

Simandou Project

Class Social and Environmental Impact Assessment (SEIA)

Roads Programme



Company: Rio Tinto

Product Group: Iron Ore

Business Unit: Simfer SA

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Abbreviations

Abbreviation	Definition
BGEEE	Guinean Bureau for Evaluation of Environmental Studies Bureau Guinéen d'Évaluation des Études Environnementales
CRD	Rural Development Committee (Comité Rurale de Développement)
EMP	Environmental Management Plan
EPCM	Engineering, Procurement, and Construction Management
ERM	Environmental Resources Management
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GPS	Global Positioning System
HSEC-MS	Health, Safety, Environmental and Communities Management System
IBA	Important Bird Areas
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
MD	Managing Director
MSDS	Material Safety Data Sheet
NGO	Non-Government Organisation
SEIA	Social and Environmental Impact Assessment
SEMP	Social and Environmental Management Plan
SEP	Stakeholder Engagement Plan
TB	Tuberculosis
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSS	Total Suspended Solids
UNESCO	United Nations Education, Scientific and Cultural Organisation
WHO	World Health Organisation
WMP	Waste Management Plan
WWTP	Waste Water Treatment Plant

Glossary

Term	Definition
Areas of Conservation Interest	Areas that are considered by the SEIA Team to be of importance for the conservation of biodiversity, habitats and species, including areas that are protected by legislation or defined by recognised systems of international and national designation, or identified through surveys undertaken for the project.
Affected Community	Communities that are affected by a project either positively or negatively.
Agriculture	The cultivation of animals, plants, fungi and other life forms for food, fibre, and other products used to sustain life (also called farming or husbandry).
Baseline Data	Data gathered during the Social and Environmental Assessment used to describe existing conditions in the area of the project, such as physical, biological, socio-economic, and labour conditions, including any changes before the project commences.
Bas Fonds	Wetlands of high productivity in lower valleys.
Biodiversity	Integrating concept that includes the ecosystems within which the people of the world live, as well as the multitude of species that are used by humankind for food, fibre, medicines, clothing and shelter. Biodiversity is the variety of life in all its forms, including genetic, species and ecosystem diversity.
Bowal	Areas characterised by wooded grassland on hills or between valleys.
Chance Find Procedure	A project-specific procedure that will operate if previously unknown cultural heritage resources, particularly, archaeological resources, are encountered during project construction or operation. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds.
Child Labour	Work by a child that is likely to interfere with a child's basic right to education, or to be harmful to a child's physical, mental, spiritual, moral or social development.
Consultation	Consultation involves two-way communication between the Project and the affected communities. The consultation process should be undertaken in a manner that is inclusive and culturally appropriate and that provides the affected communities with opportunities to express their views on a project risks, impacts and mitigations measures, and allows the client to consider and respond to them. The consultation process will ensure free, prior and informed consultation.
Critical Habitat	Critical habitats are areas with high biodiversity value, including: (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.
Ecosystem Services	Ecosystem Services (ES) are generally defined as the benefits that people obtain from nature. There are four categories of services, including provisioning, regulating, cultural and supporting services.

Term	Definition
	- Provisioning services: The goods or products obtained from ecosystems such as food, freshwater, timber, fibre and other goods. - Regulating services: The benefits obtained from an ecosystem's control of natural processes such as climate, water flow, disease regulation, pollination and protection from natural hazards. - Cultural services: The non-material benefits obtained from ecosystems such as recreation, spiritual values and aesthetic enjoyment. - Supporting services: The natural processes such as erosion control, soil formation, nutrient cycling, and primary productivity that maintain other services.
Emergency Response Plan	Plan to address situations that pose an immediate risk to health, life, property or environment.
Endemic species	A species that is only found in a particular region and nowhere else in the world.
Grievance	A grievance is a complaint or concern raised by an individual or organisation who judges that they have been adversely affected by the Project during any stage of its development. Grievances may take the form of specific complaints for actual damages or injury, general concerns about Project activities, incidents and impacts, or perceived impacts.
Grievance Procedure	Procedure developed by the Project in accordance with IFC requirements: - to receive and facilitate resolution of concerns and grievances about the client's environmental and social performance; - for workers (and their organisations, where they exist) to raise reasonable workplace concerns; and - to receive and address specific concerns about compensation and resettlement that are raised by displaced persons or members of host communities.
Habitat	The locality or environment in which an animal lives.
Hazardous Waste	Substances classified as hazardous wastes possess at least one of four characteristics-ignitability, corrosivity, reactivity or toxicity – or appear on special lists.
Health, Safety, Environmental and Communities Management System (HSEC-MS)	Part of the overall management system for the Project, the management system includes the organizational structure, responsibilities, policies, procedures and practices, and resources and is essential for successfully implementing the project-specific management plan developed through the social and environmental assessment of the project. A good management system enables continuous improvement of the project's social and environmental performance, and can lead to improved economic, financial, social and environmental project outcomes (also referred to in Rio Tinto as the Health, Safety, Environmental and Communities Management System – HSEC-MS)
Hot works	Hot work is any process that can be a source of ignition when flammable material is present or can be a fire hazard regardless of the presence of flammable material in the workplace. Common hot work processes include welding, soldering, cutting and brazing. When flammable materials are present processes such as grinding and drilling become hot work processes.
Hydrogeology	Hydro (meaning water), and geology (meaning the study of the Earth) is the area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust, (commonly in aquifers).
Hydrology	The study of the movement, distribution, and quality of water.

Term	Definition
Infectious Disease	Illnesses that are attributable to specific infectious agents or their toxic products that arise through transmission of these agents or their products from an infected person, animal or inanimate reservoir to a susceptible host. Examples include water-borne, water-related, food-borne, respiratory diseases and sexually transmitted diseases.
Information Disclosure (also Public Disclosure)	The process of providing information to the affected communities and other stakeholders that is timely, accessible, understandable, and in the appropriate language(s). For projects with potential adverse impacts, information on the purpose, nature and scale of the project, the duration of proposed project activities, and any potential risks to and potential impacts on such communities should be included.
Intangible Cultural Heritage	Cultural knowledge, innovations and practices of communities embodying traditional lifestyles.
International Good Practice	The exercise of professional skill, diligence prudence and foresight that would reasonably be expected from skilled and experienced professional engaged in the same type of undertaking under the same or similar circumstances globally.
IUCN Red List	This list has been developed by the International Union for Conservation of Nature (IUCN) and the details the global conservation status of a wide range of biological species. The Red List website is http://www.iucnredlist.org/ .
Landscape	A geographical mosaic composed of interacting ecosystems resulting from the influence of geological, topographical, soil, climatic, biotic and human interactions in a given area.
Mitigation measures	Designs, and methods for construction, operation and closure of a project that are introduced into the plans for a project, to prevent adverse impacts, where impacts cannot be prevented altogether, to reduce them as low as is technically and financially feasible, and to remedy, offset or compensate for adverse effects, and measures to provide and enhance the positive benefits from a project.
Modified habitats	Land and water areas where there has been apparent alteration of the natural habitat, often with the introduction of alien species of plants and animals, such as agricultural areas.
Natural habitats	Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions.
Non-native species	An introduced, alien, exotic or non-indigenous species, or simply an introduction, is a species living outside its native distributional range, which has arrived there by human activity, either deliberate or accidental. Some introduced species are damaging to the ecosystem they are introduced into (eg weeds), others negatively affect agriculture and other human uses of natural resources, or impact on the health of animals and humans.
Occupational Health and Safety	Refers to the range of endeavours aimed at protecting workers from injury or illness associated with exposure to hazards encountered in the workplace or while working.
Pollution	Refers to both hazardous and non-hazardous pollutants in the solid, liquid or gaseous forms, and is intended to include other forms such as nuisance odours, noise, vibration, radiation, electromagnetic energy and the creation of potential visual impacts including light.
Primary forest	Forest which has never been subject to human disturbance, or has been so little affected by hunting, gathering and tree-cutting that its natural structure, functions and dynamics have not undergone any changes that exceed the elastic capacity of the ecosystem.
Protected	An area of land and/or sea especially dedicated to the protection of biological diversity,

Term	Definition
areas	and of natural and associated cultural resources, where protection is provided through legal or other effective means.
Ramsar site	Wetlands designated by the contracting parties to the Ramsar Convention for inclusion in the List of Wetlands of International Importance because they meet the criteria established under the Convention.
Secondary habitats	Habitats that have been disturbed and / or is being restored, for example degraded forest recovering from selective logging or areas reclaimed after being cleared by slash-and-burn agriculture.
Simfer S.A.	A Guinean registered company and currently jointly owned by the Rio Tinto Group (95%), and the International Finance Corporation (IFC – 5%). The Government of Guinea has an option to acquire up to a 35% equity interest in Simfer S.A.
Species of Conservation Interest	Species of conservation interest are identified by reference to the IUCN Red List of Threatened Species together with consideration of factors such as restricted range, endemism and importance for ecosystem services such as provisioning.
Social and Environmental Impact Assessment (SEIA)	The process of predicting and evaluating the social and environmental impacts and risks of a proposed project and identifying mitigation measures that will enable the project to meet the requirements of stakeholders, applicable laws and regulations, and any additional requirements for social or environmental performance identified by the Project, and so that impacts are as low as technically and financially feasible.
Social and Environmental Management Plan (SEMP)	A plan setting out all the proposed mitigation measures that the proponent of a project will take to prevent, reduce, remedy and compensate for adverse effects, and to maximise the benefits of the project. Also the plan for monitoring and auditing that will be undertaken to confirm compliance with the SEMP.
Stakeholder Engagement	Part of the Social and Environmental Impact Assessment, stakeholder engagement is an ongoing process involving disclosure of information, consultation with affected communities, and the establishment of a grievance mechanism.
Weed	A plant whose presence is considered unwanted.
Working conditions	Conditions in the workplace and treatment of workers. Conditions in the workplace include the physical environmental, health and safety precautions and access to sanitary facilities. Treatment of workers includes disciplinary practices, reasons and process for termination of workers and respect for the workers personal dignity.

Simfer SA

Simandou Project Roads Programme

Class Social and Environmental Impact Assessment

Non-Technical Summary

1 Introduction

The Simandou Project is a world-scale iron ore mining project in the Republic of Guinea in West Africa, being planned by Simfer S.A., a member of the Rio Tinto Group. Simfer holds a mining concession for the southern part of the Simandou range in southeastern Guinea, in partnership with the International Finance Corporation and the Government of Guinea. The Simandou Project also includes a trans-Guinean railway and a deepwater port for export of iron ore from the country.

Significant construction activities for the Simandou Project are scheduled to commence in 2012 and various advance works are required to prepare for the start of construction. These include a programme of improvements to existing roads and development of new roads needed for transport of goods and materials to construct the mine, railway and port. The details of these will be defined progressively over the next few months. In preparation for this, a strategic SEIA of the Roads Programme has been carried out and this is the non-technical summary of that SEIA. Further SEIAs are being prepared for other elements of advance works and the SEIA for the main Simandou Project will be completed in 2012.

Because at this stage road requirements are still being defined, a strategic or “class” approach to the assessment of impacts has been adopted. In this approach, the proposed developments are considered as a “class” of projects for which a strategic assessment has been undertaken in consideration of the range of designs and locations that are expected to be developed. Based on this information, a general assessment of likely impacts is made and generic measures designed to mitigate likely significant impacts are identified, to ensure that significant impacts are unlikely to occur. These measures are all set out in a Social and Environmental Management Plan (SEMP) for the Roads Programme. The SEMP is presented in the SEIA Report and the measures specified in the plan will be applied at all locations where roadworks are undertaken as advance works for the Simandou Project. The purpose of the Class SEIA Report is therefore to provide available information on the proposals for the Roads Programme, and to explain how the detailed works will be planned and designed to minimise the potential for adverse environmental and social effects and maximise the benefits of the works.

The Class SEIA will be followed by Site Files for individual road proposals developed as the location and design of each road is confirmed. During planning for individual road projects, detailed local conditions will be further investigated, impacts assessed, and if additional mitigation measures are needed to address specific local issues these will be identified and included in Social and Environment Site Action Plans for each location.

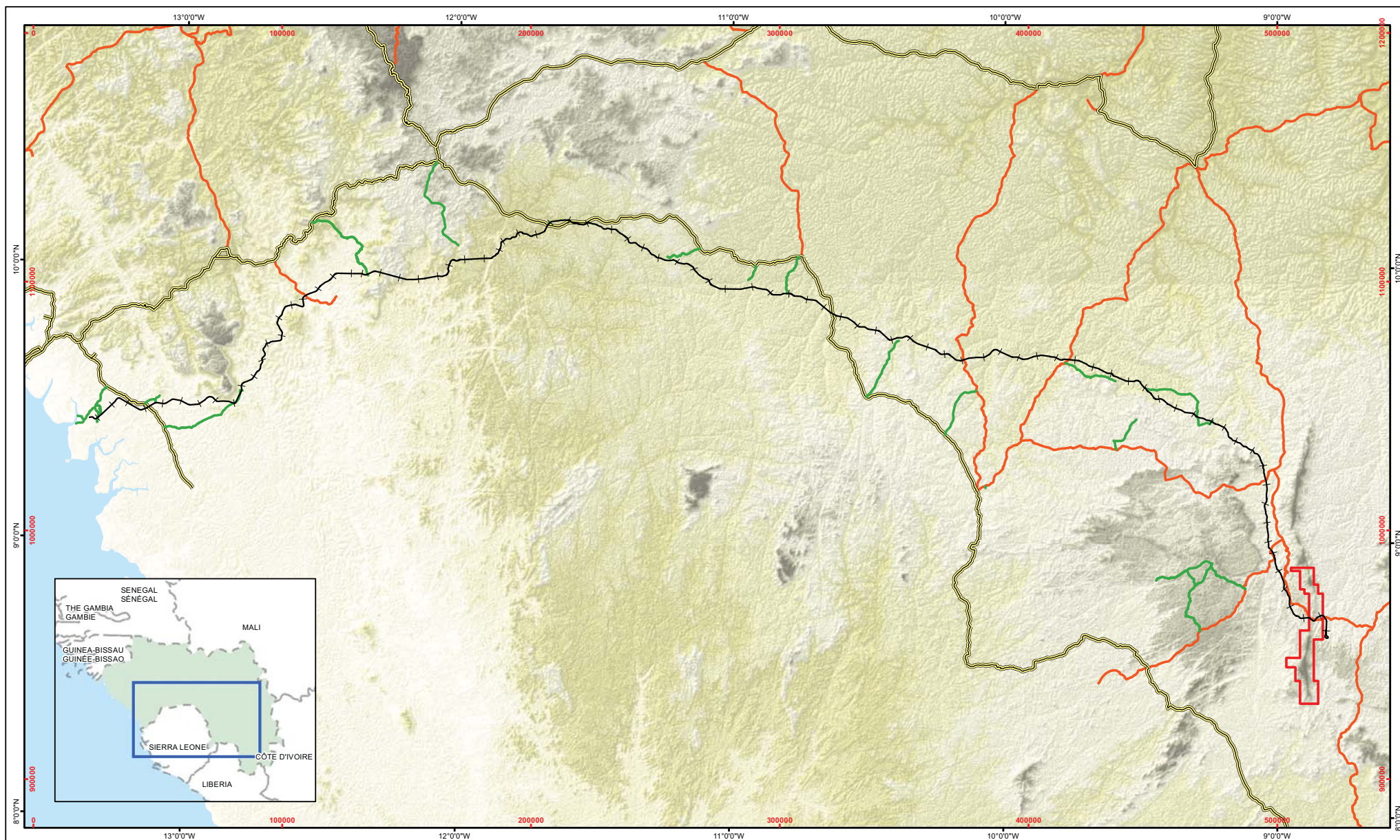
This non-technical summary highlights the main features of the proposed programme, the main potential adverse impacts, and the mitigating measures which will be adopted to avoid, reduce, remedy and offset or compensate for these. Positive opportunities are also identified.

2 The Project and its Baseline Environment

2.1 The Project

The Simandou Project Roads Programme is required to provide access to work areas associated with the Simandou Project. The precise locations where road access is required are currently being determined and refined but developments are likely to take place across the country, at the mine site, along the railway and near the port. *Figure 1* shows the existing main road network around the Simandou Project area and highlights those locations where it is currently considered that improvement works or new roads may be needed as part of the Roads Programme. It should be noted that these locations are only indicative at this time and further details will be developed relating to specific locations and will be presented in Site Files for each road.

In addition to the roadworks themselves, various ancillary developments will be required for short periods to support construction of the Roads Programme. These include borrow pits, temporary field camps, temporary access tracks, temporary bridges, temporary water supplies, concrete batching and bitumen mixing will be undertaken in various locations. The details of specific requirements in this regard will be described as part of developing the Site File for each road development.



Légende:

-  Corridor Indicatif du Chemin de Fer / Indicative Rail Corridor
-  Routes principales / Principal Roads
-  Routes Secondaires / Secondary Roads
-  Améliorations potentielles des routes existantes / Potential improvements to existing roads
-  Zone de la Concession Minière / Mine Concession Area

Client:

Simfer S.A.

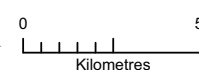
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Programme de developpement routier
du Projet Simandou: Routes indicatifs
/ Simandou Roads Programme:
Indicative Routes

ERM



SOURCE: Shuttle Radar Topography Mission (SRTM)
PROJECTION: WGS 1984 UTM Zone 29N

Date: 14/12/2011

Vérifié par: BS

Projet: 0131299

Dessiné par: CH

Approuvé par: KR

Echelle: 1:1,500,000

Figure:

ew_TerrestrialBioDivOverview.mxd

Rev:

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File: 0131299Simandou_Roads_10_CountryOverview.mxd; Terrain MBIDOverview.mxd

2.2 Site Selection

The development of the Roads Programme is currently underway taking into account the needs of the Project and constraints and opportunities offered across the Project area. Social and environmental constraints such as villages, areas of importance for biodiversity and cultural heritage and water abstraction points are being taken into account in planning route alignments and detailed designs.

Where possible, roads will be located to avoid sensitive areas. Where this is not possible, environmental and social specialists will work with the engineering team to select locations to minimise overall impacts and maximise benefits for local communities and the environment. The detailed design of each road will be developed in consultation with the local administration and the local community, and taking into account topography, land use and any site-specific environmental and social features. The plans for individual roads will be set out in the Site Files and these will include measures to address specific constraints in the area of the works.

2.3 Development Phases

The development of roads is likely to commence early in 2012, with roads developed in various locations over the course of the following one to two years. The majority of new roads will be public roads, handed over to the local administration following completion of construction, and used by Project vehicles for the duration of the Simandou Project. In some cases, roads may be used as private roads for short periods of time and then following completion of Project activities, they will remain in place and will be handed over to the administration. If closure of roads is required, roads will be decommissioned and rehabilitated in accordance with a road-specific closure plan.

3 Summary of Impacts and Mitigation Measures

3.1 Introduction

Impacts from new and improved roads have been considered in relation to the following:

- the physical environment: impacts on soils and geology, water resources, air quality, noise, resource use and waste;
- the biological environment: impacts on biodiversity including habitats, fauna and flora; and
- the social environment: impacts on people and communities including the economy, development and livelihoods, cultural heritage, community health, safety and security, labour and working conditions, human rights, gender and youth, and ecosystem services.

The following sections highlight the key potential impacts and the measures that will be taken to mitigate these at all work areas. The need for additional site-specific mitigation will be reviewed during the development of Site Files.

3.2 Impacts on the Physical Environment

The key issues and mitigation measures relating to impacts on the physical environment are summarised below.

3.2.1 Geology, Hydrogeology, Surface Water and Soils

Construction of new roads and widening and improvement of existing roads will require the removal of existing vegetation and levelling of the ground to prepare the corridor. Topsoil will be removed and kept separate for re-use to minimise loss of valuable resources.

Ground disturbance and use of construction equipment could release sediment and other contaminants into water. Ground disturbance will be avoided during periods of heavy rainfall and cleared areas that are to be rehabilitated will be re-vegetated as soon as possible following the completion of works. Where possible, construction activities will be organised to avoid work near watercourses. Where crossings of rivers are required, particular care will be taken to avoid disturbance to the river banks of watercourses and the loss of soils into the water.

Intentional or accidental releases of hazardous substances used during construction or spills caused by accidents involving Project vehicles carrying hazardous substances including fuel during use of roads, could lead to contamination of soils, surface waters and/or groundwater. Refuelling, equipment maintenance and other activities that require the use of hazardous substances will be carried out in designated areas where any spills or discharges can be contained and managed in an appropriate manner. The use, storage and transport of hazardous substances for the Project will be strictly controlled in line with international good practice. All effluent from the construction workforce will be collected and treated prior to removal for offsite disposal.

Development of new roads, or significant widening or sealing of existing roads could lead to disruption of natural drainage patterns, changing the risk of flooding and potentially affecting local water supplies. The detailed design of roads will be developed taking into account local hydrological conditions to ensure that flood risks are not increased and existing sources of water supply are maintained throughout construction and operation.

The measures described will ensure that sites are selected and run-off and discharges are effectively managed to prevent significant impacts on water and soils.

3.2.2 Air Quality

Dust generated during construction and operation could cause adverse impacts on air quality affecting the health and welfare of people, crops and sensitive natural fauna and flora. The alignment of roads will be developed to avoid communities and sites of importance for biodiversity where possible. Good construction practices will be implemented to control dust and other emissions from earthworks and other construction activities such as heating of bitumen and concrete batching, in order to prevent significant impacts on air quality during construction.

During operation, the flows of Project traffic will not be sufficient to cause significant adverse impacts from vehicle emissions. All Project vehicles will be regularly maintained and drivers will be trained in driving methods designed to avoid unnecessary emissions, for example, avoiding engine stress and reducing vehicle speed in and near communities.

3.2.3 Noise

Noise and vibration from Project equipment and activities during construction and operation could adversely affect the workforce, communities and sensitive fauna. Where possible, the alignment of new roads will be developed to avoid sensitive areas such as communities and areas used by sensitive fauna such as large mammals. Work areas will be clearly defined and demarcated to ensure that noisy activities are segregated from sensitive receptors where possible. Where this is not possible, measures will be implemented to manage site activities to avoid significant adverse noise impacts by using quiet equipment, installing screens and restricting working hours. Workers will be trained to operate machines and vehicles quietly.

Use of roads by Project traffic will not be sufficient to cause significant noise impacts on a routine basis, but Project vehicles will be regularly maintained to avoid increases in noise emissions. Speed limits will be imposed for vehicles travelling through communities and other sensitive areas, and drivers will be trained in driving methods designed to avoid unnecessary noise.

3.2.4 Use of Resources and Waste

Inefficient use of resources such as water and construction materials could deplete supplies for local communities and other users and may lead to unnecessary generation of waste. Use of water will be planned and controlled and hydrological studies will be carried out where necessary to ensure that Project requirements for water can be met without compromising existing local needs.

A Waste Management Plan (WMP) will be established defining how waste will be reduced, re-used, collected, managed, recycled and disposed of in an appropriate manner and in accordance with good international practice. Audits will be undertaken at planned intervals to assess compliance and ascertain the effectiveness of the WMP.

3.3 Impacts on the Biological Environment

The key issues and mitigation measures relating to impacts on the biodiversity, habitats and species are summarised below.

3.3.1 Loss, Fragmentation and Degradation of Habitats

Development of the Roads Programme may cause loss, fragmentation or degradation of habitats of conservation interest and severance of corridors used by wildlife. The presence of areas and species of conservation interest will be taken into account in planning the Roads Programme with the aim of avoiding areas of conservation interest and maintain a minimum buffer of approximately 500 m between any roadworks and these areas wherever possible.

More detailed habitat characterisation, mapping and screening of areas of conservation interest and animal routes will be carried out during detailed design with the aim of minimising the footprint of work areas so as to keep the loss and fragmentation of habitats as low as possible, and identifying appropriate mitigation for any damage that may occur. This will be documented in individual site files.

Where harm to habitats cannot be avoided, because either an existing road already passes through an area of interest, or a new road has to cross the area in order to provide access, a range of mitigation measures to compensate for loss of biodiversity and creation of corridors to connect fragmented areas will be implemented.

Strict controls on emissions, effluents, waste and lighting will be applied during construction to minimise risks of pollution adversely affecting habitats and species. During operation Project vehicles will be operated so as to minimise impacts from emissions, accidental spills and vehicle lights at night.

3.3.2 Severance of Animal Routes

Where the locations of roads lead to severance of routes used by species of conservation interest, passages will be developed where possible and designed to meet the needs of the affected species. The design of bridges and culverts will include measures to allow movement of animals including fish along watercourses, where possible. This will be documented in individual site files.

3.3.3 Impacts from Increased and Induced Access

Building new roads into undeveloped areas and improving existing routes will lead to increased presence of people, either directly as a consequence of project traffic, but also by encouraging local people into areas that they would not previously have visited. Increased human presence can disturb local fauna adversely affecting activities such as breeding, but it can also lead to increase in threats from hunting and fire, and the increased pressure for conversion of and for farming, logging and settlement. These impacts will be avoided where possible through careful consideration of risks of increased and induced access during strategic planning of the Roads Programme and in the detailed design of roads. Where necessary, consideration will be given to using helicopter access to avoid the need for road construction, but where this is not feasible, measures will be taken to control access as needed. Where a road is being developed only for Project

purposes it may be removed and the route rehabilitated on completion of Simandou construction in consultation with the local community and administration.

3.3.4 Direct Impacts on Flora and Fauna

Land-take and clearance of vegetation may lead to loss or displacement of plant or animal species of conservation interest. Work activities and improved access to remote areas could lead to greater demand for bushmeat and facilitate access to hunting areas. The habitat mapping process described previously will include consideration of the potential for habitats to support these species with the aim of avoiding and minimising loss of habitats required by these species. Where areas of conservation interest are located near work areas, they will be demarcated and clearly signposted and access to these areas will be prohibited to protect them from disturbance. Where practical, vegetation along rivers, drainage lines, gullies and gorges, will be protected with a buffer zone. Any essential work in watercourses will be carefully managed to avoid adverse impacts on water flow, quality and aquatic animals and plants. Appropriate routeing and detailed design of roads will facilitate avoidance of significance impacts on species of conservation interest.

3.3.5 Invasive Species and Pests

Movement of vehicles, equipment and materials into and between Project work areas could introduce invasive, non-native and pest species leading to harm local species, ecosystems and crops. High-risk areas and species will be identified, mapped and characterised where possible and appropriate management measures defined in consideration of experience elsewhere in Guinea, Rio Tinto's current operations at Simandou and international good practice. Effective hygiene and, where necessary, quarantine procedures will be implemented for all personnel and equipment coming to the area. Local species will be used during all rehabilitation activities and any introduced plant species will be reviewed and approved by appropriate specialists prior to use. Ongoing maintenance and monitoring of work areas will include regular inspections for invasive, non-native species, weeds and other pests and any incidents will be managed in accordance with the Project's established procedures. All personnel will be trained in measures needed to protect habitats and species from harm.

3.3.6 Non-Routine Impacts

Work activities in remote areas may lead to increased occurrence of bushfires with resulting habitat loss. Burning of waste will only occur in appropriately designed and approved facilities. Unauthorised open fires will be prohibited and potential ignition sources will be identified and strictly controlled. Emergency fire-fighting arrangements will be put in place to respond to fires including bushfires.

Other non-routine events such as road accidents and chance-encounters with animals could adversely affect animals. Speed limits will be established where necessary to alert drivers to risks of animal crossing roads and all drivers will be trained in safe driving practices. Non-essential travel at night and driving off-road will be prohibited. Movements by Project personnel outside the camps and work areas will be restricted to minimise disturbance offsite. Induction training for all Project personnel will include communication of key risks and mitigation measures including chance-encounter procedures.

3.4 Impacts on the Social Environment

The key issues and mitigation measures relating to impacts on people and communities are summarised below.

3.4.1 Physical and Economic Displacement

The development of new roads, widening of existing roads and ancillary works will cause physical and/or economic displacement of land and other assets used by local communities. The alignment of roads will be developed to avoid loss of homes and other land of importance to communities and their livelihoods wherever possible. The areas of land affected will be kept to the minimum necessary for the works. Where impacts cannot be avoided, land will be acquired from affected people in accordance with international good

practice as set out in principles presented in *Annex F* of this Report (Principles for Resettlement and Community Development).

Positive impacts may also occur due to road development as construction activities will offer opportunities for local employment and new/improved roads will facilitate better connectivity with surrounding areas, increasing access to jobs and markets, especially for the young, and providing opportunities for trade and associated economic development.

3.4.2 Economic Development and Employment

Opportunities for local employment and sustainable use of local goods and services during construction of roads will be identified wherever possible and measures will be devised to maximise the potential for local hiring and procurement. Key community decision-makers will be consulted as part of identifying and developing these opportunities. Unskilled labour will be preferentially hired from the local communities but all enquiries for employment will be referred to Project Employment Offices in nearby towns and there will be no direct hiring of workers at work areas. All speculative applications will be referred to the nearest employment office.

Monitoring will be carried out to identify areas where local availability of resources has been adversely affected by Project procurement. The Project will also work with suitable partners to support local capacity building and monitoring programs will be implemented to track local procurement volumes and success of capacity building.

The enhancement in accessibility provided by new and improved roads will provide benefits for local communities in terms of access to jobs, markets and services such as education and health. The benefits for local communities from improved access, and also the possible threats to traditional lifestyles and community structures, will be considered in developing plans for road development. This will be documented in individual site files.

3.4.3 Cultural Heritage

The alignment of roads will be developed to avoid culturally sensitive locations such as sacred sites, places of worship and sites linked to local traditions and practices. If any cultural artefacts are discovered during construction, work will stop, appropriate investigations will be undertaken, and any necessary measures will be taken to mitigate any losses. When this occurs, the potential for location-specific impacts will be considered in consultation with the local administration and communities and presented in the Site File for each location. The Project Cultural Heritage Management Plan documents these processes.

3.4.4 Community Health, Safety and Security

The introduction of construction workers to remote areas could adversely affect local communities by introducing or transmitting diseases into new areas. Increased risk of malaria could occur if construction activities such as ground clearance lead to the creation of areas of standing water offering breeding grounds for mosquitoes.

The safety of the public and local affected communities will be ensured through clear demarcation of all work areas, careful management of on-site conditions, strict control of access within these areas and public safety awareness training sessions for project personnel prior to commencement of construction and during operations. Specific attention will be given to prevention of malaria risk by avoiding creation of standing water in work areas. Ongoing maintenance of work areas will include regular inspections for pest species. Risk of water-borne diseases will be minimised using appropriate treatment methods for drinking water.

A health management system will be implemented to ensure that all construction personnel are fit for work and illnesses are not introduced by personnel encountering local people. All personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS and malaria, along with the prevention and mitigation measures required. Partnerships will be actively sought with specialist external

organisations to help deliver HIV education, awareness raising and treatment to Project personnel, their dependents and where appropriate, to the broader community.

During construction and operation, risks to local people and livestock from accidents involving Project vehicles will be minimised through careful route planning, training of Project drivers, application of speed limits on Project vehicles travelling through settlements, and dissemination of road safety information to local communities.

Emergency plans will be prepared for the construction period and for Project vehicles during operation, taking into account potential impacts on local communities and measures needed to ensure the safety and security of individuals in this regard. Local authorities and affected communities will be provided with appropriate information communicating the nature and extent of any potential incidents that could arise and procedures to be followed in the case of an unplanned accident or emergency.

Maintenance of security can be an issue at new developments because of the behaviour of inadequately trained security personnel. To avoid this, all security personnel on the Simandou Project will be screened prior to employment by means of detailed interviews and enquiries into previous employment to avoid those who have previously been involved in abuse or violation of human rights. All security personnel will receive training regarding work procedures and on Project expectations for security behaviours and practices.

3.4.5 Interaction with Local Communities, In-migration and Resource Use

Locating roads close to communities presents both risks and opportunities for local people. Changes in accessibility and increased development in local communities can lead to breakdown in existing community structures and livelihoods, increased pressure from in-migration, and erosion of cultural practices and traditions. However, benefits can include improved access to jobs and markets, employment for local people and opportunities for local businesses to supply goods and services can offer advantages in terms of economic development. New and improved roads can also improve mobility, enabling people to access new sources of jobs and new markets for products and to interact with new communities. If appropriately managed and directed these opportunities can be of particular benefit to women and the young. Prior to commencing activities, local communities will be consulted during planning of roads to ensure their views are taken into account and they understand the scale and nature of the proposed developments. Risks of in-migration having an adverse impact on local communities and economies will be carefully considered in road alignment and design.

Movement of non-local workers during road construction will be strictly controlled to prevent inappropriate interaction with local people and a strict Code of Conduct governing activities and behaviour will apply to all Project personnel. All personnel will receive training in these requirements.

Construction will be organised so that unsustainable demands are not placed on limited local resources, facilities or amenities. If any significant interaction with communities is required, the construction personnel will be accompanied by a member of the Simfer Communities Team.

A Grievance Procedure will operate for receipt, handling and resolution of any grievances expressed by local people. This will be freely accessible to all, transparent, culturally appropriate and without retribution. The Simfer Communities Team will co-ordinate appropriate investigation and resolution of all grievances within a reasonable timeframe in accordance with the Simandou Project's established and approved processes.

3.4.6 Human Rights, Gender and Youth

Employment procedures and conditions during road construction will conform to Guinean Law, international conventions and Company standards with respect to protection of human rights to ensure the health, safety and welfare of all workers. Use of child and forced labour and discrimination during recruitment and employment (including discrimination on grounds of gender, ethnicity, religion or age) will be strictly forbidden but opportunities will be sought to provide opportunities for women and the young. Everyone will be entitled to free choice to accept or reject opportunities of employment. Labour and working conditions will be clearly communicated to potential workers as part of the recruitment process. Workers will have the right

to form and to join trade unions, create their own worker committees and appoint worker representatives in accordance with the rights set out in the Guinea Labour Code. HIV/AIDS screening will not be a requirement for recruitment or a condition of employment.

Requirements relating to human rights and discrimination will be clearly communicated to all construction personnel as part of training, and incorporated into labour contracts. Appropriate levels of auditing and verification will be carried out to monitor compliance with these requirements.

3.4.7 Employee Health, Safety and Welfare

Strict standards will be applied for protecting the health, safety and welfare of all personnel employed during construction. Health and safety incidents will be reported, investigated and addressed in an appropriate and culturally sensitive manner. Appropriate rest and recreational time will be provided to allow workers to manage fatigue and engage in recreational activities. A fair, transparent, culturally appropriate and accessible Grievance Procedure will be available to all workers.

3.4.8 Ecosystem Services

In developing plans for specific roads consideration will be given to the potential impact of construction on ecosystem service of importance to the local community. Where significant impacts could occur services and resources of importance for communities will be protected and if adverse impacts cannot be avoided alternative provisions will be made to compensate for adverse effects.

In particular where development of roads would impact on natural buffer areas such as wetlands, mangroves and upland forests that mitigate the effects of natural hazards such as flooding, landslides and fire, and thus result in increased risks to community safety, or where adverse impacts on the quality, quantity, and availability of freshwater could result in health-related impacts, measures will be taken to prevent these impacts through design and management of construction activities. Impacts on sources of shelter, food, fodder, timber or other natural resources and on cultural services provided by the environment, will be mitigated by the measures designed to protect biodiversity and cultural heritage. All mitigation for specific sites will be developed in consultation with the local community and documented in individual site files.

4 Overview and Next Steps

The process for strategic planning and detailed design of the Roads Programme has been developed to avoid impacts as far as possible, and to minimise any impacts that cannot be avoided by adoption of the mitigation measures outlined here and set out in full in the Social and Environmental Management Plan. Specific impacts that may occur at particular locations, will be identified and assessed during the development of Site Files, and measures that are needed to mitigate these impacts will be defined in Site Action Plans. Simfer is committed to complying with all these requirements and this will be checked by regular monitoring, inspections and audits in accordance with monitoring plans to be developed as part of the Site File for each road.

Site Files will be developed in consultation with local stakeholders and will be submitted to national and local government and local stakeholders prior to start of construction. These Site Files will present:

- details of the proposals for each specific road;
- the justification for site selection and detailed layout;
- baseline conditions and any particular sensitivities relating to the location of planned road developments;
- an assessment of location-specific impacts; and
- details of specific social and environmental mitigation measures that will be implemented at the location in addition to the overarching mitigation proposals set out in this SEIA.

This SEIA is now being submitted to the Government of Guinea for consideration and approval. It is also being made available for review and comment by interested external stakeholders through dissemination to national, regional and local governmental authorities and non-governmental organisations, and publication on the web (at www.riotintosimandou.com/index_seia.asp). Copies of the full report can be obtained from the website or by request to Simfer at any of the contact points given below. Interested parties are invited to submit comments on the SEIA through the same contact points:

- on the Project website http://www.riotintosimandou.com/index_seia.asp;
- by email to Simfer at simandou.eise@riotinto.com; and
- by visiting or writing to:
 - SIMFER SA, Immeuble Kankan, Cité chemin de fer, BP 848, Conakry, République de Guinée;
 - Rio Tinto, 17 Place de Reflets, La Défense, Courbevoie, 92097 Paris; and
 - Rio Tinto, 2 Eastbourne Terrace, Paddington, London.

All submissions will be taken into account in finalising the proposals and the SEMP.

Simfer SA

Simandou Project Roads Programme

Class Social and Environmental Impact Assessment

Main Report

1 Introduction to the Project and the SEIA Report

1.1 Purpose of the SEIA Report

This document is the report of a Social and Environmental Impact Assessment (SEIA) prepared for part of a programme of advance works needed for the Simandou Mining Project. It covers a programme of roadworks needed in preparation for construction of the main Simandou Project and is one of a series of advance works SEIA reports being submitted for the project.

The Simandou Project is a world-scale mining project comprising:

- an open pit iron ore mine in the Simandou Range in south-eastern Guinea, approximately 600 km from the Guinean coast and 400 km from the Liberian coast, with an estimated resource capacity of 95 million tonnes per annum (mtpa);
- a Trans-Guinean railway of about 670 km to transport the ore from the mining concession to the Guinean coast;
- a new deepwater port located south of Conakry in the Forécariah prefecture; and.
- various associated developments providing utilities and infrastructure to the project including construction materials, power, water, access and accommodation.

The Simandou Project is being developed by the Guinean-registered company Simfer S.A. (Simfer). Simfer is a member of the Rio Tinto Group, and holds a mining concession for iron ore over the southern part of the Simandou mountain range. The current shareholders of Simfer are Rio Tinto (95%) and the International Finance Corporation (IFC – 5%). The mine will be operated by Simfer and the construction of the rail and port infrastructure will be carried out by a Special Purpose Vehicle (SPV) intended to be held 51% by the Government of Guinea and 49% by the shareholders of Simfer and its affiliates. The mine, rail and port developments, and their associated infrastructure are hereafter referred to as the Simandou Project. An SEIA for the full Simandou Project is in preparation and will be submitted to Government in 2012.

In preparation for the start of construction of the main project planned in 2012, a number of new roads and road improvements are needed across the country, including at the mine site, along the railway and near the port site, to provide access to work areas and facilitate movement of construction materials and equipment to Project locations. Further details are provided in *Chapter 2*.

As these works must be in place for the start of construction, an early application is being made for permission to develop these as advance works. This document has been drafted to support that application. It reports the findings of a Social and Environmental Impact Assessment, developed in accordance with the requirements of the Guinean Environment Code and EIA Decree (see *Section 1.2* below).

The purpose of the SEIA report is to provide information on the proposed developments and to explain how they are being planned and designed to minimise the potential for adverse environmental and social effects and to maximise the benefits of the works.

The SEIA studies have been undertaken by an international team coordinated by Environmental Resources Management (ERM) and including a number of international and Guinean specialists. The key members of the SEIA team are introduced in *Annex A*.

1.2 SEIA and other Regulatory Requirements

1.2.1 Introduction

This SEIA has been prepared in accordance with the Guinean Environment Code ⁽¹⁾, Presidential Decree 199/PRG/SGG/89 on Environmental Impact Studies (the EIA Decree) ⁽²⁾, and Order 990/NRNE/SGG/90 on the content and methodology for impact studies ⁽³⁾. The assessment is also designed to comply with the requirements of the International Finance Corporation (IFC) ⁽⁴⁾, and Rio Tinto Group policies with respect to impact assessment.

1.2.2 Guinean EIA Legislation

The Environmental Code sets out the fundamental legal principles to be complied with when developing projects in order to ensure the protection of environmental resources and the human environment. *Article 82 of Title V* of the Code specifies that where developments, works, or facilities may - given their size, the type of activities conducted there, or their impact on the natural environment - harm the environment, the promoter or project owner shall establish and file with the ministry in charge of the environment an impact assessment that evaluates the direct or indirect impact of the project on the ecological balance in Guinea, the surroundings and quality of life for the local population, and more generally the protection of the environment.

The EIA Decree ⁽⁵⁾ defines the types of projects that require an Environmental Impact Study. These include construction of roads (see Annexe to the Decree, *Class 5*) and an impact assessment is therefore required for the Simandou Roads Programme.

1.2.3 Other Requirements

In addition to the requirements relating to Impact Assessment, the Roads Programme must also comply with all Guinean legislation relating to protection and management of the environment and social, socioeconomic and labour law, and with international conventions which Guinea has ratified. As IFC is an investor in the Project, it must also comply with IFC standards and guidance regarding environmental and social performance and it must also meet Rio Tinto's own corporate standards. *Annex B* provides a summary of relevant policy and legislation in Guinea and the regulatory and administrative structure, and identifies international and corporate standards applying to the Project.

1.3 Approach to the Assessment

The Simandou Roads Programme involves the development of new and improved roads across the Simandou Project area over a period of time. The first roads are likely to be developed from early 2012. Others will follow thereafter as construction progresses and access requirements are determined and refined. As a result, the locations of all required works have yet to be confirmed and for this reason a sectoral approach has been adopted for the SEIA.

In this approach, the road developments are considered as a "class" of development for which a generic assessment has been undertaken taking into account the range of designs and locations which are expected to be implemented. At this stage the assessment is not site-specific and more detailed site-specific information will be developed in "Site Files" for each location as the plans for each stretch of road are finalised.

(1) Code for the Protection and Development of the Environment, Ordinances 045/PRG/87 and 022/PRG/89

(2) Presidential Decree 199/PRG/SGG/89 codifying Environmental impact Studies

(3) Arrêté 990/NRNE/SGG/90 Establishing the Content and Methodology for Environmental Impact Studies

(4) IFC requirements are set out in the IFC Policy on Environmental and Social Sustainability and its supporting Performance Standards and EHS Guidelines – see <http://www.ifc.org/policyreview>

(5) Guinée Codification des études d'impact sur l'environnement. Décret n°199/PRG/SGG/89 du 18 novembre 1989

This Class SEIA is being submitted to Government for approval in the same way as a conventional SEIA in order to establish approval-in-principle for the Roads Programme. The supplementary Site Files will be submitted for information, as specific plans for individual locations are defined. These will:

- identify the specific location, and describe the proposed development at that location, including the design of the works, and plans for construction, operation and, where necessary, closure;
- describe local environmental and social conditions, identifying any features of importance;
- assess impacts specific to that road or location, insofar as these may be additional to or different from those assessed in the Class SEIA; and
- propose any supplementary and location-specific mitigation needed to address specific sensitivities (eg proximity to settlements, watercourses, areas of importance for biodiversity) insofar as this may be additional to or different from that set out in the Class SEIA.

In preparing each Site File, Simfer will undertake the necessary surveys and studies and will consult with local stakeholders, including affected communities, to ensure their views are taken into account. A template for these Site Files is provided in *Annex C*.

The key steps in the Class SEIA approach have been designed to align with conventional SEIA and are outlined in *Table 1.1*.

Table 1.1 Summary of the Class SEIA Process

Stage	Summary of Approach
Scoping and Stakeholder Engagement	The assessment has been scoped to ensure it is focused on the significant environmental and social impacts which may arise from the Roads Programme. This involved a systematic consideration of the potential for interaction of Project activities with the environment and communities, to identify where significant impacts could potentially occur. The results of scoping were documented in the SEIA Terms of Reference, and formed the basis for planning the SEIA. The Terms of Reference were submitted to government in November 2011 and a copy is presented in <i>Annex D</i>. Scoping also took into account the views of external stakeholders regarding the plans for the Simandou Project, including the Roads Programme, as communicated in September and October 2011. Further information regarding scoping and stakeholder engagement is provided in <i>Chapter 3</i>.

Stage	Summary of Approach
Baseline development	For the key issues identified in scoping, available information on current environmental and social conditions was gathered with particular emphasis on aspects potentially affected by the road works. The “Project area”, as referred to in this SEIA Report, comprises the area within which the mine, rail and port for the Simandou Project will be developed. New and improved roads will typically be located within or close to this area. Baseline conditions within the Simandou Project area are therefore considered as indicative of the actual conditions that will be encountered when developing roads and to provide sufficient basis for assessing likely impacts and identifying suitable mitigation measures associated with this class of development. The local baseline environment specific to each individual site will be assessed during reconnaissance visits to each location and results will be reported in Site Files.
Alternatives	As part of the Class SEIA approach, alternatives are currently being considered at a strategic level. Road siting and design guidance has been developed and is being used by the Engineering Team in drawing up proposals for specific locations. Consideration of alternatives will continue during the planning and preparation of the Site Files for individual roads. The route selection process is described in more detail in <i>Chapter 2</i>.
Impact assessment	This stage focused on predicting how environmental and social conditions may change from the baseline as a result of construction, operation and, where appropriate, eventual closure of roads. In the Class SEIA approach, this assessment is conducted at a strategic level. The results are presented in <i>Chapters 4, 5 and 6</i>. The focus was on identifying significant impacts including both positive and negative effects. As the location of individual roads is confirmed, the potential for location-specific impacts will be considered, in consultation with the local administration and community, and presented in the Site File for each location.
Mitigation measures	Where the potential for significant impacts was identified, measures to avoid, minimise, restore, offset or compensate for adverse impacts and to maximise benefits have been identified. These include requirements relating to the siting, design and development of new and improved roads and the methods to be adopted during construction, operation and closure of roads. The mitigation measures that have been defined are described in <i>Chapters 4, 5 and 6</i> and they will be applied to all developments forming part of the Roads Programme. As the location of individual roads is confirmed, the need for any additional location-specific mitigation will be considered in consultation with the local administration and community and presented in the Site File for each location.

Stage	Summary of Approach
Social and Environmental Management Plan	The mitigation measures presented in <i>Chapters 4, 5 and 6</i> will be implemented through the Project Health, Safety, Environment and Communities (HSEC) Management System. A Social and Environmental Management Plan (SEMP) for Roads, which gathers together all the mitigation commitments, is presented in <i>Annex J</i>. This SEMF also identifies the stage at which the measure will be applied <i>ie</i> design, construction, operation or closure. This will be further developed in individual Site Files to identify any additional site-specific measures needed, responsibilities for implementation, and monitoring and auditing to be carried out to ensure the commitments are met. The SEMF is accompanied by Principles for Resettlement and Community Development for Simandou Early Works (as presented in <i>Annex F</i>) detailing how acquisition of land for Early works will be managed in accordance with international good practice. The Management System and SEMF, including monitoring and audit processes are discussed in <i>Chapter 7</i>.
Reporting, Disclosure and Approval	The final stage in the SEIA process is the publication and dissemination of this SEIA Report. The report is being submitted to Government for consideration and will be disclosed for comment by interested stakeholders as described in <i>Chapter 3</i>. All comments will be considered in finalising the proposals and the Social and Environmental Management Plan (SEMF) for the Roads Programme. A programme of continuing engagement with stakeholders will be implemented during development of the individual Site Files, and during the subsequent construction activities and use of the roads by Project traffic. This will include operation of a grievance procedure to ensure effective management of any grievances.

1.4 Structure of the Report

The remainder of this report is organised as follows.

- *Chapter 2 Project Description*: provides a description of the proposed Roads Programme including indicative design information, a description of the route design and development process for new roads, and a description of activities to be undertaken during construction, operation and, where appropriate, closure.
- *Chapter 3 Scoping and Stakeholder Engagement*: presents a summary of the scoping process that was carried out to develop the Terms of Reference and the stakeholder engagement activities undertaken to date. This chapter also describes the plans with respect to ongoing stakeholder engagement in the future.
- *Chapters 4 to 6* present the potential impacts of the Roads Programme on the Physical Environment, the Biological Environment and People and Communities. The mitigation measures that will be employed to minimise the risk of potential adverse impacts are also presented. Each chapter provides:
 - an introduction to the topic and to the sources and types of impact addressed in the chapter (*ie* the scope);

- an outline of the types of baseline conditions likely to be encountered; and
- a description of the impacts and the mitigation measures that will be adopted to avoid, minimise, restore, offset or compensate for adverse impacts and to provide benefits.
- *Chapter 7* presents the HSEC Management System for the Project and the SEMP.

Table 1.2 identifies where the information required by Order 990 on the Content and Methodology for Impact Studies can be found in the report.

Table 1.2 Meeting the Requirements of Order 990 on Content of Environmental Impact Studies

Information required by Order 990	Location in Report
1. Description of the Project including its objectives, location, cost, date of investment and schedule for implementation	See <i>Chapter 2</i>
2. Analysis of the baseline state of the environment, in particular elements susceptible to being affected by the development (sites, landscape, socio-economic way of life and culture of the people)	For physical environment including geology, hydrogeology, hydrology, noise and air quality – see <i>Chapter 4, Section 4.2</i> For biological environment– see <i>Chapter 5, Section 5.2</i> For people and communities including socio-economic conditions, cultural heritage and ecosystem services – see <i>Chapter 6, Section 6.2</i>
3. Analysis of the effects of the Project on the environment	For impacts on the physical environment – see <i>Chapter 4, Section 4.3</i> For impacts on the biological environment - see <i>Chapter 5, Section 5.3</i> For impacts on the people and communities - see <i>Chapter 6, Section 6.4, Section 6.3</i>
4. The reasons for choice of the location	See <i>Chapter 2, Section 2.2</i>
5. Measures envisaged to prevent, reduce and if possible compensate for damaging effects and an indication of their cost and effect	See <i>Section 4.3, 5.3, 6.3 and Annex J</i> All costs of mitigation are included in the planned budget for the Project. The effect of mitigation measures is described.

1.5 Next Steps

In accordance with good impact assessment practice and the requirements of the EIA Decree, this SEIA Report will be disclosed to help interested parties understand the risks, impacts and opportunities associated with the Roads Programme, and provide them with an opportunity to comment, and for their comments to be considered by the Government and by Simfer in finalising the proposals and implementing the programme. This will be done:

- by publication of the SEIA report on the Project website
http://www.riotintosimandou.com/index_seia.asp;
- through consultation with government agencies, and national and international non-governmental organisations; and

- through consultations with local communities during the planning of individual road developments and preparation of Site Files.

Copies of the report are available on the website, can be obtained on request by applying to Simfer at simandou.eise@riotinto.com, and can be viewed at Rio Tinto and Simfer offices at:

- Simfer SA, Immeuble Kankan, Cité chemin de fer, BP 848, Conakry, République de Guinée;
- Rio Tinto Simfer SA Information Centres at Beyla and Kérouané;
- Rio Tinto, 17 Place de Reflets, La Défense, Courbevoie, 92097 Paris; and
- Rio Tinto, 2 Eastbourne Terrace, Paddington, London.

A feedback process has been established for stakeholders to provide comments via the web, by email, by post or in person, and all submissions will be taken into account in finalising the proposals and the SEMP.

2 The Project Description

2.1 Introduction

As described in *Chapter 1*, the Simandou Project comprises a mine, railway, port and associated infrastructure, with main construction activities scheduled to commence in 2012. A series of advance works including a programme of new and improved roads is required to facilitate these construction activities. The Roads Programme advance works are described further in this chapter.

The roadworks are required to provide access to work areas associated with the Simandou Project. The precise locations where road access is required are currently being determined and refined but developments are likely to take place across the country: at the mine site, along the railway and near the port site. The map presented in *Annex G* shows the current main road network in the vicinity of the Simandou Project area and highlights those locations where improvement works or new roads may be proposed as part of the Roads programme. It should be noted that these locations are only indicative at this time and further details are being developed relating to specific locations and will be presented in the Site Files.

In addition to the roadworks themselves, various ancillary activities will be required for short-term periods during construction of the Roads Programme. These include borrow pits, temporary field camps, temporary access tracks, temporary bridges, transport of materials and equipment, operation of bitumen mixing plant, and water supply. Indicative information is provided in this chapter and the details of specific requirements will be described in the Site File for each location.

2.2 Indicative Design of Roads

The Roads Programme includes two main types of works.

- Improvements to existing roads and tracks ⁽¹⁾ to enable them to carry the flow and weight of vehicles needed for construction. This is expected to include improving the surface and load-bearing capacity of existing carriageways and structures, widening existing carriageways where needed, and redesigning existing carriageways to straighten tight bends and avoid obstacles etc. In some cases bypasses may be provided where improving existing carriageways would cause significant disruption in settlements. The existing roads to be improved will range from well-established roads to smaller informal tracks. Of the order of ten sections of existing roads have been identified as potentially requiring improvement, with some of these sections extending up to 60 km in length.
- Development of new roads where there is no existing access to a construction site. To date, approximately, five sections of new road have been identified as likely to be required, with each section being up to 30 km in length. More may be identified as further work is completed and some smaller sections may also be required to by-pass communities.

When completed, roads are likely to be single carriageway, two lane roads, approximately 8 to 10 m wide to enable the carriage of Heavy Mobile Equipment (HME) and Heavy Goods Vehicles (HGVs) needed for transport of construction equipment and materials. The dimensions and shape of each road will be designed to fit the specific location. A working corridor may be required in some locations to facilitate access by construction crews and execution of construction activities. Work corridors will be kept to the minimum required to execute the work activities safely.

All roads will incorporate effective drainage and erosion protection, including grading from the centre line to manage surface runoff and installation of roadside drains to collect and convey water to suitable discharge points. Roads will be designed to ensure no increase in risk of local flooding. Strict safety standards will apply and may require creation of level hard shoulders, modification of camber, provision of berms and

(1) In this document the terms "road" and "track" are used to describe carriageways suitable for use by motorised vehicles. A "road" is a surfaced carriageway (concrete, stone, clay or other hard surfacing) whereas a "track" is an unsurfaced dirt carriageway. A "path" is a route that is not suitable for vehicles.

barriers, and cutting back trees and overgrown vegetation. Pedestrian walkways may be provided, where possible and safe to do so.

Road surfaces will typically be sealed if they are major roads, they are currently already sealed or they are likely to be used by the Project for long periods. Sealed roads will typically comprise compacted sub-bases of crushed aggregate overlain with bitumen. Minor roads and roads that are currently unsealed and are likely to be only used by the Project for short periods of time will be left unsealed. Gravel roads will typically incorporate a layer of gravel, underlain by a sub-grade treatment layer.

It is not currently envisaged that any new, permanent bridges or significant improvements to existing permanent bridges will be required although temporary bridges may be installed to maintain access whilst the structure of existing bridges is improved to take the new traffic loads.

2.3 Route Selection

2.3.1 Overview

To facilitate effective spatial planning of the programme and minimise the potential for adverse environmental and social impacts, a process has been developed to guide the planning of the Roads Programme, to ensure that environmental and social constraints and opportunities are considered as part of route selection and design, and that sensitive environmental and social features are avoided where possible.

The route selection process involves two phases: strategic planning in line with agreed principles, and detailed design of the layout of each individual section of road following site reconnaissance. These steps are described in the following sections.

Routine checks and audits will be carried out during the course of the Project to verify the effectiveness of this process.

2.3.2 Strategic Planning

The following principles are being adopted in designing new routes and considering plans for road improvements.

