic and iron.

20.3.8 Geochemistry

To characterise the potential for acid rock drainage (ARD) and metal leaching (ML) in the exposed pit walls, waste dumps, and tailings, a geochemical program was initiated in 2017 by pHase Geochemistry Inc. Three hundred drill core samples retrieved from site were sent to ALS Kamloops, where they underwent metallurgical testing similar to the process that will be undertaken at the Josemaria plant during operations. The intent was to produce representative tailings samples for geochemical analysis. From there, samples representing tailings and waste rock were sent to the SGS laboratory in Burnaby, Canada. Samples were subjected to static and kinetic tests to characterise ML and ARD potential for the Josemaria wastes. Tests included acid-base accounting (ABA), solid-phase elemental analysis, shake flask extraction, mineralogy analysis and humidity cell testing.

Tailings

Acid-base accounting results indicate that ore and tailings have very low neutralization potential. Therefore, the potential for acid generation is driven by sulphide content. The sulphur content of the ore feed samples ranged from 1.2% to 3.5% and were all classified as potentially acid generating (PAG). Through the flotation process, sulphides are concentrated in the cleaner scavenger tailings which range in sulphur content from 3 to 23% and are potentially acid generating. The acid generating potential of the rougher tailings as indicated by both ABA and NAG testing is uncertain. Sulphur content in samples tested was low ranging from 0.1% to 0.3%

sulphur. Operating the mill to minimize the sulphur content in the rougher tailings to values of 0.1% or lower will in turn minimize the potential for acid generation from the rougher tailings stream. Should tailings become acidic, NAG test leachate indicates an increased potential for leaching of Al, Cd, Cu, Fe, Ni, Pb and/or Zn. Acidic conditions should be limited during operations, with the addition of alkalinity in the mill and the continual ‘wetting’ of tailings to limit oxidation. Water quality parameters that may be elevated in neutral pH conditions could include SO4, Ca and potentially Al and Mo.

The testwork concluded the tailings have very little ability to neutralize acidity produced due to sulfide oxidation. Therefore, the following is anticipated:

- Cleaner scavenger tailings will produce acid quickly upon exposure to oxygen
- Rougher tailings will likely produce acidity on closure when beaches are exposed to oxidation
- A combined, or bulk tailings stream will produce acidity

Waste Rock

NP is generally low for all waste rock samples other than post-mineralised volcanics (PMV), which show higher and more variable NP. The majority of waste rock samples are PAG, as the PMV lithology is the only type of material that has the potential to produce any material quantity of NAG (63% of PMV samples tested were NAG).

The majority of humidity cells became acidic over the 40-week test period, including 12 humidity cells that have remained acidic since initial commissioning of the testwork. Three humidity cells showed a slight increase in pH, indicating additional buffering processes and an additional three humidity cells remained neutral at cycle 40.

Kinetic testing has indicated that the majority of waste rock, excluding the PMV unit, will become acidic within a year of disturbance.

Given the acid nature of the waste rock, contact water management measures are considered in the design to prevent acidic water from entering the receiving environment (see Section 16.1.3).

20.4 Waste and Tailings Disposal

Waste rock storage designs were developed by SRK, while tailings disposal designs were developed by Knight Piésold. These are described in more detail in Sections 16 and 18, respectively, of this report.

20.5 Water Management

During the project life, water quantity and quality will be managed to maximize diversions and maintain “non-contact” water. The site water management plan is designed to “keep clean water clean” as much as possible, with the following primary objectives:

- Providing adequate protection to internal infrastructure and personnel from the uncontrolled effects of surface water runoff during storm events

- Minimize the amount of fresh water that comes into contact with exposed ore, waste mine facilities and active construction areas by intercepting and diverting upslope runoff to the maximum practical extent
- Maximizing the internal recycle of contact and process waters in ore processing and thereby minimizing the use of external water sources
- Provide a continuous supply of water to sustain mining and processing activities throughout the operating period
- Preventing sediment entry toward facilities and erosion at discharge points
- Achieve environmental compliance
- Avoid discharge to the environment that would have an adverse impact

Surface runoff that can be intercepted and directed by the diversion works will be considered non-contact water. Any water stream that cannot be captured within the area of influence of the project facilities and has the potential for its quality to be adversely affected by project activities will be treated as contact water and diverted to the TSF.

The surface runoff diversion works for the management of non-contact water consist of diversion ditches, perimeter channels, crossing structures, water capture structures, water release structures, and freshwater ponds. These structures have an integrated functionality and have been sited according to the type of water control that is required.

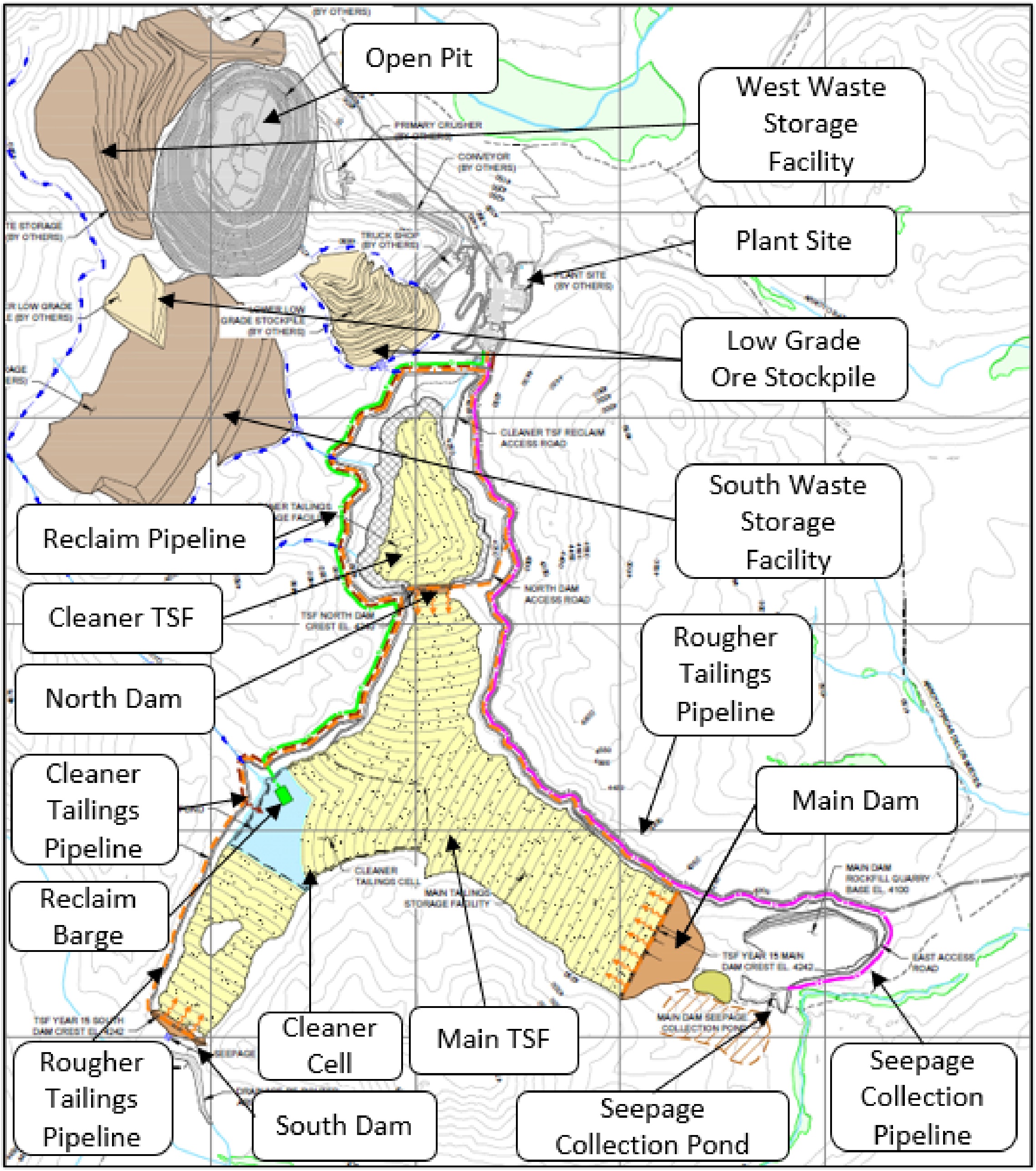
Where it is physically practical, diversion ditches will be installed around the pit, waste rock dumps and tailings storage facility to convey clean or non-contact freshwater around those areas. No water will be discharged to the environment that would have adverse environmental impact.

All mine contact water, will be collected, stored and managed within the project area. Contact water includes water relating to:

- Runoff from the plant site
- TSF contributing catchment
- Waste rock management facilities
- Tailings beaches
- Tailings slurry water
- Open pit mine dewatering flows
- Groundwater accumulating in the TSF

Seepage collected in collection ponds located downstream of the main and south dams will be recovered for reuse in processing. Contact water will not be discharged from the project site.

Figure 20-3 shows the site general arrangement at Year 15, including the location of diversion ditches and the collection seepage pond.



Source: KP, 2020
Figure 20-3: Year 15 general arrangement

20.6 Environmental Management Program

The Environmental Management Program (EMP) documents the processes, systems and actions used to manage prioritised aspects and impacts, including the incorporation of:

- Environmental values that may be impacted, and the key risks to those values
- Environmental outcomes that Josemaria aims to achieve

- Clear, specific and measurable compliance criteria that demonstrate achievement of the outcome(s)
- Leading indicator(s) criteria, proving early warning of trends that indicate compliance criteria may not be met
- Management and operational controls in place to deal with the environmental risk (aspects and impacts), including any regulatory conditions
- Contingency options to be used in the event that identified risks are realised
- Continuous improvement opportunities and development opportunities identified that can assist in meeting compliance criteria and environmental outcomes
- Environmental improvement targets and the action plan to achieve such targets
- Actions stem from continuous improvement and opportunities identified in the EMP

A specific Environmental Management Plan for construction will be developed that follows the guidance of the above sections. The construction Environmental Management Plan will outline specific procedures to be followed to ensure there is proper planning, risk assessment, hazard identification, review and approval, environmental management, and compliance inspection during construction. Some of the key procedures that will form a part of the construction Environmental Management Plan are as follows:

- Hazardous waste handling, temporary storage and final disposal
- Protection of cultural heritage
- Dust prevention
- Transit control, to avoid unnecessary roads and accesses
- Wildlife protection
- Non-hazardous waste handling, temporary storage and final disposal
- Water management
- Access road construction

Specific procedures and supervision protocols for construction of the access road will be developed as part of the construction Environmental Management Plan with a focus on a section of the road runs next to a provincial and national park. All visiting personnel will be given an orientation that outlines the environmental practices and procedures on site.

20.7 Closure Planning

The closure plan will be submitted and approved by regulators within the EIA process as mine closure in Argentina is not part of a specific approval process. The document will include details of the proposed environmental rehabilitation, reclamation and adjustment activities, and discuss how post-closure environmental impacts will be avoided. The EIA will also include details on post-closure monitoring.

Current regulatory requirements do not require submission of detailed final closure plans to obtain the initial operating license. The closure plan is first presented conceptually and then refined throughout the operating life of mine to become more definitive as closure approaches and no financial bonding for closure is required for the project to the government of Argentina; however, responsible closure planning has been considered and costs have been allocated within the scope of this project. The closure plan will be designed to ensure long-term stability of both physical and chemical properties of the site, with the intent of reclaiming the area to a similar state of the natural high-altitude environment.

Active closure is expected to last five years, followed by an additional five years of monitoring, for a total closure period of 10 years.

20.7.1 Closure Objectives, Criteria and Guidelines

Closure and reclamation activities will adhere to the stricter of local regulatory standards and international standards for large mining projects. Due to the large significance of the TSF to closure planning, closure objectives, criteria and guidelines are separated between general site-wide closure and TSF closure.

The general objectives of the site-wide closure plan are:

- Long-term (post-closure) geotechnical and geochemical stability
- Eventual return of the site to a self-sustaining environment similar to pre-mining usage and capability
- Protection of the downstream environment and management of surface water
- Salvage and re-use of materials and equipment where possible to avoid use of landfills
- Maintain useful infrastructure to the province of San Juan, including the access road, transmission line and substations. Discussions with the provincial government are advanced to define an agreement are advanced and continue to progress.

The closure objectives for the TSF are as follows:

- Return the TSF site to a self-sustaining facility with pre-mining land capability.
- Maintain long-term geochemical and physical stability, protect the downstream environment and manage surface water run-off.
- Integrate the tailings deposition plan with site wide closure objectives to reduce civil earthworks required at closure.
- Return the tailings area to a landscape similar in look and function to what was there prior to the construction and operation of the mine

20.7.2 Site-wide Closure Actions and Measures

To achieve the closure objectives, specific actions required for the general closure plan to be successful include:

- Dismantling and removal of above ground structures and equipment not required beyond mine closure, inlcuding:
  - Civil materials (eg. pipelines, multiplate tunnel structures, etc) no longer required will be removed and buried at an on-site location within 20 km of the plantsite
  - Above ground concrete will be broken and buried in an on-site location within 20 km of the plantsite (approximately 80% of all concrete)
  - All structural steel will be dismantled and transported to San Juan, where it will be sold and recycled as scrap steel
  - All buildings will be demolished and transported to San Juan for disposal
  - All mechanical equipment will be removed and transported to San Juan; approximately 8% is assumed to be sold for re-use and the remainder will be recycled
  - All process plant related pipe will be removed and transported to San Juan for disposal
  - All electrical equipment will be removed and transported to San Juan; approximately 8% is assumed to be sold for re-use and the remainder will be recycled
  - All instrumentation will be removed and transported to San Juan for disposal
- Below grade concrete (approximately 20% of all concrete) will be buried in place
- Access roads, ditches and borrow areas not required after mine closure will be removed and regraded
- Exposed, erodible materials will be stabilized
- Waste dumps will be resloped to ensure long-term stability
- All mobile equipment (including the mining fleet) not required for closure activities will be removed from site and sold
- Waste dump runoff will be captured and passively directed to the pit and tailings facility
- Reagents and supplies will be returned to the suppliers, sold to other operations, disposed of in approved waste facilities, or transported to a certified company for disposal
- All foundations will be demolished and covered to approximate as closely as possible the pre-mining topography
- Access to areas such as the open pit, waste rock facilities and the tailings facility will be restricted with the use of berms, road closures, and fencing. Warning signs will be erected to restrict access
- Excavation areas, berms and walls that are not needed for closure will be regraded to approximate pre-mining topography
- If soil contamination is detected around any facility, remediation alternatives will be evaluated and applied
- The pit will be allowed to fill to the natural phreatic level
- The remaining waste rock dump areas not progressively reclaimed will be reclaimed
- The low-grade stockpile pad will be tested for contamination and removed and disposed of as required in the Open Pit or TSF

20.7.3 TSF Closure Actions and Measures

The primary objective of the closure and reclamation initiatives will be to eventually return the TSF to a self-sustaining facility that satisfies the end land-use objectives. The TSF is designed to maintain long-term physical and chemical stability, protect the downstream environment, and manage surface water. Upon mine closure, surface facilities will be removed in stages and full reclamation of the TSF will be initiated. The closure plan is compatible with a premature closure event. General aspects of the closure plan include:

- Selectively discharge tailings around the facility during the final years of operations to establish a final tailings surface and water pond that will facilitate post-closure surface water management and reclamation
- Place suitable alluvium on the beach surface after tailings deposition ends to minimize dusting potential—measures may also include tailings stabilization (e.g., adding an agent to create a trafficable crust) in the final year of operation
- Remove all inactive surface ponds and cover tailings with an engineering dry cover system similar to the surrounding desert pavement, which naturally sheds non-contact runoff to the downstream environment
- Regrade the TSF into a landform with a closure cover similar to the surrounding desert pavement
- Construct an overflow spillway and channel to allow surface water discharge downstream of the TSF
- Dismantle and remove the tailings and reclaim delivery systems, and all pipelines, structures and equipment not required beyond mine closure
- Modify the former main dam seepage collection pond to a polishing/exfiltration pond to re-establish groundwater flow recharge into the vega
- Implement monitoring and maintenance plan during and after closure

Trial capping layers will be investigated during operations to help determine the optimum engineered cover. The cover would be constructed using non-ARD generating material. Potential borrow sources for this material could be natural alluvium, colluvium from landslide zones or select benign waste rock. The cover thickness required to meet closure objectives would be established in a subsequent phase of the closure design. An allowance of 1 m for closure cover material has been included in the feasibility study to develop conceptual closure costs. The cover would be placed as soon as the tailing surface stabilizes sufficiently to support the cover and equipment used to place it. The cover may be advanced in several stages as the tailings consolidate.

20.7.4 Closure Water Management

The closure design philosophy for the TSF involves removing all surface ponds at the end of operations and covering the tailings surface with an engineered dry cover system, which naturally sheds non-contact run-off to the downstream environment. Closure channels will be constructed in the TSF to direct flows downstream of the South Dam.

The South Dam Closure Spillway and Closure Channels are designed to meet CDA Post-Closure Guidelines. The discharge channels will be designed to pass the Probable Maximum Flood (PMF) with no pond attenuation in the facility.

An evaporation pond will be constructed in the TSF to collect and evaporate contact water inflows. The evaporation pond will be constructed in the existing depression in the Main TSF reclaim pond location to minimize civil and grading works. The evaporation pond will be constructed from a local borrow material and lined with a geomembrane liner. Contact water run-off from the South WSF will be directed to the evaporation pond along a series of contact water closure channels. Seepage flows from the main dam seepage collection pond (MDSCP) will be pumped to the evaporation pond post closure until water quality objectives are achieved. The evaporation pond will be adequately sized to collect and evaporate expected inflows from contact water run-off and consolidation seepage from the TSF post closure.

A series of closure channels will be constructed on the TSF capped surface to direct non-contact run-off downstream. Contact Water Closure Channels will direct contact water run-off from the South WSF to the evaporation pond. An overflow closure channel will be constructed from the evaporation pond to direct emergency flows from extreme precipitation events to the South Dam Closure Spillway.

Non-contact water closure channels will direct non-contact flows downstream of the TSF through the South Dam Closure Spillway. Non-contact flows will include inflows from undisturbed contributing catchment areas and run-off from the TSF closure capped surface. Existing diversion ditches along roads will be maintained to direct non-contact water from the contributing catchment around the facility.

The Main Dam Seepage Collection and pump-back system will be retained until monitoring results indicate seepage from the TSF is of suitable quality for release to the natural downstream receiving environment. The groundwater monitoring wells, and all other geotechnical instrumentation will be retained for use as long-term dam safety monitoring devices. Post-closure requirements will include an annual inspection of the TSF and on-going evaluation of water quality, flow rates, and instrumentation records to confirm design assumptions for closure.

The main dam seepage collection and pumpback system will be retained until monitoring results indicate seepage from the TSF is of suitable quality for release to downstream waters. The groundwater monitoring wells and all other geotechnical instrumentation will be retained for use as long-term dam safety monitoring devices.

Post-closure requirements will include an annual inspection of the TSF and ongoing evaluation of water quality, flow rates, and instrumentation records to confirm design assumptions for closure. Long term management of contact water is considered to be readily achievable within the current scope of the Josemaria project.

