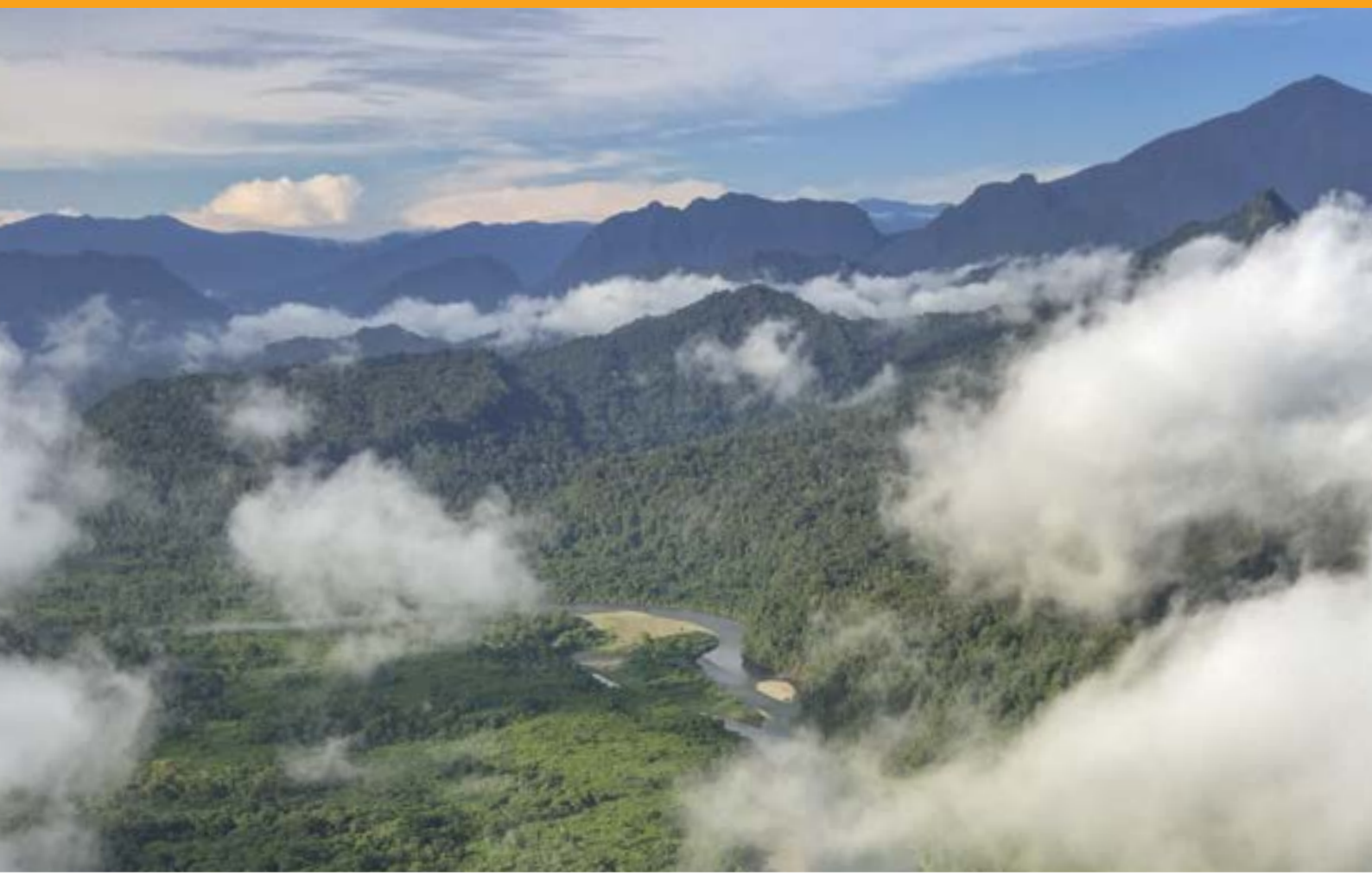
FRIEDA RIVER

Frieda River Limited
Sepik Development Project
Environmental Impact Statement
Attachment 4 – EIS Guidelines and EIR Cross Reference Table

SDP-6-G-00-01-T-003-010



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EIS GUIDELINES AND EIR CROSS REFERENCE TABLE

These tables provide a reconciliation between the contents of Sepik Development Project Environmental Impact Statement (EIS), and the PNG Government *Guideline for Preparation of Environmental Impact Statements* and the specialist studies program presented in the final Environmental Inception Report (EIR) for the Project. Table 1 addresses the EIS guidelines and Table 2 addresses the EIR.

