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Scoping Report for the Environmental and Social Impact Assessment of the CBG Mine Expansion Project

COMPAGNIE DES BAUXITES DE GUINÉE

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ABBREVIATIONS AND ACRONYMS

(Note: Text in square brackets [] is a translation of a French term for which there is no official English version.)

°C	Degrees Celsius
BGEEE	Bureau Guinéen des Etudes et Evaluations Environnementales [Guinean bureau of environmental studies and assessment]
CAF	Centre d'autopromotion féminine [women's self-help center]
CBG	Compagnie des Bauxites de Guinée
CO_x	Carbon oxides
CR	Commune Rurale [rural commune]
CRD	Commune rurale de développement [rural development commune]
dBA	A-weighted decibel
EPA	Environmental Protection Agency, USA
ESIA	Environmental and social impact assessment
GHG	Greenhouse gas
Gpt	Groupement [group]
HSE	Health, safety and environment
IFC	International Finance Corporation
KP	Kilometer point
L_{eq}	Equivalent sound level
MB	Microbusiness
mL	milliliter
MTPA	Million tonnes per annum
NCEP	National Centers for Environmental Prediction, USA
NOAA	National Oceanic and Atmospheric Administration, USA
NO_x	Nitrogen oxides
OHSE	Occupational health, safety and environment
PARC	Plan d'action de réinstallation et de compensation [resettlement and compensation action plan]

PM₁₀	Airborne particulate matter less than 10 micrometers in diameter
PM₂₅	Airborne particulate matter less than 25 micrometers in diameter
SEP	Stakeholder Engagement Plan
SH	Stakeholder
SME	Small and medium-sized enterprises
SOCANE	Société de Nettoyage et d'Assainissement [clean-up and reclamation corporation]
SOCOREM	Société de Construction et de Rénovation des Maisons [home construction and renovation corporation]
SONECI	Société de Nettoyage et de Curage Industriel [industrial clean-up corporation]
SO_x	Sulphur oxides
SP	Subprefecture
TSP	Total suspended particulates
VEC	Valued ecosystem component
WRF-NMM	Nonhydrostatic Mesoscale Model - Weather Research and Forecasting

1 INTRODUCTION

1.1 BACKGROUND

The Compagnie des bauxites de Guinée (CBG) must expand its industrial facilities to meet the demand for additional volume from its existing Halco Mining customers and a new customer, Mubadala.

The Expansion Project must make it possible to raise the shipping volume from the current 13.5 MTPA to 22.5 MTPA by 2017 and 27.5 MTPA by 2022.

To accomplish this, CBG must do the following over the next three years:

- collect field data for the environmental and social impact assessment (ESIA); and
- perform major work at the mine in the Sangarédi and Daramagnaki subprefectures, at the industrial and port facilities in Kamsar and along the railroad between Sangarédi and Kamsar and.

1.2 THE PROPONENT

The Compagnie des Bauxite de Guinée (CBG) is the proponent of the bauxite Mine Expansion Project. CGB is owned in partnership by Halco, which holds 51% of the shares (Alcoa 45%, RTA 45% and Dadco 10%), and the Government of Guinea, which holds 49%.

1.3 SCOPING MISSION AND REPORT

To identify the main host environment components to study for the ESIA, the ÉEM team conducted a scoping mission from October 3 to 24, 2013. Based on this field campaign, the team was able to validate the main elements to take into consideration for the impact study and to obtain a much more detailed understanding of the local and regional environment likely to be affected by the mining facilities.

The scoping mission also made it possible to tailor methodologies for the studies of the physical, biological and social environments. This report describes the

methodological approaches chosen for the baseline study and the study of the Project’s potential and residual impacts. It also describes the main host environment components taken into account.

1.4 STRUCTURE OF THE STUDY TEAM

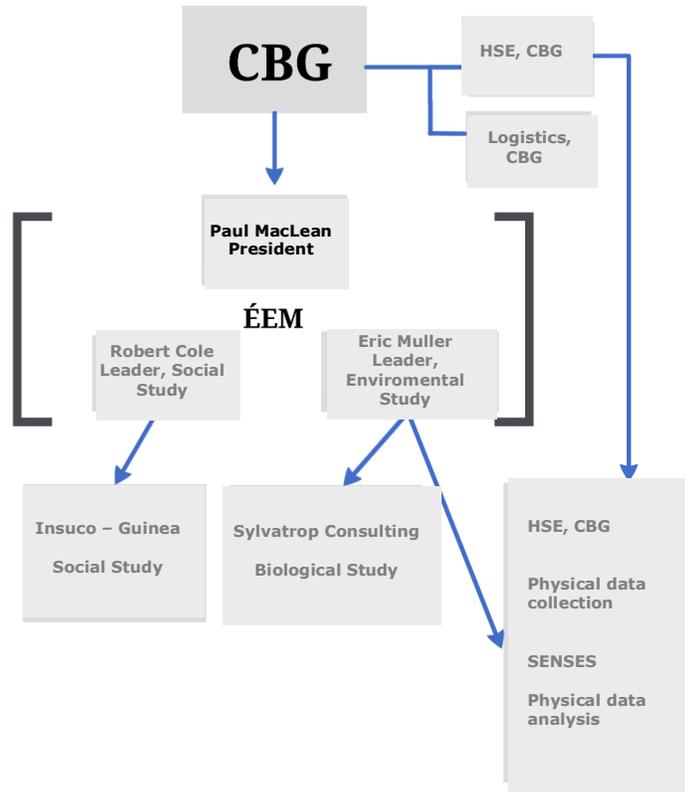


Figure 1.1 Organization chart of the ESIA team for the Expansion Project

2 LEGAL AND ADMINISTRATIVE FRAMEWORK AND POLICIES

2.1 GUINEAN LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1.1 Legal framework

The CBG Expansion Project will have legal implications in terms of the national administrative procedures for major projects and the technical regulations governing community and environmental management. The Project and the ESIA must comply with these laws and regulations in order to ensure the efficient implementation of the Project. The main elements of the legal framework applicable to the Project are as follows:

- *Code de la Protection et de la Mise en Valeur de l'Environnement (or Code de l'environnement)* – establishes the national framework for natural resource management and prescribes mechanisms, such as ESIA, for minimizing negative environmental impacts;
- Loi L/96/010/An du 22 juillet 1996 portant sur la réglementation des taxes à la pollution applicables aux établissements classés;
- Décret présidentiel N° 199/PRG/SGG/89 codifiant les Études d'Impact sur l'Environnement (November 1989) – establishes that ESIA must be conducted for certain types of projects, including ports, power stations, mines, etc.;
- Décret présidentiel N° 200/PRG/SGG/89 – establishes the project authorization and permitting process for construction and operation of a classified facility (Guinea has 79 classified facilities that constitute potential hazards to public health, agriculture, the environment, etc.);
- Décret 201/PRG/SGG/89 du 8 novembre 1989 portant sur la préservation du milieu marin;
- Arrêté conjoint N° 93/8993/PRG/SGG – specifies the nature of the classified facilities mentioned in Section 1 of Décret N° 200/PRG/SGG/89;
- Arrêté N° 990/MRNE/SGG/90 – establishes the procedures and methodology for carrying out an ESIA. The following information is required:
 - a summary description of the project (justification, location, process, capital outlay and project schedule);

- baseline data and environmental surveys of the geology, hydrogeology, hydrology, wildlife, vegetation, noise, odors, air quality, traffic, infrastructure, socioeconomic activities and topologies of the various sites;
 - an assessment of the project's impacts on the physical, ecological and social environment;
 - a study of other options (site and process) from an environmental standpoint, with a justification of the proposed choice; and
 - measures to eliminate, mitigate and, if need be, compensate for the project's harmful effects on the environment.
- Arrêté A/2008/4947/MDDE/CAB – establishes the terms for payment of the fees related to the examination of ESIA reports;
 - Arrêté N° A/2013/474/MEEF/CAB portant sur l'adoption du *Guide général d'évaluation environnementale* – establishes the structure, content requirements and implementation sequences for ESIA's;
 - Loi L/95/036/CTRN du 30 juin 1995, portant sur le *Code minier* de la République de Guinée – governs exploration, operations, commerce and processing in the mining industry, with reference to the Code de l'environnement;
 - *Code de l'eau*, established under Loi L/94/005/CTRN – governs the management of water resources;
 - *Code forestier* (Loi L/99/013/AN, 1999) – governs the management of forest resources;
 - *Code foncier et domanial* (1992) – establishes the framework for rural and urban property ownership, recognizes customary law and governs expropriations and the associated compensations;
 - *Code de protection de la faune sauvage et réglementation de la chasse* (Loi L/99/038/AN);
 - *Code minier* (Loi L/2011/006/CNT);
 - La loi-cadre sur les activités de la pêche en eau douce (L/96/067/AN du 22 juillet 1996);
 - *Code pastoral* – establishes the conditions for using lands and resources as pasturage;
 - *Code du travail* (1988) – establishes the framework for ensuring worker health and safety;

- *Code des investissements* (1995) – establishes a system of guarantees for investors and requires that foreign investments accord hiring priority to Guinean nationals.

The following figure gives an overview of the ESIA and authorization process for projects subject to the Guinean impact assessment procedure.

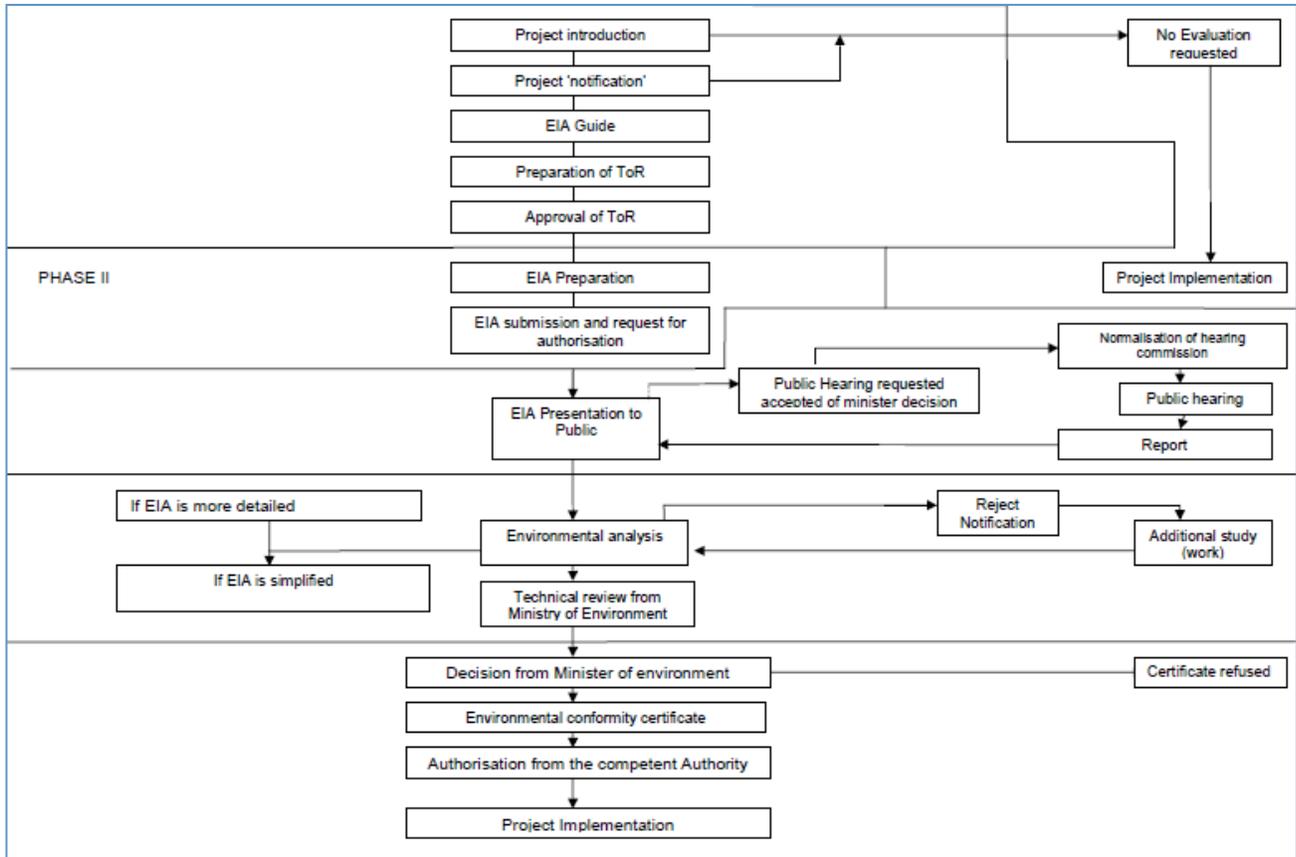


Figure 2.1 Guinean ESIA and authorization process

National plans

A number of strategic action plans of the Government of Guinea must also be taken into account in the deployment of the Project. These plans constitute the primary administrative framework for ensuring that environmental priorities are observed throughout the territory. The plans whose strategic directions and objectives are relevant to the ESIA and Project implementation include:

- Plan d'action national pour l'Environnement;
- Plan d'action forestier national;
- Plan directeur d'aménagement forestier des mangroves.

2.1.2 Administrative framework

National administrative framework

Many government bodies will be involved in the ESIA process for the Mine Expansion Project. Indeed, the Project touches on the jurisdictions of several ministries, and these ministries will participate in reviewing the ESIA report and applying the regulatory and administrative frameworks for which they are responsible. Here are the main government bodies involved in monitoring the deployment of the Project:

- Ministère délégué à l'environnement, aux eaux et forêts [environment, water and forests];
- Ministère d'État chargé des Travaux publics et des Transports [public works and transportation];
- Ministère de l'Habitat, de l'Urbanisme et la Construction [housing, urban planning and construction];
- Ministère de la Jeunesse et de l'Emploi des jeunes [youth and youth employment];
- Ministère de l'Industrie et des Petites et Moyennes Entreprises [industry and small and medium enterprises];
- Ministère de l'Élevage [animal farming];
- Ministère de l'Emploi, de l'Enseignement technique et de la Formation professionnelle [employment, technical education and vocational training];
- Ministère de l'Administration du Territoire et des Affaires politiques [territorial administration and political affairs];
- Ministère de l'Agriculture [agriculture];
- Ministère de la Culture des Arts et du Patrimoine [culture, arts and heritage];
- Ministère de la Santé et de l'Hygiène publique [health and public hygiene];
- Ministère des Mines et de la Géologie [mines and geology];
- Ministère du Plan; [planning]
- Ministère de la Pêche et de l'Aquaculture [fishing and aquaculture];

- Ministère Délégué aux Affaires sociales, à la Promotion féminine et à l'Enfance [social affairs, status of women and child protection];
- Ministère Délégué aux Transports [transportation].

The ESIA process will be overseen by the Bureau Guinéen d'Études et d'Évaluation Environnementale (BGÉÉE), which will be charged with validating the ESIA deliverables. The Guide général de réalisation des études d'impact environnemental et social (BGÉÉE, Ministère de l'Environnement, des eaux et forêts, 2013) sets out specific requirements for ESIA in terms of their content, structure and scope. The BGÉÉE is also responsible for ensuring that the sequence of steps for conducting an ESIA in Guinea is followed.

Regional and local administrative framework

Guinea is divided into seven administrative regions: Boké, Faranah, Kankan, Kindia, Labé, Mamou and Nzérékoré, plus the city of Conakry. The regions are each headed by a governor and subdivided into prefectures headed by prefects. Each prefecture is in turn divided into subprefectures, one of which is designated as an urban commune and the prefecture capital.

The subprefectures are headed by subprefects, who are appointed by the Central Administration. As part of the decentralization of Guinea and the communalization of the territory, several rural subprefectures were designated as Communes Rurales de Développement (CRDs) [rural development communes] during the 1990s. CRDs are headed by elected presidents. Certain competencies related to public services devolve to the CRDs. In total, Guinea has 33 prefectures, 38 communes (including 5 in Conakry) and 303 rural subprefectures.

The districts are divided into sectors containing a number of villages. The three study areas (Kamsar, the railroad corridor and the Sangarédi mine) are located within the Boké administrative region, although the mine extends slightly into Téliélé prefecture in the Kindia region.

However, for all intents and purposes, the Project is located in the Boké administrative region, which has five prefectures: Boké, Boffa, Fria, Gaoual and Koundara. The study areas are all located within Boké prefecture, which has 10 subprefectures: Bintimodia, Boké-Centre, Dabiss, Kamsar, Kanfarandé, Kolaboui, Malapouya, Sangarédi, Sansalé and Tanéné. Only Boké-Centre has the status of urban commune. The three local study areas are located in:

- Kamsar subprefecture/CRD for the Kamsar industrial zone;
- Kamsar, Kolaboui, Boké-Centre, Tanéné and Sangarédi subprefectures/CRDs for the railroad (particular emphasis will be placed on the areas where sidings will be built, at KP 14 and KP 118); and
- Sangarédi subprefecture/CRD for the mining area around Sangarédi, with a slight overlap into Daramagnaki subprefecture.

2.2 INTERNATIONAL FRAMEWORK

International conventions

Following is a list of international conventions that have been ratified by Guinea and have direct implications for the Mine Expansion Project and its ESIA:

- United Nations Framework Convention on Climate Change (1992) and the Kyoto Protocol (1997);
- Vienna Convention for the Protection of the Ozone Layer (1985);
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987);
- Convention on the Conservation of Migratory Species of Wild Animals (1979);
- Convention on Biological Diversity (1992);
- African Convention on the Conservation of Nature and Natural Resources (1968);
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1979);
- Ramsar Convention on Wetlands (1993);
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1995, acceded to but not ratified);
- United Nations Convention on the Law of the Sea (1994);
- Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (1984);
- Convention to Combat Desertification (1994);
- Extractive Industries Transparency Initiative (Candidate status renewed in 2011);
- World Heritage Convention (UNESCO) (ratified in 1972);
- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) (ratified in 1959);

- Right to Organise and Collective Bargaining Convention, 1949 (No. 98) (ratified in 1959);
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111) (ratified in 1960);
- Worst Forms of Child Labour Convention, 1999 (No. 182) (ratified in 2003);
- Minimum Age Convention, 1973 (No. 138) (ratified in 2003).

2.3 INDUSTRY STANDARDS AND GOOD PRACTICE

Compliance with the Performance Standards on Environmental and Social Sustainability (January 1, 2012) of the International Finance Corporation (IFC) will be a cornerstone of the ESIA, as will the Equator Principles for managing the environmental and social impacts of international investment projects.

The IFC Performance Standards establish essential criteria, in terms of social and environmental sustainability, for accessing international capital. The set of eight operational standards requires that environmental and social management systems be developed, implemented and followed to ensure that risks and impacts related to the basic themes of sustainable development are effectively and systematically managed throughout the life of a project. For each theme, particular methodology criteria, essential subjects and support principles are established to guide the process. The themes are as follows:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labor 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; and
- Performance Standard 8: Cultural Heritage

The Project will also be developed in compliance with the Equator Principles III (2011), a financial industry benchmark for taking social responsibilities and environmental management into account. The 10 basic principles are as follows:

- Principle 1 – Review and categorization: The Equator Principles Financial Institution (EPFI) must categorize the project based on the magnitude of its potential risks and impacts and the environmental and social criteria of the IFC.
- Principle 2 – Environmental and social assessment: The client must conduct an assessment of the environmental and social impacts and propose relevant management and mitigation measures for reducing the impacts to an acceptable level.
- Principle 3 – Applicable environmental and social standards: Social and environmental performance must be evaluated according to the IFC Performance Standards and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) as well as the host country laws.
- Principle 4 – Environmental and Social Management System (ESMS) and Action Plan: The client must develop a plan for implementing the mitigation, remedial and follow-up measures needed to address the impacts and risks identified in the assessment process.
- Principle 5 – Stakeholder engagement: For projects with potentially significant adverse impacts on host communities, the client must conduct free and informed consultations of said communities beforehand, facilitate their informed participation and make the assessment documents and action plan publicly available in a culturally appropriate manner.
- Principle 6 – Grievance mechanism: As part of the ESMS, the client must establish a grievance mechanism and inform the affected communities about it.
- Principle 7 – Independent review: An independent environmental and social consultant must carry out a review of the assessment, action plan and stakeholder engagement process in order to assess Equator Principles compliance.
- Principle 8 – Covenants: The client must covenant, in the financing documentation, to comply with the host country requirements, to implement the action plan, to provide periodic reports on the project’s social and environmental performance, and to decommission and dismantle the facilities as applicable.
- Principle 9 – Independent monitoring and reporting: Reports and monitoring information must be checked by an independent environmental and social consultant.

- Principle 10 – Reporting and transparency: EPFIs must report annually on their Equator Principles implementation processes and experience.

Effective management of Project risks and impacts requires a complete ESIA covering and assessing the potential risks and impacts of all operations and phases of the Project. The IFC Performance Standards require that this process use the best available tools and practices and encompass the Project’s entire area of influence, including indirect effects and effects associated with the supply chain. The process must be documented and based on solid quantitative and qualitative scientific data; any gaps in important information must be identified and justified in collaboration with local and regional stakeholders through stakeholder participation and prior free and informed consent. The nature and methods of stakeholder engagement must be established at the planning stage through a stakeholder engagement plan that must include a mechanism allowing participants to submit grievances.

The identification and assessment of risks and impacts must include the identification of possible mitigation measures in a hierarchy favoring avoidance of impacts over their minimization or compensation. The scope of the risks or impacts must also be defined in terms of the cumulative impacts on the natural, physical or human environment of all Projects—past, present and future—that could have combined effects at an international or regional level. Once the risks and impacts have been assessed, disclosed and documented in a formal process, the ESIA must also provide information on the impacts or risks that will remain after implementation of the provisional mitigation measures.

The CBG Project team has assumed responsibility for verifying the ESIA report’s compliance with the IFC Performance Standards and will make sure the report complies with those standards before the final version is submitted.

3 DESCRIPTION OF THE PROJECT

3.1 DESCRIPTION OF THE PROJET

CBG is a mining company owned jointly by the Government of Guinea and Halco Mining (Alcoa, Rio Tinto Alcan and Dadco). CBG is currently considering increasing its bauxite production by 9 MTPA of shipped material, for a production capacity of

22.5 MTPA (3% moisture content) by the last quarter of 2017, with another 5 MTPA expansion around 2022, for a total production capacity of 27.5 MTPA.

At present, CBG extracts, transports by rail, processes and ships 13.5 MTPA of bauxite (3% moisture content) from its facilities located in Kamsar and Sangarédi in northwestern Guinea, as shown in the figure below. These facilities have been in operation since 1973.

The Expansion Project will include major upgrades in three separate Project zones: the area of the Kamsar port and plant; the mining area near Sangarédi; and area of the railroad used to transport ore from the mine to the plant. Specific fields of study in each Project zone are based on environmental and social criteria. Certain technical modifications will affect all three zones, such as the increases in power generation capacity and water treatment capacity.