20.7.5 Closure Costs

To achieve the aforementioned closure actions and measures, a preliminary closure cost of $277 million was estimated. As no financial bonding is required in Argentina, this cost has been incurred during the closure period of the project within the economic model. A high-level breakdown of the closure costs are shown in Table 20-2. A detailed closure plan and cost estimate will be developed to support the Mine EIA submission.

Table 20-2: Closure cost estimate

Area	Cost ($M)
TSF	120
Plant and Infrastructure	146
Mining	11
Total	**277**

20.8 Social Considerations

The Josemaria Project has been developed with three primary goals regarding social engagement:

- Social representatives of the San Juan province and communities in the area of influence trust the project management team and are willing to discuss the project in an earnest and honest manner
- Local stakeholders receive direct and indirect benefits from the project
- Company and contractor personnel respect local customs, traditions and values

Having a relationship based on transparency and trust with local stakeholders is essential to successful project execution. Social criteria for the project's design, construction and operation are defined to support project decision-making and prioritise the social feasibility of the project.

The following operational objectives will be established for all aspects related to the communities in the area of influence:

- The stakeholders will be consulted about the expected results of the project's operation and will be free to express their opinions or interests. Their responses will be factored into the design of the project as much as practicable.
- The project will strive to maximise the positive socioeconomic impact of the project, while avoiding, minimising and/or compensating for negative impacts
- It is intended to maximise the benefits of the project for the communities in the area of direct influence

In order to achieve these objectives, a three-pillar strategy has been implemented and will continue:

1. Maintain and strengthen trust with community stakeholders in the areas of direct and indirect project influence through the following:
    - Conduct a community socioeconomic diagnostic study within the area of influence during each project stage
    - Create a community liaison plan
    - Implement a feedback mechanism (complaints, suggestions, and recommendations)
    - Create a guide for the company on how to behave within the communities
    - Adhere to socio-environmental commitment management (systematisation and closure)
    - Ensure proper training by social induction of company employees and contractor personnel
2. Manage social impacts, risks, and opportunities by:
    - Conducting a social baseline survey of the communities in the area of influence
    - Conducting a social impacts, risks, and opportunities assessment
    - Participatory monitoring of the socio-environmental variables
3. Ensure shared value in the territory by:
    - Creating a social development and investment plan adjusted to the reality and scale of the project
    - Creating a local purchasing plan
    - Creating a local employment plan

20.8.1 Social Baseline

San Juan

The Josemaria Project is located in the northern part of the Department of Iglesia in the Province of San Juan. San Juan Province is characterised by dry, largely desert conditions, interspersed with vegetated valleys where water is available. The largest population centre is the City of San Juan, which serves a regional population of approximately 700,000. It is located some 460 km by road from the project.

Communities closer to the project are characterized as agrarian villages, largely dependent on livestock herding for subsistence use. The nearest economic centres to the project are located a considerable distance downstream along the Rio Jachal, with the closest town of Rodeo approximately 265 km from the project. Towns in this area, including Iglesia, Rodeo, and San José de Jachal, are predominately agricultural, but also rely on tourism. These towns are sparsely populated, the largest (Rodeo) with less than 2,500 permanent inhabitants.

San Juan Province is a mining jurisdiction. The total production of metalliferous mining is exported with its products represents the highest share of total exports for the province. Large-scale mining began only in 2006, however by 2018, revenue from mining royalties represented 5.4% of provincial tax revenues and 1.6% of the total revenues.

Main Access Road: Rodeo – El Chinguillo – La Palca (San Juan Province)

The planned 244 km access road follows an existing rudimentary passage that approximately parallels the Rio Jachal for much of the route. The road will be constructed to service the project as described in Section 18.12.1. The road pioneered for the project will meet the tertiary provincial highway RP430 north of the village of Rodeo. The access transits the San Guillermo Biosphere Reserve through an existing road corridor.

From Rodeo, paved National Highway 40 provides access to the City of San Juan, from where rail access will bring product to the port of Rosario. No new construction is contemplated to support the project between Rodeo and Rosario.

20.8.2 Indigenous Communities

Social baseline tasks were carried out to identify indigenous communities in the area of project influence using the following verification methods:

- Requests to national and provincial registries, and agencies competent in the subject
- Interviews with authorities, and local community members
- Enquiry into secondary information available (databases, journals)

No indigenous people or communities were identified in the project area and the government of San Juan province confirmed there are no registered indigenous groups in the project's area of influence. Josemaria Resources has made a similar inquiry with the federal body Instituto Nacional de Asuntos Indígenas (INAI) and are awaiting confirmation that they concur with the Province's findings.

Josemaria Resources understands that as the project evolves and additional community engagement is realized, the presence of indigenous peoples within the project area may be identified. Should an indigenous group be identified and registered, the company will work with the government to accommodate existing access to culture and livelihood, in accordance with the International Labour Organization Convention169 protocols.

20.8.3 Social Investment

Within the guidelines and principles of the Lundin Group, a social strategy will be developed that aligns with the project's development status and complies with international standards and the commitment to create value and generate economic benefits for the affected communities. In order to achieve this, a strategy of community development is being developed, based on the following:

- Education and skills training: covering education and skills gaps to generate employment in sectors relevant to the business
- Local purchases: supporting small local companies so they become part of the business supply chain
- Economic diversification: supporting the growth of local companies in sectors that do not depend on resources managed by our group partners

- Social and environmental innovation: raising innovative solutions to social and environmental problems affecting local communities

Project investment strategy will be focused on:

- Creating jobs and giving priority to the area of direct influence
- Boosting and strengthening local suppliers
- Diversifying competence of the community members
- Diversification of the local economy
- Promoting innovation

During the feasibility study, this has translated into the design and implementation of the following plans:

- Social development and investment plan adjusted to project's reality and scale
- Local purchasing plan
- Local employment plan

During the development of the feasibility study, Fluor conducted a study that determined close to 40% of the major equipment and material supply packages could be sourced in-country. In addition, contractors within Argentina will be asked to bid for major construction work packages. There are currently no formal agreements in place with the communities regarding social development, purchasing and employment, however the company is committed to bringing the most benefits possible to the local communities and will strive for these agreements to be put in place in the coming phases.

20.8.4 Communications and Engagement Plan

Josemaria Resources' commitment to public consultation is a priority. Consultation mechanisms are implemented as continuous processes through which Josemaria will continue to inform and consult with stakeholders, communities and interested third parties. Such mechanisms are vital to obtaining information from a wider range of stakeholders and the neighbouring communities.

In the short term, consultation will focus on maximising participation and timely access to information regarding possible project effects. Josemaria will establish priorities and work procedures to collaborate with communities in the area of influence. This is aimed at defining the project's contribution plan for sustainable development of regional communities. These two elements (development of a community consultation strategy and participative development of a program of contribution to development) are the essence of the Community Relations Policy and set the foundation for the commitment of continuous consultations at the community level.

20.8.5 Information and Consultation Meetings

Consultations carried out to date have been undertaken to solicit concerns or questions about what the project entails. Other key goals of the consultation process are to listen to, collect, and analyse concerns and questions from community members in order to provide clarification and potentially make adjustments in the project design whenever necessary and possible.

To date, over 150 meetings and presentations about the project have been carried out. Such presentations were aimed at provincial and municipal authorities, government agencies, non-government organisations and the media.

The major issues raised were employment, use of local suppliers and the concern with how the project will potentially impact the water quality and quantity. The company will conduct a study to determine the availability of local labour and develop a training program to promote local hires as much as necessary. In terms of local suppliers, Josemaria is already developing a database of local suppliers for the construction and operations phases. For the EIA, a hydrogeological and seepage model will be developed to determine potential impacts, if any are identified the appropriate mitigation or compensation tools will be implemented. Information available to date does not suggest there will be any meaningful impact to the water resources available to the downstream communities when the project is in the construction, operations or closure phases.

20.8.6 Consultation Process – EIA Support

As per Argentinian legislation, the development of the EIA requires significant community input and consultation. Field work, consisting of surveys and interviews, carried out to date to develop a socioeconomic baseline in the following localities:

- Villages near the terminus of the access road in Iglesia Department: Rodeo, Las Flores, Pismanta, Villa Iglesia, Bella Vista, Tudcum, Angualasto, Colangüil, Maliman and Chinguillo
- Villages along the existing road network to be utilized by the project: Jachal Department: San Jose de Jachal, Huaco, Malvinas Argentinas, Pampa Vieja, Villa Mercedes, Niquivil, Mogna
- City of San Juan
- Villages near to the project, but outside of its direct area of influence: Province of La Rioja: Guandacol and the hamlets of Las Cuevas, El Zapallar, and Nacimiento; Villa Unión, Villa Castelli, San José Vinchina, Alto Jague

Interviews inquired about the demographics of the local inhabitants, their understanding of the project, and community trends over recent years. Interviews allowed for an understanding of potentially affected community members, how and to what extent they may be affected, and how the project may respond.

20.8.7 Consultation Process – Construction

The construction phase in any mining operation involves the greatest magnitude of changes, including traffic and materials transport, the presence of a large number of construction workers, and an increase in the amount of economic and everyday activities. Activities related to communications and consultations will be intense during this period.

The Josemaria Project will continue to provide access to information about the project and construction progress and will give people the ability to pose questions and express concerns;

answers will be provided through a wide range of mechanisms. Such mechanisms, whose implementation will continue during the construction and operation stages, are as follows:

1. Continuous operation of local offices (Rodeo, San Juan City)
2. Participation in events and public forums
3. Support regarding organised visits to the operations site
4. Maintenance and active website updates with dynamic content
5. Press releases

Understanding that interviews with affected people and communities are an important part of construction management and its potential impacts, each office at Josemaria will have an appointed contact person for communities whose purpose will be to meet with people from the beginning of construction activities.

Josemaria will start holding meetings with local individuals directly affected (residents from the immediate area of construction activities and future operations), groups and authorities of the community and representatives before starting construction activities in order to establish a process of continuous consultation and to reach agreements regarding a preliminary meeting schedule to be carried out during construction. The regular consultation scheduled program is aimed at providing the open flow of information both from the project to people/ local communities, and from the public to the company during the construction phase (characterised by a high impact potential); however, it could also be subject to modifications as the project advances, as necessary.

Before starting construction, Josemaria will develop and implement a grievance mechanism so the project can manage any formal complaints related to the project or any of its impacts in a transparent manner. This procedure will be available and made known by several mechanisms of consultation, such as meetings with stakeholders and communities aimed at informing about this process to all people involved.

Additional consultation activities include a monthly newsletter with project updates, consultation activities and reports over matters, concerns or issues at Josemaria. These newsletters will be available in digital format (on the web page and will be sent by e-mail to a subscription list) and a printed version for local stakeholders directly affected and who have no access to e-mail service. These documents are meant to reach a wide audience.

20.8.8 Consultation Process – Operation

Josemaria will develop consultation processes aimed at establishing long-term relationships with the neighbouring communities through a learning process, continuous evaluations, baselines (as needed), and discussions with these communities. A starting point for this development will be formed by baseline studies, and the results of the environmental impact evaluation.

It is expected that the frequency of direct consultation with the affected communities and residents decreases during operations, as the impacts from construction are eliminated and the project starts operating at “steady-state” conditions. However, regular formal and informal consultations will be maintained to ensure that Josemaria management personnel have a profound knowledge of matters related to the community.

Consultation mechanisms to reach a wider group of stakeholders will be maintained, specifically the functioning of the local offices, web page, and a newspaper or similar informative document, participation of the company in events, and activities as part of the communities in which the project operates, among others.

20.8.9 Consultation Process - Closure

Josemaria will invite stakeholders to participate in the closure process. The company will inform in the early stages about the useful life of the mine, the closing guidelines, its potential environmental and social risks and impacts, and the proposed use of the land after closure.

A follow-up committee will be formed with participation from the stakeholders with regard to the design and implementation of the Closure Plan.

21 Capital and Operating Costs

21.1 Capital Cost Estimate

The capital cost estimate was prepared by Fluor with input from Josemaria, SRK and KP according to each party's scope of responsibility, as follows:

- KP – TSF direct costs
- SRK – Mine equipment, capitalized pre-stripping, some mine infrastructure and Owner's costs (with support from Josemaria)
- Fluor – Indirect costs, processing plant, on-site infrastructure, power supply portion of the off-site infrastructure areas and the south access road (with support from Josemaria)

21.1.1 Class of Estimate

The level of design definition, methodology and sources of information used to prepare the estimate adheres to an Association for the Advancement of Cost Engineering International (AACEI) Class 3 estimate with an accuracy classification of ±15% at the summary level.

21.1.2 Currency Exchange Rate

The capital cost estimate is stated in United States dollars (USD or US$) at the currency exchange rate on October 23, 2019, as shown in Table 21-1. The exchange rates were used to convert the currencies of origin from vendors and contractors to the reporting currency.

Table 21-1: Exchange rates

Code	Currency	1.00 USD = equivalent
USD	US Dollar	1.00
ARS	Argentine Peso	58.96
CLP	Chilean Peso	725.80
CAD	Canadian Dollar	1.31
EURO	Euro	0.90
AUD	Australian Dollar	1.46

21.1.3 Summary Cost

The capital cost estimate is structured according to the project work breakdown structure (WBS) and by prime account code. The total capital cost by WBS area and responsible party is summarized in Table 21-2.

Table 21-2: Total capital cost (US$M)

WBS	WBS Description	Fluor	KP	SRK	Owner	Total	% Total
1000	Mine	48		254		302	9.8%
2000	Crushing	222				222	7.2%
3000	Process Facilities	666				666	21.5%
4000	Tailing Management	15	148			163	5.3%
5000	On-Site Infrastructure	181	3			184	6.0%
6000	Off-Site Infrastructure	190	2			192	6.2%
	Subtotal Direct	**1,322**	**153**	**254**		**1,729**	**56%**
7100	EPCM	271	18			289	9. 3%
7200	Temporary Facilities and Services	313		3		316	10.2%
7300	Freight	86	5			91	2.9%
7400	Spare Parts	17		5		22	0.7%
7500	First Fill	4				4	0.1%
7600	Vendor Representatives	27		1		28	0.9%
7700	Pre-Operation/Commissioning	7	0.4			7	0.2%
	Subtotal Indirect	**724**	**24**	**8**		**756**	**24%**
	Contingency	319	20	10		348	11.3%
	Owner's Costs				132	132	4.3%
	Main Access Road				126	126	4.1%
	Total Estimated Cost	**2,365**	**196**	**273**	**258**	**3,091**	**100%**

Direct Cost

The direct cost is summarized by WBS in Table 21-3.

Table 21-3: Direct cost by WBS

Prime	Description	US$M
1000	Mine	302
2000	Crushing	222
3000	Process Facilities	666
4000	Tailing Management	163
5000	On-Site Infrastructure	184
6000	Off-Site Infrastructure	192
	Total Direct	**1,729**

Site Preparation & Earthwork

Earth-moving unit rates are based on information from regional contractors who were surveyed for the project and are familiar with the area and the working conditions on site. Pricing obtained from the contractors was used in conjunction with in-house data from other similar, recent projects. These rates include the required earth-moving equipment, operators, fuel and mobilisation/ demobilisation costs.

Concrete

Concrete MTOs are derived from project-specific general arrangement drawings and foundation layouts for major structures. The unit rates for concrete placement and finishing were derived from a San Juan contractor, with further inputs and adjustments from other regional contractors as well as in-house data from similar, recent projects. A contractor will supply and install two on-site batch plants to produce concrete for the project. The unit costs are inclusive of the batch plants. Aggregate is readily available in close proximity to the plant site as confirmed by the geotechnical investigation.

Structural Steel

Structural steel MTOs are based on project-specific general arrangement drawings and from software (Risa 3D) analysis performed for the major buildings, including the grinding building, flotation building, pebble crushing station, and truck shop. The primary crusher station was estimated from similar structures designed and built by Fluor.

The fabricated steel supply cost is based on pricing obtained from competitive budget quotations. Erection unit rates are based on information from regional contractors in conjunction with in-house data from other similar, recent projects.

Building & Architectural

All project buildings in the capital cost estimate are included in the architectural building list. Architectural quantities and costs were mostly estimated on an area-factored basis (square meters) from project-specific building layouts prepared for all major facilities. Smaller, ancillary buildings were sized and factored according to typical benchmarks for the function intended. Camp pricing was obtained by competitive quotation, which included regional suppliers familiar with the site. Some in-house data was used to close scope gaps.

Mechanical

Mechanical equipment was sized and selected based on the process-driven requirements. This information is included on the mechanical equipment list. Major and medium equipment package pricing was obtained through competitive vendor quotations and accounts for 75% of the value of all mechanical equipment.

Piping

Piping MTOs down to 2” nominal size were extracted from 3D modelled pipe runs in the process area. Smaller bore piping was estimated based on similar, benchmarked projects. Piping MTOs in the crushing area (WBS 2000) were derived from 2D drawings. Quantities for ancillary areas were factored.

Valve MTOs were factored based on similar, recent projects where detailed P&IDs were available, supported by other in-house data and benchmarks. Material pricing was obtained from local vendors and installation costs were derived from regional contractors in conjunction with in-house data.

Pipeline

Pipeline MTOs were developed from project-specific general arrangement drawings. Material pricing was obtained from regional vendors and installation costs were derived from regional contractors in conjunction with in-house data.

Electrical

The high-voltage power supply to the project was designed and cost estimated by Fluor sub-consultant ESIN. The scope of this work included the high-voltage line from the Rodeo substation to site, identification of upgrades at the Rodeo substation, and the Josemaria site substation. Fluor supplemented ESIN’s work with installation unit rates from a regional contractor.

On-site power distribution MTOs were developed from project-specific single line diagrams and electrical room general arrangement drawings. Electrical equipment and electrical room sizes are based on the mechanical equipment and load lists developed for the project. Fluor performed an ETAP study to verify the design. A voltage de-rating factor of 0.67 was applied to the design and equipment selection, based on IEEE standards.

MTOs for medium- and low-voltage cables, conduit, raceways, lighting, grounding, and miscellaneous electrical materials were derived from project-specific layout drawings.

Major and medium electrical equipment package costs were obtained from competitive vendor quotations, which accounts for 96% of the value of all tagged electrical equipment. Minor equipment packages were priced using in-house data. Electrical bulk material cost was based on regional vendor information. Electrical installation hours were based on in-house data.

Instrumentation & Control System

The distributed control system (DCS) design was based on the process control strategy and its cost is based on pricing from competitive vendor quotations. Other instrument and control system equipment was based on in-house data for other recent projects. Instrumentation quantities are based on benchmark-based input/output lists. Non-quoted equipment package costs are based on in-house data.

21.1.4 Labour Cost & Productivity Factor

During October 2019, a regional labour survey was conducted by Fluor. The effort involved surveying major regional contractors in Argentina and Chile by written correspondence, followed by in-country interviews. Other entities that were consulted include the Argentine labour union 'Unión Obrera de la Construcción' (UOCRA), Argentine labour law specialist VMF, and the JOSE regional office (Buenos Aires) and Fluor regional offices (Buenos Aires and Santiago, Chile).