Table 1 Reconciliation with the PNG Government EIS guidelines

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
	Letter of Transmittal or Cover Letter It is important that an Environmental Impact Statement on the proposal must be transmitted to DEC [now CEPA] with a cover letter signed by the responsible company official or its authorised representative (i.e., consultant - engaged by the company to act on its behalf). If an external consultant is used, the letter must also authorise the consultant to make statements and provide further information on behalf of the company in relation to the application.	Cover letter	
1.	***Executive Summary or Overview of Proposal*** One of the main objectives of this section is to provide an explanation of the project for non-technical readers. Information provided in the Executive Summary shall concisely describe: • The proposed development activity and its objectives. • Anticipated bio-physical and socio-economic impacts (direct/indirect, reversible/irreversible) of the activity. • Details of remedial actions that are proposed. • All benefits to be derived from the project. • Details of consultation program undertaken by the applicant, including degree of public interest. • Rehabilitation and/or end-use plans for the development activity in relation to community needs.	Executive summary	
2.	***Purpose of the development*** The purpose of this section is to ensure that only development activities that are in the best interest of all Papua New Guineans, and therefore in line with the PNG Government's overall development strategy and planning guidelines, are considered for approval.	Chapter 2	

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
2.	***Purpose of the development (cont'd)***		
	NOTE: Demonstrate commitment to the conservation of natural ecosystems and protection of environmental values within the proposed development area.		
	This section shall include but not be limited to the following:		
	• Describe if the development is in line with the Fourth National Goal and Directive Principle of the National Constitution of PNG.	Section 2.5.1	
	• Explain if the proposed development is compatible with National, Provincial and Local Level Government development goals and planning guidelines.	Section 2.5.2	
	• Detail the economic benefits to the Nation, Province, Local Level Governments and to the local community being impacted.	Section 2.5.3	
3.	***Viability of the project***	Chapter 2	
	Provide information on the viability of the proposed development activity. These details shall include but not be limited to the following:		
	• Information on the capital cost associated with the development.	Section 2.5	
	• Details of the proponent's technological expertise and resources.	Section 2.2	
	• Results of any feasibility investigations that have been carried out.	Section 2.3	
	• Information on the extent of landowner and/or resource owner support, including a copy of the formal written approval of their consent.	Chapter 4	
	• Details of the life-span and development phases of the project.	Chapter 5	
4.	***Description of the proposed development activity***	Chapter 5	
	All details on the proposed development activity required under this section should be provided where applicable to the proposal. Details to be provided under this section may include the following:		
	• Background information to the proposal, process technologies to be employed, etc.	Chapter 5	
	• Detailed location maps (drawn to scale), site layout, etc.	Chapter 1, 5	
	• Information on method of site selection including alternatives investigated, plant or building designs, relevant diagrams and drawings.	Chapter 5, 6	
	• Detailed flowcharts, mass balances (including feedstocks, products and wastes generated, etc.).	Chapter 5	Appendices 1, 6a

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
4.	***Description of the proposed development activity (cont'd)***		
	• Description of nearby development activities that may contribute to background pollution levels or other baseline conditions.	Chapter 7	Appendices 7a, 8a, 8b, 12a, 13
	• Information on associated infrastructure/facilities to be constructed.	Chapter 5	
5.	***Development timetable***	Chapter 5	
	Information on the development timetable provided under this section should be clear and easy for DEC to understand the different phases in the development proposal. For reasons of clarity, a flow chart, Gantt or PERT chart should be used where appropriate.		
	Information provided in this section shall include but not be limited to the following:		
	• Information on funding arrangements for proposed activity or if availability of funds subject to this or other approvals being granted.		
	• Details of preconstruction activities.	Chapter 5	
	• Information on consultation program with all affected parties (i.e., parties that may be directly and indirectly affected).	Chapter 4	
	• Details of construction schedule, staging, etc.	Chapter 5	
	• Details of commissioning and operational schedules.	Chapter 5	
	• Details of infrastructure development schedule.	Chapter 5	
	• Details of closure and rehabilitation schedule.	Chapter 5	Appendices 3a, 3b
6.	***Characteristics of the receiving environment***	Chapter 7	
	Available Environmental Studies & Investigations		
	Information provided in this sub-section shall include but not be limited to the following:		
	• Historic or current baseline data on physical, biological and social systems.	Chapter 7	Appendices 4, 7a, 8a, 8b, 10, 11, 12a, 13
	• A written estimate of research and/or study time already expended and to be further undertaken.	Chapter 7	Appendices 4, 7a, 8a, 8b, 10, 11, 12a, 13

