



Chapter 1

Introduction

DISCLAIMER

This disclaimer applies to and governs the disclosure and use of this Environmental Impact Statement (“EIS”), and by reading, using or relying on any part(s) of the EIS you accept this disclaimer in full.

This Environmental Impact Statement, including the Executive Summary, and all chapters of and attachments and appendices to it and all drawings, plans, models, designs, specifications, reports, photographs, surveys, calculations and other data and information in any format contained and/or referenced in it, is together with this disclaimer referred to as the “EIS”.

Purpose of EIS

The EIS has been prepared by, for and on behalf of Wafi Mining Limited and Newcrest PNG 2 Limited (together the “**WGJV Participants**”), being the participants in the Wafi-Golpu Joint Venture (“**WGJV**”) and the registered holders of exploration licences EL 440 and EL1105, for the sole purpose of an application (the “**Permit Application**”) by them for environmental approval under the Environment Act 2000 (the “**Act**”) for the proposed construction, operation and (ultimately) closure of an underground copper-gold mine and associated ore processing, concentrate transport and handling, power generation, water and tailings management, and related support facilities and services (the “**Project**”) in Morobe Province, Independent State of Papua New Guinea. The EIS was prepared with input from consultants engaged by the WGJV Participants and/or their related bodies corporate (“**Consultants**”).

The Permit Application is to be lodged with the Conservation and Environment Protection Authority (“**CEPA**”), Independent State of Papua New Guinea.

Ownership and Copyright

The EIS is the sole property of the WGJV Participants, who reserve and assert all proprietary and copyright ©2018 interests.

Reliance and Use

The EIS is intended and will be made available to CEPA, for review by CEPA and other applicable agencies of the Government of the Independent State of Papua New Guinea (“**Authorised Agencies**”), for the purpose of considering and assessing the Permit Application in accordance with the Act (“**Authorised Purpose**”), and for no other purpose whatsoever.

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The EIS is meant to be read as a whole, and any part of it should not be read or relied upon out of context.

Limits on investigation and information

The EIS is based in part on information not within the control of either the WGJV Participants or the Consultants. While the WGJV Participants and Consultants believe that the information contained in the EIS should be reliable under the conditions and subject to the limitations set forth in the EIS, they do not guarantee the accuracy of that information.

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While the WGJV Participants, their Related Bodies Corporate and Consultants believe that the information (including any opinions, forecasts or projections) contained in the EIS should be reliable under the conditions and subject to the limitations set out therein, and provide such information in good faith, they make no warranty, guarantee or promise, express or implied, that any of the information will be correct, accurate, complete or up to date, nor that such information will remain unchanged after the date of issue of the EIS to CEPA, nor that any forecasts or projections will be realised. Actual outcomes may vary materially and adversely from projected outcomes.

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- expressly disclaim any liability for any consequential, special, contingent or penal damages whatsoever.

The basis of the Consultants’ engagement is that the Consultants’ liability, whether under the law of contract, tort, statute, equity or otherwise, is limited as set out in the terms of their engagement with the WGJV Participants and/or their related bodies corporate.

Disclosure for Authorised Purpose

The WGJV Participants acknowledge and agree that, for the Authorised Purpose, the EIS may be:

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- published or disclosed in whole or in part, including being made available to the general public in accordance with section 55 of the Act. All publications and disclosures are subject to this disclaimer.

Development of Project subject to Approvals, Further Studies and Market and Operating Conditions

Any future development of the Project is subject to further studies, completion of statutory processes, receipt of all necessary or desirable Papua New Guinea Government and WGJV Participant approvals, and market and operating conditions.

Engineering design and other studies are continuing and aspects of the proposed Project design and timetable may change.

NEWCREST MINING LIMITED DISCLAIMER

Newcrest Mining Limited (“**Newcrest**”) is the ultimate holding company of Newcrest PNG 2 Limited and any reference below to “Newcrest” or the “Company” includes both Newcrest Mining Limited and Newcrest PNG 2 Limited.

Forward Looking Statements

The EIS includes forward looking statements. Forward looking statements can generally be identified by the use of words such as “may”, “will”, “expect”, “intend”, “plan”, “estimate”, “anticipate”, “continue”, “outlook” and “guidance”, or other similar words and may include, without limitation, statements regarding plans, strategies and objectives of management, anticipated production or construction commencement dates and expected costs or production outputs. The Company continues to distinguish between outlook and guidance. Guidance statements relate to the current financial year. Outlook statements relate to years subsequent to the current financial year.

Forward looking statements inherently involve known and unknown risks, uncertainties and other factors that may cause the Company’s actual results, performance and achievements to differ materially from statements in this EIS. Relevant factors may include, but are not limited to, changes in commodity prices, foreign exchange fluctuations and general economic conditions, increased costs and demand for production inputs, the speculative nature of exploration and project development, including the risks of obtaining necessary licences and permits and diminishing quantities or grades of reserves, political and social risks, changes to the regulatory framework within which the Company operates or may in the future operate, environmental conditions including extreme weather conditions, recruitment and retention of personnel, industrial relations issues and litigation.

Forward looking statements are based on the Company’s good faith assumptions as to the financial, market, regulatory and other relevant environments that will exist and affect the Company’s business and operations in the future.