The information obtained from this process was compared to and used in conjunction with Fluor in-house data from recent, similar projects. The resulting labour rates used in the FS capital cost estimate are summarized in Table 21-4 and include base salary, payroll burden and premium and contractor indirects.

Table 21-4: All-in labour rate

Description	US$/hr
Civil	29.19
Concrete	30.49
Structural Steel	29.67
Architectural & Building	29.36
Mechanical Equipment	30.38
Piping	31.19
Pipelines	31.45
Electrical	29.83
Instrumentation	30.38

Productivity factors were established in consultation with regional contractors and by using an in-house productivity analysis process that considered a variety of factors influencing contractor performance. The productivity factors by discipline are shown in Table 21-5.

Table 21-5: Labour productivity factors

Discipline	Productivity Factor
Civil	2.70
Concrete	3.53
Steel	4.20
Architectural	3.43
Mechanical	3.12
Piping	3.80
Pipelines	2.91
Electrical	3.10
Instrumentation	3.10

21.1.5 Indirect Cost

Engineering & Procurement (EP)

The engineering and procurement (EP) services will be performed on a cost reimbursable plus fee basis, with the majority performed in a North American location. EP will be part of a full EPCM program. KP provided EP costs for TSF-related scope.

The EP hours and cost for the process plant area, on-site and off-site (high-voltage power) infrastructure areas and program management are estimated to be 873,000 hours ($126M). The TSF EP cost is estimated to be $9.1M and the mining engineering and procurement costs are included in the Owners' cost. For the Fluor scope, the cost of any EP personnel mobilised to the field is carried in the construction management (CM) estimate upon transition. The EP estimate includes the following home-office-based services and expenses:

- Engineering and design
- Management and support
- Supply chain
- Home office construction support
- Overhead staff benefits and burden
- Home office policy and assignment costs
- Home office business trips
- Other home office staff related costs

Fluor EP staffing requirements were built up based on the effort hours associated with a project-specific engineering deliverables list. Staffing levels were benchmarked to projects of similar size and complexity. The timing and duration of staff mobilisation to the project is based on the EPCM schedule. The EP staff plan is based on a 40-hour week. The labour cost applied to the estimated hours is based on Fluor's 2019 global salary structure.

Construction Management (CM)

The CM estimate is based on the Project Execution Plan (PEP), which includes the contract plan and construction schedule basis. KP provided CM costs for TSF-related scope.

The CM hours and cost for the process plant area, on-site and off-site (high-voltage power) infrastructure areas and program management per PEP (Fluor) are estimated to be 1.5 million hours ($145M). The TSF CM cost is estimated to be $9.1M and the mining engineering and procurement costs are included in the Owners' cost.

The CM estimate includes the following cost components:

- Staff salary costs, based on respective pay grades for the positions required
- Salary uplift considered appropriate for this project
- Fringe benefits and payroll taxes
- Charge-out multiplier to cover overheads
- Overtime premium for planned hours of work and shift on a rotation basis
- Mobilisation costs if applicable
- Travel costs to and from site throughout the duration of the project

The CM staffing plan was developed based on staff positions required to cover identified field functions across the major geographic areas of the work, and to supervise the contract plan as presented in the PEP. The EPCM schedule provides the basis for the timing and duration of mobilisation. Staffing levels have been checked against projects of similar size/complexity.

The CM estimate is based on a 60-hour work week. The CM staff costs are based on resources originating from the following regions:

- Canada – 13%
- USA – 15%
- Chile – 34%
- Argentina – 38%

Freight

Freight, logistics, and shipping costs are estimated based on a combination of vendor-supplied information, the Geodis logistic report, and application of factors to package costs for plant equipment and materials supply costs. Equipment and materials are categorized as originating from on-shore or off-shore. The total cost for freight is $90.6M.

Spare Parts

Spare parts are based on vendor recommendations (including start-up and capital spares) as obtained through the quotation process. If costs were not quoted, an allowance was made based on historical factors as a percentage of the equipment cost. Total cost for spare parts is $21.8M, including $4.8M from SRK for the mine scope.

First Fills

First fill quantities for process equipment were estimated by engineering and include grinding media, liners, consumables and reagents. Unit rates are based on historical information. Some reagent pricing was obtained from a regional source. Total cost for first fill is $3.5M.

Vendor Representatives

Vendor representatives are required on site during construction to verify that installation of the main equipment complies with the manufacturer's requirements. Vendor representatives will also be present during the pre-commissioning phase. The cost for vendor representatives was estimated based on quotations and in-house data. Total cost for vendor representation is $27.6M and accounts for 105,000 hours of assistance.

Pre-operational Testing

Pre-operational testing costs are based on a nine-month duration that begins six months prior to mechanical completion. The cost for pre-operational testing is based on a staffing plan. Supporting trades are also included. An allowance for testing equipment and supplies is included in the indirect construction equipment and tools cost category. The total cost for pre-operational testing is $7.4M.

Commissioning

Commissioning is included under the Owner's Costs.

Construction Indirect Field Cost

The construction indirect costs were developed based on the following breakdown:

- Temporary construction facilities and utilities, including construction camp, camp operation, temporary facilities, temporary utilities and temporary power
- High-capacity craneage including all cranes over 60-ton capacity
- Temporary construction services, including: site security services, QA/QC lab services, temporary road maintenance, waste management services, medical services, clean-up and janitorial, voice and data, light vehicles and scaffolding

Construction indirect field costs are summarized in Table 21-6.

Table 21-6: Construction indirect field cost summary

Description	US$000	%
Temporary Construction Facilities and Utilities		
Construction Camp	84,774	27
Construction Camp Operation	92,741	30
Temporary Construction Facilities	17,874	6
Temporary Utilities	28,256	9
High Capacity Cranes	19,548	6
Temporary Construction Services	69,534	22
Total	**312,726**	**100**

The 4,800-person capacity construction camp requirement was derived from the estimated peak on-site workforce. A camp management vacancy factor of 0.9% is also included. The cost for the construction camp was obtained from competitive vendor quotations, including regional suppliers familiar with the site.

The cost of camp services (food, housekeeping, laundry, etc.) is estimated to be $35/person/day and was obtained from input from regional contractors in conjunction with in-house data. The total camp operation cost is $92.7M over the duration of construction.

Temporary construction services and facilities costs include:

- EPCM temporary facilities
- Temporary power generation and distribution
- Sewage and potable treatment plant

- San Juan Office and cargo transfer centre (CTC)
- Warehouse operation (equipment and crew)
- Site security services
- QA and laboratory services
- Temporary roads maintenance
- Waste management services
- Medical services
- Clean-up and janitorial
- Voice and data links and other communication services
- Light vehicle rental and transportation
- Archaeological /paleontological monitoring (allowance)
- Environmental monitoring (allowance)
- Geotechnical services (allowance)
- Safety awards
- Site access control devices
- Personnel weather protection /storm shelters (allowance)
- Personnel testing (drugs, alcohol)
- Final clean-up and demobilisation

21.1.6 Escalation

Escalation costs are excluded.

21.1.7 Contingency

Contingency is a monetary provision in the project budget to cover uncertainties or unforeseeable elements of time/cost within the scope and control of the project. Contingency typically covers risk of cost increases resulting from lack of scope definition, lack of particular experience, omissions, under-estimation, technical problems, and non-specific schedule slippage. Scope changes and event-risk are specifically excluded from contingency.

The resulting total project contingency is summarized in Table 21-7.

Table 21-7: Project contingency costs

Description	US$M
Fluor	318.7
Knight Piésold	19.9
SRK (including indirect cost)	9.6
Total	**348.2**

21.1.8 Mining Capital Cost Estimate

Mine equipment capital costs were estimated based on an owner-operated mine. While contract mining may be considered for pioneering the initial mine development, including first bench mining, this strategy has not formed the basis of the feasibility study.

Pre-production Capital Costs

Pre-production costs include all costs associated with the activities listed in Section 16.4.1.

The cost to run equipment and employ personnel during the pre-production period was captured as a capitalized expense, which was $74.5M including 10% contingency.

Mine Equipment Capital Costs

The mine equipment capital cost is estimated for both primary (production and support) and ancillary equipment. The primary equipment unit costs are derived from vendor quotations. The ancillary equipment capital cost estimate is based on SRK benchmark cost information.

Mining sustaining capital expenditures are high in Year 1 as production ramps up, as well as in Years 11 and 12 when some equipment is replaced and additional trucks are added as the mine opens up.

The capital cost estimate for mine equipment is summarized in Table 21-8. New equipment costing (as opposed to used or leased equipment) has been assumed. The range of spare parts costs from vendors, expressed as a percentage of initial and ramp-up equipment purchases, was quite broad. Consequently, SRK elected to use its judgement to select appropriate spare parts costs for each equipment type. These percentages are also shown in Table 21-8.

Freight, erection and commissioning costs for the primary mine equipment were included in the vendor quotations. Contingency on the equipment costs was assigned at 5%.

Mine Infrastructure Capital Costs

The primary additional infrastructure required will be associated with the seepage capture trench for the West WSF and sedimentation pond at the toe of the dump. A water interceptor trench, sump, and pumping system at the base of the West WSF drainage is estimated to cost $250,000 during the pre-production period. Construction will continue into production and is part of the mining sustaining capital costs ($8,540,000).

Refuelling stations are to be included in the maintenance area and are included in the maintenance area capital cost estimate.

Table 21-8: Mine equipment capital cost summary (no contingency)

Item	Spare Parts (%)	Total Cost ($000)	Initial Cost ($000)
Primary			
Production		**431,349**	**141,568**
171-270 mm Rotary Drill - Electric	6	30,483	15,241
90-152 mm DTH Drill	10	1,650	1,650
42 m^3 - D Hydraulic Shovel - Electric	5	74,170	24,723
73 tonne Wheel Loader	5	9,916	9,916
360 tonne AHS Truck	5	315,131	90,037
Support		**72,771**	**24,322**
41 tonne Wheel Loader	5	9,873	4,936
455 kW Track Dozer	10	11,407	5,703
640 kW Track Dozer	10	6,185	0
48 tonne Backhoe	3	1,102	1,102
370 kW Wheel Dozer	3	11,205	1,867
7.3 m Grader	3	22,189	4,931
40,000 USG Water Truck	7	10,811	7,207
Subtotal Primary		**504,121**	**165,890**
Ancillary (by purpose)			
Blasting Vehicles		203	203
Dewatering and Lighting		752	332
Small Earth-moving		2,578	2,578
Portable Crusher/Screening		686	686
Moving Equipment		2,847	2,847
Service/Maintenance		11,549	2,792
Light Vehicles		15,502	1,934
Communications and Control		2,391	2,391
Subtotal Ancillary		**36,508**	**13,763**
Total Equipment Purchase		**540,628**	**179,653**
Erection/Commissioning		1,998	591
Freight		included in price	included in price
Spares		4,822	4,822
Equipment Costs (excl. contingency)		**547,449**	**185,066**

An explosives facility, including magazines for explosives and detonator caps, as well as associated garage facilities will be required; however, explosive loading will be a contracted service. Josemaria will be responsible for constructing these facilities as well as for preparatory earthworks (the latter was estimated at $750,000). The majority of explosives are intended to be trucked in from suppliers with nearby production facilities.

Contingency for mining facilities is estimated at 20%.

Miscellaneous & Other Indirect Mine Capital Costs

Miscellaneous mine capital expenditures (as initial capital) include:

- Survey equipment and software: $60,000
- Geology/mine planning software: $225,000
- Autonomous system central control computers/software: $25,000

Indirect costs for implementation and training associated with the autonomous haulage system are estimated at $2,044,000. Indirect costs related to future mining studies, including detail implementation design, have not been considered. They are presumed to be sunk at the time of project commencement.

Contingency for miscellaneous expenditures is estimated at 20%.

Summary of Mining Capital Costs

A summary of mining capital costs is provided in Table 21-9.

Table 21-9: Total mining capital cost summary

Item	Total LOM Cost ($000)	Pre-production Cost ($000)
Pre-production Mining	74,540	74,540
Mine Equipment	547,449	179,653
Mining Support Infrastructure	47,513	47,513
Mine Facilities	9,540	1,000
Miscellaneous and Other Indirects	2,519	2,329
Spare Parts	4,822	4,822
Erection/Commissioning	1,998	591
Mining Contingency	29,443	9,649
Total Mining Capital	**711,004**	**320,097**

Mining support infrastructure was estimated by Fluor and includes the truck shop, fueling station and electrical distribution to the pit and other mining infrastructure.

21.1.9 Owner Cost

Owner Costs are $258M including contingency and $126M for the south access road. The design and cost of the access road were prepared by a regional design specialist, Ruiz and Associates. Owner’s costs cover Owner’s team costs for EPCM and operational readiness over a period of 54 months. The EP phase allows for project offices in Vancouver and San Juan, while CM allows for project offices in San Juan and site with an allowance for travel cost in both phases. Other costs include consultants, software, land acquisition, community development, environment and permitting and project insurance.

21.1.10 Estimate Assumptions & Exclusions

Estimate assumptions not otherwise described herein are listed below:

- The existing exploration camp with 250 beds is immediately available for use during early works and for the remaining construction program
- A portion of the construction camp will be converted to the operations camp with an allowance provided for refurbishment
- high-voltage power supply from the grid will be available nine months before the end of construction, and will replace the temporary supply (i.e., diesel generator sets, which will be refurbished and remain as the emergency power system for operations)
- All equipment and materials will be purchased new
- The labour rate build-up is based on statutory law governing benefits to workers in effect at the time of the estimate and supported by a labour study performed in-country during the FS

The following are excluded:

- Taxes and duties
- Sunk costs
- Permits, licenses, royalties and commissions
- Fluctuation of currency exchange rates
- Forward escalation beyond Q4 2019
- Sustaining capital, operating costs, working capital
- Force majeure
- Scope changes
- Management reserve (by Owner)
- Financing charges

21.1.11 Sustaining Capital

Sustaining capital for Josemaria has been estimated on the basis that these are costs associated with maintaining the operation at full production. Possible costs associated with capital improvements undertaken in order to improve production capabilities or results have not been included in this estimate unless they are already deemed part of the Josemaria project. Any improvement projects will be evaluated on their own economic merits upon which future capital decisions will be made.

Estimated sustaining capital costs over the life of mine are shown in the Table 21-10.

Table 21-10: LOM sustaining capital cost summary

Description	US$M
Mining	391
TSF	502
Plant Mobile Equipment Replacement Costs	12
Wellfield B Construction	19
Electrical	1
Road Upgrades	15
Total	**940**

Mining Sustaining Capital Cost

Mining sustaining capital costs were estimated by SRK and are covered within the mining capital cost section of this report.

TSF Sustaining Capital Cost

TSF sustaining capital costs in early years of operation comprise expansion of the north and main dams using downstream and centreline construction methods, respectively. Other activities include construction of the main TSF-to-plant water reclaim line and installation of new rougher and cleaner tailings pipelines for efficient tailings distribution within the TSF. Construction of the south dam begins in Year 11 and continues with downstream construction.

Plant Mobile Equipment Replacement

Replacement of the plant mobile equipment fleet has been costed and scheduled in the sustaining capital cost model based on expected use and life of the equipment. Plant mobile equipment includes, but is not limited to, small front-end loaders, excavators, dozers, graders, buses and mobile cranes.

Wellfield B Construction

The source of fresh water from the operation will come from two different fields, wellfield A and wellfield B. Only wellfield A will be constructed during the initial construction period; wellfield B will be constructed in Year 4 to allow recharge to occur in wellfield A in Year 5. At this point, water will be alternately drawn from either wellfield.

Electrical Sustaining Capital Cost

A small amount of sustaining capital is required for adjustable frequency drives for the tailings distribution and reclaim water system. The pumps and pipes themselves are covered under the TSF sustaining capital account.

Road Upgrades

Costs for additional erosion control, vegetation stabilisation and silt traps are planned to be constructed in Year 2 to provide additional protection for the road and environment along the extent of the access road.

21.2 Operating Cost Estimate

This section presents the operating cost estimate (OPEX) that was developed as part of the economic evaluation for the Josemaria Project. The OPEX captures costs associated with the mine, process plant, tailings storage facility and general and administrative (G&A) facilities during the life-of-mine (LOM). Concentrate transportation and handling at the Terminal Puerto Rosario are included in the financial model as sales and marketing costs which are explained in Section 22 of this report. The estimate is based on the current project plan that operations will start at the end of 2025 and run for 20 years.

The major areas are defined by project scope division limits between SRK, KP, Fluor and Josemaria. The areas and parties responsible for developing the operating costs in each area are shown in Table 21-11.

Table 21-11: Operating cost estimate responsibility

Area	Responsible Party
Mine	SRK
TSF and freshwater supply	KP
Process plant, infrastructure and power	Fluor
Concentrate transport and port	SRK with support from Josemaria
G&A	Fluor with support from Josemaria

The project's estimated operating costs for the first four years of operation and for the LOM are summarized in Table 21-12. These costs reflect the mine production plans, metal recoveries and processing methods described in this report. All costs are expressed in fourth quarter 2019 U.S. dollars with no allowance for escalation.

Table 21-12: Operating costs

Area	Years 1 to 4		Life of Mine	
	Avg Annual Costs (US$/a)	Unit Costs (US$/t ore processed)	Avg Annual Costs (US$/a)	Unit Costs (US$/t ore processed)
Mine	160,909,935	3.07	144,560,228	2.71
TSF & Freshwater	975,500	0.02	1,188,105	0.02
Process & Infrastructure	191,476,162	3.65	194,033,053	3.64
G&A Miscellaneous	23,744,495	0.45	24,039,681	0.45
Total	**377,106,092**	**7.19**	**363,821,068**	**6.83**

21.2.1 Mining Operating Costs

Basis of Estimate

As with the capital cost estimate, SRK's derivation of the mine operations operating cost estimate is based on the following information sources:

- Equipment quotations
- Service quotations
- SRK experience and benchmark costs

Mine Operating Input Data

The following key inputs were used to develop the mine operating costs:

- For mine operations, a two week on, two week off, 12-hour shift roster was assumed, with no scheduled shutdown time (i.e., 365-day year)
- Four crews fulfill the shift roster
- 5% freight on parts & consumables
- Exchange rate – 60.0 Argentine pesos to one USD

Mining Labour Rates

The labour rates used for mine and maintenance hourly personnel were derived from remuneration surveys extrapolated to project operations.

Mine Equipment Costs

Equipment costs, based on parts and consumables, fuel and maintenance labour (no operating labour) are provided in Table 21-13.

Blasting Costs

SRK sought costing information on blasting from two sources, Orica and Austin Powder. Both have representation in Argentina and both provided a complete hole loading service.

SRK, in consultation with Josemaria, opted to blend the costs for the two in deriving blasting costs for the FS. For explosives and accessories, the costs were averaged between the two.