- Existing roads will be used by the Project where possible to minimise the need for new infrastructure and resulting environmental and social impacts.
- Where development of a new road or improvements to an existing road would cause significant adverse impacts on areas of conservation interest by increasing human activity in an otherwise isolated area, consideration will be given to the use of helicopters in preference to new road construction.
- Where existing routes are being improved to provide access, works will be undertaken within the existing road corridor where possible. If significant disruption to existing settlements and land uses such as agriculture would occur, consideration will be given to the potential for local bypasses to minimise adverse impacts.
- Where access into areas of conservation interest is increased the route and design of roads will be planned in consideration of risks associated with providing access to areas of natural habitats that would be adversely affected by human activities.
- The area of new land-take for new roads or road widening, will be kept to the minimum necessary, especially in areas of natural or semi-natural habitat and areas where communities are located close to existing roads.
- Proposals will be developed to minimise displacement of any homes and to minimise displacement of resources of importance to communities and livelihoods including:

- high quality agricultural land including bas fonds and rice fields, including fallow agricultural land that will be tilled/planted in the future;
- community forests;
- sites of importance for cultural heritage including sites important for historical or archaeological reasons or for their current significance in local culture and traditions; and
- other significant community resources.
- As far as possible, new roads will be designed to maintain a buffer zone of:
 - approximately 1 km around existing communities, to minimise adverse impacts on communities;
 - approximately 500 m around areas of conservation interest as defined in *Chapter 5* , and identified by social and environmental specialists; and
 - approximately 50 m from any waterbody or watercourse, to minimise disruption of water features and natural drainage, except where crossings are necessary, in which case mitigation measures specified in *Chapter 4* will be followed.
- Where new or improved roads are needed the potential benefits of providing improved access for communities will be considered in planning routes.
- Preference will be given to land currently owned or leased by the Project.

2.3.3 Site-Specific Planning

As part of developing the detailed proposals for each road, site-specific social and environmental impacts are being considered, evaluated and documented. Designs will be developed in consultation with competent environmental and social specialists and the local administration, and will be reported in Site Files. Prior site reconnaissance will identify on-site conditions including slope, topography, geology and soils, vegetation, existing areas of ground clearance, and sensitive social and environmental features to be avoided. During this reconnaissance, environmental and community specialists will:

- consult local stakeholders to identify any community and environmental interests including important resources or sensitive areas to be avoided and to plan mitigation of site-specific impacts;
- develop well-defined boundaries defining the area of required ground disturbance and ensure that this area is as small as possible;
- work with the engineering team to minimise loss of any features of importance for communities or for nature conservation and cultural heritage;
- negotiate agreements for use of land in accordance with the principles established to mitigate the impacts of physical and economic displacement caused by the Programme , as presented in *Annex F*; and
- consult stakeholders on options for long-term use of the road, or its closure and reinstatement of the land.

The information that is collected as part of this process will be used to develop the detailed design of each road and ensure that the roads that are developed are of benefit to local communities where possible and practicable. This information will be documented as part of the Site File and communicated to, and agreed with, relevant parties within the local administration and community leaders.

2.4 Construction of Roads

Developing new or improved roads will involve the following activities:

- establishing any required temporary access to the work area and a mobile field camp for the construction team if needed;
- demarcating the area to be cleared and establishing access control;
- erection of temporary diversions where needed to manage existing traffic;
- clearance and levelling of the corridor;
- import of road-making materials eg gravel, laterite clay, aggregate bitumen;
- sourcing of a water supply;
- modelling of the vertical and horizontal alignment using surplus spoil where available or material from local borrow pits;
- improvement of existing drainage and introduction of new road drainage including culverts if required;
- surfacing and sealing of the carriageway including use of bitumen mixing plants where the road is to be sealed;
- works to improve existing bridges including concrete batching for structures; and
- improvement of existing safety arrangements e.g. levelling of hard shoulders, modification of camber, provision of berms and barriers, and cutting back trees and overgrown vegetation to improve sight lines.

The construction of each road may take a number of months or over a year, depending on length. A range of equipment will be used which may include graders, rigid and articulated dump trucks, track dozers, excavators, rollers, water trucks, timber jacks, tool carriers, wheel loaders, four wheel drives, bitumen mixing plant, and power generators. Water will be required during the course of the works to form the road surface and dampen down areas and is likely to be obtained by means of temporary abstraction from watercourses or temporary boreholes.

2.5 Road Operation

Simandou Project traffic will include a range of different vehicle types, including heavy and light good vehicles, buses and cars and in some cases occasional abnormal loads. In most cases the roads will be public roads and therefore also used by other traffic. Social and environmental impacts associated with increased use of existing and new roads by the Project and public are considered at a strategic level in this assessment. Where specific issues may arise, this will be addressed in individual Site Files.

Roles and responsibilities for road maintenance, will be discussed and agreed with local stakeholders and regulatory authorities. Inspections will be carried out where necessary to verify compliance with any agreed procedures.

2.6 Closure of Roads

The majority of the new roads and road improvements carried out under the programme will remain in place after construction of the Simandou Project and continue to be available for public use. A small number may not be required in the long term and where this is agreed with the local administration and community, these stretches will be closed. Where necessary roads will be decommissioned and rehabilitated in accordance with a site-specific closure plan developed in consideration of international good practice, Rio Tinto's Closure

Standard ⁽¹⁾ and associated guidance, and taking into account community safety and potential opportunities for future beneficial use of the site. This plan will be developed for each location prior to opening the site.

The closure process will include site clearance, removal of all equipment, appropriate disposal of waste materials, soil ripping and re-grading where necessary. Engineered drainage controls which are obviously visible and that are no longer required, will be removed. Measures will be taken to ensure that ongoing drainage of the area occurs in a manner that minimises the risk of future erosion and/or slope instability. Ground surfaces will be profiled to blend in with the natural surrounds and topsoiling and re-planting/seeding will be undertaken where appropriate using local or native species. Sites will be returned to their previous use, unless alternative plans are developed in consultation and agreement with local communities and regulatory authorities.

Following completion of all rehabilitation works the area will be checked to verify that rehabilitation has been completed in an appropriate manner.

2.7 Ancillary Developments

2.7.1 Supply of Materials

Sand, gravel and other fill material will be required for development of roads. Where possible, material will be acquired from existing sources and by reuse of waste material (eg spoil from construction areas), however, some local borrow pits are likely to be required. A typical borrow pit location is illustrated in *Figure 2.1*.

Figure 2.1 Typical Borrow Pit Environment



In this specific context, a “borrow pit” is defined as an area:

- close to the construction work area;
- used temporarily for short term extraction of soft materials (sands, laterite, gravels and earth);
- used solely for the purpose of the Project; and
- where the pit can be excavated using mobile excavators, and simple extraction methods *ie* scraping of the ground surface (no blasting).

Where borrow pits are required, sites will be identified and developed in consultation with competent environmental and social specialists and the local administration, and will be reported in Site Files.

New borrow pits will be located in accordance with the following principles.

- Small borrow pits (<0.5 ha) will be located at least 100 m from the nearest existing residence or community facilities, and from any site identified as of importance for biodiversity or cultural heritage. Larger sites will maintain separation of at least 250 m for sites of more than 0.5 ha, and 500 m for sites of more than 1 ha.

(1) Rio Tinto (2010) Closure Standard

- Borrow pits will be located at least 50 m from the nearest waterbody or watercourse. Sediment traps will be installed to prevent entry of sediments into water and excavations will be designed to minimise disruption of natural drainage.
- Borrow pit locations will be identified in consideration of the local hydrogeological regime and the potential for groundwater changes between wet and dry seasons.
- Loss of productive land (agricultural land including fallow agricultural land that will be tilled/planted in the future) will be avoided wherever possible.
- Where land is owned or used by third parties, borrow pits will only be developed where land acquisition has been arranged in accordance with the principles set out in *Annex F*.

On completion of excavations all borrow pits will be closed and rehabilitated taking into account community safety and potential opportunities for future beneficial use of the site.

The locations of borrow pits will be detailed in plans and drawings of the works and measures for management of environmental and social impacts will be detailed in the Site File for individual roads.

2.7.2 Mobile Field Camps

The road improvement programme will be carried out by a number of teams working in parallel, with each team comprising approximately 10 - 20 personnel. Where possible, work teams will be accommodated in existing, established facilities in nearby settlements and will travel to work locations on a daily basis. Where suitable accommodation is not available within a reasonable distance of work locations. Mobile Field Camps (MFCs) may be set up to provide temporary accommodation and storage for materials and equipment. The camps will move with the work front and all facilities are likely to be tented or truck-mounted. MFCs will typically comprise accommodation units, catering facilities, medical facilities, ablutions, water treatment facilities, basic workshop facilities and mobile fuel storage tanks. All units will include appropriate containment where necessary to facilitate collection and temporary storage of discharges (eg sewage) and transportation to an appropriate disposal site

Field camps will be located in areas suitable for temporary use, avoiding the need for clearance of vegetation and ground levelling as much as possible. If ground clearance is required, the planning, preparation and decommissioning of the area will follow the same approach as described in *Section 2.3.3*.

2.7.3 Temporary Access Tracks

Where possible, works will be accessed using existing roads and tracks. Where existing roads and tracks do not provide adequate access, a temporary track will be created. These tracks will be suitable for tracked and four wheeled vehicle access and will comprise an unsealed dirt road surface approximately 5 m wide. The locations where temporary access tracks are needed will be confirmed during the preliminary site reconnaissance visit and will be detailed in the Site File. Where practicable, routes will be defined following the principles described in *Section 2.3*. If required, watercourses will be crossed using temporary bridges or culverts designed to avoid impacts on downstream users and other sensitive sites. The flow of all watercourses will be maintained at natural levels through the duration of works. Following completion of the works, access tracks will either be removed and rehabilitated, or left for future community use if:

- requested by the local community;
- approved by the relevant authorities; and
- long-term operation is unlikely to have significant adverse impacts on the environment.

2.8 Contractor Management

Rio Tinto will ensure that the environmental and social standards and commitments described in this document and in the SEMP, are implemented by all parties involved in the work, including contractors, subcontractors and suppliers of goods and services.

3 Scoping and Stakeholder Engagement

3.1 Introduction

As set out in *Section 1.3*, an initial scoping exercise was carried out to identify the potential significant impacts associated with development of the Simandou Project and plan the Social and Environmental Impact Assessment (SEIA) for all activities, including all early and ancillary works. The results of this exercise were reported as part of the Simandou Project SEIA Terms of Reference submitted to Government in August 2011. This Terms of Reference presented an overview of the Simandou Project and communicated the legal and regulatory context for the SEIA, the general approach and methodology to be adopted in the SEIA and the types of impacts that would be assessed. This document is included in *Annex D*.

An addendum to this Terms of Reference was developed and submitted in November 2011 to address the Roads Programme more specifically. This addendum is also included in *Annex D* and identifies the main topics that form the basis for the impacts addressed in the later chapters of this SEIA Report.

To assist the Government, a formal presentation of the Simandou Project Terms of Reference was made to the Guinean Bureau for Evaluation of Environmental Studies (BGEEE) in August 2011. Representatives from the BGEEE were accompanied on a field visit to show them the types of locations planned for the Project and to discuss the scope of the SEIA legislative context and methodology. A follow-up presentation of the Terms of Reference for the Roads Programme was undertaken on 29 November 2011.

3.2 Stakeholder Consultations

The views of stakeholders regarding the proposed Simandou Project and the SEIA process were sought through a programme of consultations undertaken in September and October 2011. The aim was to ensure that the views and concerns of stakeholders were considered as part of the impact assessment process, that the SEIA process focused on likely impacts of most importance to stakeholders, and that the process took into account the views and expectations of stakeholders. In this context, a stakeholder is defined as a person who has an interest in the Project, either as an individual or as a representative of a group.

A national conference was held in Conakry on September 19th and was attended by an invited audience from national, regional, prefectural and local government, non-governmental organisations, academic and research institutions, community representatives and the media. Following the national conference, a series of stakeholder events were held in the ten prefectures affected by the Simandou Project.

At least two weeks prior to each event, local leaders including Prefects and Governors were formally invited to attend and were asked to communicate the events to relevant stakeholders, including Sub-Prefects and traditional leaders, within their respective communities. The prefectural events were also open to members of the public, and were publicised by local leaders and through announcements on local rural radio stations. The locations and dates for the events are identified in *Table 3.1*, with an estimate of the number of attendees at each event and the number of comment forms received. Summary attendance lists are provided in *Annex E*. As shown in the annex, the meetings were typically attended by representatives from national, regional, prefectural levels and local government, community leaders, non-governmental organisations, members of the public and representatives from the local media.

Table 3.1 Stakeholder Consultation Events

Location	Prefecture	Date	Approximate no. of participants	No. of comment forms
Conakry	Conakry	19 September 2011	170	95
Forécariah Centre	Forécariah	22 September 2011	170	171
Kindia Centre	Kindia	4 October 2011	120	79
Tokonou	Kankan	4 October 2011	240	49

Location	Prefecture	Date	Approximate no. of participants	No. of comment forms
Albadaria	Kissidougou	5 October 2011	500	47
Mamou Centre	Mamou	6 October 2011	160	119
Douako	Kouroussa	6 October 2011	350	132
Faranah Centre	Faranah	11 October 2011	160	149
Kérouané Centre	Kérouané	11 October 2011	200	34
Macenta Centre	Macenta	13 October 2011	200	67
Beyla Centre	Beyla	18 October 2011	280	69
TOTAL			2 550	1 011

At each event, participants were provided with brochures describing the proposed developments and information regarding where the Terms of Reference could be obtained (on the web or in hard copy). The Project's plan to develop improved and new roads was discussed. Participants were provided with a feedback form to facilitate submission of their comments. The brochures, Simandou Project Terms of Reference and feedback forms were also available on the Simandou SEIA website and copies were provided to national ministries and agencies, non-governmental organisations, governorate and prefectural authorities. Feedback forms could be handed in on the day, submitted on-line or returned by email or by hand to Simfer and to Simandou Project offices and infoshops in Beyla and Kérouané. Feedback regarding the Simandou Project Terms of Reference was requested within 30 days.

As shown in *Table 3.1*, a total of approximately 2 500 individuals attended the consultation events and more than 1 000 feedback forms have been received thus far. A wide variety of issues were raised during the events, and a wide range of written comments have been received, as summarised in *Annex E*. It should be noted that the consultations covered the main Simandou Project, as well as the Roads Programme, and the comment period remains open for the main Simandou Project.

Overall, stakeholders were supportive of proposed road improvements, especially those that would provide connection between villages. No specific concerns were raised with respect to potential adverse impacts due to roads, however, some of the general comments received are relevant to the Roads Programme, and these comments are summarised in *Annex E*.

3.3 Future Stakeholder Engagement

A continuing programme of stakeholder engagement is planned during the next stages of the Project. This SEIA Report will be disseminated to national, regional and local government authorities and national and international non-governmental organisations, and their comments will be considered in finalising the proposals and the Roads Programme Social and Environmental Management Plan. The disclosure period will run for approximately 30 days following submission of the draft SEIA Report to the Government of Guinea. During this disclosure period the draft report will be:

- available on the Rio Tinto website at http://www.riotintosimandou.com/index_seia.asp;
- available on request by applying to Simfer at simandou.eise@riotinto.com; and
- available for review at Rio Tinto and Simfer offices:
 - Simfer SA, Immeuble Kankan, Cité chemin de Fer, BP 848, Conakry, République de Guinée
 - Rio Tinto Simfer SA Info Centres at Beyla and Kérouané;
 - Rio Tinto, 17 Place de Reflets, La Défense, Courbevoie, 92097 Paris; and

- Rio Tinto, 2 Eastbourne Terrace, Paddington, London.

The feedback process that has been established for the Terms of Reference will continue during the disclosure period. Stakeholders can provide comments via the website, by email to the address shown above and by post or in person at any of the Rio Tinto offices listed previously.

Any comments received during this disclosure period will be reviewed and considered by the SEIA team in finalising the SEMP and developing detailed site proposals. In cases where a response is necessary, one will be provided within 30 days of receipt of the comment.

More detailed consultation with local stakeholders (affected people and nearby communities) will then take place during the detailed planning for each road, and the development of the Site Files. The results of this will be reported in the Site Files.

Once the final planning for each road is complete the process of obtaining access to land will commence with planning for compensation and/or resettlement for any affected people, assets and resources. Local land owners and users will be consulted as part of this process to determine appropriate arrangements for acquisition or temporary leasing of the land and on measures to mitigate the impact of any displacement of existing land uses (see *Chapter 6*).

All comments received from stakeholders will be recorded in the Stakeholder Register for the Simandou Project. This register will be made available when the SEIA for the Simandou Project is published in 2012.

3.4 Grievance Procedure

Throughout this process a Grievance Procedure will operate to ensure that any grievances are received, considered and resolved in accordance with international good practice. In this context, a grievance is defined as a complaint or concern raised by an individual or organisation who judges that they have been adversely affected by the Project during any stage of its development. Grievances may take the form of specific complaints for actual damages or injury, general concerns about Project activities, incidents and impacts, or perceived impacts.

The Grievance Procedure will follow the approach currently operating in the area of the mine. This is a simple and transparent process designed to be culturally appropriate and readily accessible to all parties within affected communities, and to operate at no cost and without retribution. The procedure will not impede access by stakeholders to other judicial or administrative remedies. Individuals and groups can lodge grievances by various means including, in person, by mail or email to any of Simfer's satellite offices in Beyla, Kérouané, Moribadou, Macenta, Mamou and Forécariah, to members of Simfer's Communities Team who regularly visit local affected communities, and via the website (http://www.riotintosimandou.com/index_seia.asp) and the Simandou email address (simandou.eise@riotinto.com). A written record of all grievances is maintained and effective resolution of grievances in a timely manner is facilitated by appropriate means including dialogue and site visits.

The Grievance Procedure has already been communicated to communities in the area of the mine. It was also communicated during all of the stakeholder engagement events completed to date and will continue to be communicated as part of ongoing stakeholder engagement.

4 Impacts on the Physical Environment

4.1 Introduction and Scope

This chapter focuses on the impacts the Roads Programme may have on the physical environment, including all primary impacts associated with the Roads Programme and the Project's emissions to soils, air, water and land from the construction and operation of roads. It identifies the impacts that the Roads Programme will have on the physical environment, and identify mitigation measures to avoid, minimise, restore and offset or compensate for adverse impacts and maximise any benefits. The key topics of concern in this regard are:

- geology and hydrogeology;
- soils;
- hydrology;
- land use;
- air quality and climate;
- noise and vibration; and
- resource use and waste.

Land-take and emissions associated with roads also have the potential to have secondary impacts on sites and features of importance for biodiversity, and on people and communities. These impacts are described in *Chapter 5* and *Chapter 6*.

The remainder of the chapter is organised as follows:

- *Section 4.2* presents information on baseline conditions in the environment that may be affected by the Roads Programme;
- *Section 4.3* discusses how these conditions may be affected by the construction, operation and, where relevant, closing of the works and identifies the measures that will be taken to mitigate these impacts. The details of impacts and mitigation are presented in tabular format; and
- *Section 4.4* summarises the key issues for the physical environment.

4.2 Baseline Conditions

4.2.1 Geology and Hydrogeology

The Project area (*ie* the area around the Simandou Project within which roads will be developed) falls broadly within four Geological Units, all characterised by similar hydrogeological conditions. The distribution of these four units is described in *Table 4.1* and shown in *Annex I*.

Table 4.1 Geological Units Relevant to the Project Area

Geological Unit	Locations
Precambrian Basement Unit: characterised by crystalline granitic and gneissic rocks. Occasional intrusive masses of dolerite, gabbro and/or diorite, characteristic of intrusions and volcanic rocks.	• Occurs in more than two-thirds of the Project area. • Concentrated to the east in Upper Guinea. • Also occurs in Forécariah.
Ancient Palaeozoic and Upper Proterozoic Volcanic-Sedimentary Unit: primarily encompasses volcano-sedimentary rock formations.	• Occurs as small areas scattered throughout areas of Upper Guinea. • Also occurs within in a limited area of Lower Guinea.
Recent Sedimentary Unit (Includes marine and deltaic sand and clay deposits).	• Occurs along the coast.

Geological Unit	Locations
Mesozoic Unit of Intrusions and Volcanic Rocks.	Typically occurs in Guinea as small massifs: once in Upper Guinea, and once in Middle Guinea.

The geology of the Project area is dominated by formations with hard, crystalline, igneous and sedimentary rocks, very low interstitial porosity and a variable degree of fracturing. This type of geology is characterised by low primary porosity and hydraulic properties are often determined by secondary porosity (*ie* joints and fractures). This typically gives rise to discontinuous aquifers. Three types of aquifers typically occur and the productivity of these varies depending on fracture connectivity and material:

- Type 1: Frequently comprises three main soil horizons (a lateritic crust, an argillic alteration layer, and a layer of granular sand). The thickness of the saturated layer varies but is typically 10 to 20 m in granite and gneiss.
- Type 2: Fissure aquifers: Found under laterites. This type comprises a zone of highly fissured, decomposed rock on top of a firm rock stratum. Joints/fractures may be open or may be filled with the products of decomposition, thus reducing permeability. Thickness of the layer varies but is typically 40 to 50 m in granite and gneiss.
- Type 3: Major fault/fracture zones: These zones may be hundreds of kilometres in length. They are generally very deep and subvertical. They often have horizontal fractures and crush zones where groundwater can flow freely.

Direction of groundwater flow varies from location to location within the Project area. Within the Simandou mining area, conceptual models indicate that the groundwater system is particularly complex. Along the railway, groundwater flow is expected to follow the topography, especially in the upper saturated zones. The depth to groundwater will vary with season, lithology and topography. Significant amounts of water may be stored in the upper decomposed zone. Deeper circulation of water may also occur via underlying fissures and fractures.

Groundwater in Guinea is mainly extracted for domestic uses. According to the Food and Agriculture Organisation (FAO) ⁽¹⁾, most villages obtain their drinking water from wells, with a smaller number using surface water sources. At a national level, water is not generally considered a scarce resource but access to good quality water is an issue. Only 51% of Guinea's population has access to improved drinking-water sources ⁽²⁾. Within urban areas, 78% of the population has access to improved sources but this reduces to approximately 38% in rural areas ⁽³⁾. Wells are often hand-dug or have been developed by Non-Governmental Organisations (NGOs) or international organisations. In some areas, wells can be dry for two to three months during the dry season.

Sampling of groundwater undertaken for the Simandou Project in the area of the mine indicates that there are some exceedances of World Health Organisation (WHO) standards for metals in drinking water (magnesium, nickel, barium, lead, selenium and uranium). Where these occur, they are thought to be caused by natural sources (soils and geology). In coastal areas during the wet season, water from shallow wells is generally slightly brackish, whilst water from deeper, drilled wells tends to be fresh.

(1) FAO 2005 *Système d'information de la FAO sur l'eau et l'agriculture – Guinée*

<http://www.fao.org/nr/water/aquastat/countries/guinea/indexfra.stm>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(2) FAO 2005 *Système d'information de la FAO sur l'eau et l'agriculture – Guinée*

<http://www.fao.org/nr/water/aquastat/countries/guinea/indexfra.stm>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(3) FAO 2005 *Système d'information de la FAO sur l'eau et l'agriculture – Guinée*

<http://www.fao.org/nr/water/aquastat/countries/guinea/indexfra.stm>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

A preliminary examination of groundwater vulnerability along the rail corridor has been carried out based on consideration of the nature of the surface deposits (lateritic crust), the type of material in the unsaturated zone and the typical characteristics of the aquifer formations. Laterite soils are relatively common in the Project area and are typically considered vulnerable to contamination. However, the rock formations underlying the laterite crust are often not very permeable (with the exception of the fractured areas) and this would limit the potential for migration of potential contaminants to deeper levels. Susceptibility to contamination from human activities is more likely to occur in areas of shallow, porous soil, or where there are fractured rock outcrops, and in areas where groundwater returns to the surface *eg* at groundwater-fed watercourses and springs. Susceptibility of groundwater will increase if protective layers of soil are removed during ground-clearing.

4.2.2 Soils

Soils in the east of the Project area are typically loose and dominated by regolith (*ie* dry soil and broken rock). These soils are considered to be of low agricultural value. Many areas are susceptible to erosion, which further limits agricultural potential. Between the prefectures of Mamou and Kindia, lithic, compacted soils occur, and in the prefecture of Kindia, these lithic soils lie on top of predominantly ferruginous crust or hardpan. These lithic soils are considered to be of no significant value to agriculture.

Along the rail corridor, soil type and quality tends to vary with altitude. In high-altitude areas, soils are typically of poor quality and low agricultural productivity because of particularly high iron concentrations. These soils typically include a hard crust (duricrust), due to the presence of iron oxides and free alumina. They are generally thin, and have low vegetation density. These areas are therefore very susceptible to erosion and removal of vegetation can exacerbate this. In contrast, soils occurring at lower altitudes are often richer and thicker. Hydromorphic soils regularly occur along watercourses and are considered to be of intermediate value, supporting a variety of food crops, vegetables and fruits. Seasonal flooding can contribute valuable alluvial deposits increasing productivity. However, these soils are also susceptible to erosion and high levels of run-off and agricultural activity can quickly lead to significant soil degradation.

In coastal and inter-tidal areas, soils of high agricultural value are limited in distribution but where they occur, they support important salinity-tolerant species including rice. Vegetation, including mangroves, often offers some protection against erosion and if this vegetation is removed, the effect of erosive processes can increase dramatically and reduce soil quality and productivity.

4.2.3 Hydrology

Guinea has a particularly dense hydrographic system, with over 1,600 rivers and streams originating on the two mountain plateaus of Fouta Djallon and the Guinean Ridge. Most of West Africa's major rivers, including the Senegal, Gambia, Koliba, Rio Grande, Fataha, Konkouré, Kaba, Kolenté and Niger (the largest river in West Africa), have their source in these mountains ⁽¹⁾. Guinea is therefore often regarded as West Africa's water reservoir. From the Fouta Djallon, water flows in all directions:

- west to the Komba and Konkouré rivers;
- east to the Senegal River;
- north to the Gambia River basin; and
- south to the Kaba and Kolenté rivers.

The Project area runs through nine major drainage basins and is dominated by the Niger, Kaba and Kolenté catchments. The major rivers, and the basins to which they relate, are identified in *Table 4.2* and are shown in the map included in *Annex I*.

(1) FAO 2005, *Système d'information de la FAO sur l'eau et l'agriculture – Guinée*

<http://www.fao.org/nr/water/aquastat/countries/guinea/indexfra.stm>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

Table 4.2 Hydrographic Systems within the Project Area

Drainage Basin		Watercourses within the Project Area
Name	Total Area (km ²)	
St. Paul	20,350	---
Niger	75,989	Milo, Baoula, Balé, Niandan, Mafou, Niger
Kaba	19,180	Mongo, Kaba, Pinsell, Doundouko, Mamou
Kolenté	7,844	Kora, Kolenté, Killissi
Mélacorée	730	Mélacorée, Morékaniya, Yembalé, Kakountokhouré, Galiguiridé
Tannah	324	Tannah
Salatouk	51	Kabendo
Diguipali	177	---
Kabendo	61	Salatouk

A review of data from hydrometric stations around the Project area ⁽¹⁾ indicates that flow rates vary significantly from location to location and through the year, with groundwater levels and river flows being closely dependent on rainfall. During the wet season, lowland valley areas can be flooded, while during the dry season, flows may be limited to groundwater discharge. Even significant watercourses therefore occasionally run dry as groundwater levels drop towards the end of the dry season.

Surface water is predominantly used for agriculture, primarily for crop irrigation, with a small proportion used for cattle farming. Where irrigation occurs, the most common crop is rice, followed by potatoes.

Surface water sampling programmes at the mine site and along the rail corridor in 2006 to 2009, indicate that water quality is generally good. Samples were typically warm and cloudy, with neutral or slightly alkaline pH. The dissolved solids concentration was low for all samples, which was consistent with the low electrical conductivity values measured. The analyses indicate that most nutrients, the vast majority of trace metals, and major anion/cautions, only occurred in low concentrations or below detection limits. Overall, the sampled water generally met WHO drinking water quality guidelines for all parameters analysed, although a few sampling stations had fluoride, cadmium, lead, manganese and faecal coliform bacteria concentrations above recommended levels. Elevated metal levels are likely to arise from natural sources. Localised faecal coliform contamination is likely to be caused by discharges from people and livestock.

As discussed in *Section 4.2.2*, areas of hydromorphic soil typically occur within 500 to 1000 m of major rivers and are indicative of flooding. These soils are often temporarily or permanently saturated, due to seasonal flooding and a fluctuating water table. Upper and Lower Guinea (as shown in *Figure 4.1*) are recognised to be especially prone to flooding because of the geomorphology of the area, the water regime of the rivers and the intensity of the rainfall ⁽²⁾. Flooding also commonly occurs in coastal areas where seasonal river flow patterns are superimposed on tidal regimes. Tidal amplitude on the coast is considerable, and tides may reach up to 30 km inland.

In areas susceptible to inland or coastal flooding, networks of channels are used for irrigation of bordering agricultural land, including 'bogoni' rice fields. In case of a pollution event, the channels can transport contaminants to linked fields and downstream water bodies.

(1) The DNGRE (Direction Nationale de la Gestion des Ressources en Eau, or National Water Resources Management Authority) operate a network of 86 hydrometric stations across 16 drainage basins in Guinea. Seven of these hydrometric stations are located upstream and downstream of the Project area.

(2) FAO 2004, *Système d'information de la FAO sur l'eau et l'agriculture – Guinée* <http://www.fao.org/nr/water/aquastat/countries/guinea/indexfra.stm>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

Figure 4.1 Geographical Regions of Guinea



4.2.4 Land Use

Land within the Project area is used predominantly for agriculture. Small communities use land for cattle grazing and practice subsistence agriculture using traditional cultivation methods. Where population densities are low, the ongoing sustainability of farming is maintained through the implementation of a fallow cycle. In more densely populated areas, or areas where arable lands are scarce, agriculture is more intensive and fallow periods are often reduced in response to increased demand for agricultural produce.

Starting in the east of the Project area between the mine and Kérouané, land cover is dominated by savanna and fallow agricultural land. This is not typically used for long-term crop production but it is used by local communities for a wide range of less intensive uses including pasture land, slash and burn agriculture and harvesting of non-timber forest products. The use of savanna changes over time and cover is often highly modified by human interaction. It is frequently burnt, for slash and burn agriculture, but also to clear weeds and renew vegetation.

Small areas of more productive agricultural lowlands are found in areas of hydromorphic soil near watercourses. These areas are known as *bas fonds*. Traditional cultivation methods are practised but double cropping with higher yields is often possible because water is available throughout the year. Rice is typically the dominant crop, but areas may be left fallow or used for vegetable cultivation and livestock grazing for periods of one to two years.

Hillside agriculture is also practiced in the east of the Project area and typically occurs at higher elevations, along paths or roads that are easily accessible for communities. Slash and burn techniques are commonly practiced and crop yields are typically lower than in *bas fonds* due to poorer soil conditions. Crop rotations are commonly used to maintain soil productivity. For example, a cleared plot may be planted with rice in the first year, followed by cereals or cassava in the following year, after which the plot is left fallow. Large areas of over 100 ha may be planted, but fallow periods of four to seven years are often required to maintain long-term productivity.

Agricultural plains cover large areas at lower elevations and typically occur along major rivers, outside the *bas fonds*. Soil is typically good quality but these areas rarely flood and therefore are drier than the *bas*

fonds. This limits the type of crops that can be planted, and the frequency of cultivation. Rice is the dominant crop and land is usually cultivated each year, although it may occasionally be left fallow for six months to a year.

Settlements in the east of the Project area are dominated by traditional rural villages comprising a number of individual family units surrounded by community forest and agricultural lands. Each unit comprises a group of traditional round huts with thatched roofing. Small areas supporting subsistence farming by households are frequently located within settlements or nearby. Coffee, cacao and palm cultivation often occur within village and community forests. As villages become larger, round, thatched housing is frequently replaced by rectangular houses with tin roofing. Larger villages are typically located along main roads, although some occur close to productive agricultural lands in areas further from main roads. Villages may also support outlying camps, occupied or used on a temporary or seasonal basis. These include:

- agricultural hamlets: temporary housing close to agricultural lands, and typically used during the dry season;
- peul camps: established by herders near grazing lands. These camps were historically temporary, but are increasingly becoming more permanent; and
- hunting camps: temporary housing close to hunting grounds and typically used for short periods.

Moving west from Kérouané towards Faranah, land uses remain similar to that described above but with slightly denser settlements and more plantation and village forest. Village forests are located close to villages and are used and protected by the local community as an important source of natural resources such as fruit, wood, bushmeat and medicine. These forests also act as a protective barrier against bushfires and they can be of cultural importance. Some are managed as agroforestry plantations.

West of Faranah the density of lowland agriculture and settlements reduces slightly as elevation increases and there is more hillside agriculture and dense forest. In addition, a number of distinctive areas of *bowal* (wooded grassland on hills or between valleys) are identifiable. Land use in these areas is similar to savanna except growth of trees is typically limited by soil type or quality, rather than by human interference.

Beyond the mountains, in the western Prefectures of Kindia and Forécariah, population density and the scale of settlements increases. Wetlands become more prevalent with inland wetlands being characterised by saturated soils and hydrophilic vegetation with freshwater marsh and swamp land. Estuarine wetlands are commonplace in coastal areas. Rice fields are present in both inland and coastal wetlands and become the dominant agricultural land use near the coast. Remaining land is predominantly mangrove forest and village lands.

4.2.5 Climate

All areas of Guinea are considered to have a tropical climate, as defined by the Köppen climate classification system. Tropical climates are characterized by constant high temperature with all twelve months of the year having average temperatures of at least 18 °C. In Conakry the year-round average high is 29 °C and in Upper Guinea, approximately 30 °C. High humidity is also characteristic of this type of climate with levels in Upper Guinea averaging 80%.

The Project area includes two subclasses of tropical climate.

- Areas near the mine and the port (the east and west of the Project area) have a tropical monsoon climate. This type of climate typically results from the monsoon winds that change direction according to the season. In the case of Guinea, this climate arises because of close proximity to the coast and the influence of the Harmattan ⁽¹⁾, which brings dry, dusty conditions and reduced precipitation during winter months. The wet season is slightly longer than in other areas of Guinea and can last from April to

(1) The Harmattan is a dry and dusty West African trade wind, which typically blows south from the Sahara into the Gulf of Guinea between November/December and March/April.

November. Extreme precipitation levels occur. For example, Conakry averages nearly 4 300 mm of precipitation per year.

- Inland areas along the rail corridor have a tropical rainforest climate. In these areas, climate is dominated by the Doldrums Low Pressure System all year round, and climatic variations between the different seasons are less significant. Annual rainfall is typically between 1 500 and 2 000 mm but all twelve months have average precipitation of at least 60 mm. The dry season tends to be more pronounced in the east of Guinea, with higher rainfall in the west. Thunderstorms typically occur at the beginning and end of the wet season, with the most violent storms occurring in June and October. These are often accompanied by torrential rain and lightning, which can start bushfires.

The climate, and in particular, high rainfall levels, contribute to the creation of Guinea's complex hydrographic system, as described in *Section 4.2.3*.

4.2.6 Air Quality

The Project area is generally rural and is not generally affected by substantial anthropogenic sources of air pollution such as industry and traffic. Air quality is typically good, but seasonal variations do occur with high levels of particulates during the dry season, particularly when the Harmattan blows, and during bush fires.

4.2.7 Noise and Vibration

Noise levels are typically low and characteristic of rural areas. Sources are generally limited to local road traffic, human activity and animals. Local road traffic noise can be high due to poor road surfaces and frequent use of motorbikes and trucks that are often poorly maintained. Traffic typically commences at daylight, continues intermittently through the day, and reduces significantly, as darkness falls. Noise levels are typically higher during local events such as market-days. Night-time noise from insects, frogs and other fauna is often significant.

4.3 Prediction, Evaluation and Mitigation of Impacts

Table 4.3 presents the assessment of potential impacts on the physical environment, due to development and use of roads. Impacts are considered under the following headings:

1. Geology and Hydrogeology
2. Soils, Run-Off and Flooding
3. Pollution of Soils and Water
4. Air Quality
5. Noise and Vibration
6. Resources and Waste

Mitigation measures to avoid, minimise, restore, offset or compensate adverse impacts are also identified in *Table 4.3*. These measures will be implemented, where relevant, in all areas where roads are to be developed. As part of developing the Site File for each specific road, further site-specific assessments will be carried out and local authorities and affected communities will be consulted to identify and agree any supplementary measures required at particular locations. Site-specific mitigation measures and consultation will be reported in the Site File for each road.

Table 4.3 Prediction, Evaluation and Mitigation of Impacts on the Physical Environment

Table 10-1: Identification, Evaluation and Mitigation of Impacts on the Physical Environment		
Potential Impact	Mitigation	Assessment of Residual Impact
1. Geology and Hydrogeology		
Excavation, land clearance and development of roads could give rise to: interruption of hydrogeological conditions and groundwater flows.	- The alignment of all new and improved roads will be developed in consideration of local groundwater conditions. Locations where springs occur or where the water table is close to the surface will be avoided as far as possible. - The area of new sealed surfaces will be kept to the minimum necessary for the works in order to maintain natural recharge of the water table. - Where removal of material is required below the natural water table a site-specific Dewatering Management Plan will be developed as part of preparing the Site File for the specific site.	Roads will be designed to avoid intrusion below the water table where possible, maintain groundwater flows and avoid significant impacts on hydrogeological conditions.
pollution of groundwater from intentional discharges and accidental releases during construction, or during use of roads by Project personnel and vehicles.	See <i>Pollution of Soils and Water</i> for measures to mitigate this risk.	
2. Soils, Run-off and Flooding		
Land clearance, levelling and removal of soils during construction as part of developing roads, borrow pits or watercourse crossings could lead to loss of soil and pollution of nearby watercourses by sediment inflows. Natural drainage patterns could also be interrupted causing changes in hydrological conditions in the surrounding area and increasing risks of flooding.	- The area to be cleared for each road will be kept to the minimum necessary for the works and will be clearly demarcated to prevent unnecessary disturbance of soils outside the boundary. - Land susceptible to flooding will be avoided where possible. - Disturbance of soils will be avoided during heavy rainfall. Activities with the potential to cause significant erosion will be carried out during the dry season where possible. - The detailed design of all road works will include identification of risks relating to potential acid sulphate soils and application of appropriate control techniques that are best suited to the specific location, adhere to relevant industry standards and guidelines, and limit potential generation of acidic runoff. - A Sediment and Erosion Control Management Plan will be developed for high-risk activities and work in sensitive areas, to minimise the risk of soil erosion and ensure that mobilisation and dispersion of sediment into aquatic environments is avoided where possible. - At watercourse crossings, bridges and culverts will be designed to accommodate expected streamflows.	The measures to manage erosion, manage road run-off and protect soil identified here will ensure that significant impacts are unlikely to occur.

Potential Impact	Mitigation	Assessment of Residual Impact
	10. Drainage channels will be constructed at an early stage to intercept and divert uncontaminated surface runoff away from construction work areas. 11. Road drainage will be designed to collect and control the flow of run-off from the road surface and to minimise changes in established hydrological regimes, taking into account gradient, catchment size, expected flows, and upstream and downstream uses of receiving watercourses. 12. Road drainage systems will be inspected, cleaned as necessary and properly maintained. 13. Impacts of construction site run-off on surface waters will be controlled by use of measures such as attenuation ponds, rock gabions, sediment traps/sumps, armoured drainage lines and drainage diversion structures. 14. Where possible, drainage outlets will discharge into vegetated areas and not to exposed soil. 15. Riparian vegetation and vegetation along drainage lines and gullies will be protected and retained where practical to provide natural attenuation of flows. 16. Cleared areas that are to be reinstated will be tilled, and re-vegetated where appropriate, as soon as possible after completion of construction to minimise areas of exposed, bare soil. 17. Construction activities and movement of construction vehicles outside designated areas and transport routes will be prohibited. 18. In areas of ground clearance, topsoil will be stripped and salvaged as much as possible. 19. If short-term soil stockpiles are required, these will be located and designed to avoid compaction, and covered or seeded to prevent erosion. 20. Where there is the potential for slope instability, measures will be taken to minimise risk of slope collapse and associated impacts on soils. 21. If roads are not required once construction of the Simandou Project is complete, they will be closed and rehabilitated. Rehabilitation will include measures to ensure that natural drainage patterns are reinstated as far as possible and no impacts on drainage or flooding persist after the road has been decommissioned. 22. Inspections will be carried out during the course of the works, and upon completion of construction activities to: • Check for erosion and implement remedial works as appropriate; and • Inspect ditches and culverts and remove accumulated debris, where required.	

Potential Impact	Mitigation	Assessment of Residual Impact
3. Pollution of Soils and Water		
Construction activities associated with development of roads, borrow pits or watercourse crossings could lead to release of sediments and other contaminants into surface waters or disruption of existing water flows.	23. As far as possible, no work will be undertaken within 50 m of any surface waterbody. Where this is not possible, for example at river crossings, additional measures will be taken to ensure that pollution of water resources does not occur including minimising the need for works within the watercourse and disturbance of river banks. 24. Refuelling, maintenance and washdown of construction vehicles and equipment will only occur in designated areas, located at least 50 m from the nearest waterbody, and provided with appropriate secondary containment measures. Only approved chemicals will be used in these areas. 25. Where new roads cross watercourses: - the alignment of road approaches to watercourses will be kept as close to right angles as possible to limit disturbance to the banks of watercourses; - diversion of watercourses will be avoided wherever possible; - the duration of construction activities at watercourse crossings will be as short as practicable; and - the construction of bridges, abutments and in-river bridge supports (where needed) will take into account the hydraulics of the watercourse in their design to consider stability and flow disruptions. 26. Silt curtains and other industry good practice management controls will be used as appropriate when working near watercourses or in mangrove areas. 27. Crossings will be designed to minimise disturbance of established riparian vegetation and complex bank habitat structures. See also <i>Soils, Run-Off and Flooding</i> for measures to minimise entry of sediments into surface waters during construction.	Sediments and other contaminants will be managed to minimise the risk of pollutant releases and ensure that significant impacts are unlikely to occur.
Discharges of sanitary or other effluents (eg sewage) during construction could lead to pollution of nearby watercourses.	28. Sewage produced at the Mobile Field Camps will be collected and treated to achieve the following discharge standards prior to release into the environment. This may necessitate transport off-site to other established Project sites or facilities.	Treatment of all discharges to meet internationally accepted standards will prevent significant adverse impacts on receiving waters.

Potential Impact	Mitigation	Assessment of Residual Impact																														
	<table border="1"> <thead> <tr> <th colspan="3">Sewage Treatment Plant Discharge Criteria</th></tr> <tr> <th>Parameter</th><th>Units</th><th>Discharge Limit Value</th></tr> </thead> <tbody> <tr> <td>pH</td><td>pH units</td><td>6 – 9</td></tr> <tr> <td>Chemical Oxygen Demand (COD)</td><td>mg/l</td><td>125</td></tr> <tr> <td>Total Nitrogen</td><td>mg/l</td><td>10</td></tr> <tr> <td>Total Phosphorus</td><td>mg/l</td><td>2</td></tr> <tr> <td>Oil and Grease</td><td>mg/l</td><td>10</td></tr> <tr> <td>Total Suspended Solids</td><td>mg/l</td><td>50</td></tr> <tr> <td>Total Coliform Bacteria</td><td>MPN/100 ml</td><td>400</td></tr> <tr> <td colspan="3">Source: IFC General EHS Guidelines April 2007</td></tr> </tbody> </table>	Sewage Treatment Plant Discharge Criteria			Parameter	Units	Discharge Limit Value	pH	pH units	6 – 9	Chemical Oxygen Demand (COD)	mg/l	125	Total Nitrogen	mg/l	10	Total Phosphorus	mg/l	2	Oil and Grease	mg/l	10	Total Suspended Solids	mg/l	50	Total Coliform Bacteria	MPN/100 ml	400	Source: IFC General EHS Guidelines April 2007			
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Intentional or accidental releases of hazardous substances used during construction or released from spills caused by accidents involving Project vehicles carrying hazardous materials could lead to contamination of soils, surface waters and/or groundwater during operation of new and improved roads.	29. All hazardous substances to be used, stored or transported during construction or use of roads by Project vehicles will be reviewed, evaluated and approved by competent personnel prior to being introduced or used in any area. As part of the approval process, the relevant Material Safety Data Sheets (MSDSs) will be reviewed to identify any measures required to ensure appropriate management of the specific substance. MSDSs will be available at the point of use and all hazardous materials will be clearly labelled. 30. Refuelling of construction vehicles and equipment will only occur in designated areas that are provided with appropriate containment measures. 31. Biodegradable lubricants will be used wherever possible. 32. Refuelling, maintenance and washdown of construction vehicles and equipment will only occur in designated areas, located at least 50 m from the nearest waterbody, and provided with appropriate secondary containment measures. Only approved chemicals will be used in these areas. 33. An effective preventative maintenance programme will be established to ensure that all equipment that uses or contains any hazardous materials (including fuel, oil, <i>etc</i>) is inspected regularly and maintained in good working order. Inspection and maintenance records will be available for review at all reasonable times.	Careful selection of materials, control of material handling and use, adoption of thorough spill prevention and emergency response plans, and training of personnel in their use, will ensure that significant impacts are not likely to occur.																														

Potential Impact	Mitigation	Assessment of Residual Impact
	34. Work areas will be laid out to ensure that any hazardous materials are stored in well-ventilated areas, away from ignition sources and as far as possible from sensitive receptors including offices, heavily trafficked areas or areas where people eat, smoke or sleep. 35. Hazardous materials will only be stored and handled in designated areas provided with appropriate secondary containment measures. 36. Storage facilities for hazardous materials will be designed to include secondary containment structures capable of containing the largest of 110% of the largest tank or 25% of the combined tank volumes. Secondary containment will be made of impervious, chemically resistant material and will be designed to prevent contact between incompatible materials in the event of a release. 37. Where practical all equipment and containers (including pipes, valves and taps), containing hazardous materials, will be located above ground. These will all be provided with appropriate containment to minimise the risk of uncontrolled or undetected releases of hazardous materials. Storage areas will be located at least 50 m from any surface water. 38. All Project vehicles carrying hazardous materials will be designed and labelled in accordance with international standards and will be equipped with appropriate spill response equipment. 39. An emergency response plan will be developed for unplanned spills and discharges associated with construction work and Project vehicles. 40. Spill kits will be available in areas where spills could occur and will be appropriate for the volumes and types of hazardous material in use. 41. Individuals involved with management or transportation of hazardous materials will be provided with appropriate training to ensure competency and awareness of health, safety, environmental and social hazards and risks.	
4. Air Quality		
Dust from construction activities and borrow pits could cause adverse impacts on air quality affecting the health and welfare of people, crops and sensitive natural fauna and flora.	42. Soil stockpiles and stores of friable material will be covered or vegetated to reduce the potential for fugitive emissions of dust where possible. 43. Speed controls will be implemented where appropriate to minimise dust creation by vehicles travelling on un-made roads. 44. Vehicles carrying friable materials will be enclosed or sheeted. 45. Driver training will include awareness-raising regarding appropriate driving speeds to minimise dust emissions during different weather conditions.	The risk of adverse impacts on people and other receptors due to dust and other emissions during construction and operation will be minimised by siting roads away from communities

Potential Impact	Mitigation	Assessment of Residual Impact
	46. Loading, unloading and handling of dusty materials will only be carried out in designated areas. 47. Dust suppression systems (eg water carts) will be used to dampen down areas when there is risk of high dust emissions affecting sensitive receptors.	and sites of importance for biodiversity. Adoption of the other measures identified here will minimise the risk of any residual impact from emissions.
Other emissions from construction activities such as emissions from fuel combustion, power generators, concrete batching plant and bitumen mixing plant could cause adverse impacts on air quality affecting the health and welfare of people, crops and sensitive natural fauna and flora.	48. An effective preventative maintenance programme will be established to ensure that all construction equipment is maintained in good working order for the duration of its use and does not adversely impact air quality due to inadequate maintenance or damage. 49. To avoid black smoke, bitumen will not be heated with open flame burners or overheated, pots/tanks of bitumen will be covered, and any spills will be contained and immediately cleaned up. 50. Concrete batching, and crushing and screening plants (including mobile plants) will be fitted with dust extraction and/or suppression systems where necessary. 51. Electricity generators will be of modern design meeting up to date specifications for emission standards. 52. Temporary storage facilities such as tanks will be designed and operated to minimise fugitive emissions of hydrocarbons etc. 53. Use of ozone depleting substances such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, trichloroethane and halogenated hydrobromofluorocarbons (HBFCs) will not be permitted.	
Air emissions from Project vehicles during the operational phase of the Project could cause adverse impacts on air quality affecting sensitive receptors such as people and sensitive fauna and flora.	54. An effective preventative maintenance programme will be established to ensure that all Project equipment and vehicles is maintained in good working order for the duration of its use and does not adversely impact air quality due to inadequate maintenance or damage. 55. Speed controls will be implemented where appropriate to minimise dust creation by vehicles travelling in sensitive areas such as communities. 56. Driver training will include awareness-raising regarding appropriate driving speeds to minimise air emissions during different weather conditions.	
Project activities could introduce new ignition sources associated with equipment and workers and therefore could contribute to an increase in the risk of bushfires	57. Strict controls will be in place to minimise the risk of bushfires being caused accidentally by Project activities including: • a ban on unauthorised open fires; • storage of flammable substances in accordance with good international standards for fire safety including fitting flame arresting devices to vents, segregation of incompatible	Strict controls will be adopted to control open burning and smoke emissions, and to minimise the risk of fire.

Potential Impact	Mitigation	Assessment of Residual Impact								
	substances, engineered earthing and lightning protection; - fitting of earthing and lightning protection to other structures vulnerable to lightning strike; - control of hot work using a strict permit to work system; and - creation of firebreaks around work areas and mobile field camps, where appropriate. 58. Emergency response plans and fire fighting arrangements will be put in place to facilitate response to fire including natural bushfires, where there is a direct threat to assets. Trained fire crews will be available. All personnel will be provided with appropriate training regarding fire-related hazards and first response. Adequate water supplies for use in the case of a fire will be available in critical locations.	Fire fighting resources and trained crews will be in place to respond if fire occurs from either natural or Project-related sources.								
5. Noise and Vibration										
Noise and vibration from borrow pits and Project equipment, activities and traffic during construction may cause disturbance of noise sensitive receptors including the workforce, communities and sensitive fauna, especially from noisy activities at night.	59. Construction work areas, Mobile Field Camps and borrow pits will be organised and operated strive to restrict noise levels do not exceed the following thresholds at the nearest sensitive receptor during normal activities. If existing noise levels exceed these threshold values, the Project will not cause more than a 3dB increase in measured ambient levels during normal activities. <table border="1"> <thead> <tr> <th rowspan="2">Project Phase</th><th colspan="2">Ambient Noise Threshold Values</th></tr> <tr> <th>Daytime (07.00 – 22.00)</th><th>Night-time (22.00 – 07.00)</th></tr> </thead> <tbody> <tr> <td>Construction</td><td>75 dB(A) L_{Aeq} (daytime period)</td><td>50 dB(A) L_{Aeq} (night-time period)</td></tr> </tbody> </table> Source: IFC Environmental, Health and Safety Guidelines 2007 60. Advance notice will be given to communities if short-term noisy construction activities are to take place, which could cause these levels to be exceeded. 61. Measures to minimize noise during construction will include: - locating and orientating equipment to maximise the distance, and to direct noise emissions away from, sensitive areas; - using buildings, earthworks and material stockpiles as noise barriers where possible; and - soft-starting of equipment and turning off equipment when not in use.	Project Phase	Ambient Noise Threshold Values		Daytime (07.00 – 22.00)	Night-time (22.00 – 07.00)	Construction	75 dB(A) L_{Aeq} (daytime period)	50 dB(A) L_{Aeq} (night-time period)	Most sources of noise and vibration will be localised and short term but where noisy activities are taking place close to homes or near habitats used by sensitive fauna, significant impacts may occur, especially from exceptional activities and at night. The risk of adverse impacts on people and other receptors during construction and operation will be minimised by siting roads away from communities and sites of importance for fauna that could be disturbed by noise and by adopting good practice measures to control sources of noise
Project Phase	Ambient Noise Threshold Values									
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Construction	75 dB(A) L_{Aeq} (daytime period)	50 dB(A) L_{Aeq} (night-time period)								

Potential Impact	Mitigation	Assessment of Residual Impact
	62. Blasting will not occur at borrow pit locations. 63. Noise and vibration potential will be considered when purchasing vehicles and equipment in accordance with Rio Tinto's established Buy Quiet policy. Equipment that emits tonal or low frequency noise will be avoided where possible. 64. Noisy construction equipment located near sensitive receptors will be fitted with appropriate noise and vibration abatement devices such as silencers, mufflers and noise enclosures. 65. An effective preventative maintenance programme will be established to ensure that Project equipment, vehicles and roads are maintained in good working order for the duration of Project use and do not emit excessive noise or vibration due to inadequate maintenance or damage. 66. Working hours and activities will be carefully managed to minimise adverse noise and vibration impacts especially at night. 67. All drivers will be trained in good driving practice to minimise noise and vibration from Project vehicles. 68. All personnel will be made aware of the importance of minimising noise and the measures that are required in this regard.	and vibration.
Noise and vibration from Project traffic during the operational phase of the Project has the potential to cause adverse impacts on communities near roads used by Project vehicles during construction or operation.	69. The alignment of roads will be developed to avoid sensitive receptors such as communities, where necessary to avoid potentially significant noise or vibration impacts. 70. Where existing roads are used and passage of traffic through communities could cause significant noise impact, strict speed limits will be applied to minimise noise near homes and other sensitive buildings (schools, place of worship, clinics, etc) close to the road. 71. Where necessary to avoid unacceptable noise levels within communities, a bypass will be provided to take Project traffic away from communities. 72. Strict controls on routeing of Project-traffic will be implemented to ensure traffic moves only on designated routes and at agreed times. 73. An effective preventative maintenance programme will be established to ensure that Project equipment, vehicles and roads are maintained in good working order for the duration of Project use and do not emit excessive noise or vibration due to inadequate maintenance or damage. 74. Construction working hours and activities will be carefully managed to minimise adverse noise and vibration impacts especially at night.	Careful siting and design of new and improved roads, improvements in existing road conditions, and controls on Project vehicles, will minimise the risk of significant noise impacts from Project traffic.

Potential Impact	Mitigation	Assessment of Residual Impact
	75. All drivers of Project vehicles will be trained in good driving practice to minimise noise and vibration from Project vehicles. 76. All Project personnel will be made aware of the importance of minimising noise and the measures that are required in this regard.	
6. Resources and Waste		
Construction and operation of roads will require supply of water for activities such as road making, potable use and processes such as concrete batching. Abstraction of water from wells and rivers has the potential to adversely affect supply for existing communities and ecosystems.	77. The provisions for water supply for construction of individual roads will be defined in the Site Files and water will not be abstracted for any location until appropriate mitigation has been defined to ensure that significant impacts on communities and aquatic ecosystems are unlikely to occur. No water will be abstracted without the prior approval of the relevant authorities. 78. Water use will be monitored and recorded to maximise efficiency of water use and minimise waste. 79. Preventative maintenance and regular inspection of water tanks and related equipment will be undertaken to minimise the risk of leaks and remedial actions will be implemented as soon as possible. 80. Recycling of water will be undertaken where practical and safe.	Water supply for construction and operation of roads will be carefully planned and designed so that there is no adverse impact on other users.
Ineffective management of waste could lead to unnecessary consumption of material resources, generation of waste and other emissions and pollution of soils and water.	81. A Waste Management Plan (WMP) will be established and will include: • clear objectives and targets with respect to waste management; • an analysis of types/quantities of waste to be produced by the Project; • an analysis of potential opportunities to reduce, reuse or recycle waste in accordance with the Waste Management Hierarchy (reduction, re-use, recycling, disposal) and a description of how this will be achieved; • a description of roles, responsibilities and resources to ensure that the objectives and targets are achieved; • procedures governing the handling, treatment and disposal of all wastes; and • verification procedures for appropriate assessment of contractors and third-party facilities used for waste transport, management and disposal. 82. Different waste types will be segregated eg inert, non-hazardous and hazardous waste at the point of waste generation. 83. Waste collection stations will be positioned in easily accessible locations close to the point	The environmental impacts from resource use in construction of roads will be small, but efficient use of resources and minimising waste will nevertheless be considered at all stages of development in accordance with Rio Tinto corporate policy and standards. All areas and activities will be managed to minimise the waste produced by the Project.