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
6.	***Physical Environment***	Sections 7.1, 7.2	Appendices 4, 5, 6a, 7a, 8a, 8b, 10, 11
	Provide details on the existing physical environment including data on ambient environmental quality of various segments of the environment, including the following:		
	• Geomorphological, topographical and geological characteristics.	Section 7.1, 7.2	
	• Any natural or induced hazard in the area (e.g. flood, earthquake, volcanic zone).	Section 7.1, 7.2	
	• Climatic regime (e.g., rainfall, temperature).	Section 7.1.2	Appendices 6a, 7b
	• Air quality and meteorological data set for air dispersion modelling, etc.	Section 7.1.10	Appendix 11
	• Seasonal surface water quality and hydrological information.	Section 7.2	Appendices 5, 6a, 7a
	• Seasonal ground water quality and flow regime.	Section 7.1	Appendix 4
	• Noise levels.	Section 7.1	Appendix 10
	Biological Environment	Sections 7.1, 7.2	Appendices 7a, 8a, 8b, 12a
	Detailed information should be provided on the existing biological environment, including the following:		
	• Presence of a protected area (Conservation Area or Wildlife Management Area), if any.	Section 7.1.6	Appendices 8a, 8b
	• Details of any special purpose areas (e.g., wetland area).	Sections 7.1.6, 7.2.4	Appendices 7a, 8a, 8b
	• Aquatic and terrestrial ecology of the area.	Sections 7.1, 7.2	Appendices 7a, 8a, 8b, 12a
	• Information on vulnerable (endangered) species.	Sections 7.1.7, 7.1.8, 7.2.5 to 7.2.7	Appendices 7a, 8a, 8b, 12a
	• Other relevant biological information.	Sections 7.1, 7.2,	Appendices 7a, 8a, 8b, 12a
	Social Environment	Section 7.3, Chapter 9	Appendix 13
	This sub-section deals with the existing social structure and socio-economic data on the resource/land owners, Local Level Government, the Province and PNG as a whole.		

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
6.	***Social Environment (cont'd)***	Section 7.3, Chapter 9	Appendix 13
	Issues that may arise within and outside of the project area should be identified including whether this is a direct or indirect outcome of the physical, biological or socio-economic effects of the proposed development activity.		
	The outcome of the Social Impact Assessment process is the Social Impact Statement, which is included in this section of the Environmental Impact Statement that is submitted to DEC for assessment.		
	Information provided in this sub-section shall include but not be limited to the following details:		
	• Demographic information.	Section 7.3	Appendix 13
	• Information on existing infrastructure.	Section 7.3	Appendix 13
	• Information on public health issues (if applicable).	Section 7.3	Appendix 13
	• Information on present economic status of the project area.	Section 7.3	Appendix 13
	• Description of existing social services.	Section 7.3	Appendix 13
	• Details of archaeological, historical, cultural or religious features of the project area under consideration, etc.	Section 7.3	Appendix 13
7.	***Waste minimisation, cleaner production and energy balance***	Chapter 5	
	Information detailed in this section should include consideration of options associated with waste minimisation, cleaner production and energy balance and the ability of the proponent to employ these strategies in its proposed activity.		
	Detailed information to be covered in this section shall include but not be limited to the following:		
	• Details of alternative 'cleaner production' technologies or processes that have been considered.	Chapter 6	
	• Information on the basis for choosing the proposed technology or process.	Section 5.5	
	• Available technical background on the process chosen.	Section 5.5	
	• Details of the Waste Minimisation Strategy developed for the proposal.	Section 5.12	
	• Details of an 'energy balance' for the proposal.	Section 5.2	

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
8.	***Environmental management, monitoring and reporting***	Chapter 12	Attachment 2
	Sufficient information should be provided in this section of the Environmental Impact Statement to enable DEC to anticipate possible environmental management, monitoring and reporting requirements for an Environment Permit.		
	Information listed should reflect the proponent's environmental policy (environment management system) and the translation of that policy to meet the requirements under this Section and Section 7 (Potential Impacts of Proposal) during different stages in the project life, from construction to decommissioning and closure.		
	Information detailed in this section shall include but not be limited to the following:		
	• Details of information on plant operating conditions, including management and monitoring strategy.	Chapter 12	Attachment 2
	• Information on socio-economic management and monitoring strategy.	Chapter 12	Appendix 13
	• Mechanism and frequency for reporting monitoring results to DEC [now CEPA] and other stakeholders, especially to directly affected stakeholder groups.	Chapter 12	Attachment 2
	• Availability of contingency and/or emergency plans drawn up for the proposal.	Chapter 11, 12	Attachment 2
	• Details of Environment Improvement Plan.	Chapter 12	Attachment 2
	• Details of Waste Minimisation and/or Management Plans.	Section 5.12, Chapter 11	Attachment 2
	• Information on potential rehabilitation issues and strategies including Rehabilitation Plan.	Chapter 5, 11	Appendices 3a, 3b, Attachment 2
9.	***Other statutory decisions***		
	Provide detailed information on other statutory decision(s) that are relevant to this proposed development activity. Provide the draft or finalised Project Development Contract, Memorandum of Agreements or other similar legal decisions that are relevant to the proposal.	In progress and a subject of separate consultations with relevant PNG government departments and agencies.	
10.	***Confidential information***	Noted.	
	Details of classified information relating to a manufacturing or industrial process or trade secret used in carrying on or operating any particular undertaking or equipment or information of a business or financial nature in relation to the proposed activity should be clearly defined. Such information would be classified as 'confidential information' and excluded from the Environmental Impact Statement before the document is made available for public review.		