Table 21-13: Mine equipment unit costs

Description	$/hour
171-270 mm Rot. Drill - Electric	225.86
90-152 mm DTH Drill	260.43
42 m3 - E Hyd. Shovel - Electric	847.80
73 tonne Wheel Loader	828.72
41 tonne Wheel Loader	498.83
360 tonne Haul Truck	488.70
100-ton class Haul Truck	86.14
455 kW Track Dozer	172.91
640 kW Track Dozer	263.99
92 tonne Backhoe	173.79
560 kW Wheel Dozer	96.70
7.3 m Grader	189.42
4.88 m Grader	116.80
40,000 USG Water Truck	291.97

Mine Operating Costs by Activity

The mine operating costs are categorized by mining activity (Table 21-14) in terms of total dollars over the life-of-mine plan (after pre-production) and relevant unit costs (also after pre-production). With the exception of drilling and blasting, the unit costs are based on total material moved, including LGSP reclaim. The mine operating costs by year are provided in Table 21-15.

Table 21-14: Mine operating costs by activity

Activity	Total Cost ($000)	Unit Cost ($/t)
Drilling (blasted rock)	137,507	0.070
Blasting (blasted rock)	362,738	0.185
Loading	327,527	0.144
Hauling	1,213,430	0.532
Support	329,554	0.145
Mine General	156,001	0.068
Mine Administration	205,281	0.090
Total (all rock, including LGSP reclaim)	**2,732,038**	**1.199**

Note that the operating costs include a 3% contingency, but do not include electrical distribution costs of $14.6M over the mine life.

Table 21-15: Mining operating costs by year

Item	Units	Year Total	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19
Direct Mill Feed	kt	695,589	37,261	48,529	45,877	40,683	53,231	54,591	54,700	54,499	6,194	19,467	45,893	23,000	35,115	45,292	55,512	32,495	32,813	10,435	0
To Stockpile	kt	313,676	22,356	8,162	7,872	18,982	46,198	6,641	2,930	999	21,831	9,044	32,179	19,558	29,958	31,841	28,100	26,161	866	0	0
Waste	kt	954,040	77,856	96,004	90,252	80,399	43,488	78,012	81,615	83,503	57,361	74,690	45,671	56,983	51,032	19,787	12,196	3,431	1,400	351	6
Total Mined	kt	1,963,304	137,474	152,695	144,001	140,065	142,917	139,245	139,245	139,001	85,387	103,201	123,743	99,541	116,105	96,920	95,808	62,087	35,079	10,786	6
Total Moved*	kt	2,279,540	142,999	159,714	154,000	155,015	145,066	140,000	140,000	140,000	134,400	139,144	134,000	131,582	136,418	107,209	95,808	85,077	57,678	55,463	25,967
Strip Ratio	w:t	0.95	1.31	1.69	1.68	1.35	0.44	1.27	1.42	1.50	2.05	2.62	0.58	1.34	0.78	0.26	0.15	0.06	0.04	0.03	0.00
Operating Costs																					
Drilling	$000s	137,507	7,190	9,351	10,079	12,293	13,905	10,258	10,947	9,156	5,963	7,081	6,384	5,153	5,823	5,950	6,646	4,768	3,367	1,995	1,198
Blasting	$000s	362,738	25,962	27,971	26,493	26,757	25,515	25,133	25,688	25,983	16,973	19,907	21,468	17,789	19,200	17,075	16,980	11,946	7,994	3,029	875
Loading	$000s	327,527	16,469	15,277	20,029	27,721	34,044	20,452	20,509	19,619	18,242	20,009	14,425	15,213	17,375	14,584	13,564	13,623	10,400	9,828	6,144
Hauling	$000s	1,213,430	48,495	53,508	62,880	80,547	88,651	59,225	66,327	76,906	77,850	77,111	81,422	77,183	68,310	76,089	73,637	69,917	41,510	20,300	13,562
Support	$000s	329,554	15,993	20,341	19,267	27,000	35,722	16,083	15,915	15,764	15,913	16,760	17,638	17,746	19,187	17,976	14,727	14,319	11,569	9,343	8,290
General Mine/Mtce	$000s	155,964	8,687	8,446	8,528	10,264	11,974	8,705	8,713	8,918	9,101	9,162	9,171	9,162	9,193	8,845	8,854	5,417	4,499	4,285	4,040
Supervision & Technical	$000s	205,281	9,436	9,478	9,445	22,695	36,033	9,445	9,438	9,433	9,208	9,266	9,430	9,282	9,379	9,343	9,352	9,196	5,262	5,114	5,047
Total Operating Costs**	$000s	**2,732,001**	**132,233**	**144,372**	**156,721**	**207,276**	**245,843**	**149,301**	**157,537**	**165,778**	**153,250**	**159,296**	**159,939**	**151,528**	**148,468**	**149,863**	**143,762**	**129,185**	**84,600**	**53,893**	**39,155**

** Includes stockpile reclaim*
*** Does not include electrical distribution costs of $14.6M over the mine life.*

21.2.2 Tailings & Water Management Operating Costs

Operating costs related to the preparation and distribution of materials required to progressively raise the tailing impoundment level were estimated by KP. The labour costs associated with daily operations are included in the concentrator labour summary discussed in Section 21.2.3. Annual geotechnical and other inspection costs are included in G&A outside service/ contractor costs.

The quantities (material takeoffs) for developing the sustaining capital cost estimate and operating costs were derived from the drawings developed for the feasibility design of the tailings and water management facilities. Material takeoffs (MTOs) generated for the project include site preparation, heavy civil construction, piping, mechanical, instrumentation and electrical work activities.

A basis of estimate for the development of unit rates related to earthworks, construction activities and mechanical equipment under KP's scope was compiled to support the FS cost estimate. Mechanical equipment will need to be replaced periodically due to wear and tear. It is estimated that pumps and pipes require replacement approximately every 10 years, and that pipe fittings and valves require replacement every 5 years. These have been included in the MTOs.

The operating cost estimate for Tailings and Water Management over the mine life is approximately $23.0M as summarized in Table 21-16.

Table 21-16: Tailings and water management operating costs

Item Number	Item Description	OPEX
4500	**Mechanical Systems**	
4510	Cleaner Tailings Distribution System	2,552,000
4520	Rougher Tailings Distribution System	616,000
4530	Cleaner TSF Reclaim System	637,000
4540	Main TSF Collection Trench Reclaim System	1,686,000
4550	Main TSF Reclaim System	15,891,000
4560	Main Dam Seepage Return System	1,579,000
4570	South Dam Seepage Return System	4,000
	Total Operating Costs	**22,965,000**

21.2.3 Process Plant & Infrastructure Operating Costs

The average unit operating cost for processing copper-gold ore is $3.64/t. The process operating costs include import duties on reagents and consumable supplies, where applicable. The costs are distributed into five cost elements, summarized in Table 21-17.

Electrical Load

Electrical load accounts for more than half of the process plant and infrastructure operating costs and includes power costs for the TSF, Freshwater supply fields and mine. The plant operating load is estimated to be 233 MW. Unit costs for power are based on a forecast price of $0.065/kWh, which was provided by ESIN, a local Argentinian consultant that conducted a power study as part of the FS.

Table 21-17: Process plant and infrastructure operating costs

Cost Elements	Avg Annual Costs	Unit Costs	Distribution
	$US / a	$US /t ore	%
Labor	22,280,509	0.42	11.5
Mobiles & Vehicles	1,174,502	0.02	0.6
Maintenance	12,498,350	0.23	6.3
Consumable	58,498,004	1.10	30.1
Electrical Load	99,581,688	1.87	51.5
Total	**194,033,053**	**3.64**	**100.0**

Major Process Consumables

Quantities of operating supplies and consumables used during the normal operation of the process facilities are based on experience at similar operations and comminution test results indicating the strength and abrasion of the mill feed material. Mill liners, crusher liners, and grinding media are based on budget quotations from suppliers. Where not already included, allowances are made for delivery and import duty costs.

Reagents

Reagent consumption is based on metallurgical testwork. Unit costs are based on supplier quotations. Where not already included, delivery costs were factored.

Fuel

All vehicles are diesel powered. The Owner obtained a diesel supply cost of $0.75/ L from a regional contractor, including delivery to site. Consumptions were estimated on an hourly consumption rate and usage time.

Labour

The concentrator staffing roster proposed for the project is 85 technical/administrative staff, 71 infrastructure staff, 164 operations staff and 98 maintenance staff. Labour costs include payroll burden and benefits, Argentina payroll taxes and benefits, and legislated overtime. Labour rates were based on South American Fluor internal labour rates adjusted for inflation and Argentinian labour laws. Expatriates will fill selected positions during the first several years of operation.

General parameters for the labour rates are based on the following

- Roster will be 14 days on/14 days off
- 12-hour standard shift
- 7-day work week (84 hours)
  - Standard time rates for 44 hours per week; overtime rates for 40 hours per week
- Government legislated assessment
- Vacation and statutory holidays

Maintenance

The cost of maintenance parts and other operating supplies for the plant is factored from capital cost estimates based on equipment vendor guidelines and historical data. Unit costs are $0.228/t ore.

Mobile Equipment

The mobile equipment maintenance cost was calculated as factor of equipment cost.

21.2.4 Concentrate Transport & Port Operating Costs

The cost of transporting concentrate from Josemaria to the Port of Terminal Puerto Rosario (TPR), and port operating costs (concentrate storing and handling) are described in Section 19.3 and are not included in the operating cost.

21.2.5 General & Administrative Operating Costs

General and administrative costs are summarized in Table 21-18.

Table 21-18: G&A costs

Item	Cost ($/year)
Administration	1,580,000
G&A personnel	4,570,000
Ancillary operations	996,000
Service contracts	16,407,000
Other	5,989,000
Total	**29,542,000**

Administration costs include warehouse and office leases in San Juan, travel expenses and recruitment costs. The project will operate similar to other mines in the area with headquarters based in San Juan and minimal administrative positions on site.

G&A personnel include site director, legal team, HR team, finance and accounting team, logistics team, HSE team and medical staff. Ancillary operations include testing, training, safety equipment and laboratory equipment maintenance costs.

Service contracts include ongoing road maintenance, canteen services, cleaning service, effluent handling and garbage removal, camp and casino and employee transport.

Other G&A costs include: insurance, IT, mobile phones, couriers/post, legal and other fees, government charges, in-house conferences cost, community relations, community development, local education/scholarships, office supplies, office furniture, external consultants, software, medical equipment/consumables for on-going drug and alcohol tests, lab consumables including reagents and chemicals, and recreational costs.

22 Economic Analysis

22.1 General

Economic analysis was undertaken using a discounted cashflow model that was constructed in MS Excel®. The model primarily used constant (real, non-inflated) 2020 US dollars and modelled the project cashflows in quarterly periods. Certain costs were modelled in Argentinian Pesos (ARS) and converted to US dollars. The model assumes a 4-year physical construction period and assumes mid-year discounting at a discount rate of 8.0% per annum for net present value (NPV) calculations.

Between the date of this report and the commencement of construction, sufficient time must be allowed for the engineering and characterisation work program to be executed and this has been allowed for within the modelled schedule.

Important Note: The economic model considers only cashflows from January 2021 forward. Schedule and expenditure for the engineering and study, including technical and economic studies, detailed engineering studies, early procurement activities, cost estimating, resource delineation and infill drilling, pit-slope geotechnical characterization, metallurgical sampling and test-work, associated exploration, strategic optimization, mine, plant and infrastructure design, permitting and other pre-construction activities from 2021 forward are included, but costs for the remainder of 2020 are not modelled.

Table 22-1 shows a summary of key project parameters and project economics. LOM project annual cashflow is shown in Table 22-2.

22.2 Argentinian Inflation Forecasts

Argentina has been experiencing significant inflation in recent years, with annual rates averaging approximately 40% from 2017 to 2019. This makes forecasting of inflation rates and foreign exchange rates extremely difficult, and such forecasts are subject to considerable uncertainty. For the purposes of this study, costs were estimated and modelled in real 2020 US dollars to coincide with the commodity pricing forecasts that were also modelled in real 2020 US dollars. Local contributions to costs, such as local labour rates, were modelled at current productivity rates and converted to US dollars at current foreign exchange rates as detailed in Section 21. No further adjustments to foreign exchange assumptions were made to cost estimates within the economic model.

Table 22-1: Summary of project economics

Project Metric	Units	Value
Pre-Tax NPV @ 8%	$ Billion	2.37
Pre-tax IRR	percent	18.4
After-Tax NPV @ 8%	$ Billion	1.53
After Tax IRR	percent	15.4
Undiscounted After-Tax Cash Flow (LOM)	$ Billion	6.36
Payback Period from start of processing (undiscounted, nominal after-tax cash flow)	years	3.8
Initial Capital Expenditure	$ Million	3,091
LOM Sustaining Capital Expenditure (excluding closure)	$ Million	940
All-in Cash Costs (Co-Product excl. closure accrual)	$/lb CuEq.	1.55
Average Process Capacity	tonnes per day	152,000
Mine Life	years	19
LOM Mill Feed	Mt	1,012
LOM Grades (ROM)		
Copper	percent	0.30
Gold	grams per tonne	0.22
Silver	grams per tonne	0.94
LOM Waste Tonnes	Mt	992
LOM Strip Ratio (Waste:Ore)	ratio	0.98
First 3 Years Average Annual Payable Metal Production*		
Copper	tonnes per year	166,000
Gold	ounces per year	331,000
Silver	ounces per year	1,248,000
Life of Mine Average Annual Payable Metal Production		
Copper	tonnes per year	131,000
Gold	ounces per year	224,000
Silver	ounces per year	1,048,000
LOM Average Process Recovery		
Copper	percent	85.2
Gold	percent	62.6
Silver	percent	72.0

** When mill at full (>90%) production*

Table 22-2: LOM annual project cash flow

PREFINANCE SUMMARY CASH FLOW		LOM Total	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8
Recovered Metal Value															
Recovered Copper Value	$M	17,143	0.0	0.0	0.0	0.0	0.0	954.4	1275.6	1230.6	813.0	1064.2	945.9	1035.9	1063.9
Recovered Gold Value	$M	6,583	0.0	0.0	0.0	0.0	0.0	534.0	582.5	502.7	407.1	530.0	394.3	399.6	361.8
Recovered Silver Value	$M	398	0.0	0.0	0.0	0.0	0.0	18.0	26.7	30.9	16.0	23.8	19.6	23.5	24.4
Total Metal Value in Concentrate	**$M**	**24,124**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1506.4**	**1884.8**	**1764.2**	**1236.1**	**1618.0**	**1359.9**	**1459.1**	**1450.1**
Copper Equivalent Payable Pounds	*mmlbs*	***7,751***	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*484.4*	*605.8*	*566.8*	*397.4*	*520.1*	*437.0*	*468.8*	*465.8*
Total TCRC Freight	**$M**	**3,782**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**216.0**	**283.4**	**272.3**	**184.3**	**239.5**	**209.3**	**229.0**	**231.8**
Total Royalty	**$M**	**498**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**33.9**	**41.9**	**38.6**	**25.4**	**35.2**	**28.4**	**30.8**	**30.4**
Total Minesite Revenue	**$M**	**19,843**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1256.6**	**1559.5**	**1453.3**	**1026.4**	**1343.3**	**1122.2**	**1199.3**	**1187.9**
OPERATING COSTS															
1000 - Mine	$M	2,747	0.0	0.0	0.0	0.0	0.0	132.9	145.2	157.5	208.1	246.6	150.1	158.3	166.6
2000 - Crushing	$M	196	0.0	0.0	0.0	0.0	0.0	8.4	10.7	10.8	10.7	10.7	10.7	10.7	10.7
3000 - Process	$M	2,974	0.0	0.0	0.0	0.0	0.0	126.6	163.1	164.1	163.4	162.6	162.5	162.8	163.0
4000 - Tailings	$M	27	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.2	1.5	1.5	1.5	1.5	1.5
5000 - On-Site Infrastructure	$M	368	0.0	0.0	0.0	0.0	0.0	18.5	19.6	19.6	19.6	19.6	19.6	19.6	19.6
6000 - Off-Site Infrastructure	$M	101	0.0	0.0	0.0	0.0	0.0	4.3	5.5	5.6	5.5	5.5	5.5	5.5	5.5
7000 - Indirects	$M	500	0.0	0.0	0.0	0.0	0.0	22.4	27.3	27.3	27.3	27.3	27.3	27.3	27.3
Total Operating Costs	**$M**	**6,913**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**313.8**	**372.6**	**386.0**	**436.0**	**473.8**	**377.1**	**385.7**	**394.1**
Operating Cashflow	**$M**	**12,930**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**942.8**	**1186.9**	**1067.3**	**590.4**	**869.5**	**745.0**	**813.6**	**793.8**
Summary Capex by Project Phase															
Study Costs	$M	35	35.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction Costs	$M	3,056	32.0	336.6	1015.2	1079.7	573.7	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining Capital Costs	$M	940	0.0	0.0	0.0	0.0	0.0	119.1	65.9	66.2	72.5	33.4	26.4	29.2	64.0
Closure Costs	$M	277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total Capex (Including Closure)	**$M**	**4,309**	**67.1**	**336.6**	**1015.2**	**1079.7**	**573.7**	**138.2**	**65.9**	**66.2**	**72.5**	**33.4**	**26.4**	**29.2**	**64.0**
Working Capital	$M	13	0.0	0.0	0.0	0.0	0.0	25.8	-1.3	-3.3	1.0	4.1	-3.4	1.8	0.5
PRE-TAX CASHFLOW	**$M**	**8,608**	**-67.1**	**-336.6**	**-1015.2**	**-1079.7**	**-573.7**	**778.8**	**1122.3**	**1004.4**	**516.9**	**832.0**	**722.0**	**782.6**	**729.3**
Tax															
VAT	$M	44	0.0	2.9	9.1	24.4	-4.3	-8.0	3.4	4.7	2.4	5.7	0.9	-1.5	2.6
Applied Debits and Credits Tax (Real)	$M	147	0.0	0.9	3.5	10.7	8.4	4.8	9.2	9.5	7.7	6.8	7.6	6.8	7.2
Lirio DPMA	$M	38	0.0	0.0	0.0	0.0	0.0	4.3	5.5	7.0	2.5	4.1	3.6	3.9	3.6
Corporate Income Tax (real)	$M	2,020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.4	153.7	123.2	159.8	152.9	168.5
Total Tax	**$M**	**2,249**	**0.0**	**3.7**	**12.7**	**35.1**	**4.1**	**1.1**	**18.2**	**52.5**	**166.4**	**139.8**	**171.8**	**162.1**	**181.9**
AFTER-TAX NET CASHFLOW	**$M**	**6,359**	**-67.1**	**-340.4**	**-1027.9**	**-1114.8**	**-577.8**	**777.8**	**1104.1**	**951.9**	**350.5**	**692.2**	**550.2**	**620.5**	**547.4**