Potential Impact	Mitigation	Assessment of Residual Impact
	where waste is generated and will be clearly marked to facilitate segregation of waste. Waste will be removed from work areas at regular intervals and will not be allowed to accumulate in undesignated areas. Inspections will be carried out regularly to identify and rectify inappropriate practices, including littering. 84. Roads will be designed to achieve as close a balance as possible between the amount of spoil produced from cuttings and that required for fill to minimise the need for disposal of surplus spoil. 85. Other wastes will be re-used or recycled wherever possible. 86. All residual wastes will be treated and disposed of at facilities providing appropriate means for safe disposal. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites. 87. Landfilling of waste will only be permitted if all other options to reduce, reuse or recycle have been exhausted. 88. Landfills will be used only for disposal of inert and non-hazardous wastes. 89. Burning of waste will not be permitted except in appropriate incineration facilities. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites. 90. Medical wastes will be incinerated in appropriate incineration facilities. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites. 91. Accurate waste records will be maintained, to ensure traceability of waste material from source to final destination. Records will detail the source, type and quantity of waste as well as the date of transport, the carrier being used to transport the waste, and the final destination. 92. Materials will be stored correctly to reduce damage and waste. 93. All personnel will be trained in the appropriate management of waste in accordance with the WMP. 94. Any organisations contracted to transport, manage or dispose of waste, and any facility used for the processing, storage or disposal of waste, will be in the possession of all necessary permits and authorisations. Project personnel will confirm this prior to using any external facility and will audit their operations to ensure compliance with Project requirements. 95. Waste materials that can be safely reused or recycled may be donated to local communities	

Potential Impact	Mitigation	Assessment of Residual Impact
	following an appropriate risk assessment by HSEC personnel. All donations will be managed through the Simfer Communities Team.	

4.4 Summary of Key Issues

The key issues identified relating to impacts on the physical environment and mitigation measures for the impacts are summarised below.

4.4.1 Geology, Hydrogeology, Surface Water and Soils

Construction of new roads and widening and improvement of existing roads will require the removal of existing vegetation and levelling of the ground to prepare the corridor. Topsoil will be removed and kept separate for re-use to minimise loss of valuable resources.

Ground disturbance and use of construction equipment could release sediment and other contaminants into water. Ground disturbance will be avoided during periods of heavy rainfall and cleared areas that are to be rehabilitated will be re-vegetated as soon as possible following the completion of works. Where possible, construction activities will be organised to avoid work near watercourses. Where crossings of rivers are required, particular care will be taken to avoid disturbance to the banks of watercourses and the loss of soils into the water.

Intentional or accidental releases of hazardous substances used during construction or spills caused by accidents involving Project vehicles carrying hazardous substances including fuel during use of roads, could lead to contamination of soils, surface waters and/or groundwater. Activities that require the use of hazardous substances will be carried out in designated areas where any spills or discharges can be contained and managed in an appropriate manner. The use, storage and transport of hazardous substances for the Project will be strictly controlled in line with international good practice. All effluent from the construction workforce will be collected and treated prior to removal for offsite disposal.

Development of new roads, or significant widening or sealing of existing roads could lead to disruption of natural drainage patterns, changing the risk of flooding and potentially affecting local water supplies. The detailed design of roads will be developed taking into account local hydrological conditions to ensure that flood risks are not increased and existing sources of water supply are maintained throughout construction and operation.

The measures described will ensure that sites are selected and run-off and discharges are effectively managed to prevent significant impacts on water and soils.

4.4.2 Air Quality

Dust generated during construction and operation could cause adverse impacts on air quality affecting the health and welfare of people, crops and sensitive natural fauna and flora. The alignment of roads will be developed to avoid communities and sites of importance for biodiversity where possible. Good construction practices will be implemented to control dust and other emissions from earthworks and other construction activities such as heating of bitumen and concrete batching, in order to prevent significant impacts on air quality during construction.

During operation, the flows of Project traffic will not be sufficient to cause significant adverse impacts from vehicle emissions. All Project vehicles will be regularly maintained and drivers will be trained in driving methods designed to avoid unnecessary emissions, for example, avoiding engine stress and reducing vehicle speed in and near communities.

4.4.3 Noise

Noise and vibration from Project equipment and activities during construction and operation could adversely affect the workforce, communities and sensitive fauna. Where possible, the alignment of new roads will be developed to avoid sensitive areas such as communities and areas used by sensitive fauna such as large mammals. Work areas will be clearly defined and demarcated to ensure that noisy activities are segregated from sensitive receptors where possible. Where this is not possible, measures will be implemented to

manage site activities to avoid significant adverse noise impacts by using quiet equipment, installing screens and restricting working hours. Workers will be trained to operate machines and vehicles quietly.

Use of roads by Project traffic will not be sufficient to cause significant noise impacts on a routine basis, but Project vehicles will be regularly maintained to avoid increases in noise emissions. Speed limits will be imposed for vehicles travelling through communities and other sensitive areas, and drivers will be trained in driving methods designed to avoid unnecessary noise.

4.4.4 Use of Resources and Waste

Inefficient use of resources such as water and construction materials could deplete supplies for local communities and other users and may lead to unnecessary generation of waste. Use of water will be planned and controlled and hydrological studies will be carried out where necessary to ensure that Project requirements for water can be met without compromising existing local needs.

A Waste Management Plan (WMP) will be established defining how waste will be reduced, re-used, collected, managed, recycled and disposed of in an appropriate manner and in accordance with good international practice. Audits will be undertaken at planned intervals to assess compliance and ascertain the effectiveness of the WMP.

5 Impacts on the Biological Environment

5.1 Introduction and Scope

This chapter focuses on the impacts the Roads Programme may have on the biological environment. The key topics of concern in this regard are:

- habitats; and
- species (flora and fauna).

In many cases, significant impacts on habitats, flora and fauna can be eliminated through effective mitigation of impacts on the physical environment, as described in *Chapter 4*. This chapter therefore focuses on aspects and impacts that require mitigation measures additional to those already described in *Chapter 4*. Significant impacts on the biological environment can also lead to secondary impacts on communities that depend on biological resources, for example through services that depend on ecosystems. These types of impacts, and any necessary mitigation, are discussed in *Chapter 6*.

The remainder of the chapter is organised as follows.

- *Section 5.2* presents information on baseline conditions in the natural environment that may be affected by the Roads Programme.
- *Section 5.3* discusses how these conditions may be affected by the construction, operation and, where relevant, closing of the works and identifies the measures that will be taken to mitigate these impacts. The details of impacts and mitigation are presented in tabular format.
- *Section 5.4* summarises the key issues for the biological environment.

5.2 Baseline Conditions

This section describes the broad habitat types and designations that occur in areas where roads may be developed for the Simandou Project. Given that biodiversity interests are site-specific, and the locations of roads to be developed within the programme are still to be confirmed, this section aims to provide an overview of the types of habitats found across the Project area. This includes an overview of areas of conservation interest, that is, areas that are considered by the SEIA Team to be of importance for the conservation of biodiversity, habitats and species. These include:

- legally protected areas meeting the International Union for Conservation of Nature (IUCN) definition of “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”;
- other designated areas identified following globally recognised systems eg Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs); and
- other important sites for biodiversity, habitats and species identified through regional or national processes such as sites important for populations of West African chimpanzee identified by the Great Apes Survival Partnership (GRASP); and
- other sites which may be identified during survey work undertaken for the Project.

Further information regarding types of protected and designated areas of conservation interest occurring in the Project area is provided in *Annex H* and a map of areas identified to date is presented in *Annex I*. Areas affected by specific road proposals will be identified and assessed by surveys undertaken during the development of Site Files. These will characterise habitats within and around the specific site, establish the boundaries of nearby designated and protected areas, and identify areas of Critical and Natural Habitats as

defined by IFC Performance Standard 6⁽¹⁾ and the presence of species of conservation interest. Species of conservation interest will be identified by reference to the IUCN Red List of Threatened Species⁽²⁾ and consideration of factors such as restricted range, endemism and importance for ecosystem services such as provisioning (see *Chapter 6*).

Areas of conservation interest in the vicinity of the Project are outlined below.

The Simandou mine site is located within the region of Guinée Forestière, recognised as one of the major geo-botanical subdivisions of Africa⁽³⁾ and the most wooded region of Guinea. The mining concession lies within of the Pic de Fon Classified Forest, which covers an area of approximately 250 km². It was created mainly to protect soil against erosion in areas of rugged topography and to protect water and forest resources⁽⁴⁾. Pic de Fon Classified Forest is comprised of approximately 55% natural and 45% modified habitat and is a recognised Key Biodiversity Area⁽⁵⁾. It is also judged to meet the criteria for designation as an Important Bird Area⁽⁶⁾ and is one of the most northerly areas of the Guinean Forests of West Africa Biodiversity Hotspot⁽⁷⁾. Studies have indicated that the Classified Forests in this region constitute just 1.1% of Guinea's land area, but represent 27.6% of the remaining national forest cover.

Within the immediate area of the mine three types of Critical Habitat have been identified; submontane grassland (including rock outcrops and seasonal swamps), transitional submontane grassland-forest areas, and evergreen submontane forest⁽⁸⁾, but none are located within or near areas affected by roads planned as part of the advance works programme. Assessment of impacts on habitats and species within the mine area will be provided in the main Simandou Project SEIA.

East of the Simandou range, lowland areas are dominated by savanna. To the west there is more semi-deciduous lowland forest and secondary forest interspersed with cultivated and fallow land and plantation areas typically considered to be of low-medium importance due to degradation by human activity.

The Pic de Fon and the Pic de Tibé Classified Forests fall in part within the Fon Tibé Priority Area for Biodiversity Conservation⁽⁹⁾. This mountainous area is dominated by semi-humid forests and is the source of several of the region's major rivers. According to Conservation International, biological priorities include mammals, amphibians and reptiles and the main social and economic threats are agriculture, hunting, logging, shifting cultivation, deforestation, water pollution and mining⁽¹⁰⁾. The ecosystems of Bia Complex and Bero-Tétini both lie to the east of the concession and are also Priority Areas for Biodiversity Conservation⁽¹¹⁾. The Classified Forests of Milo and Mont Bero are located to the south of the mining concession.

North and west of the mining concession and along the rail corridor as far as Faranah, the majority of designated areas have been considerably affected by human activities and areas of original forest and

(1) Critical Habitats are areas with high biodiversity value including habitats of significant importance to critically endangered and/or endangered species, to endemic and/or restricted range species, or to globally significant concentrations of migratory and/or congregatory species, regionally significant or highly threatened or unique ecosystems, and/or areas associated with key evolutionary processes. Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species compositions.

(2) The IUCN Red List classifies species as Critically Endangered, Endangered, Vulnerable, Near threatened, Not Threatened and Data Deficient

(3) Institut de Recherche Agronomique de Guinée (IRAG) Notice explicative sur le zonage de la Moyenne Guinée, Haute Guinée et Guinée Maritime. <http://www.cta.int/partners/irag/>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(4) Decree No. 8113 SE/F.

(5) Rio Tinto and Conservation International (2008) The Conservation International Partnership

(6) The CF has not been formally listed by BirdLife as an IBA but as a result of its great avifaunal diversity, the presence of species of global conservation concern, and its assemblage of restricted-range and biome-restricted bird species, it would qualify as an IBA if officially assessed (McCullough 2004; Ekstrom 2005).

(7) http://www.biodiversityhotspots.org/xp/hotspots/west_africa/Pages/default.aspx accessed 25.10.11

(8) TBCL (2010); IFC Performance Standard 6 Critical Habitat Assessment of the Rio Tinto Simandou Project (Mine Component); The Biodiversity Consultancy Ltd, Cambridge, UK.

(9) Conservation International 2001, as referenced in the Social and Environmental Baseline Report for the Mine, SNC Lavalin, 2008

(10) Conservation International, 2001a and 2001b, as referenced in the Social and Environmental Baseline Report for the Mine, SNC Lavalin, 2008

(11) Conservation International 2001, as referenced in the Social and Environmental Baseline Report for the Mine, SNC Lavalin, 2008

habitat have been significantly cleared and degraded. The dominance of savanna habitat is an indicator that plant cover has been under considerable anthropogenic pressure from local communities.

South of Faranah, the rail corridor overlaps part of the Niger-Mafou Ramsar site for approximately 100 km. This site covers a very large flat area (approximately 1 million hectares with a mean altitude of 350 m) in the prefectures of Kouroussa and Faranah, between and around the rivers Niger and Mafou. The area is dominated by permanent and seasonal rivers and freshwater marshes, where water is available throughout the year. Areas adjacent to these rivers are often seasonally flooded creating rich alluvium plains that are used for agriculture. Water quality is good, but is under threat due to cotton-growing and increased use of pesticides. The area has been little altered by human intervention and large areas of primary dry forest (which exist nowhere else in the region) support high levels of biodiversity.

The Project area also passes through a small section of the Upper Niger National Park (UNNP) buffer zone. The park comprises two parts; a core protected area and a buffer zone. Both parts are managed by the Government in cooperation with local communities and with the support of local forestry administrations. The core area includes the Kouya CF. In the buffer area local people are encouraged to use the resources of the park in a sustainable way and farming and collecting of non-timber forest products are permitted. With its diverse mix of habitats, the UNNP is home to many different species. However, there are few endemics⁽¹⁾. The UNNP is also part of a Biosphere Reserve covering an area of approximately 650,000 ha. The Project area does not overlap with the reserve.

As the Project area approaches the Mamou highlands it runs through the southern edge of the Fouta Djallon Priority Area for Biodiversity Conservation⁽²⁾. This area is the source of many of West Africa's major rivers and is one of Guinea's main agricultural regions. It is dominated by relatively degraded woodland savanna. At elevations above 800 m, the savanna gradually gives way to dense montane forest. These forest areas typically support rich biodiversity, including noteworthy mature stands of *Parinari exelsa* (Kura)⁽³⁾. Anthropogenic pressures in these areas have led to natural habitats being progressively replaced by brush and grassland. Social and economic threats include hunting, bush fires, cultivation, human settlement, overgrazing, soil erosion, unregulated fishing, deforestation, overexploitation, disruption of rivers and streams, habitat degradation and mining⁽⁴⁾.

The Classified Forests of Soyah (8,000 ha approximately) and Pinselli (12,000 ha approximately) are also located in this area. This is one of Guinea's least densely populated areas and habitat destruction is less extensive here than in other parts of Guinea. These two forests are both Priority Sites for chimpanzee conservation. A Great Apes Survival Partnership (GRASP) project⁽⁵⁾ is currently being run by the United Nations Environmental Programme (UNEP) in the area and a fulltime forest management officer is employed to oversee the management of both forests.

Habitats in the area of Mamou are dominated by savanna interspersed with areas of mountain forest, semi-deciduous and evergreen lowland forest and secondary forest. Areas of cropland and fallow land also occur typically around rivers or near villages. As mentioned previously, savanna and lowland forest habitats and cultivated areas are typically considered to be of low to medium value in terms of biodiversity.

The highland areas south of Mamou are located within the Guinean Forests of West Africa Biodiversity Hotspot and the areas close to the country borders are considered important for a number of species including endemic birds, reptiles and chimpanzees⁽⁶⁾.

(1) Camara *et al.* 2005, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(2) Conservation International, 2001a and 2001b, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(3) Institut de Recherche Agronomique de Guinée (IRAG). No date of publication. Notice explicative sur le zonage de la Moyenne Guinée, Haute Guinée et Guinée Maritime. <http://www.cta.int/partners/irag/>, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(4) Conservation International, 2001a and 2001b, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

(5) Programme run by the United Nations Environment Programme (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) with the objective of lifting the threat of imminent extinction faced by great apes including chimpanzees (*Pan troglodytes*) across their ranges in equatorial Africa and south-east Asia.

(6) Tolisano & Gauthier, 2007, as referenced in the Social and Environmental Baseline Report for the Rail, SNC Lavalin, 2008

Between Mamou and Kindia, the area along the border between Guinea and Sierra Leone is sparsely populated and there is significantly less anthropogenic pressure than in other areas.

To the west of Mamou, the Project area passes into the coastal plain, crossing through part of the Kounounkan Classified Forest. This lies within the Guinean Forests of West Africa Hotspot and is an IBA and KBA. The Saraboli Classified Forest (850 m²) lies close to Forécariah on the Guinea-Sierra Leone border.

Approaching the coast, savanna habitat becomes relatively rare, and terrestrial and coastal habitats are dominated by cultivated and fallow land, and tracts of mangrove. The majority of habitats are modified, and significant degradation has occurred in many areas due to anthropogenic activities. Rice fields are prevalent, and occur along both banks of the Morebaya River. Small areas of secondary lowland forest occur between the Morebaya and Forécariah Rivers and many areas are dominated by oil palm (*Elaeis guineensis*).

Guinea still has approximately 2 200 km² of mangroves, which constitutes approximately one quarter of West Africa's total mangrove habitat ⁽¹⁾. Mangrove forests occur as three types: riverine mangrove is found mostly along channels up to 10 km inland; fringe mangroves cover only small areas close to the coast; and basin mangrove is found at higher altitudes than riverine mangrove. Mangroves of high conservation value occur in the port area. These areas provide important habitat for some important species (eg manatees) and mangrove ecosystems provide important services eg nursery areas for commercial fish, and coastal protection from storms and erosion. Along the coast, small areas of salt marsh, sandbanks, rocky shores and beaches also occur, and support some important species (eg sea turtle). Large areas of mangrove have been converted to rice fields but the remaining mangrove areas largely retain their natural character.

5.3 Prediction, Evaluation and Mitigation of Impacts

Table 5.1 presents the assessment of potential impacts from the Roads Programme on the biological environment. Impacts are considered under the following headings.

1. Loss, fragmentation and degradation of habitats and severance of animal routes
2. Impacts from increased and induced access
3. Direct impacts on flora
4. Direct impacts on fauna
5. Invasive species and pests
6. Non-routine impacts

The mitigation measures needed to avoid, minimise, restore, offset or compensate adverse impacts are also identified in the table. The measures identified here will be implemented, where relevant, in all areas where roads are developed for the Simandou Project. As part of developing the Site File for each specific road, local surveys will be undertaken where required, and local authorities and affected communities will be consulted to identify and agree any supplementary measures required at particular locations. Site-specific mitigation measures and consultation will be reported in the Site Files for each road.

(1) USAID (2007) Guinea Biodiversity and Tropical Forests 118/119 Assessment. Prepared by the Biodiversity Analysis and Technical Support Team.

Table 5.1 Prediction, Evaluation and Mitigation of Impacts on the Biological Environment

Potential Impact	Mitigation	Assessment of Residual Impact
1. Loss, fragmentation and degradation of habitats and severance of animal routes		
Development of new roads or significant widening of existing roads may cause loss of habitats of conservation interest through clearance of land for construction. Where cleared areas form part of a larger area of intact habitat, removal will lead to fragmentation causing adverse impacts on the integrity and viability of the remaining areas and the populations of species living within them. Rehabilitation of areas occupied only temporarily during construction may lead to development of poor quality habitats unless carefully managed to maximise potential for future biodiversity.	- Selection of routes and designs for new roads will take into account the potential for loss and fragmentation of areas of conservation interest. - Where possible, roads will be designed to avoid and maintain a buffer zone of at least 500 m around areas of conservation interest. - New roads will be designed to maintain a buffer zone of approximately 50 m from any waterbody or watercourse, to minimise disruption of water features and natural drainage, except where crossings are necessary, in which case mitigation measures specified in <i>Chapter 4</i> will be followed. - Where possible, new borrow pits will be located at least 250 m from areas of conservation interest and at least 500 m if a borrow pit occupies more than 1 ha. - The footprint of work areas will be minimised through careful planning of layouts and consideration of site-specific factors. - Working within watercourses, or on their banks, will be forbidden, except where necessary to construct a particular structure. If work in watercourses is required, measures will be implemented to ensure significant impacts on aquatic habitats do not occur as set out in <i>Chapter 4</i>. - Where rehabilitation is being undertaken cleared areas will be tilled, re-graded, spread with topsoil, re-vegetated where appropriate using local or native species and profiled to blend in with the natural surrounds to promote habitat rehabilitation and development. The rehabilitation process will be initiated as soon as practicable. - Water needed for the project will only be obtained from sustainable water sources avoiding adverse impacts on aquatic ecosystems.	Significant degradation and loss of areas of conservation interest will be avoided though attention to strategic planning and detailed design of roads and to rehabilitation of areas not required in the long term.
Development of roads may lead to severance of paths and watercourse used as routes for feeding, breeding and migration by species of conservation interest.	- Where roads would cross routes used by species of conservation interest, alignments will be developed to avoid severance of these routes where possible. - Where severance of an important wildlife route cannot be avoided, crossing facilities will be provided (overpasses, underpasses, culverts) where possible. - The design of bridges and culverts will include measures to avoid adverse impacts on movement of animals including freshwater species along watercourses.	The detailed design of roads will be developed to minimise adverse impacts on routes used by animals.

Potential Impact	Mitigation	Assessment of Residual Impact
Construction work in the vicinity of habitats of conservation interest may have adverse impacts on the integrity and/or viability of those areas through changes in land drainage, soil erosion, pollution of water, soils or air, introduction of invasive species, and general disturbance from increases in human activity.	12. Where development within areas of conservation interests cannot be avoided measures will be take to mitigate adverse impacts. • works will be designed to minimise the loss of areas of conservation interest; • the remaining area will be protected by clearly demarcating and signposting the area and preventing encroachment by construction equipment, vehicles and personnel; • depositing construction materials and waste in neighbouring areas will be prohibited; • disturbed habitats will be rehabilitated on completion of construction including creation of wildlife corridors to mitigate fragmentation as required; • habitat loss will be offset by measures to maintain biodiversity as far as is practicable; • if loss of Critical Habitats is unavoidable this will be mitigated by development and implementation of offset proposals to ensure no net loss; and • ground clearing in sensitive areas upstream of habitats of high conservation value for biodiversity will only be permitted with an appropriately engineered drainage design. See <i>Chapter 4</i> for measures to control impacts on biodiversity from pollution during construction of roads. See Invasive Species and Pests for measures to control risks associated with alien, invasive and pest species. See Induced Access for measures to control risks associated with increases in human activity.	With effective implementation of the mitigation measures detailed in <i>Chapter 4</i> , significant indirect impacts on biodiversity from changes in land drainage, erosion, emissions, effluents and waste should not occur.
Traffic moving through areas of conservation interest could have adverse impacts on the integrity and/or viability of those areas and affect sensitive fauna and flora through vehicle emissions (air emissions and noise) and general	See <i>Chapter 4</i> for measures to control impacts on biodiversity from pollution during operation of roads.	

Potential Impact	Mitigation	Assessment of Residual Impact
increase in activity.		
2. Impacts from increased and induced access		
Building new roads into undeveloped areas and improving existing routes will lead to increased presence of people, either directly as a consequence of project traffic, but also by encouraging local people into areas that they would not previously have visited. Increased human presence can disturb local fauna adversely affecting activities such as breeding, and can also lead to an increase in threats from hunting and fire, and the increased pressure for conversion of and for farming, logging and settlement.	13. Risks associated with increasing access into areas of conservation interest will be taken into account during strategic planning and detailed design of new and improved roads. Factors to be considered will include the current condition and use of the route (greenfield, existing walking trail/track, existing road requiring improvement, existing road requirement little/no improvement), its future status and use during and following the Project and the degree to which this will lead to induced access into otherwise isolated areas. 14. Appropriate mitigation will be defined on a case-by-case basis as part of preparing the Site File for each location and communicated to local stakeholders as part of site-specific consultations. This may include: • restrictions on access to roads developed only for the Project and removal of such roads when Simandou construction work is complete; • application of strict speed limits; and • signposting of sensitive areas and provision of information to travellers on fire risks and hunting. 15. Where development of a road would lead to significant levels of human disturbance consideration will be given to the use of helicopters to provide access for the Project in preference to new road construction.	Strategic planning of roads will be undertaken to ensure that access to areas of conservation interest is managed appropriately and resources are only used in a sustainable manner.
Work activities and improved access to remote areas could lead to greater demand for bushmeat and facilitate access to hunting areas.	16. Project personnel will be strictly forbidden from engaging in hunting, selling or purchasing bushmeat during work hours or within Project work areas or facilities. 17. Inspections of work areas and Project vehicles will be carried out where necessary to verify compliance. 18. Firearms will be prohibited in all work areas and accommodation. 19. Induction training for all Project personnel will include communication of relevant information regarding bushmeat hunting and important local resources. Project personnel will engage local stakeholders to manage potential impacts in this regard. See Non-Routine Impacts for measures to control risks from fire.	Potentially significant impacts associated with bushmeat hunting will be avoided through implementation of the measures detailed in this section.

Potential Impact	Mitigation	Assessment of Residual Impact
3. Direct impacts on flora		
Clearance of vegetation may lead to loss of plant species of conservation interest.	20. Mapping of plant species of conservation interest will be undertaken by competent environmental specialists as part of developing the detailed design of roads. 21. Plant species of conservation interest will be avoided wherever possible. Where these species cannot be avoided, they will be relocated if possible to other suitable locations that will not be disturbed, under the supervision of qualified specialists. 22. Where plant species of conservation interest are located near work areas, they will be demarcated and clearly signposted and access to these areas will be prohibited. 23. Riparian vegetation and vegetation along drainage lines, gullies and gorges, will be protected, where practical with a buffer zone. 24. Where rehabilitation is being undertaken cleared areas will be tilled, re-graded, spread with topsoil, re-vegetated where appropriate using local or native species and profiled to blend in with the natural surrounds and promote habitat rehabilitation and development. The rehabilitation process will be initiated as soon as practicable.	Appropriate routeing and detailed design of roads will minimise impacts on plant species of conservation interest.
4. Direct impacts on fauna		
Development of roads could lead to displacement of fauna animals of conservation interest or disturbance of habitats used by animals.	25. Mapping of animal species of conservation interest will be undertaken by competent environmental specialists as part of developing the detailed design of roads. 26. Habitats used by animal species of conservation interest will be avoided wherever possible, in particular areas used for breeding, nesting, feeding, migration and congregation. 27. Areas used by animal species of conservation interest will be demarcated and clearly signposted if they occur close to work areas and access to these areas will be prohibited. 28. Where possible, areas to be cleared will be worked from one side to another, or from the centre out, to prevent animals becoming trapped. 29. Trenches or holes created during site works will be rendered safe for animals when unattended through covering or provision of an egress ramp. 30. Snakes and other dangerous species or species of conservation interest, occurring	Appropriate routeing and detailed design of roads will minimise impacts on fauna species of conservation interest. Good construction practices will be implemented to minimise the potential for adverse impacts during construction.

Potential Impact	Mitigation	Assessment of Residual Impact
	within work areas, will only to be captured by trained personnel and will be released unharmed, where possible. See Non-Routine Impacts for risks associated with potential road collisions, bushfires and chance-encounters.	
Lighting of work areas after dark may disturb sensitive fauna close to construction sites. Lights on Project vehicles may disturb sensitive fauna present around new roads.	31. Impacts from light emissions during construction will be minimised through: • use of low emission lighting; and • use of directional lighting, aimed towards the area where light is needed, and away from any sensitive receptors. 32. During operation all Project vehicles will use low beam headlights whenever possible when driving after dark.	Potentially significant impacts associated with lighting will be avoided through appropriate selection, use and management of light sources.
5. Invasive species and pests		
Movement of vehicles and equipment into and between Project work areas could lead to introduction of invasive and pest species leading to adverse effects on local fauna and flora, ecosystems and crops.	33. High-risk areas requiring particular protection from invasive species and pests will be identified and mapped by competent environmental specialists as part of developing the detailed design of roads. Potential invasive species affecting these areas will be identified and categorised based on their invasive behaviour. 34. Appropriate management measures will be defined for each species in consideration of experience elsewhere in Guinea, Rio Tinto's current operations at Simandou and international good practice. These will include strict hygiene procedures for construction equipment and vehicles and quarantine programmes where necessary. All vehicles and machinery will be inspected and cleaned to ensure decontamination prior to mobilisation into Guinea, and into or between high-risk areas. Appropriate documentation will be provided as evidence that established procedures have been followed. 35. All introduced species, for example plants used in site rehabilitation, will be reviewed and approved by specialists prior to use. Non-native species will not be authorised unless a formal risk assessment has been completed and approved by relevant stakeholders. 36. Ongoing maintenance and monitoring of work areas will include regular inspections for invasive species, weeds and other pests. 37. Any outbreaks of invasive or pest species will be identified, reported as an incident and managed in accordance with the Project's established incident management	Spread of invasive, weed and insect pest species will be minimised through effective equipment hygiene procedures and maintenance procedures in high-risk work areas.

Potential Impact	Mitigation	Assessment of Residual Impact
	procedures to ensure appropriate corrective and preventative actions are implemented. 38. Measures will be implemented to remove unwanted species. Where necessary detailed procedures will be developed detailing required approaches to weed control (eg physical removal, slashing, mulching, herbicides). Methods used to control or prevent such species will not cause adverse impacts on the environment or communities. 39. Induction training for all personnel will include appropriate information regarding invasive animals and plants and the importance of reporting in this regard.	
6. Non-routine impacts		
Work activities in remote areas may lead to increased occurrence of bush fires causing loss of habitat.	40. Burning of waste will only be permitted in appropriately designated and approved facilities. 41. Burning of vegetation will typically be prohibited, and will require special authorisation if exceptional circumstances arise. 42. Strict controls will be in place to minimise the risk of bushfires being caused accidentally by Project activities including: • a ban on unauthorised open fires; • design of flammable substance stores in accordance with good international standards for fire safety; • fitting of earthing and lightning protection to other structures vulnerable to lightning strike; • control of hot works using a strict permit to work system; and • creation of fire breaks around roads and other work areas. 43. Emergency fire fighting arrangements will be in place to respond to fire including natural bushfires. Trained fire crews will be available at main project sites and all personnel will be trained in communication of fire-related hazards and first response. Adequate water supplies for use in the case of a fire, will be established in critical locations.	The risk of uncontrolled bushfires will be minimised through effective control of ignition sources and work practices.

Potential Impact	Mitigation	Assessment of Residual Impact
Wildlife may be harmed by traffic collisions with Project vehicles during construction and operation and by chance-encounters.	44. Measures will be taken to minimise the risk of collisions between animals and vehicles. Signposts and speed limits will be established where necessary to alert drivers to risks of animals crossing roads. Non-essential travel at night and driving off road will be prohibited. 45. Project personnel will be provided with appropriate instruction regarding the procedures to be followed if important animals or plants are encountered during the course of work.	Effective management of occupational safety and non-routine safety risks will ensure that risks associated with work activities and areas are minimised and habitats and species of conservation interest are not exposed to these risks.

5.4 Summary of Key Issues

The key issues identified relating to impacts on the biological environment and mitigation measures for these impacts are summarised below.

5.4.1 Loss, Fragmentation and Degradation of Habitats

Development of the Roads Programme may cause loss, fragmentation or degradation of habitats of conservation interest and severance of corridors used by wildlife. The presence of areas and species of conservation interest will be taken into account in planning the Roads Programme with the aim of avoiding areas of conservation interest and maintain a minimum buffer of approximately 500 m between any roadworks and these areas wherever possible.

More detailed habitat characterisation, mapping and screening of areas of conservation interest and animal routes will be carried out during detailed design with the aim of minimising the footprint of work areas so as to keep the loss and fragmentation of habitats as low as possible, and identifying appropriate mitigation for any damage that may occur.

Where harm to habitats cannot be avoided, because either an existing road already passes through an area of interest, or a new road has to cross the area in order to provide access, a range of mitigation measures to compensate for loss of biodiversity and creation of corridors to connect fragmented areas will be implemented.

Strict controls on emissions, effluents, waste and lighting will be applied during construction to minimise risks of pollution adversely affecting habitats and species. During operation Project vehicles will be operated so as to minimise impacts from emissions, accidental spills and vehicle lights at night.

5.4.2 Severance of Animal Routes

Where the locations of roads lead to severance of routes used by species of conservation interest, passages will be developed where possible and designed to meet the needs of the affected species. The design of bridges and culverts will include measures to allow movement of animals including fish along watercourses, where possible.

5.4.3 Impacts from Increased and Induced Access

Building new roads into undeveloped areas and improving existing routes will lead to increased presence of people, either directly as a consequence of project traffic, but also by encouraging local people into areas that they would not previously have visited. Increased human presence can disturb local fauna adversely affecting activities such as breeding, but it can also lead to increase in threats from hunting and fire, and the increased pressure for conversion of and for farming, logging and settlement. These impacts will be avoided where possible through careful consideration of risks of increased and induced access during strategic planning of the Roads Programme and in the detailed design of roads. Where necessary, consideration will be given to using helicopter access to avoid the need for road construction, but where this is not feasible, measures will be taken to control access as needed. Where a road is being developed only for Project purposes it may be removed and the route rehabilitated on completion of Simandou construction in consultation with the local community and administration.

5.4.4 Direct Impacts on Flora and Fauna

Land-take and clearance of vegetation may lead to loss or displacement of plant or animal species of conservation interest. Work activities and improved access to remote areas could lead to greater demand for bushmeat and facilitate access to hunting areas. The habitat mapping process described previously will include consideration of the potential for habitats to support these species with the aim of avoiding and minimising loss of habitats required by these species. Where areas of conservation interest are located near work areas, they will be demarcated and clearly signposted and access to these areas will be prohibited to

protect them from disturbance. Where practical, vegetation along rivers, drainage lines, gullies and gorges, will be protected with a buffer zone. Any essential work in watercourses will be carefully managed to avoid adverse impacts on water flow, quality and aquatic animals and plants. Appropriate routeing and detailed design of roads will facilitate avoidance of significance impacts on species of conservation interest.

5.4.5 Invasive Species and Pests

Movement of vehicles, equipment and materials into and between Project work areas could introduce invasive, non-native and pest species leading to harm local species, ecosystems and crops. High-risk areas and species will be identified, mapped and characterised where possible and appropriate management measures defined in consideration of experience elsewhere in Guinea, Rio Tinto's current operations at Simandou and international good practice. Effective hygiene and, where necessary, quarantine procedures will be implemented for all personnel and equipment coming to the area. Local species will be used during all rehabilitation activities and any introduced plant species will be reviewed and approved by appropriate specialists prior to use. Ongoing maintenance and monitoring of work areas will include regular inspections for invasive, non-native species, weeds and other pests and any incidents will be managed in accordance with the Project's established procedures regard. All personnel will be trained in measures needed to protect habitats and species from harm.

5.4.6 Non-Routine Impacts

Work activities in remote areas may lead to increased occurrence of bushfires with resulting habitat loss. Burning of waste will only occur in appropriately designed and approved facilities. Unauthorised open fires will be prohibited and potential ignition sources will be identified and strictly controlled. Emergency fire-fighting arrangements will be put in place to respond to fires including bushfires.

Other non-routine events such as road accidents and chance-encounters with animals could adversely affect animals. Speed limits will be established where necessary to alert drivers to risks of animal crossing roads and all drivers will be trained in safe driving practices. Non-essential travel at night and driving off-road will be prohibited. Movements by Project personnel outside the camps and work areas will be restricted to minimise disturbance offsite. Induction training for all Project personnel will include communication of key risks and mitigation measures including chance-encounter procedures.

6 Impacts on People and Communities

6.1 Introduction and Scope

This chapter focuses on the impacts of the Roads Programme on people and communities. The key topics addressed in this chapter are:

- the economy, development and livelihoods;
- demographics and migration;
- cultural heritage;
- community health, safety and security;
- labour and working conditions including workers rights and occupational health and safety; and
- ecosystem services and processes.

In many cases, significant impacts on people and communities will be avoided through effective mitigation of impacts affecting the physical and biological environment including controls on pollution of air, water, soils, and on dust and noise, as described in *Chapter 4* and *Chapter 5*. This chapter focuses on other impacts of a social nature, where mitigation measures additional to those described in preceding chapters will be required.

The remainder of the chapter is organised as follows.

- *Section 6.2* presents information on baseline conditions in the environment that may be affected by the Roads Programme.
- *Section 6.3* discusses how these conditions may be affected by the construction, operation and, where relevant, closing of the works and identifies the measures that will be taken to mitigate these impacts. The details of impacts and mitigation are presented in tabular format.
- *Section 6.4* summarises the key issues and mitigation measures for people and communities.

6.2 Baseline Conditions

The following section provides a broad overview of socio-economic conditions in the Project area. The primary source documents are baseline studies carried out for the Simandou Project between 2004 and 2009 ⁽¹⁾. Other sources are referenced in footnotes.

6.2.1 Economy, Development and Livelihoods

Approximately 75% of the Guinean population work in agriculture and the rural areas within which the Simandou project will be developed are traditionally dependent on subsistence farming. Landholdings tend to be quite small and traditional cultivation methods are used with little use of technologies such as irrigation. The main crops are rice (the staple food), sweet potatoes, cassava, peanuts, maize and millet. Some larger commercial plantations grow crops such as palm oil, mango, oranges and cashew nuts ⁽²⁾. Other cash crops include coffee, cacao, cotton and fruit, depending on soil type and local climate. Livestock keeping and animal husbandry are important in many areas and communities keep chickens, sheep and goats and sometimes cattle. Income is generated through the sale of livestock and animal products eg milk, fat and butter but 36% of rural households are unable to acquire adequate food through their own production and

(1) SNC Lavalin Environment: Social and Environment Baseline Study :
Simandou Project Mine Component Volume B –Social Baseline Final Report; 2010
Simandou Project Rail Component Volume C –Social Baseline Final Report; 2010
Simandou Project Rail Component- Provisional Report; 2008

(2) International Monetary Fund (IMF) Guinea Poverty Reduction Strategy 2007- 2020 (PRSP-2) as reported in SNC Lavalin Environment 2010: Social and Environment Baseline Study – Simandou Project Mine Component Volume B –Social Baseline Final Report

purchases ⁽¹⁾ and more than 70% of Guinea's people are thought to live below the international poverty line of US \$1.25 per day. Hunting and freshwater fishing (in the dry season) provide further sources of subsistence for communities, and villages with forests nearby typically use forest resources to support their livelihoods. Transhumant pastoralists use migration corridors in some areas and this can cause conflict with local farmers.

Rural communities, especially those remote from the road network, are generally quite self-sufficient, in that they source most of the goods and services they need from within their own village or nearby communities. Many have traditionally operated exclusively on a barter system. Much transport is by un-made tracks and paths and poor mobility results in low levels of development and limited opportunities to strengthen economic activities or improve agricultural practices. Larger villages in some areas are starting to develop service-based economies but this typically only involves a small number of individuals. Monetisation of rural society is occurring and this has led to younger people seeking salaried positions, rather than employment in more traditional agricultural activities. Women in rural areas often work long hours for low incomes leaving little time or money for other activities ⁽²⁾.

As discussed in *Chapter 4*, coastal areas have some of the richest agricultural land in the country. This land is used quite intensively and as such, there is little opportunity for existing users to extend their activities into new areas. Crops grown in coastal areas are typically of higher economic value than those grown elsewhere in the country and include rice, red pepper, eggplant, watermelon and okra. Fishing is also important in coastal areas although it is usually a secondary activity used to supplement agricultural livelihoods. Fishing is generally undertaken by the male head of the household, with fish trading typically undertaken by women. Other livelihood activities include shellfish collection, rice growing, market gardening and salt harvesting. Commercial fishing companies operate in the area of Île Kabak and these companies often provide credit to local fishermen to encourage purchase of fishing equipment, local trade and the loyalty of the fishermen ⁽³⁾.

6.2.2 Employment

As outlined in *Section 6.2.1*, most people are involved in subsistence-based activities associated with agriculture and fishing, with some crops grown for cash. According to the World Bank ⁽⁴⁾, women account for more than half of the agricultural labour force (53%), are responsible for approximately 80% of food production in Guinea, but are typically unpaid. Men in Guinea typically control 75% of cash cropping and agricultural income ⁽⁵⁾.

In the area of the Simandou Mine, wage employment, on average, provides only about 3% of household income. It is relatively new in the area, and is closely linked to Rio Tinto's operations. The percentage of people involved in wage employment along the rail corridor is believed to be even lower than near the mine and in many areas, there are no significant employers. Near the port, subsistence activities also dominate, although there is some wage employment associated with fishing activities and other industry.

Evidence from field research and stakeholder engagement carried out for the Project indicates that communities have high expectations with respect to future opportunities for employment from the Project.

6.2.3 Education

In 2010, the enrolment rate to primary schools in Guinea was 72.7% (both sexes) with 75.6% of enrolled pupils reaching Grade 5 ⁽⁶⁾. Both rates have increased significantly in the last ten years and although literacy

(1) International Monetary Fund (IMF) Guinea Poverty Reduction Strategy 2007- 2020 (PRSP-2) as reported in SNC Lavalin Environment 2010: Social and Environment Baseline Study – Simandou Project Mine Component Volume B –Social Baseline Final Report

(2) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

(3) Ibid

(4) World Bank, 2004; Évaluation de la situation de genre en Guinée: rapport de synthèse FYW4. Washington, D.C. p. 34

(5) World Bank, 2004; Évaluation de la situation de genre en Guinée: rapport de synthèse FYW4. Washington, D.C. p. 34

(6) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

rates are low (in 2010, only 29.5% of the population age 15 and over could read and write ⁽¹⁾), they are increasing amongst youth (15 to 24 years old) due to increased enrolment. In 2010, 46.6% of youth were literate ⁽²⁾. Enrolment in secondary schools is very low (16.8% in 2005). In rural areas in particular, few children attend secondary school.

Preliminary studies along the rail corridor have indicated that more than 70% of villages have access to a school within the village or within 3 km ⁽³⁾ and low attendance rates are therefore attributed to other factors, including the demand for children to work to support the family.

There is gender inequality in education with literacy rate for women (18.1%) being much lower than for men (42.6%). Women tend to receive less education than men for cultural reasons (including early marriage) and economic reasons (including schooling costs).

6.2.4 Land Tenure

Livelihoods within the Project area are predominantly agro-pastoral and good, productive land is an important resource supporting these activities. Guinean legislation recognises the State as the owner of the land, but also establishes and recognises the right to private property and customary rights to land (see *Annex B*). Under the Domain and Land Tenure Code ⁽⁴⁾, the State has rights to all “vacant or unclaimed land” and to the public domain (*ie* land allocated to provide public services and/or used by the public). The State also has the right to expropriate land where a public interest has been established, to regulate land uses for the purposes of urban or rural development and, where the public interest warrants, to establish servitudes.

Property rights in Guinea are typically weakly enforced and recognised as lacking transparency ⁽⁵⁾, and the cost of registering title is a barrier. In urban areas, land is commonly registered with a formal title, but this is rare in rural areas, where land ownership rights tend to be customary. In Beyla near the Simandou Mine about 5% of households have applied for and received registered title to their land. Traditionally, land is owned by the founding family of the village and acquired by households through inheritance, as gifts or through extended families ⁽⁶⁾. The views and decisions of founding families, village elders and local administrators therefore play an important role in terms of determining property rights and management. Communal lands also commonly occur within the Project area. This land is used by villagers for animal husbandry (pasture, transhumance of cattle, water sources) and gathering natural resources such as wild fruit, wood etc. Non-residents of the village can use communal lands if they obtain permission from the local village chief.

6.2.5 Demographics and Migration

In 2005, the demographic profile of Guinea had the following key features ⁽⁷⁾.

- The rural population constituted 65% of the total population.
- Women marginally outnumbered men, accounting for 52% of the population.
- The proportion of children under the age of 15 years was 48.4%.

A diverse mix of ethnic groups, religions and nationalities live in and around the Project area including the Konianké, Guerzé, Toma Mania and Peul who generally live peacefully together. Disputes are typically

(1) World Bank 2009; Working Long Hours and Having No Choice: Time Poverty in Guinea, Policy Research Working Paper 4961. Washington, D.C. p. 39.

(2) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

(3) Koppert, G. and Barry, M.I., Rio Tinto Simandou Value Enhancement Study Rail and Port. 2010

(4) Order No. 0/92/019; March 30, 1992

(5) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

(6) Koppert, G. and Barry, M.I., Rio Tinto Simandou Value Enhancement Study Rail and Port. 2010

(7) Direction Nationale de la Statistique (DNS) and ORC MACRO, 2006. Enquête Démographique et de Santé, Guinée 2005.

Calverton, Maryland, U.S.A. : DNS and ORC Macro as presented in SNC Lavalin Environment 2010: Social and Environment Baseline Study – Simandou Project Mine Component Volume B –Social Baseline Final Report

limited to local issues. None of Guinea's 16 ethnic groups constitutes a majority, and ethnic discrimination does not appear to occur systematically ⁽¹⁾.

The majority of the population of Guinea is Muslim (85%), with approximately 8% Christians and 7% holding indigenous beliefs ⁽²⁾.

Parts of the Project area are located close to national borders with Côte d'Ivoire, Liberia and Sierra Leone. People are permitted to move freely between these countries, as members of the Economic Community of West African States (ECOWAS), and many people regularly cross the border pursuing livelihood opportunities. Refugees from neighbouring and historically war-torn countries have also often fled to Guinea, where they are typically accepted peacefully, despite the additional demand this can put on scarce resources.

Evidence of migration is provided by the population of Guinée Forestière, which increased steadily between the 1980s and 1996 causing population density to grow from 29 to 45 persons per square kilometre. It is estimated that at its peak in 1999 more than 10% of the population of Guinée Forestière were refugees, accounting for approximately 739,000 people. Guineans also regularly migrate cross borders. From 2004 to 2007, the United Nations Commission for Human Rights worked with the Guinean government to assist the voluntary repatriation of many Guineans who have emigrated in the past ⁽³⁾.

Within Guinea, employment opportunities are one of the major drivers of both seasonal and permanent migration. Migration from rural villages to major cities (including Conakry) is relatively common, especially for young people but significant in-migration has occurred in the area of the Simandou mine. Two distinct types of migrants can be identified: employees of Simfer and its contractors, and others moving to the area in search of opportunities. Opportunistic migrants have often travelled long distances from across Guinea and neighbouring countries. As a result, the villages of Nionsomoridou, Traoréla, Moribadou and the town of Beyla have grown significantly in recent years and this is already placing increased demands on resources, food, housing, goods and services.

In-migration in the areas of the rail corridor and port is not linked to the Simandou Project at present, but is likely to increase as people become more aware of the Project.

6.2.6 Cultural Heritage

West Africa is an area whose prehistoric past witnessed large-scale population migrations, interregional trade, warfare and the rise of urbanism in prehistoric times. There is archaeological evidence that iron smelting technology actually originated in West Africa as early as 2000 BC and was later adopted in the Mediterranean and beyond in the first century BC. Stone Age remains in West Africa may hold clues to the development and migration of early humans, and the iron-rich southern regions of Guinea would have provided an important resource for Iron Age populations of the region. Guinea's coastline has also made it an attractive place to settle and trade from prehistoric times to the present, and even today the ruins of French colonial plantations dot the coast.

In historic times, Guinea's location between the three great medieval empires - Ghana, Mali and Songhai - would have fostered sweeping cultural shifts as Islam first took root and spread within the African continent. Despite the wealth of historical texts detailing the Islamic Medieval period and the availability of colonial-period documents, very few archaeological studies have actually been conducted within Guinea's borders, so relatively little is known of Guinea's pre-history. West Africa has received the least amount of archaeological research of any region of the world due to European perceptions of the African past, low visibility in forested areas, and modern political shifts that have presented difficulties for conducting research in many parts of the sub-continent. Since 1979, when West Africa was recognized as the home of several prehistoric urban civilizations, archaeological research has slowly increased in intensity. Due in part to

(1) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

(2) Ibid

(3) Ibid

political reasons, however, comparatively little is yet understood about how wider historic trends played out within the modern borders of Guinea.

Throughout West Africa, landscape plays a central role in the social identity of various cultural and ethnic groups. While certain landscapes will have nuanced meanings for different groups, some general cultural trends also exist. For example, many sacred forests and other natural resources are fundamental to social and cultural systems representing intense nodes of spiritual power and sources of powerful occult knowledge. In some cases, these locations can be indistinguishable from the larger surrounding area but historical or mythical events may have occurred at the location, conferring high cultural significance. In other cases, a sacred landscape may include easily discernible natural features such as caves or mountains to which histories or foundation beliefs are attached.

Despite the lack of previous investigation into Guinea's archaeological and living cultural heritage, recent cultural heritage surveys for the Simandou Project have identified at least 146 cultural sites to date, mainly ancient iron smelting sites around the mine and landscape features of cultural significance at the port. Most villages include a cemetery (sometimes containing tombs of the village's founders), religious places of worship (mosques or churches) and sacred or mythical sites such as forests, ponds, special trees, former village ruins, grottos and rocks. These sites are visited by villagers to invoke the spirits and to pay their respects by making offerings and carrying out other rituals. In some areas, their significance is slowly diminishing as people replace their beliefs in animistic rituals with mainstream Islam ⁽¹⁾. However, in other areas, hybridisation is occurring and ritual activities and religious beliefs often include aspects of both Islam and indigenous concepts. Initiation sites are also common, where male circumcisions, female excisions, and other initiation ceremonies are carried out and offerings made.

6.2.7 Community Health

Generally, the health of the population in Guinea is poor, as evidenced by low life expectancy (49 for males, 55 for females) and the high mortality rate of children under five (142 per 1 000 live births). The maternal mortality rate is also extremely high in Guinea, and it has increased in recent years. Most years of life lost (a measure of premature mortality) are assigned to communicable/contagious diseases (73%), while non-communicable diseases account for just 19% and the remainder (8%) are due to injuries ⁽²⁾.

Malaria is endemic ⁽³⁾ in Guinea and is one of the leading causes of death in the country ⁽⁴⁾. Studies undertaken for the Project indicate that malaria is a significant health issue and is one of the main reasons why individuals seek medical treatment from both modern and traditional sources ⁽⁵⁾.

Other communicable diseases that are of concern in Guinea, and contribute to years of life lost, include diarrhoeal diseases, measles, respiratory infections and tuberculosis (TB) ⁽⁶⁾. The high level of diarrhoeal disease is strongly linked to poor hygiene and sanitation leading to contamination of water sources. Baseline studies undertaken close to the mine indicate that 57% of wells used by the communities for water were contaminated with coliform bacteria.

In 2005, the Guinea Demographic Health Survey (GDHS) estimated that the national Human Immunodeficiency Virus (HIV) prevalence rate for Guinea was 1.5%, with a clear predominance in urban areas and amongst women. HIV amongst mine workers is higher than the national average at 5.2% ⁽⁷⁾. This has been corroborated at a regional level, where mine workers had a reported prevalence of 10.2% in

(1) Koppert, G. and Barry, M.I., Rio Tinto Simandou Value Enhancement Study Rail and Port. 2010

(2) WHO Country Profiles Guinea available at: <http://www.who.int/gho/countries/gin.pdf> - last accessed 11.10.11

(3) An infectious disease is said to be endemic if occurs at a predictable rate in a specific location or population

(4) *ibid*

(5) Newfields, 2010 Baseline Health Survey: Mining area and SNC Lavalin Environment December 2008 ; Étude de caractérisation sociale et environnementale de base pour le chemin de fer – Rapport provisoire ; SNC Lavalin Environment December 2008 ; Étude de caractérisation sociale et environnementale de base pour le port – Rapport provisoire

(6) WHO – Country Health Profile – 2006 available at <http://www.afro.who.int/en/guinea/country-health-profile.html> - last accessed 11.10.11

(7) United Nations General Assembly Special Session (UNGASS) Country Progress Report on HIV/AIDS in Guinea in 2008 as described in Newfields, 2010 Baseline Health Survey: Mining area

Guinée Forestière ⁽¹⁾. Survey findings in communities close to the mine indicate that knowledge and awareness of HIV/AIDS transmission routes and prevention methods are inconsistent. Significant stigma continues to be associated with sexually transmitted diseases and condom use ⁽²⁾.

Other reported diseases include:

- Typhoid Fever - a bacterial disease transmitted through the ingestion of food or drink contaminated by the faeces or urine of infected people. Symptoms include high fever, malaise, headache, constipation or diarrhoea, rose-coloured spots on the chest, and enlarged spleen and liver ⁽³⁾.
- Meningitis - an inflammation of the meninges, the covering of the brain and spinal cord. It is most often caused by infection (bacterial, viral or fungal) ⁽⁴⁾.
- Leprosy - caused by bacteria transmitted via droplets from the nose and mouth of untreated patients with severe disease. The disease can cause nerve damage, leading to muscle weakness and atrophy, and permanent disabilities ⁽⁵⁾.
- Schistosomiasis (bilharzia) - a parasitic disease caused by flatworms (transmitted by freshwater snails), whose larvae penetrate the skin of people in the water. In urinary schistosomiasis, there is progressive damage to the bladder, ureters and kidneys. In intestinal schistosomiasis, there is progressive enlargement of the liver and spleen, intestinal damage, and hypertension of the abdominal blood vessels ⁽⁶⁾.
- Onchocerciasis (river blindness) - a parasitic disease caused by filarial worms. It is transmitted through the bites of infected black flies. As the worms die in the body, they cause a variety of conditions, including blindness, skin rashes, lesions, intense itching and skin depigmentation ⁽⁷⁾.

Lack of adequate nutrition and anaemia are also of concern in Guinea and can lead to stunted growth in children and issues during pregnancy. A quarter of Guinea's 9.8 million people are moderately or severely food insecure and chronic malnutrition rose by 50% between 2005 and 2010 ⁽⁸⁾. Lack of adequate food and associated malnutrition is linked to poverty, the high cost of food and low availability of productive land ⁽⁹⁾.

Accurate data relating to potential alcohol or drug abuse is limited in Guinea. Evidence from baseline studies near the mine indicates that alcohol use is limited (only 9% of those surveyed reported that they drank). However 88% of respondents felt that drug abuse was an issue in the community they lived in ⁽¹⁰⁾.

Baseline surveys in the mine area also indicated that hypertension also commonly occurs – 65.7% of those surveyed reported some form of hypertension ⁽¹¹⁾.

Access to healthcare, including maternal care and childcare, is limited due to a lack of infrastructure and human resources as well as the cost of seeking health treatment ⁽¹²⁾. The situation appears to have worsened in recent years and in rural areas, traditional healers are used by many communities ⁽¹³⁾. National standards for medical coverage consider households have no access to health services if it takes longer than

(1) Stat View International. Analyse de situation des IST/VIH/SIDA en Guinée as described in Newfields, 2010 Baseline Health Survey: Mining area

(2) Newfields, 2010 Baseline Health Survey: Mining Area

(3) WHO: http://www.who.int/topics/typhoid_fever/en/ last accessed 11.10.11

(4) WHO: <http://www.who.int/topics/meningitis/en/> last accessed 11.10.11

(5) WHO: <http://www.who.int/topics/leprosy/en/> last accessed 11.10.11

(6) WHO: <http://www.who.int/topics/schistosomiasis/en/> last accessed 11.10.11

(7) WHO: <http://www.who.int/topics/onchocerciasis/en/> last accessed 11.10.11

(8) Country Briefing Guinea; The Human Rights and Business Portal; 2010

(9) Newfields, 2010 Baseline Health Survey: Mining Area: SNC Lavalin December 2008 ; Social and Environmental Baseline Study for the Port and Rail

(10) Newfields, 2010; Baseline Health Survey: Mining Area

(11) Ibid

(12) Ibid

(13) Newfields 2010 Health Impact Assessment Scoping Study - Port Site

thirty minutes to reach a health facility. Based on this, 85% of surveyed households have inadequate access to health services.