Table 1 Reconciliation with the PNG Government EIS guidelines (cont'd)

EIS Assessment Guidelines		EIS Section or Chapter	EIS Appendix or Attachment
11.	***References*** Provide details of reference materials used in sourcing information and/or data used in the Environmental Impact Statement.	Chapter 14	
12.	***Acknowledgements*** Detail relevant acknowledgements.	Chapter 16	
13.	***Study team*** Provide detailed information on persons who assisted in the conduct of the Environmental Impact Assessment study and compilation of the Environmental Impact Statement. Persons involved should be the same as those approved in the Environmental Inception Report.	Chapter 15	

Table 2 Reconciliation with the EIR specialist studies program

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Hydrology and meteorology	• Characterise stream flow in the Project area, including the catchments of the FRHEP, and downstream. • Build a hydro-meteorological database for use in planning the Project's water supply and the mine's water management scheme. • Provide information that will allow calculation of the downstream dilution of mine-derived contaminants that may enter the river system.	• Maintain a hydromet network data collection program (gauging stations, pluviographs and weather stations). • Determine river flow statistics.	Section 7.2	Appendix 6a
Surface water and sediment quality	• Establish a baseline of the Project area (including characterising selected watercourses along the infrastructure corridor from the mine site to Vanimo) describing the range of background water and sediment quality conditions in surface waters. • Predict impacts to water quality as a result of the Project. • Propose a mixing zone boundary and downstream compliance point for the Project.	• Collect water samples for surface water bodies in the Project area, with sampling capturing both high (wet season) and low flow (dry season) events, and including on-going opportunistic high flow events. • Obtain bed sediment samples at selected sites. • Analyse water and bed sediment samples for metals and physical and chemical parameters at water sampling sites. • Undertake modelling to predict water chemistry downstream of the Project area during construction, operations and post-closure. • Compare the results of the modelling with relevant water quality standards and guidelines and baseline water quality data to determine and propose a mixing zone boundary for the Project. • Determine potential water treatment strategies for the Project, if required.	Sections 7.3, 8.5	Appendices 6b, 7a

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Mine waste geochemistry	• Characterise representative mine materials with potential for causing ARD or problematic water quality. • Assist in designing ARD control measures.	• Implement a sampling and analysis program to characterise the ARD potential of the site, including lag time estimates and long-term behaviour of problematic material. • Develop a simple site water quality model (concentrations and loads) to predict the quality and quantity of residual runoff, leachates and discharged waters from the Project during construction, operations and post closure. • In association with the mine planning team, design effective and affordable measures to control ARD and achieve acceptable water quality downstream from the Project. • Evaluate the long-term ARD implications for closure planning and make specific recommendations for minimisation of ARD risk in the long term.	Sections 5.5.3, 8.5	Appendices 1, 6b

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Groundwater	• Characterise the groundwater regime of the Project area. • Assess the likely changes to local groundwater flows and quality as a result of the Project.	• Describe the existing groundwater regime in the Project area and describe the conceptual hydrogeological model for the Project. • Estimate pit dewatering yields. • Assess the level of groundwater and surface water interactions, including with groundwater dependent ecosystems. • Assess the potential long-term impact of the Project on local and regional groundwater resources, post closure. • Characterise the groundwater quality and inflow rates to the open pit and FRHEP during operations and closure. • Assess the potential changes to local and regional groundwater quality. • Assess the likelihood and significance of contamination of groundwater and downstream surface water due to seepage from the pit lake and FRHEP during construction and operations. • Develop measures to avoid, manage and mitigate potential impacts. • Develop a groundwater monitoring program for construction, operations and closure. • Update the existing groundwater model to represent the revised project.	Sections 7.1.5, 8.4, 12.6	Appendix 4

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
FRHEP reservoir limnology	• Assess the likely limnological behaviour of the FRHEP during filling, operations, post closure and, if appropriate, during overturning. • Predict the water quality within the FRHEP reservoir and downstream in the Frieda River during filling, operations, post closure and, if appropriate, during overturning.	• Review in-country and international case studies of the limnology of mountain lakes/reservoirs in similar tropical, high rainfall settings. • Create a conceptual model of the likely limnological behaviour of the FRHEP reservoir including stratification and mixing. • Predict water quality within the reservoir and downstream in the Frieda River (including downstream water flows) during operations, after closure and also during overturning episodes, with mine wastes in the reservoir. • Propose feasible and affordable recommendations to achieve improved water quality within the reservoir and downriver. • Repeat the water quality predictions and outline the likely benefit to water quality within the reservoir and downstream in the Frieda River.	Section 8.5	Appendices 2a, 6b