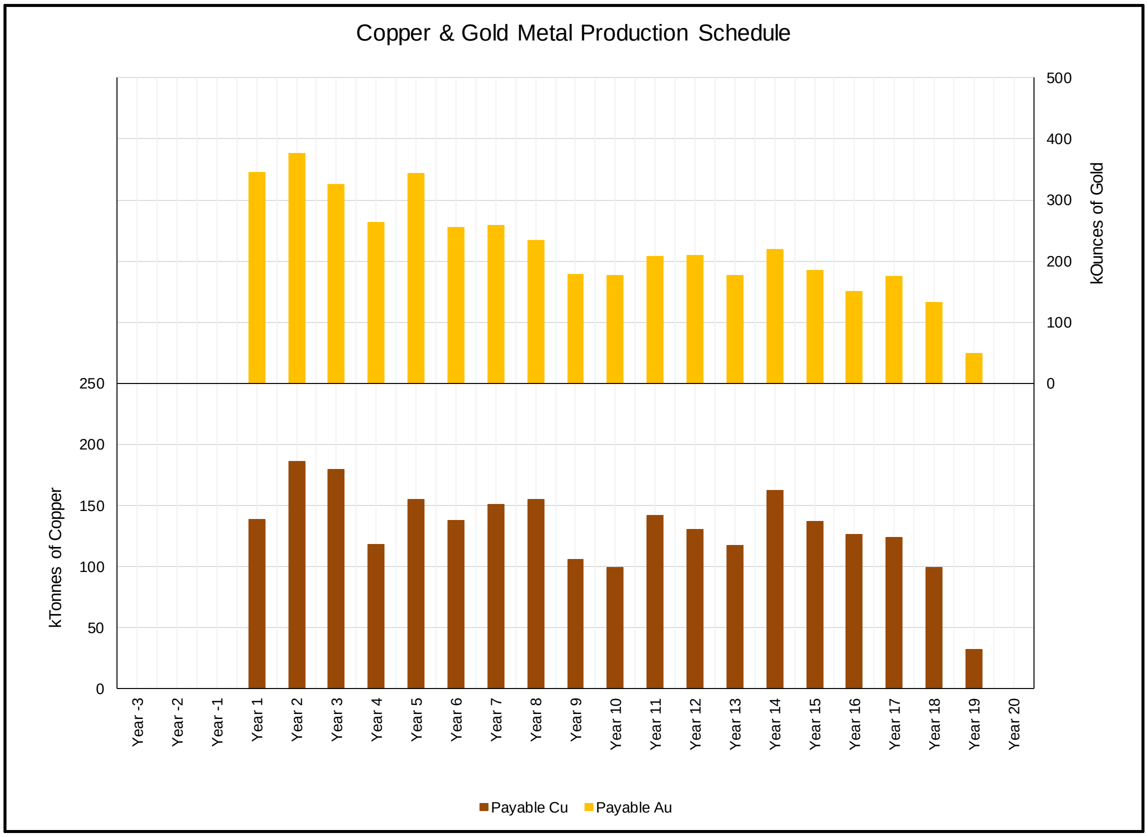
Table 22-2: LOM annual project cash flow – continued

PREFINANCE SUMMARY CASH FLOW	Units	LOM Total	9	10	11	12	13	14	15	16	17	18	19	20
Recovered Metal Value														
Recovered Copper Value	$M	17,143	725.5	681.9	972.9	898.8	804.4	1114.3	940.0	870.1	849.1	680.5	221.6	0.0
Recovered Gold Value	$M	6,583	274.4	272.3	322.0	323.7	273.2	337.8	285.9	231.4	270.9	203.5	75.7	0.0
Recovered Silver Value	$M	398	16.5	16.0	19.9	18.8	17.9	23.7	21.9	25.2	26.9	21.3	7.0	0.0
Total Metal Value in Concentrate	**$M**	**24,124**	**1016.3**	**970.3**	**1314.8**	**1241.4**	**1095.5**	**1475.8**	**1247.8**	**1126.8**	**1146.9**	**905.3**	**304.3**	**0.0**
Copper Equivalent Payable Pounds	*mmlbs*	***7,751***	*326.5*	*311.7*	*422.4*	*398.8*	*351.9*	*474.0*	*400.7*	*361.7*	*368.2*	*290.6*	*97.7*	*0.0*
Total TCRC Freight	**$M**	**3,782**	**160.2**	**152.2**	**212.5**	**197.4**	**177.4**	**241.5**	**203.6**	**188.2**	**185.7**	**148.5**	**49.3**	**0.0**
Total Royalty	**$M**	**498**	**19.6**	**18.4**	**26.9**	**25.2**	**21.4**	**30.9**	**25.2**	**22.0**	**22.7**	**16.6**	**4.5**	**0.0**
Total Minesite Revenue	**$M**	**19,843**	**836.6**	**799.6**	**1075.4**	**1018.7**	**896.7**	**1203.4**	**1019.0**	**916.5**	**938.5**	**740.2**	**250.5**	**0.0**
OPERATING COSTS														
1000 - Mine	$M	2,747	154.0	160.1	160.8	152.3	149.3	150.7	144.6	130.0	85.4	54.7	39.5	0.0
2000 - Crushing	$M	196	10.6	10.7	10.8	10.6	10.7	10.7	10.7	10.7	10.7	10.6	5.5	0.0
3000 - Process	$M	2,974	162.1	162.7	164.8	161.7	162.8	163.2	163.0	162.9	162.7	161.9	78.5	0.0
4000 - Tailings	$M	27	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.5	1.5	1.5	1.2	0.4
5000 - On-Site Infrastructure	$M	368	19.6	19.6	19.6	19.5	19.6	19.6	19.6	19.6	19.6	19.6	17.0	0.0
6000 - Off-Site Infrastructure	$M	101	5.5	5.5	5.6	5.5	5.5	5.5	5.5	5.5	5.5	5.5	2.6	0.0
7000 - Indirects	$M	500	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	27.3	14.5	0.0
Total Operating Costs	**$M**	**6,913**	**380.6**	**387.3**	**390.4**	**378.3**	**376.5**	**378.4**	**372.1**	**357.5**	**312.6**	**281.0**	**158.7**	**0.4**
Operating Cashflow	**$M**	**12,930**	**455.9**	**412.3**	**685.1**	**640.4**	**520.1**	**825.0**	**647.0**	**559.0**	**625.8**	**459.2**	**91.7**	**-0.4**
Summary Capex by Project Phase														
Study Costs (Year -5)	$M	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction Costs	$M	3,037	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining Capital Costs	$M	959	67.7	64.1	98.0	167.2	15.4	9.4	28.3	4.6	4.5	3.6	0.2	0.0
Closure Costs	$M	277	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	277.5
Grand Total Capex (Including Closure)	**$M**	**4,309**	**67.7**	**64.1**	**98.0**	**167.2**	**15.4**	**9.4**	**28.3**	**4.6**	**4.5**	**3.6**	**0.2**	**277.5**
Working Capital	$M	13	-4.5	0.0	4.5	-0.3	-1.2	5.0	-2.1	-1.0	0.8	-2.5	-6.8	-3.4
PRE-TAX CASHFLOW	**$M**	**8,608**	**392.8**	**348.2**	**582.5**	**473.5**	**506.0**	**810.6**	**620.8**	**555.5**	**620.5**	**458.1**	**98.3**	**-274.5**
Tax														
VAT	$M	44	2.8	1.6	2.4	3.1	2.0	-1.0	1.8	1.6	0.2	-0.5	-1.4	-10.8
Applied Debits and Credits Tax (Real)	$M	147	6.6	5.0	5.2	6.4	5.9	5.8	6.9	6.0	5.5	5.3	3.7	1.1
Lirio DPMA	$M	38	1.9	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corporate Income Tax (real)	$M	2,020	145.8	78.4	84.6	130.0	110.1	103.4	156.8	117.2	114.0	119.3	69.1	2.2
Total Tax	**$M**	**2,249**	**157.1**	**86.7**	**92.2**	**139.5**	**118.0**	**108.3**	**165.6**	**124.8**	**119.7**	**124.1**	**71.4**	**-7.5**
AFTER-TAX NET CASHFLOW	**$M**	**6,359**	**235.7**	**261.5**	**490.3**	**334.0**	**388.0**	**702.3**	**455.2**	**430.7**	**500.8**	**334.0**	**26.9**	**-267.0**

Note: Closure Expenditure spent over 5 years post-closure is summarized in Year 20 for brevity

22.3 Production Schedule

The production schedule evaluated is summarized in Table 22-3. Metal production and mine physicals are shown in Figure 22-1 and Figure 22-2.



Source: SRK, 2020

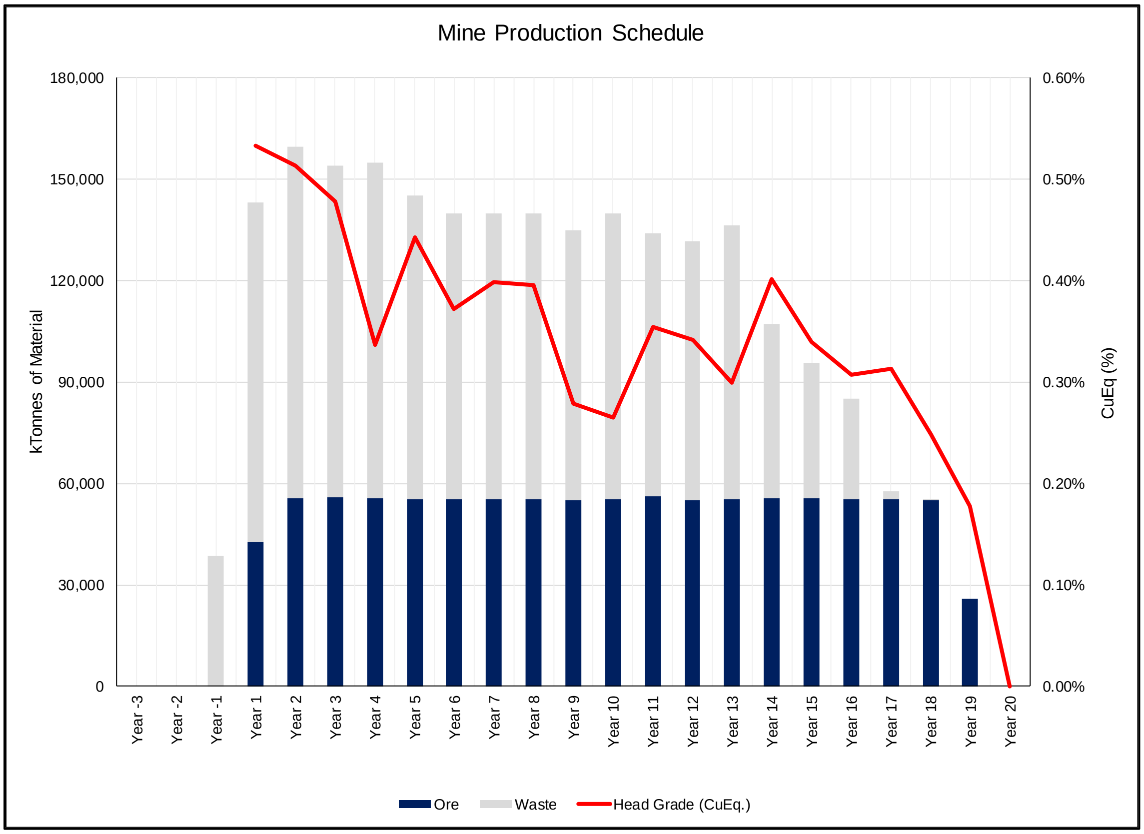
Figure 22-1: Metal production schedule

Table 22-3: Production schedule summary

Production Summary		Total	NPV	1	2	3	4	5	6	7	8	9	10
Material to Mill	**Kt**	**1,011,825**		**42,787**	**55,549**	**55,876**	**55,633**	**55,380**	**55,346**	**55,455**	**55,498**	**55,207**	**55,411**
Cu recovered grade	*%*	***0.256%***		*0.337*	*0.347*	*0.333*	*0.221*	*0.291*	*0.258*	*0.282*	*0.290*	*0.199*	*0.186*
Au recovered grade	*gpt*	***0.135***		*0.259*	*0.217*	*0.187*	*0.152*	*0.198*	*0.148*	*0.149*	*0.135*	*0.103*	*0.102*
Ag recovered grade	*gpt*	***0.680***		*0.728*	*0.831*	*0.955*	*0.497*	*0.743*	*0.613*	*0.733*	*0.759*	*0.516*	*0.500*
ROM Metal													
Copper	Kt	**2,592**		144	193	186	123	161	143	157	161	110	103
Gold	kg	**136**		11	12	10	8	11	8	8	8	6	6
Silver	kg	**688**		31	46	53	28	41	34	41	42	28	28
Payable Recovered to Con													
Payable copper	klbs	**5,502,676**		306,364	409,446	395,022	260,976	341,598	303,637	332,514	341,499	232,874	218,896
Payable gold	koz	**4,257**		345	377	325	263	343	255	258	234	177	176
Payable silver	koz	**19,903**		902	1,335	1,544	800	1,191	982	1,176	1,219	824	801
Recovered Metal Value													
Recovered copper value	$K	17,142,954	6,876,755	954,442	1,275,581	1,230,647	813,041	1,064,208	945,947	1,035,910	1,063,899	725,492	681,946
Recovered gold value	$K	6,582,715	2,828,144	533,971	582,521	502,693	407,074	529,985	394,314	399,618	361,777	274,353	272,301
Recovered silver value	$K	398,069	154,391	18,035	26,702	30,875	16,002	23,825	19,647	23,523	24,387	16,479	16,020
Total Metal Value in Concentrate	**$K**	**24,123,738**	**9,859,290**	**1,506,448**	**1,884,804**	**1,764,214**	**1,236,118**	**1,618,018**	**1,359,909**	**1,459,051**	**1,450,063**	**1,016,324**	**970,267**
Copper Equivalent Payable Pounds	*mmlbs*	***7,751***		*484*	*606*	*567*	*397*	*520*	*437*	*469*	*466*	*327*	*312*
Concentrate													
Grade	*%Cu*	***27.0%***		27	27	27	27	27	27	27	27	27	27
Dry weight	Kt	**9,600**		534	714	689	455	596	530	580	596	406	382
Wet weight	Kt	**10,774**		600	802	773	511	669	595	651	669	456	429
Payable deduction	$K	872,213	354,978	53,172	67,390	63,748	43,925	57,697	48,829	52,708	52,696	36,749	35,028
Treatment charges	$K	750,875	301,207	41,805	55,871	53,903	35,612	46,613	41,433	45,374	46,600	31,777	29,870
Freight charges	$K	1,614,986	647,838	89,915	120,169	115,935	76,594	100,256	89,115	97,590	100,227	68,346	64,244
Losses	$K	62,657	25,666	3,965	4,924	4,592	3,240	4,240	3,542	3,790	3,752	2,638	2,523
Copper refining charge	$K	430,403	172,652	23,963	32,026	30,897	20,413	26,719	23,750	26,008	26,711	18,215	17,121
Gold refining charge	$K	21,284	9,144	1,727	1,883	1,625	1,316	1,714	1,275	1,292	1,170	887	880
Silver refining charge	$K	9,159	3,552	415	614	710	368	548	452	541	561	379	369
Penalties	$K	20,496	8,374	1,016	508	884	2,818	1,709	952	1,668	65	1,185	2,210
Total TCRC Freight	**$K**	**3,782,072**	**1,523,413**	**215,978**	**283,386**	**272,296**	**184,286**	**239,496**	**209,347**	**228,972**	**231,781**	**160,176**	**152,246**
Net Pre-royalty Revenue	**$K**	**20,341,666**	**8,335,877**	**1,290,470**	**1,601,419**	**1,491,918**	**1,051,831**	**1,378,522**	**1,150,562**	**1,230,079**	**1,218,283**	**856,148**	**818,021**

Table 22-3: Production schedule summary (continued)

Production Summary		Total	NPV	11	12	13	14	15	16	17	18	19
Material to Mill	**Kt**	**1,011,825**		**56,150**	**55,041**	**55,428**	**55,582**	**55,512**	**55,485**	**55,412**	**55,112**	**25,962**
Cu recovered grade	*%*	***0.256%***		*0.262*	*0.247*	*0.219*	*0.303*	*0.256*	*0.237*	*0.232*	*0.187*	*0.129*
Au recovered grade	*gpt*	***0.135***		*0.119*	*0.122*	*0.102*	*0.126*	*0.107*	*0.086*	*0.101*	*0.077*	*0.060*
Ag recovered grade	*gpt*	***0.680***		*0.612*	*0.590*	*0.558*	*0.737*	*0.681*	*0.786*	*0.840*	*0.667*	*0.464*
ROM Metal												
Copper	Kt	**2,592**		147	136	122	168	142	132	128	103	34
Gold	kg	**136**		7	7	6	7	6	5	6	4	2
Silver	kg	**688**		34	32	31	41	38	44	47	37	12
Payable Recovered to Con												
Payable copper	klbs	**5,502,676**		312,293	288,519	258,196	357,679	301,744	279,302	272,540	218,447	71,129
Payable gold	koz	**4,257**		208	209	177	218	185	150	175	132	49
Payable silver	koz	**19,903**		994	940	895	1,186	1,094	1,261	1,346	1,063	349
Recovered Metal Value												
Recovered copper value	$K	17,142,954	6,876,755	972,914	898,848	804,380	1,114,309	940,049	870,134	849,066	680,545	221,595
Recovered gold value	$K	6,582,715	2,828,144	321,994	323,729	273,199	337,771	285,902	231,390	270,897	203,504	75,724
Recovered silver value	$K	398,069	154,391	19,886	18,803	17,909	23,711	21,871	25,227	26,927	21,265	6,975
Total Metal Value in Concentrate	**$K**	**24,123,738**	**9,859,290**	**1,314,794**	**1,241,380**	**1,095,488**	**1,475,791**	**1,247,822**	**1,126,751**	**1,146,890**	**905,314**	**304,294**
Copper Equivalent Payable Pounds	*mmlbs*	***7,751***		*422*	*399*	*352*	*474*	*401*	*362*	*368*	*291*	*98*
Concentrate												
Grade	*%Cu*	***27.0%***		27	27	27	27	27	27	27	27	27
Dry weight	Kt	**9,600**		545	503	450	624	526	487	475	381	124
Wet weight	Kt	**10,774**		611	565	506	700	591	547	534	428	139
Payable deduction	$K	872,213	354,978	47,682	44,883	39,779	53,775	45,581	41,692	42,267	33,437	11,176
Treatment charges	$K	750,875	301,207	42,614	39,370	35,233	48,808	41,175	38,113	37,190	29,808	9,706
Freight charges	$K	1,614,986	647,838	91,655	84,678	75,778	104,976	88,559	81,973	79,988	64,112	20,876
Losses	$K	62,657	25,666	3,399	3,217	2,834	3,805	3,218	2,895	2,962	2,334	788
Copper refining charge	$K	430,403	172,652	24,427	22,567	20,195	27,977	23,602	21,846	21,317	17,086	5,564
Gold refining charge	$K	21,284	9,144	1,041	1,047	883	1,092	924	748	876	658	245
Silver refining charge	$K	9,159	3,552	458	433	412	546	503	580	620	489	160
Penalties	$K	20,496	8,374	1,210	1,199	2,280	557	11	392	491	560	781
Total TCRC Freight	**$K**	**3,782,072**	**1,523,413**	**212,486**	**197,393**	**177,394**	**241,534**	**203,573**	**188,239**	**185,710**	**148,485**	**49,296**
Net Pre-royalty Revenue	**$K**	**20,341,666**	**8,335,877**	**1,102,308**	**1,043,986**	**918,094**	**1,234,257**	**1,044,249**	**938,513**	**961,180**	**756,830**	**254,998**



Source: SRK, 2020

Figure 22-2: Mine physicals production schedule

22.4 Pricing Assumptions

Flat real prices were assumed for the life of the project. Table 22-4 shows the price assumptions used.