6.2.8 Community Safety and Security

According to the World Health Organisation (WHO), accidents close to roads and involving vehicles are a significant issue in Guinea ⁽¹⁾. Poor infrastructure, old vehicles and low levels of driver awareness and training are all contributing factors, making driving and walking near roads hazardous. These same factors also ensure that transportation by boat and ferry is often hazardous, on both rivers and at the coast. Other common safety hazards include natural hazards such as dangerous fauna (eg snakes), bushfires and physical hazards such as uneven terrain.

Subsistence living, in areas of poverty, often leads to high risk tolerance amongst communities as individuals are often routinely forced to engage in dangerous activities in order to survive, and without having the capacity to implement appropriate provisions to ensure their personal safety. The equipment and materials are rarely subject to any quality control, or are not well understood by the user, and therefore often represent hazards in themselves. Within communities, awareness and education regarding safety hazards and risk management tends to be relatively low. High levels of illiteracy in many areas and linguistic diversity do not facilitate written communication of safety messages. Dangerous work areas typically have to be clearly demarcated with access strictly controlled.

6.2.9 Labour and Working Conditions

The Republic of Guinea has been a member country of the International Labour Organization since 1959 and 79 conventions are currently proposed for ratification. The Labour Code ⁽²⁾ provides a legal framework covering all aspects of labour and working conditions and is considered one of the most modern in West Africa. The Social Security Code ⁽³⁾ governs the collection and distribution of the national social security funds for labour-related health insurance and social initiatives. The Code also details the responsibilities of the employer and how the fund can be used in the event of a work-related accident or illness. A summary of key requirements of Labour law is provided in *Table 6.1* with a comparison with international standards ⁽⁴⁾.

Table 6.1 Summary of Key Aspects of Labour Law

Topic	Summary of provisions	International standards
Discrimination	Labour law prohibits discrimination on the grounds of sex, birth, race, ethnicity, language, political opinions, philosophical or religious beliefs	
Annual leave	Legally mandated annual leave: 2 workdays per month	3 weeks
Working hours	Weekly working hours: 10 hours per day or 48 hours per week	48 hours per week
Rest periods	Mandated weekly rest period: 24	24 consecutive hours each seven days
Working age	Minimum age for admission to full-time employment: 16 Workers and apprentices under the age of 18 are not permitted to work at night, for more than 10 consecutive hours, or on Sundays	15 (14 in selected states)

(1) WHO Country Health Profile – 2006 available at <http://www.afro.who.int/en/guinea/country-health-profile.html> last accessed 11.10.11

(2) The Labour Code, Department of Employment and Social Laws Order No. 003/PRG/SGG/88

(3) L/94/006/CTRN 14 February 1994 Social Security Code

(4) Country Briefing Guinea; The Human Rights and Business Portal; The Danish Institution for Human Rights. 2010

Topic	Summary of provisions	International standards
School leaving age	Age at which compulsory education ends: 12	
Maternity leave	Paid maternity leave: 98 calendar days	14 weeks
Overtime pay	Overtime pay: data not available	1.25 times regular wage

Although this legal framework exists, rules relating to labour and working conditions are recognised to be poorly enforced and child labour is recognised to be a significant issue in Guinea in both rural and urban areas. According to the Danish Institute of Human Rights ⁽¹⁾, approximately 20% of the total working population are children and half of Guinea's children under the age of 15 are employed, many working under hazardous conditions. The Labour Code sets out the right to a minimum wage and the right of the Government to define what this wage is, but a minimum wage has not been defined or adopted to date. In addition, there have been differences historically in the treatment (pay and conditions) between women and men.

The rights to join trade unions, bargain collectively and strike are generally respected in practice, and trade unions play a strong role in Guinean society. However, the high rate of informal labour limits their influence. Only approximately 167,000 workers are unionised ⁽²⁾.

The Guinea Labour Code defines general provisions regarding occupational health and safety (OH&S), including the requirement for companies of 500 or more to have a doctor available on the premises. However, according to the Danish Institute for Human Rights, the Guinean government has not established a set of practical workplace health and safety standards and violations are common ⁽³⁾. The majority of work is carried out using manual labour, rather than mechanized systems or technology. Understanding of basic measures needed to manage occupational health and safety tends to be very low. Significant OH&S training and education programmes are required prior to employing individuals to undertake potentially hazardous work or work in hazardous areas.

6.2.10 The Role of Women

Guinean legislation recognises equality between men and women, and prohibits discrimination on the grounds of sex. Laws exist promoting the equality of men and women in the workplace and equal rights to work, pay and parental leave. Women have the right to vote, the right to access land, the right to inherit their deceased husbands goods and equal rights to education. Violence against women is prohibited under the Penal Code, with some restrictions, and forced marriage is punishable by law.

In practice, however, these laws are rarely upheld. Gender discrimination occurs in the work place and women are generally paid less than men. Sexual harassment is common.

Women also have low levels of social development when measured in terms of literacy, educational attainment and general health conditions. At a national level, 45% of men are literate compared with 14% of women (IMF 2008). At the national level, less than half of girls (48%) who enrol in primary school complete the programme compared to 72% of boys (World Bank 2004). Customary practices in rural areas which mean that women do not have land rights, are not eligible to inherit from deceased husbands, play little part in decision-making, and are customarily given by their parents to early, forced or polygamous marriages, or chosen by their husbands, reinforce this bias. Women are often not able to access land or other productive resources, or engage in income-generating activities. Violence against women and female genital excision is practiced in all regions and among all religious and ethnic groups, typically without a competent medical practitioner and in unhygienic conditions.

(1) Country Briefing Guinea; The Human Rights and Business Portal; 2010

(2) Ibid

(3) Ibid

Women do play a significant role in the economy of the family through livelihood and subsistence activities as noted in *Section 6.2.1*. In many cases, the income of men is used for expenditure associated with housing and family ceremonies, with the women's income paying for food, clothing, healthcare, education and other expenses associated with children. For this reason, women's incomes can be particularly important and any reduction of their incomes can significantly adversely impact the health and well-being of families, and particularly children.

6.2.11 Youth

According to the United Nations General Assembly and World Bank, "Youth" can be defined as a developmental phase where an individual moves from dependence (childhood) towards independence (adulthood) and it typically comprises individuals between the ages of 15 to 24 years⁽¹⁾. Guinean legislation defines adulthood as commencing from the age of 15, and the minimum age for employment in Guinea is 16 years. However, in practice, socio-cultural factors are also important in Guinea, and an individual's transition to adulthood is often considered to be marked by their capacity to sustain a legal marriage. Hence, a twelve-year-old girl in Guinea may be considered an adult in her community, by virtue of marriage, and a 40 year-old unmarried man considered as a youth.

In a recent press announcement, the United Nations General Assembly recognised that young people in all countries are a major human resource for development, and key agents for social change, economic development and technological innovation⁽²⁾, often having the energy and tenacity needed to drive and contribute to better governance, accountability, and development of democracy. However, young people are often faced with challenges relating to inadequate opportunities for education or skill development, poor access to health services, poor job market opportunities and inadequate opportunities to participate in relevant decision-making. Uncertain employment prospects and financial insecurity can lead to young people failing to establish stable personal relationships, postponing marriage, and/or postponing having children. In poor socio-economic conditions, young people may be forced to migrate in search of opportunities. In the absence of a stable social framework, and with inadequate financial resources, young people face risks associated with engagement in illegal activities such as drug trafficking, violent crime, gang activities and other antisocial behaviours including exposing themselves, or others, to HIV/AIDS through practice of unsafe sex.

Internationally, youth policy tends to be aimed towards:

- providing opportunities for young people to access education and training initiatives such as apprentice programs and paid internships;
- ensuring young people are not unemployed or engaged in hazardous or exploitative labour;
- providing access to health services and appropriate information regarding key health risks, with a special focus on HIV/AIDS and STIs; and
- developing mechanisms for consultation and engagement of young people, providing opportunities for participation in relevant decision-making.

The Government of Guinea has recognised and communicated the need to provide employment and livelihood opportunities for young people in Guinea. This need was also recognised by stakeholders during stakeholder consultations on the Simandou Project in September and October 2011, as detailed in *Annex E*.

(1) Curtain (2002), quoted in the [U.N. World Youth Report 2003](http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTCY/0,,contentMDK:20261632~menuPK:565270~pagePK:148956~piPK:216618~theSitePK:396445,00.html) and <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTCY/0,,contentMDK:20261632~menuPK:565270~pagePK:148956~piPK:216618~theSitePK:396445,00.html>

(2) Press Statement from the United Nations General Assembly (GA/SHC/4027) as released on 8th November 2011 on <http://www.un.org/News/Press/docs/2011/gashc4027.doc.htm> . Last accessed 22/11/11

6.2.12 Ecosystem Services

The natural environment of Guinea, including the Project area, offers a range of services and resources of benefit to people and communities that could be affected by the Roads Programme. These ecosystem services include:

- provisioning services, providing products such as food, freshwater, shelter, timber;
- regulating services, giving benefits through processes such as surface water purification, carbon storage and sequestration, climate regulation and protection from natural hazards;
- cultural services, providing non-material benefits through natural areas that are sacred or of importance for recreation and aesthetic enjoyment; and
- supporting services that maintain the other services such as soil formation, nutrient cycling and primary production.

All of these services are provided by the environment of the Project area with their importance and degree of benefit varying according to location. So for example, forests can provide *inter alia* shelter, food, fuel, fibres, medicines, fodder, carbon storage, water purification, sacred sites, protection and formation of soils and nutrient cycling. In many instances these services are linked to aspects of the physical, biological or cultural environment described in preceding sections of the report. The services which are provided by particular locations will be identified and impacts on them assessed in developing proposals for specific sites.

6.3 Prediction, Evaluation and Mitigation of Impacts

Table 6.2 presents the assessment of potential impacts on the socio-economic conditions and health of people and communities, due to the Roads Programme. Impacts are considered under the following headings.

1. Physical and Economic Displacement
2. Economic Development and Employment
3. Cultural Heritage
4. Community Health
5. Community Safety and Security
6. Worker-Community Interactions
7. In-Migration and Resource Use
8. Human Rights
9. Labour and Working Conditions – Employee Health, Safety and Welfare
10. Ecosystem Services

The mitigation measures needed to avoid, minimise, restore and offset or compensate for adverse impacts are also identified in the table. These measures will be implemented, where relevant, in all areas where new or improved roads are planned as advance works for the Project. As part of developing the Site File for each specific road project, local surveys and consultations with local authorities and affected communities will be undertaken to identify and agree any supplementary measures required at particular locations. The results will be reported in the Site Files for each road.

Table 6.2 Prediction, Evaluation and Mitigation of Impacts on People and Communities

Potential Impact	Mitigation Measure	Assessment of Residual Impact
1. Physical and Economic Displacement of People, Property and Other Assets and Resources		
Development of new roads, widening of existing roads, and ancillary works may cause physical displacement of homes or economic displacement of land of beneficial use to local communities, including areas used by individuals or communities for cultivation, grazing, hunting, forest products, water supply, street vendors and other purposes.	- Existing roads will be used where possible to minimise the need for new infrastructure and resulting impacts from physical and economic displacement. - Where existing routes are being improved to provide access, works will be undertaken within the existing road corridor where possible. - The area of new land-take for new roads or road widening, will be kept to the minimum necessary. - The alignment of roads will be designed to avoid displacement of peoples' homes and their community facilities such as market areas, community buildings, wells, schools, places of worship, medical centres, etc as far as possible. Where displacement is unavoidable, decisions will be taken in consultation with the local administration and the local community to ensure their views and wishes are taken into account and to minimise adverse impacts on individuals and communities. - Designs will be developed to minimise displacement of other resources of importance to communities and livelihoods including: - high quality agricultural land including bas fonds and rice fields; - community forests; and - other significant community resources. - If significant disruption to existing settlements and land uses such as agriculture would occur, consideration will be given to the development of local bypasses to minimise adverse impacts. - Where displacement of people, property or beneficial land uses is unavoidable, the Project will develop and agree a plan for resettlement and compensation to ensure that the livelihoods of affected people and communities are restored and where possible improved. These will be developed in consultation with the affected households and the community, and in accordance with the Principles for Resettlement and Community Development for Early Works (see <i>Annex F</i>).	Significant adverse impacts will be avoided through careful selection and design of road routes to avoid areas of existing beneficial use. All land acquisition for road works will be undertaken in compliance with strict principles for managing resettlement, compensation and community development to ensure that affected people's livelihoods are restored and where possible improved.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
2. Economic Development and Employment Opportunities		
Construction of roads will offer opportunities for employment of local people with the necessary skills and experience although community relations may be adversely affected if employment opportunities are not managed in an appropriate and transparent manner. Development of new and improved roads is likely to enhance the accessibility of jobs and markets and of services such as education and health, bringing benefits for local people.	8. An Employment Plan will be developed to define requirements and procedures to be followed when identifying and developing Project employment opportunities, managing employees, recording and reporting employment data, terminating work contracts, and other labour-related issues. This plan will comply with the Guinea Labour Code. 9. The Employment Plan will take into account expected fluctuations in demand for employment and local community expectations during different phases of development of roads. 10. The Employment Plan and any local employment opportunities will be communicated in a transparent and culturally appropriate manner. 11. When advertising employment opportunities, the Project will clearly define the skills, qualifications and experience required for the available positions and refer candidate to the local employment offices. 12. All employment-related decisions, including hiring, placement, promotion, benefits, training, discipline and dismissals, will be based solely on the skills, experience, performance and qualifications of employees and applicants. 13. Local Employment Offices will be established at key locations to facilitate access to employment opportunities for local candidates with appropriate skill-sets and to discourage in-migration to remote or sensitive areas. 14. Unskilled labour will be preferentially hired from the local communities. 15. A vocational training plan will be prepared to provide training to local people to increase their eligibility for employment. In addition, selected community employees will receive skills training to allow them to progress from unskilled to semi-skilled/skilled positions.	Recruitment and employment will be carefully managed so as to maximise potential opportunities and resulting benefits for local people, but also to manage community expectations in this regard and avoid potentially significant impacts. There are likely to be benefits for local communities from enhanced accessibility created by new and improved roads.
Procurement of local and Guinean goods and services for roads would assist local economies, livelihoods and incomes. However, it could also deplete resources available for other members of the community, decreasing food and resource	16. Opportunities for sustainable local procurement of goods and services to support road construction will be identified wherever possible and measures will be devised to maximise the potential of these opportunities. Key community decision-makers will be consulted as part of identifying and developing opportunities. 17. The Project will work with suitable partners in Guinea to identify suitable suppliers	Procurement of local goods and supplies will be carefully managed to maximise the potential for positive economic benefits for local communities and will ensure that significant adverse impacts are unlikely to

Potential Impact	Mitigation Measure	Assessment of Residual Impact
security and leading to localised price inflations.	and, where relevant, implement initiatives to support local capacity building. 18. Local prices may be monitored to identify any areas where local availability of resources has been adversely affected by Project procurement.	occur.
3. Cultural Heritage		
The construction and use of new roads, widening of existing roads and ancillary works may lead to: - displacement or damage to cultural heritage sites within the boundary of the works; - harm to the value, amenity or setting of sites and features in the vicinity of the works; and - restrictions on access to such sites. Sites and features of cultural importance could include tangible features such as buried archaeology, (both already known and sites discovered during the works), natural features (trees, rocks, water), standing buildings or other structures including places of worship or pilgrimage, and sites with associations to historic events (battles, migrations, etc). Cultural heritage values can also include intangible values such as local traditions and practices, which could be disturbed or interrupted by the works or the intrusion of new	19. A Cultural Heritage Management Plan will be implemented for the Project. 20. Roads will be planned and designed to minimise displacement of sites of importance for cultural heritage including historical or archaeological sites and sites of significance for local culture and traditions. 21. All works will be located at least 100 metres from any identified heritage site where possible. If this is not possible, effective protection and management measures will be devised on a case-by-case basis. 22. In developing specific road proposals, field surveys and consultation with local communities will be carried out to identify any sites or features of importance for cultural heritage. This will include both tangible features or sites, and locations of intangible cultural importance. 23. Although the potential risk of encountering buried archaeology is low, the Project will operate a "Chance Finds" procedure in accordance with IFC Performance Standard 8. 24. If any finds are encountered, work will cease immediately and temporary protection of the area will be established. The find will be reported to the Simfer Communities Team and relevant specialists will be appointed to determine an appropriate course of action. 25. The location of any identified sites will be recorded and mapped using GIS for future reference when planning site developments and ground disturbance. Knowledge of the exact location and significance of any sites will be restricted to the minimum number of people required to ensure effective protection of the area. 26. If the alignment of a road is located close to an area of importance, the area will be clearly demarcated to prevent encroachment by Project personnel or activities and to protect it from accidental disturbance. Such sites will be inspected regularly to confirm no inadvertent or unreported damage has occurred and to identify any risk of harm from the Project. 27. If a site or feature of cultural importance cannot be avoided, effective mitigation	Likely significant impacts on cultural heritage will be avoided through careful selection and development of road routes to avoid areas of importance. Potential impacts on intangible cultural heritage will be carefully managed and avoided where possible by minimising the potential for inappropriate interactions between workers and communities and enforcing an appropriate Code of Conduct.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
people and practices into an area.	measures will be devised on a case-by-case basis in consultation with the local community. 28. If a cultural heritage site is damaged in any way, this will be treated as an incident, and will be investigated and managed in accordance with the approved incident management procedures established for the Project. If any grievance should arise in this regard, this will be managed in accordance with the approved Grievance Procedure established for the Project. 29. All Project personnel will be required to respect local cultural traditions and religious festivals, funerals and other traditional events. Induction training for all personnel will include appropriate cultural awareness training. 30. Inspections will be carried out during the works and after their completion to verify that measures have been implemented as planned.	
4. Community Health		
Pollution of air, water or soils and release of hazardous substances during construction could cause adverse impacts on the health and welfare of people in the surrounding area. Inappropriate management of construction waste could lead to increased occurrence of pest species (including vermin, flies, mosquitoes).	31. A high standard of housekeeping will be maintained at all times in all construction work areas. 32. Pools of standing water will be avoided to minimise the availability of breeding grounds for mosquitoes. 33. Ongoing maintenance of work areas will include regular inspections for pest species. Appropriate management strategies will be implemented to manage any pests that may arise and may include use of approved pesticides <i>etc.</i> Methods used to control or prevent pests will not cause adverse impacts on the environment or communities. 34. Risk of water-borne diseases will be minimised using appropriate treatment methods for water. Risks to the health of people caused by pollution of air, water and soils or from use of hazardous materials and disposal of hazardous waste during construction and from soils for Project vehicles during operation, will be managed in accordance with the measures set out in <i>Chapter 4</i>.	Populations of pest species and vectors of disease will be carefully managed to minimise the potential spread of illnesses and infective diseases.
Interaction between construction workers and communities could lead	35. A health management system will be established to ensure that all construction workers are fit for work and illnesses are not introduced by Project personnel	Inappropriate behaviour by Project personnel will be

Potential Impact	Mitigation Measure	Assessment of Residual Impact
to increased occurrence and transmission of communicable diseases. Prostitution may lead to increases in prevalence of sexually transmitted diseases (STDs) including HIV/AIDS. Lack of awareness and education concerning health hazards may contribute to a rise in the spread of communicable diseases during the construction phase of the Project.	coming into contact with local people. 36. When undertaking risk assessments for occupational health hazards potential impacts on community health and safety will be considered alongside worker health and safety, and mitigation measures will be adopted, including health surveillance where appropriate, to provide appropriate levels of protection. 37. All Project personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS and malaria along with the prevention and mitigation measures required. 38. Awareness posters regarding relevant hazards, including HIV/AIDS and malaria, will be posted and maintained in areas regularly used by workers. 39. Workers will be encouraged to attend HIV Awareness Programmes offered by the Project. The programmes will be developed in consideration of demands for prevention measures, awareness and education, voluntary counselling, testing, treatment, monitoring and evaluation. 40. Partnerships will be actively sought with specialist external organisations to deliver HIV education, awareness raising and treatment to employees, their dependents and the broader community.	carefully managed to minimise the potential spread of illnesses and infective diseases. Specific efforts will be made to manage risks associated with HIV/AIDS in accordance with established Rio Tinto standards.
5. Community Safety and Security		
Unauthorised access to work sites by members of the community, could lead to individuals being exposed to safety hazards such as excavations (trenches etc), hazardous materials, electricity, equipment and construction traffic.	41. Access to all work areas will be strictly controlled using appropriate security provisions. Work areas will be clearly demarcated and signposted using pictorial signage to indicate and communicate hazards. 42. All risk assessment and emergency response planning will consider potential impacts on local communities and measures needed to ensure the safety and security of individuals in this regard. 43. Local authorities and affected communities will be provided with appropriate information communicating the nature and extent of any potential risk and impacts resulting from Project activities and procedures to be followed in the case of an unplanned accident or emergency. Training will be organised where necessary, as identified by means of risk assessment.	Effective management of occupational safety and non-routine safety risks, along with site security, will ensure that risks associated with work activities are minimised and local communities are not exposed to potentially significant impacts.
Inappropriate behaviour by security personnel during construction could compromise the safety and security of	44. Security personnel and all security arrangements will be managed in compliance with the Voluntary Principles on Security and Human Rights, developed by companies in the extractive sectors together with governmental and non-	Trained, competent and adequately supervised security personnel will minimise the

Potential Impact	Mitigation Measure	Assessment of Residual Impact
individuals from local communities.	governmental organisations. 45. Security personnel will be screened prior to employment by means of detailed interviews and inquiries will be made to investigate previous employment experience and records to avoid those who have previously been involved in abuse or violation of human rights. 46. Work procedures, including a Code of Conduct, will be defined for security personnel defining expected and accepted behaviours and practices. These procedures will be communicated as part of induction and appropriate training will be provided to ensure ongoing adherence to Project requirements and expectations in this regard. 47. The Project will develop appropriate disaster and emergency response plans. Security personnel will receive appropriate training regarding the different security-related scenarios that might arise, procedures to be followed in the case of each scenario, their roles and responsibilities during an emergency/security incident, and appropriate responses to different emergency scenarios that might arise. 48. Appropriate supervision will be provided by senior competent personnel to ensure that established procedures are being applied by security personnel and training has been understood by the relevant security personnel. 49. Firearms will be strictly forbidden at any work area. Security personnel will not be permitted to carry firearms or knives. 50. If community members express grievances in relation to the conduct of security personnel or activities, the Project will respond to the grievance in accordance with the Project's established Grievance Procedure. 51. Security arrangements will be explicitly communicated to all relevant stakeholders including workers and representatives of affected communities.	potential for safety and security risks and impacts affecting local communities.
Development of roads is likely to lead to increases in traffic and an increase in the risk to members of the community and livestock from accidents involving Project or other vehicles.	52. The route of new and improved roads, will be planned in consultation with the local administration and the local community to include appropriate provisions for pedestrians, livestock, Project traffic and local traffic. 53. Local people will be made aware of hazards associated with increased traffic on new and improved roads, and provided with appropriate information regarding safety provisions.	Significant adverse impacts on people and communities will be avoided through appropriate design of roads, driver training and ongoing communications with communities and local

Potential Impact	Mitigation Measure	Assessment of Residual Impact
	54. Project personnel will be provided with regular driver training and competency testing regarding driving rules, speed limits and relevant emergency procedures. 55. Project personnel will work with the local authorities to communicate any hazards associated with the use of roads by Project personnel or vehicles and will adhere to any requirements of local authorities in this regard.	authorities.
6. Worker-Community Interactions		
The presence and activities of Project personnel could lead to communities feeling threatened. They may experience, or perceive, an increased risk of privacy invasion, crime or violence. Relations with the local community could be disturbed because of prostitution, gambling, drug abuse, and other antisocial or culturally unacceptable behaviours. Unauthorised movements by Project personnel outside work areas may lead to acts of trespass and damage to local land, crops or property. Influx of Project personnel and people looking for work may lead to reduced community cohesion as new cultures, traditions and customs are introduced to an area.	56. Local stakeholders will be consulted prior to commencing activities: - to understand their views regarding the siting and management of the specific road works and associated infrastructure; - to ensure the administration and communities are aware of the activities that are planned and any impacts that may occur; and - to agree any management measures that may be required taking account of specific local factors, conditions, or stakeholders. 57. All Mobile Field Camps for construction workers will be operated as closed camps with controlled entry and exit for non-local workers. Transport between camps and work areas will be strictly controlled. Non-local workers will only be permitted to leave work areas on specific work-related missions authorised by an appropriate supervisor. Appropriate levels of security will be provided at all camps and work areas to ensure that this policy is upheld. 58. Appropriate catering and recreational facilities will be provided so that work crews are self-sufficient and do not need to enter local communities for facilities or amenities. 59. If significant interaction with communities is required, the work team will be accompanied by a member of the Simfer Communities Team. 60. A Code of Conduct for Project Personnel will be developed detailing rules to be upheld to minimise the risk of anti-social behaviours. Appropriate disciplinary procedures will be developed and enforced to ensure that the Code of Conduct is upheld by all Project personnel. 61. All Project personnel will be provided with appropriate induction training that will include communication of the Code of Conduct, associated disciplinary procedures, and any cultural sensitivities relevant to worker activities and work	The potential for unauthorised interactions with communities will be minimised and any such interactions will be carefully managed in an appropriate manner to avoid potential adverse impacts on people or communities.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
	areas. 62. Induction training will also include communication of the procedures in place to ensure appropriate management of grievances and the requirement for all personnel to report any grievance within 24 hours of receipt. 63. The Simfer Communities Team will co-ordinate appropriate investigation and resolution of all grievances within a reasonable timeframe in accordance with the Simandou Project's established and approved Grievance Procedure.	
7. In-Migration and Resource Use		
Individuals may migrate to the area of construction works or be encouraged into areas made more accessible by new and improved roads seeking employment and economic opportunities. This influx of new people to existing communities could lead to conflicts, with existing communities and increased demand for resources could place increasing demands on limited local resources and infrastructure. This could overwhelm existing provision or cause price inflation. Resources may include food, housing, other goods, infrastructure, services and natural resources such as firewood, medicinal plants, water and forest products. Depletion of food and water supplies could lead to adverse impacts on community nutrition.	64. Project personnel will adhere to national policies and legislation regarding free movement of individuals and open borders between the Economic Community of West African States (ECOWAS). 65. The route of new and improved roads will be planned in consideration of risks associated with providing access to remote areas where communities would be adversely affected by in-migration. 66. Decisions will be taken in consultation with the local administration and the local community, including local security personnel, to ensure their views and wishes are taken into account to minimise adverse impacts on individuals and communities. 67. If significant disruption to existing settlements and land uses such as agriculture would occur, local bypasses will be provided where possible, to minimise adverse impacts. 68. All employment will be managed via Local Employment Offices, which will be established in existing large settlements with capacity to accommodate population growth. Any individuals who approach work areas will be referred to the nearest Employment Office. No employment will be offered directly at Project sites. 69. An influx/in-migration management plan will be developed for the Project in consultation with the relevant local authorities setting out measures to manage in-migration to avoid adverse impacts on local communities. 70. Changes in local populations and demographics may be monitored where in-migration is considered a significant risk. 71. Supplies will be obtained locally where there are sustainable local sources	Development of local employment offices and careful management of employment opportunities will help minimise potential in-migration of individuals seeking job opportunities. Ongoing vigilance and strategy development will continue during the course of the Project to inform developing management plans in this regard at a local level.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
	available but will be imported into the area where suitable local resources are not available. 72. Measures will be taken to ensure that abstraction of water for road constructions will not lead to significant adverse impacts on water resources for local use.	
8. Human Rights		
Inappropriate management of Project personnel could lead to real, or perceived, curtailment of worker human rights (eg right to liberty).	73. Employment during road construction will be managed so as to: • comply with the Universal Declaration of Human Rights and Rio Tinto's Global Human Rights Policies; • comply with all relevant legislation (including the Guinean Labour Code) and International Labour Organisation (ILO) conventions; • ensure appropriate management of labour-related risks; and • adhere to the Voluntary Principles on Security and Human Rights, as devised by companies in the extractive sectors together with governmental and non-governmental organisation. 74. Use of child labour will be strictly forbidden during construction. Contractors, suppliers and recruitment agencies will not hire workers under the age of 16 and employment of young workers between 16 and 18 years will only be for light work of limited duration, where the work does not interfere with education, and is not dangerous or harmful to the physical, mental or moral development of young workers. 75. Use of forced labour will be strictly forbidden during construction. Everyone will be allowed free choice to accept or reject opportunities of employment. 76. Labour and working conditions will be clearly communicated to potential workers as part of the recruitment process and will include communication of conditions relating to the closed camp policy and key relevant worker hazards and risks. 77. Workers will have the right to form and to join trade unions and create their own worker committees and worker representatives in accordance with the requirements and rights set out in the Guinea Labour Code. 78. Salaries will be just and favourable ensuring the worker and the worker's family have an existence worthy of human dignity. 79. Discrimination because of race, colour, sex, language, religion, political or other	Worker rights and working conditions will be clearly communicated to construction workers in a transparent manner prior to commencement of employment, and enforced by employers, to ensure adherence to established norms and international standards. Appropriate auditing will be undertaken by Project personnel to monitor compliance in this regard and ensure that significant impacts do not occur.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
	opinion, national or social origin, property, birth, actual or perceived HIV status or other status will be strictly forbidden. 80. HIV/AIDS screening will not be a requirement for recruitment or a condition of employment. 81. Requirements relating to Human Rights will be clearly communicated to all relevant personnel as part of training, and incorporated into labour contracts. 82. Appropriate levels of auditing and verification will be carried out to monitor compliance with these requirements. 83. The Project will establish appropriate procedures facilitating the reporting of non-compliances and grievances by Project personnel and stakeholders and ensuring that any reported incidents are addressed in an appropriate and culturally sensitive manner.	
9. Labour and Working Conditions - Employee Health, Safety and Welfare		
Inappropriate management of occupational health and safety hazards could lead to unsafe working conditions and accidents, injuries or illnesses amongst workers. Mental health issues associated with remote/enclosed living may arise <i>eg</i> low morale, isolation and loss of family attachments, boredom, stress, anxiety or a general reduction of wellbeing. Differences in nationality, religion, ethnicity and gender may lead to discrimination and harassment during daily work. Resentments may arise if working conditions vary between different worker groups and these variations cannot be appropriately justified.	84. Employment procedures and conditions during construction will conform to international standards with respect to protection of human rights, as set out in the previous section. 85. Employment practices and working conditions will conform to the requirements of IFC Performance Standard 2 (Labour and Working Conditions), the Government of Guinea Labour Code and ILO Standards. 86. Worker accommodation will be designed taking into consideration the guidelines developed by the IFC and European Bank for Reconstruction and Development (EBRD). 87. Appropriate facilities and rest and recreational time will be provided to allow workers to manage fatigue and engage in recreational activities. 88. Rules with respect to alcohol consumption and drug prohibition will be defined, to ensure that all Project personnel are fit for work and do not pose a danger to themselves or others. 89. Where different standards of accommodation are provided, procedures will be established governing allocation of accommodation and will be documented and communicated in a transparent manner to all affected personnel. Allocation of accommodation based on ethnicity or nationality will not be permitted.	Employee health, safety, welfare and working conditions will be managed in accordance with international good practice standards to ensure that significant adverse impacts do not occur.

Potential Impact	Mitigation Measure	Assessment of Residual Impact
	90. Strict procedures will be adopted for hazard identification and risk assessment and for definition and implementation of appropriate mitigation measures to ensure a safe workplace. Relevant information will be communicated to all Project personnel. 91. A comprehensive health and safety plan will be developed prior to commencement of any activities to ensure that employees are aware of the risks associated with activities. 92. The Project will establish strict procedures facilitating the reporting of health and safety incidents and ensuring that any reported incidents are addressed in an appropriate and culturally sensitive manner. 93. A fair, transparent, culturally appropriate and accessible Grievance Procedure will be available to all workers.	

6.4 Summary of Key Issues

The key issues and mitigation measures identified relating to impacts of the Roads Programme on people and communities are summarised below.

6.4.1 Physical and Economic Displacement and Economic Development

The development of new roads, widening of existing roads and ancillary works will cause physical and/or economic displacement of land and other assets used by local communities. The alignment of roads will be developed to avoid loss of homes and other land of importance to communities and their livelihoods wherever possible. The areas of land affected will be kept to the minimum necessary for the works. Where impacts cannot be avoided, land will be acquired from affected people in accordance with international good practice as set out in principles presented in *Annex F* of this Report (Principles for Resettlement and Community Development).

Positive impacts may also occur due to road development as construction activities will offer opportunities for local employment and new/improved roads will facilitate better connectivity with surrounding areas, increasing access to jobs and markets, especially for the young, and providing opportunities for trade and associated economic development.

6.4.2 Economic Development and Employment

Opportunities for local employment and sustainable use of local goods and services during construction of roads will be identified wherever possible and measures will be devised to maximise the potential for local hiring and procurement. Key community decision-makers will be consulted as part of identifying and developing these opportunities. Unskilled labour will be preferentially hired from the local communities but all enquiries for employment will be referred to Project Employment Offices in nearby towns and there will be no direct hiring of workers at work areas. All speculative applications will be referred to the nearest employment office.

Monitoring will be carried out to identify areas where local availability of resources has been adversely affected by Project procurement. The Project will also work with suitable partners to support local capacity building.

The enhancement in accessibility provided by new and improved roads will provide benefits for local communities in terms of access to jobs, markets and services such as education and health. The benefits for local communities from improved access, and also the possible threats to traditional lifestyles and community structures, will be considered in developing plans for road development.

6.4.3 Cultural Heritage

The alignment of roads will be developed to avoid culturally sensitive locations such as sacred sites, places of worship and sites linked to local traditions and practices. If any cultural artefacts are discovered during construction, work will stop, appropriate investigations will be undertaken, and any necessary measures will be taken to mitigate any losses. When this occurs, the potential for location-specific impacts will be considered in consultation with the local administration and communities and presented in the Site File for each location. The Project Cultural Heritage Management Plan documents these processes.

6.4.4 Community Health, Safety and Security

The introduction of construction workers to remote areas could adversely affect local communities by introducing or transmitting diseases into new areas. Increased risk of malaria could occur if construction activities such as ground clearance lead to the creation of areas of standing water offering breeding grounds for mosquitoes.

The safety of the public and local affected communities will be ensured through clear demarcation of all work areas, careful management of on-site conditions, strict control of access within these areas and public safety awareness training sessions for project personnel prior to commencement of construction and during operations. Specific attention will be given to prevention of malaria risk by avoiding creation of standing water in work areas. Ongoing maintenance of work areas will include regular inspections for pest species. Risk of water-borne diseases will be minimised using appropriate treatment methods for drinking water.

A health management system will be implemented to ensure that all construction personnel are fit for work and illnesses are not introduced by personnel encountering local people. All personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS and malaria, along with the prevention and mitigation measures required. Partnerships will be actively sought with specialist external organisations to help deliver HIV education, awareness raising and treatment to Project personnel, their dependents and where appropriate, to the broader community.

During construction and operation, risks to local people and livestock from accidents involving Project vehicles will be minimised through careful route planning, training of Project drivers, application of speed limits on Project vehicles travelling through settlements, and dissemination of road safety information to local communities.

Emergency plans will be prepared for the construction period and for Project vehicles during operation, taking into account potential impacts on local communities and measures needed to ensure the safety and security of individuals in this regard. Local authorities and affected communities will be provided with appropriate information communicating the nature and extent of any potential incidents that could arise and procedures to be followed in the case of an unplanned accident or emergency.

Maintenance of security can be an issue at new developments because of the behaviour of inadequately trained security personnel. To avoid this, all security personnel on the Simandou Project will be screened prior to employment by means of detailed interviews and enquiries into previous employment to avoid those who have previously been involved in abuse or violation of human rights. All security personnel will receive training regarding work procedures and on Project expectations for security behaviours and practices.

6.4.5 Interaction with Local Communities, In-migration and Resource Use

Locating roads close to communities presents both risks and opportunities for local people. Changes in accessibility and increased development in local communities can lead to breakdown in existing community structures and livelihoods, increased pressure from in-migration, and erosion of cultural practices and traditions. However, benefits can include improved access to jobs and markets, employment for local people and opportunities for local businesses to supply goods and services can offer advantages in terms of economic development. New and improved roads can also improve mobility, enabling people to access new sources of jobs and new markets for products and to interact with new communities. If appropriately managed and directed these opportunities can be of particular benefit to women and the young. Prior to commencing activities, local communities will be consulted during planning of roads to ensure their views are taken into account and they understand the scale and nature of the proposed developments. Risks of in-migration having an adverse impact on local communities and economies will be carefully considered in road alignment and design.

Movement of non-local workers during road construction will be strictly controlled to prevent inappropriate interaction with local people and a strict Code of Conduct governing activities and behaviour will apply to all Project personnel. All personnel will receive training in these requirements.

Construction will be organised so that unsustainable demands are not placed on limited local resources, facilities or amenities. If any significant interaction with communities is required, the construction personnel will be accompanied by a member of the Simfer Communities Team.

A Grievance Procedure will operate for receipt, handling and resolution of any grievances expressed by local people. This will be freely accessible to all, transparent, culturally appropriate and without retribution. The

Simfer Communities Team will co-ordinate appropriate investigation and resolution of all grievances within a reasonable timeframe in accordance with the Simandou Project's established and approved processes.

6.4.6 Human Rights, Gender and Youth

Employment procedures and conditions during road construction will conform to Guinean Law, international conventions and Company standards with respect to protection of human rights to ensure the health, safety and welfare of all workers. Use of child and forced labour and discrimination during recruitment and employment (including discrimination on grounds of gender, ethnicity, religion or age) will be strictly forbidden but opportunities will be sought to provide opportunities for women and the young. Everyone will be entitled to free choice to accept or reject opportunities of employment. Labour and working conditions will be clearly communicated to potential workers as part of the recruitment process. Workers will have the right to form and to join trade unions, create their own worker committees and appoint worker representatives in accordance with the rights set out in the Guinea Labour Code. HIV/AIDS screening will not be a requirement for recruitment or a condition of employment.

Requirements relating to human rights and discrimination will be clearly communicated to all construction personnel as part of training, and incorporated into labour contracts. Appropriate levels of auditing and verification will be carried out to monitor compliance with these requirements.

6.4.7 Employee Health, Safety and Welfare

Strict standards will be applied for protecting the health, safety and welfare of all personnel employed during construction. Health and safety incidents will be reported, investigated and addressed in an appropriate and culturally sensitive manner. Appropriate rest and recreational time will be provided to allow workers to manage fatigue and engage in recreational activities. A fair, transparent, culturally appropriate and accessible Grievance Procedure will be available to all workers.

6.4.8 Ecosystem Services

In developing plans for specific roads consideration will be given to the potential impact of construction on ecosystem service of importance to the local community. Where significant impacts could occur services and resources of importance for communities will be protected and if adverse impacts cannot be avoided alternative provisions will be made to compensate for adverse effects.

In particular where development of roads would impact on natural buffer areas such as wetlands, mangroves and upland forests that mitigate the effects of natural hazards such as flooding, landslides and fire, and thus result in increased risks to community safety, or where adverse impacts on the quality, quantity, and availability of freshwater could result in health-related impacts, measures will be taken to prevent these impacts through design and management of construction activities. Impacts on sources of shelter, food, fodder, timber or other natural resources and on cultural services provided by the environment, will be mitigated by the measures designed to protect biodiversity and cultural heritage. All mitigation for specific sites will be developed in consultation with the local community.

7 Management of Social and Environmental Impacts and Risks

7.1 Introduction

This chapter sets out how the Project will deliver the mitigation measures identified in the preceding chapters and any site-specific additional mitigation identified for individual roads. This will be done through the Project's overarching Management System, a Social and Environmental Management plan (SEMP) for the Roads Programme, and Site Files for individual locations.

Simfer has been operating in Guinea for more than 10 years. Over that period, robust procedures have been developed to manage social and environmental risks and impacts associated with exploration activities. These procedures form part of an integrated Health, Safety, Environment and Communities Management System (HSEC-MS) that has been developed to conform to relevant Rio Tinto ⁽¹⁾, IFC ⁽²⁾ and legal requirements. This HSEC-MS provides a framework to ensure systematic identification and management of social and environmental aspects of the Project in accordance with the requirements of the international standard for Environmental Management Systems ISO14001. The HSEC-MS sets out:

- the Project's policy, objectives, programme and targets for achieving continuous improvement in social and environmental performance;
- the way in which the Project identifies social and environmental impacts and risks and the legal and other requirements that apply to Project activities;
- the allocation of roles and responsibilities for social and environmental performance and how the Project ensures that people are qualified and competent to fulfil these responsibilities;
- how the Project communicates internally and with its external stakeholders;
- how the Project achieves operational control over its performance and prevents and responds to emergencies through detailed plans and procedures; and
- how the Project monitors and evaluates its performance.

This Management System will be used to ensure that all the mitigation measures identified in this SEIA, together with any other requirements deriving from national legislation, or from international conventions and other agreements or standards relevant to the Project, are implemented during the design, construction, operation and, where appropriate, closure of roads.

7.2 The Social and Environmental Management Plan for the Roads Programme

To support the management system, all the mitigation measures identified in this SEIA Report have been captured in a Social and Environmental Management Plan (SEMP) for the Roads Programme. A draft of this document is presented in *Annex J* and is based on the generic mitigation measures identified within this SEIA Report.

7.3 Development of Site Action Plans

A Site File will be developed for each road to record any site-specific mitigation that may be necessary to address particular local issues identified during the detailed planning of each road and in consultation with the local administration and the local community. The Site File together with the general SEMP will form the

(1) Rio Tinto HSEQ Management System Standard (Rio Tinto Group, Version 2, 2006 which is consistent with ISO 14001 (Environment), OHSAS 18001 (Health and Safety), AS/NZS 4801 (Health and Safety) and ISO 9001 (Quality)

(2) International Finance Corporation, (2012), Performance Standard 1: Assessment and Management of Social and Environmental Risks and Impacts

Site Action Plan for each road, will comply with the requirements set out in *Table 7.1* and will include a detailed Monitoring and Auditing Plan as outlined in *Annex C*.

Table 7.1 Summary of Relevant Requirements Relating to SEMP and Action Planning

Source	Relevant Requirements
IFC Performance Standard 1	A Social and Environmental Management Plan will: • be consistent with the organisation's policy and objectives; • describe mitigation and performance improvement measures and actions with a view to addressing all relevant social and environmental risks and impacts; • incorporate/reflect a combination of operational procedures, practices, plans, legal agreements and other related supporting documents; • be applied across the project and organisation taking into account primary suppliers and contractors affiliated with the company, as well as encompassing all relevant sites, facilities and activities relating to the project; • reflect the outcome of any relevant consultations with affected communities; • facilitate compliance with applicable national and international laws and regulations, as well as with the requirements of IFC Performance Standards (PS) 1 - 8 ⁽¹⁾; • be developed to a level of detail and complexity commensurate with the risks and impacts identified; and • include mechanisms by which individuals can respond to the results of ongoing monitoring and review, and any unforeseen events or changes in circumstances.
	A SEMP will include: • required actions and/or required outcomes as and where appropriate; • prioritisation of actions; • measures of performance, where possible, using a combination of performance indicators, targets, or acceptance criteria to facilitate ongoing mitigation and monitoring over defined time periods; • estimates of suitable resources required for implementation; and • clear definition of responsibilities recognising, where relevant, the role of third parties.
Rio Tinto's HSEQ Management System Standard	Management plans will include: • clear identification and categorisation of actions; • formal agreement that the actions will be implemented; • prioritisation of actions; • assignment of responsibilities, resources and schedules for implementation; • implementation of actions The following actions will be undertaken to help ensure implementation of action plans: • tracking and reporting against implementation; • monitoring and verifying the effectiveness of the actions implemented and ongoing communication of action status; and • analysis of trends to communicate long term performance.

(1) International Finance Corporation Updated Sustainability Framework, 2012

7.4 Resources and Responsibilities

Rio Tinto will be responsible for ensuring that the environmental and social standards and commitments described in this document and set out in the SEMP and individual Site Action Plans are implemented by all parties involved in the work, including relevant contractors and subcontractors, where appropriate.

The Project Director will have overall accountability for ensuring that all activities are carried out in compliance with legal requirements, international standards, the HSEC-MS, SEMP and Site Action Plans. As part of this role, the Project Director will ensure that adequate financial and technical resources are allocated to ensure appropriate development, maintenance and implementation of the HSEC-MS, SEMP and Site Action Plans for the Roads Programme.

The Project Director will also ensure that appropriate arrangements are made to maintain training, competency and awareness for all Project personnel. Competency profiles and selection criteria will be developed for all roles in consideration of requisite training, education, skills and/or experience.

Health, Safety, Environmental and Social Specialists will support the ongoing operation of the HSEC-MS and ensure that all relevant requirements are clearly communicated to Project personnel. Procurement Specialists and Human Resources Specialists will support the development of effective and transparent systems for management of suppliers, contractors and labour-related issues. These specialists will regularly audit and inspect activities to verify and communicate compliance with legal requirements, international standards (including IFC and Rio Tinto standards) and Project-specific requirements.

At a local level, the Senior Manager responsible for each road project will be responsible for implementation of the Site Action Plan for each road and for ongoing supervision of day-to-day activities.

At various stages of the project, contractors will be commissioned to undertake specific activities. These contractors will only be engaged on the condition that they operate at all times in accordance with the Project HSEC-MS, take ownership of the risks and potential impacts associated with their activities, implement the mitigation measures that are required, as detailed in the Site Action Plans, and effectively manage risks and potential impacts. The Senior Manager responsible for each road project will provide sufficient oversight to ensure that this occurs and social and environmental impacts and risks are managed in an appropriate manner.

7.5 Management of Change

If circumstances at a site change, the Senior Manager responsible for each road project will be responsible for ensuring that the Site Action Plan is reviewed so that it remains appropriate to the impacts and risks associated with the specific road. All changes will be documented, communicated and approved prior to implementing the change in accordance with the Project HSEC-MS. The Action Plan will also be reviewed in the event of any adverse occurrences or incidents, to ensure that appropriate measures are taken to prevent recurrence. Information will be shared with other locations so that they can also implement necessary measures.

7.6 Monitoring and Audit

Monitoring and auditing processes will be implemented to check the implementation and effectiveness of mitigation measures and determine compliance with agreed standards set out in *Chapters 4, 5 and 6*. The Site Action Plan will ensure significant risks are adequately monitored and actions taken. This will include weekly work area inspections to check implementation of mitigation measures at a local level, quarterly audits and an annual review of the adequacy of the HSEC-MS.

- Work area inspections will check that measures are being implemented on a routine basis.
- Quarterly audits will be undertaken to check that the Site Action Plans are being implemented. The scope of these audits will be clearly defined using a risk-based approach and will focus on high-risk

areas and activities associated with each road. An audit team will be appointed for the Roads Programme and will develop an audit programme and protocol covering all roads. Audits will examine:

- specific management plans or other documents, where required under the SEMP eg Waste Management Plan, monitoring plans, procedures;
 - specifications, drawings and finished works to show that mitigation measures have been planned into the design of the works and implemented;
 - permits demonstrating that appropriate authorisations have been obtained prior to work commencing;
 - monitoring records to check that environmental standards are being met;
 - incident records verifying that incidents are being reported effectively, and appropriately investigated and corrective and preventive actions identified; and
 - other records to demonstrate that required activities have been carried out eg inspection reports, reports of pre-construction surveys, records of community liaison, training records.
- Annual reviews will be undertaken to check that the Project's policy, objectives and targets are being met and will include assessment of:
 - the effectiveness of the Project HSEC-MS, including procedures relating to definition of responsibilities, allocation of resources and verification of competency;
 - implementation of mitigation and monitoring measures set out in the SEMP and Site Action Plans;
 - compliance with legislative and regulatory requirements and standards, including any licences, permits and obligations arising from these;
 - implementation of resettlement and compensation of people affected by physical or economic displacement in accordance with the Principles for Resettlement and Community Development for Simandou Early Works and with detailed resettlement and compensation plans for each road;
 - implementation of appropriate actions for engagement with external stakeholders in compliance with the Simandou Project Stakeholder Engagement Plan;
 - satisfactory operation of the Grievance Procedures for external stakeholders and workers; and
 - implementation of corrective actions identified through the work area inspections and audits.

The results of annual reviews will be made available to the public as part of the annual Sustainable Development Report for the Simandou Project.

Appropriate corrective and / or preventive measures will be defined, initiated and tracked through to completion for all issues identified during the course of any inspection, audit or review, in accordance with procedures laid out in Simfer's HSEC-MS.

Annex A

Study Team

A1 SEIA Study Team

Topic	Name	Organisation	Role/ Title	Qualifications	Years
Project management	Karen Raymond	ERM	Project Director and Environmental Impact Lead	B.Sc. Chemistry M.Sc. Environment and Pollution Control IEMA Principal EIA Practitioner IEMA EIA Practitioner Examiner	38
	Sabine Hoefnagel	ERM	Social Impact Lead	M.Law University of Amsterdam M.Law, University of New York	15
	Richard Fontaine	SNC-Lavalin	Baseline Study Team Director	B.Sc.A. (Forest Eng.) M.Law MBA	21
	Robert Auger	SNC-Lavalin	Baseline Study Team former Project Manager	B.Eng., MSc.A. (Civil Eng.)	21
	Libby Schroenn	ERM	SEIA Social Lead	B.E Economics, Industrial Psychology B.Com Economics, Environmental Economics	15
	Alec Martin	ERM	SEIA Environment Lead	B.Sc. Physical Geography M.Sc. Sustainable Management of Water Environment	10
Mine Team	Peter Southern	ERM	Component Director	B.Sc. Murdock University	30
	Camille Maclet	ERM	Component Manager	M.Eng. Environmental and Earth Resources Engineering	15
Rail Team	Eamonn Barrett	ERM	Component Director	B.A. Anthropology PhD Tropical Ecology	25
	Sarah Dewsbury	ERM	Component Manager	B.A. Geography M.Sc. Coastal Zone Management	10
Port and Marine Offloading Facility Team	Maarten Kuijper	ERM	Component Director	M.Sc. Marine Biology M.Sc. Tropical Coastal Management	19
	Alec Martin	ERM	Component Manager	B.Sc. Physical Geography M.Sc. Sustainable Management of Water Environment	10
Early works and Infrastructure Team	Karen Raymond	ERM	Component Director	B.Sc. Chemistry M.Sc. Environment and Pollution Control IEMA Principal EIA Practitioner IEMA EIA Practitioner Examiner	38

Topic	Name	Organisation	Role/ Title	Qualifications	Years
	Mike Shelly	ERM	Component Director	BSc Biology and Earth Sciences	25
	Will Weir	ERM	Component Manager	B. Eng.	15
	Caroline Kennedy	ERM	Component Manager	B.Sc. Environmental Science M.Sc. Environmental Management	6
Social Impact Specialists	Philippa Spence	ERM	In-Migration	B.A. Social Anthropology and English B.A. Social Anthropology PDM Human Resources	10
	George Koppert	SNC-Lavalin	Social Baseline	B.Sc. Maths Applied to Social Sciences M.Sc. Human Nutrition and Applied Statistics PhD Anthropology	14
	Catherine Sabinot	SNC-Lavalin	Social and Fisheries	B.Sc. Biology of Organisms M.Sc. Environmental Science PhD Ethanoecology	12
	Mark Dival	SHAPE Consulting Ltd	Health	MB ChB PG diploma in Anaesthesia PG diploma in Occupational Medicine and Health	14
	Graeme Rodgers		In-Migration	B.A. Social Anthropology and Psychology M.A. Social Anthropology PhD Social Anthropology	15
	Callie Phillips	ERM	Health, Safety and Security Lead	B.Med.Sc. Medical Science M.Sc. Epidemiology	5
	Michael Hall	ERM	Land Use, Impact Assessment	B.Sc. Zoology M.Sc. Environmental Technology	4

Topic	Name	Organisation	Role/ Title	Qualifications	Years
Socio-economics	Kerryn McKune Desai	ERM	Socio-economic	B.Soc.Sc. Environmental & Geographical Science, Social Anthropology, Archaeology B.A. Environmental & Geographical Science M.A. Geography of Third World Development	10
	-	Cabinet AMERA	Environmental and socio-economic expertise	Various	-
	-	LA Granada Enterprises Inc.	Social sustainable development	Various	-
	Susan Novak	SNC-Lavalin	Baseline Socio-economist	MEDes. B.Arch. B.A. (philosophy)	25
	France Séguin	SNC-Lavalin	Socio-economic Baseline	Master (International Development) B.A. (Communication)	20
	Julie Forget	SNC-Lavalin	Socio-economic Baseline	MA (Development Economics), BEng. (Industrial Eng.)	15
	Caroline-Anne Perreault	SNC-Lavalin	Socio-economic Baseline	MSc.(Urban Studies) B.A. (Geography)	10
	Brigitte Ditner	SNC-Lavalin	Socio-economic Baseline	PhD (Sociology)	35
	Fodé Mamadou Camara, Dantily Diakité, Amadou Diallo, Maïmouna Diallo, Mady Diawando, Mohamed Lamine Dioubaté, David Niéréké, Niabalamou, Massa Guilavogui Abdoulaye Ibrahima Touré, Augustin Sakouvogui	SNC-Lavalin	Baseline Sociologist	Various	
Geology, Hydrology, hydrogeology	Mark Raynor and Peter Baur	Water Management Consultants (now Schlumberger Water Services (SWS))	Development, management, and environmental protection of water resources	Various	
	Peter Southern	ERM	Soils and Geology	B.Sc. Murdock University	30
	Hugo Marais	ERM	Groundwater and Hydrogeology	B.Sc. Geology, Zoology B.Sc. Hydrogeology M.Sc. Geology	10

Topic	Name	Organisation	Role/ Title	Qualifications	Years
	Tim Smith	ERM	Inland freshwater	B.Sc. Physics M.Sc. Engineering Hydrology C.Eng. Chartered Engineer	22
Marine Environment	Maarten Kuijper	ERM	Marine Environment	M.Sc. Marine Biology M.Sc. Tropical Coastal Management	19
	Alec Martin	ERM	Marine Biodiversity	B.Sc. Physical Geography M.Sc. Sustainable Management of Water Environment	10
Noise	Rod Linnett	ERM	Noise and Vibration	Mech Eng. Associate Diploma	18
	Claude Chamberland	SNC-Lavalin	Noise Baseline	B.Sc. (Mechanical Eng.) M.Sc. (Mechanical Eng.)	21
Air Quality	Chris Hazel- Marshall	ERM	Air Quality	B.Sc. Environmental Risk Management PhD Air pollution and cardiovascular health effects	13
	Alexandre Couture	SNC-Lavalin	Air Quality and Noise	-	-
Climate	Kate Fradley	ERM	Microclimate	B.Sc. Physics with Satellite Technology M.Sc. Applied Meteorology	1
	Karen Fisher	ERM	GHG and Global Climate	B.Sc. Biology M.Sc Aquatic Resources Management Postgraduate Certificate Environmental life cycle management	8
Biodiversity	Eamonn Barrett	ERM	Biodiversity	B.A. Archaeology & Anthropology M.A. Anthropology PhD Tropical Ecology	25
	Beth Seldon	ERM	Terrestrial/ Freshwater Biodiversity	B.Sc. Wildlife Biology M.Sc. Wildlife Conservation and Management	4
	Helen Temple	The Biodiversity Consultancy	Biodiversity Specialist	B.Sc. (Animal & Plant Biology) PhD (Zoology)	16
	Véronique Tuffeli	SNC-Lavalin	Biologist	B.Sc. M.Env. (Biology)	28
	Jonathon Ekstrom	The Biodiversity Consultancy	Biodiversity	B.Sc. M.Sc.	12

Topic	Name	Organisation	Role/ Title	Qualifications	Years
	Chantal Roy	SNC-Lavalin	Biodiversity Specialist	B.Sc. (Biology)	24
	Dominique Auger	SNC-Lavalin	Biologist	B.Sc. M.Env. (Biology)	10
Specialist information on biodiversity provided by individual scientists					
Amphibian and reptile	Christian Brede	University of Würzburg, Experimentelle Stammzell		PhD	-
	Annika Hillers	Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam		-	-
	Mohamed Alhassane Bangoura	Programme de conservation de la biodiversité des Monts Nimba		-	-
	Joseph Doumbouya	Centre d'Etude et de Recherche en Environnement (CERE), Université de Conakry		-	-
	Eli Kpogomou	Centre de Gestion de l'Environnement des Monts Nimba et Simandou (CGENS)		-	-
	Kaman Camara	SNC-Lavalin	Herpetofauna Specialist	-	-
	Bernard Doré	Programme de conservation de la biodiversité des Monts Nimba		-	-
	Gaspard Théa	SNC-Lavalin	Herpetofauna Specialist	-	-
Freshwater Fish	Philippe A. Lalèyè	Faculty of Agriculture Sciences University of Abomey-Calavi		Diploma (Agronomy)	22
	Mambi Magassouba	Centre National des Sciences Halieutiques de Boussoura (CNSHB)		M.Sc. (Ichthyology)	29

Topic	Name	Organisation	Role/ Title	Qualifications	Years
	Sékou Camara	Centre National des Sciences Halieutiques de Boussoura (CNSHB)		-	-
Flora	Martin Cheek,	Royal Botanic Gardens, Kew		B.Sc. M.Sc. D.Phil.	20
	Susana Baena, Yvette Harvey, Xander van der Burgt, Charlotte Couch, Laura Pearce, Iain Darbyshire, Sharon Laws	Royal Botanic Gardens, Kew		Various	-
	Barthelemy Tchiengue, Gaston Achoundong	Herbier National Camerounais		Various	-
	Martin Etuge	Conservation Research on Endangered Species (CRES)	-	-	-
	Elias Ndivé	Limbe Botanic Garden	-	-	-
	Jean-Louis Holié, Nicolas Delamou	N'Zérékoré Forestry Center	-	Various	-
	Thomas Williams Seydou Cissé	Rio Tinto Environment Department	-	Various	-
	Alphonse Traoré, Fatoumata Fofana, Pépé Haba, Pierre Haba	Guinée Écologie	-	Various	-
	Boubacar Diallo	Herbier de Séré	-	--	-
Use of Natural resources	Watta Camara	N'Zérékoré Forestry Centre		-	-
	Salim Kouyaté	N'Zérékoré Forestry Centre		-	-
Ecosystems Services	Emily Cooper	ERM	Ecosystem Services	B.A. Biology M.Sc. Environment and Development	7
Landscape	Peter Austin	ERM	Landscape and Visual Impacts	B.Sc. Urban and Regional Planning, Landscape Architecture Graduate Diploma Landscape Architecture, Masterplanning. Urban Design	30

Topic	Name	Organisation	Role/ Title	Qualifications	Years
Cultural Heritage	Doug Park	ERM	Cultural Heritage	B.Sc. PhD	10
	Djibril Tamsir Niane	SNC-Lavalin	Historian	-	-
Legal Framework	Monya Pelchat	SNC-Lavalin	Environmental Analyst	B.Sc.A. B.A. M.Sc. (Civil Eng. & Geographer)	15
	Laurent Lopez-Parodi	ERM	Government Relations	M.Law	8
GIS	Crona Hodges	ERM	GIS Manager	B.Sc. Environmental Science Ph.D. Remote Sensing	6
	Christian Laliberté, Laurence Bathalon, Mélanie Dupré, Christian Laroche, René Aubut	SNC-Lavalin	GIS Specialists	Various	-

Annex B

Policy, Administrative & Regulatory Review

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B1 Introduction

This annex sets out the legal and administrative context for the Project, including brief summaries of selected legislation and standards concerning environmental and social issues that may be applicable. It does not seek to provide comprehensive details of all relevant Guinean legislation.