Port and plant

Increasing the mine's production capacity will mean that larger quantities of mineral matter must be loaded and shipped. Scenarios considered to increase the capacity of the Kamsar port facilities are examined in Section 3.4.1.

Upgrades at the Kamsar plant will include a car dumper station and an ore crushing station. Two locations are currently being studied by Fluor, which will submit a prefeasibility study report in December 2013. One scenario locates the new crusher at the mine, in which case the crusher at the plant will be shut down. The other scenario calls for upgrading the Kamsar plant crushing process right at the new car dumper station.

The plant's power generation capacity will have to be increased. Other upgrades are also planned, including new conveyors, new dryers and chimney scrubbers and enlargement of the dried bauxite stockpiling area. The maintenance facilities will also be enlarged and refitted for the additional equipment and staff required to maintain the cars and locomotives. Preliminary analyses indicate that one additional building may be sufficient.

The plant upgrades will create new jobs, and estimates will be provided at the end of the prefeasibility study (FEL 2). Preliminary figures suggest that about 1,200 employees will be required for the construction phase, and about 275 workers for the expansion of activities depending on the location of the crushing station.

Additional housing required will also be assessed during the prefeasibility study (FEL 2).

Mine

The crushing station may be located at the site of the Sangarédi mine, depending on the scenario CBG selects. The N'Dangara rail yard and the mined area of the bauxite plateau will also be enlarged. Two scenarios are currently being studied: the first calls for a railroad loop around the plateau and the second for an extension toward the village of Parawi. Map 3.2 (page 17), which shows the location of the Study Area, also shows targets for expansion of the mining operations.¹

Expansion of the mine may mean employment opportunities, including jobs for about 75 employees during the construction phase and 113 skilled employees for the mining operations.

Railroad

The Expansion Project will also involve improvements to the railroad running from the Sangarédi mine to the plant and to the Kamsar port. More than 380 cars may be added to the rail link, which could be of considerable benefit to current and future users of the railroad. The length of the trains carrying bauxite to Kamsar will increase, and the number of daily trips will rise from five to 11. Two sidings will also be built, at KM 14 and KM 118 of the railroad. The siding at KM 71 will be extended by 300 m. The signal appliances will also have to be adapted for the new usage. Appendix 1 shows the provisional general layout of the planned railroad facilities.

3.2 TIME LINE

The following figure gives a time line for the main stages of the ESIA process.

¹ This map does not show anticipated variations in extraction rates.

Activity	October	November	December	January	February	March
PROJECT COORDINATION						
Project management Report compilation FEASIBILITY STUDY ASSISTANCE						
Feasibility study assistance ESIA – Physical environment						
Scoping mission Air quality Noise and vibrations Water quality Geology and soils ESIA – Biological environment						
Scoping mission Biology baseline Biological impacts ESIA – Social environment						
Scoping mission Stakeholder Engagement Plan Socioeconomic baseline Socioeconomic impacts						

Figure 3.1 ESIA time line

3.3 PROJECT AND STUDY AREAS

3.3.1 Areas affected by the Project

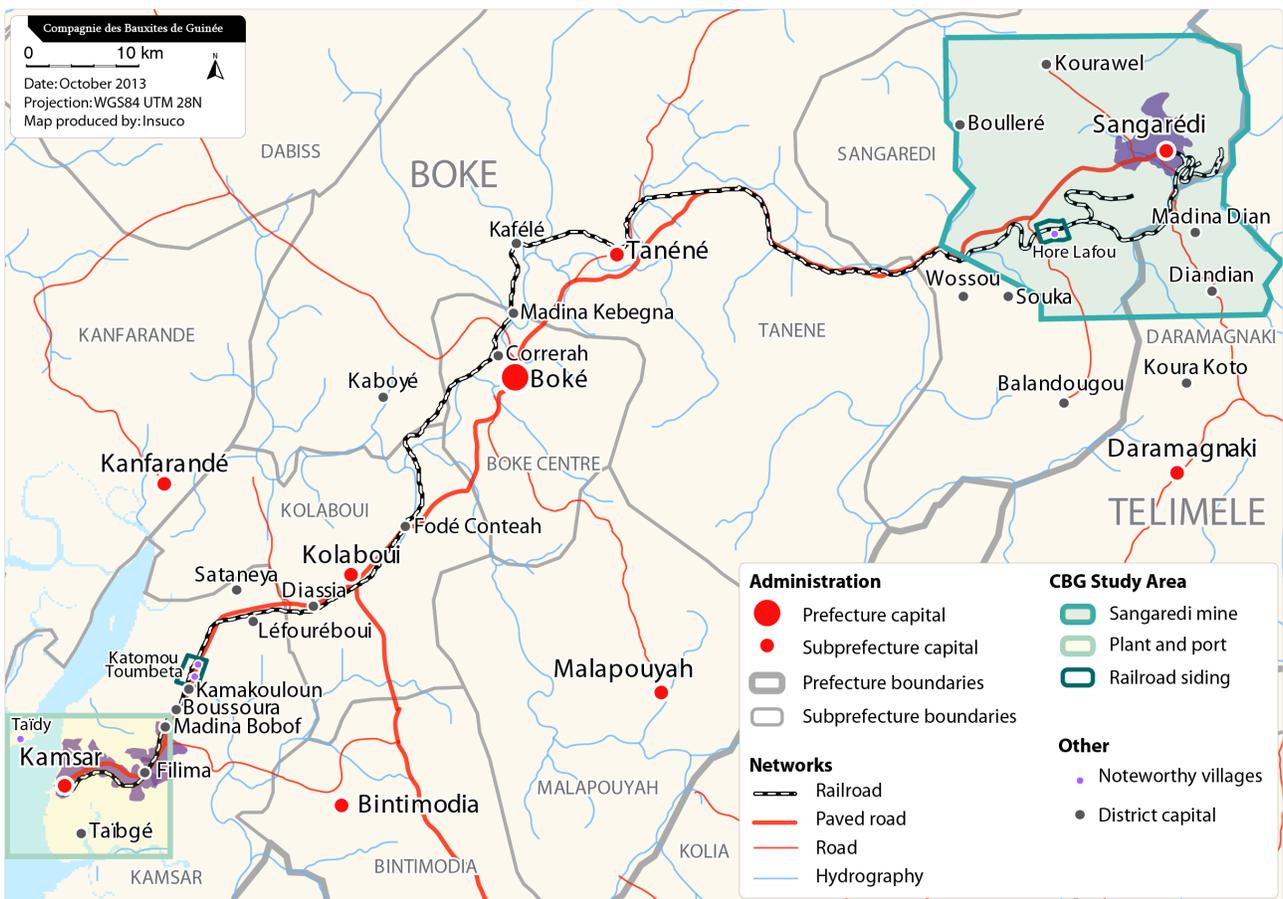
As shown in the layout sketch for the CBG Expansion Project, the Project footprint can be divided into three separate zones:

1. the bauxite mining area around Sangarédi;
2. a corridor along the railroad between Sangarédi and Kamsar, with particular emphasis on two sections where rail sidings are to be built;
3. the mouth of Rio Nuñez, an area that encompasses the CBG plant, the ore-loading port and the area used by the ships carrying the ore.

The mining area around Sangarédi (Zone 1) straddles two prefectures, Boké and Téli­mé­lé, in the administrative regions of Boké and Kindia, respectively. It covers part of the subprefecture of Sangarédi (in Boké prefecture) and part of the subprefecture of Daramagnaki (in Téli­mé­lé prefecture).

The CBG plant and loading port (Zone 2) are on the east bank of the mouth of Rio Nuñez, in Kamsar subprefecture, Boké prefecture. The west bank is actually an island also belonging to Kamsar subprefecture.

The railroad (Zone 3) crosses the subprefectures of Kamsar, Kolaboui, the urban commune of Boké and then the subprefectures of Tanéné and Sangarédi in Boké prefecture. It ends in Daramagnaki subprefecture, Telimélé prefecture. At present, it is anticipated that the sidings will be at KM 14 (KM 14 to KM 15.9) in Kamsar subprefecture and at KM 118 (KM 118.3 to KM 120.1) in Sangarédi subprefecture.



Map 3.1 Map of Project area

The Socioeconomic Study Area was determined based on the possible overall effect of the Expansion Project. Thus the main villages or populated areas liable to be affected by the Project have been targeted. However, with the information currently available, more specific targeting based on the scope of the anticipated impacts in those villages and populated areas is not possible. Still less is it possible to base the

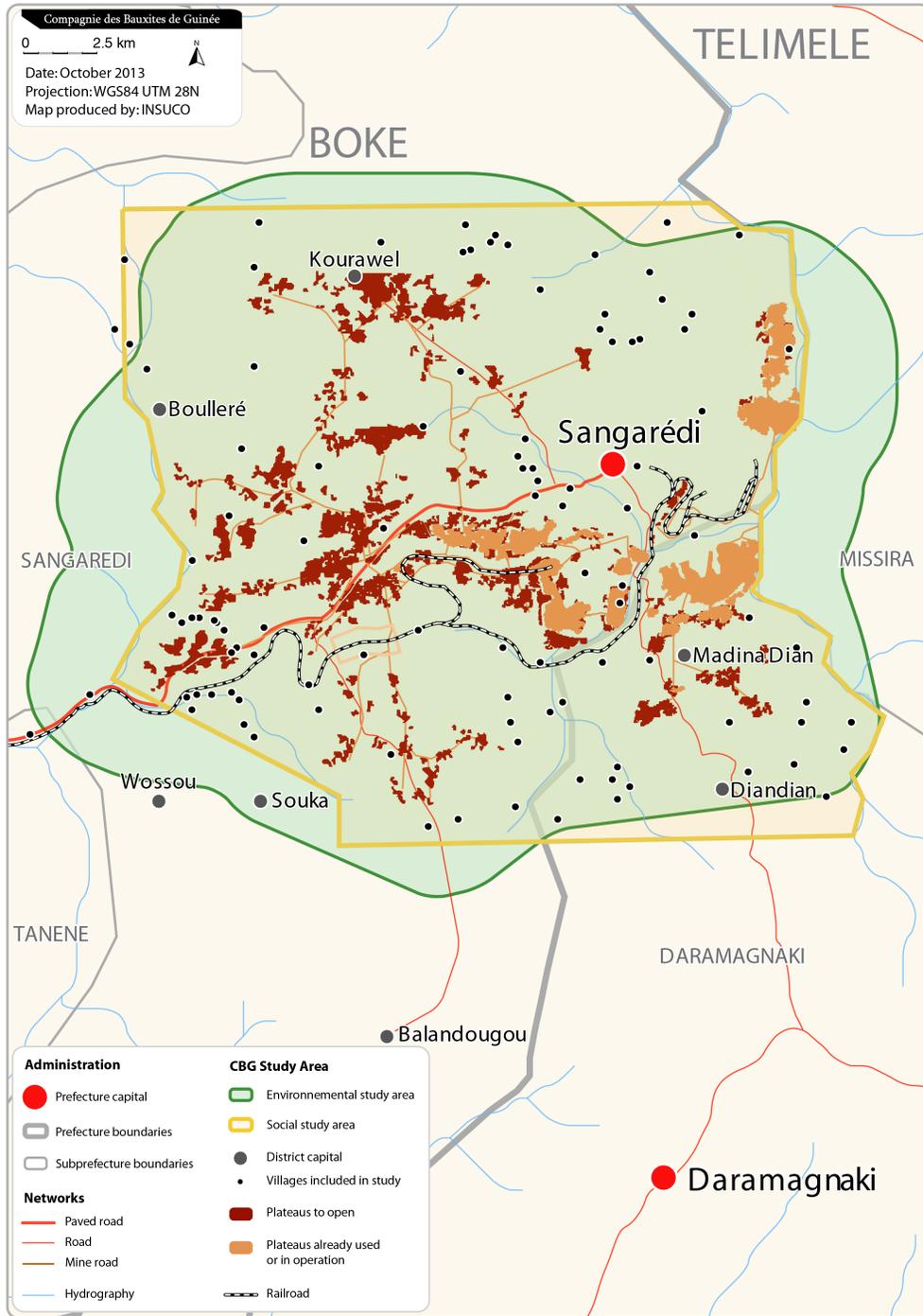
sampling method for the household surveys on a set of villages where the impact is likely to be substantial. Instead the goal of the baseline socioeconomic study is to generate a broad range of quantitative and qualitative data that can improve our understanding of the socioeconomics of the communities and their households in order to better assess possible impacts and target populated areas that should be studied in the impact assessment. In addition, socioeconomic impacts are not systematically proportional to distance from a project. Many factors can play a role in determining impacts (access to resources, travel impediments, the attractiveness of a city, etc.), and these may have more of an effect depending on populations (ethnic minorities, vulnerable populations, etc.) and geographic situation (rural, urban, isolation, etc.).

3.3.2 Description of study zones

Zone 1

Based on the most up-to-date mining plan provided by CBG at the time of the scoping mission, all hamlets, villages, towns and other populated areas liable to be impacted by expansion of bauxite mining areas in the communes of Sangarédi and Daramagnaki in the coming years were identified and geolocated. The Project area does not extend beyond the limits of the South Cogon concession. Though the built-up areas of some localities are outside the CBG concession, they have still been included in the Study Area when part of their land is within the concession, near a bauxite plateau slated for operation.

Appendix 2 lists the hamlets, villages, towns and urban areas in the CGB bauxite mining area. More than a hundred (109) localities were identified in Zone 1 of the Expansion Project. These are in eight districts in Sangarédi subprefecture and two in Daramagnaki subprefecture. The following map shows this zone.



Map 3.2 Zone 1

The natural environment in Zone 1

The Environmental Study Area for Zone 1 encompasses areas that will be mined according to the 2013-2028 Mining Plan, plus an additional 3 km outside this perimeter to take into account the effects of mining operations (noise, dust, etc.). This 3-km buffer seems reasonable given the size of the deposits and the relatively short period during which they will be mined. The fieldwork for establishing the baseline will focus on reference sites and on the areas that will see changes due to the increase in the rate of bauxite extraction.

Available satellite images of the mining area date from 2010 and cover part of the Study Area. Visits to sites selected based on these images show that the habitats have changed somewhat in the three intervening years. More recent and more complete satellite image coverage will be used for the field studies and impact assessment.

Areas currently mined are bare. Mining operations have virtually ceased on some plateaus, such as Bidikoum Nord, but these areas remain under the responsibility of CBG in case mining operations resume.

Trees were planted on the Bidikoum Nord plateau about ten years ago. CBG considers the plantation a biological forest. Cashew trees are often planted on plateau where mining operations have ceased, and villagers are free to harvest the fruit when it is ripe. These cashew plantations sometimes cover several hectares and probably replace what was originally bowal, savanna, farmland, fallow land or forest. In areas being mined, only gallery forests are maintained.

During the scoping mission, the sites listed below (some will also be targeted in the baseline studies) were visited:

- the area around Boulléré (reference site);
- the North Bidikoum biological forest;
- the area around Hamdallaye, where the new bauxite stockpiling area will be located;
- the forest plantation northwest of the CBG control station;
- the gallery forests south of the N'Dangara plateau; and
- the Rio Cogon, near Sangarédi.

Socioeconomics of Zone 1

Located in the foothills of Fouta Djallon, the Sangarédi area seems relatively homogeneous socioeconomically. Almost all of the people seem to belong to the Fulani ethnolinguistic group and all are Moslem. The villages and hamlets in which they live generally have no more than 50 households. It is likely that the land management system in this rural area is traditional.

The inhabitants of these villages are essentially engaged in agropastoral activities. They are subsistence farmers who grow mainly rice, corn, peanuts and a variety of root crops. The seasonal time sequence of crops governs the activities of the men and women, generally with a strict division of labor. The level of household consumption of the main crops needs to be verified.

The agrarian system relies on two main production factors: land access; and household labor, including mutual assistance from village mutual-help groups for the most arduous tasks. There seems to be no mechanization or use of draught animals and very little use of inputs. Slash and burn is the only cropping system, and it involves letting cropland lie fallow for several year—tying up large amounts of cropland.

Some people also raise animal, engaging in free-range production of poultry and small ruminants but also sedentary and transhumant cattle raising. *Bowés* (bauxite plateaus) and fallow land are the main pasture areas in the region. The diet and living conditions of the local population could be improved by harvests from the natural environment (fish, game, subsponaneous palm oil, firewood, construction wood, charcoal, medicinal plants and wild fruits and tubers), which could also provide additional money income.

Surface water is traditionally used to water animals. In many villages and hamlets without wells, it is also the only source of drinking water. In addition, the lowland around streams is colonized by palm groves—the population's main source of lipids, together with peanuts.

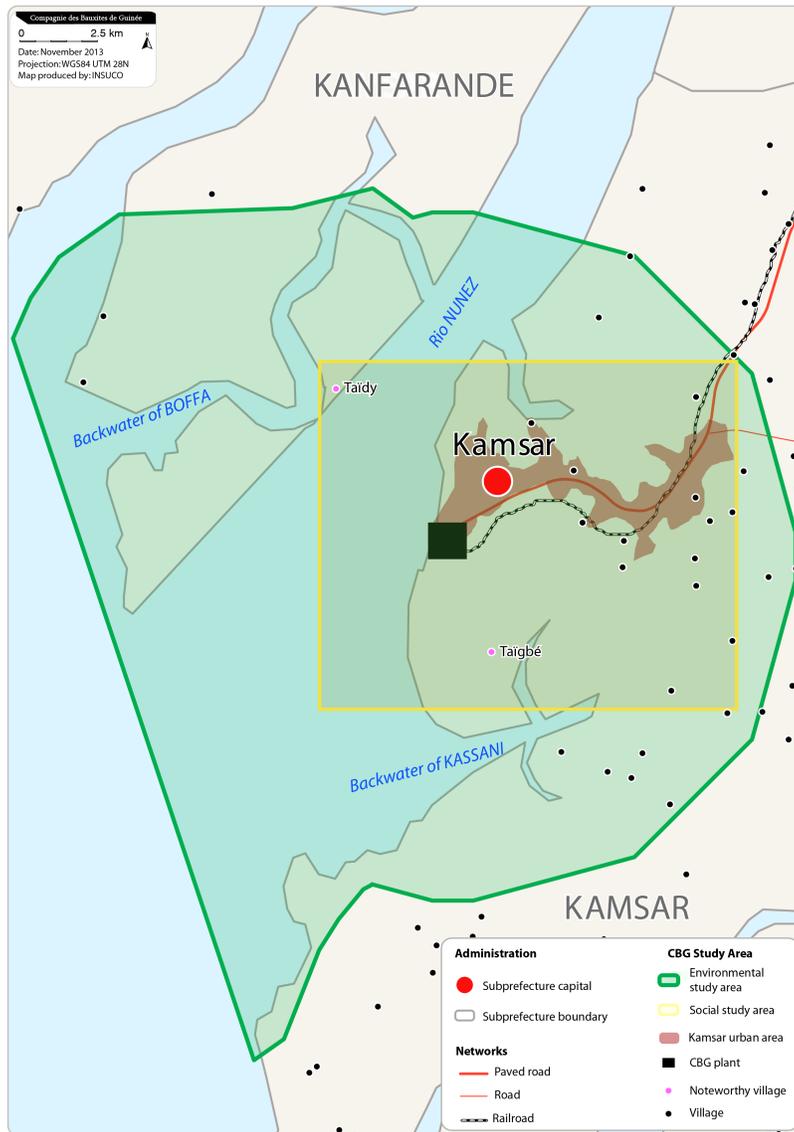
Sangarédi is the only urban center in the area, and the dramatic growth in its population is related directly to CBG's arrival in the region in the 1970s. The city is home to most of the population of the subprefecture. Because it has attracted people from all over, Sangarédi is more ethnolinguistically diverse than the

surrounding rural area, though Fulani remains the dominant language. Activities are also more diverse among the urban than the rural population: Sangarédi is home to the salaried employees of CBG and its subcontractors, most of the subprefecture's civil servants, and people who have developed commercial, artisanal or service activities.

In addition, essentially all of the subprefecture's functional health and education infrastructure is in the city, as well as its social, sports and cultural infrastructure—apart from a few primary schools, health posts and mosques built in the rural districts. It is important to mention in this respect the ubiquitous role of mine operators, CBG in particular, in the construction and maintenance of the area's infrastructure—from maintenance of Sangarédi's drinking water and electric power systems (placed at the disposal of the inhabitants without charge) to the construction of improved water supply points or school buildings in a number of villages, not to mention maintenance of the urban road network, rural roads and the national highway between Sangarédi and Kamsar.

Zone 2

The Socioeconomic Study Area for Zone 2 encompasses the area near the CBG plant and ore-handling port, where direct impacts (such as dust and noise) will be felt, as well as an extended area covering the city of Kamsar.



Map 3.3 Zone 2

Natural environment in Zone 2

The Environmental Study Area for Zone 2 was determined by superimposing two potential impact zones. The first is a 10-km area around the CBG plant and port; this is a conservative buffer for impacts related to air quality and noise. The second is a marine area likely to see impacts from the port facilities and increased marine traffic. This area covers the mouth of Rio Nuñez as well as certain important biological environments nearby. In addition, even though the planned extension of

the dredging zone falls outside Zone 2, as defined above, water and sediment will still be analyzed the length of the dredging channel.

Available aerial photos are not representative of the current status of the environment, as they are too old (date from 2001) and do not cover all of the Study Area. Recent satellite images covering the entire Study Area will be used to analyze habitats present and assess impacts.

The main biological issue in the Kamsar Study Area is related to the port facilities. Dredging and construction of a jetty could impact marine habitats (benthic fauna in particular) and certain species that have already been identified as vulnerable (manatee and humpback dolphin, for example).

The new conveyor running from the plant to the ore-loading quay will operate in a hermetically sealed environment, and bauxite losses during transport can be recovered. This will prevent contamination of the sea water. The old conveyor will also be refurbished to prevent this type of loss.

The plant site, which is in the city, has no potential for fauna or flora: it is almost entirely occupied by people and the plant facilities. There are thus no biological environmental issues to contend with here.

The following were visited during the scoping mission:

- The railroad siding north of the plant (KM 14).
- Île de Taïgbé, south of the plant: this island has forestland with some potential for terrestrial wildlife, a sandy beach (on the western part of the island) with excellent potential for migrating birds at low tide, and extensive mangroves and mangrove channels with potential for crocodiles and manatees, among other things, depending on the shoreline. The sandy beach, submerged at high tide, has no potential for nesting sea turtles.
- Île de Binari, a Ramsar site just south of Taïgbé: the beaches, mangroves and mangrove channels of the northern part of the island will serve as reference environment.
- Île de Taïdi, west of the plant, on the other side of Rio Nuñez: this island is covered with mangroves, as it is scarcely above sea level. The sandy beaches on the west side of the island were visited. They seem to offer less potential for birds than the beaches of Île de Taïgbé. The mangrove channels of the northeastern part of the island were visited. They offer potential for

crocodiles, manatee and dolphins. Like the beach of Taïgbé, the beaches of Taïdi are submerged at high tide and do not have potential for sea turtle nesting. These sites will be targeted in the baseline studies.