Table 22-4: Pricing assumptions for economic analysis

Commodity	Units	Price
Copper Price	$/lb	3.00
Gold Price	$/oz	1,500
Silver Price	$/oz	18.00

22.5 Processing Recovery Assumptions

The estimated processing recoveries were supplied in the form of algorithms that allowed process recoveries to be estimated by ore characteristics. Additional detail on the development of the algorithms is contained in Section 13.

22.6 Capital Costs

Capital costs used for the evaluation are summarized in Table 22-5. Additional detail regarding the capital cost estimate is contained in Section 21. The capital costs presented do not include any costs prior to 2021. An estimate of the future work program and costs is included in Section 26.

Table 22-5: Capital cost summary

Initial Capital Costs	LOM ($M)
Mine	302
Crushing	222
Process Facilities	666
Tailing Management	163
On-Site Infrastructure	184
Off-Site Infrastructure	192
Total Direct Cost	**1,729**
Total Indirect Cost	756
Total Direct Plus Indirect	**2,485**
Contingency	348
Total Project W/Contingency	**2,833**
Owner's Costs	258
Grand Total Capex (Including Closure)	**3,091**

22.7 Operating Costs

Operating costs are summarized in Table 22-6. The operating costs exclude pre-stripping, which has been re-allocated and included in the mining capital costs shown in Table 22-5. The unit costs are expressed as total operating costs (before re-allocation) divided by total tonnage.

Table 22-6: Operating costs summary

Operating Costs	LOM ($M)	Unit Rates	
1000 - Mine		*$1.20*	$/t moved
1000 - Mine	2,747	*$2.71*	$/t milled
2000 - Crushing	196	*$0.19*	$/t milled
3000 - Process	2,974	*$2.94*	$/t milled
4000 - Tailings	27	*$0.03*	$/t milled
5000 - On-Site Infrastructure	368	*$0.36*	$/t milled
6000 - Off-Site Infrastructure	101	*$0.10*	$/t milled
7000 - Indirects	500	*$0.49*	$/t milled
Total Operating Costs	**6,913**	***$6.83***	**$/t milled**

22.8 Royalties and Taxes

Royalties, taxes and offsite costs are summarized in Table 22-7.

Table 22-7: Royalty summary

Category	LOM ($K)	NPV @ 8% ($K)
Total TCRC Freight	3,782,072	1,523,413
San Juan Provincial Royalty	498,294	207,446
Lirio DPMA	38,054	19,125
VAT	44,275	34,912
Applied Debits and Credits Tax (real)	146,622	69,061
Corporate Income Tax (real)	2,020,425	715,415
Total Offsite, Tax and Royalty Costs	**6,529,742**	**2,569,372**

22.8.1 San Juan Provincial Royalty

San Juan provincial royalties will be applicable to all copper concentrate sales. According to current legislation, the rate of provincial royalty is capped at 3% of pithead value. The pithead value has been calculated by deducting all site operating costs (processing, infrastructure and G&A), except mining operating costs, from project net revenue.

While not required by legislation, the project may be required to contribute to a Provincial Infrastructure Fund (PIF). Considerable investment will be incurred by the project in San Juan infrastructure, including roads and electrical networks. It is to be determined how such investments may be offset against any such PIF requirements and royalty obligations.

The ultimate rate of provincial royalty, infrastructure funding requirements and associated offsets for infrastructure costs incurred by the project will be mutually agreed between Josemaria Resources and the Government of the Province of San Juan in conjunction with the project approvals and permitting process. The highest rate of potential provincial royalty has been utilized in the project economics in order to provide an adequate provision for all potential provincial royalties, infrastructure funding requirements and municipal levies.

22.8.2 Lirio DPMA Royalty

One private royalty was considered in accordance with advice received from Josemaria Resources. This royalty, Lirio DPMA, is applicable to the majority of the lease and was modelled as applying to all sales. It is comprised of a $2M lump-sum payable in the third year of production and 0.5% net profit royalty for the subsequent 10 years of production.

22.8.3 Corporate Tax

Corporate income tax was modelled in a simplified manner, as is appropriate for an FS level of study. The current rate of Argentina corporate income tax is 30% and is legislated to reduce to

25% commencing in 2021. Accordingly, the rate of corporate income tax applied in the base case model is 25%. Tax losses were carried forward.

Depreciation was modelled in a simplified fashion, suitable for a FS evaluation. As a sensitivity, allocating all capital to the slower depreciation model made approximately $1M difference to the project valuation. The project valuation is insensitive to minor variations in depreciation treatment.

In accordance with advice regarding Argentina taxation laws, an adjustment was made to depreciation balances to account for the effect of the high inflation rate assumed for the Argentinian Peso. This adjustment reduced the erosion of the depreciation balance in reals terms and ensured that the full expenditure was ultimately deducted for the determination of taxable income.

22.8.4 Federal Export Tax

The current legislation provides for the application of an export tax, levied on sales. The rate is set at 8%, but a cap at a rate of 3 Argentinian Pesos per USD is also applied. The current hyper-inflationary environment means that the effective capped rate drops to very low levels by the commencement of production. It is considered unlikely that the export tax will be continued in its current form, and accordingly, it was not modelled for the base case presented in this report. SRK notes that the application of a significant export tax remains a possibility and therefore a risk to the economics of the project.

22.8.5 Value Added Tax

Value added tax (VAT) was modelled using capital and operating expenditure as the basis for the tax. The tax was assumed to be 100% refundable in nominal terms, but with an average delay of three months resulting from the combination of delay between incurring expense and receiving revenue, as well as an administrative delay. The rates applied were 10.5% for capital expenditure and 21.0% for operating expenditure. The allocation of rate to expenditure to those rate categories will be more complex than modelled, but for the purposes of feasibility-level evaluation, the proxy of splitting between capital and operating costs in this fashion is appropriate.

22.8.6 Debits and Credits Tax

This tax is applicable on certain debits and credits on bank accounts opened with local financial institutions (that act as withholding agents) and on movements of funds through organized payment systems replacing the use of bank accounts. The main exemptions related to the project are the collection of export proceeds and credits for loans received from financial institutions.

The applicable rate is 0.6% per debit and 0.6% per credit. As from 1 January 2018, 33% of the total tax paid may be taken as an advance payment of income tax. The portion of the tax that is not an income tax credit is deductible for income tax purposes.

The 0.6% debits and credits tax was modelled using various cashflows in the economic model as proxies for the more detailed accounting procedures and policies that will be in place for financing, construction and operations.

22.9 Off-Site Costs

Off-site costs (concentrate freight, port handling, treatment charges and refining charges) were deducted from payable revenue and are summarized in Table 22-8. The basis for the charges is summarized in Section 19.

Table 22-8: Summary of modelled off-site costs

Category	Units	Costs
Concentrate Freight		
Road Freight	$/wmt	82.00
Port and Handling	$/wmt	19.00
Ocean Freight	$/wmt	42.33
Weighing, assaying and insurance	$/wmt	6.56
Total Freight Charges	**$/wmt**	**149.89**
Treatment and Refining Charges		
Treatment Charges	$/dmt	78.22
Losses	%	0.30
Copper refining charge	$/lb	0.078
Gold refining charge	$/oz	5.00
Silver refining charge	$/oz	0.46

22.10 Arsenic Penalties

Arsenic penalties were estimated within the economic model. The average arsenic grades in mill feed were reported from the mining schedule. A recovery to concentrate was estimated using a simple assumption of arsenic recovery percentage to concentrate being two-thirds of the copper recovery percentage for the same material.

A penalty function was modelled at $2.50 per tonne of concentrate per 0.1% of arsenic above a threshold of 0.2% arsenic. Some additional variability was artificially introduced into the presumed arsenic concentrations to offset some assumed smoothing in the modelling and production forecasts and to test the sensitivity of the calculations to this potential issue. The total estimated arsenic penalties remained low, with a total LOM penalty estimated at approximately $20M, or 0.09% of total payable revenue.

22.11 Sensitivity Analysis

Table 22-9 to Table 22-16 summarize the sensitivity of the project NPV ($B at 8% discount rate) and IRR (real terms) to variations in key input assumptions across a change of +/-20%.

Table 22-9: Two-factor sensitivity (NPV in $M) – Capex and Opex

After-tax NPV at 8%		Operating Costs				
		-20%	-10%	0%	10%	20%
Capital Costs	-20%	2,448	2,245	2,043	1,840	1,637
	-10%	2,191	1,988	1,786	1,583	1,380
	0%	1,934	1,731	**1,528**	1,326	1,119
	10%	1,677	1,472	1,265	1,060	855
	20%	1,412	1,207	1,002	797	592

Table 22-10: Two-factor sensitivity (IRR in %) – Capex and Opex

After-tax IRR		Operating Costs				
		-20%	-10%	0%	10%	20%
Capital Costs	-20%	21.2	20.4	19.5	18.6	17.7
	-10%	18.9	18.1	17.3	16.4	15.5
	0%	16.9	16.2	**15.4**	14.5	13.6
	10%	15.3	14.5	13.7	12.9	12.0
	20%	13.7	13.0	12.2	11.4	10.6

Table 22-11: Two-factor sensitivity (NPV in $M) – Prices and discount rate

After-tax NPV at 8%		Discount Rate				
		6%	7%	8%	9%	10%
Metal Prices	-20%	546	313	111	-64	-215
	-10%	1,412	1,097	823	584	376
	0%	2,272	1,875	**1,528**	1,226	962
	10%	3,121	2,642	2,224	1,859	1,539
	20%	3,970	3,409	2,920	2,491	2,115

Table 22-12: Two-factor sensitivity (IRR in %) – Prices and discount rate

After-tax IRR		Discount Rate				
		6%	7%	8%	9%	10%
Metal Prices	-20%	8.6	8.6	8.6	8.6	8.6
	-10%	12.2	12.2	12.2	12.2	12.2
	0%	15.4	15.4	**15.4**	15.4	15.4
	10%	18.1	18.1	18.1	18.1	18.1
	20%	20.7	20.7	20.7	20.7	20.7

Table 22-13: Two-factor sensitivity (NPV in $M) – Capex and metal prices

After-tax NPV at 8%		Metal Prices				
		-20%	-10%	0%	10%	20%
Capex	-20%	644	1,347	2,043	2,738	3,435
	-10%	381	1,090	1,786	2,481	3,177
	0%	111	823	**1,528**	2,224	2,920
	10%	-162	560	1,265	1,967	2,663
	20%	-434	291	1,002	1,710	2,405

Table 22-14: Two-factor sensitivity (IRR in %) – Capex and metal prices

After-tax IRR		**Metal Prices**				
		-20%	**-10%**	**0%**	**10%**	**20%**
Capex	-20%	12.2	16.1	19.5	22.6	25.4
	-10%	10.3	14.0	17.3	20.2	22.9
	0%	8.6	12.2	**15.4**	18.1	20.7
	10%	7.2	10.7	13.7	16.4	18.9
	20%	5.9	9.3	12.2	14.9	17.2

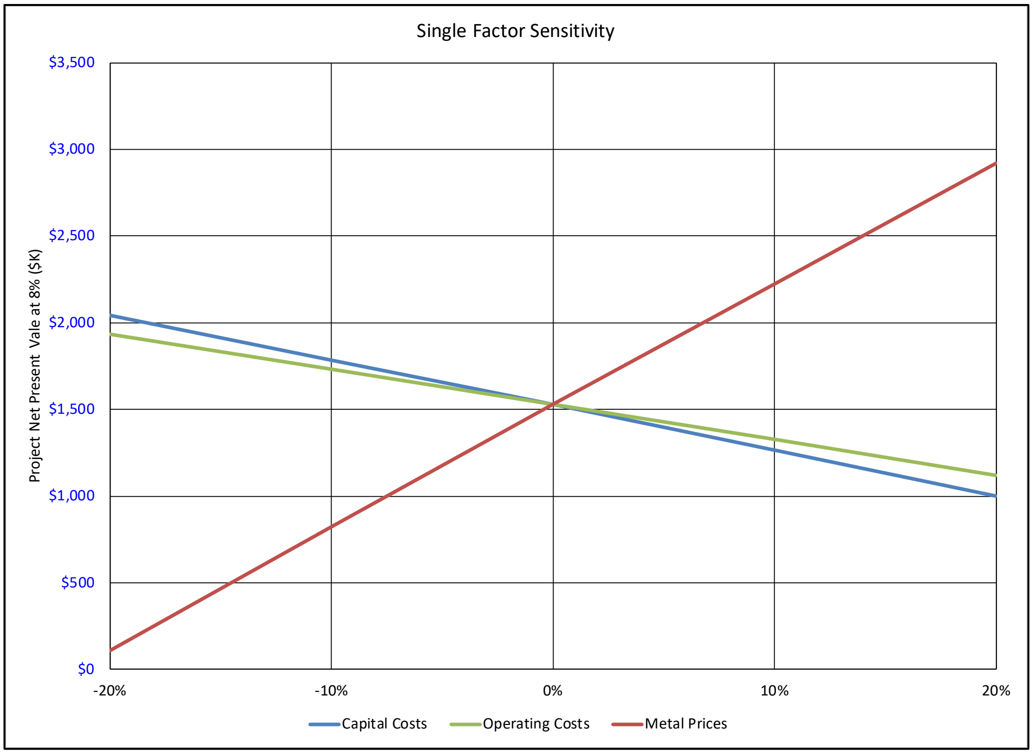
Table 22-15: Sensitivity (NPV in $M) – Individual metal prices

After-tax NPV at 8%	**Metal Prices**				
	-20%	**-10%**	**0%**	**10%**	**20%**
Copper Price ($/lb)	2.40	2.70	3.00	3.30	3.60
After-tax NPV at 8%	547	1,037	1,528	2,013	2,497
Gold Price ($/oz)	1,200	1,350	1,500	1,650	1,800
After-tax NPV at 8%	1,120	1,327	1,528	1,730	1,931
Silver Price ($/oz)	14.40	16.20	18.00	19.80	21.60
After-tax NPV at 8%	1,508	1,518	1,528	1,539	1,549

Table 22-16: Sensitivity (IRR – Real in %) – Individual metal prices

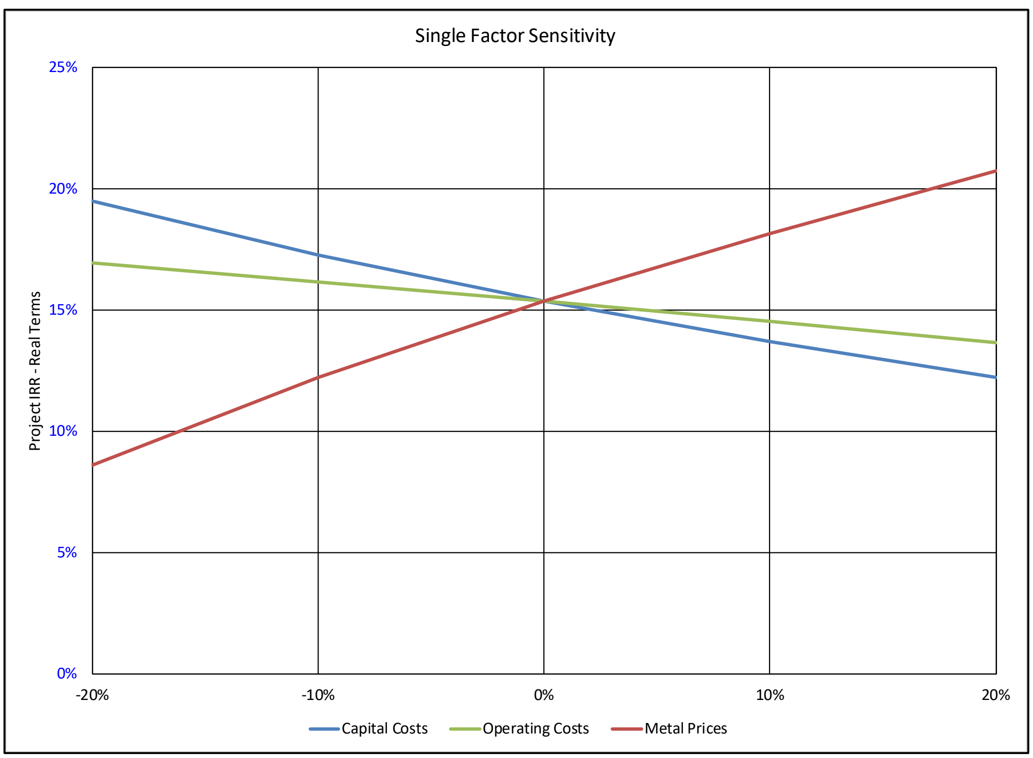
After-tax IRR (Real)	**Metal Prices**				
	-20%	**-10%**	**0%**	**10%**	**20%**
Copper Price ($/lb)	2.40	2.70	3.00	3.30	3.60
After-tax IRR (Real)	10.9	13.2	15.4	17.3	19.1
Gold Price ($/oz)	1,200	1,350	1,500	1,650	1,800
After-tax IRR (Real)	13.5	14.5	15.4	16.2	17.1
Silver Price ($/oz)	14.40	16.20	18.00	19.80	21.60
After-tax IRR (Real)	15.3	15.3	15.4	15.4	15.4

Figure 22-3 and Figure 22-4 show how the project NPV and IRR vary as price, capital costs and operating costs are varied across a range of +/-20%. As is common to all minerals industry projects, commodity price is a highly significant driver of value.