Simfer, as part of the Rio Tinto Group, through its application to construct and operate the Project, is committed to meeting the spirit and intent of a number of international, national, provincial policies, guidelines, laws and regulations. These include the following.

- Internal Corporate mandates, policies and best practices commitments;
- Guinean legislation and regulations including all necessary permits and approvals;
- International law;
- IFC Performance Standards; and
- Good International Industry Practice (GIIP) that helps define leading industry practices.

This regulatory and administrative framework is described in the following sections, along with the targets for environmental and regulatory compliance and a summary of the status of project permitting.

B2 Corporate Commitments

Rio Tinto is a world leader in finding, mining and processing the earth's mineral resources. Key Rio Tinto operating principles include protecting the health & safety of its employees, contributing to sustainable development and conducting business with integrity. Rio Tinto aims to work closely with host countries and communities, respecting their laws and customs and ensuring a fair share of benefits and opportunities ⁽¹⁾. Rio Tinto's reputation for acting responsibly is embedded in the way Rio Tinto operates and is based on Rio Tinto's core values of Accountability, Respect, Teamwork and Integrity. These values are expressed through the principles and standards of conduct set out in *The Way We Work*. These define the way Rio Tinto manages the economic, social and environmental challenges of its operations and are important to fulfilling Rio Tinto's commitment to contribute to sustainable development. The key principles set out in *The Way we Work* can be summarised as follows.

- **Safety** - We are committed to an incident and injury free workplace. Our Goal is zero harm.
- **Health** - We are committed to protecting health and wellbeing.
- **Employment** - We respect the right and dignity of employees throughout our own operations and those of our business partners.
- **Drugs and alcohol impairment** - We must not possess or consume illegal drugs, or be impaired by alcohol or drugs, while working on Rio Tinto business or premises.
- **Security and business** - We are committed to protecting our employees, assets and reputation, and ensuring the resilience of our operations when confronted by crises, site disasters or any instance that might affect business continuity.
- **Human Rights** - We support and respect human rights consistent with the Universal Declaration of Human Rights and actively seek to ensure we are not complicit in human rights abuses committed by others.
- **Communities and indigenous peoples** - We set out to build enduring relationships with our neighbours that demonstrate mutual respect, active partnership, and long-term commitment.
- **Land access** - We seek to get the widest possible support for our proposals throughout the lifecycle of our activities.
- **Environment** - Excellence in environmental performance and product stewardship is essential to our business success.

As the developer of the Simandou Project, Simfer will abide by the Rio Tinto values and will comply with *The Way We Work*. In abiding by these values and by complying with *The Way We Work*, Simfer is committed to the sustainable development of Guinea and its people and aims to protect and develop Guinean's environmental resource and its people over the long term. Simfer is committed to the health & safety of its employees and the wider communities on which its activities will have an impact.

Simfer intends to implement systems for managing environment, health and safety and community issues across the Simandou Project based on corporate principles embedded in *The Way We Work*. Simfer will develop the capabilities and support mechanisms necessary to administer its social and environmental management plans. Implementation will be based on raising the level of awareness of social and environmental requirements, expectations, and benefits throughout the Project. Health, safety, environmental and community protection and development are amongst the highest Project priorities.

(1) Rio Tinto, "*The Way We Work*", our global code of business conduct; December 2009

In addition to *The Way We Work*, Rio Tinto also supports a number of international voluntary commitments, agreements and conventions as follows.

- Extractive Industries Transparency Initiative
- Global Sullivan Principles of Social Responsibility
- International Chamber of Commerce Charter for Sustainable Development
- International Council on Mining and Metals Sustainable Development Framework
- International Labour Organisation (ILO) Declaration on Fundamental Principles and Rights at Work
- International Labour Organisation Convention 169: Concerning Indigenous and Tribal Peoples in independent Countries
- Kimberley Process
- OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions
- OECD Guidelines for Multinational Enterprises
- Transparency International
- Business Principles for Countering Bribery
- United Nations Global Compact
- United Nations Universal Declaration of Human Rights
- Sources Voluntary Principles on Security and Human Rights
- World Economic Forum- Global Corporate Citizenship Initiative CEO Statement
- World Economic Forum- Partnering Against Corruption Initiative (PACI)
- Principles for Countering Bribery.

Rio Tinto has taken into the above into account when setting out its proposals for the Project.

B3 Guinean Government and Administration

B3.1 Government Structure

The Government of Guinea is lead by a president elect for five year terms. Presidential candidates must receive a majority of the votes cast to be elected president and it is possible for the president to be elected for a second term. Once a winning candidate has been announced, The President appoints a Prime Minister who nominates 33 ministers who form the government. Alongside the elected President, the system requires that the Minister of Defence and Commander in Chief of the Army jointly lead the government for the duration of the term.

In March 2010, a 155 member National Transition Council (CNT) was appointed and has since acted as the national legislature. CNT members come from a diverse background, including academics, opposition party members, trade unionists and representatives of civil society groups. Legislative elections are scheduled for December 2011 and will see the CNT dissolved and new government created.

Guinea operates a civil law system based on the French model. It accepts the International Criminal Court systems and implements International Court of Justice requirements with reservations. The most recent constitution is dated 7 May 2010.

Guinea has a hierarchal system of government delivered through eight Regions, each led by a Governor and 33 Prefectures and 1 'special zone' (Conakry) each prefecture led by a Prefect supported by a council of appointed ministers. The prefectures are subdivided into 335 sub-prefectures. There are also 33 Urban Districts (*Communes Urbaines*) headed by elected mayors and 304 Rural Development Communities (CRDs *Communautés Rurals de Développement*) headed by elected presidents.

B3.2 Institutional Framework

The government has established a number of Ministries led by appointed Ministers and Ministers of State. Each Ministry delivers and implement specific responsibilities on behalf of The President. The Ministers have the authority to issue consents for development which relate to their administrative areas The key Ministers who may be involved in regulation and granting permits and other approvals relevant to the Simandou Project include, but are not limited to, the Ministers of Mines and Geology, Environment, Territorial Administration and Decentralisation Habitat, Urbanism and Construction, Health and Public Hygiene, Transport and Agriculture.

B4 Legislative Framework Applicable to the Project

B4.1 Environmental Legislation and Policy

The Code for the Protection and Development of the Environment, Ordinances 045/PRG/87 and 022/PRG/89 (also known as the Environmental Code) establishes the administrative and legal framework in Guinea to enable the Guinean State to deliver on its constitutional obligation to provide for a clean and healthy environment to every person in Guinea.

The Environmental Code is the cornerstone of environmental protection in Guinea and sets out the fundamental legal principles to be complied with to ensure the protection of environmental resources and the human environment.

Title I sets out the general principals applicable in relation to environmental protection in Guinea and sets out the administrative structures in charge of administering environmental protection activities in Guinea and provides that the Ministry for natural resources, energy and the environment is the key administrative institution for the protection and management of environmental resources in Guinea. The Act creates a National Committee to help the Ministry in formulating the national policy for environmental protection. Title II provides for the protection of specific resources such as the soil and sub-soil; inland waters; the sea and its resources and the air.

Title III provides for the protection and valorisation of environmental resources and the human environment. Title IV deals with nuisance and covers a broad range of topics. Chapter I deals with waste management; of particular interest Article 60 provides that waste must be treated to eliminate or reduce the negative impacts on human health, natural resources, fauna, flora and the overall quality of the environment. Article 66 provides that wastewaters and other liquid wastes originating from industrial or commercial installations such as quarries or mines must be treated by physical, biological or chemical means before being disposed of. Chapter II deals with installations requiring an environmental permit (also known as classified installations) and provides that these installations must obtain a permit before construction or operation commences. This permit is delivered jointly by the Ministry of Environment and the Ministry of Industry and Small and Medium Enterprises. Chapter III deals harmful or dangerous chemical substances and Chapter IV deals with noise and odour nuisance.

Title V provides for the administrative procedures and financial arrangements applicable in Guinea. Chapter I establishes the procedure for environmental impact assessment. Article 82 sets out that the developer or the project manager must submit an environmental impact study to the relevant regulatory authority for projects, structures or installations that may, by their size or the nature of their activities, have an impact on the environment. Article 83 of the Environment Code provides for a Ministerial Decree to set out a list of activities that may require an environmental impact study and also provide for a Ministerial Order to provide the content, methodology and the procedure to follow in relation to the environmental impact study. Article 83 provides, however, that the study must include a baseline assessment of the site and the environment the proposed development will be located in; an assessment of the foreseeable impacts that the Project/development may have on the natural and human environment; a synopsis of the mitigation measures proposed by the developer to eliminate, reduce or compensate the negative impacts that the Project may have and an estimate of the costs associated with these measures. A description of the alternatives and the reasons why, from an environmental protection perspective, the Project envisaged was selected. Chapter II of Title V deals with emergency plans and Chapter III provides for a financial fund dedicated to environmental protection.

Title VI deals with offences and penalties and Title VII deals with miscellaneous arrangements.

B4.2 Environmental Planning and EIA Legislation

Article 82 of Title V of the Environmental Code (Ordinances 045/PRG/87 and 022/PRG/89) sets out that the developer or the project manager must submit an environmental impact study to the relevant regulatory authority for projects, structures or installations that may, by their size or the nature of their activities, have an impact on the environment. Article 83 of the Environmental Code then provides for a

Ministerial Decree to set out a list of activities that may require an environmental impact study and also provide for a Ministerial Order to provide the content, methodology and the procedure to follow in relation to the environmental impact study.

Presidential Decree 199/PRG/SGG/89, made under Article 82 of the Environmental Code, sets out the projects which require an environmental impact assessment (EIA) study ⁽¹⁾. This is a framework Decree in relation to EIA. It sets out the projects that require an EIA and the content of the EIA study. Simfer activities that are likely to fall under the scope of the EIA Decree include the construction and/ or development of harbours; mining and quarrying activities; construction of airports, railway lines and roads; and all sites that would be classified as a Class I classified installation.

Order 990/ NRNE/SGG/90, made under Art 7 of Decree 199/PRG/SGG/89, establishes the content, methodology, and procedures to be complied with when carrying out an environmental impact assessment. This Order sets out that the Environmental Impact Study must have five sections:

- The first section must summarily describe the Project including its aim(s); geographical location; estimated build costs; the date the investment decision was made and the timeline for the Project.
- The second section should describe the baseline of the site and the surrounding environment, concentrating especially on the aspects that may be affected by the Project such as sites, natural resources, landscapes, and the socio-economic and cultural landscape of populations). Topics to be covered in relation to the Project include geology and pedology; hydrogeology; hydrology; fauna and flora; landscape and visual; air pollution and noise/ odour nuisance; traffic and infrastructure; social and socio-economics.
- The third section should assess the impacts of the Project on the environment in respect of, in particular, landscape and visual; fauna and flora, the natural environment and biological interactions and, if applicable, nuisances (noise, vibration, odour etc); on public hygiene and the cultural heritage.
- The fourth section sets out the reasons why, especially from the point of view of the protection of the environment, the Project, in its present form, has been selected. In particular, this section should address the selection of the site and the selection of the various production processes that have been chosen.
- The fifth section details the measures envisaged by the developer to eliminate, reduce, or mitigate the negative impacts of the Project, including cost estimates to put these measures into action.

Environmental impact studies that do not provide sufficient details in the sections detailed above will be required to justify and explain the gaps by citing the costs or technical implications that would be involved in closing these gaps as per Art.3 and 4 of Decree 199/PRG/SGG/89. The National Directorate for the Environment may however, in compliance with Art.4 of Decree 199/PRG/SGG/89 request additional submissions to be made to complement the environmental impact study.

Article 9 of Order 990/ NRNE/SGG/90 provides for the publicity arrangements depending on whether the Project is to be (or not) subjected to a public enquiry.

Chapter II of Order 990/ NRNE/SGG/90 deals with the procedure relating to the environmental impact study. Article 10 states that all environmental impact assessment studies must gain the approval of the Environmental Minister (on the recommendation of the National Directorate for the Environment) within three months or within the timeline fixed by other relevant legal texts as necessary. Article 11 provides for work to be suspended by Order of the Environment Minister if an environmental impact assessment study has not been submitted or if the procedure for submitting such a study has not been complied with. Article 12 establishes the role of the National Directorate for the Environment in ensuring that mitigation measures presented in the environmental impact study and agreed upon in the planning Order are complied with.

(1) Note that this assessment is entitled a Social and Environmental Impact Assessment and is designed to meet the Guinean requirements for EIA and also IFC and Rio Tinto corporate policies requiring consideration of social as well as environmental issues.

B4.3 Interaction between Environmental Planning and Permitting Legislation

Presidential Decree 200/PRG/SGG/89, made under Article 73 of the Environmental Code, on the Regulatory Regime for Classified Installations in relation to the Protection of the Environment sets out the administrative and financial provisions applicable to classified installations. Classified Installations are installations which by the nature of their activities or the actual volume of activities undertaken require permitting under Guinean environmental legislation.

Order 03/8003/PRG/SGG lists all industrial activities which fall under the scope of Decree 200/ PRG/SGG/89 and for which an integrated permit is required. This Order sets, for each industrial activity, thresholds that reflect the level of potential harm arising from the activity and for which different obligations will apply. Industrial sites are classified as Class I or Class II sites depending on the level of harm to the environment.

Simfer activities that may potentially fall under the scope of the classified installation regime include vehicle maintenance workshops (category 23); any activities involving the crushing, screening of rocks or mineral or associated activities (category 29); treatment of waste including land filling of waste or incineration of waste (category 42); the storage of explosives (category 45); the storage of heavy fuel (category 49) and/ or LPG (category 50); the storage of fuel (59 to 62); the washing of minerals (category 65).

Article 2 of Presidential Decree 200/PRG/SGG/89 provides that the owner or the operator of a classified installation must request its environmental permit at the same as its building permit. A building permit will need to be obtained prior to the construction of any building as per Article R221-1 of the Urban Development Code. However, a building permit can only be obtained only after the environmental permit for a classified installation has been obtained.

B4.4 Land Law and Policy

There are a number of Guinean laws applicable to the Project that control the use of land and the built environment. The role of land law legislation in Guinea is three fold:

- Ensure that environmental protection is considered at the level of policy making. These plans set the basic ground rules for action on the environment in any particular area. These plans are generally drafted at the national and/ or regional levels and must be read in conjunction with central government policy documents;
- Ensure control over the development process through the use of planning permission/ building permit which needs to be obtained from the local planning authority before development can take place. In most instances, a building can only be obtained if the authorities have given a positive decision to the development through the environmental impact assessment process; and
- Ensure environmental protection through the use of conditions, agreements etc. related to environmental protection on a grant of planning permission/ building permit via, for example, the need to obtain an environmental permit (also known as a classified installation permit) before production can begin.

The Urban Code (Law L/98 No 017/98) sets out that the Guinean State is responsible for the management and development of the national territory. This control is exercised through the national land development plan (also known in French as the *Schéma National d'Aménagement du Territoire-SNAT*) and the Regional Development Master Plans (*Plans Directeurs d'Aménagement Régionaux, PDAR*), which provide the different level of governments with the tools to influence development at a policy making level.

In addition to the Urban Code, the Guinean Government has published the Declaration of Land Policy in the Rural Environment (Decree D/ 2001/037/PRG) which is aimed at promoting rural economic and social development by securing rural land rights and rules in favour of agricultural development, improving sustainable resource management, and allowing the development of a transparent and equitable land market. This Decree is the strategic framework for rural land management.

At a local level, the Code on Local Government, which provides for the decentralisation of powers from Central Government defines the local communities' competencies, missions, domain and assets as well as the boundaries for community intervention. This Code defines the local communities' roles and responsibilities in land use management. The local council must give its opinion prior to every investment projects and all soil occupation / exploitation. Local communities share with the State the responsibility for land use management.

The cornerstone of property rights in Guinea is the Fundamental law of the Republic of Guinea which proclaims that the right to own property is guaranteed. This law expressly recognises the right to private property ownership in Guinea. With regards to expropriation, it states that: "no one can be expropriated if it is not for the wider public interest and only if it is accompanied by fair and prior compensation."

The Land Code (L/99/013/AN) sets out the over-arching legal framework that sets out the rules applicable to land in Guinea. It reinforces and underlines the right of private ownership in accordance with the general principle set forward by the Fundamental law. The Land Code primarily deals with registered properties and provides for the registration of properties through the use of titles, leases and deeds. It defines two land registration procedures:

- through the land ownership plan: it is a simple administrative document, not in itself a property title, which is held at the urban municipality level for towns and at the rural development community level for rural areas; and
- through the land ownership registration: this results in the deliverance of a full ownership deed and the document will be held by the land ownership conservation service.

In practice, these land registration procedures have not been comprehensively implemented in rural areas. Although most of the Land Code provisions relate to registered property, Article 39 can be interpreted as recognising customary rights. It defines land owners as physical persons or legal entities that can demonstrate peaceful, personal, continuous (in excess of thirty years) and bona fide occupation of a dwelling as an owner.

The Land Code also sets out provisions for expropriation in the public interest. The Land Code does not however provide detailed provisions with regards to the level of compensation over and above the general principal of fair compensation set out in Article 55. Article 69 also states that: "compensation must cover the whole of the quantifiable and known loss incurred as a direct result of the expropriation".

The Land Code also provide for the need to obtain a building permit before building occurs.

B4.5 Mining Legislation and Policy

Law L/95/036/CTRN of 30 June 1995 relating to the Mining Code of the Guinean Republic, and subsidiary legislation made under this law, establishes the legal framework relating to the ownership and rights to minerals and covers prospection, exploration, exploitation, storage, transport, commercial exchange and transformation of mineral substances and the tax system associated with these activities. Liquid and gaseous hydrocarbons do not fall under the scope of this Law.

Article 16 of the Mining Code sets out that mining or quarrying activity must be undertaken in an environmentally friendly way in compliance with the requirements of the Environmental Code. Firms must take necessary measures to prevent pollution of the environment; treat waste, emissions to air and discharges to the environment; protect forests and water resources.

The Mining Code also sets out requirements, in Chapter II on health & safety at work, applicable to the health & safety of workers (see *Section 2.4.8*).

Article 11 of the Mining Code on Mining Conventions provides that a mining convention will be drawn for all mining permits and mining concessions. This document will set out the rights and obligations of all parties

participating in a mining project and will set-out the legal, financial and fiscal and social framework applicable to these parties for the duration of the Convention.

Rio Tinto signed with the Government of the Republic of Guinea a framework mining convention on the 26th November 2002. This Convention provides the legal, administrative, financial, tax and customs and social framework in which Simfer will be able to carry out its research and prospection activities within the limits of its exploration concession in order to determine the presence of iron ore that may be exploited on a commercial basis. This Convention provides for Simfer activities to include iron ore concentration and transportation activities with a view to allow the efficient workings of the iron ore and allows for Simfer to set-up and manage the necessary heavy infrastructure for the transport and onward distribution of the iron ore. This Convention also sets out the general and business conditions under which the Project will be undertaken. This Convention is established under the Mining Code and deals with iron ore.

This Convention will be, alongside the Mining Code, the primary legal instrument that will regulate Simfer early work activities in relation to the Simandou Project. Article 37 of this Convention deals with the protection of the environment and cultural heritage and provides that Simfer must comply with the applicable Guinean environmental, health & safety, security and well-being legislation and international best practices as applicable to the mining sector.

Article 37.2 of the Mining Convention provides that Simfer must, for all investment programmes relating to mining projects in the Concession area carry out an environmental and social impact assessment. The assessment will include mitigation measures to reduce the negative impacts of the Project including a programme to rehabilitate impacted sites. The assessment will also include a monitoring programme. The scope of these assessments will be agreed between Simfer and the State within 6 months of the Mining Convention being signed.

Article 37.4 provides that in the instance that an archaeological find is made within the Concession area, an appropriate assessment by a competent person will have to be carried out prior to the production phase and costs will have to be born by Simfer. If Simfer discovers archaeological artefacts, it must ensure that these are not moved or removed and that the administration is contacted as soon as possible. Simfer also pledges to participate financially, to a reasonable level, to any rescue attempt.

B4.6 Forestry Legislation and Policy

The Forestry Code (81/PRG/SGG/89) sets out the legal framework in Guinea with regards to the protection of forests. It is the cornerstone of forestry legislation in Guinea and covers all aspects of commercial, conservation and community use of forests. The Forestry Code details the requirements relating to the classification, management, usage, protection and replanting of Guinean forests. It also sets out the role of the Forestry police. Article 58 provides that trees (with very few exceptions) cannot be felled without a licence. When trees are located in an area covered by a forestry management plan, the felling licence can only be in line with the forestry management plan (Art. 59).

Section 2 of the Forestry Code deals with the protection of forestry resources.

Section 3 deals with bush fires.

Section 4 deals with reforestation.

Section 5 deals with customary rights.

Section 6 sets up the national forestry fund.

Section 5 establishes the forestry police and provides for the procedure when investigating offences, sets out the types of offences, the punishment linked to these offences (typically monetary fines, custodial sentences or remedial works).

Section 6 provides for the final administrative provisions with regards to this Code.

B4.7 Biodiversity Legislation and Policy

The Code of Protection of Wildlife and Rules of the Hunt (L/99/038/AN) sets out the legal framework for the protection, conservation and management of wildlife and its habitats; and provides for the right to hunt to be

recognised. This text also provides for some rules on hunting and aims to promote the sustainable use of animal species and ensure their sustainability for the satisfaction of human needs.

B4.8 Marine Legislation and Policy

Decree 201/PRG/SGG/89, made under Articles 32 to 39 of the Environmental Code, sets out the legal framework for the control of pollution in the marine environment. Article 4 of the Decree sets out that all vessels, within Guinean territorial waters must comply with the Guinean Environmental Code, this Decree and all applicable legal texts made under these. A vessel is defined as any type of structure used in the marine environment including ships, submarines, platforms, fixed and floating structures.

Chapter II deals with discharges from vessels and accidents at sea. Article 14 of the Decree prohibits hydrocarbon releases to the marine environment except under very specific circumstances.

Chapter III deals with discharges from land based structures to the marine environment. Chapter III makes provisions for discharges from land-based structures that have the potential to impact the marine environment to be prohibited or permitted by the Environmental Regulator.

Chapter IV deals with discharges from offshore platforms or structures used for exploration or extraction purposes. Article 30 prohibits any hydrocarbons or mixed discharges that may impact public health, marine fauna or flora; or impact the coastal economic development or tourism.

Chapter V deals with marine wrecks.

Annex I of the Decree lists substances for which discharges are prohibited, while Annex II lists substances for which discharges subject to permitting.

B4.9 Guinean Extractive Industries Transparency Initiative (ITIEG)

Guinea was accepted as an EITI Candidate country on 27 September 2007, but temporarily suspended its EITI Candidate status in December 2009, with EITI Board's approval, in view of the difficult political situation in the country. Following a request from the democratically elected Guinean government, Guinea's suspension was lifted and its candidate status reinstated by the EITI Board on 1 March 2011.

The Extractive Industries Transparency Initiative (EITI) is a global standard that promotes revenue transparency. It is founded on a process initially developed from the EITI Principles at the EITI Conference in 2003 ⁽¹⁾. The Standard is underpinned by the EITI Principles and the EITI Criteria. In short, the EITI requires companies to publish what they pay in taxes and royalty payments and governments to publish what they receive by applying a robust yet flexible methodology for monitoring and reconciling company payments and government revenues at the country level. The process is overseen by participants from the government, companies and national civil society. The EITI Board and the International Secretariat are the guardians of the EITI methodology internationally ⁽²⁾.

The aims of the EITI are to:

- ensure the transparency of the payments and revenues made by companies in the extractive industry and the payments received by governments by the companies in the extractive industry;
- make this information public and to enhance dialogue with civil society and the general public; and
- ensure the good use of the wealth generated as an engine for growth and to contribute to sustainable development and poverty reduction.

(1) <http://eiti.org/eiti/principles>

(2) EITI Factsheet, 3 May 2011

The ultimate aim of a candidate EITI country is to achieve compliant status under the Standard. This is achieved by undergoing validation against the EITI Standard, which provides an independent assessment of the status of a country implementing the EITI and what measures they should take to make better and faster progress. This assessment is carried out by an independent auditor, using the Validation Grid and Indicator Assessment Tools as outlined in the EITI Rules. The EITI Board, through the EITI Secretariat, oversees the Validation process. The EITI Board reviews all Validation Reports. To achieve Compliant status a country must complete an EITI Validation within 2 years of becoming a Candidate Country. Once a country is Compliant, the country must undergo Validation at least every 5 years, or upon the request from the EITI International Board.

If the Board considers that the country meets all of the EITI Indicators, the country will be designated as EITI Compliant. Where the validation report shows that a country has made progress but does not meet all the EITI Indicators, the country will remain a Candidate. Where Validation shows that no meaningful progress has been achieved, the Board may revoke the country's candidate status.

The administrative structures of the EITI in Guinea (also known as EITIG) were created as early as June 2005 and immediately started work on implementing the ITIE Principles and Standard. These structures are as follows.

- The Overseeing Committee. Its role is to exercise strategic oversight of the Steering Committee. It reviews progress against the plan and the budget to achieve validation against the Standard. Its aim is to remove any roadblocks;
- The Steering Committee, is a multi-stakeholder group in charge of implementation and follow up of the EITI in Guinea. It comprises 24 members, including 12 members from the Civil Service. It includes the Ministers in charge of mines and economy and finance; the president of the chambers of mine and the president of the national civil societies. It is chaired by the Prime Minister ;
- The Executive Committee was eliminated and replaced by two commissions in charge of the collection, processing and the audit of payment data ; and the other one responsible for communicating and capacity building; and
- The Executive Secrétariat is in charge of managing, organising and carrying out the activities of the ITIE in Guinea.

B4.10 Workers Protection

The Social Security Code (L/94/006/CTRN) is the primary source of legislation in Guinea for the protection of workers and their families against economic or social poverty and hardship that could result from any significant loss of earnings. This Code sets out the legal framework to protect workers and their families from such hardship and provides for a number of social protection regimes including retirement pension funds, invalidity funds and survivors funds; work accidents and occupational illnesses funds; family support fund, illnesses fund and sanitary and social fund. All workers, falling under the scope of the Work Code, will fall under the scope of the social security regime. The Code provides for indemnities to be collected from employees and employers; and also provides for the redistribution of monies collected via a number of indemnities to be paid out when employees fall ill, retire, raise children etc. Simfer will ensure that employees are registered as per the requirements of the Code.

Decree D/253/24/PRG on Occupational health creates a national department of occupational medicine within the Guinean Health Ministry; and sets out the roles and responsibilities of this Department. This Decree also sets a number of key requirements in relation to the monitoring of employees health in relation to medical exams (pre-employment and on an annual basis, whilst in employment; or when returning to work following a period of illness in order to determine the employee's fitness to work)

In addition to the Social Security Code, the National Framework Convention on mining and quarrying activities and the mining industry and Order 1386/MASE/DNTLS on the categorisation of workers in the private sector regulates the relationship between the employers who have signed the Convention and the

unions for mines, quarries and the mining industry for companies that principally operate in the mines, quarries and mining industry sector. Simfer, as an employer that has signed the Convention, will fall under the scope of the Convention.

Key requirements under the Convention include the following.

- The requirement for Rio Tinto to comply with the current framework, set out by legislation and convention, with regards to work hours, compensation (in terms of time off) and overtime.
- The requirement for Rio Tinto to comply with current health & safety legislation and set-up health & safety committees whose purpose is to support the set-up of health & safety management programmes, their management and implementation to protect workers.
- The Requirement for Rio Tinto to comply with the relevant health & safety legislation, including Art.193 & 194 of the Work Code on occupational health medicine. Simfer is not limited by the law and can offer additional benefits over and above what is prescribed by law.

B4.11 Health, Safety and Environment

The Labour Code is the primary source of legislation governing employment practices and labour relations in Guinea. The Code does not apply to civil servants, but applies to all private sector employees. It prohibits forced or compulsory labour. It establishes the rules for hiring and termination of employment; rules in relation to work conditions including salary entitlement, maximum work hours and overtime; employee benefits such as holiday pay and retirement pay. The Code also sets out requirements in relation to the health & safety protection of employees. It makes provisions for the creation of employers unions and trade unions and sets out rules for trade union representation within the workplace; employee membership in labour unions, as well as setting out rules for dispute negotiations and collective bargaining. It provides for the creation of a specialised administrative branch of the state (Work Inspectorate) and a specialised branch of the legal system to deal with the implementation of, and compliance with, Labour laws.

In addition to the Labour Code, the Mining Code also sets out requirements, in Chapter II on health & safety at work, applicable to the health & safety of workers. Article 133 of the Mining Code provides that persons (including bodies corporate like Simfer) undertaking mining or quarrying activities must comply with the highest standards of health & safety as set by the Mining Ministry in collaboration with the Ministry in charge of Public Health and the Work Ministry. Companies are required to submit their health & safety policy (describing their health & safety arrangements) to the National Directorate of Mines. Article 134 provides a mechanism for addressing any sub-standard health & safety performance in the mining or quarrying sector. Article 135 prohibits under sixteen year olds from working in the mining or quarrying industry.

B4.12 International Obligations and Commitments

In addition to its national laws, Guinea is a signatory to a number of international conventions, co-operative agreements and legal obligations concerned with environmental and social issues (see *Table B4.1*), which have contributed to shaping and influencing the development of policy, guidelines and regulations that are applicable to the Project.

Table B4.1 Main International Conventions and Agreements Signed by Guinea

Convention	Date of Ratification/ Accession	Key Objectives
Convention on Climate Change	Guinea ratified the Convention in May 1993 and it entered into force in March 1994.	192 countries around the world joined an international treaty, the United Nations Framework Convention on Climate Change, that sets general goals and rules for confronting climate change. The ultimate objective of the Convention is to stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. The Convention provides that countries must meet the Convention objectives primarily through national measures.
Kyoto protocol to the United Nations Framework Convention on Climate Change	Guinea accepted the Kyoto protocol in September 2000.	This Protocol has been accepted by the Guinean Government in September 2000 and it came into force in February 2005. Guinea is not an Annex I Party to the Protocol and therefore does not, currently, have to meet a specific greenhouse gas emission reduction target. There is currently no Guinean specific legislation implementing the Kyoto Protocol in Guinea.
Vienna Convention for the Protection of the Ozone Layer	Guinea acceded to the Vienna Convention in June 1992 and the Convention came into force in September 1992.	Guinea ratified the Vienna Convention and the Montreal Protocol in June 1992. The Convention provides for the international legal framework to protect the ozone layer. Guinea has not, to date, adopted specific legal instruments to implement the Convention in its legal system.
The Montreal Protocol on Substances that Deplete the Ozone Layer	Guinea ratified the Montreal Protocol in June 1992.	The Montreal Protocol on Substances That Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature on September 16, 1987, and entered into force on January 1, 1989. Guinea ratified the Montreal Protocol in June 1992. The Protocol provides for the international legal framework to protect the ozone layer by setting out phasing-out targets and schedules for the substances (chlorofluorocarbons and hydro chlorofluorocarbons) listed in the Protocol. The Protocol allows developing countries (meeting specific requirements listed in the Protocol), in order to meet their basic domestic needs, to delay for ten years their compliance with the control measures set out in the Protocol. This means that the implementation of the Montreal Protocol in Guinea may occur in the future. In addition, the Protocol is addressed to the signatory States and does not directly apply to Simfer's activities in Guinea. Simfer's activities could be indirectly impacted by the Protocol if Guinea had adopted specific legal instruments to implement the Protocol in its legal system, however, there is currently no Guinean specific legislation implementing the Montreal Protocol in Guinea.

Convention	Date of Ratification/ Accession	Key Objectives
Convention on the Conservation of Migratory Species of Wild Animals	Guinea is a party to this Convention which came into force in August 1993.	The convention aims to ensure the conservation of Migratory Species and Natural Environment by an intergovernmental co-operation. The convention sets out to conserve wild flora and fauna and their natural habitats; promote co-operation between states; monitor and control endangered and vulnerable species; and to assist with the provision of assistance concerning legal and scientific issues. This convention was transposed into Guinean legislation via the Guinean Code of Protection of Wildlife and Rules of the Hunt.
Convention on Biological Diversity	Guinea ratified this Convention in May 1993.	The objective of this Convention is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. The Convention has three main goals: conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources. This Convention has been transposed at a national level in Guinea with the Code of Protection of Wildlife and Rules of the Hunt.
African Convention for Nature Conservation and the Conservation of Natural Resources	Not yet ratified by Guinea.	This Convention aims for the conservation and rational use of soil, water, flora and fauna resources. The objectives of this Convention are: to enhance environmental protection; to foster the conservation and sustainable use of natural resources; and to harmonize and coordinate policies in these fields with a view to achieving ecologically rational, economically sound and socially acceptable development policies and programmes. It has not been possible to confirm, based on publicly available information, whether Guinea has ratified this Convention and/ or whether it has transposed the requirements of this Convention into Guinean legislation.
Convention concerning the Protection of the World Cultural and Natural Heritage	Not yet ratified by Guinea.	This Convention aims to protect the world cultural and natural heritage. This Convention provides for the creation of an intergovernmental committee for the protection of the world cultural and natural heritage and its associated fund. Information available in the public domain shows that Guinea has not ratified the Convention to date. Guinea is therefore unlikely to have transposed the Convention in its national legislation at this moment in time.

Convention	Date of Ratification/ Accession	Key Objectives
Ramsar Convention on Wetlands	Guinea is a party to this Convention, which came into force in March 1993.	The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention uses a broad definition of the types of wetlands covered in its mission, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans. Guinea has signed and ratified this Convention and it came into force in March 1993. Guinea has submitted national reports on the implementation of the RAMSAR Convention in Guinea which show that the Guinean government has taken some steps to implement the Convention; however it appears that Guinea does not have a national policy on the management of wetlands.
Basel Convention	26.04.95 (accession but not ratification)	Control of Transboundary Movements of Hazardous Wastes and their Disposal.
United Nations Convention on the Law of the Sea	Guinea ratified this Convention in September 1985 and the Convention came into force in November 1994	The United Nations Convention on the Law of the Sea (UNCLOS), also called the Law of the Sea Convention or the Law of the Sea treaty, is the international agreement that defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. It has not been possible to confirm, based on publicly available information, whether it has transposed the requirements of this Convention into Guinean legislation.
Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the Western and Central African Regions	Guinea is a party to this Convention. The Convention came into force in August 1984.	The Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the Western and Central African Regions (also known as the Abidjan Convention) covers the marine environment, coastal zones and related inland waters falling within the jurisdiction of the States of the West and Central African Region, from Mauritania to Namibia inclusive. It is a comprehensive umbrella agreement for the protection and management of the marine and coastal areas and lists the sources of pollution which require control: pollution from ships, dumping, land based sources, exploration and exploitation of the sea-bed, and pollution from or through the atmosphere. It also identifies environmental management issues from which co-operative efforts are to be made: coastal erosion, specially protected areas, combating pollution in cases of emergency; and environmental impact assessment. There are also articles on scientific and technological co-operation and liability and compensation. It has not been possible to confirm, based on publicly available information, whether the Guinean Government has transposed the requirements of this Convention into Guinean legislation.

Convention	Date of Ratification/ Accession	Key Objectives
Convention to Combat Desertification (A/AC.241/27)	Guinea has signed and ratified this Convention and it came into force in September 1997.	The objective of this Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa. The Convention aims to achieve this through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievement of sustainable development in affected areas. Guinea has signed and ratified this Convention and it came into force in September 1997. Guinea has also produced a national action plan against desertification. It appears, from a review of Guinean legislation that there is no specific additional national legislation dealing with desertification, but that the aims and objectives of the Convention have been incorporated into existing legislation such as the Environmental Code, the Mining Code etc.
Extractive Industries Transparency Initiative	Guinea is a candidate country under the EITI	Guinea's candidate status was reinstated on 1 March 2011, following the temporary suspension of its candidate status in 2009 in light of the political difficulties experienced by the country. The aim of the EITIG is to ensure the transparency of the payments and revenues made by companies in the extractive industry operating in Guinea and the payments received by the Guinean government from these companies.
World Heritage Convention (UNESCO)	The Convention came into force in 1975. Guinea ratified the Convention in March 1979.	The Convention aims to promote cooperation among nations to protect the world's natural heritage and cultural properties that is of such outstanding universal value that its conservation is important for current and future generations. The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List; and sets out the duties of States Parties, of which Guinea is one of, in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The <i>Mount Nimba Strict Nature Reserve</i> was established by Decree in 1944 and declared as a biosphere reserve in 1980. Guinea has listed the <i>Mount Nimba Strict Nature Reserve</i> on the list of world heritage in danger in 1992. The Guinean government has also listed the cultural landscape of the <i>Mount Nimba</i> range on the tentative list of cultural sites to be protected under the Convention.
Freedom of Association and Collective Bargaining, Convention 1948 (87)	Guinea ratified Convention 87 in January 1959.	The Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87) establishes the right of all workers and employers to form and join organizations of their own choosing without prior authorization, and lays down a series of guarantees for the free functioning of organizations without interference by the public authorities. It has not been possible to confirm, based on publicly available information, whether the Guinean Government has transposed the requirements of this Convention into Guinean legislation.

Convention	Date of Ratification/ Accession	Key Objectives
Right to Organise and Collective Bargaining Convention 1949 (98)	Guinea ratified Convention 98 in March 1959.	The Right to Organise and Collective Bargaining Convention 1949 (98) provides for protection against anti-union discrimination, for protection of workers' and employers' organizations against acts of interference by each other, and for measures to promote and encourage collective bargaining. It has not been possible to confirm, based on publicly available information, whether the Guinean Government has transposed the requirements of this Convention into Guinean legislation.
Elimination of Discrimination in Respect of Employment and Occupation (111)	Guinea ratified Convention 111 in September 1960.	The Convention on the Elimination of Discrimination in Respect of Employment and Occupation provides that member states pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination in respect thereof. It has not been possible to confirm, based on publicly available information, whether the Guinean Government has transposed the requirements of this Convention into Guinean legislation.
Worst Forms of Child Labour Convention 1999 (182)	Guinea ratified Convention 182 in June 2003.	The Worst Forms of Child Labour Convention 1999 provides that each member who ratifies the Convention must take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency. This includes slavery, trafficking, prostitution and pornography, forced labour and recruitment into militia, as well as occupations that harm the child's safety, morals or health. It has not been possible to confirm, based on publicly available information, whether the Guinean Government has transposed the requirements of this Convention into Guinean legislation.
Minimum Age Convention 1973 (138)	Guinea ratified Convention 138 in June 2003.	The ILO Minimum Age Convention, 1973 (No.138) sets the age below which children should not be in work at 15 (or 14 if a country's economic status requires that in the short term). Two years before they reach this minimum legal age, children can do 'light work' -- non-hazardous work for no more than 14 hours a week, and that does not interfere with schooling. Children under the minimum working age who are engaged in more than light work are in child labour. UNICEF additionally considers a child to be in child labour if they do domestic work for 28 hours or more a week.
Safety and Health in Mines Convention 1995 (176)	Guinea has not, to date, ratified this Convention.	The Convention applies to all mines (except mines that have been exempted by a competent national authority where the protection afforded at these mines under national law and practice is not inferior to that which would result from the full application of the provisions of the Convention). Each State which ratifies the Convention, must following consultations with the most representative organizations of employers and workers concerned, formulate, carry out and periodically review a coherent policy on safety and health in mines.

B5 International Standards Applicable to the Project

B5.1 Applicable IFC Performance Standards and EHS Guidelines

International Finance Corporation (IFC) Performance Standards, and accompanying Guidance Notes, are utilised by financial institutions to define clients' roles and responsibilities for managing social and environmental risks and impacts of their projects. These standards are internationally recognised and are therefore also regularly applied to projects that are not necessarily seeking IFC support. IFC Performance Standards relate to both conducting an SEIA as well as to the technical performance standards of the Project.

The IFC Performance Standards comprise:

- Performance Standard 1: Assessment and Management of Social and Environmental Risks and Impacts
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

The social dimension of these standards encompass (i) labour standards and working conditions including occupational health and safety and (ii) community impacts such as public health, safety and security, gender equality, impacts on Indigenous Peoples and cultural heritage, involuntary resettlement, and affordability of basic services.

The Project will also demonstrate best practice in relation to a number of voluntary IFC General and Industry Sector EHS Guidelines. The EHS Guidelines contain performance levels and measures that are generally considered to be achievable in new facilities at reasonable costs by existing technologies⁽¹⁾. The Project proponent is thus aiming to conform to the intent and spirit of these standards and guidelines. The Project Proponent will work in partnership with the Guinean government, communities and other stakeholders to address relevant and applicable specific recommendations from these standards and guidelines.

A high level summary of the requirements of the IFC Performance Standards that are applicable to the Project is presented in *Table B5.1*.

PS7 will not apply as there are no defined indigenous peoples in Guinea.

(1) Application to existing facilities may involve the establishment of site-specific targets.

Table B5.1 Applicable IFC Performance Standards

Performance Standard	Requirements	Relevant Requirements
<i>Performance Standard 1: Social and Environmental Assessment and Management System</i>	- Establish and maintain a Social and Environmental Management System incorporating: (i) Social and Environmental Assessment; (ii) management program; (iii) organizational capacity; (iv) training; (v) community engagement; (vi) monitoring; and (vii) reporting; - Social and Environmental Assessment to be based on: accurate project description; appropriate social and environmental baseline data; and consider applicable laws and regulations, conventions; - Analyse key risks and impacts within project's area of influence: (i) the primary project site(s) and related facilities; (ii) associated facilities (iii) areas potentially impacted by cumulative impacts; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; - Risks and impacts will also be analysed for the key stages of the project cycle; - Avoid, minimize, mitigate, or compensate adverse impacts; - Project-affected groups and local NGOs must be consulted about the potential effects; - Public Consultation and Disclosure Plan (PCDP) which establishes the framework for executing public consultation in a way which is transparent and captures relevant stakeholder feedback; and - Establish and manage a program (Management Program) to consist of operational policies, procedures, mitigation and performance improvement measures and actions that address the identified social and environmental risks and impacts.	- International SEIA in line with international expectations (IFC); - Regulatory EIA which meets Guinean requirements; - SEMS and SEMP identifying how adverse impacts and risks will be managed and mitigated; - SEP that will be updated throughout SEIA process to reflect ongoing stakeholder engagement; - Grievance Procedure; - Timely Disclosure of impacts and proposed mitigation measures; and - Stakeholder comments to be integrated into final SEIA and SEMP.
<i>Performance Standard 2: Labour Conditions</i>	- Create good working conditions and manage the worker relationship; - Protect the work force, do not employ child or forced labour; - Provide workers with a safe and healthy work environment; - Use commercially reasonable efforts to contract non-employee workers; and - Consider any adverse impacts associated with supply chains.	- Health and safety procedures to be incorporated into SEMP; and - Where feasible execute a preferential employment policy that gives local workers an opportunity to benefit from the project.

Performance Standard	Requirements	Relevant Requirements
<i>Performance Standard 3: Pollution Prevention and Abatement</i>	• Apply pollution prevention and control technologies and practices that are best suited to avoid, minimize or reduce adverse impacts on human health and the environment while remaining technically and financially feasible and cost-effective; • Energy Efficiency: Examine and incorporate in its operations resource conservation and energy efficiency measures, consistent with the principles of cleaner production; • Promote the reduction of project-related GHG in a manner appropriate to the nature and scale of project operations and impacts; and • The project-specific pollution prevention and control techniques should be applied during the entire project life-cycle.	• SEIA to consider environmental standards set out in national law and in IFC General and relevant sectoral EHS Guidelines, 2007; • Comply with International Standards for Energy Efficiency and Cleaner Production; • Quantify emissions; and • Evaluate options for reducing of offsetting disturbance and emissions.
<i>Performance Standard 4: Community Health, Safety and Security</i>	• Evaluate the risks and impacts to the health and safety of the affected community throughout whole life cycle from both routine and non-routine circumstances; • Establish appropriate preventive measures to address them; • Infrastructure and Equipment Safety: Design, construct, and operate and decommission project in accordance with good international industry practice; • Hazardous Materials Safety: Prevent or minimise the potential for community exposure to hazardous materials that may be released by the project. Special attention to delivery/removal of hazardous waste/ products along transportation routes; • Environmental and Natural Resource Issues: Avoid or minimise the exacerbation of natural hazards, such as landslides or floods that could arise from land use changes; • Community Exposure to Disease: Prevent or minimise the potential for community exposure to water-borne, water-based, water-related, vector-borne disease, and other communicable diseases that could result from project activities; • Where specific diseases are endemic in communities in the project area of influence, the client is encouraged to explore opportunities during the project life cycle to improve environmental conditions that could help reduce their incidence; • Emergency Response Plan: Inform affected communities of significant potential	• Health and safety procedures to be incorporated into SEMP; • Design project elements, especially Tailings Storage Facility, Waste Rock Disposal Facility, Flood Water Catchments & Diversion structures etc. to minimise risk from natural hazards such as flooding, soil erosion, earthquake; • Disease and Health Management Plan which covers all workers for the Project; • Pre-employment medicals; • Access to medical check-ups, education about communicable diseases (such as STDs); • Emergency Response Plan: to be prepared in consultation with communities and local government; and • SEP to include plan for stakeholder engagement on emergency response issues.

Performance Standard	Requirements	Relevant Requirements
	hazards in a culturally appropriate manner. Assist and collaborate with the community and the local government agencies in their preparations to respond effectively to emergency situations; and Employee/Contractor safety: provide security safeguards based on international practices in terms of hiring, rules of conduct, training, equipping and monitoring of such personnel and applicable laws.	
<i>Performance Standard 5: Land Acquisition and Involuntary Resettlement</i>	- Compensation and Benefits for Displaced Persons: When displacement cannot be avoided, the client will offer displaced persons, and communities, compensation for loss of assets at full replacement cost and other assistance to help them improve or at least restore their standards of living or livelihoods; - Where livelihoods of displaced persons are land-based, or where land is collectively owned, the client will offer land-based compensation, where feasible; - Mitigate socio-economic impacts from land acquisition; - Improve livelihoods of those displaced and living conditions at resettlement sites; - Special requirements for Physically and Economically Displaced Persons; and - If resettlement is required, these requirements are achieved through the development of a Resettlement Action Plan (RAP) which incorporates: consultation, compensation, income restoration, monitoring.	- Project Design: Avoid or at least minimize involuntary resettlement; - Inform groups who may be affected by land acquisition; - SEP to include plan for consultation with those affected by land acquisition and resettlement; - Special grievance procedure to be established for persons affected by physical or economic displacement; and - Demonstrate that due process has been followed for compensating existing land users.
Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management	- Evaluate project impacts on biodiversity (during SEIA) and adopt measures to eliminate or reduce, paying particular attention to the problems of habitat destruction; and - Special requirements for “protected areas” and “critical habitats”.	- Evaluate impacts on biodiversity (during SEIA); and - Adopt measures to eliminate or reduce adverse impacts.
<i>Performance Standard 8: Cultural Heritage</i>	- Comply with relevant national law on the protection of cultural heritage; - Cultural Heritage impacts during the impact assessment process, and (ii) include a “Chance-find Procedure” for archaeological relics; and - Consult with affected communities if the project may affect cultural heritage.	- Cultural Heritage Investigation; and - Chance-find Procedure to be implemented during construction.

B6 Mining Concession and Mining Convention

Simfer S.A., a member of the Rio Tinto Group, holds a mining concession for iron ore over the Southern part of the Simandou mountain range in the Republic of Guinea.

A mining agreement convention between the Guinean government and Simfer S.A., which was ratified by a law passed and signed in February 2003 (Mining Convention), as well as a Settlement Agreement signed between the same parties on 22 April 2011, defines the legal framework applicable to the Simandou project.

The mining concession for the exploration and mining of iron ore over the Southern part of Simandou was granted by decree (Decree D/2011/134/PRG/SGGD2006/008/PRG/SGG) to Simfer on April 22, 2011. This decree was issued pursuant to the Mining Convention and the Settlement Agreement.

Annex C

Site File Template

Simandou Project

Social and Environmental Impact Assessment

Roads Programme

Site File: <<Location>>

Company:	Rio Tinto
Product Group:	Iron Ore
Business Unit:	Simfer S.A.
Doc Ref:	XX VX00
Date:	DD Month YYYY

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2	Project Description	3
3	Stakeholder Engagement.....	4
4	Description of the Baseline Environment	5
	4.1 Introduction	5
	4.2 Road Corridor	5
	4.3 Surrounding Areas	5
5	Site-Specific Impacts and Mitigation	6

Annex A: Technical Information

Annex B: Record of Stakeholder Consultation

Annex C: Site Social and Environmental Action Plan

Annex D: Site Monitoring and Audit Programme

1 Introduction

Provides an introduction and explains the context of the document including:

- the proposed road project (new road or road widening or improvement);
- explanation of context of the Class SEIA approach; and
- description of the purpose of this Site File in relation to the Class SEIA, and the additional site-specific information to be presented.

2 Project Description

Provides a description of the proposed roadworks, including the following.

- Relevant maps:
 - a national and local map showing the location of the proposed activities; and
 - a detailed plan of the route with indication of what works are proposed including any new or upgraded structures (bridges, culverts, intersections, etc), side road junctions, overlain on aerial photography.
- Specifications for the structure of the road (comparison of before and after the works for improved roads), drainage design including culverts, and design of structures.
- Details regarding any ancillary works required for construction, including temporary work sites, haul roads, construction work corridor, water supply, borrow pits, supply of other materials (aggregate, concrete, bitumen, etc).
- A discussion on alternatives considered, and the justification for the selection of the proposed route and design.
- A summary of the construction schedule and methods for the works.
- An overview of the operation of the works including estimates of expected use by Project-traffic (duration of Project-use; average daily flow by type of vehicle; use by any abnormal loads).
- Current plans for continued use of the road on completion of use by the Simandou Project or plans for closure and rehabilitation of the corridor.

3 Stakeholder Engagement

- Description of stakeholder engagement activities undertaken during planning for the works identifying dates, times, locations and names/positions of stakeholders involved in the process. Detailed records to be documented in *Annex B*.
- Summary of the comments and views expressed by stakeholders and explanation of how they have been taken into account in planning for the works.

4 Description of the Baseline Environment

4.1 Introduction

Documents the sources of information including maps, aerial photography, satellite imagery, baseline studies, published information, site visits and consultation with members of local communities.

4.2 Road Corridor

Provides a description of the conditions and features in the area of planned works including:

- physical conditions;
- vegetation, habitats and any significant fauna and flora;
- soils;
- water resources;
- current land use and land ownership; and
- vehicle/pedestrian/livestock access routes across and in the vicinity of the corridor.

4.3 Surrounding Areas

Provides a description of the conditions and features in the area surrounding the planned works, including:

- physical conditions;
- local habitats and any significant species of fauna or flora;
- water resources;
- locations of settlements in the vicinity of and connecting to the route;
- surrounding land use and ownership, including any sensitive or important areas;
- existing infrastructure in the area;
- size, economic status, livelihoods, religion and ethnicity of people living near the road;
- potential for the local community to supply goods or services to the works; and
- specific health, safety or security issues in the local community;
- any significant ecosystem services supported by the area of the works.

5 Site-Specific Impacts and Mitigation

- Provides the assessment of the magnitude and significance of any impacts specific to the planned works (including positive impacts/opportunities)
 - Mitigation measures are presented in the Site Social and Environmental Action Plan included in *Annex C*.
 - Actions to monitor delivery and performance of these measures are set out in the Monitoring and Audit Programme in *Annex D*.

Annexes

A Technical Information

Supplementary maps, drawings and specifications.

B Records of Stakeholder Consultations

Stakeholder Engagement Record	
Date	
Time	
Site	
Location	
Participants	
Key Issues or Concerns	

C Site Action Plan

Impact/ Issue	Site Specific Mitigation	Compliance Indicators	Responsibilities & Resources

D Site Monitoring and Audit Plan

Impact/ Issue	Monitoring plan (parameters, frequency, measuring locations, methods)	Standards for satisfactory performance	Responsibilities & Resources

Annex D

Terms of Reference

Part A	Proposed SEIA Overview and Methodology
Part E	Roads Programme

Simfer SA

Simandou Project

Social and Environmental Impact Assessment Terms of Reference

PART A

Proposed SEIA Overview and Methodology

Contents

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A2 MAIN PROJECT OVERVIEW A-2

A3 LEGAL AND REGULATORY CONTEXT A-3

A4 APPROACH AND METHODOLOGY TO BE ADOPTED FOR THE SEIA.....A-4

A1 Introduction

The Simandou Project ("Project") is located in eastern Guinea, approximately 600km from the Guinean coast and 400km from the Liberian coast. The concession licence-holder and project company is Simfer S.A., which is currently owned 5% by International Finance Corporation (IFC) and 95% by the Rio Tinto Group. In April 2011, the Republic of Guinea and Simfer S.A. (Simfer) signed a Settlement Agreement, which confirms Simfer's title to a southern part of Simandou. The Settlement Agreement provides the Republic of Guinea with the right to progressively take a stake of up to 35% in Simfer (the Mine) and, a 51% stake in a separate company to be created (known as a special purpose vehicle the "SPVA") to build, own and operate the Project's (Rail & Port) Infrastructure. The Settlement Agreement also acknowledges the proposed participation by Aluminium Corporation of China Limited (Chinalco) through a Joint Venture with Rio Tinto.