Socioeconomic study of Zone 2

The Socioeconomic Study Area for Zone 2 encompasses the area near the CBG plant and ore-handling port (where direct impacts such as dust and noise will be felt) as well as an extended area covering the city of Kamsar (where indirect impacts caused by population growth and increased local employment will be felt). Demographic growth will increase the pressure on local and regional basic services and infrastructure. Two villages at the mouth of Rio Nuñez were also added to the Study Area, since they are likely to be impacted by increased maritime traffic as a result of the Expansion Project: the villages of Taïdi, on the west side of the river mouth, and the village of Taïgbé, south of Kamsar.

Zone 3

To ensure that all communities whose land is crossed, even partially, by the railroad are included in the impact assessment, all populated areas within a corridor two kilometers wide (one kilometer on either side of the railroad) were considered.

In all, 70 populated areas in six subprefectures and 24 districts were identified and geolocated. The two sections where a railroad siding is planned are located on land belonging to the villages of Toumbeta and Katomou (district of Kamakouloun, Kamsar subprefecture) and the village of Hore Lafou (district of Tiankounnaye, Sangarédi subprefecture). These locations are shown on Map 3.1.

3.4 PROJECT ALTERNATIVES

CBG is considering a number of alternatives in planning the technical parameters of the Expansion Project. This section describes the main alternatives in each Project zone.

3.4.1 Alternatives for the port

CBG's port capacity will have to be increased to accommodate the increased production. This involves building a new jetty, increasing the capacity of the conveyor that carries the bauxite from the plant to the loading quay and adding a new boat loader.

Four different scenarios are currently being considered for the port improvements:

1. Capesize carriers will be fully loaded dockside: dredging depth = 16 m; dredging volume = $26 \times 10^6 \text{ m}^3$; canal width = 190 m.
2. Capesize carriers will be partially loaded dockside, and loading will be finished at an offshore transfer station with Handymax vessels (30,000 tonnes); dredging depth = 13.2 m; dredging volume = $11.3 \times 10^6 \text{ m}^3$; canal width = 190 m.
3. Capesize carriers will be partially loaded dockside, and loading will be finished at an offshore transfer station with Panamax vessels (30,000 tonnes): dredging depth = 11.2 m; dredging volume = $4.9 \times 10^6 \text{ m}^3$; canal width = 190 m.
4. Capesize carriers will be loaded at an offshore transfer station by a Panamax vessel (in three trips): dredging depth = 11.3 m; dredging volume = $2.5 \times 10^6 \text{ m}^3$; canal width = 120 m.

Plans for the jetties required for the different port alternatives are included in Appendix 3.

3.4.2 Alternatives for the crushing station

Two options are being considered to upgrade the crushing station. The first scenario locates the crushing station at the plant's new car dumper station whereas the second scenario places it at the Sangarédi mine. Three sizing options are still being considered for crushing at the mine. Diagrams of these options are included in Appendix 4.

3.4.3 Alternatives for the railroad

Alternatives for the crossing of the national highway include the possibility of multiple crossings, but a scenario with a single crossing at Parawi-Hamdallaye has been selected. Studies are in progress to determine if this should be a level crossing or an underpass.

4 VALUED ECOSYSTEM COMPONENTS (VECS)

A Valued Ecosystem Component (VEC) is an environmental element of an ecosystem that is identified as having scientific, social, cultural, economic, historical, archeological or esthetic importance.

The list of VECs will be determined based on the technical studies and public consultations conducted for the Project scoping study and the baseline study of the host environment.

The value of an ecosystem element can be determined on the basis of cultural ideals or scientific concerns. Key ecosystem elements likely to interact with Project components will be included in the assessment of environmental effects.

4.1 GENERAL ENVIRONMENTAL COMPONENTS

At this preliminary stage, the VECs of the physical and biological environment include the following:

1. air quality;
2. climate;
3. sound environment;
4. groundwater, surface water and sediment; and
5. biodiversity.

These components may be subdivided based on future studies. For example, some key aspects can already be identified for biodiversity:

1. the mangroves and their systems of tidal channels: highly productive ecosystems offering habitats of great ecological importance that serve as spawning and rearing grounds for many socioeconomically important species (fish, mollusks and crustaceans) and that foster the presence of rare animal species such as the manatee (*Trichechus senegalensis* – vulnerable IUCN status – presence confirmed);
2. the lower intertidal zone: offers excellent potential for migrating birds, shorebirds in particular;
3. the large tidal channels and submerged sand banks: serve as feeding grounds for certain sea mammals—especially certain dolphin species, such

- as the humpback dolphin (*Souza teuszii* - vulnerable IUCN status – presence confirmed);
4. the sandy beaches: offer nesting habitats for sea turtles (presence confirmed);
 5. permanent streams, the Cogon River in particular, which supports a population of hippos (*Hippopotamus amphibius* – vulnerable IUCN status – presence confirmed) and crocodiles (*Osteolaemus tetraspis* - vulnerable IUCN status – presence confirmed) and drains most of the surface water of the operated mining area;
 6. the gallery forests: offer greater biodiversity in the operated area; and
 7. the remnant forest near Boulléré (considered a reference habitat): despite deterioration observed, still offers some biodiversity and probably supports a population of chimpanzees (*Pan troglodytes* – endangered IUCN status – presence confirmed).

4.2 GENERAL SOCIAL COMPONENTS

This chapter gives a preliminary description of the main socioeconomic components of the Study Area:

1. social structure and demographics;
2. health and safety;
3. education;
4. infrastructure and services;
5. economic activities and household strategies;
6. land tenure/land use; and
7. cultural heritage;

The description is based on a rapid analysis performed during the 10-day scoping mission. Each component will be developed when the complete baseline socioeconomic study (an integral part of the ESIA) is performed.

5 PRELIMINARY IDENTIFICATION OF ENVIRONMENTAL AND SOCIAL ISSUES

5.1 ANTICIPATED POSITIVE IMPACTS

5.1.1 Shorter period of mining activity

The increase in production will reduce the period of activity of the mine, and speed the return to other uses of the land. This will have a positive impact on the natural habitat and on land use by the inhabitants.

5.1.2 Positive impacts of certain operational modifications

Some of the proposed modifications will have a positive impact on the environment. Some examples are as follows:

- 1) The new conveyor running from the plant to the ore-loading quay will operate in a hermetically sealed environment, and bauxite losses during transport can be recovered. This will prevent contamination of sea water. The old conveyor will also be refurbished to prevent this type of loss.
- 2) The new car dumper station will not only make it possible to increase operating speed but, as it is to be built underground, will also reduce the amount of dust released and the distance the dust travels.
- 3) Some of the planned changes to the locomotive fueling and washing station will mean improvement in the performance of the water-oil separation system.
- 4) Improvements to the configuration of the locomotive and car repair shops will improve worker health and safety.

5.1.3 Employment

Generally speaking, the CBG Expansion Project could have a positive socioeconomic impact and help to improve the general living conditions of a significant portion of the population in the Project footprint. Employment opportunities will be generated in the construction phase of the new infrastructure (port, plant and railroad) and then in the Project operation phase. Employment of local youth was by far the main concern expressed by local respondents in the first phase of consultation during the scoping mission and the preparation of the Stakeholder Engagement Plan. In the eyes of the local population, such employment seems naturally to be the main acceptable compensation for loss of some of their land. Local employment is crucial

to smooth operation of the Project. If it is not managed properly, the social impact could be especially negative, generating a lot of resentment and frustration in the local communities. This is thus a key point to be examined in the social and environmental impact assessment.

5.1.4 Vocational training

During discussions of employment, the local population repeatedly emphasized that mechanisms for vocational training in mining trades (drivers, mechanics, machine operators, etc.) must also be established. Such initiatives will be beneficial for both the mining company and the local communities.

5.1.5 Economic development

The CBG Expansion Project is also likely to contribute to the economic development of the region by stimulating agricultural, commercial and service activities. The establishment of microbusinesses by the CBG is a good example of integrated local economic development which can have attractive local spinoffs.

5.1.6 Infrastructure and services

CBG investments in basic infrastructure (health, education, access to drinking water, electric power system) have already contributed substantially to the socioeconomic development of the area and are much appreciated by the local population. The development and maintenance of the road system, for example, has been a big help in breaking the isolation of certain farming areas, opening up new opportunities for inhabitants to market their products. The development of CBG activities and the substantial increase in amounts that revert directly or indirectly to local communities should thus make it possible not only to continue but also to accelerate the development of infrastructure in the region. It would be wise to have all stakeholders concerned, not only government officials, fully behind this policy of infrastructure development, again to prevent activities that would seem to have a positive social impact end up instead generating anger and frustration in those affected by the Project.

5.2 ANTICIPATED NEGATIVE IMPACTS

5.2.1 Land use

Some components of the Expansion Project will increase CGB's footprint, and the additional land used is likely to lose its original ecological and socioeconomic functions.

The impacts of the footprint of the Expansion Project and the related changes in land use will be particularly dramatic in the bauxite mining area (Zone 1), which occupies a larger surface area than any other Project component. There will also, nonetheless, be Project footprint impacts in Zone 2 (dredging and new jetty) and Zone 3 (sidings).

It is important to understand, however, that some of the new bauxite mining areas are not related to the Expansion Project. The Expansion Project is a project to increase the rate of bauxite extraction. Even without this increase, the extraction would continue at the current rate, and this would involve operation of new bauxite mining areas around Sangarédi.

Soil, sediment and water

After clearing the land, the topsoil is typically removed and stored to be used later for site rehabilitation. The increase in land that has been stripped bare facilitates soil erosion and reduces its rainwater retention capacity. The reduced rainwater retention can in turn lead to faster flow of surface water towards streams, and this can cause accelerated shoreline erosion and in the long run result in falling of riparian trees in the gallery forest and an increase in stream sediment loads.

Given the excavations involved, bauxite mining operations can also cause changes to the moisture properties of the subsoil, affecting streamflow regimes. Some residents report that near mined deposits streams that used to be perennial now dry up in the dry season, affecting fishing activities, agriculture (irrigation of truck farms) and animal husbandry (watering of animals). A tangible drop in yields from subsynchronous palm groves growing in lowlands along streams has also been reported.

The work at the Kamsar port includes dredging and construction of a new jetty. The channel leading to CGB's existing jetty is dredged regularly to maintain the depth required for the bauxite carriers. Alternatives studied for loading the vessels at the

new jetty include required increases in dredging (depth and width of the channel and the basin around the jetties). Dredging involves moving large amounts of sediment, and this can affect water quality as well as sedimentation and erosion zones at the mouth of Rio Nuñez.

Biodiversity

The most direct impact is the destruction of individual plants and many small animals in the zone directly affected. Some of the larger animals will be able to escape from the area being cleared or dredged, but this does not guarantee their survival. Often, neighboring habitats either already have a population of these species or are not suitable for the species in question. The impact on some species can be reduced by scheduling the land clearing or the work in the water so the destruction is not at critical periods. Habitat loss also has secondary impacts, including changes in the size of the residual habitat and in habitat connectivity as well as changes caused by ecotones. When the land is no longer used for mining, some areas may once again serve as a natural habitat.

There are also secondary impacts related to the possible impacts described above on water quality and quantity. An increase in stream sediment load can have a negative impact on freshwater wildlife as well as riparian plants and animals. Dredging may cause suspension of buried materials than can be harmful to marine plants and animals. Even if the sediment is not harmful, being covered by sediment suspended by dredging could have a negative impact on benthic organisms.

Cultural heritage

The increase in the footprint of CBG activities as a result of the Expansion Project could result in damage to, if not destruction of, certain heritage sites. The ESIA is to include an inventory of these sites.

Population displacement

In some cases, the larger footprint of the CBG Expansion Project will mean physical displacement of people, for economic reasons (loss of land, the main productive capital) or quite simply because their homes are right in the Project footprint. These foreseeable impacts warrant the development of a Resettlement and Compensation Action Plan, in compliance with Performance Standard 5 of the International Finance Corporation (IFC).

Given the preliminary findings in the field, it is highly likely that several hamlets located in the mining area (Zone 1) will have to be relocated as the bauxite extraction area expands and will thus be included in a resettlement program. Regarding the railroad corridor (Zone 3), relocation for economic reasons is probable, given the acquisition of farmland. No population displacement is anticipated however in Zone 2 (plant and port) based on the current Project description, but this remains to be validated.

Impact on residents

In Zone 1, the expansion of mining operations will have a negative impact on traditional land use:

- land used by local populations for agriculture (cultivated or fallow uplands, agroforestry plantations) will be taken over and irreversibly transformed by the mining activity;
- loss of habitat for numerous plant and animal species will have an impact on traditional harvesting of natural resources on the bauxite plateaus (timber, construction wood, energy wood, hunting and gathering harvests, etc.); and
- the increase in the mined area will mean a concomitant decrease in pasture for livestock.

In the Sangarédi area, homes are often located near streams, in the lowlands between the bauxite plateaus, and are thus below the mined areas. It is therefore highly probable that runoff loaded by erosion of mounds of earth displaced by the mining operations will lead to deterioration of the quality of the surface water consumed by the inhabitants of hamlets that do not have improved water points. This also applies in case of runoff contaminated by accidents or spills and can be particularly dangerous in places where fuel or chemicals are stored, handled, transported or transferred.

In Zone 2, where the plant and the port are located, there will be virtually no increase in the CBG footprint, though it will depend on the solution chosen to load the ships: dredging a new, longer and deeper channel for larger boats could affect fishing activities by populations living along the mouth of Rio Nuñez.

In Zone 3, the construction of railroad sidings will appreciably increase the footprint of the railroad. The field investigations showed that the land east of the existing track is more systematically used for agriculture (cultivated uplands with food crop

production at Hore Lafou, palm oil plantations at Toumbeta and Katomou) than the land west of the track; this is true at both KP 14 and KP 118.

5.2.2 Possible increase in atmospheric contaminants, noise and vibrations

The work at the port, the plant and the railroad during the construction phase will involve use of heavy equipment and machines that generate noise, dust and exhaust gas. There is also the possibility of an increase in these emissions over the long term due to an increase in traffic (boats, trains and trucks) and in the rate of bauxite extraction.

Climate effects

In general, greenhouse gases are released when fossil fuels are burned in mobile and stationary equipment, such as the dryers at the Kamsar port facilities, or to produce electricity in fossil-fuel generators. An increase in greenhouse gases can contribute to global warming.

Impact on biodiversity

Increases in SO_x , NO_x and airborne particles can affect flora in the area depending on the concentrations concerned. SO_x and NO_x can damage plant leaves, reduce their photosynthesis potential and stunt plant growth. Airborne particles can also diminish photosynthesis potential. Depending on loads and concentrations, these emissions can also affect the acidification of soil and streams.

Noise and vibrations can affect wild animals and contribute to the elimination of certain sensitive species. This is a consideration not only for land animals but also for marine animals (noise associated with the construction of the new jetty and the increase in shipping traffic).

Impact on people

These emissions are likely to be a nuisance and to affect the health not only of those who work for CGB and its subcontractors but also of those who live near the different Project components. The extent of the nuisance depends mainly on how close a home is to the Project activities.

An increase in blasting of bauxite plateaus stemming from expansion of the mining activities is also a major issue for waterside populations. Besides the noise pollution,

there may also be property damage, in particular cracking or partial collapse of homes built with traditional materials (adobe or burnt clay bricks).

5.2.3 Increase in traffic

Shipping, railroad and road traffic will increase with the construction work and the increase in the rate of bauxite extraction. In addition to the increase in emissions discussed above, the increase in traffic could also cause other problems.

The increase in traffic along the railroad as a result of the CBG Expansion Project will increase the risk of railroad traffic accidents.

Construction work in particular generally entails an increase in road traffic, with additional vehicles needed to carry equipment and materials. Such an increase in traffic is likely to occur along the road between Kamsar and Sangarédi during the construction phase for the railroad and possibly along the road between Conakry and Kamsar, if equipment is brought in from the capital city. This will mean an increase in road safety risks and hence in accidents. This is also the case for the mining roads in the mining area around Sangarédi, as traffic will inevitably increase with the increase in the volume of activity. The increased traffic will also up the risk of collision with wild animals, livestock and free-ranging animals.

Activities during the construction phase are also likely to cause disturbances along communication lines or damage to other infrastructure and services (drains, buildings, water distribution system, electric power system, etc.), with significant impacts on commercial exchanges and more general social and economic activities in the area. The construction activities will require proper planning and a clear communication strategy to minimize these impacts.

5.2.4 Occupational health and safety

The Project construction phase will also mean specific occupational health and safety risks for employees of CBG and its subcontractors: excavations, use of heavy equipment, work in confined spaces, handling of hazardous substances and hazardous waste, handling of heavy loads, work at heights, etc.

5.2.5 Influx of people

In the construction phase as well as the operations phase, the Project will likely cause an influx of workers, people looking for jobs and their families, to the Project area, especially to the two main urban centers, Kamsar and Sangarédi.

The fact that CBG has been engaged in mining operations in the area for over 40 years will certainly help to limit the influx of people specifically for the Expansion Project. Nonetheless, the possibility of an influx of people must not be underestimated, given the many consequences it will have.

A population implosion would increase the pressure on the area's basic infrastructure, most of which is already close to saturation. The situation is especially critical with respect to power and water supplies in Sangarédi and Kamsar. Education and health infrastructure is also a concern.

New migrations will also increase the pressure on and risk of depletion of natural resources, in particular timber and fishing and hunting harvests, given the anticipated increased demand.

The scarcity of housing and the increased demand for staples will accentuate the dynamics of inflation, causing the prices of staples and possibly the cost of housing to rise, with a concomitant drop in the purchasing power of local populations. Though the earnings of new employees will have a positive impact on the local economy, the increased monetization of society thanks to the injection into the local economy of the salaries of new employees of CBG and its subcontractors is likely to lead to the impoverishment of households whose basic strategies are food self-sufficiency and community support systems.

There is a risk that the increased pressure on the care infrastructure will lead to a deterioration in health conditions of the host community. The risk of propagation of sexually transmitted diseases will also increase.

A major population influx could also weaken traditional social organization, destabilize the existing power structure and cause an increase in prostitution and petty crime. The difference between the living conditions of the host community and those of the new arrivals could also stir up resentment within the host population, and the likely increase in inequalities over time is liable to create tension between the new arrivals and the population with a long history of living in the area, and intercommunity tensions in general.

5.2.6 Depletion of resources

A major impact of the Project on the social environment is related to the acceleration of the extraction of bauxite. Though production will double, the number of jobs and the spinoffs for the villages, towns and cities affected will not double, though they will increase substantially. The correlation between the increase in the pace of extraction and the increase in socioeconomic spinoffs will thus not be linear; in other words, the positive economic spinoffs for the region will be proportionally smaller.

6 IMPACT STUDY TERMS OF REFERENCE

6.1 DOCUMENTATION AVAILABLE

6.1.1 Key documents

Two major studies provide large amounts of data important for the present study. In 2011, AECOM produced an ESIA for CBG for a project to increase production from 13.5 MTPA to 16.5 MTPA (3% free moisture content). The ÉEM team will incorporate the relevant baseline and other data collected and/or compiled for that study, to avoid duplicating the work.

The Guinea Alumina Corporation (GAC) had a bauxite mine project in a region adjacent to the CBG mining area and similar in its physical geography. GAC has also had projects at Kamsar. GAC's studies (Knight Piésold and Co. 2008. Guinea Alumina Project – Social and Environmental Assessment) therefore offer useful data on Kamsar and the CBG mining area.

6.1.2 Documentation on the physical environment

Air quality baseline

Baseline conditions will be determined using an atmospheric dispersion model together with the baseline measurements collected by AECOM in January 2011 and the data from the baseline monitoring that will be done by CBG for the present study.

The ÉEM team examined data from meteorological stations in the region (Kamsar and Boké) and discovered that there are no surface observation stations providing

reliable hourly data with a total coverage that could be adapted to the atmospheric dispersion model. AECOM's 2011 ESIA used five years of meteorological data produced by the MM5 model. MM5 is a mesoscale model that usually generates fairly low-resolution data (often 12 x 12 km). Such a resolution is not suitable for obtaining the coastal effects on the port. Assuming that the data used earlier are still available, they will be reviewed to determine if they are sufficiently representative to be used in the impact assessment. If not, the ÉEM team plans to develop five years of local meteorological data for each site (the mine, a site along the railroad, and Kamsar) for 2008–2012 at a resolution of 3 x 3 km using a proprietary meteorological forecasting and forecast refinement system called FReSH.

Noise baseline

Baseline conditions will be determined using the baseline measurements collected by AECOM in early 2011 and the baseline monitoring that will be done by CBG for the present study.

Water and sediment quality baseline

As much as possible, the assessment will make optimum use of information from previous reports and documents provided by the client, including but not limited to all available relevant data on surface water and groundwater resources inside the study areas (the mining area and the treatment facility site), flows (including relevant monitoring data), anticipated discharges, waste management, maps, etc. This will be rounded out by additional sampling performed by CBG under the direction and supervision of ÉEM.

Examination of AECOM's 2011 ESIA and other relevant data sources show that the following data are available and these will be used after an assessment of their quality:

Hydrology

Data are available on the major rivers (Knight Piésold and Co. 2008. Guinea Alumina Project – Social and Environmental Assessment).

Surface water quality

AECOM's 2011 ESIA has data on Kamsar (two sites for Dougoufissa Creek and six sites for wastewater). The report for the Guinea Alumina Corporation project (Knight Piésold, 2008) has data for Rio Nuñez and Dougoufissa Creek (2005–2007, four sites). CBG is conducting regular wastewater sampling (two sites) that includes measuring pH, suspended solids and hydrocarbons.

Data on the mining area are available in AECOM's 2011 ESIA (four sites in the Boundou Wandé and Thiapikouré rivers). CBG is also conducting regular sampling (six sites) that includes measuring nitrate, nitrite, suspended solids, hydrocarbons and fecal coliforms. Sampling has also been conducted since 2001 west of the CBG mining area for the Guinea Alumina project (Knight Piésold, 2008), and this could be useful for comparison purposes.

Sediment quality

Sediment samples were taken at Kamsar during AECOM's 2011 ESIA (10 sites) and for the Guinea Alumina project (Knight Piésold, 2008).

Groundwater quality

Data on the Kamsar region are available in AECOM's 2011 ESIA (four wells) and in the report for the Guinea Alumina project (Knight Piésold, 2008) (2006, five wells).