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Sediment characterisation and transport	• Evaluate the potential impacts associated with sediment transport resulting from the Project. • Develop mitigation measures and, once these are finalised, predict Project-related changes in suspended and bed load sediment transport rates, and downstream implications.	• Estimate existing suspended and bed load sediment transport rates at key locations downstream of the Project. • Revise the existing sediment transport model for construction, operations and closure based on the updated mine layout and project development. • Identify Project-wide sources of fugitive sediment generation, and work with the design teams to produce feasible and affordable measures to mitigate fugitive sediment generation. • Estimate the changes in suspended load and bed load generated from Project components (e.g., open pit and roads) at key locations downstream of Project, and how this would vary with time according to project timelines. • Assess the likely changes to bed levels, stream morphology, flooding, over-bank sedimentation and sediment effects on off-river water bodies along the lower Frieda River and along the Sepik River below the Frieda River during construction, operations and post closure.	Sections 7.2, 8.5	Appendix 5

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Land change assessment	• Prepare a land capability assessment that evaluates broad scale land changes occurring in northern PNG, particularly along the infrastructure corridor as a result of commercial forestry and agroforestry (palm oil) developments. • Evaluate the potential implications for a large scale mine in the region. • Develop a land impact assessment focusing on predicted landscape changes as a direct and indirect outcome of the Project.	• Use spatial data (satellite and aerial imagery), DEM technology and other spatial data such as PNG Forest Observatory to obtain aerial imagery. • Use available spatial data (current and historic spatial data) to: – Determine current land use types and degree of forest cover. – Evaluate the existing rate of land use change due to commercial forestry and agroforestry (palm oil) at a provincial scale. – Assess the regional scale impacts of land change (commercial forestry and agroforestry). – Produce a land capability assessment that considers regional soils, geology and terrain to predict potential future land uses (such as agroforestry).	Chapter 10	Appendix 9

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Water and load balance	• Assess potential changes to surface water flow inputs to rivers and creeks downstream of Project areas.	***Water and Load Balance*** • Estimate the volumes and flows of contact and non-contact water. • Estimate the volumes of contact water that would be reporting to the environment under various climatic scenarios. • Estimate discharge volumes from the open pit (operations and post-closure), process plant and FRHEP (operations and post-closure). • Describe the movement of water around relevant Project areas and the potential impact on infrastructure. • Estimate water quality for pit water, process plant discharge, FRHEP and at various locations downstream. ***Pit Water Management*** • Describe the final pit water management strategy • Describe the diversion drain design and management. • Estimate final void water level, spill regime and time-to-fill analysis.	Sections 5.5.6, 8.5	Appendices 6a, 6b
Soils	• Characterise soils in the Project area.	• Describe the characteristics of soils in the Project area. • Provide an assessment of the likelihood of impacts related to acid sulfate soils and propose management techniques to ameliorate any impacts. • Identify potential sources of material to be used in any proposed management techniques.	Sections 7.1.4, 8.2	

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Terrestrial biodiversity	• Characterise the existing environment and sensitive environmental areas relating to avifauna, reptiles and amphibians, mammals and flora of the Project area (including for selected parts of the infrastructure corridor from the mine site to Vanimo). • Analyse the potential direct and indirect effects of the Project and develop measures for mitigation. • Assess the residual impact post-mitigation. • Design a program to monitor effects on biodiversity during construction and operations.	• Determine relevant laws, treaties, conventions and similar that will provide an assessment framework for the investigation. • Describe the flora (vascular), and fauna (mammals, reptiles, amphibians and birds) of conservation or local community significance (including cultural importance), particularly in areas to be directly affected by construction and operation of the mine and infrastructure corridor in the context of their general distribution and conservation significance. • Document any exotic and invasive species. • Determine whether the construction and operation of the Project would potentially affect habitats or species of conservation significance, or significance to the local community. • Calculate vegetation loss associated with the Project. • Assess the potential for, and implications of, the introduction of new invasive species into the area. • Develop management and mitigation measures to reduce and/or mitigate Project impacts. • Assess the post-mitigation impacts of the Project on biodiversity generally and on species of conservation significance or significance to the local community.	Sections 7.1, 8.6	Appendices 8a, 8b, 8c