The Company does not give any assurance that the assumptions will prove to be correct. There may be other factors that could cause actual results or events not to be as anticipated, and many events are beyond the reasonable control of the Company. Readers are cautioned not to place undue reliance on forward looking statements. Forward looking statements in the EIS speak only at the date of issue. Except as required by applicable laws or regulations, the Company does not undertake any obligation to publicly update or revise any of the forward looking statements or to advise of any change in assumptions on which any such statement is based.

Non-IFRS Financial Information

Newcrest results are reported under International Financial Reporting Standards (IFRS) including EBIT and EBITDA. The EIS also includes non-IFRS information including Underlying profit (profit after tax before significant items attributable to owners of the parent company), All-In Sustaining Cost (determined in accordance with the World Gold Council Guidance Note on Non-GAAP Metrics released June 2013), AISC Margin (realised gold price less AISC per ounce sold (where expressed as USD), or realised gold price less AISC per ounce sold divided by realised gold price (where expressed as a %), Interest Coverage Ratio (EBITDA/Interest payable for the relevant period), Free cash flow (cash flow from operating activities less cash flow related to investing activities), EBITDA margin (EBITDA expressed as a percentage of revenue) and EBIT margin (EBIT expressed as a percentage of revenue). These measures are used internally by Management to assess the performance of the business and make decisions on the allocation of resources and are included in the EIS to provide greater understanding of the underlying performance of Newcrest's operations. The non-IFRS information has not been subject to audit or review by Newcrest's external auditor and should be used in addition to IFRS information.

Ore Reserves and Mineral Resources Reporting Requirements

As an Australian Company with securities listed on the Australian Securities Exchange (ASX), Newcrest is subject to Australian disclosure requirements and standards, including the requirements of the Corporations Act 2001 and the ASX. Investors should note that it is a requirement of the ASX listing rules that the reporting of Ore Reserves and Mineral Resources in Australia comply with the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code) and that Newcrest's Ore Reserve and Mineral Resource estimates comply with the JORC Code.

Competent Person's Statement

The information in the EIS that relates to Golpu Ore Reserves is based on information compiled by the Competent Person, Mr Pasqualino Manca, who is a member of The Australasian Institute of Mining and Metallurgy. Mr Pasqualino Manca, is a full-time employee of Newcrest Mining Limited or its relevant subsidiaries, holds options and/or shares in Newcrest Mining Limited and is entitled to participate in Newcrest's executive equity long term incentive plan, details of which are included in Newcrest's 2017 Remuneration Report. Ore Reserve growth is one of the performance measures under recent long term incentive plans. Mr Pasqualino Manca has sufficient experience which is relevant to the styles of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the JORC Code 2012. Mr Pasqualino Manca consents to the inclusion of material of the matters based on his information in the form and context in which it appears.

HARMONY GOLD MINING COMPANY LIMITED DISCLAIMER

Harmony Gold Mining Company Limited ("Harmony") is the ultimate holding company of Wafi Mining Limited and any reference below to "Harmony" or the "Company" includes both Harmony Gold Mining Company Limited and Wafi Mining Limited.

Forward Looking Statements

These materials contain forward-looking statements within the meaning of the safe harbor provided by Section 21E of the Securities Exchange Act of 1934, as amended, and Section 27A of the Securities Act of 1933, as amended, with respect to our financial condition, results of operations, business strategies, operating efficiencies, competitive positions, growth opportunities for existing services, plans and objectives of

management, markets for stock and other matters. These include all statements other than statements of historical fact, including, without limitation, any statements preceded by, followed by, or that include the words "targets", "believes", "expects", "aims", "intends", "will", "may", "anticipates", "would", "should", "could", "estimates", "forecast", "predict", "continue" or similar expressions or the negative thereof.

These forward-looking statements, including, among others, those relating to our future business prospects, revenues and income, wherever they may occur in this EIS and the exhibits to this EIS, are essentially estimates reflecting the best judgment of our senior management and involve a number of risks and uncertainties that could cause actual results to differ materially from those suggested by the forward-looking statements. As a consequence, these forward-looking statements should be considered in light of various important factors, including those set forth in these materials. Important factors that could cause actual results to differ materially from estimates or projections contained in the forward-looking statements include, without limitation: overall economic and business conditions in South Africa, Papua New Guinea, Australia and elsewhere, estimates of future earnings, and the sensitivity of earnings to the gold and other metals prices, estimates of future gold and other metals production and sales, estimates of future cash costs, estimates of future cash flows, and the sensitivity of cash flows to the gold and other metals prices, statements regarding future debt repayments, estimates of future capital expenditures, the success of our business strategy, development activities and other initiatives, estimates of reserves statements regarding future exploration results and the replacement of reserves, the ability to achieve anticipated efficiencies and other cost savings in connection with past and future acquisitions, fluctuations in the market price of gold, the occurrence of hazards associated with underground and surface gold mining, the occurrence of labour disruptions, power cost increases as well as power stoppages, fluctuations and usage constraints, supply chain shortages and increases in the prices of production imports, availability, terms and deployment of capital, changes in government regulation, particularly mining rights and environmental regulation, fluctuations in exchange rates, the adequacy of the Group's insurance coverage and socio-economic or political instability in South Africa and Papua New Guinea and other countries in which we operate.

For a more detailed discussion of such risks and other factors (such as availability of credit or other sources of financing), see the Company's latest Integrated Annual Report and Form 20-F which is on file with the Securities and Exchange Commission, as well as the Company's other Securities and Exchange Commission filings. The Company undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after the date of this EIS or to reflect the occurrence of unanticipated events, except as required by law.