Groundwater levels and quality have been sampled since 2001 west of the CBG mine site for the Guinea Alumina project (Knight Piésold, 2008), and this could be useful for comparison purposes.

Geology and soil baseline

The general description of the regional geology and soils will be largely based on the data in AECOM's 2011 ESIA and other recent studies, as well as additional data provided by CBG.

A number of local soil analyses were performed:

- In 2011, AECOM analyzed the soil in Kamsar at three locations and Golder Associates at six locations. In addition, four samples were subjected to leaching tests in 2011.
- AECOM analyzed a composite soil sample from the mine site in 2011.

6.1.3 Documentation on the biological environment

AECOM did not do systematic fieldwork in biology for the 2011 ESIA, relying instead on biological data from other studies, in particular the GAC 2008 ESIA (Guinea Alumina Corporation project).

In addition to the GAC 2008 ESIA, the following reports contain biological data:

EIA by BERCA-baara on the N'Dangara and Boundou Wandé mining plateaus

This is a preliminary version of a 2003 report commissioned by CBG and written by the consulting firm BERCA-baara, titled "Étude d'impact sur l'environnement du Projet d'exploitation des gisements de N'Dangara et de Boundou Wandé."

Study of plateau vegetation by BERCA-baara

This is a 2003 report commissioned by CBG and written by the consulting firm BERCA-baara, titled "Inventaire de la flore des plateaux miniers de Sangarédi, Bidikoum, Silidara et N'Dangara."

This study is useful and provides interesting data, particularly on ethnobotanical aspects and the use of certain species for revegetation.

RAP survey of Boké

The 2006 survey "A Rapid Biological Assessment (RAP) of Boké Préfecture, Northwestern Guinea" is a good assessment of selected sites in Boké prefecture: The RAP survey was carried out at several sites in Boké Préfecture along the coast of northwestern Guinea: Sarabaya (Rio Kapatchez), Kamsar (including 5 subsites), and Boulléré.

The RAP survey provides highly useful data and has helped focus the biological fieldwork by indicating the species that may be present.

6.1.4 Documentation on the social environment

All necessary existing data and reports (produced internally or externally) on the CBG Expansion Project and on social and economic conditions in the Project area will be studied.

The data to be analyzed includes scientific reference works, reports, development plans, aerial photographs and articles from international scientific journals. They will be used to build a social database for the ESIA.

6.2 GENERAL IMPACT ASSESSMENT METHODOLOGY

6.2.1 Project impact assessment

Based on the host environment baseline studies and the stakeholder consultations, it will be possible to identify a set of potential impacts on the physical, biological and social environments of the Project Study Area. Positive, negative, direct and indirect impacts will be considered.

The following three criteria will be used in assessing the relative significance of the Project's environmental and social impacts on VECs:

1. impact intensity;
2. impact geographical scope; and
3. impact duration.

The following sections define criteria and outline uniform assessment procedures for the Project as a whole. To maintain consistency in the assessment, a uniform approach will be used for the physical, biological and social analyses. Any differences in the understanding of the criteria applied to the various VECs will be specified and justified during the discussions on methodology for each impact. The impacts will be assessed for each Project phase (construction, operation and closure) and for three separate zones: the plant and port in Kamsar; the railroad linking the mine to the plant; and the bauxite mine properly speaking.

Intensity

Intensity is understood as a weighting of two subcriteria: severity of disturbance to the quality of the VEC; and importance of the VEC. Impacts are assigned a rating of Low, Medium or High for each of these two subcriteria, the average then determining the intensity of the impact on the component.

Quality is used here as a generic term that can refer to the integrity, function, use, strength, resilience, abundance or any other relevant intrinsic characteristic of the VEC.

Low	Medium	High
Affects the quality of the VEC but does not significantly alter its characteristics or functions.	Affects certain aspects of the quality of the VEC, without compromising its integrity.	Affects the integrity of the VEC, or irreversibly alters its quality.

Table 6.1 Intensity

Geographical scope

Geographical scope refers to the extent of the area that might be affected by the impact.

Site	Local	Regional
Disturbs the VEC over a specific and circumscribed area around the site of activities (e.g., in the vicinity of the facilities, perceptible by only a few people, etc.).	Disturbs the VEC beyond the Project footprint, within a 10-km radius (e.g., over the Study Area, perceptible by several groups of people, etc.).	Disturbs the VEC over a very large area (e.g., affecting several communities, extending over several geographical units or territorial organizations, or affecting extended networks).

Table 6.2 Scope

Duration

Duration refers to how long the impact might last.

Short	Medium	Long
Affects VECs during construction or site rehabilitation phases.	Affects VECs over a longer period than Project construction or rehabilitation, but not as long as the duration of mine operation.	Affects VECs for the duration of mine operation or longer.

Table 6.3 Duration

Matrix for determining aggregate significance of impacts

The following table illustrates the method that will be used to weight impact significance.

Intensity		Scope		Duration		Aggregate significance
High	3	Regional/indefinite	3	Long/indefinite	3	High (27)
				Medium	2	High (18)
				Short	1	Medium (9)
		Local	2	Long/indefinite	3	High (18)
				Medium	2	High (12)
				Short	1	Medium (6)
		Site	1	Long/indefinite	3	Medium (9)
				Medium	2	Medium (6)
				Short	1	Low (3)
Medium	2	Regional/ indefinite	3	Long/indefinite	3	High (18)
				Medium	2	High (12)
				Short	1	Medium (6)
		Local	2	Long/indefinite	3	High (12)
				Medium	2	Medium (8)
				Short	1	Medium (4)
		Site	1	Long/indefinite	3	Medium (6)
				Medium	2	Medium (4)
				Short	1	Low(2)
Low	1	Regional/ indefinite	3	Long/indefinite	3	Medium (9)
				Medium	2	Medium (6)
				Short	1	Low (3)
		Local	2	Long/indefinite	3	Medium (6)
				Medium	2	Medium (4)
				Short	1	Low (2)
		Site	1	Long/indefinite	3	Low (3)
				Medium	2	Low (2)
				Short	1	Low (1)

Table 6.4 Matrix for calculating impact significance

6.2.2 Impact mitigation and optimization measures

For all impacts identified, measures will be proposed to optimize the Project’s positive impacts and minimize the negative ones. These mitigation measures will be based on technical solutions envisaged by CBG in its Project planning, on the one hand, and on ÉEM team members’ expertise and suggestions from the stakeholders consulted, on the other hand.

The following order of priority will be followed:

1. Avoidance measures – ways of preventing the impact will be given top priority.

Example: changing the design of a facility or the choice of equipment (such as substituting a type of machine that does not produce atmospheric contaminants) in order to prevent an impact.

2. Reduction measures – ways of reducing an impact's significance will be considered if the impact cannot be avoided.

Example: modifying equipment or introducing a mechanism (such as a system for controlling contaminated runoff) in order to reduce an impact.

3. Restoration measures – ways of repairing the damage will be considered if the impact cannot be avoided or reduced.

Example: when shutting down the mine, restoring an ecosystem destroyed during construction or operation.

4. Compensation measures – ways of substituting other resources or services with a similar use or function will be considered if an impact cannot be avoided or reduced and it causes irreversible degradation of a VEC that cannot be restored.

Example: Substituting pasture lands to replace the ones lost.

6.2.3 Residual impacts

Based on the technical studies of the physical, biological and social environments in the Study Area, as well as consultation of Project stakeholders, a preliminary assessment of the Project's impacts on the host environment will be made and potential mitigation and optimization measures will be identified.

An additional round of stakeholder consultations will make it possible to validate the impact assessment performed by the ÉEM team as well as the proposed mitigation and optimization measures. Once these approaches are validated, it will be possible to assess the Project's residual impacts, those that will persist despite efforts made.

The residual impact assessment will use the same methodology as that used for the preliminary assessment of potential impacts. The mitigation measures identification process will be repeated until the residual impacts are reduced to the lowest level possible.

A fourth criterion will also be applied to the assessment of residual impacts: probability of occurrence. Although this criterion is not applied in the numerical

weighting of impacts, it allows more effective prioritization of actions in the environmental and social management plans to be developed later.

Each impact will be assigned a probability rating:

1. certain: occurrence of the impact is inevitable and confirmed;
2. probable: occurrence is not certain, but its stochastic probability can be scientifically determined; or
3. uncertain: based on the data gathered and the team's expertise, it is not possible to state the impact's probability of occurrence. For example, impacts created by natural disasters or accidents not directly related to CBG facilities would be in this category.

6.2.4 Cumulative impact assessment

The ESIA teams will analyze the direct and indirect social and environmental impacts of the Expansion Project and will then compile a list of past, present and planned developments or activities in the Study Area in order to assess the cumulative impacts stemming from interaction between the CBG Expansion Project and other activities in the region. These impacts will be assessed according to the CEAA guidelines (Canadian Environmental Assessment Agency, "Cumulative Effects Assessment Practitioners' Guide," February 1999) as well as other guidances and regulations applicable to cumulative impact assessment in Guinea.

IFC standards for cumulative impact assessment (International Financial Corporation, "Good Practice Note – Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets," 2012) will also be followed. These standards require the cumulative impact assessment to take into account all data available from impact studies of other projects and all environmental and social baseline data for the defined Study Area. A process similar to the ESIA methodology must be applied to the cumulative impact analysis and must incorporate the risks and potential impacts left over from past projects as well as those arising from any probable or potential regional projects. As in the ESIA, as much quantitative data as possible must be provided, and gaps in data must be understood and justified. Regional mitigation measures must be identified and developed in conjunction with regional stakeholders, government representatives and representatives of other projects located within the cumulative impact Study Area.

One of the main tasks of the cumulative impact assessment will be to determine which of the many development activities near the Study Area should be taken into account. Potential activities include RUSAL's alumina production facility at Dian-Dian, Alcoa/Rio Tinto Alcan's Kabata project, Guinea Alumina Corporation's alumina production facility and SEMAFO's Poudaldé hydroelectric project on the Cogon River. The status of potential or planned developments must be the subject of in-depth discussions with CBG management and government representatives.

6.3 PHYSICAL ENVIRONMENT STUDY METHOD

6.3.1 Air quality

The work in this section includes assessment of the potential impacts of the implementation of the Project on air quality. The assessment will be carried out following the appropriate methodologies and requirements of the IFC/World Bank guidance on air emissions and ambient air quality (Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality. April 30, 2007). The assessment will include an evaluation of greenhouse gases (GHGs) so that changes in GHG emissions after the Project is implemented can be measured, both direct emissions (from fossil fuel combustion) and indirect emissions (deforestation).

Update of air quality baseline

Baseline conditions will be determined using an atmospheric dispersion model together with the baseline measurements collected by AECOM in early 2011 and the data from the baseline monitoring that will be done by CBG for the present study.

The recommended air quality baseline conditions updating program is based on methods recommended by the U.S. EPA and includes the following tasks:

Task 1 – Scoping of monitoring locations

The ÉEM team performed an initial analysis to identify possible air quality monitoring locations. Available data on Project activities (mine and port), information on previous baseline monitoring locations and the 2013-2028 Mining Plan map were used for this analysis.

For the mining area, it is important to select locations that are representative of current operating conditions (near deposits being mined) as well as locations that are farther away from the current activities but close to deposits that will be mined at a later date. It is recommended that two sets of three low-volume MiniVol air samplers (TSP, PM₁₀ and PM_{2.5}) be placed for two weeks close to the current mining operations and then moved for a second period of two weeks to a location northwest of Sangarédi near the deposits to be mined at a later date.

When the sampling of the mining area is completed, the MiniVols will be moved to Kamsar for a second series of samplings (twice, each time for two weeks).

In all, there will thus be six locations (two in the mining area close to current operations, two in an area further away and two in Kamsar).

Task 2 – Development of an air quality monitoring plan

Once Task 1 is completed, an air quality monitoring plan designed to detect gaseous and particulate pollutants will be developed. The plan will cover the following:

- monitoring locations;
- monitoring equipment;
- sampling methods and procedures;
- calibration and quality assurance/quality control requirements;
- data collection and storage; and
- logistics.

Task 3 – Operations program

The ÉEM team suggests baseline monitoring at a minimum of two locations—at the Sangarédi mine and at the Kamsar processing facility. Low-volume air samplers (MiniVol) will be required to collect samples to obtain TSP, PM₁₀ and PM_{2.5} concentrations over a 24-hour period at the selected monitoring locations in the mining area and at the processing facility (as identified in Task 1). The suspended particles sample (TSP) will also be analyzed to detect metals. For planning purposes, the ÉEM team has assumed that the samples will remain at each location for about one month (that is, in the mining area for the first month and at the processing facility for the second month, or vice versa).

At each location, a minimum of six TSP, PM₁₀ and PM_{2.5} samples must be taken over 24 hours. In all, there will thus be 144 filters (72 at the mining site and 72 at Kamsar).

Gaseous pollutants (NO_x, NO₂ and SO₂) will be collected using cartridge-type passive absorption samplers. The samplers will be installed for one month at two locations in the mining area (near and at a distance from current operations) and one location in Kamsar. At each location, six cartridges will be used (two for each pollutant), for a total of 18 cartridges.

The ÉEM team will help CBG select appropriate equipment (including spares) and will coordinate equipment delivery to CBG personnel in Guinea. We assume that the CBG technicians on site will follow the procedures established by the ÉEM team so the sampling is carried out properly. We also assume that these technicians will be responsible for the following tasks:

- installing and using the equipment;
- changing the filters, resetting the units and recharging the batteries at least three times a week;
- storing the samples after collection and recording all relevant necessary and supplementary information in a protocol;
- shipping the samples to Canada or elsewhere for analysis, including completing the chain of custody; and
- performing required routine maintenance.

Task 4 – Laboratory analysis

When the sampling program is completed at each site, CBG must send the samples and the protocol to a laboratory for analysis.

A gravimetric analysis of the filter samples (TSP, PM₁₀ and PM_{2.5}) will be performed to determine the total quantity of particles deposited. In addition, the TSP filters will be digested and analyzed for metal composition and concentrations. Probably, two filters from the same series will have to be analyzed together to obtain measurable metal levels. In principle, there will thus be 24 samples to be analyzed for metals. Analysis for the following is proposed: aluminum, antimony, arsenic, cadmium, chromium, chrome VI, copper and nickel.

The passive cartridges will be analyzed for absorbed NO_x, NO₂ and SO₂.

Task 5 – Data compilation and analysis

Once the laboratory results are received, the ÉEM team will compile the data, complete the necessary calculations, perform quality assurance/control and then compile and reduce all the air quality data and generate data tables. The particle data collected during periods of precipitation will be eliminated from the database. It is assumed that suitable meteorological data (rain, wind speed, temperature and humidity) will be available to correct/reduce the data as required.

Task 6 – Report

SENES will prepare a draft baseline air quality report that will be revised by ÉEM. The structure of the report will be as follows:

- summary;
- introduction;
- methodology;
- monitoring results and data analysis;
- results and conclusions; and
- appendices (protocols, calibration data, laboratory results, raw data, etc.).

Meteorology

It is assumed that five years of representative meteorological data will be developed using a nonhydrostatic mesoscale model. The modeling will be performed according to accepted practice and standard methods used in the United States and Canada that comply with or exceed the requirements of the IFC and local authorities.

The ÉEM team examined the data from meteorological stations in the region (Kamsar and Boké) and discovered there are no surface observation stations providing reliable hourly data with a total coverage that can be adapted for atmospheric dispersion modeling. The preceding ESIA used five years of meteorological data generated by the MM5 model. MM5 is a mesoscale model that usually generates fairly low-resolution data (often 12 x 12 km). Such a resolution is not suitable for obtaining the coastal effects on the port. Assuming that the data used earlier are still available, they will be reviewed to determine if they are sufficiently representative to be used in the assessment.

If the data are not sufficiently representative, the EEM team plans to develop five years of local meteorological data for each site (the mining area, a site along the railroad and Kamsar) for 2008–2012 at a resolution of 3 x 3 km, using a proprietary weather forecasting and forecast refinement system called FReSH. FReSH makes it possible to calculate meteorological data for specific places using a nonhydrostatic mesoscale model and data available from the weather research and forecasting system (WRF-NMM) developed by the National Oceanic and Atmospheric Administration (NOAA) and the National Centers for Environmental Prediction (NCEP). This system can generate three-dimensional gridded meteorological data for large geographic areas with relatively few or even no surface meteorological observation stations as data sources.

The FReSH system was developed and tested by SENES, and SENES has used it for numerous different applications over the last ten years. The FReSH system is a standalone computer model with three main modules: the first module collects the required starting data from NCEP; the second is the state-of-the-science weather model (WRF NMM); and the third formats the output data to meet the needs of the particular application.

The output data will provide a set of reliable meteorological data that can be used for any atmospheric dispersion modeling required for the main Project areas. The information will be documented in a memorandum explaining how the file was developed and the resulting data will be illustrated in the form of wind roses for several locations in the region. There will also be a comparison with the limited observations available from local surface stations (at Boké and at Kamsar airport) and the limited site data collected by AECOM).

Air quality modeling

The CALPUFF model has been selected for the assessment, mainly because Kamsar is located along the sea coast. The CALPUFF model, which uses three-dimensional gridded meteorological data, is often recommended in such situations. The CALPUFF system comprises the CALMET meteorological processor, the CALPUFF dispersion model and the CALPOST postprocessing package. The CALPUFF modeling system has been used for other mining industry environmental assessments where the local terrain includes areas of substantial relief (hilly or mountainous area, for example, with air currents that circulate through the valleys) or nearshore effects caused by

the proximity of large expanses of water (the Atlantic Ocean, for example) that alter the weather flow regime.

The modeling will require timely supply of key Expansion Project data, the following in particular:

- georeferenced maps (topography, aerial photos), data about the terrain and location maps;
- georeferenced layout of buildings and elevation drawings;
- road and railroad maps;
- construction, operation and decommissioning schedule (that is, the mining plan);
- daily quantities (with seasonal variations) of materials extracted, handled and/or processed, including ore and waste;
- ore and waste mineral analysis data (metal levels);
- locations and dimensions of any tailings management areas;
- list, location and specifications (engine power and rating) of mining equipment to be used in each Project phase (haulage trucks, loaders, bulldozers, excavators, etc.);
- list, location and specifications of processing equipment at the mine or the port, including but not limited to primary, secondary and tertiary crushing lines, dryers, materials handling activities, air pollution control, etc.; in addition to general information about the onsite equipment, details are also required about locomotives used for shipping and any other mobile or stationary fuel-burning equipment used at the mine or the port (such as diesel generators for generating electricity);
- information about type, model, frequency and idling/docking times of boats at the port;
- list, locations and specifications of any auxiliary equipment, including pump stations, emergency generators, etc.; and
- locations of all areas that are human-health sensitive, including permanent homes, seasonal camps and associated locations.

Note that similar or identical data are essential for most other aspects of the ESIA and that this list will not be repeated in the following sections.

Determining Project impact criteria

A project's impacts on air quality are generally assessed quantitatively by comparison with concentration standards and guidelines for ambient air quality. The criteria are generally based on human health effects of long- and short-term exposure. A detailed review will be performed of local and international air quality effects criteria to be considered in the impact assessment, including but not limited to the environmental requirements of Guinea, the IFC, the Equator Principles, WHO and the World Bank. A summary description of the Project impact criteria will be prepared for examination by CBG and the study team. For planning purposes, the ÉEM team has assumed that no more than 15 pollutants will be evaluated.

Assessment of baseline air quality

The ÉEM team will use the information and data from the preceding ESIA and the 2013 surveys as well as additional data provided by the client to assess current baseline air quality near the three sites of the Project's major components. In addition, emissions inventories will be carried out for all selected pollutants at each site, and atmospheric dispersion modeling will be used to determine predicted baseline pollutant concentrations for the five years of representative meteorology. The baseline air quality measurements collected by AECOM in January 2011 and by CBG for the present study will be used to calibrate the concentrations yielded by the model with respect to real measurements. Correction factors will be developed if necessary to achieve a reasonable correlation between predicted values and real measurements.

Note that the ÉEM team believes that when an existing facility is to be expanded, this method of assessing baseline air quality is required in order to obtain a significant benchmark to compare with model predictions for expansion scenarios. In this way, incremental changes stemming from implementation of the Project can be reliably determined. Simple comparison of baseline concentrations and expansion scenario concentrations predicted by modeling generally overestimate incremental changes and thus overestimate possible air quality impacts. For this reason, it is best to use the modeled baseline method.

Assessing the impacts of construction activities

The ÉEM team will use the information and data from the preceding ESIA and additional data provided by the client to assess possible impacts of construction activities at each site. As the impacts of construction are often short term, dispersion modeling will not be used for this part of the assessment. Instead, the possible impacts of the construction activities will be assessed using an emissions cost analysis, whereby total emissions from each activity are calculated and compared to total emissions after the expansion. Emissions associated with construction are generally greater than emissions during operations, especially at mine sites. This is why emissions cost analysis is a useful tool for identifying the possible proportional magnitude of anticipated impacts. For example, if particle emissions during construction are 50% greater than operations emissions, the anticipated impacts would also be about 50% greater.

Operations assessment (22.5 MTPA and 27.5 MTPA)

The ÉEM team will use the information and data from the preceding ESIA and additional data provided by the client to characterize operations activities and resulting emissions. The emission factors listed by the US EPA AP-42 standard will be the main source of information for characterizing the emissions. The ÉEM team has extensive experience developing mining industry emissions inventories and has found that most sources are accurately characterized using this method.

The ÉEM team assumes that two different scenarios (maximum and average annual daily operation) will be assessed for each of the Project's two phases. This will mean four modeling cycles for each contaminant (scenario 1 - 22.5 MTPA average and maximum operation and scenario 2 - 27.5 MTPA average and maximum operation at three sites). Emissions-generating activities that will be considered include but are not limited to the following:

- drilling and explosive fracturing;
- excavation/loading;
- movement of vehicles at the site (including exhaust emissions);
- in ditches and on ramps/roads (ore and waste);
- movement of vehicles offsite (road to railroad);

- power generation;
- storage of tailings and stockpile maintenance; and
- wind erosion of uncovered surfaces and stockpiling areas.

In addition to the emissions from mining activities, emissions from rail transport of ore to Kamsar will be included in the Project emissions inventory, but they will be modeled separately. EPA emission factors for locomotives will be used to characterize railroad emissions, whereas the AP-42 standard emission factors will be used for other sources of emissions.

A 3-km stretch of railroad close to the siding will be assessed. Assessment of impacts the length of the railroad would require expanding the scope of the work, as the corridor between Kamsar and Sangarédi is more than 100 km long. Emissions-generating activities that will be considered include but are not limited to the following:

- car loading (handling and chute loading);
- transport by diesel locomotives;
- idling of diesel locomotives on siding; and
- offsite vehicle traffic, including truck transport of ore along the access road between the railroad and the port (exhaust emissions included).