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Aquatic biodiversity	• Characterise the aquatic fauna (including selected invertebrates), flora and habitats within the Project area. • Determine whether the Project would adversely disturb aquatic biodiversity or significantly affect the ability of the local community to exploit aquatic resources, after the implementation of mitigation measures. • Assess the residual impact after mitigation measures have been implemented • Design a program to monitor effects on aquatic biodiversity during construction and operations.	• Identify significant aquatic fauna and flora species, communities and habitats in the study area (mine area and infrastructure corridor), and in particular the distribution of any species of conservation significance or significance to the local community, using a sampling protocol that can be repeated in future sampling. • Identify the aquatic biota (flora, macroinvertebrates and fauna) known to exist in the riverine systems potentially affected by the Project. • Assess the sensitivity of aquatic fauna and flora to increased turbidity and sediment loads, changes to the natural flow regimes downstream of the FRHEP reservoir and assess potential impacts on aquatic fauna and flora associated with the Project. • Collect flesh and liver samples from aquatic biota (e.g. fish/fresh water crayfish) consumed by local communities and conduct metals analyses. • Identify measures to avoid, minimise, or mitigate adverse impacts upon aquatic fauna and to manage residual impacts, including determination of minimum environmental flows to maintain environmental values downstream of the FRHEP to maintain environmental values downstream. • Assess the overall impacts on aquatic fauna, flora and aquatic habitats associated with Project construction and operation after assuming implementation of mitigation measures.	Sections 7.2, 8.5	Appendix 7a

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Nearshore marine impacts	• Characterise the existing conditions of the nearshore marine ecology at the Ocean Port in Vanimo. • Determine whether the proposed development at the Ocean Port will adversely disturb nearshore marine ecology, or significantly affect the ability of the local community to exploit nearshore marine resources. • Assess the residual impact after mitigation measures have been implemented.	• Characterise the existing nearshore marine ecology at the Ocean Port. • Identify significant nearshore marine fauna and flora species, communities and habitat in the study area (including seagrass and coral reefs) and in particular the distribution of any species of conservation significance or significance to the local community (including cultural significance). • Describe the diversity, abundance and distribution of large fish, marine mammals, turtles (including searching for turtle nesting sites) and other marine fauna of conservation or local community significance. • Identify the presence of exotic and/or invasive marine species near the existing port. • Sample by video transect recording to characterise the benthic habitat. • Assess potential impacts on nearshore marine ecology associated with the proposed activities. • Assess whether the Project may significantly affect the ability of the local community to exploit nearshore marine resources. • Identify measures to avoid, minimise, or mitigate adverse impacts upon nearshore marine ecology and to manage residual impacts. • Assess the overall impacts on nearshore ecology associated with Project construction and operation after assuming implementation of mitigation measures.	Sections 7.2, 8.10	Appendices 12a, 12b

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Air quality, noise and blasting	• Determine the potential impacts of the Project with respect to air quality, noise and blasting during construction and operations within the Project Area. • Assist with Project optimisation to comply with appropriate air quality and noise constraints.	***Air Quality*** • Establish existing meteorological conditions by reference to existing data sets, supplemented by data from the on-site monitoring program. • Develop appropriate air quality targets. • Identify sources of dust and other air emissions (including those associated with Project infrastructure and transportation). • Develop an air quality model with local meteorological data and estimated emissions to determine air quality emissions from the Project and assess the potential impacts of this. • Predict impacts to air quality as a result of the Project. • Undertake a greenhouse gas assessment to determine the implications for greenhouse gas emissions associated with the Project. • Identify and describe mitigation and management measures for reducing/controlling air quality impacts. • Outline a monitoring and reporting program to enable sound air quality management and ensure public accountability.	Section 7.1.10, 7.1.11, 8.8, 8.9	Appendix 11

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Air quality, noise and blasting (cont'd)		***Noise*** • Establish existing background noise levels for the study area, nearest residences and other sensitive receptors. • Develop appropriate environmental noise level goals. • Identify significant noise sources of the revised project area and their mode of operations (including those associated with blasting, Project infrastructure and transportation). • Use a noise prediction model to estimate noise levels from the Project at nearest sensitive receptors, taking into account the effects of terrain, vegetation and worst case meteorological conditions, and assess the potential impacts of this. • Identify and describe mitigation and management measures for reducing/controlling noise impacts. • Outline an appropriate monitoring and reporting program based on the impact assessment. ***Blasting*** • Describe the likely blasting regime for the Project. • Use separation distances to predict the impact of ground-vibration and overpressure levels to the nearest sensitive receptors. • Identify and describe mitigation and management measures for reducing/controlling vibration and blast overpressure impacts, taking into account the remote location of the Project. • Outline an appropriate monitoring and reporting program based on the impact assessment.	Sections 7.1.9, 8.7 Chapter 12 Sections 5.5, 8.7 Chapter 12	Appendix 10 Attachment 2 Appendix 10 Attachment 2