Competent Person's Statement

The Wafi-Golpu Joint Venture is an unincorporated joint venture between a wholly-owned subsidiary of Harmony Gold Mining Company Limited and a wholly-owned subsidiary of Newcrest Mining Limited.

The information in the EIS that relates to Golpu Ore Reserves is based on information compiled by the Competent Person, Mr Pasqualino Manca, who is a member of The Australasian Institute of Mining and Metallurgy. Mr Pasqualino Manca, is a full-time employee of Newcrest Mining Limited or its relevant subsidiaries, holds options and/or shares in Newcrest Mining Limited and is entitled to participate in Newcrest's executive equity long term incentive plan, details of which are included in Newcrest's 2017 Remuneration Report. Ore Reserve growth is one of the performance measures under recent long term incentive plans. Mr Pasqualino Manca has sufficient experience which is relevant to the styles of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the JORC Code 2012. Mr Pasqualino Manca consents to the inclusion of material of the matters based on his information in the form and context in which it appears.

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1. INTRODUCTION

Wafi Mining Limited and Newcrest PNG 2 Limited (the WGJV Participants) are equal participants in the Wafi-Golpu Joint Venture (the WGJV). The WGJV Participants are currently investigating the feasibility of constructing, operating and (ultimately) closing an underground copper-gold mine and associated ore processing, concentrate transport and handling, power generation, water and tailings management, and related support facilities and services (hereafter the “Wafi-Golpu Project” or “Project”).

The proposed underground copper-gold mine will be located beneath Mt Golpu, approximately 300 kilometres (km) north-northwest of Port Moresby and 65km southwest of Lae (Figure 1.1) in the Morobe Province of the Independent State of Papua New Guinea (PNG). Related support facilities include access roads to the mine and pipelines from the mine to the Port of Lae and to new coastal facilities near the village of Wagang.

This environmental impact statement (EIS) has been prepared as the statutory basis for the environmental, social and cultural heritage assessment of the Project under the *Environment Act 2000*. This EIS will inform a decision on whether the Project should proceed and, if so, under what conditions.

This chapter provides background information on the WGJV Participants (Section 1.1), an overview of the Project, including location, scope, phasing, rationale and other considerations (Section 1.2), information on the EIS, including its objectives, steps, method, key issues discussed and its structure (Section 1.3) and a description of the references cited (Section 1.4).

1.1. Project Proponent

The Project is 100% owned by the WGJV Participants. The operating company for the Project on behalf of the WGJV Participants will be Wafi-Golpu Services Limited.

The ultimate parent companies of the WGJV Participants are (in the case of Wafi Mining Limited) Harmony Gold Mining Company Limited and (in the case of Newcrest PNG 2 Limited) Newcrest Mining Limited. Section 2.1 provides further information about these companies.

1.2. The Project

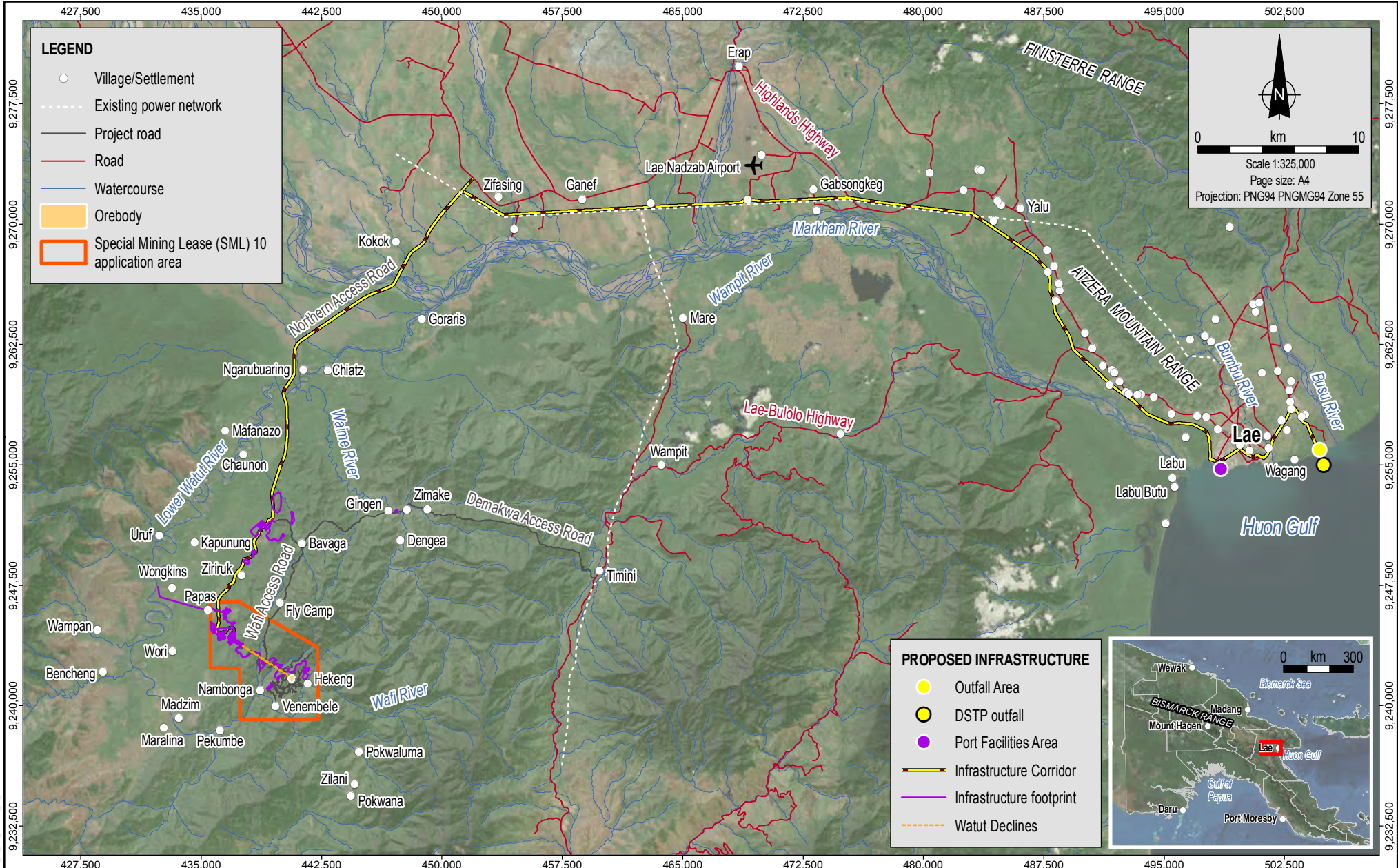
This section provides a high-level overview of the Project, including its location, scope, phasing and rationale and other considerations for development.