Last, emissions from crushing and processing activities at the Kamsar port will also be included in the site emissions inventory and, given the distance between the port and the mine, they will be modeled/assessed separately. The US EPA AP-42 standard emission factors will be used to characterize the emissions from relevant sources. Emissions-generating activities that will be considered include but are not limited to the following:

- handling and wind erosion of materials in stockpiles of crude and processed bauxite;
- generation of electricity;
- dumping into the crushing line;
- primary and secondary crushing (emissions should be negligible if the products are wet);

- bauxite drying (dust and products of combustion);
- handling of materials when boat loading; and
- idling of boat engines.

When the inventory is completed, a memorandum describing the sources of emissions and the assumptions of each scenario will be drafted and sent to the client for approval.

As mentioned, it is assumed that a total of four scenarios for each of three sites will have to be assessed, for a total of 12 modeling cycles. Regarding quality assurance/quality control issues (in compliance with the requirements of the SENES ISO9001 certification), the modeling results will be reviewed by senior air quality staff members of the ÉEM team (internal staff) to ensure they are representative and valid.

The ÉEM team assumes that the assessments will be limited to compliance at specific receptor locations with standards and guidelines applicable to ambient air. However, land biology and possibly other disciplines will require information on the deposition rates of the pollutants selected for assessment (generally in the form of isopleth plots of pollutant levels). This has been taken into account.

Assessment of the impacts of decommissioning activities

The ÉEM team will use the information and data from the preceding ESIA and additional data provided by the client to assess possible impacts of decommissioning activities at each site. Such impacts are short term, and this part of the assessment will therefore not include any dispersion modeling. As with the assessment of the impacts of construction activities, an emissions costs analysis will be undertaken and the results compared with other scenarios analyzed to determine the possible impact of the Project on air pollutant levels.

Greenhouse gas inventory/assessment

The ÉEM team will use the information and data from the preceding ESIA and additional data provided by the client to inventory greenhouse gases (GHGs) resulting from the Project. GHGs are generally emitted as a result of the combustion of fossil fuels in mobile or stationary equipment (such as the dryer at the Kamsar port facilities) and the generation of electricity by fossil fuel-fired generators. Total

fuel used at each site (each type of fuel) will be used to calculate total annual GHG emissions (baseline and with the expansion), expressed as a carbon dioxide equivalent (CO₂e), and hence GHG emissions attributable to the Project. In addition, an estimate of GHG emissions related to deforestation activities will be generated with data provided by the work on the biological environment.

6.3.2 Noise and vibrations

The noise and vibrations impacts of a project are generally assessed qualitatively by comparison with regulatory guidelines on noise and vibrations. These criteria are based on the human health effects broadly associated with sleep disturbances and nuisance.

Update of baseline noise conditions

The baseline will be determined using the baseline measurements collected by AECOM in early 2011 and the baseline monitoring that will be done by CBG for the present study.

The noise baseline updating program will include the following:

Task 1 – Scoping of monitoring locations

For Kamsar, we anticipate that there will be two to three monitoring locations with receptors as close to the site as possible.

At the mine, the situation is more complex, as a large number of deposits that are to be mined as well as numerous villages in their vicinity must be considered. At least 15 monitoring locations will be required. In selecting the locations, the variable exposure of the villages to the noise of the mining operations will be taken into account.

The following must be considered in making the final selection of monitoring locations:

- 1) receptor type (to ensure a good selection of receptor types);
- 2) having a receptor further away to represent predevelopment conditions;
- 3) distance from reflecting surfaces and obstacles;
- 4) equipment protection; and
- 5) access.

Task 2 – Development of a noise monitoring plan

A noise monitoring plan will be developed after Task 1 is completed. The plan will cover the following:

- monitoring locations;
- monitoring equipment;
- sampling methods and procedures;
- calibration and quality assurance/quality control requirements;
- data collection and storage; and
- logistics.

Task 3 – Continuous noise monitoring program

Two sound-level meters (Class 1 Larson Davis sound-level meters, for example) will be used for the noise monitoring program. They will initially collect at least 48 hours (preferably more) of continuous sound measurements (10 min Leq) at the monitoring locations (at the mining site and the processing facility) selected in Task 1. After these initial measurements, it will be decided if the monitoring should be continued or if a finer resolution is required.

It is important to consider installing a small portable meteorological station to validate the results (identification of periods of rain and wind, for example).

The ÉEM team will help to select appropriate equipment (including necessary spares) and to coordinate equipment delivery to CBG personnel in Guinea. We assume that the CBG technicians on site will follow the procedures established by the ÉEM team so that the sampling will be carried out properly. We also assume these technicians will be responsible for the following:

- installing and using the equipment;
- downloading data and changing the batteries at least once a week (unless a power supply can be established, batteries must be changed every week); and
- performing required routine maintenance.

Task 4 – Data compilation and analysis

The ÉEM team will compile the noise data, perform the necessary calculations, and ensure quality assurance/control. The noise data will be reduced if necessary and analyzed. Noise data collected during periods of precipitation, strong winds and/or high temperatures and/or high humidity will be eliminated from the database.

The following table gives an idea of acceptable limits for meteorological conditions:

Parameter	Lower limit	Upper limit
Temperature ¹	-10°C	50°C
Relative humidity	25% ¹	90% ¹
Rainfall	No rain allowed	No rain allowed
Wind speed	-	15 km/h ²
NOTES 1. Larson Davis operating parameters. 2. Ontario Ministry of the Environment, Model Municipal Noise Control By-Law Publication NPC-102, August 1978.		

Table 6.5 Acceptable meteorological parameters for noise data collection

Task 5 – Report

ÉEM will prepare a draft noise baseline report. The structure of the report will be as follows:

- summary;
- introduction;
- methodology;
- monitoring results and data analysis;
- results and conclusions; and
- appendices (protocols, calibration data, laboratory results, raw data, etc.).

Modeling noise and vibrations

The noise modeling was performed using the Cadna-A model of noise propagation, a model based on the ISO 9613 standard: Attenuation of sound during propagation outdoors — Part 2: General method of calculation (ISO 1996). The CadnaA visual interface allows the user to create a three-dimensional representation of the mining area, the processing facility and the railroad corridor. CadnaA also allows the user to place a variety of source types at locations representing those where the associated work is to be undertaken. Sound level data are applied to each source as appropriate and the model calculates the sound level based on the distance between the source(s) and user-specified points of reception, accounting for intervening obstructions to noise propagation.

The model is also able to account for atmospheric absorption and absorptive qualities of the intervening ground surface. Obstructions to noise propagation that may be incorporated into the modeling include buildings, acoustic barriers, earthen berms and natural changes in ground elevation. CadnaA calculates the individual impact of each noise source at each defined sensitive receptor. A sound level grid may also be created on a user-specified node spacing to provide a visual representation of the noise propagation in the form of isopleths.

The impacts of vibrations will be assessed using standard industry techniques for assessing the impacts of vibrations with propagation equations from the US Bureau of Mines and the US Federal Transit Authority, or similar methods. If necessary, a vibration analysis of railroad blasting equipment or other heavy equipment will be performed using standard empirical models.

Determining Project impact criteria

The EEM team will conduct a detailed review of local and international noise and vibrations impacts criteria to be considered in the impact assessment, including but not limited to the environmental requirements of Guinea, the Equator Principles and the requirements of WHO, the World Bank and the IFC. A summary describing the Project impact criteria will be prepared for examination by CBG.

The IFC/World Bank guidelines stipulate that noise impacts should not exceed the levels presented in the following table or result in an increase in background levels of more than 3 dB at the nearest offsite receptor location.

Receptor	Maximum allowable ambient noise levels, LAeq, 1h, dBA free field	
	Daytime 07:00 – 22:00	Nighttime 22:00– 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70
Source: International Finance Corporation, 2007. Environmental, Health and Safety (EHS) Guidelines, General EHS Guidelines: Environmental, Noise Management.		

Table 6.6 IFC/World Bank guidelines for collection of noise level data

The IFC/World Bank Environmental, Health and Safety guidelines for Mining stipulate as follows:

Sources of noise emissions associated with mining may include noise from vehicle engines, loading and unloading of rock into steel dumpers, chutes, power generation, and other sources related to construction and mining activities. Additional examples of noise sources include shoveling, ripping, drilling, blasting, transport (including corridors for rail, road, and conveyor belts), crushing, grinding, and stockpiling.

IFC guidelines also stipulate that monitoring should be conducted for at least 48 hours continuously in order to establish background sound levels.

Assessment

The available data will be reviewed and a list of Project equipment and associated noise and vibration levels will be prepared. If noise and vibration levels specific to the equipment are difficult to obtain, a number of estimation techniques will be used (when possible) to estimate emissions, including the following:

- calculation of noise and vibration levels based on equipment specifications (supplied by CBG); and
- use of measured data for similar equipment in SENES’ internal database.

Other key vibration and noise data and the modeling assumptions will be documented for review by CBG. Once approved, these will be used to develop noise and vibration models.

A series of assessment scenarios will be prepared that consider current operations and future expansion options. Based on a preliminary review, we understand that there are two expansion scenarios to assess: a 22.5-MPTA and a 27.5-MTPA increase in production capacity. For this proposal we offer the following assessment scenarios:

- current operations;
- expansion of operations to 22.5 MTPA; and
- expansion of operations to 27.5 MTPA;

These expansion scenarios will be adjusted to reflect maximum use of the equipment at the Sangarédi mine, along the railroad (Sangarédi to Kamsar) and at the Kamsar plant, so that upper limits can be developed for each of the scenarios mentioned. A summary description of the assessment scenarios will be prepared for approval.

Noise and vibration modeling will be carried out for the three scenarios. The modeling of the existing operations scenario will be calibrated using available baseline data to ensure that the modeling results will be accurate and reliable. The existing operations model will be updated to reflect the 22.5-MTPA and 27.5-MTPA expansion scenarios. The noise and vibrations modeling results will be summarized in a technical brief.

6.3.3 Water quality and sediment

The assessment of Project impacts on water resources will include the impact of the changes on surface-water hydrology, groundwater quality and levels and the quality of fresh water, seawater and sediment.

Update of water and sediment quality baseline

As much as possible, the assessment will maximize the use of information from earlier reports and documents provided by the client, including but not limited to all pertinent available data on surface water and groundwater resources in the Study Areas (at the mining site and at the site of the processing facility), flows (including appropriate monitoring data), anticipated discharges, waste management, etc. This information will be completed by additional sampling by CBG under the supervision

of ÉEM. We assume that the CBG technicians on site will follow the procedures established by the ÉEM team so that the sampling will be carried out properly.

The ÉEM team proposes additional sampling, comprising 54 water and sediment samples (27 for metals and 27 for general chemistry) collected at 10 locations in Kamsar and 17 in the mining area. In addition, one to five groundwater samples should be collected from wells at Sangarédi. Further details about the sampling locations are as follows:

- in Kamsar, five locations in the Dougoufissa River (three upstream of the CBG site, one near the CBG site and one at the mouth of the river);
- in Rio Nuñez, five locations;
- in the mining area, 11 locations in streams associated with the current mining footprint;
- in the mining area, six locations in streams outside the current mining footprint but upstream and downstream of the deposits that will be mined between 2013 and 2028;
- in the mining area, groundwater samples collected where possible. A search for springs will be carried out. Groundwater wells in neighboring villages may also be sampled.

Sediment samples will also be collected at the surface water sampling locations.

Water sampling

Analyses

The water samples will be characterized for total concentrations of aluminum as well as several metals generally included in metal analyses using inductively coupled plasma mass spectrometry (ICP-MS), such as antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silicon, silver, strontium, tellurium, thorium, tin, titanium, tungsten, uranium, vanadium, zinc and zirconium. Unfiltered water samples for determining total metal concentrations will be collected in 250-mL bottles and preserved with nitric acid (1-2% v/v) at the time of collection. Preservation with concentrated acid diminishes the pH to less than two, preventing biotransformation of the samples and reducing deposits on

container walls. Acid-preserved samples that are kept cool ($<10^{\circ}\text{C}$) during storage and shipping will not be altered during the estimated one to two months it will take to get the samples analyzed.

The chemical composition of the water will also be determined, the following parameters in particular: pH, ammonia (NH_3), dissolved organic carbon (DOC), total suspended solids (TSS) and total dissolved solids (TDS). Aluminum mobility and availability (and hence its toxicity) are strongly affected by pH and presence of DOC. Other general chemical parameters can include alkalinity, hardness, chloride and sulfate. Unfiltered water samples for general chemical analyses will be collected in 50-mL bottles without adding preservatives. These samples must be kept cool ($<10^{\circ}\text{C}$) during storage and shipping. The general chemical parameters will be analyzed in the laboratory using a variety of techniques, including gravimetry (TDS and TSS), colorimetry or ion-exchange chromatography (chloride and sulfate), titration (alkalinity), UV/persulfate oxidation (DOC) and a probe (pH).

As ammonia is of particular interest and is time-sensitive because of changes to pH and microbial activity, it is recommended that ammonia concentrations be determined in situ with a multiparameter instrument such as the YSI Pro Plus.

A probe, such as the YSI Pro Plus multiparameter meter equipped with a 10-m cable will be used for in situ measurement of basic limnological characteristics, including water temperature, pH, dissolved oxygen and conductivity. The long cable will make it possible to take measurements at depth from a boat if need be.

Sampling methods

The sampling methods will be confirmed once the locations of the sampling stations are established. Surface samples will probably be collected along the shoreline directly from the water column (upper 0.5 m) in prewashed and labeled sampling bottles. For samples collected deeper in the water column from a boat, a sampling device such as a vertical Van Dorn 3-L water sampler is required. The 3-L water sample will then be divided into several sampling bottles.

Powder-free latex gloves will be worn when handling the samples to reduce the risks of contamination. Labels will be placed on all sampling bottles, which will be filled completely, and each sample will be entered on a chain of custody form.

Sediment sampling

Analyses

After nitric acid digestion at high temperature, the sediment samples will be characterized for concentrations of different metals that are generally included in metal analyses using inductively coupled plasma mass spectrometry (ICP-MS). Generally, the sediment will be analyzed for the following, in addition to aluminum: antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium and zinc. Analyses for organic parameters (PAH and PCB) will also probably be performed. The physical characteristics of the sediment samples will also be analyzed, including grain-size distribution, moisture content and total organic carbon content.

Sampling methodology

Sediment samples will be collected from a boat with a Petite Ponar grab sampler. At each sampling location, the Ponar sampler will be lowered to the water/sediment interface, shaken by pulling on the line to cause the jaws to clamp shut and then hauled to the surface. Once out of the water, the Ponar grab sampler will be immediately placed in a clean plastic container and the sediment sample will be released for subsampling. Three separate Ponar samples will be collected at each location and subsampled for metal determination. The metal samples will be collected in 120-mL glass containers and will also be used to determine moisture, grain-size distribution and total organic carbon. The samples will be individually bagged to prevent cross contamination and kept as cool as possible until they are shipped to a laboratory. The subsampling will be performed with clean latex gloves and the sample containers will be carefully washed before the sample collection.

Determining Project impact criteria

The impact assessment will involve comparing water and sediment quality data with guidelines meant to protect the aquatic biota (freshwater and seawater) and/or human health. General IFC guidances will be consulted in assessing the environmental impacts, including but not limited to the following:

- IFC. Environmental, Health and Safety Guidelines for Mining. December 10 2007;

- IFC & World Bank. Environmental, Health, and Safety Guidelines – General EHS Guidelines: Wastewater and Ambient Water Quality. April 30, 2007;
- IFC Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts. January 1, 2012.

In cases where Guinea does not have specific guidelines, criteria published in other jurisdictions will be studied to select appropriate values to be used in the impact assessment. To this end, sediment and water quality guidelines and criteria published by WHO, Environment Canada, the U.S. Environmental Protection Agency and/or European Union countries will be used as the main sources of quantitative criteria. A summary of proposed criteria will be prepared for review by CBG.

Assessment

To identify the effects/impacts of past activities on the aquatic environment, the sampling data collected in exposed areas will be compared to data from reference locations. These comparisons will be helpful in distinguishing between unfavorable conditions that are naturally produced and those that can be attributed to bauxite mining and processing activities in the past.

Regarding the assessment of Project impacts on surface water hydrology and groundwater levels, the goal in the assessment program described in the preceding paragraphs is not to measure flows or water elevations. Instead, the assessment of Project impacts on these components will be based, if possible, on existing information (as indicated above). If information is lacking, recommendations will be made for future monitoring as part of the Project's ongoing operations monitoring program. To meet environmental assessment requirements, the discussion of possible impacts on groundwater levels and surface water flows will be essentially qualitative. It will, however, be necessary to have a good understanding of current and planned water management practices and planning at each site, the characteristics of the wastewater from each operation, including quality and quantity estimates, and information on water use in the local Study Area. To this end, coordination of information exchanges with the design team and/or operations personnel is important.

Unlike in many other mining projects, levels of hazardous materials (heavy metals) are generally low in bauxite ores. One possible environmental risk is an increase in

aluminum levels and a decrease in pH in receiving waters. In addition, discharges of high turbidity water can affect water quality and sedimentation. The assessment of the impact of the expansion of operations will be limited to quantification of these impacts within the limits imposed by available data. When impacts cannot be quantified, inferences will be drawn from past experience at the sites.

Another possible risk is spills from storage and handling of the large quantities of diesel fuel and heavy fuel oil required for bauxite extraction and processing. The impact of spills is covered in the assessment of technical risks in the 2011 AECOM ESIA.

6.3.4 Geology and soils

The general description of the regional geology and soils will be based mainly on data from the 2011 AECOM ESIA, other recent studies and additional information that CBG may provide.

The impact assessment will involve comparison of soil quality data with guidelines for protecting the biota and/or human health. General guidances issued by the IFC will be consulted in evaluating the environmental impacts, including but not limited to the following:

- IFC. Environmental, Health and Safety Guidelines for Mining. December 10 2007;
- IFC Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts. January 1, 2012.

In cases where Guinea does not have any particular guidelines, criteria published in other jurisdictions will be studied to select appropriate values to be used in the impact assessment. To this end, guidances and criteria published in Canada, the United States and the United Kingdom as well as in other jurisdictions will be used as the main sources of quantitative criteria.

A few analyses of local soils have been performed:

- In 2011 in Kamsar, AECOM analyzed the soil at three locations and Golder Associates analyzed the soil at six locations. In addition, leaching tests were performed on four samples in 2011.
- In 2011, AECOM analyzed a composite soil sample.

- Additional sampling may be required for the assessment, particularly in the mining area. Plans are to collect, analyze and assess up to 10 samples. Qualified staff at the mine (ÉEM/CBG) will collect the samples.

This section will be closely linked to the technological risk assessment of the 2011 AECOM/CBG ESIA and the landscape assessment described in the biological programs.

6.4 BIOLOGICAL ENVIRONMENT STUDY METHODOLOGY

6.4.1 Scoping

A scoping mission was carried out for the biological part of the ESIA from October 5 to 24, 2013 inclusive, with the focus on Kamsar and Sangarédi. At Kamsar, the scoping mission covered the site of the CBG plant, the islands of Taïgbé and Taïdi, and the northern part of Île Binari as well as the adjacent tidal channels, beaches and mudflats.

At Sangarédi, the scoping mission covered mainly the operated plateaus and a search was conducted for a reference site.

6.4.2 Baseline study

General information

The baseline study will cover the sites mentioned in Section 6.4.1 and the areas of direct impact but will not necessarily be restricted to these areas—in case important habitats were not detected in the scoping mission.

Baseline study objectives are as follows:

- to identify and characterize Study Area habitats based on available aerial photos and satellite images;
- to assess faunal and floral diversity, especially in habitats affected by the Project;
- to determine the presence of vulnerable or threatened species (according to the Monographie Nationale and the UICN); and
- to identify critical habitats and species that use them.

The baseline study will cover the following in particular:

- vegetation;
- large and medium-sized terrestrial mammals;
- freshwater fauna (at Sangarédi only);
- birds;
- reptiles and amphibians; and
- marine mammals, sea turtles and mangrove crocodiles (Kamsar only).

In addition, visual and landscape studies will also be conducted, as well as studies of renewable resources (fisheries, game and nontimber forest products). Each study team will include an internationally recognized expert and at least one senior national researcher.

Seasons

There are two seasons in Guinea: the rainy season and the dry season. Biological studies are generally conducted during both seasons to take seasonal variations into account. Species presence or visibility differs depending on the season. However, a decision has been made to conduct a single study for both seasons. This decision to conduct a single study in the interseason, that is at the interface of the rainy and the dry seasons (October to December), is a cost-effective approach to biological fieldwork, given that most taxonomic groups will exhibit an appreciable variation in this short period of time. For example, by starting near the end of the rainy season, most amphibians can be inventoried (more low-profile in the dry season), even though most amphibian species have stopped calling by the end of the rainy season and are thus less apparent. At the time of the interseason, some species of migrating southern hemisphere birds will have started their migration south, and some northern hemisphere species will just be arriving in Guinea.

Because of the appreciable decrease in stream flows at the end of the rainy season, some freshwater aquatic fauna will have migrated to aquatic habitats downstream.

It may not be possible to identify certain plants unless they are flowering. Some species bloom continuously, but others bloom only in the middle of the rainy season or in the middle of the dry season.

An interseason inventory is complex, given the interannual rainfall variability, which can mean a shorter or longer dry or rainy season.

Landscape and visual assessment

Landscape character assessment (LCA) is a technique used to develop a full and ongoing understanding of what gives a landscape its character. It involves identifying the features that contribute to the character of the landscape, making it possible to understand the special character and qualities of a region.

The goal will be to characterize the landscape by identifying physical units, visual units and image units in the landscape. The characterization involves topographical mapping of habitats in the Study Area, with contour lines.

Survey of use of land and natural resources

Use of the land and of renewable natural resources will be determined in cooperation with the social assessment team based on surveys of local residents in the Project area and field inspections.

Regarding renewable natural resources, the focus will be on nontimber forest products and bush meat.

Land use will be mapped.

Plant inventory

Transects will be established in selected habitats. The main anticipated results are habitat mapping, description of habitat status, a list of species present and their importance for biodiversity and proposals to mitigate the impacts given the plan to expand operations.

The vegetation will be described at each site inventoried. While the plant inventory is being conducted, observations will be made regarding health, history and impacts at the sites examined.

Mammal inventory

Presence as well as absence of large and medium-sized mammals will be examined. Reconnaissance surveys will be conducted using the path of least resistance method to obtain data on presence, distribution, relative abundance and habitat preferences

of mammal species as well as the status of inventoried habitats and human activities that can harm animal populations (hunting). The path of least resistance is very often a trail used by animals or humans and can thus lead to overestimation of both animal abundance and human disturbance to the environment.

Observations will be recorded and georeferenced to develop presence indexes (PIs) and kilometeric abundance indexes (KAIs) whenever possible.