Source: SRK 2020

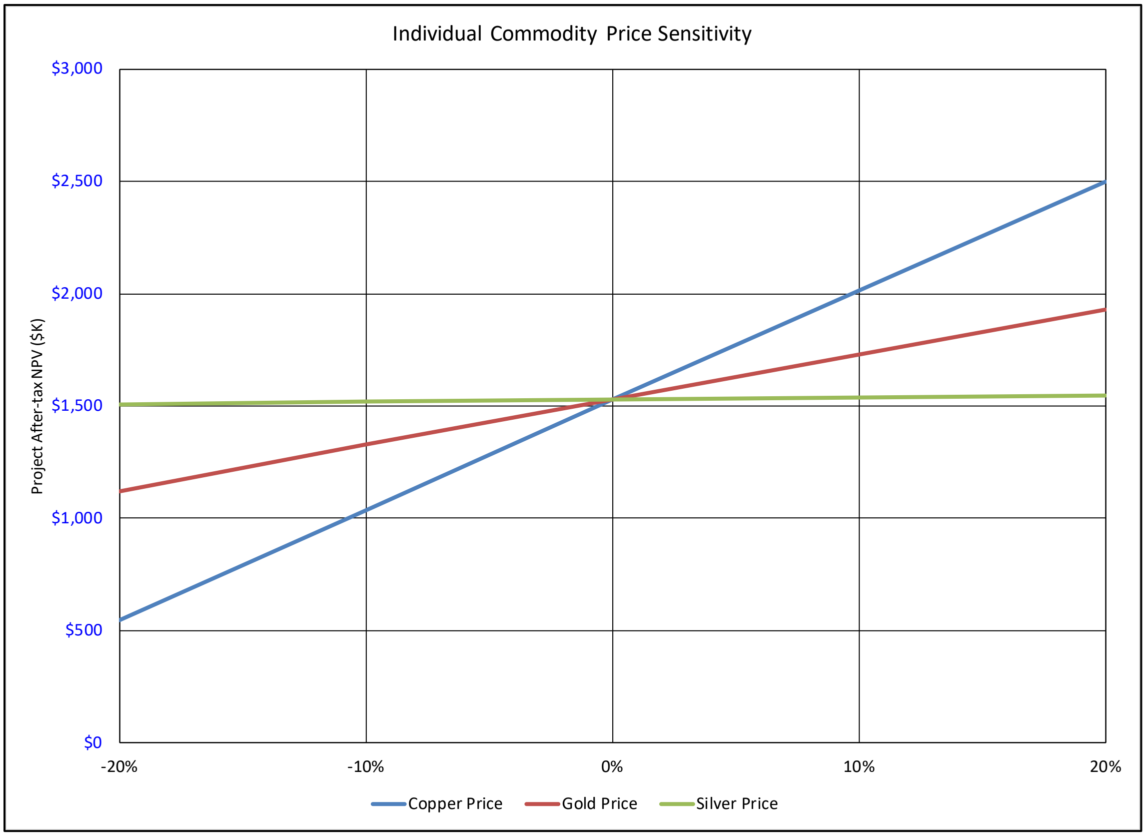
Figure 22-3: Single factor sensitivity – NPV @ 8%



Source: SRK 2020

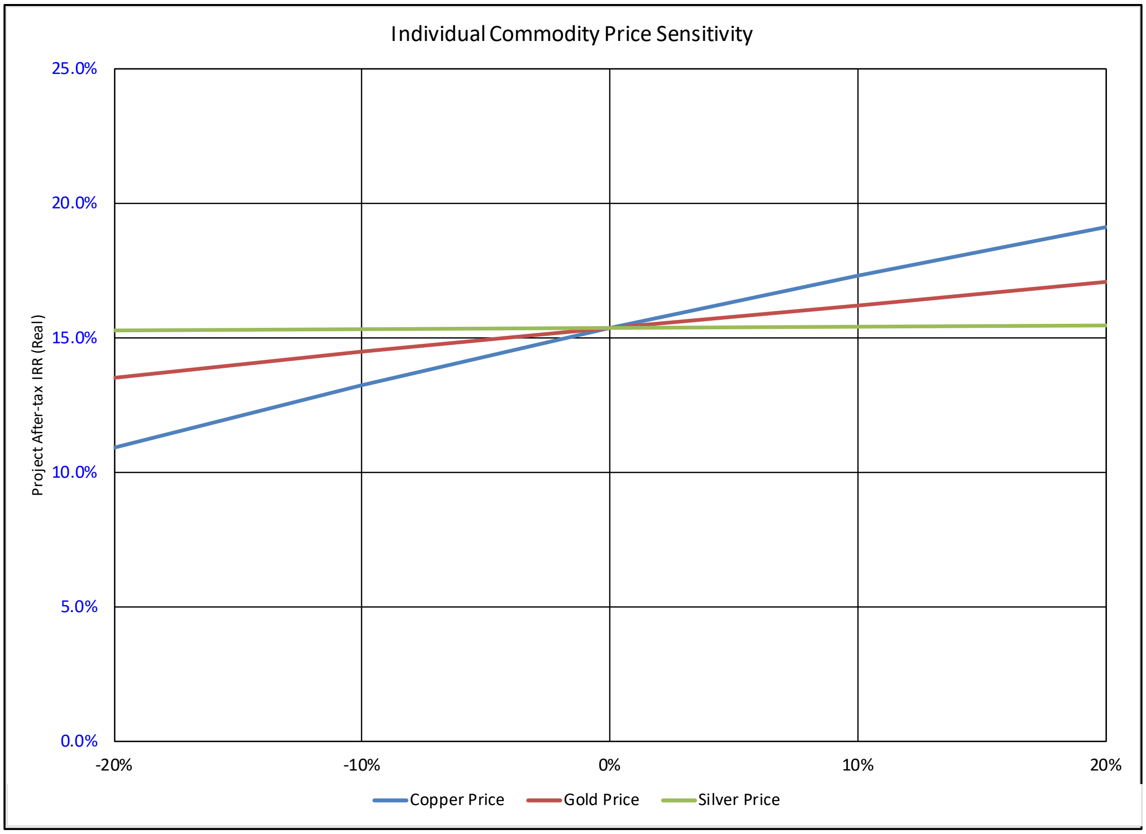
Figure 22-4: Single factor sensitivity – IRR (Real)

Figure 22-5 and Figure 22-6 show how the project NPV and IRR vary as individual commodity prices are varied across a range of +/-20%. Copper, being the main source of revenue, demonstrates greater sensitivity.



Source: SRK, 2020

Figure 22-5: Metals price sensitivity – NPV @ 8%



Source: SRK, 2020

Figure 22-6: Metals price sensitivity – IRR (Real)

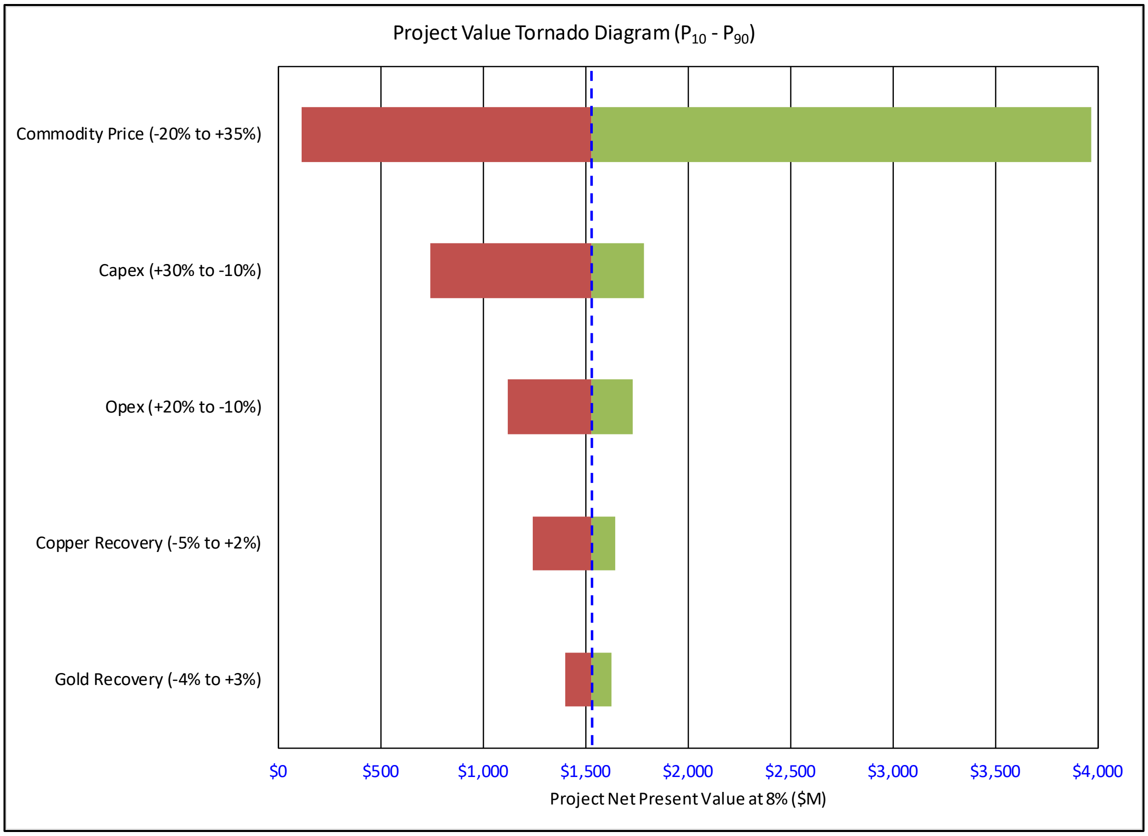
Figure 22-7 and Figure 22-8 illustrate the response of project NPV and IRR to variations in assumptions regarding key value-drivers. The general approach was to estimate P_{10} and P_{90} values for each key driver.

A P_{10} defines the parameter value that has only a 10% probability of being realized on the downside. Conversely it is estimated that there is a 90% chance of that value being exceeded.

A P_{90} defines the parameter value that is estimated to have only a 10% chance of being exceeded on the upside (or conversely a 90% chance of not being exceeded). Another way to look at it is that the parameter has an 80% chance of lying between the P_{10} and P_{90} values.

Commodity Price was estimated to have a moderately asymmetric risk with the range being defined at -20% and +35% compared to base-case. Across this range, commodity prices are the largest single uncertainty with respect to project value.

Capital Expenditure was estimated to have an asymmetric risk with a +35% to -20% range. That is, there is a 10% chance that the capital costs will be 35% higher than base case and a 10% chance that a saving of 20% will be realized.

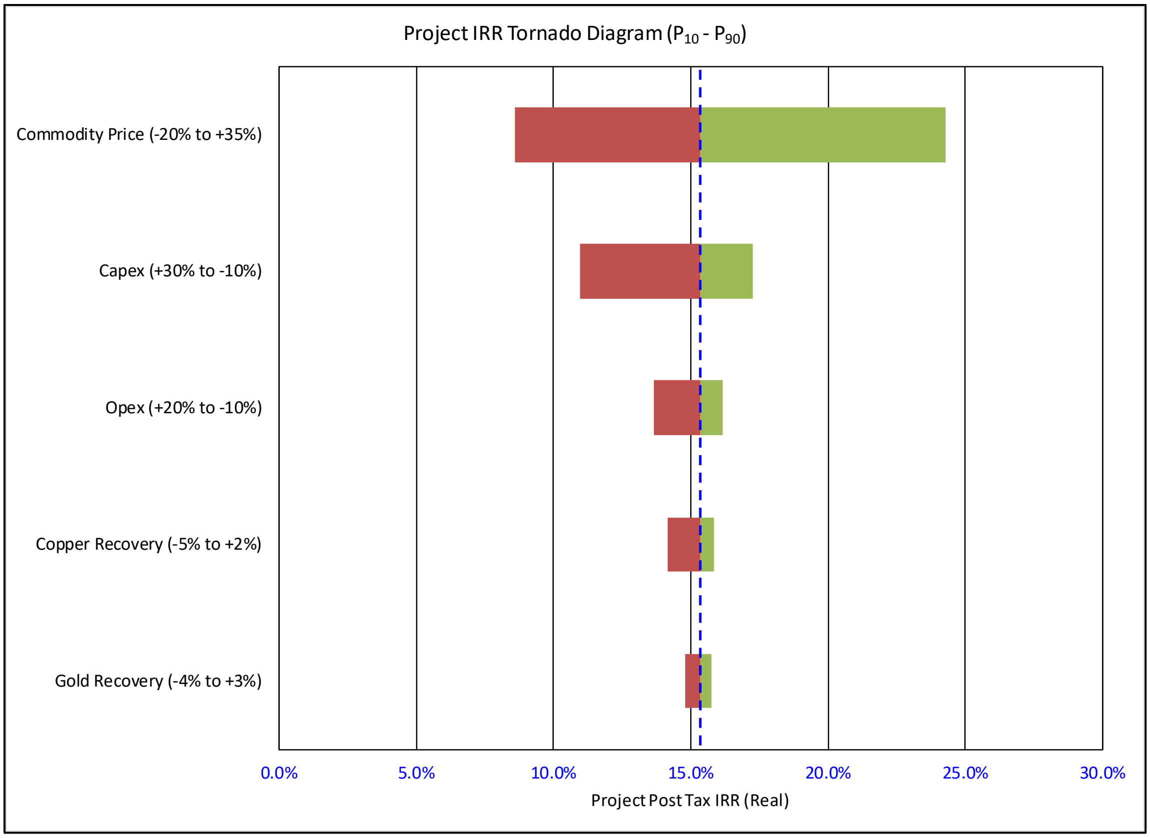


Source: SRK, 2020

Figure 22-7: Tornado diagram of key risk sensitivity – NPV @ 8%

Operating Costs were estimated to have moderately asymmetric risk across the range of +20% downside to -10% upside.

Process Recovery is also considered as an asymmetric risk. For copper, a 5% reduction in recovery downside value and a 2% upside value was considered. For gold, the range was from -4% downside to +3% upside. Note that the flex is expressed as absolute percentage points (not relative), added and subtracted to the base-case recovery assumptions for this analysis.



Source: SRK, 2020

Figure 22-8: Tornado diagram of key risk sensitivity – IRR (real)

23 Adjacent Properties

Not applicable

24 Other Relevant Data and Information

Not applicable

25 Interpretations and Conclusions

25.1 Mineral Resource Estimates

The Josemaria Project hosts a sulphide mineral resource (Measured and Indicated) of 1,159 Mtonnes at 0.29% Cu, 0.21 g/t Au and 0.9 g/t Ag.

25.2 Mineral Reserve Estimate

The Josemaria Project hosts a mineral reserve (Proven and Probable) of 1,012 Mtonnes at 0.30% Cu, 0.22 g/t Au and 0.94 g/t Ag.

The mine will use a variable cut-off grade policy. Material will only be fed to the mill if its NSR exceeds the operating cost of the mill plus G&A costs and sustaining capital costs. If at the time of mining, there is more above cut-off material than the mill can handle, this material is to be stockpiled at any of low-grade, medium-grade or high-grade stockpiles. In order to be placed in the long-term low-grade stockpile, the cut-off grade is elevated by the rehandle cost to place and then reclaim ore from these stockpiles. For the FS study, the cut-off grade for material fed directly to the mill ranges from $5.16/t to $5.22/t in NSR, depending on the metallurgical zone. The cut-off increases by $0.53/t for stockpiling.

25.3 Pit Geotechnical

The pit footprint is on a hillside and the maximum wall heights will range from approximately 800 m in the south to 400 m in the north. Rock mass and strength data were interrogated via histograms and statistics based on lithology, alteration and mineralization properties. Rock mass ratings of the major units were in the ‘fair’ to ‘good’ categories, with the exception of a distinct zone of rock (‘low-RQD’ zone) at depth in the north that was in the ‘poor’ category. SRK found that the geomechanical control on this zone was both alteration and structure.

Average slope angles were constrained by benchmarking against published deep pits and typically range from 37 to 43 degrees, with the exception being the low-RQD zone that required a slope angle of 34 degrees to maintain slope stability.

25.4 Mining Methods

The Josemaria project is to be developed as a large-scale open pit mining operation. Over 1 billion tonnes of ore will be mined at a strip ratio of 0.98 over a 19-year life of mine. Large electrically powered hydraulic shovels will be used in combination with ultra-class 360-tonne haul trucks. To maximize productivity, efficiency and safety in a high-altitude environment, haul trucks will be autonomously operated and drill functions will also be autonomously operated as much as possible.

Waste rock mining will result in the disposal of PAG material. The two waste facilities (West WSF and South WSF) are designed to optimize waste haulage throughout the LOM plan while abiding by geotechnical design criteria. Water management in closure consists in directing water from these facilities to either the TSF or the mined out open pit.

25.5 Metallurgical Testwork

Numerous metallurgical test programs have been completed on the Josemaria deposit over the last five years. Average metal recoveries over the life of the mine are expected to by 85% for copper, 63% for gold and 72% for silver. Ore hardness for the different zones has been considered when evaluating throughput, allowing for marginal increases in throughput when softer supergene and porphyry material are processed. Josemaria materials are amenable to conventional grinding and flotation processes and will produce a readily saleable copper concentrate.

25.6 Recovery Plan

The plant is a conventional SABC circuit. The design of the plant was supported by extensive testwork, including SMC testing, to support SAG sizing and a pilot plant for the flotation circuit as well as pilot plant product testing at Pocock Industrial for solid liquid separation parameters.

The plant design is considered to be robust enough to allow operation at tonnages above nameplate when treating softer ores.

25.7 Tailings Storage Facility

Bulk tailings will be segregated in the process to form two tailings streams; low sulphur rougher tailings and high sulphur cleaner tailings. The tailings streams are segregated to assist with the management of PAG material using a Best Management Practice approach. Thickened slurry tailings will be discharged in the TSF located to the south of the Process Plant. Approximately one billion tonnes of thickened slurry tailings will be discharged over the life of the project within the TSF. The TSF impoundment requires three dams that will be constructed continuously from Years -3 to Year 18 to contain the tailings.

All mine contact water, which includes runoff from the plant site, TSF contributing catchment, waste rock storage facilities, tailings beaches, tailings slurry water, open pit mine dewatering flows and groundwater accumulating in the TSF will be collected, stored and managed within the project area. Seepage collected in collection ponds located downstream of the Main and South Dams will be pumped back to the plant site for reuse in processing. Contact water will not be discharged from the project site. Diversion ditches will be installed around the plant site, waste storage facilities, open pit, and TSF to convey clean or non-contact freshwater around these disturbed areas, where it is physically practical. Water that accumulates on project infrastructure will be collected and pumped to the TSF for reuse in processing. No water will be discharged to the environment that would have adverse environmental impact.

The primary objective of the closure and reclamation initiatives will be to return the TSF to a self-sustaining facility that satisfies the end land-use objectives. The TSF is designed to maintain long-term stability, protect the downstream environment, and manage surface water. At closure, the tailings surface will be capped using non-acid generating material to limit ingress of oxygen and water to the tailings material.

25.8 Environmental Studies, Permitting, and Social or Community Impact

Baseline environmental studies have been completed in various areas: meteorology, hydrology, geochemistry, water quality, hydrogeology, seismicity, glaciology/cryology, noise and vibration, archaeology, aquatic biology and terrestrial biology. Public consultation has also occurred. The project will not be releasing any contaminated water into the receiving environment during operation or closure and there is strong public support for the project.

The permitting process is established and well understood. Sufficient time has been built into the project schedule to allow for a rigorous submission and review period, but no delays are anticipated as all expected concerns will be addressed within the initial submission.

25.9 Risks and Opportunities

As part of the FS, subject matter experts from SRK (Mining, Geotechnical Engineering, Economics), Fluor (Processing, Infrastructure), Knight Piésold (Tailings Management) and representatives from Josemaria Resources (Geology, Environment, Permitting, Logistics, Marketing) attended a 2-day workshop from 30-31 July 2019 to discuss, review and rank risks and opportunities associated with the Josemaria project. The outcomes of the risk assessment workshop were updated in September 2020 to reflect new information and project understanding gathered during the FS process.

25.9.1 Probability and Consequence Assessment

Risks and opportunities were quantified for both likelihood (probability of occurrence) and consequence (impact of occurrence) and then normalised out of 100. The consequences were assessed over seven categories: safety impact, revenue impact, production rate, capital cost, operating cost, construction schedule and pre-construction schedule (including permitting). The likelihood of occurrence was based on professional opinion in the context of the current plans for the project.