1.2.1. Location

Geographically, the Project will occupy a mine to port footprint that extends from the Mine Area to the Coastal Area with an Infrastructure Corridor linking them. Together, these three discrete areas make up the proposed Project Area.

The Mine Area, encompassing the proposed mine and related ancillary facilities, is located on the northern side of the Owen Stanley Ranges of PNG, in the foothills of the Watut River catchment. Much of the Mine Area is steep, mountainous and heavily forested, transitioning to the broad, flat to gently undulating, Watut River valley to the west.

The Infrastructure Corridor follows the broad flat plains of the Watut River and Markham River valleys to connect the Mine Area to the Coastal Area.



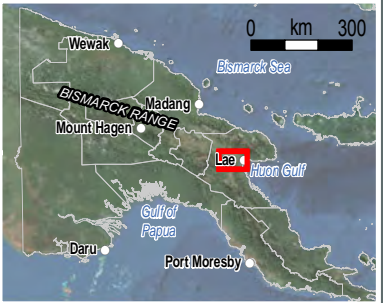
LEGEND

- Village/Settlement
- - - Existing power network
- Project road
- Road
- Watercourse
- Orebody
- Special Mining Lease (SML) 10 application area

Scale 1:325,000
Page size: A4
Projection: PNG94 PNGMG94 Zone 55

PROPOSED INFRASTRUCTURE

- Outfall Area
- DSTP outfall
- Port Facilities Area
- Infrastructure Corridor
- Infrastructure footprint
- - - Watut Declines



MXD Reference: 0520DD_10_BM_GIS001_v0_11

Source:
Power network, SML and orebody from WGJV.
Villages, infrastructure and project roads from WGJV and Coffey.
Roads and watercourses from NSO.
Imagery from ArcGIS Online (capture date unknown).

coffey
A TETRA TECH COMPANY

Date: 08.06.2018
Project: 754-ENAUABTF100520DD
File Name: 0520DD_10_F01.01_GIS

WAFI-GOLPU
JOINT VENTURE

Wafi-Golpu Project

General arrangement of proposed Project

Figure No:
1.1

The Coastal Area encompasses both the proposed Port Facilities Area located at the Port of Lae, where copper-gold concentrate will be exported, and the Outfall Area located east of the city of Lae near the village of Wagang, for tailings management into the Markham Canyon in the Huon Gulf. Further details of proposed Project activities and infrastructure are provided below.

1.2.2. Scope

The WGJV Participants are equal owners of Exploration Licences (EL) 440 and EL 1105. Within EL 440, exploration has identified three separate but geologically related mineral deposits: Nambonga, Wafi and Golpu.

Project development centres on the proposed underground mining of the Golpu deposit, for which the WGJV's commercial evaluation is the most advanced. The Golpu deposit is also considered to be the most economically significant of the three deposits, based on exploration results to date (see also Section 1.2.4).

The design presented in this EIS is based on the Feasibility Study Update released by the WGJV on 19 March 2018 (WGJV, 2018)¹, which is premised on:

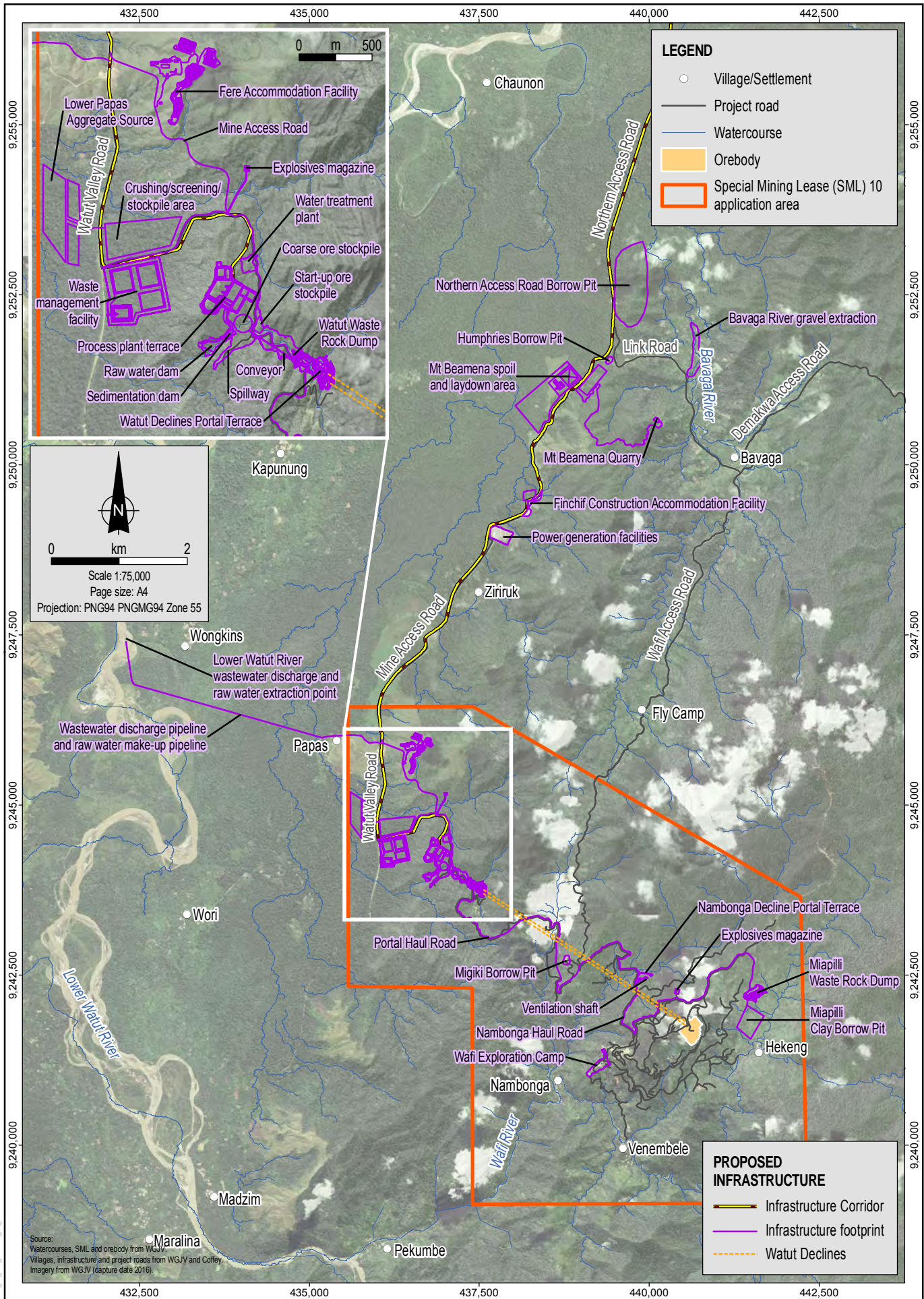
- Ore extracted via the block cave mining method, developing three block caves.
- Ramping up to a design mine production rate of 16.84Mtpa as the mine progressively develops.

Development of the Project will require significant infrastructure and facilities to operate. The principal components of the Project (Figure 1.2) include:

- Underground mine comprising three block caves: Block Cave (BC) 44, BC 42 and BC 40, to be developed in stages and located beneath Mt Golpu at Reduced Level meters (mRL) 4,400mRL, 4,200mRL and 4,000mRL, respectively. Primary access to the orebody will be obtained via 4.6km-long twin declines (tunnels). Initial access to undertake further geotechnical data collection will be established via the Nambonga Decline.
- Ore processing and concentrate transport/handling facilities, including a pipeline to transport concentrate slurry from the Mine Area to the Port Facilities Area at the Port of Lae.
- A deep sea tailings placement (DSTP) system for tailings management into the Markham Canyon in the Huon Gulf near Lae, with tailings transported by pipeline from the Mine Area to the Outfall Area on the Huon Gulf coast.
- On-site power generation facilities located within the Mine Area, with intermediate fuel oil delivered via pipeline from the yard of a third-party fuel supplier located adjacent to the Port of Lae.
- Waste rock dumps to store non-acid forming (NAF) and potentially acid-forming (PAF) rock generated during the development of the declines and ventilation shaft.
- Water and waste management facilities, including water treatment facilities, wastewater discharge and raw water make-up pipelines and raw water and sedimentation dams.

To provide a complete understanding of the entire Project, this EIS addresses all Project infrastructure and associated activities, including infrastructure already approved.

¹ For further information, please refer to Harmony Gold Mining Company Limited and Newcrest Mining Limited websites.



Source:
 Watercourses, SML and orebody from WGJV.
 Villages, infrastructure and project roads from WGJV and Coffey.
 Imagery from WGJV (capture date 2016).

Table 1.1 provides a summary of anticipated Project infrastructure and facilities according to geographic area. Further details are provided in Chapter 6, Project Description.