Camera trapping will be used to complete the information collected during the reconnaissance surveys by verifying the presence of terrestrial mammal species, especially nocturnal species and species whose presence is difficult to confirm solely on the basis of indirect signs. Camera trapping is an appropriate method given the difficulties of monitoring elusive, often nocturnal species that live in habitats hard to reach. The traps will be set to operate 24/7 and will take three consecutive photos every time they are activated. Sites where the cameras are installed will be selected with the help of local guides.

Bird inventory

Birds have a proven track record as indicators of a site's natural diversity. Their taxonomy and worldwide geographic distribution are relatively well documented compared to other taxa, which helps in their identification and allows rapid analysis of the results of ornithological studies. As the conservation status of most species has been reasonably well assessed, the results and conclusions of an ornithological study can be examined and put to productive use.

The principal inventory method will consist in carrying binoculars and walking slowly along trails and paths in search of birds, stopping frequently. Efforts will be made to cover as much ground and as many different habitats as possible. Notes will be made on visual observations of birds and bird calls. Some species will be opportunistically recorded at night. If possible, net captures will be made. For each day in the field, a list of all species recorded will be drafted. The number of individuals or flocks will be noted, as well as any evidence of reproduction (such as presence of young) and basic information on the habitat in which the birds were observed.

The goal is to collect data on the presence and distribution of bird species, their relative abundance, their preferred habitats, the status of the habitats inventoried and the human activities that can harm their populations. The number of individuals

or groups will be noted, as well as any element that can demonstrate their reproduction in the Study Area (such as presence of nests or young).

Observations will be recorded and georeferenced to develop presence indexes (PIs) and kilometric abundance indexes (KAIs) whenever possible.

Herpetological inventory

Guinea's forest habitats are among the most diverse regions in Africa when it comes to amphibians. As amphibians are extremely sensitive to changes in their habitat, they are excellent bioindicators.

The herpetofauna in the different selected habitats will be randomly sampled, based on direct observations and/or acoustic monitoring (for amphibians). Aquatic habitats in particular will be targeted for amphibians. The goal is to obtain data on presence, distribution, relative abundance and habitat preferences of the species present as well as on the status of the habitats inventoried and human activities that could be harmful to their populations.

Observations will be recorded and georeferenced. For the amphibians, night outings will be made, since amphibians are identified by their calls, generally after sundown.

Ecological freshwater study

Fish sampling

Two sampling methods will be used: dipnet fishing (active) in small streams, shallows or shoreline areas; and gillnet fishing (passive) in deeper waters of larger streams. The goal is to obtain data on species presence, distribution, relative abundance and habitat preferences as well as on the status of habitats inventoried and human activities that could harm their populations.

Freshwater macroinvertebrates

Macroinvertebrates play an important role in Guinea's mangroves and freshwater ecosystems. Decapod crustaceans (crab, shrimp and lobster) are especially important ecologically because they play an essential role in the ecological processes of the aquatic ecosystems, acting at different trophic levels as herbivores, scavengers, predators and prey.

Two sampling methods will be used: a passive technique using baited traps; and active fishing involving dragging a dipnet against the current along the bottom of the stream, depth permitting. The objective is to obtain data on species presence, distribution, relative abundance and habitat preferences as well as on the status of habitats inventoried and human activities that could harm their populations. The data will be georeferenced. The microhabitats studied will include riverbanks, beds of immersed vegetation, aquatic vegetation, rocky bottoms, gravelly bottoms and wood debris. The different microhabitats will be identified.

The South African Scoring System (SASS), Version 5, Rapid Bioassessment Method for Rivers, will be used for this study, a protocol that is well established in Africa for studying rivers.

Marine biology study

Most of the team members will spend one week conducting studies in the intertidal and marine area around Kamsar so that a wide range of taxa can be covered. The methods used for the terrestrial study will be used for the marine study as well, with the following differences:

- Habitat study: the mangrove habitat will be studied by the botanical team, so that plant conservation status can be assessed.
- Ornithological study: seabirds and shorebirds will be inventoried in the intertidal zone.
- Herpetological study: herpetofauna will be assessed in the intertidal zone to determine if large species are present (for example, crocodiles and sea turtles).
- Marine mammal study: the mammal team will investigate the presence of manatees, speaking to fishermen and traveling in boats in search of direct observations. Presence of other marine mammals, such as dolphins, will also be assessed by going out to sea with fishermen and questioning them.
- Special mission: a Hummingbird 998cSI sonar will be used for special river and ocean transects. With this tool and the appropriate method, it could be possible to identify manatees, crocodiles and sea turtles when they are under water. A hydrophone could also be used to locate manatees.

With respect to mangrove marine mammals, sea turtles and crocodiles, the focus will be on visual observations in estuaries, tidal channels and the mangrove in the Kamsar Study Area. The team will travel by boat, taking tides into account. The goal is to obtain data on the presence and distribution of species that use these habitats, their habitat preferences, the status of the inventoried habitats and human activities that could be harmful to their populations. Special attention will be paid to the port development area. Given the size of the area to be studied, information obtained from fishermen interviewed in chance encounters will be helpful in targeting additional areas to be inventoried that might have potential for manatee.

Data on marine fish will be obtained from the marine fish survey described below.

Marine fish study

Background

In the Kamsar area, sea fishing is a major resource for local populations. Any change in fishing practices, fishing areas or the fisheries would have major ecological, social and economic impacts.

Objectives

A rapid investigation of fishing will be undertaken to gain a preliminary understanding of the biological, economic and social aspects of fishing in order to do the following:

- suggest a reproducible methodology that can be used for future biological monitoring;
- investigate and suggest possible mitigation measures; and
- suggest a management plan for restoring means of livelihood.

Approach

An interdisciplinary team will conduct a field campaign:

- A one-month campaign will be conducted in the month of November 2013, to cover the end of the rainy season.

Locations proposed for the field studies are as follows:

- the fishing port and the Kamsar markets; and
- two fishing villages in the port area.

The following components are proposed for the study:

- baseline description of fishing activities, fishing sites, fish production and the fish trade, and fishing revenues (systematic and comparable seasonal data);
- assessment of anticipated impacts of Project activities on fishing resources and fishing activities (a portrait of resources/species and habitats affected by the Project); and
- development of a management plan to restore livelihoods, including assessment of impacts on livelihoods and search for possible mitigation measures.

Assessment of fishing activities and fishing revenues (fishermen and women who smoke fish)

- importance to households of fishing and fish-smoking activities;
- importance of fishing products (and seafood in general) in household diets (species eaten, quantity, variety, etc.);
- assessment of incomes of fishermen; and
- assessment of incomes from smoking fish (activity specific to women).

Methodology: a socioeconomic questionnaire will be administered at the household level to a random sample of fishermen and women who smoke fish in each village. The sample will be monitored for five consecutive days to assess production per household and per village. For a better assessment of fishing activity revenues, systematic questionnaires will be administered in the households under study. These questionnaires will also make it possible to get an idea of seasonal fishing parameters.

Standardization of annual frequency of fishing activities and revenues

- Assessment of percentage of active working days in each village

Methodology: a random sample of all households will be monitored daily during the November field campaign to assess, at the village level, how many people go fishing and smoke fish every day.

Assessment of production and exporting by local fishing enterprises

- Improvement in the quality of data on catches, prices, species and quantities

Methodology: semi-structured interviews will be conducted with fishing enterprise representatives to contextualize and improve the quality of the data obtained. Government sources of information will also be sought.

Assessment of impact of Project activities on fish and fishing activities

The purpose of the study is to perform a rapid assessment of fish stocks and their natural habitats and to obtain indicators that can be used to measure the impact of livelihood restoration programs without the need for a complete environmental assessment.

An accurate scientific assessment is not possible within the available time frame given the resources, equipment and specific competencies required. The data collected will be included in the database prepared for the preceding study.

Mapping of fishing beats and fishing areas

- number and duration of fishing trips around the Project area; and
- fishing trip trajectories.

Methodology: distribution of GPSs to a random sample of fishermen in each village for a three-week period (sample size will depend on the size of the village or hamlet), and monitoring of each individual for five consecutive days.

Assessment of fishing potential and fishing effort

- identification and assessment of fishing fleet (type and number of boats, size of boats);
- identification and assessment of boat endurance at sea (number of motor boats, outboard motors); and
- identification and assessment of fishing gear.

Methodology: fishing gear and fishing boats of the entire populations of the fishing villages will be inventoried and described.

Diversity, key species and habitats

Objectives

- list fish species caught;
- collect local names of fish; and
- gather general information based on local knowledge (species habitats and representation of key species).

Methodology

- random sampling of fish landings, identifying species to establish a species index associated with habitat indicators;
- interviewing of a representative group of fishermen and the population to collect local names of fish;
- statistical analysis of biodiversity indicators; and
- mapping of the main fishing locations.

Assessment of impact of fishing activities on resources

To determine the impact of fishing in the waters of West Africa, appropriate data must be collected, with the awareness that fishing grounds and fish populations must be estimated in an area for which there is little ecological knowledge for many species.

The following data will be collected for a sample of landings:

- for the fish population structure study: average size or weight of each species;
- for the study of the most affected species: determination, for each species, of the percentage of the catch that is too small to keep.

Methodology: random sampling of fish landings, including species identification, counts and weights, and size measurement of a subsample. GPS tracking will make it possible to collect data on actual fishing time and to distinguish between time required to reach a fishing site and time spent fishing. Interviews with a representative group of fishermen will help in interpreting measurements.

Development of a livelihood restoration plan: assessment of impacts on livelihoods and search for possible mitigation measures.

Measures to restore livelihoods and improve fishing in the Project area will be analyzed. The final livelihood restoration management plan will be developed in close cooperation with the CGB livelihood restoration team. The livelihood restoration team will also be responsible for programming and implementing the livelihood restoration plan.

Description of fishing activities and the fishing value chain in the region

Stakeholders in the fishing value chain will also be directly and indirectly affected by the Project. Through a social network analysis, each step in the value chain could also be associated with different actors and additional activities that contribute to the generation of fishing products and their value add:

- description of the different types of fishing-related activities (fishing, purchasing, processing) and the prices associated with each part of the chain;
- identification of the channel of distribution, the markets and their economic importance;
- fish quantities, frequencies and prices on the market and at the different stages of the value chain (frozen, smoked and fresh fish, purchase and resale, local market, village market); and
- understanding of the socioeconomic importance of the fishing value chain (number of people, social control and social status).

Methodology: Value chain approach. A sample of successive buyers of fish in different villages (survey in villages and in local markets in Kamsar) will be followed and stakeholders in the fishing value chain will be interviewed.

Understanding and measurement of mobility and migrations in the Project area

- Estimation of seasonal variations in traffic in and around the river to assess mobility and understand the different reasons for it.

Methodology: Boat traffic counts will be performed at four strategic locations 12 hours a day for an entire week.

- Assessment and understanding of seasonal and permanent fishing migrations predominant in the villages studied in the area

Methodology: Household inventory complemented by semi-structured qualitative interviews of key stakeholders to understand migration trends, the reasons given for them and the causes.

Examination of the means of subsistence situation in the Project area with identification of limitations and opportunities

- Develop a comprehensive picture of the fishermen

Based on the fishing questionnaires, semi-structured interviews will be conducted with all fishermen who agreed to be interviewed. The goal is to develop a comprehensive picture of the fishermen—including the way they fish, their social characteristics, their knowledge and perception of the environment and of nature and their position with respect to the Study Area.

- Research possible mitigation measures and fishing-related means of livelihood

The management plan will be designed to comply with international best practices, including IFC standards, and will recommend livelihood restoration measures. The following measures will be explored: improvement of marine resources management; improvement of safety at sea; support for community-based local development; etc.

- Inventory of activities other than fishing that could be improved economically

The household inventories could provide a basis for an inventory of all economic activities in the Study Area. It will be completed by semi-structured interviews of different stakeholders to explore measures that might best respond to the expectations of the communities. Employment, employment opportunities and the development of microenterprises and small businesses will also be studied, in partnership with the CBG's livelihood restoration team.

- Identification of especially vulnerable populations

The household inventory will provide a basis for a census of individuals and groups who might be directly and differentially or disproportionately affected by the Project because of their vulnerable or disadvantaged situation. The study teams will focus

on indicators of vulnerability and local strategies and practices to combat vulnerability.

6.4.3 Impact assessment – specific approaches

The diversity of the organisms and systems to be assessed and the wide range of possible impacts complicates the assessment of biological impacts. The social impacts of the marine fisheries are considered in the social section.

The areas covered by the biological studies are circumscribed in Section 3.3.2. In addition, several area outside the Study Area properly speaking may be studied as reference areas or as areas than might be concerned, if need be.

If possible, impacts will be assessed for a group of organisms, though it is often necessary to consider each species on a case-by-case basis. This is particularly true when it comes to evaluating the impacts on species designated as sensitive or rare. Reactions to change are often very different, even in the case of species that are very close. In fact, in very detailed studies, it is clear that reactions can even differ between specimens of the same species.

The types of biological impacts that are simplest to assess are those where there is a habitat loss or alteration (extension of a railroad siding, for example). In such cases, modifications can be quantified by area and, for some species, by individuals displaced. A habitat loss also causes secondary impacts that are more difficult to assess. This includes changes in the size of the residual habitat, changes in connectivity and changes caused by ecotones.

For some impacts related to air, water, sediment and soil quality there are related standards or criteria that can help in determining the scope of the impact. Though these criteria are usually generalized for large groups of organisms and stem from values averaged over many species and tests, they are often conservative and can thus be used to assess impacts.

Other impacts are more difficult to quantify, especially the effects of noise, artificial lighting and human presence (including direct threats such as poaching and simple disturbance). These impacts must generally be considered at the species level, especially in the case of important species. And of course, impacts can interact synergistically, and this must also be taken into consideration.

The ability to conduct a good biological assessment is thus related to the following:

Availability of good baseline data on species presence and density

The study will establish a good baseline for a wide range of species and systems, with particular attention to species of concern because they are rare, vulnerable or important to local inhabitants.

Availability of good physical science data

The physical sciences experts of the ÉEM team will provide data that will help in predicting impacts on biological components as well as people in the host environment. For example, the air quality and sound modeling will include the generation of isopleth maps that can be very useful in identifying critical or affected areas.

Good interaction early on with Project designers and the client

The best way to prevent impacts is to have frequent discussions with those planning the development of the sites. Early notification of problem areas (for example, an area that contains rare plant species) can often lead to small changes to a project that can reduce or even prevent impacts. The ÉEM team plans to work closely with all concerned Project personnel.

Competent staff to perform the assessments

In the end, the quality of a biological assessment usually depends on the knowledge and competencies of those performing the assessment. They must have a thorough knowledge of the biological data on the species involved and of the methods of assessment. The study group that has been put together for the biological work includes some of West Africa's leading experts as well as biologists who are among the most highly qualified in carrying out assessments.

6.5 SOCIAL ENVIRONMENT STUDY METHODOLOGY

The methodology presented in this section covers all stages in the production of a full social impact assessment, in accordance with international standards (National Instrument 43-101, *Standards of Disclosure for Mineral Projects*, as well as standards of the International Finance Corporation and the International Council on Mining and Metals) and Guinean national legislation.

Several techniques will be used to gather and analyze data at each stage in the various social components of the ESIA. The methodology will include the following elements:

6.5.1 Scoping

A scoping mission was carried out at the CBG Project sites from October 5 to 24, 2013, with the aim of identifying the main issues and impacts of the proposed Project and defining the scope of the ESIA.

From an administrative viewpoint, a scoping report provides basic information to the BGEEE and launches the ESIA validation process (Décret n° 199/PRG/SGG/89 and Ordonnance n° 990/MRNE/SGG/90). It thus enables the BGEEE to see the scope and potential magnitude of the impacts of the proposed Project. In addition, the BGEEE is fully informed of the scope of the ESIA and is then in a position to conduct a review mission and provide comments on the ESIA report.

The scoping report also provides information on the Project and its potential environmental and social impacts to the various stakeholders that could be concerned or affected by the Project. A preliminary examination of the administrative and regulatory requirements applicable to the Project and its ESIA is an integral part of the scoping study, with particular attention to the Guinean regulatory frameworks and to international standards (specifically, the IFC Performance Standards and the Equator Principles).

The social component of a scoping mission consists, firstly, in delineating the ESIA Study Area and in identifying and georeferencing the populated areas that would be affected by the Project.

Consultations are held with local authorities and representatives from the communities and from civil society. The aim is to get a preliminary idea of how the Project impacts are perceived locally—a task facilitated, in this case, by the fact that CBG has been operating in the area for several decades. The Project's technical and environmental aspects are also communicated at the stakeholder meetings. Details on the consultations held are presented in Chapter 7 of this Scoping Report.

6.5.2 Stakeholder Engagement Plan

The purpose of a Stakeholder Engagement Plan (SEP) is to provide a structure for all interactions among stakeholders (including the proponent itself) concerning the project. It serves as a basis for implementing the ESIA components and must be adapted to the capacity of each actor (project proponent, communities, local and decentralized authorities, civil society organizations, etc.).

Developing the SEP will consist in setting up focus groups with the various stakeholders within the Study Area (especially around Kamsar and Sangarédi) that will be directly or indirectly affected by the Project. The discussions will center mainly on the stakeholders' relationship with the company and in particular their knowledge of the Expansion Project.

Some of the focus groups will be set up formally (e.g., with official associations representing civil society organizations) and others informally (e.g., with groups of young people).

Traditional bodies (Council of Elders, mosque council) will be included in the focus groups even if their members are likely to also be in some of the other economic interest groups surveyed. The objective is to address a wide range of people in all the strata of local society.

The prefecture and subprefecture administrations will be contacted and asked to participate in designing the SEP. The regional authorities will also be met, along with decentralized technical departments.

Finally, the various departments of CBG and their directors or employees will be consulted in order to gather the most diverse possible viewpoints on the current situation and to assess their perception of an engagement plan based on dialogue.

These meetings have several specific objectives:

- identify and list the stakeholders;
- evaluate the level of communication so far between CBG and other parties;
- evaluate how much each stakeholder knows about the Project; and
- identify the stakeholders' main expectations and concerns regarding engagement and communication.

Based on a comparison of what the company has achieved or planned for its current operations or for the Expansion Project with what has been observed in the field, a general outline for a Stakeholder Engagement Plan can then be developed.

Ideally, the results described in the SEP should be shared with the various stakeholders met. This second series of consultations must lead to initiation of the plan and consolidation of the engagement strategy.

6.5.3 Community engagement

The methodology presented in this section was designed to ensure that the work will be carried out in accordance with the IFC Performance Standards on Environmental and Social Sustainability (1.30) and Guinean national legislation.

Once the optimal communications platforms and target communities have been identified, communications operations will be launched to inform people who may be affected by the Project. Community engagement activities will also be initiated.

The objectives of this consultation are as follows:

1. ensure that the people who may be affected are informed and given the opportunity to participate freely in the consultation;
2. inform the population about the ESIA and the Expansion Project, as well as aspects of the Project that could be of interest to them;
3. give potentially affected people the opportunity to express their concerns and have their questions answered; and
4. ensure that the views, preferences and concerns of potentially affected people are taken into account in the validation of possible alternatives, the identification of impacts and the development of mitigation, compensation and follow-up plans.

To engage stakeholders in the ESIA and, more broadly, in the Expansion Project, the current approach consists of two actions:

- Communication about the mining plan, initiated by CBG and targeted at stakeholders in the three zones identified; priorities should be the representatives of decentralized collectives (rural/urban communes and districts), the people in charge of decentralized State services (subprefectures), a number of civil society organizations, and CBG's partners.

- Structured consultation missions, in the form of focus groups, to be conducted in each of the three Project zones:

- Zone 1: The Sangarédi mining area;
- Zone 2: Kamsar plant and port facilities;
- Zone 3: Key points along the railroad between Sangarédi and Kamsar.

These consultations will take place during the next two studies (baseline studies and impact study), and there will be at least two rounds in the affected communities. Supplementary consultations may be added if need be.

The methodology for developing the SEP consists in setting up focus groups with the various interest groups within the Study Area who will be directly or indirectly affected by the Expansion Project, especially around Kamsar and Sangarédi. The discussions will focus mainly on the stakeholders' relationship with CBG and in particular their knowledge of the Expansion Project. Some of the focus groups will be set up formally (e.g., with official associations representing civil society organizations) and others informally (e.g., with groups of young people).

Traditional bodies (Council of Elders, mosque council) will be included in the focus groups even if their members are likely to also be in some of the other economic interest groups surveyed. The objective is to address a wide range of people in all strata of local society.

The prefecture and subprefecture administrations will be contacted and asked to participate in designing the SEP. The regional authorities will also be met, along with decentralized technical departments.

Note that additional efforts will be devoted to villages and hamlets that may have to be relocated (in Zone 1) and to directly impacted communities in all three zones (near the new rail sidings at KP 14 and 118). A list of priority stakeholders by issue is appended to this Scoping Report as Appendix 5.

The consultations conducted by the social study team will be compiled using a special software program, and summaries will be attached to the reports. To complete our stakeholder mapping, we will refine our knowledge about the stakeholders identified during the SEP mission by considering them on the basis of certain groups of themes:

- all themes: identification of the key stakeholder groups (i.e., the most invested) for each theme;
- socioeconomic themes, during the baseline study: identification of vulnerable groups (coupled with the study results) and knowledge about issues faced by local authorities; and
- impact-related themes, during the impact assessment: economic and social impacts, both positive and negative.

Because of CBG's knowledge of the technical aspects of the Expansion Project and its long history of relations with communities in the Study Area, the Project team and its communications department will play a primary role in implementing the stakeholder engagement activities.

6.5.4 Socioeconomic baseline study

The principal objective of a baseline study is to develop an exhaustive social and economic portrait of the Project footprint area, including operational decision tools that can be used for the duration of the Project. The specific objectives are as follows:

- provide good socioeconomic knowledge of the region;
- constitute the social component of the ESIA;
- constitute a reference state of the human environment to facilitate monitoring of socioeconomic impacts;
- provide qualitative and quantitative data with the relevant level of analysis;
- develop tools for measuring impacts during the construction and operation phases; and
- propose decision tools for designing the mining infrastructure.

The baseline study will have two main thrusts: a quantitative approach and a qualitative approach. The quantitative approach primarily addresses the need for a precise socioeconomic snapshot of the Project area, with reliable quantified data.

The qualitative approach, on the other hand, will be applied at several stages in the study. Initially it will be used to fine-tune the questionnaire used in household surveys, especially the land ownership part; traditional property law in rural Guinea is highly complex and, despite the team's knowledge, certain aspects particular to

the Project area and to the ethnic groups living there had to be investigated. The same applies to agricultural and non-agricultural activities, vernacular terminology, local perceptions of the concepts used in the household surveys (definition of a household, basic diet, etc.). Later on, qualitative studies will be conducted after the household surveys in order to obtain more information about certain aspects: traditional property law, local culture, decision making processes, village histories, the centers of power, cultural events and heritage sites, etc.