25.9.2 Project Risks and Opportunities

The risks and opportunities assessed were considered at the Josemaria project asset level. However, potential effects at the corporate level (Josemaria Resources), which may impact cost of capital or corporate reputation, were also reflected in the Corporate Relevance column of the register. Risks identified with Moderate or High corporate relevance, while not necessarily receiving a high aggregate risk ranking, are nonetheless important to highlight since in the unlikely event that they do come to pass, they could have a significant impact on Josemaria Resources and its ability to continue as a going concern.

25.9.3 Assumption of Controls

Risks and opportunities were assessed in the context of the currently planned construction and operation as contemplated for the feasibility study report.

As the project is yet to be constructed, many planned controls are not yet in place. The principle of the assessment is that risks and opportunities were ranked under the assumption that mitigation methods and controls understood to be planned by way of the current study are put in place, and that industry standard practices are generally implemented. It is NOT assumed that “best practice” controls will be put in place, nor that controls not currently planned nor reasonably expected are implemented.

25.9.4 Summary Results

Risks and opportunities were ranked and assigned both an aggregate risk ranking, representing its actual impact based on its assigned likelihood of occurrence, and a high probability ranking, when the likelihood of occurrence of that particular risk or opportunity was assigned the highest probability rating regardless of the actual assessed likelihood. This approach ensures that high-consequence, low probability events are not ignored simply because they are unlikely to occur.

A total of 109 items were ultimately identified and assessed as potential risks or opportunities. The number of items assessed should not be taken as an indication of the level of risk or opportunity around the project but is arguably a measure of the thoroughness of the assessment.

Aggregate Ranking

No risks or opportunities had an aggregate ranking above “Moderate”. The values of the risk and opportunity scoring are typical for a project that is in the feasibility study stage. No technical risks were identified that were significant enough to suggest a full strategic revision is required.

None of the risks ranked higher than “Moderate”, with the highest risk scoring 10/100. This risk was associated with a 50% relative increase in the base corporate income tax rate. The next highest risks (seven in total) scored 9/100 and were associated with environmental issues (in-perpetuity water treatment or increased closure costs), infrastructure (insufficient freshwater to supply the mill) and waste management (tailings facility failure or lack of sufficient waste rock storage capacity within an economic distance of the pit). The majority of risks identified during the workshop scored 6/100 or lower (“Insignificant“).

The four most significant opportunities scored 9/100 (“Moderate”) and were associated with a variable grind size (as recovery is relatively insensitive to grind size), higher metal prices, construction of an airstrip reducing the risk associated with commuting along the construction access roads, and bulk ore sorting to remove waste material from the ore feed before it gets to the mill. Two other opportunities scored 6/100 (“Insignificant”) and were associated with creation of a dump leach to extract value from the oxide material on the top of the deposit and a more refined cut-off assessment leading to improvements in the metal delivery schedule to the mill.

High Probability Ranking

Scoring risks and opportunities as if they had a >90% of occurring, even if they were originally scored with a low probability, ensures that high consequence events are identified and considered, even if they are very unlikely to occur.

Two risks scored as “Severe” (risk score of 26 – 50) and these were associated with catastrophic events – a tailings dam failure and extreme natural phenomenon (that may cause a tailings dam failure or other severe consequences such as a pit slope failure). The tailings dam has been designed with an appropriate factor of safety to withstand anticipated conditions (seismicity, precipitation, etc.), however unlikely they may be to occur. The project has no control over weather or other natural phenomenon, but various project components have been designed with an appropriate factor of safety to address unlikely but possible weather conditions.

Three of the most significant opportunities were the same as the aggregate risk ranking and are associated with metal prices, grinding insensitivity and construction of an airstrip. The other opportunity is the possibility for a dump leach to extract value from the precious metals in the oxide material at the top of the deposit. All four opportunities were ranked in the “Major” category.

Corporate Relevance

As one would expect, the risks with the highest scores (both aggregate and high probability) also tend to be the ones that are associated with the highest impact at the corporate level, particularly those involving safety (human and environmental) and finance (cost of capital, taxation, initial capital cost). Of note, however, is that the high consequence/low probability risk of an extreme natural phenomenon is not considered of high corporate relevance as that is completely out of the control of Josemaria, other than ensuring the design of various project components took appropriate factors of safety into consideration, which they did.

All risks of high corporate relevance score 10/100 (“Moderate”) or lower on an aggregate basis.

25.10 General Financial Risks and Opportunities

25.10.1 Risks

Project Strategy Risk

SRK undertook an analysis as part of prior studies to determine the optimum project strategy across a range of commodity prices, and the recommendation for the current 150 ktpd throughput assumption remained valid. Overall, SRK considers that the likelihood of a major revision to project strategy emerging to be low.

Commodity Price Risk

There is a risk that commodity prices may not be consistent with assumptions made in this study. This risk is common to all minerals industry projects.

Capital Cost Risk

There is a risk that the capital required to build and operate the project may be higher than that forecast in this study. SRK recommends that the precision of the estimates be refined before commitment to project construction is made.

Operating Cost Risk

There is a risk that the operating costs incurred to operate the project may be higher than that forecast in this study. SRK notes that variability in the operating cost drivers (productivity, input costs and labour costs) over time is expected. The analysis assumes constant conditions but is best thought of as reflecting an expectation of average costs. SRK recommends that the precision of the estimates be refined before commitment to project construction is made.

Schedule Risk

There is a risk that the schedule to build the project may vary from that assumed in the study. This is an asymmetrical risk, with significantly more downside scope than upside. This risk is exacerbated by the seasonality of the location, with difficult construction conditions occurring in winter months. Smalls delays have the potential to be more significant than might otherwise be the case if they push critical path activities into winter months, thereby incurring a much longer delay.

Process Recovery Risk

There is a risk that achieved recoveries could be lower than estimated.

Permitting and Pre-construction Schedule Risk

This was not explicitly considered for the purposes of this study in the economic analysis as the analysis is conducted only from the commencement of construction. Nevertheless, the risk of longer-than-anticipated permitting timeline will reduce the project value as it is considered from “today” forward.

25.10.2 Opportunities

Real Option Value

In the case of a large, long-life open pit mine such as is contemplated for Josemaria, there exists significant optionality that can be leveraged to improve project cashflows and values. The simple sensitivity analysis conducted in Section 2.12 assumes a constant operating strategy, even as assumptions are varied. In practice, management has the option to alter strategy in response to those variations. Downsides can be mitigated, and upsides can be leveraged for greater returns.

It is also expected that the mine would be run using a dynamic cut-off policy where mill cut-offs, stockpiling strategies and mining rates will all be varied in real time to maximise returns as prices and costs vary. The benefits of this strategy are not reflected in the central estimate approach to valuation summarized in this report.

Project Strategy Opportunity

The probability of a major revision to project strategy is considered low, but nevertheless, careful consideration and revision of the strategic decisions should be a feature of studies going forward. In particular, effort should be made to enhance the optionality of the project, particularly where this is low cost.

Commodity Price Opportunity

There is a risk that commodity prices may not be consistent with assumptions made in this study. Higher prices, both realised and forecast would lead to re-optimisation of the mine and processing plans with a potential to create additional value beyond that shown by the sensitivity analysis summarized in Section 2.12.

Capital Cost Opportunity

Opportunities to reduce or defer capital expenditure may be realised in future studies. Care should be taken when considering the relationship between lower capital opportunities and technical risk to the project.

Operating Cost Opportunity

Operating costs may be lower than forecast for the purposes of this study. Lower costs should feed into both strategic and short-term mine planning, to allow optimisation of stockpiling and mill feed strategies.

Schedule Opportunity

This risk is highly asymmetric. SRK considers that the opportunity to execute a significantly shorter construction program is low. SRK cautions that optimised schedules with multiple critical or near-critical path activities will contain additional embedded risks.

Process Recovery Opportunity

Further metallurgical testwork will allow for optimisation of the process flow sheet and plant design from the Feasibility Study. Recoveries better than the current planning assumptions are possible.

Pit Slope Angle Opportunity

This is not considered to be a significant opportunity from an economic perspective. Pit slopes will be designed and refined as operations commence to manage the safety risk of slope failure.

26 Recommendations

26.1 Geology and Resources

The mineral resources in the pit are open at depth and the ultimate pit design currently is limited by the contact between probable reserves and inferred resources. Additional drilling targeting the inferred resource below the designed pit will improve confidence in the existence and grade of mineralized material below the pit, which may result in the ability to expand the pit at depth. If the pit is extended at depth, this may also allow for additional economic phases around the pit circumference at shallower depths.

26.2 Geotechnical

The geological complexity at Josemaria warrants ongoing investigations to continue developing an understanding of the structural geology of the deposit. In particular, the structures in the slopes that have greater stability risk should be targeted with drilling and the core carefully logged for faults and fault zones. The structural model should then be evaluated and updated with the data from each new drillhole and the model then evaluated for new slope stability risks.

Particular focus needs to be on improving the understanding of the major structures in Design Domain VI. The slope stability analyses in this domain showed that major structures, and their connectivity with the low RQD zone, could impact overall slope stability. Depending on their true orientation and continuity, the pit design for this domain may be dictated by these features, possibly requiring flatter slopes.

Additional structural mapping of the surface rock exposures (such as drill pad and road cuttings) would provide valuable control on the minor structures from drillholes and coverage of drillhole blind zones.

Laboratory geomechanical tests should be conducted on selected core samples from the 2019/2020 field program to establish larger data sets for the geotechnical domains that are under-represented. Geotechnical Domain 9 (low RQD zone = Design Domain II) should be a focus of the program. A focused study of the low RQD zone should be undertaken. The objective would be to better understand its geotechnical characteristics and refine the rock mass property values.

The stability analyses found that the low RQD zone will need to be depressurised for the design slopes to achieve the acceptance criteria. The current design considered passive drainage via a system of horizontal drains, however the effectiveness of natural drainage in this zone is uncertain. Additional vibrating wire piezometers (VWPs) should be installed during any subsequent drilling in the northern part of the pit to better assess potential impacts of structural controls (potential for compartmentalisation), which could impede passive slope depressurisation. To assess the ability to depressurise these domains, all VWPs should be monitored during any nearby drilling to determine if pressure responses provide higher confidence on connectivity in the rock mass.

In order to confirm the acceptability of the design slopes at the South WSF, lower LGSP and crusher access pad, a deformation analysis should be undertaken for each of these facilities as part of detailed engineering. Further field investigation is required in conjunction with the proposed seepage collection trench at the West WSF to confirm site characterisation assumptions.

26.3 Mining and Mineral Reserve Estimate

Recommendations associated with mining and the mineral reserve estimate include:

- Before detailed design or project implementation, the LG optimization exercise should be updated with latest forecasted metal prices and estimated metallurgical recoveries, operating costs and sustaining capital costs, as well as the latest resource model and geotechnical design inputs. If the outcome is a materially different ultimate pit shell, pit designs should be updated.
- The mine production schedule, which ultimately is the basis of Josemaria mineral reserves, is based on a dynamic cut-off grade policy. There will be opportunity to further optimize the application of cut-off grades for mine planning during the life of mine. It is recommended to revisit the development and application of the cut-off policy to determine if further value can be obtained. The mine schedule in any case will require updating if the pit designs are updated.

26.4 Metallurgy and Processing

The Josemaria Project will have a bridging phase between the end of the feasibility study and the start of basic engineering in January 2021. During this phase there exists an opportunity to conduct further metallurgical testwork in order to:

- Determine if an improvement can be made in metallurgical performance (recovery and/or grade)
- Obtain any further design data that is required to bring more certainty to equipment sizing and plant design

As well as potential improvements in metallurgical performance, the recommended program also offers the potential to reduce the number of re-grind mills and realize potential cost savings in thickening and filtration equipment.

Additional flotation testwork should be conducted using the major composite samples at coarse primary grinds to confirm or improve copper/gold recovery assumptions when compared to current limited data at coarse grinds. This work will likely include higher reagent dosages in flotation and higher mass pulls in rougher flotation. It is recommended that this work at higher reagent dosages duplicate the reagent suite used in the 2015 SGS Phase II testwork. This will enable determination with certainty as to whether the lower metallurgical performance in the ALS work is solely because of the samples containing more secondary copper minerals, or if the generally lower reagent dosages selected by ALS played a part.

It is recommended that cleaner flotation testwork set a target for re-grinding that is finer than the previous targets and with a narrower target range of 18 to 22 µm (P_{80}). This will likely provide a higher overall copper concentrate grade and benefit the chalcocite-containing materials, as this mineral is shown to be finer in particle size than chalcopyrite. If a finer re-grind size is selected, then the currently proposed tower mills may be at the limit of their efficiency. It is suggested, again only if a finer re-grind size is shown to be beneficial, that additional signature plot testwork be commissioned to support the design of IsaMills and HIG mills.

It is also recommended that testwork to evaluate the use of a first cleaner stage of flotation prior to re-grinding be investigated to allow for higher mass pulls in rougher flotation and to reduce the tonnage sent to re-grinding. Approximately 80% of the contained gangue in the rougher concentrates is shown to be completely liberated, based on PMA analysis of the ALS Metallurgy test products. If a finer re-grind size is selected, then several more tower mills will be required; however, if the concentrate mass can be reduced ahead of re-grinding, then additional mills will not be necessary.

26.5 Tailings and Freshwater Management

Recommendations for the next phase of engineering include:

- Confirm foundation conditions in the TSF basin and underneath the dams by completing additional geotechnical site investigation programs
- Install vibrating wire piezometers in foundation materials so that foundation pore pressures and hydraulic gradients can be assessed
- Complete geological mapping in the TSF basin to identify and characterize fault systems
- Complete additional geotechnical site investigation programs depending on findings of fault study
- Complete additional studies and site investigation programs to characterize and assess the landslides in the TSF basin
- Complete additional laboratory testwork programs to geotechnically and geochemically characterize the construction borrow sources
- Identify and characterize the concrete aggregate borrow source
- Complete detailed finite element stability modelling on the TSF dams to further analyse the effect of seismic loading and settlement on the structures
- Complete liquefaction assessment on the alluvial foundation in the dam footprints to confirm that the foundation is suitable for embankment construction and does not require foundation improvement or removal
- Develop 3D model of the TSF basin alluvial/bedrock contact to determine pore volume storage or potential losses in the sands and gravels
- Complete additional site investigation programs to confirm the make-up water requirement can be successfully provided by the well fields identified in the FS over the life of mine
- Tailings materials and properties should be reviewed during the next phase of design so that they are representative, especially if any changes to the process occur. Representative tailings samples should be provided and tested if they become available
- Assess the use of an Owner purchased construction fleet to construct the Main Dam versus contractor over life of the project
- Continue collection of site-specific meteorological and hydrology data to refine seasonal runoff values and design storms
- Optimize the water balance to incorporate updated runoff and process flow estimates

- Develop an Operations, Maintenance and Surveillance (OMS) Manual and Emergency Preparedness and Response Plan (EPRP) for the tailings and water management systems based on final designs and operating criteria
- Develop a full closure plan for the TSF based on the final design configuration
- Advance all design concepts to detailed design level in line with regulatory requirements

26.6 Infrastructure

It is recommended to complete another field investigation on various plant site infrastructure. This would involve drilling additional holes at the crusher (it has moved slightly from the previous location), at the truck shop (to characterise a fault structure), along the conveyor alignment (this alignment is now fixed) and in the plant site (SAG mills and ball mills) for geotechnical logging and analysis to confirm foundation conditions in advance of detailed structural engineering.

A detailed topographic survey, geohazard and geotechnical review of the South Access Road as defined by the local road design consultant should be undertaken in the next phase to support an updated design, cost estimate and schedule for its construction.

26.7 Logistics

A rail integrity assessment should take place to validate the information provided from BCyL (the owner of the rail line) and to discuss in more detail the upgrade plan that may positively impact rail payload. A meeting with BCyL should define travel times according to their future expansion plans; if the round-trip travel times can be reduced, there will be positive impacts on the cost of concentrate transport over land.

Port site visits should occur to directly evaluate the receiving facilities and to assess port infrastructure upgrade requirements. Currently port upgrades are included in the unit cost of port operations; however, any efficiencies that can reduce port capital will improve unit costs for that task.

26.8 Concentrate Marketing

During subsequent metallurgy and recovery test programs, any concentrate produced can be sent to smelters to test for suitability. Most smelters can approve from an assay and mineralogical analysis of the concentrate, but some smelters are more formal and will insist on samples prior to contract completion. A sample of 250 g will normally suffice for each smelter. This is a normal confirmatory exercise for potential financiers of the project to increase confidence that smelters can consume the concentrate.

26.9 Environmental Studies, Permitting, and Social or Community Impact

With the completion of the FS, Josemaria Resources should complete and submit an EIA by Q1 2021 to ensure project timelines remain intact; the EIA is currently well advanced and it is anticipated that this timeline will be met.

The EIA for the access road requires a separate permit. The company must collect archaeological baseline data along the access road in order to finish this particular EIA application.

Pump tests have been conducted on the water sources; however, additional pump tests are recommended on the Macho Muerto basin (well field B) to provide increased confidence in this water source.

The Josemaria site currently collects data from various environmental monitoring stations and should continue to collect water quality data and other meteorological information. Glacier monitoring in the regional area should also continue.

The government of Argentina has legislated that large power consumers need to source at least 20% of their power from renewable sources by 2025. During the feasibility study, obtaining power from solar or other renewable energy technologies was investigated. The response from prospective energy providers was positive and indicated a potential reduction in unit power costs when using renewables at no additional capital cost. This study was not advanced sufficiently to make use of the lower power costs within the financial analysis, but it represents a possible outcome. Further investigation is warranted, and a formal feasibility study should be conducted on the viability of utilising renewable energy.

26.10 2021 Work Program

The 2021 work program is contingent upon Josemaria Resources raising the necessary funds to conduct the work and the lifting of COVID-19 travel restrictions. Josemaria Resources will endeavour to complete as much of the work as possible but will also strive to maintain capital efficiency. If COVID-19 restrictions prevent or impede Josemaria Resources' ability to conduct work, programs may be delayed or cancelled and it may perform alternative works.

The expected work program for the upcoming year consists of:

- Deformation studies to confirm pseudo-static conditions of waste dumps/low-grade stockpiles
- Additional metallurgical testing to pursue the opportunity of moving the regrind circuit after the first cleaner stage of flotation which, if successful, would result in lower regrind opex and capex. Additional rougher grind tests to confirm optimal grind for design criteria and reagent suite tests to determine if any improvement in recoveries is possible.
- A field program of additional geotechnical drilling under major infrastructure based on final layout determined during the FS. Perform additional field investigation around the TSF.
- Finish and submit project and road EIAs along with remaining baseline data collection. Perform a more detailed assessment of local workforce capabilities.
- Detailed investigation of the concentrate transportation route including rail integrity assessment and port site visit
- Receive detailed topography and initiate detailed engineering of the south access road; commence bidding process for the pioneer and full construction road
- Engage with EPCM by performing basic engineering phase

The estimated cost for completing this work is summarized in Table 26-1.

Table 26-1: Josemaria work program cost estimate

Program Component	Cost Estimate ($000)
Engineering	35,000
Environmental	2,000
Field programs and lab work	4,000
Total Cost	**41,000**

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Date and Signature Page

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All data used as source material plus the text, tables, figures and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.