Table 1.1: Summary of Project infrastructure and facilities

Project Infrastructure and Facilities	
Mine Area	
Block cave mine, declines and subsidence zone	
Watut Declines Portal Terrace including: <ul style="list-style-type: none"> • Decline entrances (portals) • Watut Waste Rock Dump • Water treatment facilities • Ventilation fans • Refrigeration plant including cooling towers • Conveyors and transfer points • Electrical substations and switch rooms • Drainage and stormwater infrastructure • Diesel generators and associated infrastructure • Workshops, buildings, fuel facilities, washdown bay • First aid and emergency response 	Process plant terrace including: <ul style="list-style-type: none"> • Watut Process Plant including: <ul style="list-style-type: none"> ○ Feed conveyor ○ Coarse ore stockpile ○ Grinding units ○ Flotation units ○ Reagent storage ○ Concentrate storage tanks and pump station ○ Tailings thickeners, tanks and pump station • Helicopter pad • Offices • Access control (security) • Change house • Mine power supply yard • Laboratory • Sewage treatment facility • Workshop, fuel facilities and washdown bay • Raw water dam • Sedimentation dams • Ore stockpiles
Nambonga Decline Portal Terrace including: <ul style="list-style-type: none"> • Decline entrance (portal) • Ventilation fans • Air cooling system including refrigeration machines • Transfer points for waste rock • Drainage and stormwater infrastructure • Diesel generators and associated infrastructure 	Associated Nambonga Decline infrastructure and facilities: <ul style="list-style-type: none"> • Miapilli Waste Rock Dump • Miapilli Clay Borrow Pit • Nambonga Haul Road • Lower Papas Aggregate Source and crushing / screening area • Process water tank • Water treatment plant • Workshops, buildings, fuel facilities, first aid, washdown bay • Explosives magazine
Ventilation shaft	
Wastewater discharge pipeline to the Watut River	
Raw water make-up pipeline from the Watut River to the Watut Process Plant (co-located with the wastewater discharge pipeline)	
Accommodation facilities (Fere Accommodation Facility, Finchif Construction Accommodation Facility)	
Power generation facilities (as required)	
Explosives magazines	
Waste management facility (including topsoil stockpiles/laydown areas)	
Borrow pits and gravel extraction sources: <ul style="list-style-type: none"> • Migiki Borrow Pit • Humphries Borrow Pit • Northern Access Road Borrow Pit • Bavaga River gravel extraction • Waime River gravel extraction 	

Project Infrastructure and Facilities
Mt Beamena Quarry, spoil and laydown and crushing/screening area
Mt Beamena Quarry Access Road
Infrastructure Corridor
Mine Access Road
Northern Access Road
Concentrate pipeline to transport the copper-gold concentrate from the Watut Process Plant to the concentrate filtration plant at the Port of Lae
Fuel pipeline from the Port of Lae to the power generation facilities (as required) at the Mine Area
Terrestrial tailings pipeline from the Mine Area to the Outfall Area
Construction pads and laydown areas
Coastal Area
Port Facilities Area including concentrate filtration plant and materials handling, water treatment plant and filtrate discharge pipeline, concentrate storage and ship loading facilities
Outfall System including mix/de-aeration tank, seawater intake pipelines, DSTP outfall pipelines, laydown area, diesel storage, parking and associated access road
Bulk intermediate fuel oil storage facility and fuel pump station at the Port of Lae
Laydown area for Outfall System construction (Lae Tidal Basin preferred)

1.2.3. Project Phasing

The Project comprises four main phases of activity:

- **Permitting:** including the evaluation, assessment and approval of the WGJV Participants' application for a special mining lease under the *Mining Act 1992* and an environment permit under the *Environment Act 2000*. The Project, as currently proposed, includes prescribed Level 3 Activities as defined in the Environment (Prescribed Activities) Regulation 2002, which triggers the requirement for an EIS to be completed under the *Environment Act 2000*.
- **Construction:** the construction of an underground mine and ancillary infrastructure, including: Watut and Nambonga declines development; block cave developments, ore processing; concentrate, tailings, fuel and water transport and handling facilities; power generation facilities; access roads and other related ancillary infrastructure.
- **Operations:** the operation of the mine and ancillary services and infrastructure.
- **Closure:** closure of the mine and ancillary services and infrastructure.

Key Project milestones, including permitting milestones further described in Chapter 3, Legal, Administrative and Policy Framework, are estimated in Table 1.2. For the purposes of the information included here, it is assumed that a special mining lease is granted by the State of PNG by June 2019, following its assessment and acceptance of Project documentation.

The estimated timeframes presented within Table 1.2 are subject to the above assumption being correct, completion of statutory processes and the securing of approvals from the State of PNG and the WGJV Participants.

Table 1.2: Proposed timing of key Project milestones

Key Milestones	Estimated Timeframe
Permitting	
EIS submission	June 2018
Environment Permit Application submission – Revised per approved EIS	Before June 2019
Level 3 Environment Permit approval	By June 2019
Special Mining Lease (SML) 10 grant	By June 2019
Construction	
Construction start (decline development)	Third-quarter CY2019
Operations	
Watut Process Plant operation commences	First-quarter CY2024
Mine life from first ore through the processing plant	28 years (see Section 1.2.4)
Closure	
Mine closure (decommissioning)	After completion of all mining activities

1.2.4. Rationale and Future Potential of the Mine

The Wafi-Golpu mineral deposit is a world-class deposit in terms of its size and grade. In the most recent estimate (March 2018), the Golpu deposit's JORC-compliant Ore Reserve was 400 million tonnes (Mt) at 0.86 grams per tonne (g/t) gold and 1.2% copper, containing 11 million troy ounces (Moz) gold and 5Mt of contained copper. The WGJV's immediate intention is to build and operate a mine that is safe and sustainable and delivers value to stakeholders.