Quantitative surveys

Census and sampling

In order to collect reliable demographic data, an exhaustive population census will be conducted in the mine area (hamlets, villages and temporary camps in Zone 1), which is without a doubt the Project area with the largest socioeconomic issues. The same work will be done in the urban agglomeration of Sangarédi, which is also located at the center of the Project footprint.

In addition to providing precise, reliable demographic data, the census is an excellent tool for conducting representative sampling. It supplies many demographic facts (size of the population, breakdowns by sex, age and ethnicity, migration waves, etc.) as well as an exhaustive list of all households, which is the most reliable way to extract a random sample to be surveyed. Relying on administrative data is not recommended: such data, when available, often have shortcomings resulting from their end purpose (for example, local censuses have often been designed purely for tax collection purposes). Each household is assigned an identifier which is a combination of a geographical code and an individual household code. Using the census officers' itineraries and the household codes, the households making up the survey sample can be identified.

The sample will be constituted through a simple random draw without replacement in order to ensure that the data subsequently collected in the household survey will be as representative as possible. The size of the final survey sample will depend on the counted population in Zone 1, the principle being to arrive at a representative percentage representative of households surveyed from among the counted population. The sample size will be based on a minimum of 100 households surveyed in this reference study area. Qualitative surveys and impact investigations

will be conducted for zones 2 and 3, and Zone 2 will also be the subject of specific surveys on fishing.

Household surveys

While many of the survey questions are fairly conventional, others inform us about particular characteristics of the Study Area and will be indispensable to a good understanding of local strategies. We must therefore base ourselves on the first part of the qualitative studies to develop the questionnaires and the code grids for the multiple-choice questions.

The questionnaire will first be tested in villages outside the Study Area.

The survey-takers will also have to be trained. The last corrections to the questionnaire must be made during this training. The training will be mainly focused on translating the questions and making sure the survey-takers understand them. During the survey campaign, all the response sheets will be read when the survey-takers return from the field, and the households will be contacted if need be. It is very important to make sure that the survey-takers' responses to any questions are consistent. In conjunction with the household survey, a few supplementary surveys facilitating income calculation will be conducted. These are questionnaires on prices, measurement unit equivalences, the use of machines and equipment (to determine the actual profit when equipment is leased), and fishing yields and fish prices (to assign a monetary value to self-consumption).

A household's monetary income is not an accurate reflection of its wealth. A given income does not represent the same level of opportunity for a household of twenty people as it does for a family of five. In this respect, income expressed on a per capita basis is more informative. But the data enable us to go even further: using the Oxford scale, which takes age into account, we can calculate the number of consumption units per household. Income per consumption unit is an interesting indicator of household wealth and will help us identify the most vulnerable groups within the studied population.

The survey will cover a 12-month reference period corresponding to the cultural calendar. All income-in-kind is valued in Guinean francs based on agricultural product prices at local markets during the month halfway between two harvests. Each household's level of monetization, its economic strategies, and the proportions of its various income sources will all be detailed in the final document.

The other aspects of the household survey are demographics, migration, health (especially use of modern and traditional medicine), education, land ownership, agrarian practices, non-agricultural activities, access to services, housing, comfort, and dietary practices.

Main components of qualitative surveys

The qualitative component of a baseline study consists of four main themes. The first concerns a study of the history of the villages and their local authorities. We need a thorough knowledge of the decision making processes and especially of the key people in the decision making spheres in order to understand the directions taken. The second concerns the land ownership regime. The third is a study of cultural heritage and related sites, while the fourth is archaeology. All these data would be difficult to collect through household surveys and are common to the subgroups of the Study Area population. For these reasons, they need to be studied qualitatively.

It is clear that many points are connected, and there must be a high level of synergy between the various axes, in terms not only of work organization but also of data interpretation. This synergy will take the form of numerous instances of data overlap after each survey. The discussions will culminate in the formulation of new hypotheses, which can subsequently be validated.

Village history and decision making spheres

Some aspects of societies and cultures are highly complex: for example, lineages of power are closely linked to a society's concepts of nature and the supernatural. Studying the power structure of a society requires a qualitative and empirical field study of the history of migrations and the creation of lineages (first arrivals, foreign lineages) and of the genealogy of the founding lineages and village decision makers. All these aspects will help us understand the social organization of the Study Area.

The tools will include interview guides (lineage histories, distribution of administrative and institutional positions), genealogical surveys, and informal surveys conducted on respondents identified in earlier surveys.

Land ownership

Although the household survey will provide us with interesting statistics on land ownership, we will need a more qualitative approach in order to understand exactly

how land is divided and acquired. The important thing will be to establish a typology of the various collections of laws—often overlapping in rural Guinea—according to the different *terroirs* encountered in the Study Area.

Several multidisciplinary tools will be used for this study. First, guided interviews will be conducted with lineage Elders, which will give us information not only on land ownership in the village but also on power relationships between the various lineages in managing land ownership and access to village resources. Second, we will conduct rural surveys by collecting data *in situ* and talking directly about the lots visited, using the interview guides. The data collected will be more precise and more reliable about lot distribution, inheritance, appropriation, etc. At the same time, we will produce diagrams of farm lots and village lands with the sole objective of understanding the practices and deepening our knowledge of how land is managed by the traditional authorities. No maps will be produced from these drawings.

Specific studies on property ownership will be conducted in the agglomeration of Sangarédi, given how traditional and modern property regimes are particularly interwoven there and because of the existence of many levels of recognition and legal documents covering various aspects of property security.

Cultural heritage site inventory

This part of the baseline study fits in with IFC Performance Standard 8, one of whose objectives is “to protect cultural heritage from the adverse impacts of Project activities and support its preservation.” Sites of cultural interest in Guinea are generally kept secret. It is therefore very important to have an exact, proven method for obtaining exhaustive data in a short time.

The purpose of this survey is to locate and inventory such sites—not only those belonging to villages located totally or partially within the mining zone but also those of special importance to neighboring communities—and to identify the people who have authority over them. This will likely be sufficient preparation for implementing protection and conservation measures in accordance with Performance Standard 8.

We must start by identifying all the villages in question. For many of the sites, especially sites where genies live, it is very difficult for an “outsider” to extract information from the villagers, even though we are only asking them to reveal

secrets so that we can help protect the sites. Considerable time and effort will be invested in preparing a discourse for presenting this to the villagers. We will tell them clearly what is at stake, explaining that we need to know where the sites are located so as to avoid defiling them or destroying them without the villagers' prior consent. It will be made clear that not all the sites can be preserved, but that nothing will be destroyed without notifying the community members and discussing with them how best to proceed.

It is to be hoped that the objectives of this mission will be fully embraced by the villagers, but we will not stop there. After our first visit, during which we will explain the entire process, the villagers will have several days in which to convene their Council of Elders and discuss the Project. We will then return for a general gathering during which we will receive their conclusions. It is only after these consultations that we will be able to begin the inventory. We will start by asking the villagers to list all the sites, then we will proceed to the sites to take photos and GPS coordinates, requesting basic information from our guides if need be. We will then return to the village to interview the person in charge of the site, in an open conversation assisted by a guide. Once back at the base camp, we will compile all the data and produce a data sheet for each.

Archaeology

The archaeology work will focus on the mine area (Zone 1). It will be divided into three stages:

1. analysis of available maps and documentation on the region;
2. walk-about, conversations with community members, surface digs, description of potential finds, GPS mapping and inventory of sites and evaluation of their importance; and
3. production of a map showing all the sites inventoried.

During the exploration, the team will identify sites needing additional analysis, which could include investigations involving stratigraphy, digs and C-14 dating. More details on the use of dating methods and other tools will be provided in the methodology part of the final report.

Efforts will also be made to assess local knowledge and obtain the participation of people in the communities visited throughout the archaeological investigations.

Supplementary qualitative surveys

Product flows and market surveys

The flow of products on the main road between Sangarédi and Kamsar will be carefully studied. People involved in the principal weekly market in Sangarédi and other markets in the subprefecture within the concession (including Boulléré) will be interviewed with a view to mapping the main flows of imports and exports. By conducting price surveys on these markets, we will be able to elaborate on some of the information gathered in the household survey and develop an equivalence chart for measurement units (conversion of local units to SI units, useful in calculating income-in-kind). Whereas the population census will provide precise data on migratory dynamics, the household survey will examine the travel habits of the settled population.

Fishing

During the baseline study, particular attention will be focused on fishing in Zone 2 at the mouth of the Rio Nuñez. Fishing is the main source of cash revenue for people living around the plant and the mineral port, and could be considerably impacted depending on the technical option selected for shipping the ore out by freighter.

The work will consist of semi-structured investigations conducted with the various actors involved in the fishing industry in the target localities (Kamsar, Taïdi and Taïgbé). It will of course be complemented by the collection of scientific data. The topics addressed during the investigations will include the institutional and legal framework, fishing areas, types of fishing, products and volumes for each type of fishing, the social and economic roles of fishing (revenue, jobs, place of women, etc.), and the actors' perception of the impact of CBG's dredging operations. This particular study will be conducted in close collaboration with the Sylvatrop marine biology teams responsible for the fishing study.

Infrastructure and public services

A detailed description of the key public services and infrastructure, along with the related issues, will be presented to the main communities in the Study Area.

Human rights declaration

The team will prepare a human rights declaration emphasizing the possible human rights problems related to the Expansion Project. However, a thorough assessment of the risks related to human rights exceeds the scope of this study.

6.5.5 Social impact study

The social impact study team will work closely with the technical teams of CBG and its subcontractors to determine the options for the various stages of the Expansion Project. An exhaustive impact list will then be produced, based on the exact nature of the work and its social impact. The impacts of the construction and operation phases will be studied and evaluated, based on the knowledge acquired during the socioeconomic baseline study.

The impact assessment will also be the subject of consultations with institutions, interest groups and stakeholders, who will be invited to participate. In this way, identified and perceived impacts will be cross-identified.

These consultations will cover all the Expansion Project components (zones 1, 2 and 3). The stakeholders to be consulted will include:

- chiefs and lineage elders of the affected communities;
- Councils of Elders and mosque councils;
- decentralized regional authorities at the prefecture and subprefecture levels;
- other decentralized authorities (mayors, communal councilors, district presidents);
- technical departments;
- NGOs and other civil society organizations.

For each impact category, indicators will be developed and informed on the basis of the baseline study. All calculation methods will be clearly explained, and the dashboard will be an invaluable tool for monitoring impacts over time. Mitigation measures will be recommended for each impact category and each Project phase.

The social impacts and the mitigation measures identified will be used to develop a preliminary social management plan that will serve as the basis for the future socioeconomic management plans to be developed and implemented by CBG.

7 REPORT ON CONSULTATIONS

When the INSUCO teams first went out into the field for the scoping mission from October 5 to 24, 2013, they held more than 500 meetings with individual stakeholders within the Study Area. Details on the meetings are appended to this Scoping Report as Appendix 6.

Nearly half these interviews were with ordinary citizens who were met with informally in the localities visited. In addition, the teams interviewed the Governor of Boké, prefecture and subprefecture authorities, the mayors of all the communes located within the Project's footprint, commune councilors, employees from various departments of CBG, heads of government or corporate technical departments, and representatives from area and district offices, local authorities (councils of elders, mosque councils), NGOs, farm groups, women's associations, schools, schools, healthcare institutions, the port authorities and the Kamsar chamber of commerce.

Of the government authorities with jurisdiction over a territory at least partially affected by the CBG Expansion Project, only the representatives of Téliimélé prefecture could not be met with during the scoping mission.

Briefly, the content of the consultations was as follows:

- welcome and introduction of the team;
- brief presentation of the Expansion Project, which would double CBG's bauxite extraction capacity to 27.5 MTPA by 2022; this involves expansion of the mining area, an increase in the number of trucks, more frequent train runs between Sangarédi and Kamsar, more maritime traffic at Kamsar, and modifications to the jetty and to the Kamsar plant infrastructure;
- explanation of the next social and environmental studies to be conducted in accordance with Guinean law and international standards;
- INSUCO and SYLVATROP – Consulting firms based in Conakry, Guinea and selected to conduct these studies during the fourth quarter of 2013 and the first quarter of 2014;
- aspects addressed in the social studies: demographics, health, education, sanitation, economic activities, impacts of the Project on nearby communities;
- objectives of this first visit: identification and georeferencing of all localities within the Project's footprint, identification of resource persons (name,

- function, telephone number), estimation of number of households in each locality, verification and validation of administrative boundaries, verification of the activities of CBG and its contractors on the locality's territory (surveys /operations/boundary marking/replanting);
- additional issues addressed in District and Commune capitals and in localities already significantly impacted by CBG's operations: extent of knowledge about the Expansion Project (with sources, if applicable), relations with CBG (investments made/infrastructure built, information visits in villages/information meetings at the Commune level, communications with CBG), general comments about the Expansion Project (concerns, expectations, fears).

Consultations were also held by the biological study team. The list of people consulted is in Appendix 7.

ANNEXE 2 – LOCALITIES AND ADMINISTRATIVE BOUNDARIES IN MINE EXPANSION AREA (ZONE 1)

Subprefecture	District	Locality	Other names found
Sangarédi	Balandougou	Djoloun	
		Lougal center	
		Sintiourou Kaouri Bowé	
	Boulléré	Bandodji Nialby	
		Bandodji Tougouyé	Bandodji Touguidje
		Bosséré	
		Boulléré center	
		Boundi Foullasso	M'body Foullasso
		Fassaly Belendere	
		Feto Kewewol	Fetekewol
		Gueguere	
		M'bourore	
		Ndara	Dara
		Pomboniwol	
		Sinhiourou Nalbewou	
		Kourawel	Kahel M'body
	Kourawel center		
	Nyalé Boussoura		
	Nyalé Djáïman		
	Nyalé Hogo		
	Nyalé Missidé		
	Nyalé Moussa		
	Parawol Aliou		
	Sintiourou Amadou Oury		Darou Salam
	Sintiourou Boussoura		
	Sintiourou Hakountianly		
	Sintiourou Kourawel		
	Lavage	Djiibo	
		Fassaly Foutabe	
		Gondiji	
		Hamdallaye	
		Kaniadji	
		Kougnoubè	
		N'dantari	
		Paragogo	
		Samaya Bè	
		Sefadou	
		Sintiourou Baladarul	
	Silidara	Daba do	
		Daba ley	Formerly Hafia Misside
		Cogon lengué	
		Doumoun Cogon	Doumou Cogon
Dounsi		Dounsi Gadha, Dounsi Modoun	
Hore Sella, hamlet 1		Hore sella Mariama Dalan	
Hore Sella, hamlet 2		Hore sella Djioun Diadia	
Hore Sella, hamlet 3		Hore sella Thierno Bachir	
Ndanta Fongné	N'danta Fonyé		

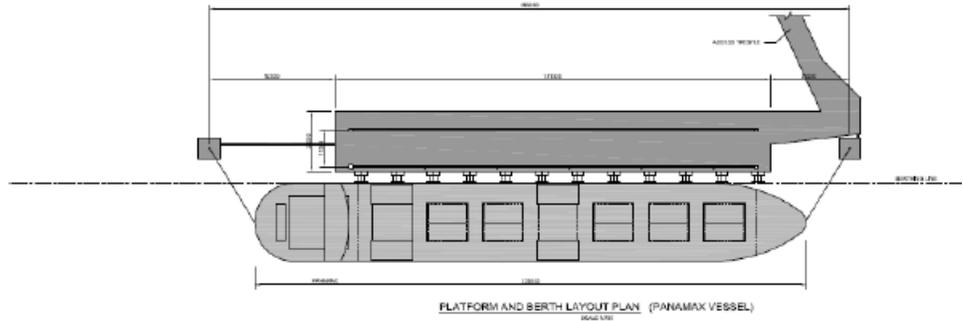
		Passago	
		Sambou, hamlet 1	
		Sambou, hamlet 2	
		Sella rounde	Sella
		Sellawol	
		Tiaghé	
	Souka	Feto Parawi	
		Feto Parawi 2	
		Kalinko Guessoré	
		Kalinko Poutaï	
		Kankalaré	
		Kankalaré Hacoudé	
		Madina Kankalaré	
		Nyangaba	Gnangaba
		Parawi	
		Parawi Saleah 1	
		Parawi Saleah 2	
		Parawi Saleah 3	
		Parawol Kouradjé	
		Parawol Malassi	
	Sintiourou Barkere		
	Sintiourou hafia		
	Telibofi		
	Thiankounnaye	Boundou Wandé	Boundou Waade
		Hafia 1	
		Hore Lafou	
		Lafou M'balia	
		Ndiarinde Misside	Ndiarinde Foulasso
		Ndiarinde Roundé	Ndiarinde Garanke
	Wossou	Sintiourou Hafia	
Kagnaka			
Kalinko Ley			
Kalinko Ley 2			
Daramagnaki	Madina Dian	Sintiourou madina	
		Bourreti	
		Carrefour Parawol	
		Daroul	
		Kareda Bel	
		Madina Dian	Parawol Sitako
		Missira	
		Ndantari	Hore fello/Ndantari Timbi
		Pora KP 130	
		Sakidje	
	Diandian	Sintiourou Gnalka	
		Sintiourou Missira	
		Sitako	
		Diandian	Diandian Misside
		Gaidhe Djeli	
		Hounsire	
		Kourawi	
		Limbiko	
Petoun Nyalbi			
Pora Bala	(hamlet of Pora)		
Pora Hodho			

	Sintiourou Daroul Diandian	
	Sintiourou Kerkere	
	Sintiourou Saïkou Timbi	(hamlet of Pora)
	Sintiourou Tiewere	Daroul (hamlet of Pora)
	Sintiourou Toumbeta	
	Thiankoye	
	Toumbeta	
	Wendou Baga	

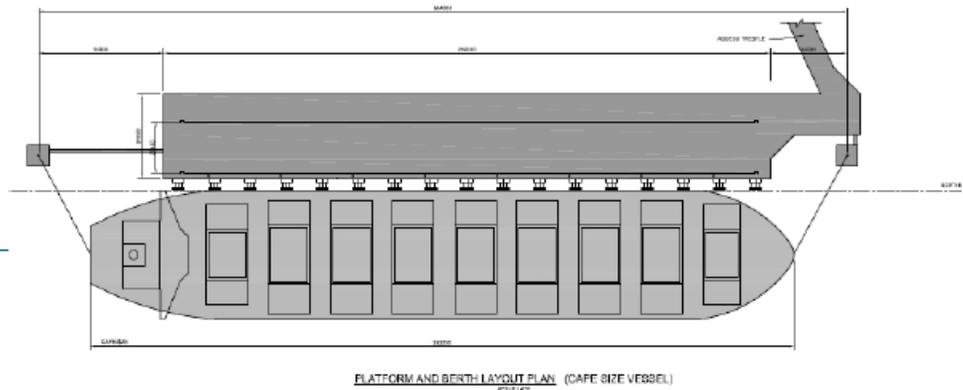
ANNEXE 3 – DESIGN OPTIONS FOR JETTY IN PORT OF KAMSAR

New jetty

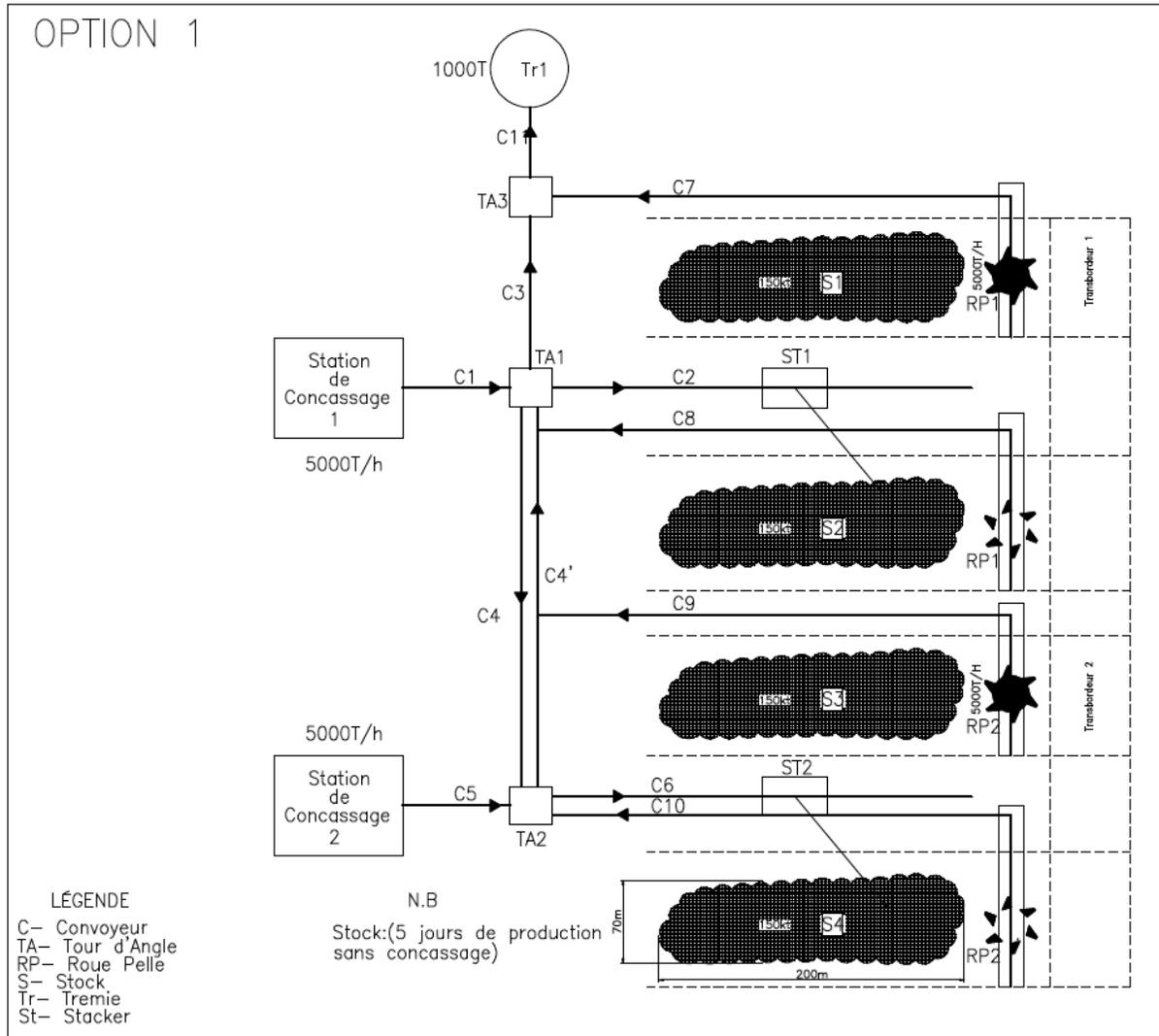
- For Panamax vessels (alternative 4 only)