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Conceptual closure and rehabilitation plan	• Propose a closure goal for the FRCGP and the FRHEP. • Determine objectives for the final land forms, structures and materials required to meet the mine closure goal.	• Based on the current mine plan, prepare a conceptual closure plan that identifies potential issues and impacts for mine closure (early and whole-of-mine-life). • Identify the completion criteria for closure that are specified in the relevant legal documents, policies and guidelines. • Develop a rehabilitation plan that progressively rehabilitates disturbed land when it becomes available. • Provide the basis for the ongoing review of closure concepts and detailed closure planning during the life of the Project.	Chapters 5, 8	Appendices 3a, 3b
Demography	• Characterise the demographics of the Project area and surrounds. • Build an understanding of the human populations in the Project area. • Assist in the identification of potential Project impacts that will inform mitigation and community development strategies.	• Determine the geographic and ethnic origin of local villagers and their present residential address. • Determine the age structure, sex ratio and any other relevant demographic characteristics. • Determine the range and average household size (area and number of persons) and relate this to ethnic origin.	Section 7.3	Appendix 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Economy and governance	• Characterise the economic and governance matters relevant to the Project area and surrounds. • Build an understanding of the local economies and local governance structures and their respective capabilities.	• Describe the local economy in the areas likely to be affected by the Project within the context of the two provinces and PNG as a whole, with particular reference to: – Employment. – Livelihoods and income derivation. – Industry diversity. – Standards of living of potentially affected populations. • Identify and describe relevant historical and current influences on the Project area and region. • Assess the economic impacts of the Project.	Section 7.3 Chapter 9	Appendix 13
Land use	• Characterise land use and people's connection to land in the Project area to identify potential impacts and sensitivities in regards to land use, and to assist with the siting of Project facilities and land access arrangements. • Inform impact mitigation, compensation and community development strategies.	• Describe the present pattern of land use in the Project area and explain who uses land or resources in various parts of the Project area, linking these to the ethnic origins of the local villagers. Land use to include but not limited to subsistence hunting and gardening and alluvial gold mining activities. • Describe connections to land in the Project area and explain the nature of those connections as they relate to the Project. • Provide data to enable the preparation of a map of land use and resource use in the Project area (including areal estimates). • Assess the social impacts associated with the physical disturbance of land for development of the Project. This will include an assessment of impacts associated with the physical and economic displacement of villages requiring resettlement.	Section 7.3 Chapter 9	Appendices 8, 9, 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Water use (including nearshore marine)	• Characterise water use by potentially affected people and communities.	• Identify and map the nature and location of major water sources used by potentially affected local communities, based on interviews and site inspections. • Characterise water use in terms of: – Type of use at each water source. – Frequency of water use at each water source. – Seasonal changes to location, type and frequency of water source. • Define and map stretches of rivers and streams that are specifically exploited as freshwater resources. • Describe subsistence and commercial (if any) fishing activity. • Describe other water uses, e.g. transport, laundry, cultural significance. • Comment on the relative importance of aquatic fauna to the local community. • Characterise uses of the nearshore marine environment at Vanimo. • Assess the social impacts associated with the physical disturbance of watercourses and potential impacts to surface water quality associated with development of the Project.	Section 7.3 Chapter 9	Appendix 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Resettlement	• Critically appraise earlier resettlement planning work and identify gaps or omissions with respect to leading practice. • Identify critical issues to be addressed, and propose methods to resolve these issues in a timely manner. • Develop the framework to guide resettlement planning and activity for the Project.	• Conduct a resettlement desktop assessment. This will involve: – Review the current status of PNG draft policy and regulations. – Review and identify the requirements of Equator Principle banks and international finance institutions with respect to the need for, and management of, involuntary resettlement. – Identify issues and lessons resulting from resettlement exercises in PNG, associated with mining and gas development, as well as resettlement resulting from natural disaster responses. • Develop draft options for livelihood (including Artisanal and Small-scale Mining (ASM)) compensation and restoration and prepare a Resettlement Policy Framework.	Chapter 9[1]	Appendix 13[1]

[1] A Resettlement Plan has been prepared and will be provided to the Mineral Resource Authority as part of the Project's updated proposals. The resettlement of villages and information from the Resettlement Plan is included in the social impact assessment.