Significant high grade resources have been determined by Simfer., which are expected to form the basis of a mining operation with an estimated resource capacity of 95Mtpa. The Project will produce a high grade "sinter fines" product. The open pit could be mined by conventional truck and shovel methods although in-pit crushing and conveying options are currently being assessed. Simfer plans to use a combination of hydropower and diesel powered generation to provide electricity to on-site processing plant. The transport infrastructure requirements for the project involve a new port and up to 700km railway to the Project site.

The Simandou Project will be subject to the Guinean Environmental Code and to subsidiary decrees, orders and guidance¹ which require Environmental Impact Studies to be completed before the development can commence. Rio Tinto's own corporate policies and standards also require a comprehensive Environmental Impact Study to be undertaken as part of project planning and decision-making, as do the policies and standards of IFC². In line with corporate and international standards Simfer proposes that its impact studies will address social as well as environmental issues. The term Social and Environmental Impact Study (SEIA) is therefore used throughout the remainder of the present document.

In accordance with Guinean law and guidance the first step in the SEIA procedure is for the Minister for the Environment to issue a Terms of Reference for the studies. The aim of the Terms of Reference is to ensure that the SEIA covers all the aspects of the project and all the potential significant impacts at a level of detail that is sufficient to allow an informed decision to be made about approval of the project. To do this, the Terms of Reference will define the project and its potential impacts on the environment and communities, and set out the proposed approach to the Impact Study, the experience that is needed to prepare the study and the timetable for its completion.

This document presents a draft of the Terms of Reference for the Project for consideration by the Minister for the Environment. Following issue of the Final Terms of Reference by the Minister, Simfer will complete the preparation of impact studies in compliance with the requirements of the Republic of Guinea.

In order to meet the target for first commercial ore production by mid 2015, set out in the Settlement Agreement, the SEIA is being undertaken in a number of parts to allow certain works to start in advance of the main Project. This Draft Terms of Reference is therefore presented in a number of parts relating to different components of the works for which separate SEIA Reports will be submitted. The timetable for each SEIA is set out in the individual Terms of Reference for each component. The main Simandou Project SEIA is programmed to be submitted in March 2012 and will incorporate the results of the earlier assessments.

The components for which Terms of Reference are presented here are:

- The main Simandou Project, including the Mine, Railway and Port

1 Code de l'Environnement of the Republic of Guinea; Presidential Decree 199/PRG/SGG/89 on Environmental Impact Studies; Arrêté 990/ NRNE/SGG/90 establishing the content and methodology for Environmental Impact Studies; and Ministère de l'Agriculture de l'Elevage de l'Environnement des Eaux et Forêts, Service National des Etudes et d'Evaluation Environnementale « Les Etudes d'Impact sur l'Environnement : Termes de Reference pour les Etudes d'Impact Environnemental & Social & Guide d'Evaluation » ; Version 03/2007.

2 Simfer will follow the policies and guidance established by its joint venture partner IFC (the International Finance Corporation) in its Policy on Social & Environmental Sustainability 2006 and the supporting Performance Standards, Environmental, Health and Safety Guidelines, and other referenced sources of guidance. Reference will also be made to the currently proposed updates to the IFC's policy and performance standards – see <http://www.ifc.org/ifcext/policyreview.nsf/Content/Home>

- A Marine Offloading Facility required for construction; and
- Construction Workforce Accommodation and Logistic Supply Centres.

Further Terms of Reference will follow relating to a hydroelectric project at Lolema, and further possible construction-related early works such as quarries, road improvements, and water supply.

These Draft Terms of Reference have been prepared by the international specialist consultants Environmental Resources Management (ERM). ERM has been appointed by Simfer to undertake the SEIA for the Project including development of the Draft Terms of Reference. The international consulting firms SNC Lavalin, Tractabel, Schlumberger Water Services, The Biodiversity Consultancy and several other international specialist organisations and individuals, are also involved in the studies, as are a number of Guinean organisations who are undertaking baseline surveys and other research for the assessment.

The remainder of Part A of this document provides an overview of the general approach to the SEIA and is organised as follows:

- Section A2 provides an overview of the main project;
- Section A3 presents the legal and regulatory context for the SEIA for all components of the works; and
- Section A4 describes the general approach and methodology to be adopted for the SEIA.

Parts B to D then present more specific details for each project component covered by this document:

- Part B: The Simandou Project Mine, Railway and Port Development.
- Part C: The Pioneering Marine Offloading Facility; and
- Part D: Construction Workforce Accommodation and Logistical Support Centres.

In each case the following information is presented:

- Sections B1 – D1: a description of the proposed works;
- Sections B2 – D2: the proposed scope of the assessment
- Sections B3 – D3: the planned SEIA Report structure;
- Sections B4 – D4: the SEIA team; and
- Sections B5 – D5: the SEIA timetable.

If as planning for the Simandou Project proceeds it proves necessary to propose other advance works which require SEIA, for example relating to dredging, supply of materials, development of supporting infrastructure (roads, etc) or early development of other elements of the main project, further Terms of Reference for these additional early works will be prepared, as adjuncts to this document, for Government consideration and approval.

A2 Main Project Overview

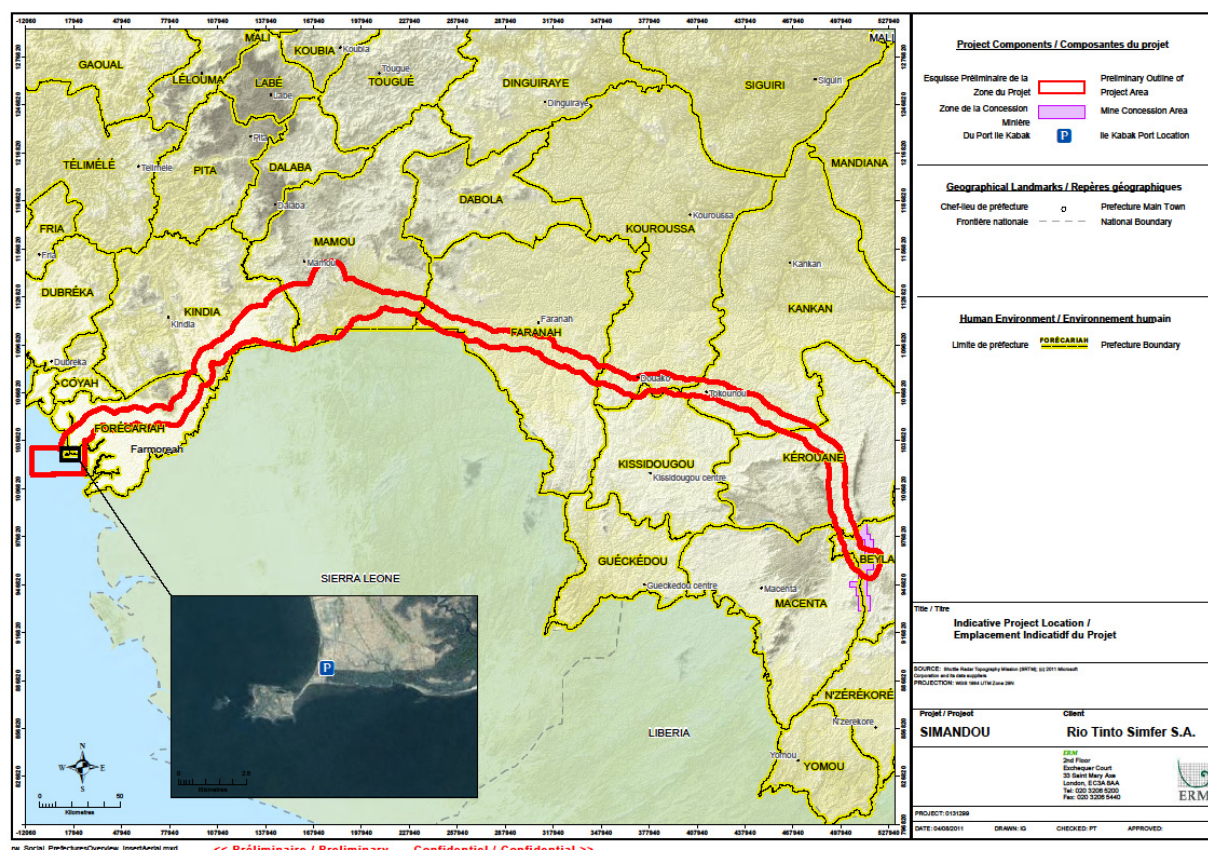
The Simandou Project comprises three main components:

1. an iron ore mine in the Simandou Range in south-eastern Guinea with an estimated resource capacity of 95MTpa;
2. a Trans-Guinean railway of up to 700 km to transport the ore from the mining concession to the Guinean coast;

3. a new deepwater port currently planned to be located south of Conakry in the Forécariah prefecture.

The location of the mining concession and indicative locations for the rail line and port area are illustrated in *Figure A2.1*. Further details of the main Project are provided in Part B.

Figure A2.1 Overview of the Simandou Project



A3 Legal and Regulatory Context

The Code for the Protection and Development of the Environment, (Ordinances 045/PRG/87 and 022/PRG/89) also known as the Environmental Code sets out the fundamental legal principles to be complied with to ensure the protection of environmental resources and the human environment. Article 82 of Title V of the Environmental Code imposes an obligation on developers of projects which are likely to have a significant impact on the environment, to conduct an Environmental Impact Study and submit this to the Minister for the Environment prior to the construction of a Project, allowing evaluation of the direct and indirect impacts of the Project on the ecological equilibrium of the environment of Guinea, the quality of life of the people and the protection of the environment.

Presidential Decree 199/PRG/SGG/89 issued under Article 82 of the Environmental Code sets out the projects which by virtue of their size or nature of their activities require an Environmental Impact Study. The list of works for which an impact study is required is set out in the Annexe to the decree and includes:

- 2e: Works for the construction and management of ports;
- 4e: Mines
- 5e: Construction of railways.

An Environmental Impact Study is therefore required for all main components of the Simandou Project.

The subsequent *Arrêté* 990/ NRNE/SGG/90 issued under Art 7 of Decree 199/PRG/SGG/89, establishes the content and methodology for environmental impact studies.

The procedure for an EIS provides for the Minister for the Environment to issue a project-specific Terms of Reference which provides details on the project to be assessed, the issues to be addressed, the environmental experts who will conduct the EIS and the steps to be followed. This document presents a draft of the Terms of Reference for consideration by the relevant authorities.

A4 Approach and methodology to be adopted for the SEIA

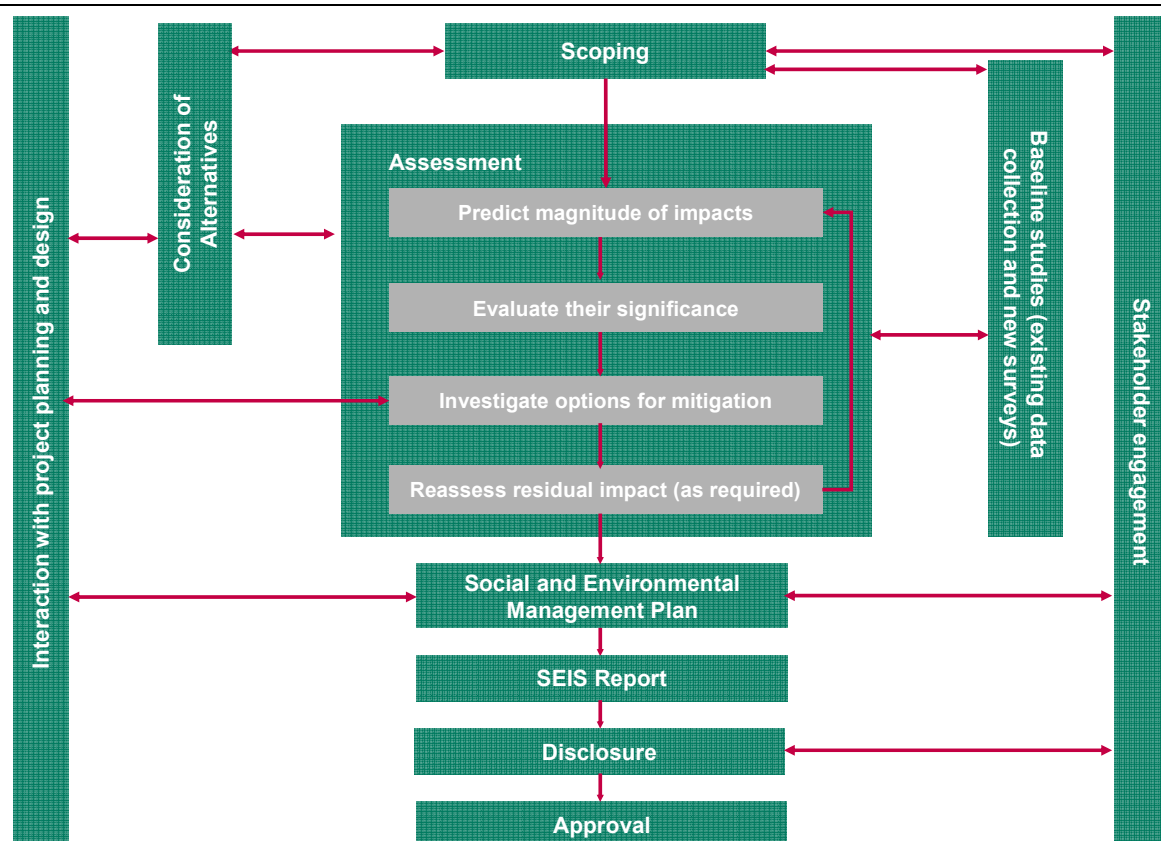
A4.1 Overview of Methodology

The social and environmental impact assessment for the Project will be undertaken in accordance with the guidelines and procedures identified in this Terms of Reference. It will follow a systematic process of:

- establishing baseline conditions in the physical, natural, cultural, social and socio-economic environment of the area potentially affected by the Project;
- predicting and evaluating the positive and negative changes in these baseline conditions that will result from construction, operation and closure of the Project, i.e. the impacts of the Project ; and
- identifying the measures that Simfer. will take to avoid, reduce, remedy, offset or compensate for adverse impacts, and to provide or enhance benefits from the project.

The proposed approach for the assessment is shown schematically in *Figure A4.1* and the key steps are described below.

Figure A4.1 SEIA Approach



The key steps in the process are outlined in *Table A4.1* and detailed further below.

Table A4.1 Summary of the SEIA Process

Stage	Summary of Approach
Scoping	Scoping is designed to ensure the process is focused on the significant environmental and social impacts which may arise from the Project. It involves a systematic consideration of the potential for interaction of project components and activities with features in the environment to identify where significant impacts are likely to occur. The results of scoping are presented in this Draft Terms of Reference and for the basis for planning the assessment studies. The scope will be kept under review and updated as new data emerges from baseline studies and as the SEIA proceeds. The SEIA will also take into account the results of consultations undertaken on the Project.
Baseline development	For the key issues identified in scoping, available information on the current environmental and social conditions will be gathered. Particular emphasis will be placed on sensitive aspects which are potentially affected by the Project including its immediate location and the surrounding environment. Baseline field studies and surveys will be conducted where necessary. The future development of baseline information in the absence of the Project will also be considered. This future No Project scenario will provide the baseline against which the impacts of the Project will be predicted and evaluated. (Note: a substantial programme of baseline survey work has already been completed for the Simandou Project and further surveys are currently underway to address the outstanding gaps in knowledge).
Alternatives	Where alternatives exist for the siting or design of particular components of the Project these will be considered in collaboration with the engineering design team. The SEIA will appraise the environmental and social impacts of these alternatives as an input to the selection of preferred options. The results will be presented in the SEIA report. The rationale behind siting of the project and selection of the proposed design and construction techniques will be presented from a technical, environmental and social perspective.

Stage	Summary of Approach
Impact assessment	This stage is focused on predicting how environmental and social conditions will change from the baseline as a result of constructing and operating the Project and where relevant decommissioning, closing and rehabilitating the site. Quantitative and qualitative information on the nature, magnitude, spatial extent, duration and likelihood of change will be predicted and each impact will then be evaluated to determine its significance for the environment and society by reference to established standards and norms. The focus will be on identifying the significant impacts (ie the most important and the impacts with the potential to cause greatest harm). The assessment will also review all possible impacts in order to determine which are likely to be significant. Positive benefits provided by the Project will be identified.
Mitigation measures	Measures to avoid, reduce or remedy adverse effects, and where this is not possible to provide compensation by offering resources or facilities to replace those that are lost will be identified and agreed with the Project engineering team and Simfer. These mitigation measures may include amendments to the Project design or methods to be adopted during construction or operation of the Project. The aim is to minimise adverse effects and provide or enhance environmental and social benefits.
Assessment of residual impacts	Where feasible mitigation measures are identified impacts will be reassessed to determine residual impacts after mitigation.
Social and Environmental Management Plan (SEMP)	All mitigation measures will be presented in a Social and Environmental Management Plan (SEMP). These will be set out as commitments made by Simfer. The SEMP will also describe how the measures will be implemented during the detailed design, construction and operation of the Project. It will detail the responsibilities and resources for implementation, the timing, and monitoring and auditing to be carried out to ensure all mitigation commitments are met. The SEMP will also identify requirements for training and capacity building within the project and amongst other stakeholders including government. The social aspects of the SEMP will incorporate a Land Acquisition, Compensation and Resettlement Policy Framework detailing how expropriation of land for the Project will be managed in accordance with international good practice. The SEMP will also reference more detailed supporting plans for managing particular aspects of the social and environmental impacts of the project including plans for influx management, cultural heritage, community development, waste and water management, and detailed land acquisition, compensation and resettlement.
Consultation and Stakeholder Engagement	During the SEIA the team will seek the views of interested parties. This information will be taken into account in the assessment and reflected in the proposals for mitigation. Once complete the SEIA Report will be disclosed for comment from all interested stakeholders. All comments will be considered in finalising the Project proposals and the SEMP. The SEMP will be accompanied by a Stakeholder Engagement Plan. This plan will detail how the Project will continue to engage with stakeholders during development including operation of a Grievance Mechanism to handle complaints from affected people.
Reporting, Disclosure and Approval	The final stage in the SEIA process is the preparation of the SEIA Report presenting all the findings of the impact studies. This will be submitted to Government for consideration. The report will be disclosed to the public and other stakeholders for review and comment. Once the disclosure and consultation process is complete the findings of the studies and the results of consultation will be taken into account by Government in making its decision on whether to approve the project and on any conditions to be attached to that approval.

A4.2 Scoping

During Scoping the Project and predicted interactions with communities and the environment will be reviewed to determine what are likely to be significant impacts, and to plan the work required to assess these impacts. This Terms of Reference has been produced following Scoping.

To undertake scoping effectively it is important to clearly define the Project, how the area of influence is defined, and the broad types of impacts that need to be considered in the assessment. The approach that will be followed in defining the Project, the resultant area of influence and the types of impacts to be addressed within the SEIA are described below.

Definition of the Project and its Area of Influence

In the SEIA a **Project** should be clearly defined to include all actions and activities which are a necessary part of the development. This will include all the main components of the Project and also any related and ancillary facilities without which the Project cannot proceed. This includes utilities, infrastructure, accommodation, etc. It should also include any other developments or activities which can be expected to follow as a necessary consequence of the Project even if not within the responsibility of Simfer. Examples may include migration of people into an area or new roads built by the government to meet increased demand for traffic caused by the project. This approach will be followed for all components of the Simandou Project.

Impacts will also be assessed for all **Phases** of the Project from initial site preparation and advance works, through construction and operation to closure, decommissioning and restoration of sites.

Impacts will be assessed throughout the **Area of Influence** of the Project. This will vary depending on the type of impact being considered, but in each case the area will be defined to include all that area within which it is considered that significant impacts could occur. This will take into account:

- the physical extent of the proposed works, defined by the limits of land to be acquired or used temporarily or permanently for the construction and operation of the Project;
- the nature of the baseline environment, the source of impact and the manner in which the impact is likely to be propagated beyond the Project boundary.

For example, losses of existing land uses are likely to be confined to those areas physically disturbed by the works, whilst the effects of noise could be experienced at some distance, and air pollution may be dispersed over long distances or even have regional or global effects. The proposed area of influence (study area) for each type of impact will be defined in the respective chapters of the SEIA Report.

Some impacts could extend across national boundaries, for example as a result of changes in animal migration or patterns of cattle herding, and the assessment will include these **Trans-Boundary** effects.

Types of Impact

The assessment will consider both **Positive and Negative** impacts on all aspects of the **Physical, Natural, Cultural, Social and Socio-Economic** environment.

Positive or beneficial impacts will be those which are considered by the SEIA team, taking in to account the views of external stakeholders, to present an improvement on the situation without the Project (the baseline) or to introduce a new desirable factor. Negative or adverse impacts will be the reverse.

Aspects of the environment to be considered will include:

- the physical environment including:
 - geology and soils;
 - land and topography;
 - hydrology and hydrogeology;
 - microclimate and global climate
 - surface and ground water resources including marine and freshwater;

- air quality;
- noise, vibration, light and other forms of radiation;
- the biological or natural environment including:
 - aquatic and terrestrial habitats and ecosystems;
 - flora and fauna and their biodiversity;
 - protected areas;
 - useful services provided by natural systems (referred to as ecosystem services)
- the cultural environment including:
 - tangible and intangible sites and features of archaeological, historic, traditional, cultural, aesthetic interest;
 - cultural traditions, practices and events;
 - the landscape and visual amenity;
- the social and socioeconomic environment including:
 - people and their homes, lands, other resources and assets;
 - the characteristics and structures of communities;
 - population and demographics;
 - human health, welfare, amenity, safety and security;
 - lifestyles including livelihoods, employment and incomes;
 - economic activities including industry and commerce, tourism, fisheries, agriculture and forestry;
 - community facilities such as schools, hospitals and leisure facilities;
 - utilities and infrastructure (power, water, sewerage, waste disposal, transport);
 - services such as health care, education and access to goods;
 - local, regional and national economies.

When discussing different aspects of the environment we will distinguish between **Resources** that is features of the environment such as soils, water resources, habitats, species, etc which are valued by society for their intrinsic worth and/or their social or economic contribution, and **Receptors**, that is people and communities who may be affected by the Project.

Timeframe

The assessment will address impacts with different temporal characteristics:

- **Permanent** impacts that will arise from irreversible changes in conditions such as the removal of physical features during construction;
- **Temporary** impacts that will arise during **short term** activities such as construction and decommissioning; and
- **Long term** impacts that will arise over the **operation** of the Project or occur as the environment recovers after its **closure**.

Short term, temporary impacts will cease on completion of the relevant activities although there may be a period before the environment returns to its previous condition. Long term impacts will continue over the life of the Project and during restoration, and may vary during this period, but will ultimately cease when the Project ceases although the environment may take some time to recover.

Other temporal characteristics of impacts (continuous or intermittent, one-off or recurrent) and their frequency and timing (e.g. seasonality) will also be taken into account.

Routine and Non-Routine Impacts

Development of the Project raises the potential for impacts to arise from both planned and unplanned events. The SEIA will therefore assess both:

- **routine** impacts resulting from planned activities within the Project; and
- **non-routine** impacts arising from:
 - unplanned or accidental events within the Project such as accidents involving spills of hazardous substances;
 - natural hazards and other external events affecting the Project such as seismic activity and flooding.

The impact of non-routine events will be assessed in terms of the Risk ie taking into account both the consequence of the event and the probability of occurrence (Risk = probability x consequence).

Direct, Indirect and Induced Impacts

Impacts can also be characterised according to whether they are **direct** (primary) impacts arising from activities associated with the Project or **indirect** (secondary and higher order) impacts that follow on as a consequence of these. So for example construction can lead to emissions of dust with a direct effect on air quality. Dust dispersion can then affect nearby agricultural fields possibly causing adverse effects on the quality and/or quantity of crops and the livelihoods of farmers. Dust can also result in soiling of buildings and materials with effects on amenity for users and added costs for maintenance.

Projects can also have **induced** impacts by stimulating other developments to take place which are not directly within the scope of, or essential to, the development of the Project. So for example, road improvements may encourage people or businesses to move into an area, and as a result lead to building of new homes which will have their own impacts. Whilst these possible developments are not part of the Project, they are caused at least in part by the Project and they will therefore be considered in the assessment.

Cumulative Impacts

The potential for the Project to have **cumulative** impacts with other activities and with known or committed developments such as other major mines or more informal artisanal mining, taking place in the area at the same time will also be taken into account in the assessment. Where other developments are already underway or committed they will be addressed by incorporating them into the future baseline for the Project (ie the No Project situation against which the impacts of the Project are assessed). If there are other developments which are still in planning but have yet to be formally approved the impacts of these will be considered alongside the impacts of the Project so that a full picture is provided of the possible future situation.

A4.3 Baseline Studies

To provide a baseline against which the impacts of the Project can be assessed, an important part of the SEIA will be to establish the conditions that would prevail in the absence of the Project – the Baseline. Baseline studies have already been undertaken in particular areas and additional baseline data is being collected, drawing upon information from:

- existing sources including government agencies, research organisations, publications;
- consultations with stakeholders;
- review of maps, satellite images and aerial photographs of the Project location and its surrounding area; and
- field studies designed to fill gaps in the data where this is needed to enable assessment of impacts.

The details of sources and survey methods will be fully described in the SEIA Report.

When assessing the impacts of projects, it is important to recognize that the baseline is likely to change significantly from the existing situation, as a result of changes in population, land use and economic activity, and through other developments independent of the Project. The baseline for this Project will therefore be defined by considering how current conditions will develop in the future without the Project (the “No Project” scenario).

A4.4 Assessment of Impacts

A4.4.1 Introduction

The assessment of impacts will follow an iterative process considering four questions:

1. Prediction - What will happen to the environment and communities as a consequence of this Project?
2. Evaluation - Does this impact matter? How important or significant is it?
3. Mitigation – If it is significant can anything be done to avoid or reduce adverse effects or enhance benefits?
4. Residual Impact – Is the impact still significant after mitigation?

The approach to these steps is outlined below.

A4.4.2 Predicting the Magnitude of Impacts

The impact assessment will describe what will happen to the environment and communities by predicting the magnitude of impacts and quantifying this to the extent practicable. The term “magnitude” is used here to encompass various possible dimensions of the predicted impact including:

- the nature of the change (what is affected and how);
- size, scale or intensity;
- geographical extent and distribution;
- duration, frequency, reversibility, etc; and
- where relevant, the probability of the impact occurring as a result of accidental or unplanned events.

It will also include any uncertainty about the occurrence or scale of the impact¹. Magnitude therefore describes the actual change predicted to occur in a resource or receptor (e.g. the area and duration over which air or water become polluted and the increase in concentration of the pollutant; the degree and probability of impact on the health or livelihood of a local community; the probability of injuries or deaths as the result of an accident).

Magnitude can be predicted using a range of different methods depending on the nature of the impact. As an example, noise and air quality impacts are typically predicted using standard mathematical models developed for calculating the effects of sources on ambient noise levels and concentrations of air pollution. Direct impacts on land use and habitats can be calculated from maps of the project footprint. However, some impacts which are less amenable to mathematical or physical representation are predicted using the professional knowledge and experience of experts, for example in areas such as biodiversity. The approach employed for this Project will be detailed for each type of impact in the relevant chapters of the SEIA.

To assist in the next step of evaluating significance (see A4.4.3), the magnitude of impacts will be graded taking into account all the various dimensions, to determine whether an impact is of small, medium or large magnitude. This scale is defined differently according to the type of impact and depending on the circumstances. For quantifiable impacts such as noise, numerical values are used whilst for other topics a qualitative classification is necessary.

The details of how magnitude is predicted and described for each impact will be explained in the relevant chapters of the SEIA Report.

A4.4.3 Evaluation of Significance

The next step in the assessment will be to take the information regarding the magnitude of impacts, and explain the importance to society and the environment. This will allow stakeholders to understand how important issues are when considering the Project. This is referred to as Evaluation of Significance.

There is no statutory or agreed definition of significance however, for the purposes of this assessment, the following practical definition is proposed:

An impact will be judged to be significant if, in isolation or in combination with other impacts, it should, in the judgement of the SEIA team, be reported in the SEIA Report so that it can be taken into account in the decision on whether or not the Project should proceed and if so under what conditions.

This recognises that evaluation requires an exercise of judgement and that judgements may vary between parties involved in the process (including regulators, experts, affected people and the general public). The evaluation of impacts that is presented will be based on the judgement of the SEIA Team, informed by reference to legal and international standards and policy, current good practice and the views of stakeholders as expressed through the consultation process.

Criteria for assessing the significance of impacts will be clearly defined for each type of impact taking into account whether the Project will:

- Cause legal or accepted environmental standards to be exceeded – e.g. air, water or soil quality, noise levels – or make a substantial contribution to the likelihood of standards being exceeded; or
- Adversely affect protected areas or features or valuable resources – these include protected nature conservation areas, rare or protected species, historic features, important sources of water supply; or
- Conflict with established government or international policy e.g. to reduce greenhouse gas emissions, recycle waste, improve health, protect human rights, etc.

(1) A distinction is made here between the probability of impact arising from a non-routine event such as a seismic event or fire, and the uncertainty inherent in making predictions about what will happen in the future. For example it may not be certain that health will be affected by air emissions or that jobs will be obtained by local people. This is different from estimating the probability of an unplanned event occurring. Uncertainty can be expressed by describing the predicted outcome using a range rather than a single value, by placing confidence limits around the prediction, or by estimating the likelihood of the prediction being correct.

Where standards are not available or provide insufficient information on their own to allow evaluation of impacts, significance will be evaluated taking into account the magnitude of the impact and the value or sensitivity of the affected resource or receptor. Magnitude will be defined as described in the previous section (A4.4.2). The value of a resource will be judged taking into account its quality and its importance as represented, for example, by local, regional, national or international designation, its importance to the local or wider community, or its economic value. The sensitivity of receptors, for example a household, community or wider social group, will take into account their likely response to the change and their ability to adapt to and manage the effects of the impact.

Magnitude and value/sensitivity will be looked at in combination to evaluate whether an impact is significant and if so its degree of significance. The principle is illustrated in *Figure A4.2*. The grades apply to both positive and negative impacts.

Figure A4.2 Evaluation of Significance

Sensitivity/Value of Resource/Receptor	Magnitude of Impact		
	Small	Medium	Large
Low	Not significant	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Critical

The specific criteria used to evaluate significance for each type of impact will be clearly defined in the impact assessment. It should be made clear that the distinctions between grades cannot be considered as clear cut and judgments as to magnitude, value or sensitivity, and significance involve careful weighing up of a range of factors by the SEIA Team.

A4.5 Mitigation

Impact assessment is designed to ensure that decisions on Projects are made in full knowledge of likely impacts on the environment and society. A vital step within the process is the identification of measures that can be taken to ensure impacts are as low as reasonably practicable.

This will be done by identifying where significant impacts could occur and then working with the Project team to identify reasonably practical ways of mitigating those impacts as far as possible. These measures will be agreed with Simfer and integrated into the Project proposals.

Where a significant impact is identified, a hierarchy of options for mitigation will be considered to identify the preferred approach:

- Avoid at source – remove the source of the impact, for example by relocating a component of the Project to avoid a sensitive site.
- Abate at source – reduce the source of the impact, for example by controlling the emission of dust or noise.
- Attenuate – reduce the impact between the source and the receptor, for example by installing a noise barrier between an industrial facility and neighbouring communities.
- Abate at the receptor – reduce the impact at the receptor, for example by providing noise insulation in nearby buildings.
- Remedy – repair the damage after it has occurred, for example by cleaning up accidental spills during construction.

- Compensate / Offset – replace a lost or damaged resource with a similar or a different resource of equal value, for example by resettling displaced businesses into new premises, or providing monetary compensation for loss of business.

Mitigation will also include measures to provide or enhance positive benefits from the Project, so for example by providing employment opportunities, and improving the chances of these being available to local people by setting up training in the required skills.

Consideration will be given to achieving mitigation of impacts by various means including:

- Changes in the design of the Project, for example relocating structures, incorporating noise barriers into the design, and designing structures to minimise their visual impact.
- Selection of particular approaches and methods for construction, for example using bored rather than driven piling or electrical rather than diesel powered equipment.
- Adoption of measures to control impacts during construction and operation, such as covering of dusty materials, installation of oil interceptors, adoption of emergency spill plans, and traffic management.

All these types of measures will be considered in the assessment and proposals discussed and agreed with Simfer. and presented in a Social and Environmental Management Plan (SEMP) for the Project. Where detailed measures cannot be presented as formal commitments at this stage in the Project, a clear commitment will be given to achieving a specified level of environmental performance and to finalizing specific measures at a later stage. Proposals will also be set out for monitoring implementation of mitigation and providing regular reports for external stakeholders as part of the Social and Environmental Management System for the Project. The SEMP will also identify means to build capacity in Guinea manage and regulate potential impacts.

A4.6 Assessing Residual Impacts

Following agreement on feasible mitigation the SEIA team will re-assess the impacts taking into account the mitigation adopted within the Project. Where significant residual impacts remain after mitigation further options will be examined and impacts re-assessed in consultation with the Project team. This will continue until they are considered to be as low as reasonably practicable. The significant residual impacts remaining at the end of this process will be described in the SEIA Report with commentary on the proposed mitigation. The degree of significance attributed to residual impacts will reflect the level of consideration the SEIA team considers should be given in reaching decisions on the Project.

- **Critical** impacts will be avoided.
- Any residual **Major** impacts, whether positive or negative, will warrant substantial consideration, when compared with other environmental, social or economic costs and benefits, in deciding whether or not the Project should proceed. Conditions should be imposed to ensure adverse major impacts are strictly controlled and monitored and beneficial impacts are fully delivered.
- Residual **Moderate** impacts are considered be of reducing importance to the decision, but still warrant careful attention to conditions regarding mitigation and monitoring, to ensure best available techniques are used to keep adverse impacts as low as reasonably practicable, and to ensure beneficial impacts are delivered.
- **Minor** impacts will be brought to the attention of the decision-maker but are identified as warranting little if any weight in the decision. Adequate mitigation should be achieved using normal good practice and monitoring should be carried out to confirm that impacts do not exceed predicted levels.

A4.7 Interface with the Design Team

The SEIA team will gather information for the assessment on the design, construction and operation of the Project. As impacts are investigated the results will be discussed with them and feasible mitigation measures discussed and integrated into the Project where possible. All agreed measures will be described in the SEIA Report and SEMP.

A4.8 Stakeholder Engagement

During the SEIA the team will also consult with stakeholders to understand their views and concerns relating to the Project and to collect information about the local environment and community. This information will be taken into account in the assessment and in the identification of appropriate mitigation measures for the Project.

Once the SEIA Report is completed and submitted to Government for review and approval it will be made widely available for public comment and its findings will be disseminated to affected communities. All comments made on the Project, its impacts and the proposed mitigation will be considered in finalising the Project design, the methods for construction and operation, and the detailed Social and Environmental Management Plan.

Simandou Project

Social and Environmental Impact Assessment Terms of Reference

PART E

Road Programme

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E1 Introduction

This document is a supplement (Part E) to the Terms of Reference for the Social and Environmental Impact Assessment (SEIA) of the Simandou Project, which was presented to the Government of Guinea in August 2010. It covers a programme of new roads and road improvements required in preparation for construction of the main project.

As detailed in the original Terms of Reference, the Simandou Project is a world-scale mining project comprising:

- an open pit iron ore mine in the Simandou Range in south-eastern Guinea, approximately 600 km from the Guinean coast and 400 km from the Liberian coast, with an estimated resource capacity of 95 million tonnes per annum (mtpa);
- a Trans-Guinean railway of about 670 km to transport the ore from the mining concession to the Guinean coast;
- a new deepwater port located south of Conakry in the Forécariah prefecture; and
- various associated developments providing utilities and infrastructure to the project including construction materials, power, water, access and accommodation.

The Simandou Project is being developed by the Guinean-registered company Simfer S.A. (Simfer). Simfer is a member of the Rio Tinto Group, and holds a mining concession for iron ore over the southern part of the Simandou mountain range. The current shareholders of Simfer are Rio Tinto (95%) and the International Finance Corporation (IFC – 5%). The mine will be operated by Simfer and the construction of the rail and port infrastructure will be carried out by a Special Purpose Vehicle (SPV) intended to be held 51% by the Government of Guinea and 49% by the shareholders of Simfer and its affiliates. The mine, rail and port developments, and their associated infrastructure, are hereafter referred to as the Simandou Project. An SEIA for the full Simandou Project is in preparation and will be submitted to Government in 2012.

This Terms of Reference for a Roads Programme, follows the Terms of Reference for two other advance works packages, which have already been submitted and approved; these relate to a Marine Offloading Facility (MOF) and Temporary Construction Workforce Accommodation Camps and Logistical Supply Centres (Camps and LSCs).

The proposed road improvements are required prior to the start of the main construction programme. An early application is therefore being developed for permission to develop these as advance works. An SEIA will be submitted to the Government of Guinea for review and approval as part of this application. This Terms of Reference sets out the proposed scope of the SEIA.

The remainder of the document is organised as follows:

- *Section E2* describes the proposed works;

- *Section E3* reviews their potential significant impacts and presents the proposed scope for the SEIA;
- *Section E4* presents the planned structure for the SEIA report:
- *Section E5* identifies the planned composition of the SEIA Team: and
- *Section E6* presents the planned timetable for submission.

E2 The Proposed Development

This section provides a general overview of the proposed Project, the details of which will be elaborated on in the SEIA Report. The exact locations where road improvements are likely to be needed are still being identified. This Terms of Reference does not therefore provide specific details at this stage. Further information will be provided in the SEIA Report, but as the programme will be developed progressively over the forthcoming months, it is proposed that the SEIA adopts a “class assessment” approach (as used for the Camps and LSCs SEIA). The SEIA will therefore assess impacts on a sectoral basis and identify common mitigation measures which will be adopted for all road improvements. Details on individual items of road work will then be presented in supplementary Site Files as plans for each location are developed.

The road programme includes the upgrading of existing roads and development of new roads in various locations across Guinea:

- to facilitate movement of equipment and materials from the planned Marine Offloading Facility to points on the existing road network as close as possible to construction sites for the Simandou mine, railway and port; and
- to create new roads to link existing roads to construction sites and other facilities.

Further road improvements may also be needed to provide access to construction workforce accommodation camps and logistical supply centres, but these roads are covered by the separate SEIA for Camps and LSCs.

The Simandou Roads Programme SEIA will cover the works needed to plan and build new and upgraded roads. Construction will include:

- site clearance;
- excavation and modelling of the vertical and horizontal alignment using surplus spoil where available or material from local quarries;
- improvement of existing drainage and introduction of new road drainage;
- grading, rolling, surfacing and sealing; and
- improvement of existing safety arrangements e.g. levelling of hard shoulders, modification of camber, provision of berms and barriers, and cutting back trees and overgrown vegetation to improve sight lines.

A range of equipment will be used including graders, rigid and articulated dump trucks, track dozers, excavators, rollers, water trucks, timber jacks, tool carriers, wheel loaders, four wheel drives, mobile asphalt batch plants, asphalt laying plant, bitumen spray plant, and power generators. Water may be required during the course of the works to form the road surface and dampen down areas and is likely to be obtained from temporary boreholes or bankside lagoons.

The SEIA will also cover ancillary activities required to facilitate the completion of the roads programme including borrow pits for supply of soft fill material, temporary access tracks, temporary mobile camps and temporary abstraction points for surface and ground water. The Roads Programme may also require rock and aggregate materials which will be obtained from established suppliers or by developing quarries. If quarry development is required, the impacts associated with this will be addressed in a separate Simandou Quarries SEIA, which is being prepared in parallel with the Simandou Roads Programme SEIA.

The Roads Programme SEIA will report how traffic impacts are being addressed in route selection for new roads and design of road upgrades. It will also report how environmental impacts such as noise, dust and vehicle emissions will be managed through effective traffic management, driver training and vehicle maintenance. Impacts associated with the use of upgraded and new roads by Simandou Project traffic will be assessed in the main Simandou Project SEIA. Project traffic will include heavy and light good vehicles carrying construction materials and equipment, workforce transport (buses), and cars travelling on Project business.

The majority of roads for the Project will be public roads and will remain in operation after construction of the Simandou Project. If roads are not needed they will be removed and the land will be rehabilitated for agreed future use.

E3 Proposed Scope of the Assessment

The primary purpose of the Terms of Reference is to identify the impacts which the Project is expected to have on the environment and communities, so that assessment of these can be planned as part of the SEIA. This section outlines the expected impacts from the proposed development, providing an initial view on their likely significance and outlining how they will be assessed. In undertaking this initial assessment consideration has been given to the guidance on Social and Environmental Impact Studies including the international standards established by the International Finance Corporation (IFC) and Rio Tinto's own corporate policies and standards.

The methodology for the SEIA will follow the approach described in *Part A* of the original Terms of Reference approved for the Simandou Project. The work schedule is presented in *Section E6*.

The likely significant impacts have been elaborated on in *Table E 3.1*. The key topics of interest are as follows.

- Geology and soils;
- Hydrogeology and hydrology, including water resources;
- Land use;
- Air quality;
- Noise and vibration;
- Biodiversity (habitats, flora, fauna and ecosystem services);
- The economy, development and livelihoods;
- Demographics and migration;
- Cultural heritage;
- Community health, safety and security; and
- Labour and working conditions including workers rights and occupational health and safety.

The following information is included in *Table E 3.1*, for each topic.

- Sources of impact: identifies the potential causes or sources of impact during construction, operation and decommissioning
- Potential impacts of significance: discussion of the types of impact that could occur based on review of the Project and its potential for interaction with the baseline environment
- Proposed assessment approach: an outline of the work required to complete the assessment

The precise location where roads are required has not yet been defined and therefore site-specific baseline information is not available at this time. The potential impacts described in *Table E 3.1* have been developed in consideration of environmental and social conditions that would typically be encountered in Guinea and which could potentially be affected by new or upgraded roads.

The Class SEIA will include an overview of baseline conditions and will assess the impacts that are likely to occur due to new and upgraded roads. The mitigation measures that are defined in the Class SEIA will apply to the entire programme of road developments. More detailed site-specific information for each individual road will be presented in the Site File and will include a description of local baseline conditions and any additional site-specific mitigation that is required. The assessment approach column in *Table E 3.1* focuses on the information that will be provided at the site-specific level.

Table E 3.1 Potential Significant Effects of the Road Developments

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
Geology and Hydrogeology	Site clearance and levelling as part of road improvements or borrow pit development	Clearance of land for new roads, road widening, borrow pits or temporary work areas could lead to removal of protective layers of soil and vegetation increasing the susceptibility of groundwater to contamination and reducing groundwater recharge by infiltration.	Hydrogeological conditions will be described through review of existing information and site inspection where required. The susceptibility of groundwater to contamination will be assessed. Appropriate measures will be defined to ensure adequate protection of groundwater resources.
Soils and groundwater	Removal or erosion of soil during ground clearance, operation of borrow pits and rehabilitation activities	Vegetation and topsoil will be cleared as part of temporary and permanent site preparation and borrow pit development. In some areas soil may be stockpiled for use during reinstatement. Erosion, loss or degradation of soils could potentially occur as underlying soils and stockpiles become exposed to wind or water and soils compacted during storage or by vehicle movements. Loss of soil resources could potentially adversely affect agricultural and other land uses, habitats, flora and eco-system services. Soil dispersion as dust could adversely impact nearby watercourses and communities.	Work areas will be developed in consideration of the need to avoid areas with soils of high value to local communities. The assessment will include consideration of the quality, value and use of soil resources to determine the likelihood for significant impacts. Risks relating to erosion and dispersion of soils will be identified. Measures will be identified to minimise any losses that might occur and to manage soils so as to minimise the potential for erosion and other adverse impacts and maximise opportunities for rehabilitation.
	Waste management during construction of roads and at borrow pit locations	Inadequate management of waste could lead to unnecessary landfilling of waste with associated impacts on soil and groundwater quality.	The potential for waste arisings will be identified and waste streams will be characterised. Appropriate waste management measures will be defined to ensure waste is managed in accordance with the waste hierarchy (reduce, reuse, recycle, dispose) and adverse impacts are avoided where possible and minimise the need for landfilling. In cases where landfills are required, appropriate designs will be developed to ensure adequate protection of soil and groundwater resources.
Hydrology and	Water usage during	Water may be required to prepare surfaces and suppress dust during	Areas and periods of risk will be identified. Good construction

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
Surface Water Resources	construction of roads and development of borrow pits	construction and operation of roads and development of borrow pits. Run-off of could erode nearby areas, and carry suspended solids to nearby watercourses.	practices will be defined to ensure that use of water during construction is carefully managed in an appropriate manner.
	Water usage during construction of roads and development of borrow pits	Use of local water resources could adversely affect water supplies used by local communities or associated with areas of high conservation value for biodiversity.	The site selection process for borrow pits and new roads will be developed to include consideration of the need to avoid sensitive water resources and minimise the footprint of developments in sensitive areas. Hydrological surveys will be carried out to determine sustainable water resources that can be used by Project personnel without adversely affecting other local communities or biodiversity.
Water pollution	Routine and non-routine discharge of liquid effluents and other substances to ground, ground water and surface water, during construction and operation	Intentional or accidental discharges to soil and groundwater could cause contamination of soils and reduced groundwater quality, adversely affecting downstream users of water resources and sensitive habitats, flora and fauna.	Sources of potential discharges will be identified and the nature of discharges will be characterised. Measures will be defined governing the management of such sources and discharges. Appropriate consideration of non-routine events will facilitate definition of any controls needed to minimise the risk of spillages and contingency plans to be implemented in the case of a non-routine event to minimise adverse impacts.
	Runoff from road surfaces	Run-off from road surfaces can be contaminated by hazardous materials routinely used during normal operation of vehicles (eg tyre and brake dust, oily deposits) or by more substantial contamination released during accidents involving spills of fuel, oil and vehicle loads	The assessment will consider how road drainage is designed to control run-off and identify controls to attenuate pollution from non-routine operations and events. Impacts of drainage flows on downstream receiving waters will be examined and measured to control storm flows identified
Land use	Permanent and temporary land-take	Permanent and temporary land-take to facilitate development of roads and borrow pits could potentially result in economic and/or	The site selection process for new sites will be developed with the primary objective of ensuring that physical displacement of people

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
	for road and borrow pit development	physical displacement of people living in, or using, the local area. Loss of land used for income generation and subsistence activities (eg farming, hunting) could adversely impact livelihoods.	is avoided and minimising the footprint of developments in sensitive areas. Users of land will be identified and potential impacts on residents, farmers, other users of land-based and water-based resources will be identified along with associated potential impacts on livelihoods. A framework policy for land acquisition, compensation and resettlement will be developed in accordance with international standards.
	Changes in land use as sites are developed, operated and reinstated	Changes in landuse at road and borrow pit locations may change the landscape and visual character of the local area.	The site selection process for borrow pits and new roads will be developed to include consideration of the need to avoid areas of high landscape value and the need to minimise the footprint and visibility of developments in sensitive areas.
Air quality	Air emissions from construction vehicles and equipment used to develop roads and operate borrow pits and traffic during operation of new or improved roads.	Ambient air quality is very good in many rural areas of Guinea. Construction activities along roads in these areas could generate dust for short-term periods during to ground disturbance as vegetation is removed and soils become exposed to wind. Combustion emissions from traffic may have an adverse impact on local air quality. Construction vehicles and equipment, including mobile concrete batching plants, could adversely impact nearby residential areas and areas of high importance with respect to biodiversity.	Sensitive receptors such as communities and areas of high biodiversity will be identified and mapped. The site selection process for borrow pits and new roads will include consideration of the need to avoid these receptors. Ambient air quality and any sensitive receptors will be described. The potential for impacts will be assessed in consideration of national and international (IFC and WHO) air quality standards. Measures will be identified to mitigate any potential significant impacts
Noise and vibration	Noise from construction vehicles and equipment used to develop roads and	Ambient noise levels are low in many rural areas of Guinea. Noise from vehicles and equipment could adversely affect local communities and sensitive fauna in areas of high conservation value for biodiversity. If work is carried out at night, noise may be	Sensitive receptors such as communities and areas of high biodiversity will be identified and mapped. The site selection process for borrow pits and new roads will include consideration of the need to avoid these receptors.

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
	operate borrow pits. Induced traffic during operation of new or improved roads.	particularly evident in rural areas. Road improvements and new roads may also attract more traffic, with associated increases in traffic noise.	Ambient noise levels and any sensitive receptors will be described. The potential for impacts will be assessed in consideration of national and international (IFC and WHO) noise standards. Impacts on workers will also be identified, assessed and mitigated where significant impacts could potentially occur. Measures will be identified to mitigate any potential significant impacts
Biodiversity	Land-take for borrow pits, new roads or widening of existing roads within important habitats	Habitat loss may occur due to land-take with consequent impacts on species and biodiversity, and the ecosystem services provided by these habitats.	Appropriate habitat characterisation and mapping of important and sensitive habitats and species will be carried out. Any associated ecosystem services will be described. The site selection process for borrow pits and new roads will include consideration of the need to avoid sensitive receptors including areas of high conservation value for biodiversity. The sensitivity and importance of habitats will be considered as part of assessing impacts on biodiversity. Mitigation measures will be defined where necessary to mitigate significant impacts.
	Land-take for new roads or widening of existing roads within important or sensitive habitats	Fragmentation of habitats and disruption of wildlife corridors may occur as new roads are developed or existing roads are widened. Fragmentation of habitats and severance of these corridors could adversely affect fauna species dependent on these corridors for feeding, breeding or migration.	Appropriate habitat characterisation and mapping of important and sensitive habitats, including wildlife corridors, will be carried out. The site selection process for borrow pits and new roads will include consideration of the need to avoid sensitive areas such as habitats supporting high biodiversity and wildlife corridors. An assessment will be carried out to establish the magnitude of the impacts on biodiversity and nature conservation and measures will be identified to mitigate the impacts.
	Movement of traffic,	Alien or invasive species may be introduced by construction	Risks relating to alien species will be identified through

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
	equipment and personnel during construction activities	equipment, personnel or materials (eg soil) entering Guinea from overseas and moving between different, sensitive areas. Alien species which could be introduced into local ecosystems by Project personnel or be carried by equipment used in various areas eg on the wheels of construction vehicles travelling from one location to another.	consideration of experience elsewhere in Guinea and Rio Tinto's current operations at Simandou. Appropriate control measures will be developed in consideration of international standards including strict rules regarding species introductions and inspection, washing and quarantine procedures for equipment and vehicles.
	New and improved roads in sensitive areas that are currently difficult to access	The development of new and improved roads may induce people and non-local fauna and flora (including pests and weeds) to enter previously inaccessible areas. This may adversely affect existing local habitats, fauna and flora (due to increased disturbance, predation, invasion, disease, etc).	Sensitive areas of high biodiversity value will be identified and mapped. The site selection process for new roads will include consideration of the need to avoid facilitating access to these areas by third parties.
Demographics and Migration	New and improved roads facilitating access to remote areas or areas of low population	New and improved roads may lead to localised population growth as individuals migrate to the area in response to the better access provided and seeking opportunities. Increases in local population could potentially be associated with a wide range of both positive and negative impacts. For example, it may facilitate trade and economic growth or could place additional strain on scarce local resources (eg water) or cause conflicts or destabilisation in existing communities	The scale and character of potential in-migration will be assessed by reference to past experience at Simandou, and experience elsewhere in Guinea and internationally and by considering the accessibility and attractiveness of locations for potential migrants from within and outside Guinea. The Project's existing Influx Management Plan will be developed to address the level of influx predicted to occur, manage the potential adverse effects and maximise the benefits for local communities, resources and the environment in accordance with international good practice, including the IFC guidance document Projects and People: A Handbook for Addressing Project-Induced In-migration.
Economy, Development and Livelihoods	New and improved roads facilitating access to areas that	Construction activities may offer opportunities for local employment. Indirect positive impacts may also occur as new/improved roads facilitate better connectivity with surrounding areas, increasing	The SEIA will include consideration of positive impacts on local economy and livelihoods. Opportunities for positive impacts will be identified and measures will be defined to maximise the benefit

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
	are currently underdeveloped	opportunities for trade and associated economic development.	associated with such opportunities.
Cultural Heritage	Land-take for new or improved roads and borrow pits facilitating access to previously inaccessible areas	Land used for the developments could potentially include sites and features of cultural significance. Sites of tangible cultural heritage (historic buildings, buried archaeology) located within the Project footprint would be directly affected and sites nearby could be affected by impacts on their setting. Intangible cultural heritage may also be affected due to in-migration of people from elsewhere disturbing the setting of existing communities, local cultures, customs and traditional ways of life. Positive impacts could also occur if sites that are currently under threat are protected by the Project.	Sites and features of cultural significance will identified and mapped in consultation with local communities. The site selection process for borrow pits and new roads will include consideration of the need to avoid these areas and minimise the footprint of developments in sensitive areas. Measures will be developed to ensure significant impacts on intangible cultural heritage do not occur. These measures will include the development of a Cultural Heritage Management Plan, definition of a strict code of conduct for all Project personnel, and strict control of Project personnel to minimise adverse interactions with local communities
Community health, safety and security	Project personnel and security personnel interacting with local communities	Project personnel travelling between areas can bring diseases to remote areas where medical support is not available. Prevalence of sexually transmitted diseases may increase due to the activities of Project personnel and migrating people. Communities may feel harassed or intimidated by Project personnel including security personnel	Potential impacts will be identified and described. Appropriate measures will be defined to mitigate the potential for significant impacts. The measures may include health management procedures to ensure all Project personnel are fit-for-work, careful management of community interactions and a strict code of conduct for all Project personnel including security personnel
	Local communities accessing work areas or navigating roads	There will be increased traffic during construction and operation of roads and hazardous equipment and materials may be used. Local communities may be exposed to hazards at work sites and when navigating local roads. Increased traffic could lead to increased road accidents affecting local people and livestock.	Potential impacts will be identified and described. Appropriate measures will be developed to ensure work sites are clearly demarcated and managed so as to minimise community access to hazardous areas, equipment and materials. Project consultations carried out as part of the assessment will include communication of

Topic	Potential Impact		Proposed Approach to Assessment
	Source	Description	
			relevant hazards and provisions for ongoing communications with affected communities.
Labour and working conditions	Project personnel including contractors establishing inappropriate labour management practices or working conditions during construction of roads or development of borrow pits	The health, safety and welfare of workers may be adversely affected by inappropriate procedures for management of labour and working conditions including human rights and occupational health and safety.	Potential impacts will be identified and described. Appropriate measures will be developed to ensure adverse impacts are avoided and all activities are managed in accordance with relevant national and international labour and human rights law and good international practice.

E4 SEIA Report Structure

The proposed structure of the SEIA Report for the Road Upgrading and Development is outlined in *Table E 4.1*. The proposed outline covers the requirements of *Arrêté 990/ NRNE/SGG/90* in a structure designed to ensure all the required information is provided in a convenient and easily understandable manner.