The Project described in this EIS is based on the current Golpu Ore Reserve² and design information (see Section 1.2.2). On the basis of this design, it is anticipated that the mine life from first ore through the processing plant (excluding construction and closure phases) will be approximately 28 years.

Throughout this report, Project activities are described for simplicity using the term 'will' rather than 'would', e.g., 'construction of Project facilities will take place over approximately five years'. The Project is, however, a development proposal, the implementation of which (in the manner described) is conditional on a number of factors including the completion of the State of PNG's statutory processes and obtaining approval from the WGJV Participants to proceed with any development.

Engineering design and other work is continuing and aspects of the Project design described in this EIS may change. The Project configuration will continue to be refined as the Project progresses to financial investment decision, construction and operation. Any development and mining beyond that specifically proposed in this EIS may be subject to additional approvals as agreed with the State of PNG.

² As per the Joint Ore Reserve Committee, Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC) (JORC, 2012) compliant Ore Reserves at March 2018.

1.3. Environmental Impact Statement

This section describes the objectives, steps, method, key issues of interest and the structure of the EIS.

1.3.1. Objective of the EIS

The objective of this EIS is to identify potential environmental, social and cultural heritage impacts associated with the Project and set out the management measures WGJV proposes to address potential adverse impacts. This EIS provides:

- For affected and interested persons and organisations – a basis for understanding the Project; the environmental, social and cultural heritage impacts that may arise from its development; and the avoidance or management measures WGJV proposes to mitigate potential adverse impacts.
- For the State of PNG – the means to assess, in accordance with statutory processes, whether the Minister should grant approval in principle for the Project under the *Environment Act 2000*, and subsequent to that, a Level 3 environment permit for the Project.
- For the WGJV – a practical framework to assist with managing potential Project risks and impacts, including the establishment of performance objectives and management measures to be undertaken throughout construction, operation and decommissioning of the Project.

The EIS has been developed to address DEC Publication GL-Env/02/2004, Guideline for Conduct of Environmental Impact Assessment & Preparation of Environmental Impact Statement. A checklist demonstrating how the EIS meets the guidelines is provided in Attachment 1, Reconciliation with Relevant State of PNG Guidelines.

1.3.2. Steps of the EIS Process

The provisions of the *Environment Act 2000* govern the EIS process and the grant of State of PNG approvals. Broadly, these include:

- Scoping, including preparation of an environmental inception report (EIR) setting out the issues to be covered in the EIS.
- Preparation of the EIS setting out the environmental, social and cultural heritage impacts which are likely to result from carrying out the Project.
- Assessment of the EIS by the State of PNG, including public review.
- Decision by the Minister whether to approve the Project in principle.

Further details of this process are provided in Chapter 3, Legal, Policy and Administrative Framework.

1.3.3. Method of the EIS

This EIS presents a detailed description of proposed Project activities and sets out the environmental, socioeconomic and cultural heritage aspects of the Project. On this basis, the technical appendices to this EIS, and the EIS Main Report itself, have drawn upon a range of desktop studies, field investigations, stakeholder engagement activities and modelling to:

- Identify legislation, policy, international agreements and other guidelines applicable to the Project.
- Describe the existing environmental, socioeconomic and cultural heritage setting within and surrounding the Project Area.
- Review the type, timing, extent and duration of Project activities to determine potential, credible environmental, socioeconomic and cultural heritage impacts.
- Propose avoidance and management measures to minimise potential impacts or capitalise on benefits that may arise from the Project.
- Predict credible residual impacts and, where applicable, potential cumulative impacts arising from the Project occurring at the same time as other proposed developments in the Watut River and Markham River valleys and the city of Lae.

The method adopted for this EIS is elaborated on in Chapter 4, Overview of Impact Assessment Methods.

1.3.4. Key Issues Detailed in the EIS

The EIR sets out the issues to be covered, studies to be undertaken and the study team for the EIS. For the Project, an EIR was submitted on 16 May 2017 and approved by the Conservation and Environment Protection Authority (CEPA) on 8 June 2017. Attachment 1, Reconciliation with Relevant State of PNG Guidelines details where each of these issues have been addressed in the EIS.

Those issues which have the greatest potential for adverse impacts and which are likely to be of greatest interest to Project stakeholders include:

- The need for some households to physically relocate due to Project activities or impacts. Within SML 10, the villages of Hekeng, Nambonga and Venembele are proposed to be relocated in accordance with WGJV's Resettlement Policy Framework (refer to Chapter 23, Integrated Management System for further detail). Construction of the Infrastructure Corridor may also lead to relocation of individual households that cannot be avoided during detailed Infrastructure Corridor design.
- Potential impacts on terrestrial biodiversity arising from vegetation clearance and infrastructure development.
- Potential physical or chemical impacts of DSTP in the Huon Gulf, with particular regard to marine ecology, the ocean water column and the benthic environment and associated commercial and artisanal fisheries.
- Risk of acid and metalliferous drainage arising during different phases of the Project, including in and around Mt Golpu following mine closure.
- Potential impacts arising from damage to or failure of the proposed concentrate, terrestrial tailings and fuel pipelines between the Mine Area and the Coastal Area.
- Impacts on current social structures, local subsistence agriculture economies and subsistence resource use arising from Project development.

Positive impacts include direct financial benefits to the State of PNG and Morobe Province, workforce employment and training, and procurement of equipment and materials from within Morobe Province and elsewhere in PNG.