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Alluvial mining	• Characterise the geographical extent and economic worth of alluvial mining activities in and downstream of the Project area.	• Describe the geographical extent of alluvial mining activities within and downstream of the Project area. • Estimate numbers of small-scale mining operations and miners within and downstream of the Project area. • Describe the nature of mining operations being conducted. • Estimate the proportion of miners that are locals (i.e., from nearby villagers) versus outsiders that have migrated into the area. • Assess the social and economic impacts on existing alluvial gold mining activities from development of the Project.	Section 7.3[2] Chapter 9[2]	Appendix 13[2]

[2] Community surveys sought information on levels of household income, primarily derived from employment by FRL and alluvial gold mining for mine area villages. Due to uncertainty surrounding income levels stated by respondents, FRL has commissioned a more detailed longer-term ASM study to inform the negotiation of compensation agreements. The results of this study are not yet available.

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Infrastructure (physical and social)	• Characterise the adequacy of the existing physical (e.g., power, water, transport) and social (e.g. hospitals, schools, clinics) infrastructure in the study area. • Assist in the identification of potential project impacts that will inform mitigation and community development strategies. • Identify the priority infrastructure development required to support the Project and its potential social impacts and opportunities.	• Describe the existing physical infrastructure: – Transport. – Constructed drainage. – Sanitation and sewerage. – Solid waste management. – Energy sources and use. – Telecommunications. – Housing and accommodation. – Ports. • Identify inadequacies in physical infrastructure to support Project development and operations, and potential population increases. • Describe the existing social infrastructure, including access to: – Childhood and community education services. – Health care facilities (hospitals, dispensaries, clinics, HIV/AIDS screening). – Emergency services. – Government services. – Law and order services. • Assess social impacts on changes to access and use of infrastructure associated with the Project.	Section 7.3 Chapter 9	Appendix 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Health	• Characterise the health status of the population in the Project area and surrounds. • Assist in the identification of potential Project impacts that will inform mitigation and community development strategies.	• Describe the existing health status of the population in the study area by considering key health indicators that include: – Life expectancy at birth. – Infant mortality rates. – Age standardised mortality rates. – Nutrition status. – Current disease risks. – Rates of infection and immunisation program. • Use existing information to describe and assess the potential exposure pathways and uptake of contaminant metals in downstream villages along the Frieda and Sepik rivers associated with the Project. • Use the results of the health surveys, socio-economic surveys, surface water and sediment sampling, groundwater and downstream impact modelling completed by others for the EIS to develop modelled scenarios of health impacts on downstream communities as a result of discharged surface water and fugitive sediment. • Based on this, predict whether the health of people living in downriver communities will be adversely affected by contaminants released by the Project.	Section 7.3 Chapter 9	Appendix 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Archaeology and cultural heritage	• Characterise the relevant archaeology and cultural heritage of the Project area and surrounds. • Identify and understand areas of archaeological or cultural importance in the Project area. • Assist in the identification of potential Project impacts that will inform mitigation and community development strategies.	• Review existing information, consult with relevant authorities and examine the relevant literature to locate known sites of archaeological or cultural significance in the Project area. • Identify sites of archaeological or cultural significance that could impose constraints on the location of Project facilities or otherwise require specific management.	Section 7.3 Chapter 9	Appendix 13
Culture and customs	• Identify unique cultures in isolated communities that have had little contact with modern society. • Provide the framework on which to base further studies to develop mitigating strategies and ongoing monitoring and measurement of cultural and customs indicators.	• Identify individual language groups and their community leadership structures. • Collaborate with other surveys to identify interactions between biodiversity and culture and customs.	Section 7.3 Chapter 9	Appendix 13

Table 2 Reconciliation with the EIR specialist studies program (cont'd)

Technical Study	Objectives	Tasks	EIS Section or Chapter	EIS Appendix or Attachment
Amenity[1]	• Characterise the relevant amenities of the Project area and surrounds. • Identify and understand the amenity of the Project area. • Assist in the identification of potential impacts that will inform mitigation and community development strategies.	• Identify the amenity within the study area. • Assess impacts on amenity within the study area.	Sections 7.3, 8.3 Chapter 9	Appendix 13
Impact assessment	▪ Identify potential social and cultural impacts, both positive and negative, and describe the nature and extent of each on Project-affected populations (using the aforementioned specialist characterisation studies). ▪ Contribute to a better understanding of the proposed Project activities by local populations, particularly those potentially affected by the Project. ▪ Facilitate the expression of views, concerns and aspirations about the proposed mining activity by Project-affected populations. • Assist the proponent, communities and other stakeholders to identify development goals to ensure that positive outcomes are maximised.	• Identify the potential impacts (direct, indirect and cumulative) of the Project. • Seek stakeholders' views concerning the potential impacts associated with the Project and their aspirations and expectations resulting from these impacts. • Investigate impacts to be addressed by the Project and recommend management and mitigation strategies for those issues, and describe residual impacts. • Describe agreed strategies to maximise potential community benefit from the Project. • Describe agreed subsequent action planning for the mitigation and realisation of potential Project impacts.	Chapter 9	Appendix 13