Table E 4.1 Proposed Structure of the SEIA Report

Section	Description of Content
0. Non-Technical Summary	Provides a concise and easy to understand summary of the findings of the SEIA
1. Introduction	Includes background to the Project, the proponent, the legal context and need for a SEIA and the methodology adopted. Detailed information on environmental and social legislation applying to the Project and the administrative and policy context will be provided in an annex.
2. Project description	The Project description will provides details on the design, construction, operation and decommissioning of the Project and explain the background to its development and alternatives considered.
3. Scoping and Stakeholder Consultations	This chapter will present the results of the current scoping studies and summarise the views and concerns of external stakeholders as expressed during the SEIA consultations.
4. Impacts on the Physical Environment 5. Impacts on the Biological Environment 6. Impacts on the Human Environment	Each chapter will provide the following information: ▪ an introduction to the topic and to the sources and types of impact addressed in the chapter (i.e. the scope); ▪ a description of the baseline relevant to the chapter; and ▪ a description of the impacts, planned mitigation and how this will avoid or reduce impacts, and evaluation of the significance of the residual impacts after mitigation.
Management of Social and Environmental Risks	This section will describe the framework to be used to ensure mitigation are implemented by all Project personnel.
Annexes	Supporting information will be provided in annexes where needed and will include the following. ▪ The SEIA Team ▪ The Approved Terms of Reference ▪ A template for Site Files ▪ Design information for the proposed works ▪ The Roads Programme Social and Environmental Management Plan

Section	Description of Content
	The Project Resettlement and Compensation Framework

E5 Proposed SEIA Team

The SEIA team will be led by Environmental Resources Management Limited (ERM)⁽¹⁾ and will include professionals with more than 25 years experience in the field for each of the relevant environmental and social disciplines as identified in *Section E3*. All specialist studies will be undertaken under the supervision of suitably qualified experts with at least 15 years experience. Local, Guinean and West African specialists will be included in the SEIA team where appropriate

E6 Proposed SEIA timetable

The proposed schedule for completion of the SEIA is set out in *Figure E 6.1*. The current planned schedule envisages submission of the SEIA Report to the Minister of the Environment in November 2011 and issue of approval for the Roads Programme by January 2012.

Figure E 6.1 SEIA Schedule

Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Agreement on Terms of Reference							
Baseline data collection							
Stakeholder consultations							
Appraisal of alternatives and selection of preferred site							
Impact assessment and mitigation planning							
SEIA Report and SEMP submission to Government					◆		
Disclosure and consultation							
Government review and decision-making							

(1) ERM is a member of the UK Institute of Environmental Management and Assessment EIA Quality Mark Scheme. ERM's Project Director is a registered as a Principal EIA Practitioner and is a Practitioner Examiner with the Institute.

Annex E

Stakeholder Engagement Records

Part A Record of Events

Part B Summary of Relevant Questions

Part A

Événement / Event	Conférence Nationale de Lancement de l'Etude d'Impact Social et Environnemental (EISE) pour le Projet Simandou National Conference for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	Hotel Novotel
Date	19 Sept 2012
Durée / Time	10.30am - 5.30pm
Président / Chair	Le ministère de l'environnement et Le ministère des mines Ministry of Environment and the Ministry of Mines
Liste des présents / Attendance List	
Approximativement 200 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer: - des représentants du Gouvernement guinéen (Ministère des Mines, Ministère de l'Environnement, Ministère de l'Urbanisme, Ministère de l'Agriculture, Ministère de la Décentralisation) ; - des représentants du BGEEE et du CNSES; - les gouverneurs de Kindia, Mamou et N'Zérékoré; - les préfets ou leur représentant de Forécariah, Kindia, Mamou, Faranah, Kouroussa, Kankan, Kissidougou, Macenta, Kérouané and Beyla; - les sous-préfets de Ouré-Kaba, Banankoro, Konsankoro, Sikhourou, Douako, Moussayah, Sandeniah, Tiro, Marella, Heremakonon, Soyah, Madina Oula, Tokonou, Kérouané, Nionsomoridou, Kaliah, Albadariah - les maires de Forecariah, Beyla; - des représentants des organisations onusiennes (UNHCR, ONUSIDA, UNESCO, UNICEF, UNDP, FAO) ; - des représentants d'ONG (Ecologie, Faisons Ensemble, AVODEK, Pride Guinée) ; - des représentants d'institutions internationales de financement (SFI, AFD, GIZ) ; - des représentants de la presse; - des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc); et - des représentants du cabinet ERM. Approximately 200 people participated in the workshop. Among the attendees were: - representatives from the Government of Guinea (Ministry of Mines, Ministry of Environment, Ministry of Urbanism, Ministry of Agriculture, Ministry of Decentralisation); - representatives from the BGEEE and the CNSES; - the governors of Kindia, Mamou and N'Zérékoré; - the prefets or prefets' representatives of Forécariah, Kindia, Mamou, Faranah, Kouroussa, Kankan, Kissidougou, Macenta, Kérouané and Beyla; - the sous-prefets of Oure-Kaba, Banankoro, Konsankoro, Sikhourou, Douako, Moussayah, Sandeniah, Tiro, Marella, Heremakonon, Soyah, Madina Oula, Tokonou, Kérouané, Nionsomoridou, Kaliah, Albadariah - the mayors of Forecariah, Beyla; - UN representatives (UNHCR, ONUSIDA, UNESCO, UNICEF, UNDP, FAO); - representatives from NGOs (Guinée Ecologie, Faisons Ensemble, AVODEK, Pride Guinée); - representatives of international financing organisations (IFC, AFD. GIZ); - representatives from the press; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Forécariah, le 22 septembre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	<i>Hotel Malaika à Forécariah</i> Malaika hotel in Forecariah
Date	22 Sept 2011
Durée / Time	10am - 4pm
Président / Chair	<i>Mme Cissé Sarangbè Camara, Gouverneur de Kindia et Mme Hadja Leno Mariama, Préfet de Forécariah</i> Mrs Cissé Sarangbè Camara, Governor of Kindia and Mrs Hadja Leno Mariama, Prefet of Forécariah
Liste des présents / Attendance List	
<i>Approximativement 170 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer:</i> <i>la Gouverneure de la Région de Kindia;</i> <i>la Préfet de Forécariah;</i> <i>les sous-préfets de Kaback et Maférényah;</i> <i>le maire de la commune urbaine de Forécariah;</i> <i>un représentant du Ministère des Mines;</i> <i>un représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> <i>des représentants des services techniques préfectoraux (agriculture, éducation, santé, agriculture etc);</i> <i>des représentants de la police et de la gendarmerie nationale;</i> <i>le directeur de la radio rurale locale;</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc); et</i> <i>des représentants du cabinet ERM.</i> Approximately 170 people participated in the workshop. Among the attendees were: - the governor of Kindia region; - the prefet of Forecariah; - the sous-prefets of Kaback and Maférényah; - the Mayor of the urban district of Forécariah; - a Ministry of Mines' representative; - a Ministry of Territorial Administration and Decentralisation's representative; - representatives of the prefectural technical services (Agriculture, education, health, etc.); - representatives of the police and the gendarmerie; - the local rural radio director; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Kindia, le 4 Octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	<i>Maison des Jeunes de Kindia</i> Kindia youth house
Date	4 Oct 2011
Durée / Time	10.20am - 4.20pm
Président / Chair	<i>Mme Cissé Sarangbè Camara, Gouverneur de Kindia et M. Condé Drame, Préfet de Kindia</i> Mrs Cissé Sarangbè Camara, Governor of Kindia and Mr Condé Drame, Prefet of Kindia
Liste des présents / Attendance List	
<i>Approximativement 117 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer:</i> <i>Mme le Gouverneur de la Région Administrative de Kindia;</i> <i>M. le Préfet de Kindia;</i> <i>les représentants du Ministère de l'Environnement des Eaux et Forêts;</i> <i>les représentants du MATD (Ministère de l'Administration du Territoire et de la Décentralisation);</i> <i>le maire de la commune urbaine de Kindia;</i> <i>les inspecteurs régionaux et les directeurs préfectoraux des différents départements ministériels à Kindia;</i> <i>les sous-préfets de Sougueta, Madina-Oula, Kolentin;</i> <i>les représentants religieux et les sages de la ville de Kindia;</i> <i>les représentants de la jeunesse, d'ONGs et des femmes de Kindia.</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés, etc.); et</i> <i>des représentants du cabinet ERM.</i> Approximately 117 people participated in the workshop. Among the attendees were: - the governor of Kindia administrative region; - the prefet of Kindia; - representatives of the Ministry of Environment, Waters and Forests; - representatives of the Ministry of Territorial Administration and Decentralisation; - the mayor of the urban district of Kindia; - the regional inspectors and prefectural directors of the different ministry services in Kindia; - the sous-prefets of Sougueta, Madina-Oula and Kolentin; - the religious representatives and the elders of Kindia; - representatives of the Youth, NGOs and Women of Kindia; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Evénement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Tokonou (Préfecture de Kankan), le 4 octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment of the Simandou Project
Lieu / Location	<i>Maison des Jeunes de la CRF de Tokonou</i> CRD youth house in Tokonou
Date	4 Oct 2011
Durée / Time	10.30am - 5pm
Président / Chair	<i>M. Mohamed V Kéita, Gouverneur de Kankan</i> Mr Mohamed V Kéita, Governor of Kankan
Liste des présents / Attendance List	
<i>Environ 240 personnes ont participé à l'atelier. Parmi les participant(e)s, on peut citer:</i> <i>le préfet de Kankan;</i> <i>les Sous-préfets (entrant et sortant) de Tokounou;</i> <i>le Maire de la CRD de Tokounou;</i> <i>le représentant du Ministère des Mines;</i> <i>le représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> <i>les directeurs des services techniques rattachés de la région et de la préfecture de Kankan (agriculture, éducation santé, environnement, etc);</i> <i>les représentants de la gendarmerie et de la police;</i> <i>le directeur de la radio rurale locale;</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc); et</i> <i>des représentants du cabinet ERM.</i> Approximately 240 people participated in the workshop. Among the attendees were: - the prefet of Kankan; - the sous-prefets (entering and exiting) of Kankan; - the Mayor of the urban district of Tokonou; - a Ministry of Mines' representative; - a Ministry of Territorial Administration and Decentralisation's representative; - representatives of Kankan's prefectural technical services (agriculture, education, health, etc.); - representatives of the police and the gendarmerie; - the local rural radio director; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Albadariah (Préfecture de Kissidougou), le 5 octobre 2011</i> Prefecture workshop for the launch of the Social and Environmental Impact Assessment (SEIA) of the Simandou Project
Lieu / Location	<i>Maison des Jeunes de la CRD d'Albadariah</i> CRD youth house in Albadariah
Date	5 Oct 2011
Durée / Time	10am - 5pm
Président / Chair	<i>M. Sébastien Tounkara, Préfet de Kissidougou</i> Mr Sébastien Tounkara, Prefet of Kissidougou
Liste des présents / Attendance List	
<i>Environ 500 personnes ont participé à l'atelier. Parmi les participant(e)s, on peut citer:</i> <i>le préfet de Kissidougou;</i> <i>le maire de la commune urbaine de Kissidougou;</i> <i>le sous préfet d'Albadariah;</i> <i>le Maire de la CRD d'Albadariah;</i> <i>le représentant du Ministère des Mines;</i> <i>le représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> <i>le directeur préfectoral de l'environnement;</i> <i>le représentant de la gendarmerie et de la police;</i> <i>la directrice de la radio rurale de Kissidougou;</i> <i>le représentant de l'AGP (Agence Guinéenne de Presse);</i> <i>la confrérie des chasseurs d'Albadariah;</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc.); et</i> <i>des représentants du cabinet ERM.</i> Approximately 500 people participated in the workshop. Among the attendees were: - the prefet of Kissidougou; - the mayor of the urban district of Kissidougou; - the sous-prefet of Albadariah; - the mayor of the urban district of Albadariah; - a Ministry of Mines' representative; - a Ministry of Territorial Administration and Decentralisation's representative; - the prefectural director for the environment; - representatives of the police and the gendarmerie; - the Kissidougou local rural radio director; - an AGP's representative of the (Guinean Press Agency); - the Albadariah hunters confederation; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Mamou, le 6 Octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	<i>Salle de Conférence de Mamou</i> Mamou's conference room
Date	6 Oct 2011
Temps / Time	10am - 6pm
Président / Chair	<i>M. Diallo Amadou Oury, Gouverneur de Mamou</i> Mr Diallo Amadou Oury, Governor of Mamou
Liste des présents / Attendance List	
<i>Approximativement 160 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer:</i> • <i>Monsieur le Gouverneur de la Région Administrative de Mamou;</i> • <i>Monsieur le Préfet de Mamou;</i> • <i>le représentant du Ministère de l'Environnement;</i> • <i>le représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> • <i>les sous-préfets de Soyah, Ouré Kaba et les Présidents des CRD;</i> • <i>les religieux, notabilités et sages de Mamou;</i> • <i>les représentants de la société civile;</i> • <i>les représentants des cadres des services déconcentrés de Mamou,</i> • <i>des ONGs;</i> • <i>des jeunes et femmes de Mamou;</i> • <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés, etc.); et</i> • <i>des représentants du cabinet ERM.</i> Approximately 160 people participated in the workshop. Among the attendees were: • the governor of Mamou region; • the prefet of Mamou; • a Ministry of Environment's representative; • a Ministry of Territorial Administration and Decentralisation's representative; • the sous-prefets of Soyah, Oure Kaba and the presidents of the CRDs; • religious representatives, notables and elders of Mamou; • representatives from the civil society; • representatives of the staff of the decentralised services of Mamou; • NGOs; • youth and women of Mamou; • representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and • representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Douako (Préfecture de Kouroussa), le 6 octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment of the Simandou Project
Lieu / Location	<i>Maison des Jeunes de la CRD de Douako</i> CRD youth house in Douako
Date	6 Oct 2011
Durée / Time	9.30am - 4.15pm
Président / Chair	<i>M. Mohamed Douty Oularé, Préfet de Kouroussa</i> Mr Mohamed Douty Oularé, Prefet of Kouroussa
Liste des présents / Attendance List	
<i>Environ 350 personnes ont participé à l'atelier. Parmi les participant(e)s, on peut citer:</i> <i>le préfet de Kouroussa;</i> <i>le sous préfet de Douako;</i> <i>le Maire de la CRD de Douako;</i> <i>le secrétaire général chargé des collectivités décentralisées;</i> <i>le secrétaire général des affaires administratives;</i> <i>le représentant du Ministère des Mines;</i> <i>le représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> <i>le directeur de préfectoral de l'éducation;</i> <i>la directrice préfectorale de la santé;</i> <i>le directeur préfectoral de l'agriculture;</i> <i>le chef de la section mines et carrières;</i> <i>le représentant de la radio rurale locale;</i> <i>un journaliste de la RTG (Radio Télévision Guinéenne);</i> <i>une délégation de ressortissants de Douako à Conakry;</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc.); et</i> <i>des représentants du cabinet ERM.</i> Approximately 350 people participated in the workshop. Among the attendees were: - the prefet of Kouroussa; - the sous-prefet of Douako; - the mayor of the urban district of Douako; - the General Secretary responsible for Decentralised Communities; - the General Secretary of Administrative Affairs; - a Ministry of Mines' representative; - a Ministry of Territorial Administration and Decentralisation's representative; - the prefectural director of education; - the prefectural director of health; - the prefectural director of agriculture; - the head of the mine and quarry section; - a representative of the local rural radio; - a RTG's journalist (Guinean Radio Television); - a delegation Douako's ressortissants living in Conakry; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Faranah, le 11 Octobre 2011 Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	Salle de Conférence de Faranah Faranah's conference room
Date	11 Oct 2011
Durée / Time	10.20am - 4pm
Président / Chair	M. Doumbouya Mohamed Lamine, préfet de Faranah Mr Doumbouya Mohamed Lamine, Prefet of Faranah
Liste des présents / Attendance List	
Approximativement 160 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer: • Monsieur le Préfet de Faranah; • les représentants de la commune urbaine de Faranah; • les cadres des services déconcentrés régionaux et préfectoraux; • les représentants des sous-préfectures de Tiro, Marela, Sandenia, Banian, Heremakono et Nialia; • les représentants des sages de Faranah et de la ligue islamique régionale et préfectorale; • le conseil paroissial; • l'Eglise Baptiste, protestante, évangélique et la paroisse de Faranah; • le représentant du Ministère de l'Environnement; • le représentant du Ministère de l'Administration du Territoire et de la Décentralisation; • les représentants de la société civile (Syndicat des Transporteurs, chambre de commerce et d'Agriculture, ONGs); • les représentants des institutions d'enseignement supérieur et de recherche; • des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés, etc.); et • des représentants du cabinet ERM. Approximately 160 people participated in the workshop. Among the attendees were: • the prefet of Faranah; • representatives of the urban district of Faranah; • the staff of the regional and prefectural decentralised services; • representatives from the sous-prefectures of Tiro, Marela, Sandenia, Banian, Heremakono and Niala; • representatives of the elders of Faranah and of the regional and prefectural Islamic league; • the Parish assembly; • the Baptist, Protestant and Evangelic Churches and the Parish of Faranah; • representatives of the Ministry of Environment; • representatives of the Ministry of Territorial Administration and Decentralisation; • representatives of the civil society (NGOs, transport union, chamber of commerce and agriculture); • representatives of the education and research institutions; • representatives of Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and • representatives of ERM.	

<i>Evénement /</i> Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Kérouané, le 11 Octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) of the Simandou Project
<i>Lieu /</i> Location	<i>Maison des Jeunes de la CRD de Kérouané</i> CRD youth house in Kérouané
<i>Date</i>	11 Oct 2011
<i>Temps /</i> Time	9.30am - 4.30pm
<i>Président /</i> Chair	<i>Mme Cissé Sarangbè Camara, Gouverneur de Kindia (et ressortissante de Kérouané) et M. le Secrétaire General de la préfecture</i> Mrs Cissé Sarangbè Camara, Governor of Kindia (and Kerouane's ressortissante) and the Mr. Executive Secretary of the prefecture
<i>Liste des présents / Attendance List</i>	
<i>Approximativement 200 personnes ont participé à l'atelier. Parmi les personnes présentes, on peut citer:</i> <i>la Gouverneure de la Région de Kindia;</i> <i>le secrétaire administratif de la préfecture de Kérouané;</i> <i>le maire de la Commune Urbaine de Kérouané;</i> <i>les sous-préfets de Damaro, Banankoro, Soromayah et Sibiribaro;</i> <i>un représentant du Ministère des Mines;</i> <i>un représentant du Ministère de l'Administration du Territoire et de la Décentralisation;</i> <i>un représentant du Ministère de l'Environnement;</i> <i>des représentants des services techniques préfectoraux (agriculture, éducation, santé, agriculture etc.);</i> <i>le chef de la section Forêts;</i> <i>des représentants de la police et de la gendarmerie;</i> <i>le directeur de la radio rurale locale;</i> <i>des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc.); et</i> <i>des représentants du cabinet ERM.</i> Approximately 200 people participated in the workshop. Among the attendees were: - the governor of Kindia; - the executive secretary for Kérouané prefecture; - the mayor of the urban district of Kérouané; - the sous-prefets of Damaro, Banankoro, Soromayah and Sibiribaro; - a Ministry of Mines' representative; - a Ministry of Territorial Administration and Decentralisation's representative; - a Ministry of environment's representative; - representatives of the prefectural technical services (agriculture, education, health, etc.); - the head of the Forest section; - representatives of the police and the gendarmerie; - the local rural radio director; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Événement / Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Macenta, le 13 Octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project
Lieu / Location	<i>Maison des Jeunes de Macenta</i> Macenta youth house
Date	13 Oct 2011
Temps / Time	9.30am - 4.30 pm
Président / Chair	<i>M. Mory Diallo, préfet de Macenta</i> Mr Mory Diallo, prefet. of Macenta
Liste des présents / Attendance List	
Plus de 200 personnes ont participé à cette consultation. Parmi les personnes présentes, on peut citer: • le préfet de Macenta; • un représentant du Ministère de l'Administration du Territoire et de la Décentralisation; • un représentant du Ministère des Mines; • un représentant du Ministère de l'Environnement; • le secrétaire général des affaires administratives de la préfecture; • le chef de la délégation spéciale de la commune urbaine de Macenta (qui fait office de Maire); • le juge de paix de Macenta; • le commandant de l'escadron départemental de Macenta; • le commissaire de la police de Macenta; • le sous-préfet de Kouankan; • le directeur de la radio rurale locale; • le correspondant de l'AGP (Agence Guinéenne de Presse); • des représentants de Rio Tinto Simfer (relations gouvernementales, approbations environnementales, communications, communautés etc.); et • des représentants du cabinet ERM. Over 200 people participated in the workshop. Among the attendees were: • the prefet of Macenta; • a Ministry of Territorial Administration and Decentralisation's representative; • a Ministry of Mines' representative; • a Ministry of the Environment's representative; • the General Secretary of Administrative Affairs for the prefecture; • the head of the special delegation of the urban district of Macenta (which serves as the Mayor's office); • the judge of Macenta; • the Commander of the Macenta squadron department; • the Macenta Police Commissioner; • the sous-préfet of Kouankan; • the local rural radio director; • an AGP (Guinean Press Agency) correspondent; • representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and • representatives from ERM.	

<i>Evénement /</i> Event	<i>Atelier préfectoral de lancement de l'Etude d'Impact Social et Environnemental (EISE) du Projet Simandou, Beyla, le 18 Octobre 2011</i> Prefecture Workshop for the launch of the Social and Environmental Impact Assessment (SEIA) for the Simandou Project, Beyla
<i>Lieu /</i> Location	<i>Maison des Jeunes de Beyla</i> Beyla's youth house
<i>Date</i>	18 Oct 2011
<i>Temps /</i> Time	10 am - 5 pm
<i>Président /</i> Chair	<i>M. Kourouma El Hadj Amadou, préfet de Beyla</i> Mr Kourouma El Hadj Amadou, prefet of Beyla
<i>Liste des présents / Attendance List</i>	
<i>Les questions et préoccupations des communautés de la préfecture de Macenta ont essentiellement porté sur:</i> <i>les opportunités d'emploi et de formation offertes par le Projet, notamment pour les jeunes ;</i> <i>le soutien que Rio Tinto Simfer compte apporter au développement d'infrastructures routières (afin de désenclaver les villages de la préfecture) et sociales ;</i> <i>la perte de cultures pérennes au sein de la forêt classée du Pic de Fon ;</i> <i>les mesures d'accompagnement et de transition pour les personnes réinstallées du fait du Projet ;</i> <i>les impacts pour la population et pour les espèces protégées du fait notamment des poussières et pollutions engendrées par le Projet ; et</i> <i>l'itinéraire du rail et la localisation des villages qui seront impactés.</i> Approximately 280 people participated in the workshop. Among the attendees were: - the prefet of Beyla; - a Ministry of Territorial Administration and Decentralisation's representative; - a Ministry of the Environment's representative; - the General Secretary of Administrative Affairs for the prefecture; - the Mayor of the Urban Commune of Beyla; - an AGP (Guinean Press Agency) correspondent; - representatives from Rio Tinto Simfer (Government Relations, Environmental Approvals, Communications, Communities etc); and - representatives from ERM.	

Part B

Question	Stakeholder Meeting
General Questions regarding the Project	
Who / What is Rio Tinto?	Albadariah, Macenta
How will Rio Tinto respect the schedule of mid-2015?	Macenta
Is a road planned between Beyla and Kabak along the railway?	Douako
How is it possible to raise a comment / question? How is it possible to have a fast response?	Albadariah
Environmental Questions	
What will be done with respect to atmospheric pollution?	Forécariah, Beyla
How will the Project protect the local populations from the dust and the odours?	Kerouane, Macenta, Beyla
What will be done to protect / restore the vegetation cover?	Forécariah, Macenta, Beyla
What will be done to protect flora of importance to communities	Douako
How will protected areas and protected forests be protected?	Mamou, Faranah, Beyla
What will the impacts be on the fauna?	Mamou
How will the aquatic fauna be protected?	Faranah
How will chimps, elephants and other important species be protected?	Kindia, Kerouane, Macenta
What will be done to rehabilitate areas?	Kindia, Douako, Kerouane
What are the plans with respect to reforestation of Project areas?	Douako, Mamou
Will the Project's works impact the water supply?	Kerouane
Rain could create some mud, what will be the measures to protect the nearby villages?	Beyla
What are the measures to protect the population from the machines' noise?	Beyla
Social Questions	
How will the Project impact on vulnerable populations?	Douako, Kerouane
How will the Project manage induced in-migration?	Faranah
How will the Project impact on the young?	Macenta
How will the Project avoid religious and historical sites?	Albadariah
Livelihood Questions	
What are the Project's opportunities in terms of employment and training (particularly for the young or illiterate)?	Forécariah, Kindia, Mamou, Faranah, Tokonou, Albadariah, Douako, Macenta, Kerouane, Beyla
Health & Safety Questions	
What will the health impacts be?	Forécariah, Douako
What measures will the Project take to protect the local populations from HIV?	Mamou, Faranah
How will the Project manage health impacts due to in-migration?	Kerouane, Beyla
What are the risks associated with big machines for the children?	Beyla
Resettlement and Compensation Questions	
What will the compensation be in case of resettlement? How will compensation be calculated? Who will calculate compensation?	Forécariah, Kindia, Tokonou, Albadariah, Douako, Mamou, Faranah, Kerouane, Macenta, Beyla

Question	Stakeholder Meeting
How will it be possible to compensate like for like for a mature fruit tree or for a field? Will there be some differences in compensations between the families? Will the compensation be in cash or in kind? If the compensation is in cash, how long will it be paid for? Who will pay the compensation? Will it be Rio Tinto or the Government of Guinea?	
How will the host sites be chosen? Will the populations be involved in the host site's choice? Will the host sites be similar to the previous site? How will the Project make sure that the old site and the new host site are similar? How will it be possible to ensure that the host site is indeed available? How will it be possible to avoid land conflicts?	Forécariah, Tokonou, Mamou, Kerouane, Beyla
Is it possible to be resettled in a big town (ie Kissidougou)?	Douako
Will social infrastructure be resettled?	Tokonou, Douako
Will mosques / churches be resettled?	Albadariah, Kerouane, Beyla
If mosque / churches are to be resettled, how will they be compensated?	Kerouane, Beyla
Will the Project involve religious and traditional leaders in the decision to resettle?	Faranah
How will it be possible to ensure that the community links remain after a resettlement?	Tokonou
How will it be possible to ensure that a village is resettled following the same town planning as the old village?	Tokonou
What will the transition measures be? How long will they last?	Tokonou, Macenta
Who will rebuild the houses?	Albadariah
Resettlement of fishermen Will fishermen have to be resettled? Where will they be resettled? How will they be compensated? What will their livelihoods consist of?	Forécariah
Will people be able to return to their original sites, once the Project is over?	Kerouane
How will the Project improve the resettled persons' lives?	Macenta
Resettlement and the cattle: How will the Project move / resettle cattle? What about the sanitary risks due to the resettlement of cattle? Has the Project ensure that cattle are welcomed in the host site?	Beyla

Annex F

Principles for Resettlement and Community Development for Simandou Early Works

F1 Objectives

The general objective of the land acquisition, resettlement and compensation strategy is to avoid and/or minimize the negative impacts of the project on the population and improve the quality of life of the population by implementing a successful resettlement, compensation and rehabilitation program fully integrated with the cultural and customary ethos of the country and regional and socio economic development.

F2 Reference Framework/Applicable Requirements

The strategy is designed to comply with:

1. IFC Performance Standards 5 (Land Acquisition and Involuntary Resettlement) and subsequent revisions in 2011;
2. Rio Tinto community standards and HSEC policy;
3. applicable Guinean legislation; and
4. relevant customary/traditional laws

The principles and provisions under which the resettlement and compensation will be carried out are committed to meeting the above standards and requirements therein.

F3 Key Principles

The following key principles will apply.

5. Compliance: Ensure compliance with Guinean legislation, Rio Tinto and IFC Standards.
6. Minimization of adverse impacts: Negative/ adverse impacts of the project will be avoided or minimized, to the extent possible.
7. Minimization of displacement: Where feasible, physical and economic displacement will be avoided or at least minimized by exploring alternative project designs and locations.
8. Consideration of both physical and economic displacement: impacts from permanent or temporary land acquisition on assets and livelihoods will be mitigated, with both physical and economic displacement (severance of livelihoods) taken into consideration.
9. Compensation at Replacement Value: The project will compensate both physical and economic impacts of land acquisition at full replacement value.
10. Opportunity Cost: The determination of compensation will take into account the opportunity cost of the affected land and/or assets to the extent feasible.
11. Livelihood restoration: Affected livelihoods will be restored as a minimum, or preferably improved, and living conditions of affected households will be improved. A robust monitoring mechanism will ensure that livelihood restoration is regularly tracked and through consistent and continuous engagement to maximize livelihood restoration.
12. Recognition of customary rights: The project will recognize customary land ownership and, to the extent feasible, align with the different layers of land rights identified in the local land tenure system and develop culturally appropriate and sustainable entitlements and compensation plans.
13. Consultation and Disclosure: The project will be transparent in disclosing information related to the project and entitlements and people's participation will be sought across the lifecycle of the project.

Consultations will continue during the implementation of resettlement and rehabilitation works. Simfer will engage in free, timely, and informed consultation and promote informed participation.

14. Grievance Mechanism: An effective and accessible grievance redressal mechanism will be established at the project level to ensure speedy resolution of grievances/disputes. Representation of the community will be ensured in the grievance redressal mechanism.
15. Minimizing Impacts on Heritage Sites and Community Assets: The project will to the extent feasible avoid impacts on cultural and heritage sites as well as community assets.
16. Vulnerable Groups: The project will recognize that vulnerable groups have special needs and require specific measures and safeguards to ensure they are not further marginalised.

The Project will ensure the following.

1. Compensation is received by the rightful and eligible person or family through a process agreed with the village elders and the concerned family.
2. The Project Affected People (PAP including individuals, households and families) will be provided options of monetary compensation as well as non-monetary/ in kind compensation.
3. To the extent feasible and acceptable to PAP, resettlement housing and provision of replacement agricultural land, will be offered to the PAP, preferably as close to their original village/location as possible.
4. PAP will be assisted in restoring their affected livelihoods. Provision of transitional assistance, rehabilitation grants and livelihood support programmes will be considered to restore livelihoods to pre-project levels, and where possible improve livelihoods.
5. The implementation of land acquisition and its outcomes will be monitored and evaluated as part of a transparent process involving independent parties.
6. Impact on host communities and neighbouring villages will be minimized to the extent possible, and where possible, to achieve benefits from the resettlement process.
7. Community resources will be compensated at a community level along with programmes to mitigate impacts and enhance the value and quality of the remaining resource.
8. Adverse impacts on access routes, common property resources (CPRs) and other community resources will be minimized to the extent possible. Where losses are unavoidable the project will provide replacements for such losses to restore and where possible strengthen community resources.

F4 Broad Entitlement Categories

Based on the assessed impacts and the broad entitlement principles, PAP will typically be entitled to the following kinds of compensation and assistance.

- a) Compensation for loss of land, crops / trees *etc.*
- b) Compensation for structures (residential/ commercial) and other immovable assets.
- c) Compensation for loss of livelihood loss of income and livelihood restoration support.
- d) Compensation and assistance for loss of common resources (such as fishing areas, water resources, forest) and dependent livelihoods.
- e) Assistance for resettlement, relocation and rehabilitation.

- f) Replacement and shifting of community assets.
- g) Rebuilding, restoration and/or strengthening/ and/ or of community resources/ assets/facilities.
- h) Preferential employment and skill building support.
- i) Community development activities.

F5 Eligible Project Affected People

Based on the impacts assessed and the broad entitlement principles the broad groups of PAP eligible under the entitlement framework have been identified as including:

- a) general community/villagers;
- b) lineage;
- c) individual or a nuclear family units;
- d) a household or concession which may be composed of several families;
- e) share croppers/tenants
- f) transhumant herders;
- g) users of CPRs;
- h) fishermen/women; and
- i) vulnerable families.

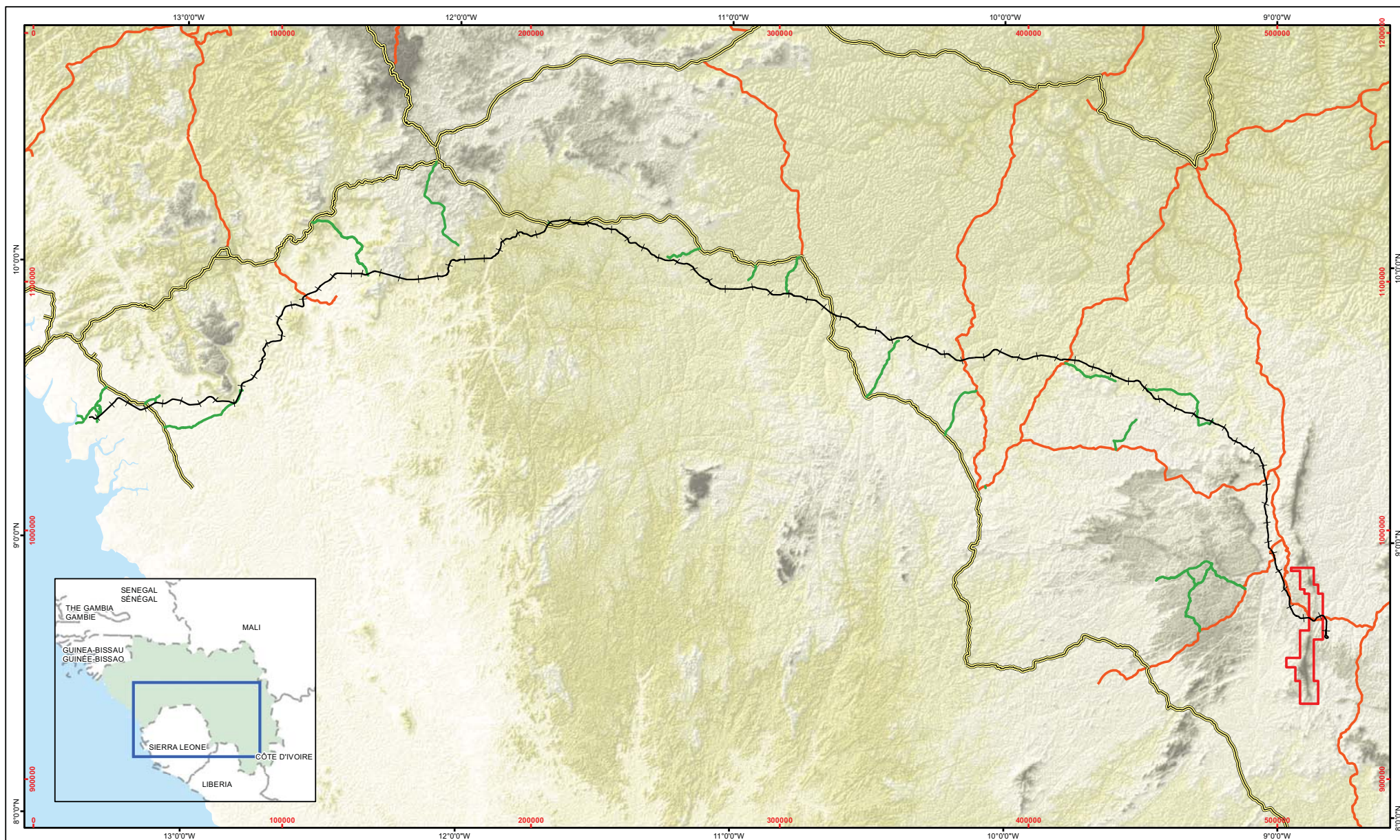
F6 Eligibility and Entitlements

An Entitlement Matrix will define details regarding the entitlements of each category of PAP and impact in relation to the principles enumerated above. The Entitlement Matrix will identify:

- a) impacted Asset: a description of the type of asset that is impacted;
- b) impacted Category; the community level unit of impact (village, family *etc*);
- c) unit of entitlement: to whom the given entitlement will be delivered,
- d) eligible conditions: the conditions that the asset or the right holder must meet for the entitlement to be delivered, and
- e) entitlement: the compensation and/or other benefits that will be delivered in the event that the asset is affected by project activities.

Annex G

Additional Design Information



- Légende:
- Corridor Indicatif du Chemin de Fer / Indicative Rail Corridor
 - Routes principales / Principal Roads
 - Routes Secondaires / Secondary Roads
 - Améliorations potentielles des routes existantes / Potential improvements to existing roads
 - Zone de la Concession Minière / Mine Concession Area

Client:	Simfer S.A.	Taille:	A4
SOURCE: Shuttle Radar Topography Mission (SRTM) PROJECTION: WGS 1984 UTM Zone 29N		Figure: ew_TerrestrialBioDivOverview.mxd	

Titre: Programme de developpement routier du Projet Simandou: Routes indicatifs / Simandou Roads Programme: Indicative Routes		
Date: 14/12/2011	Vérifié par: BS	Projet: 0131299
Dessiné par: CH	Approuvé par: KR	Echelle: 1:1,500,000
Rev:		2.00

Annex H

Areas of Conservation Interest

H1 Areas of conservation interest

Areas of conservation interest are areas considered to be of importance for habitats, species, ecosystem services and processes, defined as including:

- legally protected areas meeting the IUCN definition “A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.” eg National Parks, Ramsar sites, Classified Forests, UNESCO biosphere reserves;
- other designated areas identified following globally recognised systems eg Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs); and
- other important sites for biodiversity identified through regional/national processes such as sites important for populations of West African chimpanzee, identified by GRASP, and other sites which may be identified during detailed survey work undertaken for the Project.

A number of areas of conservation interest are relevant to the Project and are described in *Table H.1*.

Table H.1 Areas of conservation interest relevant to the Project

Area	Description and Relevance in Guinea
Biodiversity Hotspot	• Defined by Conservation International; not protected by law, but recognised internationally. • Areas characterised by exceptional levels of plant endemism and also by serious levels of habitat loss. To qualify as a hotspot, an area must: • contain at least 1,500 endemic species of vascular plant; and • have lost at least 70 % of its original natural habitat. • One Biodiversity Hotspot occurs in Guinea - the Lowland Forests of West Africa – home to more than a quarter of Africa's mammals including more than 20 species of primate.
Biosphere Reserves – legally protected	• Defined by UNESCO's Man and the Biosphere (MAB) Program; not protected by law, but recognised internationally and defined using criteria defined at the Seville conference of 1995. • Part of a worldwide network of protected areas designated with the intention of developing a balanced relationship between people and nature and promoting knowledge exchange, research, monitoring, education and training. • Usually organised into three separate zones: • a core area enjoying long-term protection where biological diversity can be conserved and research and other undistruptive activities can be conducted; • a buffer zone used for cooperative activities, including environmental education, recreation, ecotourism and applied and fundamental research; and • an external transition area that may accommodate a number of agricultural activities, human settlements or other forms of sustainable resource development. • Guinea has four biosphere reserves: Nimba Mountains, Ziama Massif, Badiar and Upper Niger.
Classified Forest (CF) - legally protected	• Designated by the National Government. Not officially a Protected Area, either in Guinea, or in international terms, but have become de facto protected areas in Guinea and are included in IUCN Category VI “Managed Resource Protected Areas” in recognition of the fact that they are managed mainly for the sustainable

Area	Description and Relevance in Guinea
	use of natural ecosystems. - Typically created ⁽¹⁾: - to preserve soil from erosion in areas of steep topography; - to prevent degradation of the country's forest resources and to protect forests as a source of energy and lumber; and - to protect water sources. - Stewardship not typically rigorous, and only those that are either very isolated or of cultural significance are still partially intact. - Most are severely degraded, for a variety of reasons: logging, land clearing, bush fires, overgrazing, etc. - Guinea has 162 Classified Forests covering a total land area of 1,182,133 ha (4.8% of the country's total area) ⁽²⁾.
Endemic Bird Areas (EBA)	- Designated by BirdLife International and recognised internationally. - Regions of the world where the distribution of two or more restricted range species overlap (where restricted range is defined as <50 000 km²). - Guinea is part of one EBA – the Upper Guinea Forests, which extends from Guinea and Sierra Leone in the west through to Liberia, Côte d'Ivoire and Ghana to Togo in the east, and a few kilometres inland.
Important Bird Area (IBA)	- Designated by BirdLife International and internationally recognised. - Recognised only if it meets certain internationally agreed and standardised criteria: - vulnerability (presence of threatened bird species); - irreplaceability (presence of restricted-range bird species and migratory or congregatory bird species); - distinct assemblages (biome-restricted bird species); and - must be amenable to conservation action and management. - Ideally, should be large enough to support self-sustaining populations of as many as possible of the key bird species for which it was identified or, in the case of migrants, fulfil their requirements for the duration of their presence. - Guinea has approximately 18 Important Bird Areas ⁽³⁾.
Key Biodiversity Area (KBA)	- Identified by BirdLife International and internationally recognised. - Many KBAs in Guinea have been identified by Conservation International, the Critical Ecosystem Partnership Fund and various partners including Guinée Écologie. - Areas of critical importance for the conservation of global biodiversity. - Identified using criteria that were originally defined by BirdLife International for IBAs incorporating a unified multi-taxonomic approach that covers plants, mammals, amphibians, reptiles, birds and crustaceans. - Must meet at least one of the following criteria:

(1) Unité Nationale pour la diversité biologique, 1997

(2) Unité Nationale pour la diversité biologique, 1997

(3) BirdLife International, 2008

Area	Description and Relevance in Guinea
	- regularly accommodate a significant number of threatened species assessed under IUCN Red List Categories and Criteria; - support a significant number of restricted-range species; - support an assemblage of species confined to a particular distribution or reproductive range or habitat type (biome); and - constitute a congregating site for reproduction or accommodate a large number of migratory species. 28 KBAs have been designated to date, accounting for approximately 5% of Guinea's total land area ⁽¹⁾.
National Parks National Nature or Wildlife Reserves – legally protected	- Designated by the National Government. Not recognised internationally as 'true' protected areas by IUCN (ie Categories I-IV). - Areas dedicated to the conservation of biodiversity, wildlife, landscapes and geological formations that have scientific or special aesthetic value. - Strict controls are typically implemented to preserve habitats and species. It is prohibited, except in unusual cases, to capture animals, damage lairs, collect eggs, destroy vegetation in any way, travel off-road, park outside of designated parking areas, bear weapons, fly over at low altitude or use the land for farming, grazing, forestry or mining ⁽²⁾. - Only five areas have been classified to date in Guinea: two National Parks (Badiar and Haut Niger) and two Wildlife Reserves (Kankan and Blanche Island). Guinea has one of the smallest networks in the world, in terms of number of sites and percentage of the country's land area ⁽³⁾.
Ramsar sites -- legally protected	- Designated under The Ramsar Convention (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat) adopted as an international treaty for the conservation and sustainable utilisation of wetlands at Ramsar, Iran, in 1971. - Designated to promote the conservation and wise use of wetlands by national action and international cooperation as a means to achieving sustainable development throughout the world. - Wetlands are selected based on their international significance in terms of ecology (and particularly waterfowl), botany, zoology, limnology or hydrology. - Guinea has 16 Ramsar sites, accounting for a total land area of approximately 2.6 million ha ⁽⁴⁾.
Biological Diversity Conservation Priority Zone	- Defined as part of a Conservation Priority Setting Process Workshop led in Ghana in 1999, lead by Conservation International. - Have not been peer reviewed and are not recognised internationally. - Identified through review of existing documents and reports, based on eight biological components: plants, mammals, birds, reptiles and amphibians, insects, freshwater and marine ecosystems, and biogeography. - Overlap with, and therefore reinforce, the strength of the KBA designations.
Priority site for populations of	GRASP is a project of the United Nations Environment Programme and the

(1) Kebele, no date given

(2) Unité Nationale pour la diversité biologique, 1997

(3) Brugiére and Kormos 2009

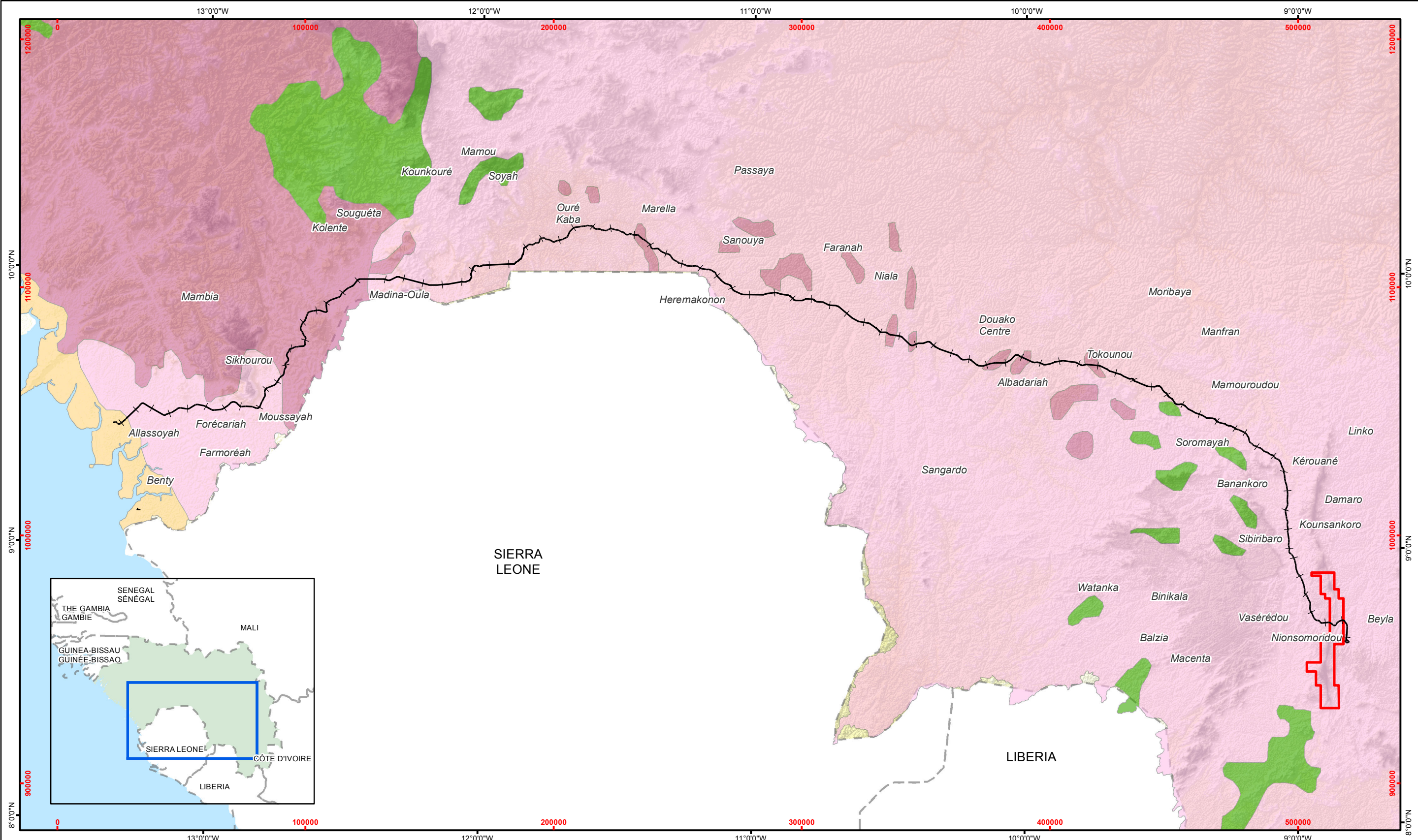
(4) Ramsar Sites Database, 2007

Area	Description and Relevance in Guinea
Western chimpanzee – Great Apes Survival Project (GRASP)	United Nations Educational, Scientific and Cultural Organization with an aim to work against the threat of extinction faced by chimpanzees and other ape and primate species across their ranges in equatorial Africa and south-east Asia. • Priority sites for populations of Western chimpanzee identified by GRASP include the Outamba-Kilimi site designated as a 'very important priority area', a status below the 'extremely important priority area' designation. GRASP have established a Regional Action Plan for the Conservation of Chimpanzees in West Africa.
Transboundary Protected Area	• An area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces or regions, autonomous areas and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts form a matrix that contributes to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and which are managed co-operatively through legal or other effective means ⁽¹⁾. • STEWARD (Sustainable and Thriving Environments for West African Regional Development) biodiversity program in Sierra Leone funds the Outamba-Kilimi National Park (on the Sierra Leone side of the border). STEWARD have been approached by the Jane Goodall Institute (JGI) for the designation of a Transboundary Alliance for Biodiversity and Livelihoods Alternatives (TABALA) (the TABALA Project) and by the Global Environmental Facility (GEF) for the introduction of a transboundary designated area

(1) IUCN, 1994

Annex I

Maps



Légende:

Corridor Indicatif du Chemin de Fer / Indicative Rail Corridor

Mine Concession Area / Zone de la Concession Minière

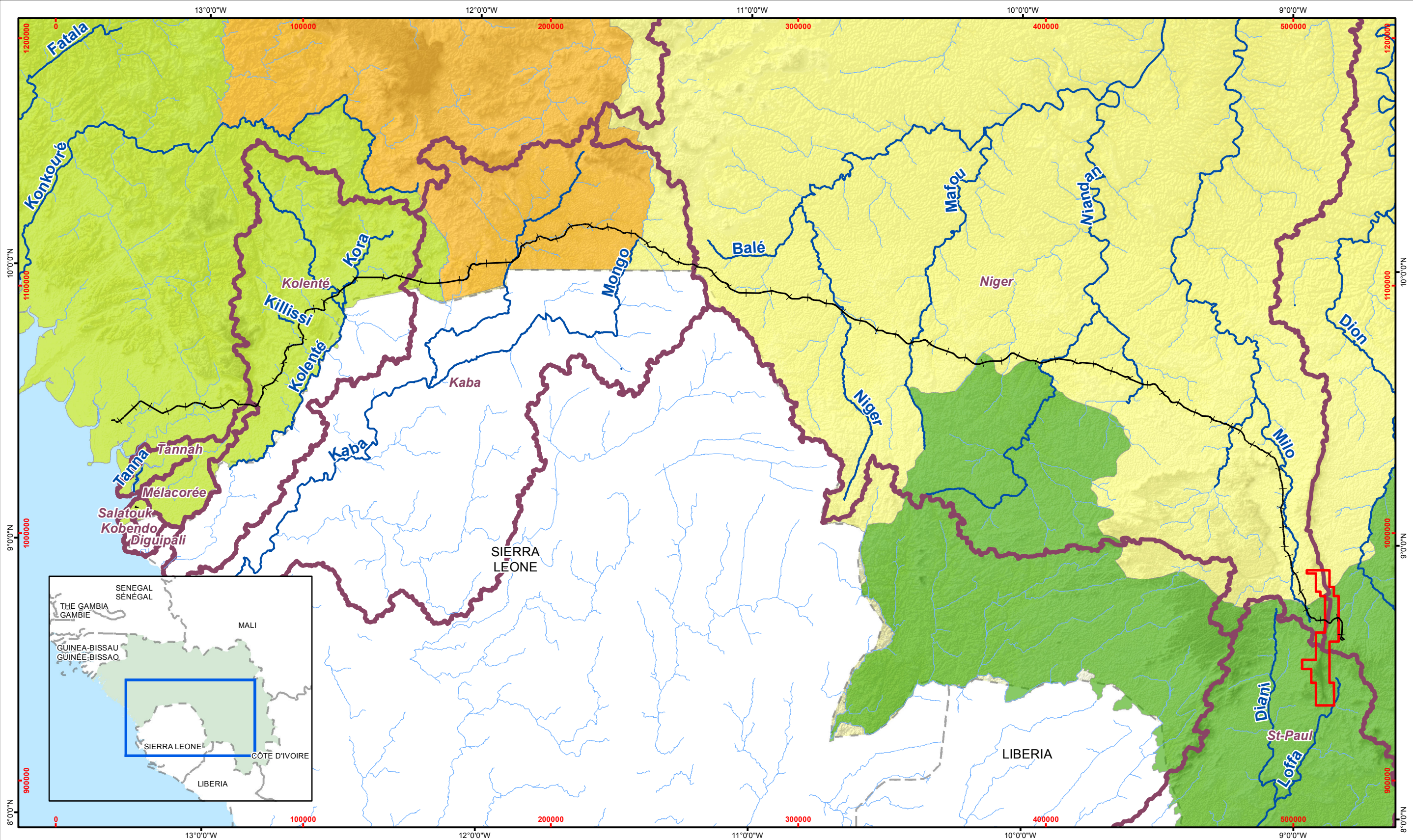
Precambrian Basement Unit / Socle Précambrien

Ancient Palaeozoic and Upper Proterozoic Volcanic-Sedimentary Unit / Formation sédimentaire volcanique du Paléozoïque ancien et du Protérozoïque supérieur

Recent Sedimentary Unit / Formation sédimentaire récente

Mesozoic Unit of Intrusions and Volcanic Rocks / Formation mésozoïque d'intrusions et de roches volcaniques

Client: Simfer S.A.		Taille: A4	Titre: Formations géologiques / Geological units		
Kilometres		Date: 14/12/2011		Vérifié par: CK	Projet: 0131299
		Dessiné par: CH		Approuvé par: KR	Echelle: 1:1,500,000
SOURCE: Shuttle Radar Topography Mission (SRTM) PROJECTION: WGS 1984 UTM Zone 29N		Figure: ew_Geology.mxd			Rev: 2.00

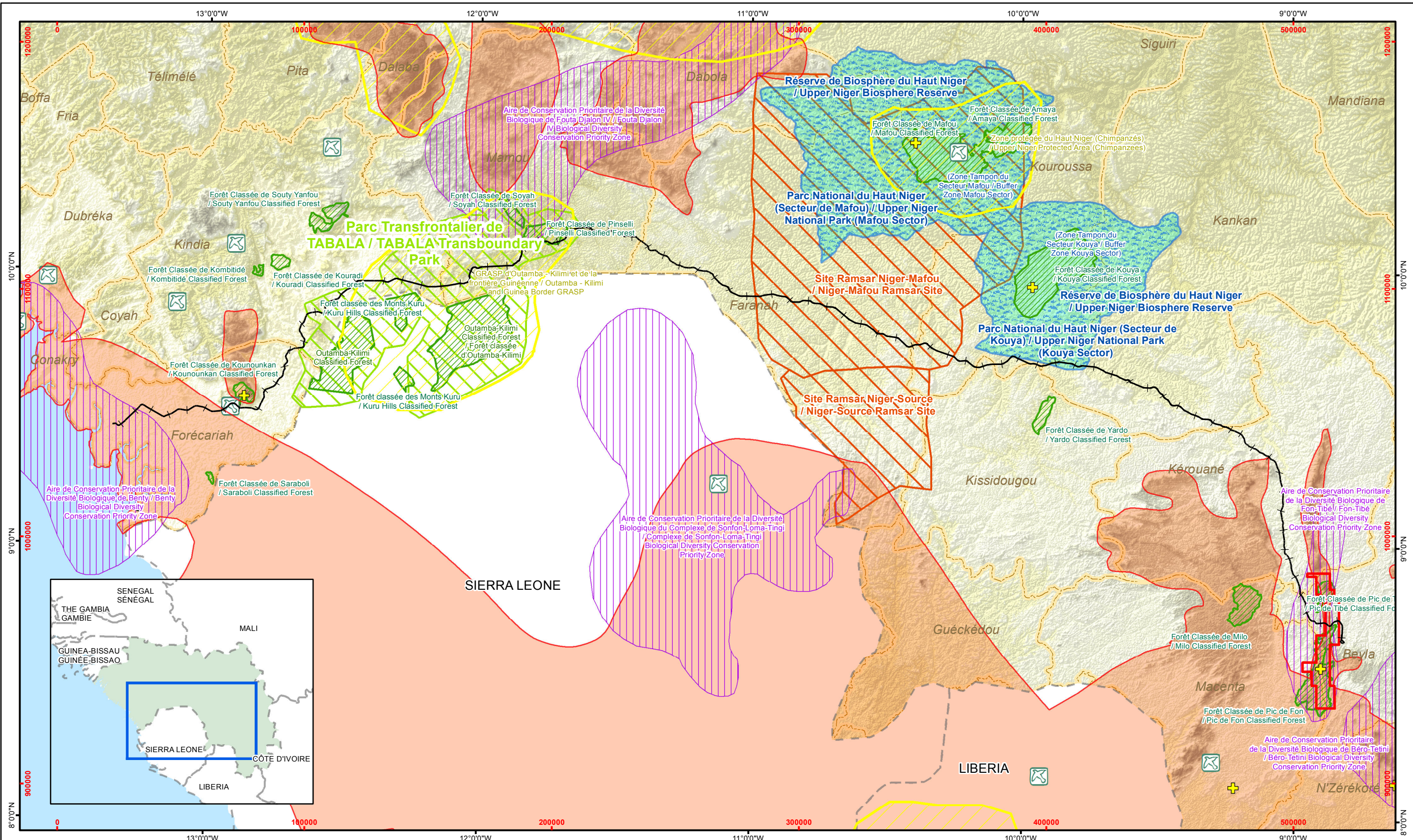


- Légende:
- Corridor Indicatif du Chemin de Fer / Indicative Rail Corridor
 - Mine Concession Area / Zone de la Concession Minière
 - Bassin versant / Watershed
 - Principaux cours d'eau / Main Water Courses
 - Cours d'eau Mineurs / Minor Water Courses