1.3.5. Structure of the EIS

This EIS has the following structure:

- **Executive Summary.** A summary, prepared in English and Tok Pisin, of the proposed Project, impact assessment and management measures.
- **Volume 1 – Main Report.** A stand-alone environmental, social and cultural heritage assessment that can generally be understood without reference to the supporting (technical) studies upon which it is based.
- **Volume 2 – Attachments.** Supplementary material to the main report including a reconciliation of the EIS with relevant State of PNG guidelines, as well as environmental, social and cultural heritage management plans.
- **Volumes 3 to 8 – Appendices.** A series of technical reports on the various investigations that have informed the EIS Main Report.

The EIS Main Report comprises a glossary and list of abbreviations followed by 24 chapters including figures, tables and plates. Attachments and supporting studies appended to the EIS Main Report are listed in Table 1.3.

Table 1.3: Wafi-Golpu Project EIS documentation

EIS Component	Title	Lead Author
Executive Summary and Main Report		
Executive Summary	Wafi-Golpu Project Executive Summary	WGJV
Main Report	Wafi-Golpu Project EIS Main Report	WGJV
Attachments		
Attachment 1	Reconciliation with Relevant State of Papua New Guinea Guidelines	WGJV
Attachment 2	Conceptual Closure and Rehabilitation Plan	WGJV
Attachment 3	Environmental Management Plan	WGJV
Attachment 4	Social Management Plan	WGJV
Attachment 5	Cultural Heritage Management Plan	WGJV
EIS Supporting Studies		
Appendix A	Air Quality and Greenhouse Gas Impact Assessment	SLR Consulting
Appendix B	Noise and Vibration Impact Assessment	SLR Consulting
Appendix C	Terrestrial Ecology Characterisation – Mine Area to Markham River	Biodiversity Assessment and Management Pty Ltd
Appendix D	Terrestrial Ecology Characterisation – Markham River to Wagang	Coffey Environments Pty Ltd
Appendix E	Mine Material Geochemistry	SRK Consulting
Appendix F	Groundwater Management and Modelling of Inflows to Golpu Underground Mine	Piteau Associates South Africa / WGJV
Appendix G	Surface Water and Freshwater Aquatic Ecology Characterisation – Mine Area to Markham River	BMT WBM

EIS Component	Title	Lead Author
Appendix H	Surface Water and Freshwater Aquatic Ecology Characterisation – Yalu to Wagang	Coffey and The Waterbug Company
Appendix I	Catchment and Receiving Water Quality Modelling	BMT WBM
Appendix J	Density Current, Plume Dispersion and Hydrodynamic Modelling	Tetra Tech, Inc.
Appendix K	Oceanographic Investigations of the Huon Gulf	IHAConsult
Appendix L	Tailings Ecotoxicology and Geochemistry	CSIRO
Appendix M	Physical, Chemical and Biological Sedimentology of the Huon Gulf	IHAConsult
Appendix N	Assessment of Metal Bioaccumulation and Biomagnification from DSTP in the Huon Gulf	Tetra Tech, Inc.
Appendix O	Benthic Video Characterisation	Coffey Environments Pty Ltd
Appendix P	Deep-slope and Pelagic Fish Characterisation	Marscco and Coffey Environments Pty Ltd
Appendix Q	Zooplankton and Micronekton Characterisation	Marscco and Coffey Environments Pty Ltd
Appendix R	Nearshore Marine Characterisation	Coffey Environments Pty Ltd
Appendix S	Fisheries and Marine Resource Use Characterisation	EnviroGulf Consulting, Coffey Environments Pty Ltd
Appendix T	Socioeconomic Baseline	Coffey Environments Pty Ltd
Appendix U	Cultural Heritage Baseline and Impact Assessment	Andrew Long and Associates and Social Research Institute
Appendix V	Site-wide Water and Mass Balance Modelling	Piteau Associates South Africa
Appendix W	Human Health Risk Assessment	Coffey Environments Pty Ltd and Dempsey Toxicology and Risk Assessment
Appendix X	Assessment of Closure Conditions and Water Management Options for the Wafi-Golpu Block Cave and Subsidence Zone	Piteau Associates South Africa
Appendix Y	Freshwater Ecology Impact Assessment	Coffey Environments Pty Ltd and EnviroGulf Consulting
Appendix Z	Tailings Management Engineering Design	Tetra Tech, Inc.

The EIS does not disclose information that is confidential for cultural or commercial reasons; however, the WGJV may provide the latter in confidence to CEPA upon request.

In addition to informing the decision-making processes of the State of PNG, this EIS can also inform decision-making by the communities who will host various components of the Project.

Subject to the approval of CEPA, the entire EIS, including technical appendices, will be available for download from the WGJV website at <http://www.wafigolpujv.com>

Hard copies of the EIS will be on public display at the following locations:

- Wafi-Golpu Joint Venture office in Lae.
- Office of the Conservation and Environment Protection Authority (CEPA), Port Moresby.
- Office of the Mineral Resources Authority (MRA), Port Moresby.
- Office of the Morobe Provincial Government, Lae.

The public is invited to read the EIS and participate in government processes about the Project by making a submission.

1.4. References

JORC. 2012. Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Prepared by the Joint Ore Reserve Reporting Committee.

WGJV. 2018. Feasibility Study Update. Wafi-Golpu Joint Venture.