- Forest Guinea / Guinée Forestière
- Lower Guinea / Basse Guinée
- Middle Guinea / Moyenne Guinée
- Upper Guinea / Haute Guinée

CLIENT: Simfer S.A.		Taille: A4	Titre: Regime Hydrologique / Hydrological Regime	
ERM		0 50 Kilometres		
SOURCE: Shuttle Radar Topography Mission (SRTM) PROJECTION: WGS 1984 UTM Zone 29N		Date: 14/12/2011 Dessiné par: CH		Vérifié par: CK Approuvé par: KR
		Projet: 0131299 Echelle: 1:1,500,000		Rev: 2.00
		Figure: ew_WaterResources.mxd		

File: 0131299\Simfer\Early Works\29w_WaterResources.mxd



Légende:

Corridor Indicatif du Chemin de Fer / Indicative Rail Corridor

Zone de la Concession Minière / Mine Concession Area

Préfectures / Prefectures

Grande Aire à Oiseaux / Important Bird Area

Site prioritaire pour les populations de Chimpanzé de l'Ouest / Priority site for Populations of Western Chimpanzee (GRASP)

Aire de Conservation Prioritaire de la Diversité Biologique / Biological Diversity Priority Conservation Zone

Réserve de Biosphère / Biosphere Reserve

Parc Transfrontalier de TABALA (Proposée) / TABALA Transboundary Park (Proposed)

Site Ramsar / Ramsar Site

Forêt Classée / Classified Forest

Parc National / National Park

Site Primordial de Biodiversité des forêts Guinéennes d'Afrique de l'Ouest / Guinean Forests of West Africa Biodiversity Hotspot

Zone Clé pour la Biodiversité / Key Biodiversity Areas

Client: **Simfer S.A.**

ERM

0 50 Kilometres

SOURCE: Shuttle Radar Topography Mission (SRTM)
PROJECTION: WGS 1984 UTM Zone 29N

Taille: **A4**

Titre: **Domaines d'intérêt pertinents de conservation / Relevant areas of conservation interest**

Date: 14/12/2011	Vérifié par: BS	Projet: 0131299
Dessiné par: CH	Approuvé par: KR	Echelle: 1:1,500,000

Figure: **ew_TerrestrialBioDivOverview.mxd**

Rev: **2.00**

File: 0131299SimferS.A.01_CK_Maps_ERM_Early Works\29w_TerrestrialBioDivOverview.mxd

Annex J

Social and Environmental Management Plan for the Roads Programme

Social and Environmental Management Plan for the Roads Programme

Topic	Mitigation Measure	Timing
A. Physical Environment		
Geology and hydrogeology	1. The alignment of all new and improved roads will be developed in consideration of local groundwater conditions. Locations where springs occur or where the water table is close to the surface will be avoided as far as possible.	Siting
Geology and hydrogeology	2. The area of new sealed surfaces will be kept to the minimum necessary for the works in order to maintain natural recharge of the water table.	Design
Geology and hydrogeology	3. Where removal of material is required below the natural water table a site-specific Dewatering Management Plan will be developed as part of preparing the Site File for the specific site.	Siting Design
Soils, Run-off and Flooding	4. The area to be cleared for each road will be kept to the minimum necessary for the works and will be clearly demarcated to prevent unnecessary disturbance of soils outside the boundary.	Design
Soils, Run-off and Flooding	5. Land susceptible to flooding will be avoided where possible.	Construction
Soils, Run-off and Flooding	6. Disturbance of soils will be avoided during heavy rainfall. Activities with the potential to cause significant erosion will be carried out during the dry season where possible.	Design
Soils, Run-off and Flooding	7. The detailed design of all road works will include identification of risks relating to potential acid sulphate soils and application of appropriate control techniques that are best suited to the specific location, adhere to relevant industry standards and guidelines, and limit potential generation of acidic runoff.	Design
Soils, Run-off and Flooding	8. A Sediment and Erosion Control Management Plan will be developed for high-risk activities and work in sensitive areas, to minimise the risk of soil erosion and ensure that mobilisation and dispersion of sediment into aquatic environments is avoided where possible.	Design
Soils, Run-off and Flooding	9. At watercourse crossings, bridges and culverts will be designed to accommodate expected streamflows.	Construction
Soils, Run-off and Flooding	10. Drainage channels will be constructed at an early stage to intercept and divert uncontaminated surface runoff away from construction work areas.	Construction Operation
Soils, Run-off and Flooding	11. Road drainage will be designed to collect and control the flow of run-off from the road surface and to minimise changes in established hydrological regimes, taking into account gradient, catchment size, expected flows, and upstream and downstream uses of receiving watercourses.	Construction

Topic	Mitigation Measure	Timing
Soils, Run-off and Flooding	12. Road drainage systems will be inspected, cleaned as necessary and properly maintained.	Design
Soils, Run-off and Flooding	13. Impacts of construction site run-off on surface waters will be controlled by use of measures such as attenuation ponds, rock gabions, sediment traps/sumps, armoured drainage lines and drainage diversion structures.	Design
Soils, Run-off and Flooding	14. Where possible, drainage outlets will discharge into vegetated areas and not to exposed soil.	Closure
Soils, Run-off and Flooding	15. Riparian vegetation and vegetation along drainage lines and gullies will be protected and retained where practical to provide natural attenuation of flows.	
Soils, Run-off and Flooding	16. Cleared areas that are to be reinstated will be tilled, and re-vegetated where appropriate, as soon as possible after completion of construction to minimise areas of exposed, bare soil.	Construction
Soils, Run-off and Flooding	17. Construction activities and movement of construction vehicles outside designated areas and transport routes will be prohibited.	Construction
Soils, Run-off and Flooding	18. In areas of ground clearance, topsoil will be stripped and salvaged as much as possible.	Construction
Soils, Run-off and Flooding	19. If short-term soil stockpiles are required, these will be located and designed to avoid compaction, and covered or seeded to prevent erosion.	Construction
Soils, Run-off and Flooding	20. Where there is the potential for slope instability, measures will be taken to minimise risk of slope collapse and associated impacts on soils.	Design Construction
Soils, Run-off and Flooding	21. If roads are not required once construction of the Simandou Project is complete, they will be closed and rehabilitated. Rehabilitation will include measures to ensure that natural drainage patterns are reinstated as far as possible and no impacts on drainage or flooding persist after the road has been decommissioned.	Closure
Soils, Run-off and Flooding	22. Inspections will be carried out during the course of the works, and upon completion of construction activities to: • Check for erosion and implement remedial works as appropriate; and • Inspect ditches and culverts and remove accumulated debris, where required.	Construction
Pollution of Soils and Water	23. As far as possible, no work will be undertaken within 50 m of any surface waterbody. Where this is not possible, for example at river crossings, additional measures will be taken to ensure that pollution of water resources does not occur including minimising the need for works within the watercourse and disturbance of river banks.	Design Construction Operation

Topic	Mitigation Measure	Timing																														
Pollution of Soils and Water	24. Refuelling, maintenance and washdown of construction vehicles and equipment will only occur in designated areas, located at least 50 m from the nearest waterbody, and provided with appropriate secondary containment measures. Only approved chemicals will be used in these areas.	Design																														
Pollution of Soils and Water	25. Where new roads cross watercourses: - the alignment of road approaches to watercourses will be kept as close to right angles as possible to limit disturbance to the banks of watercourses; - diversion of watercourses will be avoided wherever possible; - the duration of construction activities at watercourse crossings will be as short as practicable; and - the construction of bridges, abutments and in-river bridge supports (where needed) will take into account the hydraulics of the watercourse in their design to consider stability and flow disruptions. 26. Silt curtains and other industry good practice management controls will be used as appropriate when working near watercourses or in mangrove areas. 27. Crossings will be designed to minimise disturbance of established riparian vegetation and complex bank habitat structures.	Design Construction Operation																														
	28. Sewage produced at the Mobile Field Camps will be collected and treated to achieve the following discharge standards prior to release into the environment. This may necessitate transport off-site to other established Project sites or facilities. <table border="1"> <thead> <tr> <th colspan="3">Sewage Treatment Plant Discharge Criteria</th></tr> <tr> <th>Parameter</th><th>Units</th><th>Discharge Limit Value</th></tr> </thead> <tbody> <tr> <td>pH</td><td>pH units</td><td>6 – 9</td></tr> <tr> <td>Chemical Oxygen Demand (COD)</td><td>mg/l</td><td>125</td></tr> <tr> <td>Total Nitrogen</td><td>mg/l</td><td>10</td></tr> <tr> <td>Total Phosphorus</td><td>mg/l</td><td>2</td></tr> <tr> <td>Oil and Grease</td><td>mg/l</td><td>10</td></tr> <tr> <td>Total Suspended Solids</td><td>mg/l</td><td>50</td></tr> <tr> <td>Total Coliform Bacteria</td><td>MPN/100 ml</td><td>400</td></tr> <tr> <td colspan="3">Source: IFC General EHS Guidelines April 2007</td></tr> </tbody> </table>	Sewage Treatment Plant Discharge Criteria			Parameter	Units	Discharge Limit Value	pH	pH units	6 – 9	Chemical Oxygen Demand (COD)	mg/l	125	Total Nitrogen	mg/l	10	Total Phosphorus	mg/l	2	Oil and Grease	mg/l	10	Total Suspended Solids	mg/l	50	Total Coliform Bacteria	MPN/100 ml	400	Source: IFC General EHS Guidelines April 2007			Construction
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Source: IFC General EHS Guidelines April 2007																																

Topic	Mitigation Measure	Timing
Pollution of Soils and Water	29. Refuelling of construction vehicles and equipment will only occur in designated areas that are provided with appropriate containment measures.	Construction Operation
Pollution of Soils and Water	30. Biodegradable lubricants will be used wherever possible.	Construction Operation
Pollution of Soils and Water	31. An effective preventative maintenance programme will be established to ensure that all equipment that uses or contains any hazardous materials (including fuel, oil, etc) is inspected regularly and maintained in good working order. Inspection and maintenance records will be available for review at all reasonable times.	Construction Operation
Pollution of Soils and Water	32. Work areas will be laid out to ensure that any hazardous materials are stored in well-ventilated areas, away from ignition sources and as far as possible from sensitive receptors including offices, heavily trafficked areas or areas where people eat, smoke or sleep.	Construction Operation
Pollution of Soils and Water	33. Hazardous materials will only be stored and handled in designated areas provided with appropriate secondary containment measures.	Construction Operation
Pollution of Soils and Water	34. Storage facilities for hazardous materials will be designed to include secondary containment structures capable of containing the largest of 110% of the largest tank or 25% of the combined tank volumes. Secondary containment will be made of impervious, chemically resistant material and will be designed to prevent contact between incompatible materials in the event of a release.	Design
Pollution of Soils and Water	35. Where practical all equipment and containers (including pipes, valves and taps), containing hazardous materials, will be located above ground. These will all be provided with appropriate containment to minimise the risk of uncontrolled or undetected releases of hazardous materials. Storage areas will be located at least 50 m from any surface water.	Design
Pollution of Soils and Water	36. All Project vehicles carrying hazardous materials will be designed and labelled in accordance with international standards and will be equipped with appropriate spill response equipment.	Design
Pollution of Soils and Water	37. An emergency response plan will be developed for unplanned spills and discharges associated with construction work and Project vehicles.	Design
Pollution of Soils and	38. Spill kits will be available in areas where spills could occur and will be appropriate for the volumes and types of hazardous material in use.	Construction Operation

Topic	Mitigation Measure	Timing
Water		
Pollution of Soils and Water	39. Individuals involved with management or transportation of hazardous materials will be provided with appropriate training to ensure competency and awareness of health, safety, environmental and social hazards and risks.	Construction Operation
Air Quality	40. Soil stockpiles and stores of friable material will be covered or vegetated to reduce the potential for fugitive emissions of dust where possible.	Construction
Air Quality	41. Speed controls will be implemented where appropriate to minimise dust creation by vehicles travelling on un-made roads.	Construction
Air Quality	42. Driver training will include awareness-raising regarding appropriate driving speeds to minimise dust emissions during different weather conditions.	Construction Operation
Air Quality	43. Loading, unloading and handling of dusty materials will only be carried out in designated areas.	Construction Operation
Air Quality	44. Dust suppression systems (eg water carts) will be used to dampen down areas when there is risk of high dust emissions affecting sensitive receptors.	Construction Operation
Air Quality	45. An effective preventative maintenance programme will be established to ensure that all construction equipment is maintained in good working order for the duration of its use and does not adversely impact air quality due to inadequate maintenance or damage.	Operation
Air Quality	46. To avoid black smoke, bitumen will not be heated with open flame burners or overheated, pots/tanks of bitumen will be covered, and any spills will be contained and immediately cleaned up.	Construction Operation
Air Quality	47. Concrete batching, and crushing and screening plants (including mobile plants) will be fitted with dust extraction and/or suppression systems where necessary.	Design
Air Quality	48. Electricity generators will be of modern design meeting up to date specifications for emission standards.	Design
Air Quality	49. Temporary storage facilities such as tanks will be designed and operated to minimise fugitive emissions of hydrocarbons etc.	Design Construction Operation
Air Quality	50. Use of ozone depleting substances such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, trichloroethane and halogenated hydrobromofluorocarbons (HBFCs) will not be permitted.	Construction Operation

Topic	Mitigation Measure	Timing											
Air Quality	51. An effective preventative maintenance programme will be established to ensure that all Project equipment and vehicles is maintained in good working order for the duration of its use and does not adversely impact air quality due to inadequate maintenance or damage.	Construction Operation											
Air Quality	52. Speed controls will be implemented where appropriate to minimise dust creation by vehicles travelling in sensitive areas such as communities.	Construction Operation											
Air Quality	53. Driver training will include awareness-raising regarding appropriate driving speeds to minimise air emissions during different weather conditions.	Construction Operation											
Air Quality	54. Strict controls will be in place to minimise the risk of bushfires being caused accidentally by Project activities including: • a ban on unauthorised open fires; • storage of flammable substances in accordance with good international standards for fire safety including fitting flame arresting devices to vents, segregation of incompatible substances, engineered earthing and lightning protection; • fitting of earthing and lightning protection to other structures vulnerable to lightning strike; • control of hot work using a strict permit to work system; and • creation of firebreaks around work areas and mobile field camps, where appropriate.	Design Construction Operation											
Air Quality	55. Emergency response plans and fire fighting arrangements will be put in place to facilitate response to fire including natural bushfires, where there is a direct threat to assets. Trained fire crews will be available. All personnel will be provided with appropriate training regarding fire-related hazards and first response. Adequate water supplies for use in the case of a fire will be available in critical locations.	Construction Operation											
Noise and vibration	56. Construction work areas, Mobile Field Camps and borrow pits will be organised and operated strive to restrict noise levels do not exceed the following thresholds at the nearest sensitive receptor during normal activities. If existing noise levels exceed these threshold values, the Project will not cause more than a 3dB increase in measured ambient levels during normal activities. <table border="1" data-bbox="434 1177 1400 1378"> <thead> <tr> <th rowspan="2">Project Phase</th><th colspan="2">Ambient Noise Threshold Values</th></tr> <tr> <th>Daytime (07.00 – 22.00)</th><th>Night-time (22.00 – 07.00)</th></tr> </thead> <tbody> <tr> <td>Construction</td><td>75 dB(A) L_{Aeq} (daytime period)</td><td>50 dB(A) L_{Aeq} (night-time period)</td></tr> <tr> <td colspan="3">Source: IFC Environmental, Health and Safety Guidelines 2007</td></tr> </tbody> </table>	Project Phase	Ambient Noise Threshold Values		Daytime (07.00 – 22.00)	Night-time (22.00 – 07.00)	Construction	75 dB(A) L_{Aeq} (daytime period)	50 dB(A) L_{Aeq} (night-time period)	Source: IFC Environmental, Health and Safety Guidelines 2007			Construction Operation
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Source: IFC Environmental, Health and Safety Guidelines 2007													

Topic	Mitigation Measure	Timing
Noise and vibration	57. Advance notice will be given to communities if short-term noisy construction activities are to take place, which could cause these levels to be exceeded.	Construction
Noise and vibration	58. Measures to minimize noise during construction will include: • locating and orientating equipment to maximise the distance, and to direct noise emissions away from, sensitive areas; • using buildings, earthworks and material stockpiles as noise barriers where possible; and • soft-starting of equipment and turning off equipment when not in use.	Design Construction Operation
Noise and vibration	59. Blasting will not occur at borrow pit locations.	Design
Noise and vibration	60. Noise and vibration potential will be considered when purchasing vehicles and equipment in accordance with Rio Tinto's established Buy Quiet policy. Equipment that emits tonal or low frequency noise will be avoided where possible.	Design
Noise and vibration	61. Noisy construction equipment located near sensitive receptors will be fitted with appropriate noise and vibration abatement devices such as silencers, mufflers and noise enclosures.	Construction Operation
Noise and vibration	62. An effective preventative maintenance programme will be established to ensure that Project equipment, vehicles and roads are maintained in good working order for the duration of Project use and do not emit excessive noise or vibration due to inadequate maintenance or damage.	Construction Operation
Noise and vibration	63. Working hours and activities will be carefully managed to minimise adverse noise and vibration impacts especially at night.	Construction Operation
Noise and vibration	64. All drivers will be trained in good driving practice to minimise noise and vibration from Project vehicles.	Siting
Noise and vibration	65. All personnel will be made aware of the importance of minimising noise and the measures that are required in this regard.	Construction Operation
Noise and vibration	66. The alignment of roads will be developed to avoid sensitive receptors such as communities, where necessary to avoid potentially significant noise or vibration impacts.	Design
Noise and vibration	67. Where existing roads are used and passage of traffic through communities could cause significant noise impact, strict speed limits will be applied to minimise noise near homes and other sensitive buildings (schools, place of worship, clinics, etc) close to the road.	Design

Topic	Mitigation Measure	Timing
Noise and vibration	68. Where necessary to avoid unacceptable noise levels within communities, a bypass will be provided to take Project traffic away from communities.	Construction Operation
Noise and vibration	69. Strict controls on routing of Project-traffic will be implemented to ensure traffic moves only on designated routes and at agreed times.	Design
Noise and vibration	70. An effective preventative maintenance programme will be established to ensure that Project equipment, vehicles and roads are maintained in good working order for the duration of Project use and do not emit excessive noise or vibration due to inadequate maintenance or damage.	Construction Operation
Noise and vibration	71. Construction working hours and activities will be carefully managed to minimise adverse noise and vibration impacts especially at night.	Design
Resources and Waste	72. The provisions for water supply for construction of individual roads will be defined in the Site Files and water will not be abstracted for any location until appropriate mitigation has been defined to ensure that significant impacts on communities and aquatic ecosystems are unlikely to occur. No water will be abstracted without the prior approval of the relevant authorities.	Design Construction Operation
Resources and Waste	73. Water use will be monitored and recorded to maximise efficiency of water use and minimise waste.	Design
Resources and Waste	74. Preventative maintenance and regular inspection of water tanks and related equipment will be undertaken to minimise the risk of leaks and remedial actions will be implemented as soon as possible.	Construction Operation
Resources and Waste	75. Recycling of water will be undertaken where practical and safe.	Construction Operation
Resources and Waste	76. A Waste Management Plan (WMP) will be established and will include: • clear objectives and targets with respect to waste management; • an analysis of types/quantities of waste to be produced by the Project; • an analysis of potential opportunities to reduce, reuse or recycle waste in accordance with the Waste Management Hierarchy (reduction, re-use, recycling, disposal) and a description of how this will be achieved; • a description of roles, responsibilities and resources to ensure that the objectives and targets are achieved; • procedures governing the handling, treatment and disposal of all wastes; and	Construction Operation

Topic	Mitigation Measure	Timing
	• verification procedures for appropriate assessment of contractors and third-party facilities used for waste transport, management and disposal.	
Resources and Waste	77. Different waste types will be segregated eg inert, non-hazardous and hazardous waste at the point of waste generation.	Construction Operation
Resources and Waste	78. Waste collection stations will be positioned in easily accessible locations close to the point where waste is generated and will be clearly marked to facilitate segregation of waste. Waste will be removed from work areas at regular intervals and will not be allowed to accumulate in undesignated areas. Inspections will be carried out regularly to identify and rectify inappropriate practices, including littering.	Design Construction Operation
Resources and Waste	79. Roads will be designed to achieve as close a balance as possible between the amount of spoil produced from cuttings and that required for fill to minimise the need for disposal of surplus spoil.	Construction
Resources and Waste	80. Other wastes will be re-used or recycled wherever possible.	Construction Operation
Resources and Waste	81. All residual wastes will be treated and disposed of at facilities providing appropriate means for safe disposal. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites.	Construction Operation
Resources and Waste	82. Landfilling of waste will only be permitted if all other options to reduce, reuse or recycle have been exhausted.	Construction Operation
Resources and Waste	83. Landfills will be used only for disposal of inert and non-hazardous wastes.	Construction Operation
Resources and Waste	84. Burning of waste will not be permitted except in appropriate incineration facilities. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites.	Construction
Resources and Waste	85. Medical wastes will be incinerated in appropriate incineration facilities. This may necessitate transport off-site to other established and appropriate Project waste treatment and disposal sites.	Construction Operation
Resources and Waste	86. Accurate waste records will be maintained, to ensure traceability of waste material from source to final destination. Records will detail the source, type and quantity of waste as well as the date of transport, the carrier being used to transport the waste, and the final destination.	Construction Operation
Resources and	87. Materials will be stored correctly to reduce damage and waste.	Construction

Topic	Mitigation Measure	Timing
Waste		Operation
Resources and Waste	88. All personnel will be trained in the appropriate management of waste in accordance with the WMP.	Construction Operation
Resources and Waste	89. Any organisations contracted to transport, manage or dispose of waste, and any facility used for the processing, storage or disposal of waste, will be in the possession of all necessary permits and authorisations. Project personnel will confirm this prior to using any external facility and will audit their operations to ensure compliance with Project requirements.	Construction Operation
Resources and Waste	90. Waste materials that can be safely reused or recycled may be donated to local communities following an appropriate risk assessment by HSEC personnel. All donations will be managed through the Simfer Communities Team.	Construction Operation

Topic	Mitigation Measure	Timing
B. Biological Environment		
Degradation and loss of habitats	91. Selection of routes and designs for new roads will take into account the potential for loss and fragmentation of areas of conservation interest.	Siting Design
Degradation and loss of habitats	92. Where possible, roads will be designed to avoid and maintain a buffer zone of at least 500 m around areas of conservation interest.	Siting
Degradation and loss of habitats	93. New roads will be designed to maintain a buffer zone of approximately 50 m from any waterbody or watercourse, to minimise disruption of water features and natural drainage, except where crossings are necessary, in which case mitigation measures specified in Chapter 4 will be followed.	Siting
Degradation and loss of habitats	94. Where possible, new borrow pits will be located at least 250 m from areas of conservation interest and at least 500 m if a borrow pit occupies more than 1 ha.	Design
Degradation and loss of habitats	95. The footprint of work areas will be minimised through careful planning of layouts and consideration of site-specific factors.	Construction Operation
Degradation and loss of habitats	96. Working within watercourses, or on their banks, will be forbidden, except where necessary to construct a particular structure. If work in watercourses is required, measures will be implemented to ensure significant impacts on aquatic habitats do not occur as set out in Chapter 4.	Construction
Degradation and loss of habitats	97. Where rehabilitation is being undertaken cleared areas will be tilled, re-graded, spread with topsoil, re-vegetated where appropriate using local or native species and profiled to blend in with the natural surrounds to promote habitat restoration and development. The rehabilitation process will be initiated as soon as practicable.	Closure
Degradation and loss of habitats	98. Water needed for the project will only be obtained from sustainable water sources avoiding adverse impacts on aquatic ecosystems.	Construction
Degradation and loss of habitats	99. Where roads would cross routes used by species of conservation interest, alignments will be developed to avoid severance of these routes where possible.	Design
Degradation and loss of habitats	100. Where severance of an important wildlife route cannot be avoided, crossing facilities will be provided (overpasses, underpasses, culverts) where possible.	Design
Degradation and loss of habitats	101. The design of bridges and culverts will include measures to avoid adverse impacts on movement of animals including freshwater species along watercourses.	Design
Degradation and loss of	102. Where development within areas of conservation interests cannot be avoided measures will be take to mitigate	Design

Topic	Mitigation Measure	Timing
habitats	adverse impacts. • Works will be designed to minimise the loss of areas of conservation interest. • The remaining area will be protected by clearly demarcating and signposting the area and preventing encroachment by construction equipment, vehicles and personnel. • Deposit of construction materials and waste in neighbouring areas will be prohibited. • Disturbed habitats will be rehabilitated on completion of construction including creation of wildlife corridors to mitigate fragmentation as required. • Habitat loss will be offset by measures to maintain biodiversity as far as is practicable. • If loss of Critical Habitats is unavoidable this will be mitigated by development and implementation of offset proposals to ensure no net loss. • Ground clearing in sensitive areas upstream of habitats of high conservation value for biodiversity will only be permitted with an appropriately engineered drainage design.	Construction
Impacts on plants	103. Mapping of plant species of conservation interest will be undertaken by competent environmental specialists as part of developing the detailed design of roads.	Design
Impacts on plants	104. Plant species of conservation interest will be avoided wherever possible. Where these species cannot be avoided, they will be relocated if possible to other suitable locations that will not be disturbed, under the supervision of qualified specialists.	Construction Operation
Impacts on plants	105. Where plant species of conservation interest are located near work areas, they will be demarcated and clearly signposted and access to these areas will be prohibited.	Construction
Impacts on plants	106. Riparian vegetation and vegetation along drainage lines, gullies and gorges, will be protected, where practical with a buffer zone.	Construction Operation
Impacts on plants	107. Riparian vegetation and vegetation along drainage lines, gullies and gorges, will be protected, where practical with a buffer zone.	Design
Impacts on plants	108. Where rehabilitation is being undertaken cleared areas will be tilled, re-graded, spread with topsoil, re-vegetated where appropriate using local or native species and profiled to blend in with the natural surrounds and promote habitat restoration and development. The rehabilitation process will be initiated as soon as practicable.	Construction
Impacts on animals	109. Mapping of animal species of conservation interest will be undertaken by competent environmental specialists as	Construction

Topic	Mitigation Measure	Timing
	part of developing the detailed design of roads.	Operation
Impacts on animals	110. Habitats used by animal species of conservation interest will be avoided wherever possible, in particular areas used for breeding, nesting, feeding, migration and congregation.	Construction
Impacts on animals	111. Areas used by animal species of conservation interest will be demarcated and clearly signposted if they occur close to work areas and access to these areas will be prohibited.	Construction
Impacts on animals	112. Where possible, areas to be cleared will be worked from one side to another, or from the centre out, to prevent animals becoming trapped.	Construction Operation
Impacts on animals	113. Trenches or holes created during site works will be rendered safe for animals when unattended through covering or provision of an egress ramp.	Construction
Impacts on animals	114. Snakes and other dangerous species or species of conservation interest, occurring within work areas, will only to be captured by trained personnel and will be released unharmed, where possible.	Construction
Impacts on animals	115. Impacts from light emissions during construction will be minimised through: • use of low emission lighting; and • use of directional lighting, aimed towards the area where light is needed and away from any sensitive receptors.	Construction
Impacts on animals	116. During operation all Project vehicles will use low beam headlights whenever possible when driving after dark.	Operation
Induced Access	117. Risks associated with increasing access into areas of conservation interest will be taken into account during strategic planning and detailed design of new and improved roads. Factors to be considered will include the current condition and use of the route (greenfield, existing walking trail/track, existing road requiring improvement, existing road requirement little/no improvement), its future status and use during and following the Project and the degree to which this will lead to induced access into otherwise isolated areas.	Siting Design
Induced Access	118. Appropriate mitigation will be defined on a case-by-case basis as part of preparing the Site File for each location and communicated to local stakeholders as part of site-specific consultations. This may include: • restrictions on access to roads developed only for the Project and removal of such roads when Simandou construction work is complete; • application of strict speed limits; and • signposting of sensitive areas and provision of information to travellers on fire risks and hunting.	Design
Induced Access	119. Where development of a road would lead to significant levels of human disturbance consideration will be given to	Construction

Topic	Mitigation Measure	Timing
	the use of helicopters to provide access for the Project in preference to new road construction	Operation
Induced Access	120. Project personnel will be strictly forbidden from engaging in hunting, selling or purchasing bushmeat during work hours or within Project work areas or facilities.	Construction Operation
Induced Access	121. Inspections of work areas and Project vehicles will be carried out where necessary to verify compliance.	Construction Operation
Induced Access	122. Firearms will be prohibited in all work areas and accommodation.	Construction Operation
Induced Access	123. Induction training for all Project personnel will include communication of relevant information regarding bushmeat hunting and important local resources. Project personnel will engage local stakeholders to manage potential impacts in this regard.	
Direct Impacts on flora	124. Mapping of plant species of conservation interest will be undertaken by competent environmental specialists as part of developing the detailed design of roads.	
Direct Impacts on flora	125. Plant species of conservation interest will be avoided wherever possible. Where these species cannot be avoided, they will be relocated if possible to other suitable locations that will not be disturbed, under the supervision of qualified specialists.	
Direct Impacts on flora	126. Where plant species of conservation interest are located near work areas, they will be demarcated and clearly signposted and access to these areas will be prohibited.	
Direct Impacts on flora	127. Riparian vegetation and vegetation along drainage lines, gullies and gorges, will be protected, where practical with a buffer zone.	
Direct Impacts on flora	128. Where rehabilitation is being undertaken cleared areas will be tilled, re-graded, spread with topsoil, re-vegetated where appropriate using local or native species and profiled to blend in with the natural surrounds and promote habitat rehabilitation and development. The rehabilitation process will be initiated as soon as practicable.	
Direct Impacts on fauna	129. Mapping of animal species of conservation interest will be undertaken by competent environmental specialists as part of developing the detailed design of roads	
Direct Impacts on fauna	130. Habitats used by animal species of conservation interest will be avoided wherever possible, in particular areas used for breeding, nesting, feeding, migration and congregation.	
Direct Impacts on fauna	131. Areas used by animal species of conservation interest will be demarcated and clearly signposted if they occur	

Topic	Mitigation Measure	Timing
	close to work areas and access to these areas will be prohibited.	
Direct Impacts on fauna	132. Where possible, areas to be cleared will be worked from one side to another, or from the centre out, to prevent animals becoming trapped.	
Direct Impacts on fauna	133. Trenches or holes created during site works will be rendered safe for animals when unattended through covering or provision of an egress ramp.	
Direct Impacts on fauna	134. Snakes and other dangerous species or species of conservation interest, occurring within work areas, will only to be captured by trained personnel and will be released unharmed, where possible.	
Direct Impacts on fauna	135. Impacts from light emissions during construction will be minimised through: • use of low emission lighting; and • use of directional lighting, aimed towards the area where light is needed, and away from any sensitive receptors.	
Direct Impacts on fauna	136. During operation all Project vehicles will use low beam headlights whenever possible when driving after dark.	
Introduction of invasive species and pests	137. High-risk areas requiring particular protection from invasive species and pests will be identified and mapped by competent environmental specialists as part of developing the detailed design of roads. Potential invasive species affecting these areas will be identified and categorised based on their invasive behaviour.	Construction Operation
Introduction of invasive species and pests	138. Appropriate management measures will be defined for each species in consideration of experience elsewhere in Guinea, Rio Tinto's current operations at Simandou and international good practice. These will include strict hygiene procedures for construction equipment and vehicles and quarantine programmes where necessary. All vehicles and machinery will be inspected and cleaned to ensure decontamination prior to mobilisation into Guinea or between high-risk areas. Appropriate documentation will be provided as evidence that established procedures have been followed.	Construction
Introduction of invasive species and pests	139. All introduced species, for example plants used in site rehabilitation, will be reviewed and approved by specialists prior to use. Non-native species will not be authorised unless a formal risk assessment has been completed and approved by relevant stakeholders	Construction Operation
Introduction of invasive species and pests	140. Ongoing maintenance and monitoring of work areas will include regular inspections for invasive species, weeds and other pests.	Construction Operation
Introduction of invasive species and pests	141. Any outbreaks of invasive or pest species will be identified, reported as an incident and managed in accordance with the Project's established incident management procedures to ensure appropriate corrective and preventative actions are implemented.	Construction Operation

Topic	Mitigation Measure	Timing
Introduction of invasive species and pests	142. Measures will be implemented to remove unwanted species. Where necessary detailed procedures will be developed detailing required approaches to weed control (eg physical removal, slashing, mulching, herbicides etc). Methods used to control or prevent such species will not cause adverse impacts on the environment or communities.	Design Construction
Introduction of invasive species and pests	143. Induction training for all personnel will include appropriate information regarding invasive animals and plants and the importance of reporting in this regard.	Construction
Non-routine impacts on fauna and flora	144. Burning of waste will only be permitted in appropriately designated and approved facilities.	Construction Operation
Non-routine impacts on fauna and flora	145. Burning of vegetation will typically be prohibited, and will require special authorisation if exceptional circumstances arise.	Construction Operation
Non-routine impacts on fauna and flora	146. Strict controls will be in place to minimise the risk of bushfires being caused accidentally by Project activities including: • a ban on unauthorised open fires; • design of flammable substance stores in accordance with good international standards for fire safety; • fitting of earthing and lightning protection to other structures vulnerable to lightning strike; • control of hot works using a strict permit to work system; and • creation of fire breaks in the buffer zone around roads and other work areas.	Construction Operation
Non-routine impacts on fauna and flora	147. Emergency fire fighting arrangements will be in place to respond to fire including natural bushfires. Trained fire crews will be available at main project sites and all personnel will be trained in communication of fire-related hazards and first response. Adequate water supplies for use in the case of a fire, will be established in critical locations.	Construction Operation
Non-routine impacts on fauna and flora	148. Measures will be taken to minimise the risk of collisions between animals and vehicles. Signposts and speed limits will be established where necessary to alert drivers to risks of animals crossing roads. Non-essential travel at night and driving off road will be prohibited.	Construction Operation
Non-routine impacts on fauna and flora	149. Project personnel will be provided with appropriate instruction regarding the procedures to be followed if important animals or plants are encountered during the course of work.	Construction Operation

Topic	Mitigation Measure	Timing
C. Socio-Economic Environment		
Physical and Economic Displacement	150. Existing roads will be used where possible to minimise the need for new infrastructure and resulting impacts from physical and economic displacement.	Siting
Physical and Economic Displacement	151. Where existing routes are being improved to provide access, works will be undertaken within the existing road corridor where possible.	Siting
Physical and Economic Displacement	152. The area of new land-take for new roads or road widening, will be kept to the minimum necessary.	Design
Physical and Economic Displacement	153. The alignment of roads will be designed to avoid displacement of peoples' homes and their community facilities such as market areas, community buildings, wells, schools, places of worship, medical centres, <i>etc</i> as far as possible. Where displacement is unavoidable, decisions will be taken in consultation with the local administration and the local community to ensure their views and wishes are taken into account and to minimise adverse impacts on individuals and communities.	Siting
Physical and Economic Displacement	154. Designs will be developed to minimise displacement of other resources of importance to communities and livelihoods including: • high quality agricultural land including bas fonds and rice fields; • community forests; and • other significant community resources.	Siting
Physical and Economic Displacement	155. If significant disruption to existing settlements and land uses such as agriculture would occur, consideration will be given to the development of local bypasses to minimise adverse impacts.	Siting
Physical and Economic Displacement	156. Where displacement of people, property or beneficial land uses is unavoidable, the Project will develop and agree a plan for resettlement and compensation to ensure that the livelihoods of affected people and communities are restored and where possible improved. These will be developed in consultation with the affected households and the community, and in accordance with the Principles establishment for management of land acquisition, resettlement and community development for early works. (see <i>Annex F</i>).	
Economic Development and Employment Opportunities	157. An Employment Plan will be developed to define requirements and procedures to be followed when identifying and developing Project employment opportunities, managing employees, recording and reporting employment data, terminating work contracts, and other labour-related issues. This plan will comply with the Guinea Labour Code.	

Topic	Mitigation Measure	Timing
Economic Development and Employment Opportunities	158. The Employment Plan will take into account expected fluctuations in demand for employment and local community expectations during different phases of development of roads.	
Economic Development and Employment Opportunities	159. The Employment Plan and any local employment opportunities will be communicated in a transparent and culturally appropriate manner.	
Economic Development and Employment Opportunities	160. When advertising employment opportunities, the Project will clearly define the skills, qualifications and experience required for the available positions and refer candidate to the local employment offices.	
Economic Development and Employment Opportunities	161. All employment-related decisions, including hiring, placement, promotion, benefits, training, discipline and dismissals, will be based solely on the skills, experience, performance and qualifications of employees and applicants.	
Economic Development and Employment Opportunities	162. Local Employment Offices will be established at key locations to facilitate access to employment opportunities for local candidates with appropriate skill-sets and to discourage in-migration to remote or sensitive areas.	
Economic Development and Employment Opportunities	163. Unskilled labour will be preferentially hired from the local communities.	
Economic Development and Employment Opportunities	164. A vocational training plan will be prepared to provide training to local people to increase their eligibility for employment. In addition, selected community employees will receive skills training to allow them to progress from unskilled to semi-skilled/skilled positions.	
Economic Development and Employment Opportunities	165. Opportunities for sustainable local procurement of goods and services to support road construction will be identified wherever possible and measures will be devised to maximise the potential of these opportunities. Key community decision-makers will be consulted as part of identifying and developing opportunities.	
Economic Development and Employment Opportunities	166. The Project will work with suitable partners in Guinea to identify suitable suppliers and, where relevant, implement initiatives to support local capacity building.	
Economic Development and Employment Opportunities	167. Local prices may be monitored to identify any areas where local availability of resources has been adversely affected by Project procurement.	

Topic	Mitigation Measure	Timing
Cultural heritage	168. A Cultural Heritage Management Plan will be implemented for the Project.	Siting
Cultural heritage	169. Roads will be planned and designed to minimise displacement of sites of importance for cultural heritage including historical or archaeological sites and sites of significance for local culture and traditions.	Siting
Cultural heritage	170. All works will be located at least 100 metres from any identified heritage site where possible. If this is not possible, effective protection and management measures will be devised on a case-by-case basis.	Design
Cultural heritage	171. In developing specific road proposals, field surveys and consultation with local communities will be carried out to identify any sites or features of importance for cultural heritage. This will include both tangible features or sites, and locations of intangible cultural importance.	Construction Operation
Cultural heritage	172. Although the potential risk of encountering buried archaeology is low, the Project will operate a "Chance Finds" procedure in accordance with IFC Performance Standard 8.	Design
Cultural heritage	173. If any finds are encountered, work will cease immediately and temporary protection of the area will be established. The find will be reported to the Simfer Communities Department and relevant specialists will be appointed to determine an appropriate course of action.	Construction
Cultural heritage	174. The location of any identified sites will be recorded and mapped using GIS for future reference when planning site developments and ground disturbance. Knowledge of the exact location and significance of any sites will be restricted to the minimum number of people required to ensure effective protection of the area.	Construction
Cultural heritage	175. If the alignment of a road is located close to an area of importance, the area will be clearly demarcated and if necessary fenced to prevent encroachment by Project personnel or activities and to protect it from accidental disturbance. Such sites will be inspected regularly to confirm no inadvertent or unreported damage has occurred and to identify any risk of harm from the Project.	Construction Operation
Cultural heritage	176. If a site or feature of cultural importance cannot be avoided, effective mitigation measures will be devised on a case-by-case basis in consultation with the local community.	Construction Operation
Cultural heritage	152. If a cultural heritage site is damaged in any way, this will be treated as an incident, and will be investigated and managed in accordance with the approved incident management procedures established for the Project. If any grievance should arise in this regard, this will be managed in accordance with the approved Grievance Procedure established for the Project.	Construction
Cultural heritage	177. All Project personnel will be required to respect local cultural traditions and religious festivals, funerals and other traditional events. Induction training for all personnel will include appropriate cultural awareness training.	Construction Operation

Topic	Mitigation Measure	Timing
Cultural heritage	178. Inspections will be carried out during the works and after their completion to verify that measures have been implemented as planned.	Construction
Community Health, Safety and Security	179. . A high standard of housekeeping will be maintained at all times in all construction work areas.	Construction Operation
Community Health, Safety and Security	180. Pools of standing water will be avoided to minimise the availability of breeding grounds for mosquitoes.	Construction Operation
Community Health, Safety and Security	181. Ongoing maintenance of work areas will include regular inspections for pest species. Appropriate management strategies will be implemented to manage any pests that may arise and may include use of approved pesticides etc. Methods used to control or prevent pests will not cause adverse impacts on the environment or communities.	Construction Operation
Community Health, Safety and Security	182. Risk of water-borne diseases will be minimised using appropriate treatment methods for water.	Construction Operation
Community Health, Safety and Security	183. A health management system will be established to ensure that all construction workers are fit for work and illnesses are not introduced by Project personnel coming into contact with local people.	Construction Operation
Community Health, Safety and Security	184. When undertaking risk assessments for occupational health hazards potential impacts on community health and safety will be considered alongside worker health and safety, and mitigation measures will be adopted, including health surveillance where appropriate, to provide appropriate levels of protection.	Construction Operation
Community Health, Safety and Security	185. All Project personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS and malaria along with the prevention and mitigation measures required.	Construction Operation
Community Health, Safety and Security	186. Awareness posters regarding relevant hazards, including HIV/AIDS and malaria, will be posted and maintained in areas regularly used by workers.	Design
Community Health, Safety and Security	187. Workers will be encouraged to attend HIV Awareness Programmes offered by the Project. The programmes will be developed in consideration of demands for prevention measures, awareness and education, voluntary counselling, testing, treatment, monitoring and evaluation.	Construction Operation
Community Health, Safety and Security	188. Access to all work areas will be strictly controlled using appropriate security provisions. Work areas will be clearly demarcated and signposted using pictorial signage to indicate and communicate hazards.	Construction Operation
Community Health,	189. All risk assessment and emergency response planning will consider potential impacts on local communities and	Construction

Topic	Mitigation Measure	Timing
Safety and Security	measures needed to ensure the safety and security of individuals in this regard.	Operation
Community Health, Safety and Security	190. Local authorities and affected communities will be provided with appropriate information communicating the nature and extent of any potential risk and impacts resulting from Project activities and procedures to be followed in the case of an unplanned accident or emergency. Training will be organised where necessary, as identified by means of risk assessment.	Construction Operation
Community Health, Safety and Security	191. Security personnel and all security arrangements will be managed in compliance with the Voluntary Principles on Security and Human Rights, developed by companies in the extractive sectors together with governmental and non-governmental organisations.	Construction Operation
Community Health, Safety and Security	192. Security personnel will be screened prior to employment by means of detailed interviews and inquiries will be made to investigate previous employment experience and records to avoid those who have previously been involved in abuse or violation of human rights.	Construction Operation
Community Health, Safety and Security	193. Work procedures, including a Code of Conduct, will be defined for security personnel defining expected and accepted behaviours and practices. These procedures will be communicated as part of induction and appropriate training will be provided to ensure ongoing adherence to Project requirements and expectations in this regard.	Construction Operation
Community Health, Safety and Security	194. The Project will develop appropriate disaster and emergency response plans. Security personnel will receive appropriate training regarding the different security-related scenarios that might arise, procedures to be followed in the case of each scenario, their roles and responsibilities during an emergency/security incident, and appropriate responses to different emergency scenarios that might arise.	Construction Operation
Community Health, Safety and Security	195. Security personnel will be screened prior to employment by means of detailed interviews and inquiries will be made to investigate previous employment experience and records to facilitate avoidance of individuals who have previously been involved in abuse or violation of human rights.	Construction Operation
Community Health, Safety and Security	196. Work procedures, including a code of conduct, will be defined for security personnel to clearly established expected and accepted behaviours and practices. These procedures will be communicated as part of induction and appropriate training will be provided to ensure ongoing adherence to Company expectations in this regard.	Construction Operation
Community Health, Safety and Security	197. The Project will develop appropriate disaster and emergency response plans. Security personnel will receive appropriate training regarding the different security-related scenarios that might arise, procedures to be followed in the case of each scenario, their roles and responsibilities during an emergency/security incident, and appropriate responses to different emergency scenarios that might arise.	Construction Operation
Community Health, Safety and Security	198. Appropriate supervision will be provided by senior competent personnel to ensure that established procedures are being applied by security personnel and training has been understood by the relevant security personnel.	Construction Operation

Topic	Mitigation Measure	Timing
Community Health, Safety and Security	199. Firearms will be strictly forbidden at any work area. Security personnel will not be permitted to carry firearms or knives.	Construction Operation
Community Health, Safety and Security	200. If community members express grievances in relation to the conduct of security personnel or activities, the Project will respond to the grievance in accordance with the Project's established Grievance Procedure.	Construction Operation
Community Health, Safety and Security	201. Security arrangements will be explicitly communicated to all relevant stakeholders including workers and representatives of affected communities.	Construction Operation
Community Health, Safety and Security	202. The route of new and improved roads, will be planned in consultation with the local administration and the local community to include appropriate provisions for pedestrians, livestock, Project traffic and local traffic.	Design Construction
Community Health, Safety and Security	203. Local people will be made aware of hazards associated with increased traffic on new and improved roads, and provided with appropriate information regarding safety provisions.	Construction Operation
Community Health, Safety and Security	204. Project personnel will be provided with regular driver training and competency testing regarding driving rules, speed limits and relevant emergency procedures.	Construction Operation
Community Health, Safety and Security	205. Project personnel will work with the local authorities to communicate any hazards associated with the use of roads by Project personnel or vehicles and will adhere to any requirements of local authorities in this regard.	Construction Operation
Worker-Community Interactions	206. Local stakeholders will be consulted prior to commencing activities: • to understand their views regarding the siting and management of the specific road works and associated infrastructure; • to ensure the administration and communities are aware of the activities that are planned and any impacts that may occur; and • to agree any management measures that may be required taking account of specific local factors, conditions, or stakeholders.	
Worker-Community Interactions	207. All Mobile Field Camps for construction workers will be operated as closed camps with controlled entry and exit for non-local workers. Transport between camps and work areas will be strictly controlled. Non-local workers will only be permitted to leave work areas on specific work-related missions authorised by an appropriate supervisor. Appropriate levels of security will be provided at all camps and work areas to ensure that this policy is upheld.	

Topic	Mitigation Measure	Timing
Worker-Community Interactions	208. Appropriate catering and recreational facilities will be provided so that work crews are self-sufficient and do not need to enter local communities for facilities or amenities.	
Worker-Community Interactions	209. If significant interaction with communities is required, the work team will be accompanied by a member of the Simfer Communities Team.	
Worker-Community Interactions	210. A Code of Conduct for Project Personnel will be developed detailing rules to be upheld to minimise the risk of anti-social behaviours. Appropriate disciplinary procedures will be developed and enforced to ensure that the Code of Conduct is upheld by all Project personnel.	
Worker-Community Interactions	211. All Project personnel will be provided with appropriate induction training that will include communication of the Code of Conduct, associated disciplinary procedures, and any cultural sensitivities relevant to worker activities and work areas.	
Worker-Community Interactions	212. Induction training will also include communication of the procedures in place to ensure appropriate management of grievances and the requirement for all personnel to report any grievance within 24 hours of receipt.	
Worker-Community Interactions	213. The Simfer Communities Team will co-ordinate appropriate investigation and resolution of all grievances within a reasonable timeframe in accordance with the Simandou Project's established and approved Grievance Procedure.	
In-migration	214. Project personnel will adhere to national policies and legislation regarding free movement of individuals and open borders between the Economic Community of West African States (ECOWAS).	Design
In-migration	215. The route of new and improved roads will be planned in consideration of risks associated with providing access to remote areas where communities would be adversely affected by in migration.	Construction Operation
In-migration	216. Decisions will be taken in consultation with the local administration and the local community, including local security personnel, to ensure their views and wishes are taken into account to minimise adverse impacts on individuals and communities.	Construction Operation
In-migration	217. If significant disruption to existing settlements and land uses such as agriculture would occur, local bypasses will be provided where possible, to minimise adverse impacts.	Construction Operation
In-migration	218. All employment will be managed via Local Employment Offices, which will be established in existing large settlements with capacity to accommodate population growth. Any individuals who approach work areas will be referred to the nearest Employment Office. No employment will be offered directly at Project sites.	Design
In-migration	219. An influx/in-migration management plan will be developed for the Project in consultation with the relevant local authorities setting out measures to manage in-migration to avoid adverse impacts on local communities.	Construction

Topic	Mitigation Measure	Timing
In-migration	220. Changes in local populations and demographics may be monitored where in-migration is considered a significant risk.	Construction
In-migration	221. Supplies will be obtained locally where there are sustainable local sources available but will be imported into the area where suitable local resources are not available.	Construction
In-migration	222. Measures will be taken to ensure that abstraction of water for road constructions will not lead to significant adverse impacts on water resources for local use.	Construction
Local Employment and Procurement	223. An Employment Plan will be developed to define requirements and procedures to be followed when identifying and developing Project employment opportunities, managing employees, recording and reporting employment data, terminating work contracts, and other labour-related issues. This plan will comply with the Guinea Labour Code.	Construction Operation
Local Employment and Procurement	224. The Employment Plan will take into account expected fluctuations in demand for employment and local community expectations during different phases of development of roads.	Construction Operation
Local Employment and Procurement	225. The Employment Plan and any local employment opportunities will be communicated in a transparent and culturally appropriate manner.	Construction Operation
Local Employment and Procurement	226. When advertising employment opportunities, the Project will clearly define the skills, qualifications and experience required for the available positions and refer candidate to the local employment offices.	Construction Operation
Local Employment and Procurement	227. All employment-related decisions, including hiring, placement, promotion, benefits, training, discipline and dismissals, will be based solely on the skills, experience, performance and qualifications of employees and applicants.	Construction Operation
Local Employment and Procurement	228. Local Employment Offices will be established at key locations to facilitate access to employment opportunities for local candidates with appropriate skill-sets and to discourage in-migration to remote or sensitive areas.	Construction Operation
Local Employment and Procurement	229. Unskilled labour will be preferentially hired from the local communities.	Construction Operation
Local Employment and Procurement	230. A vocational training plan will be prepared to provide training to local people to increase their eligibility for employment. In addition, selected community employees will receive skills training to allow them to progress from unskilled to semi-skilled/skilled positions.	Construction Operation
Local Employment and Procurement	231. Opportunities for sustainable local procurement of goods and services to support road construction will be	Construction

Topic	Mitigation Measure	Timing
Procurement	identified wherever possible and measures will be devised to maximise the potential of these opportunities. Key community decision-makers will be consulted as part of identifying and developing opportunities.	Operation
Local Employment and Procurement	232. The Project will work with suitable partners in Guinea to identify suitable suppliers and, where relevant, implement initiatives to support local capacity building.	Construction Operation
Local Employment and Procurement	233. Local prices may be monitored to identify any areas where local availability of resources has been adversely affected by Project procurement.	Construction Operation
Human Rights	234. Employment during road construction will be managed so as to: • comply with the Universal Declaration of Human Rights and Rio Tinto's Global Human Rights Policies; • comply with all relevant legislation (including the Guinean Labour Code) and International Labour Organisation (ILO) conventions; • ensure appropriate management of labour-related risks; and • adhere to the Voluntary Principles on Security and Human Rights, as devised by companies in the extractive sectors together with governmental and non-governmental organisation.	Construction Operation
Human Rights	235. Use of child labour will be strictly forbidden during construction. Contractors, suppliers and recruitment agencies will not hire workers under the age of 16 and employment of young workers between 16 and 18 years will only be for light work of limited duration, where the work does not interfere with primary education, and is not dangerous or harmful to the physical, mental or moral development of young workers.	Construction Operation
Human Rights	236. Use of forced labour will be strictly forbidden during construction. Everyone will be allowed free choice to accept or reject opportunities of employment.	Construction Operation
Human Rights	237. Labour and working conditions will be clearly communicated to potential workers as part of the recruitment process and will include communication of conditions relating to the closed camp policy and key relevant worker hazards and risks.	Construction Operation
Human Rights	238. Workers will have the right to form and to join trade unions and create their own worker committees and worker representatives in accordance with the requirements and rights set out in the Guinea Labour Code.	Construction Operation
Human Rights	239. Salaries will be just and favourable ensuring the worker and the worker's family have an existence worthy of human dignity.	Construction Operation

Topic	Mitigation Measure	Timing
Human Rights	240. Discrimination because of race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, actual or perceived HIV status or other status will be strictly forbidden.	Construction Operation
Human Rights	241. HIV/AIDS screening will not be a requirement for recruitment or a condition of employment.	Construction Operation
Human Rights	242. Requirements relating to Human Rights will be clearly communicated to all relevant personnel as part of training, and incorporated into labour contracts.	Construction Operation
Human Rights	243. Appropriate levels of auditing and verification will be carried out to monitor compliance with these requirements.	Construction Operation
Human Rights	244. The Project will establish appropriate procedures facilitating the reporting of non-compliances and grievances by Project personnel and stakeholders and ensuring that any reported incidents are addressed in an appropriate and culturally sensitive manner.	Construction Operation
Employment Terms and Working Conditions	245. Employment procedures and conditions during construction will conform to international standards with respect to protection of human rights, as set out in the previous section.	Construction Operation
Employment Terms and Working Conditions	246. Employment practices and working conditions will conform to the requirements of IFC Performance Standard 2 (Labour and Working Conditions), the Government of Guinea Labour Code and ILO Standards.	Design
Employment Terms and Working Conditions	247. Worker accommodation will be designed taking into consideration the guidelines developed by the IFC and European Bank for Reconstruction and Development (EBRD).	Design
Employment Terms and Working Conditions	248. Appropriate facilities and rest and recreational time will be provided to allow workers to manage fatigue and engage in recreational activities.	Design
Employment Terms and Working Conditions	249. Rules with respect to alcohol consumption and drug prohibition will be defined, to ensure that all Project personnel are fit for work and do not pose a danger to themselves or others.	Construction Operation
Employment Terms and Working Conditions	250. Where different standards of accommodation are provided, procedures will be established governing allocation of accommodation and will be documented and communicated in a transparent manner to all affected personnel. Allocation of accommodation based on ethnicity or nationality will not be permitted.	Construction Operation
Employment Terms and Working Conditions	251. Strict procedures will be adopted for hazard identification and risk assessment and for definition and implementation of appropriate mitigation measures to ensure a safe workplace. Relevant information will be	Construction Operation

Topic	Mitigation Measure	Timing
	communicated to all Project personnel.	
Employment Terms and Working Conditions	252. The Project will establish strict procedures facilitating the reporting of health and safety incidents and ensuring that any reported incidents are addressed in an appropriate and culturally sensitive manner.	Construction Operation
Employment Terms and Working Conditions	253. A fair, transparent, culturally appropriate and accessible Grievance Procedure will be available to all workers.	Construction Operation