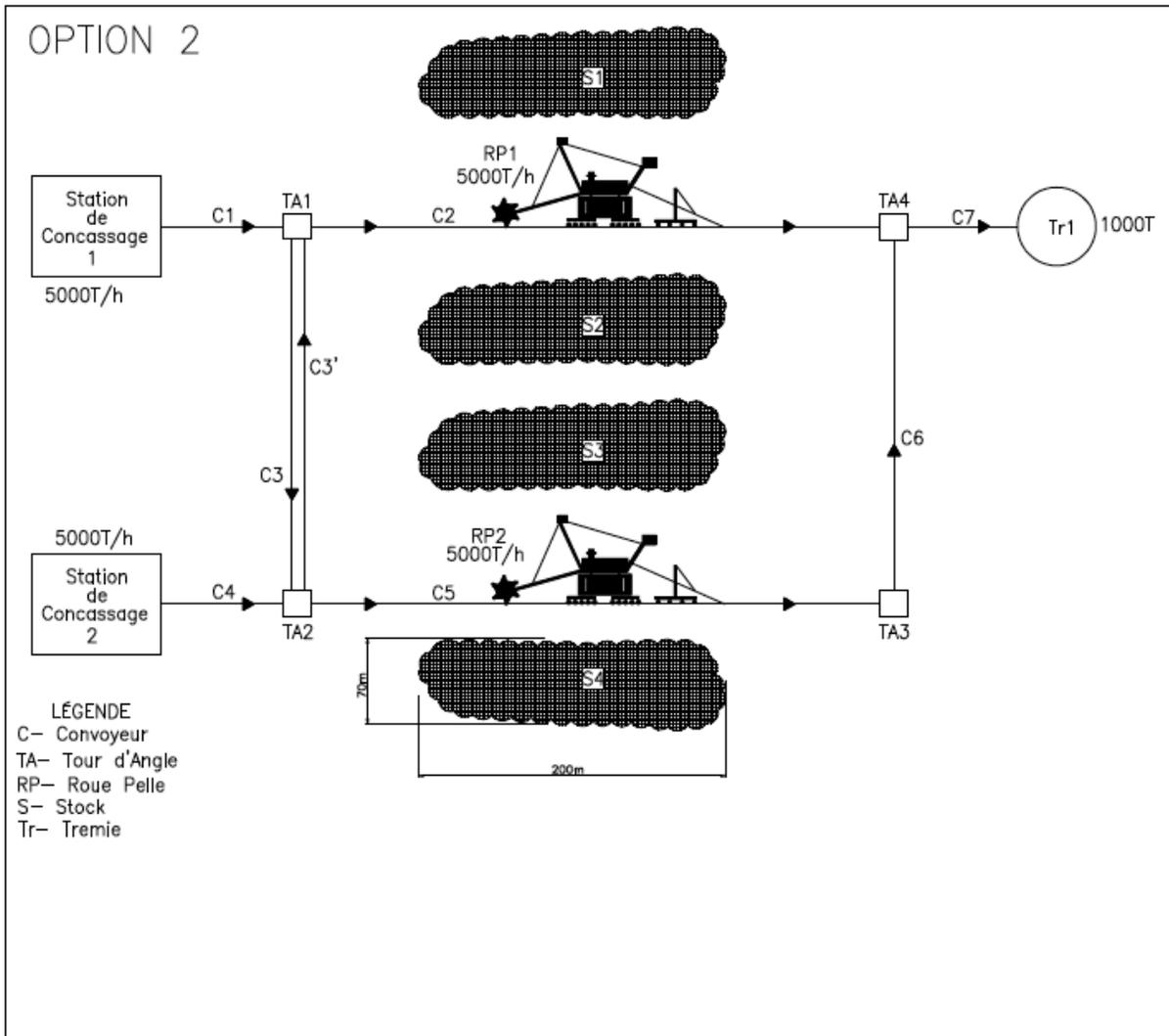


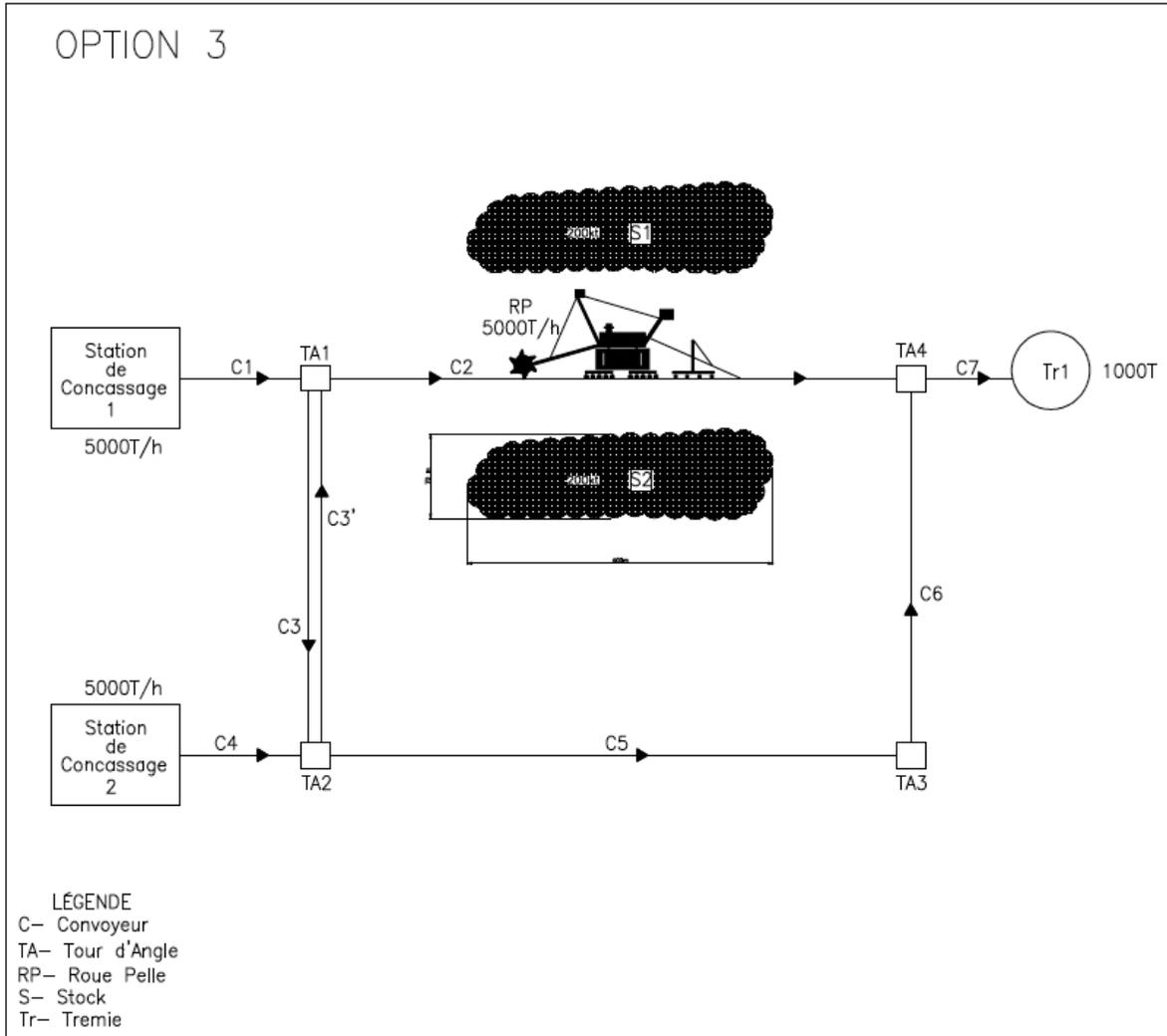
- For Capesize vessels (alternative 1, 2 and 3)



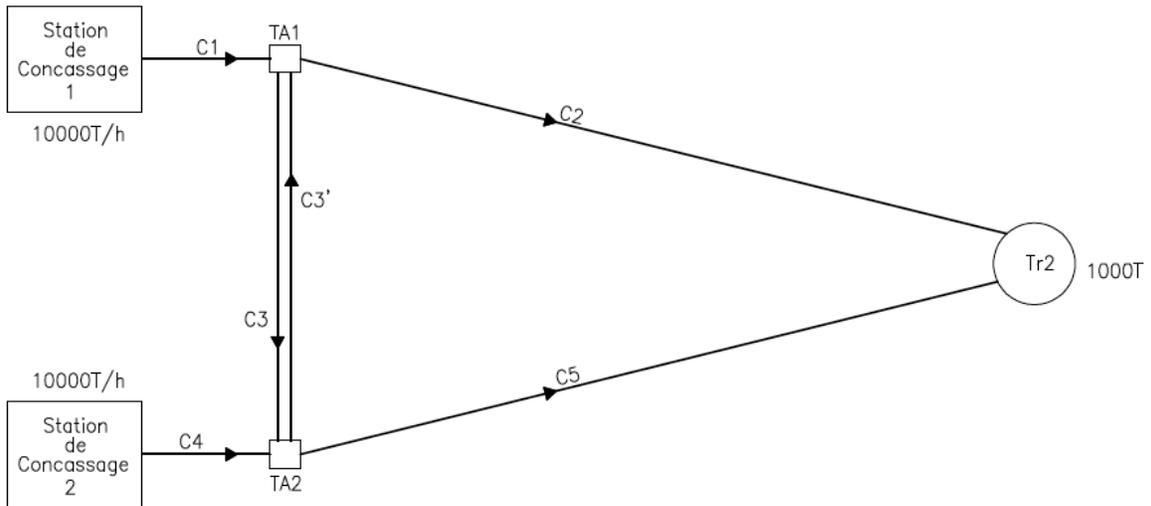
ANNEXE 4 – OPTIONS FOR DIMENSIONING OF CRUSHER FACILITIES







OPTION 4



LÉGENDE
C- Convoyeur
TA- Tour d'Angle
Tr- Tremie

ANNEXE 5 – PRIORITY STAKEHOLDERS LISTED BY ISSUE

Issue	Stakeholders potentially targeted by consultations ²
Communications	All PPPs
Employment	Subcontractors Unions Elders in the localities concerned Local youth
Economic development	Reference prefecture(s) Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned Local entrepreneurs NGOs Local interest groups (women, youth, groups, etc.)
Infrastructure	Reference prefecture(s) Reference subprefecture(s) Reference Rural Commune(s) Districts
Land tenure/occupation	Reference prefecture(s) Elders in the localities concerned
Resettlement	Reference prefecture(s) Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned Districts
Migration	Reference prefecture(s) Reference Rural Commune(s) Subprefectures Elders in the localities concerned Districts
Health risks	Reference prefecture(s) Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned Districts Local interest groups (women, youth)
Road traffic	Reference prefecture(s) Reference Rural Commune(s) Reference subprefecture(s)
Environmental degradation (especially in Zone 1): Loss of land Shrinking of pasturage Water pollution Blasting	Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned Districts Local interest groups (women, youth, economic interest groups, etc.)

<p>Increased maritime traffic in Rio Nuñez Estuary (Zone 2)</p>	<p>Reference Rural Commune(s) Reference subprefecture(s) Local interest groups (women, youth, fishing industry)</p>
<p>Increased activity at Kamsar plant (Zone 2): Air pollution, noise pollution</p>	<p>Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned Districts Local interest groups (women, youth)</p>
<p>Increased rail traffic (Zone 2)</p>	<p>Reference Rural Commune(s) Reference subprefecture(s) Elders in the localities concerned "Gare au train" safety program</p>

ANNEXE 6 – CONSULTATIONS HELD DURING SOCIAL SCOPING MISSION

Sr	Date	Name	Organization/Institution	Function	Locality	Contact
1	05 Oct.	Jeffrey Doodnath	CBG	Expansion Project Logistics	Kamsar	
2	05 Oct.	Danielle Angot	CBG	Expansion Project Administration	Kamsar	
3	05 Oct.	Stéphane Dallaire	CBG	HSE Manager, Expansion Project	Kamsar	
4	07 Oct.	Facinet Laysane Camara	Subprefecture	Head, Small Business Office	Kamsar	620 90 91 41
5	07 Oct.	Drame Aicha Barry	CBG	Administrative Director	Kamsar	
6	07 Oct.	Alpha Keita	CBG	Head, Community Projects	Kamsar	
7	07 Oct.	Ms. Sangare	CBG	Community Services Officer	Kamsar	
8	07 Oct.	Ms. Toure	CBG	Community Services Officer	Kamsar	
9	07 Oct.	Robert Max Aublet	CBG	Superintendent, Public Relations and Communications	Kamsar	
10	07 Oct.	Mamadou Aliou Barry	CBG	Superintendent, Health and Safety	Kamsar	
11	08 Oct.	Alseny Camara	CBG	General Secretary, labor union, Kamsar-Conakry local	Kamsar	
12	08 Oct.	Sekou Oumar Ly Diallo	CBG	General Secretary, labor union, Sangarédi local	Sangarédi	
13	08 Oct.	Ansoumane Kaba	CBG	Treasurer, labor union, Kamsar-Conakry local	Kamsar	
14	08 Oct.	Bachir Diallo	CBG	Mine Director	Sangarédi	
15	08 Oct.	Kaourou Camara	Subprefecture	Subprefect	Sangarédi	
16	08 Oct.	Ibrahima Sidibe	CBG	HSE Manager, Sangarédi Mine	Sangarédi	
17	08 Oct.	Siba Severin Lolamou	Governorate	Governor	Boké	
18	08 Oct.	El Hadj Daouda Bangoura	Prefecture	Prefect	Boké	
19	08 Oct.	Samba Fraterna Barry	Governorate	Cabinet Head	Boké	
20	08 Oct.	Ousmane Diallo	Governorate	Political Advisor	Boké	622 57 03 40
21	08 Oct.	Ibrahima Barry	Urban Commune	Mayor	Boké	
22	08 Oct.	Laye Nouhan Kaba	Urban Commune	General Secretary	Boké	
23	08 Oct.	Guillaume	CBG	Geologist	Sangarédi	
24	09 Oct.	El Hadj Mamadou Dioulde Bah	Rural Commune	Mayor	Sangarédi	655 36 30 28 631 85 02 01
25	09 Oct.	Fara Nestor Leno	Subprefecture	Head of Rural Development/Responsible for Youth and Sports	Sangarédi	662 68 02 77

26	09 Oct.	Sandaly Toure	Subprefecture	Work Inspector	Sangarédi	664 43 40 98
27	09 Oct.	Sako Fode Mamoudou	Subprefecture	Manager, Water and Forest Reserves	Sangarédi	621 40 41 86
28	09 Oct.	Alama Conté	Subprefecture	Chair, Committee for the Cogon-Tingilinta subwatershed	Sangarédi	621 90 37 42
29	09 Oct.	Mamadou Ouri Diallo	Rural Commune	Local Development Officer	Sangarédi	628 92 47 29
30	09 Oct.	Mariam Diallo	Subprefecture	Chief of Post, Environment	Sangarédi	631 83 38 28
31	09 Oct.	Moussa Camara	Subprefecture	Chief of Post, Quality Control and Standards	Sangarédi	621 03 43 72
32	09 Oct.	Moustapha Conde	Subprefecture	Assistant to the Director, Education	Sangarédi	655 36 23 82
33	09 Oct.	Mamadou Hadi Balde	Subprefecture	Chief of Post, Urban Planning and Housing	Sangarédi	622 82 30 03
34	09 Oct.	Ismael Camara	Subprefecture	Agricultural Advisor	Sangarédi	622 14 90 79
35	09 Oct.	Moussa Camara	Subprefecture	Environment Department Officer	Sangarédi	631 64 44 18
36	09 Oct.	Aboubacar Conte	Subprefecture	Urban Planning and Housing Officer	Sangarédi	631 65 21 02
37	09 Oct.	Mambinti Sako	Subprefecture	Deputy Subprefect	Sangarédi	
38	09 Oct.	Aminata Toure	Subprefecture	Archivist	Sangarédi	664 87 75 87
39	09 Oct.	Fatoumata Boke Barry	Subprefecture	Chief of Post, Livestock Industry	Sangarédi	621 41 61 44
40	09 Oct.	Saa Mamadou Kamano	Improved health center	Department Head, Extended Vaccination Program	Sangarédi	622 32 82 12
41	09 Oct.	Kadiatou Aidara	Improved health center	Representative, Maternity Ward	Sangarédi	622 33 39 57
42	09 Oct.	Mamadou Lamarana Diallo	Improved health center	Department Head, Hospitalization	Sangarédi	621 09 77 44
43	09 Oct.	Aissatou Sadio Diallo	Improved health center	Point of Sale Manager	Sangarédi	622 32 66 24
44	09 Oct.	Dr. Fatoumata Bah	Improved health center	Laboratory Manager	Sangarédi	628 36 08 52
45	09 Oct.	Bah Mamadou	Bureau de la société civile	Member	Sangarédi	666 56 24 14
46	09 Oct.	Mamadou Alpha Tounkara	Rural Commune	General Secretary	Sangarédi	628 31 85 32
47	09 Oct.	Boubacar Bah	Bowé services (SME)	Director	Sangarédi	621 90 36 10
48	09 Oct.	Mr. Toure	CBG	Geologist	Sangarédi	
49	09 Oct.	Mr. Barry	CBG	Geologist	Sangarédi	
50	10 Oct.	Dr. Yacine Diallo	Hospital (CBG)	Director	Sangarédi	664 86 48 95
51	10 Oct.	Fode Sangare	Subprefecture	Director of Education	Sangarédi	622 98 96 85
52	10 Oct.	Mamadou Salio Diallo	Seed producers' cooperative	President	Sangarédi	621 34 95 01

53	10 Oct.	Fatoumata Diallo	Market gardeners' group	Representative	Sangarédi	
54	10 Oct.	Aissatou Bah	Market gardeners' group	Member	Sangarédi	666 91 00 61
55	10 Oct.	Mamadou Bah	Area office	Assistant Manager	Hamdallaye	628 68 14 13
56	10 Oct.	Thierno Mamadou Salio Bah	Mosque	First Imam	Hamdallaye	622 24 48 43
57	10 Oct.	3 other people	-	Citizens	Hamdallaye	
58	10 Oct.	Thierno Alhassane Bah	District office	Vice-President	Boulléré	631 45 56 86
59	10 Oct.	Mamadou Moktar Bah	District office	Secretary	Boulléré	
60	10 Oct.	Mamadou Lamine Bah	District office	Member	Boulléré	
61	10 Oct.	Mamadou Dian Diallo	Islamic League	District Representative	Boulléré	
62	10 Oct.	El Hadh Abdouallaye Bah	Mosque	First Imam	Boulléré	
63	10 Oct.	Souaïbou Bah	-	Motorcycle taxi	Boulléré	620 24 08 04
64	10 Oct.	9 other people	-	Citizens	Boulléré	
65	10 Oct.	Salia Bah	-	Village Chief	M'bourore	
66	10 Oct.	Boubacar Bah	Literacy center	Manager	M'bourore	
67	10 Oct.	Mamadou Nouho Bah	-	Citizen	Paragogo	
68	11 Oct.	Mamadou Tela Bah	District office	President	Sangarédi/Silidara	631215991 620240664
69	11 Oct.	El Hadji B Fofana	District office	Vice-President	Sangarédi/Silidara	666 507 693
70	11 Oct.	Boubacar Diallo	District office	Secretary	Sangarédi/Silidara	
71	11 Oct.	Souleymane Bah	-	Citizen	Sangarédi/Silidara	
72	11 Oct.	Samba Kodo Camara	District office	President	Sangarédi/Tiankounnaye	669 73 51 23
73	11 Oct.	Ibrahima Sidibe	CBG	In Charge, HSE Mine, Sangarédi	Sangarédi	
74	11 Oct.	Satala Bah	District office	President	Sangarédi/Lavage	628900465 631891683
75	11 Oct.	Samba Diallo	Council of Elders	Member	Sangarédi/Lavage	
76	11 Oct.	Ousmani Bah	Council of Elders	Member	Sangarédi/Lavage	
77	11 Oct.	Thierno Bachir Barry	Area office	Secretary	N'dantari	
78	11 Oct.	Almamy Malik Diallo	Area office	Advisor	N'dantari	
79	11 Oct.	Yaya Barry	Council of Elders	Elder	N'dantari	
80	11 Oct.	Mamadou Oury Diallo	District office	President	Sangarédi/Bapa Sergent	662 70 57 59

81	12 Oct.	Mamoudou Bah	Mosque	Second Imam	Kagnaka (Wossou)	666 07 60 29
82	12 Oct.	Mamadou Saliou Barry	-	Citizen	Kagnaka (Wossou)	
83	12 Oct.	Aboubacar Bah	-	Guide	Boundou Wandé	
84	12 Oct.	Kaouri Bowe Ba	-	Head of household	Sintiourou Kaouri Bowe Ba	
85	12 Oct.	Ahmadou Bah	-	Citizen	Lope (Balandougou)	
86	12 Oct.	Mamadou Bailo Diallo	-	Citizen	Lope	
87	12 Oct.	Abdoulaye Pathé Diallo	-	Citizen	N'danta Fongné (Balandougou)	
88	12 Oct.	Boubacar Diallo	District office	President	Balandougou	620 18 85 25
89	12 Oct.	Amadou Farba Diallo	Council of Elders	Doyen	Balandougou	
90	12 Oct.	Mamadou Ouri Diallo	-	Citizen (chauffeur)	Balandougou	
91	12 Oct.	Alpha Amadou Bah	-	Citizen (chauffeur)	Balandougou	
92	12 Oct.	Mamadou Pathé Barry	-	Citizen	Balandougou	
93	12 Oct.	Mamadou Dian Diallo	-	Citizen	Balandougou	
94	12 Oct.	Younoussa Barry	-	Head of household	Bosséré (Balandougou)	
95	12 Oct.	Amadou Douga Diallo	-	Citizen	Bosséré (Balandougou)	
96	12 Oct.	Mamadou Bhoy Diallo	Mosque	First Imam	Boundou Wandé	
97	12 Oct.	Amadou Tidian Diallo	Mosque	Second Imam	Boundou Wandé	
98	12 Oct.	Algassimou Bah	Area office	Assistant Manager	Boundou Wandé	662 97 52 45
99	12 Oct.	Amadou Dioulde Bah	Mosque	Muezzin	Boundou Wandé	
100	12 Oct.	Mamadou Celiou Camara/Diallo	Area office	Youth Representative	Boundou Wandé	669 01 67 29
101	12 Oct.	Mamadou Aliou Bah	APAE	President	Boundou Wandé	
102	12 Oct.	Abdoulaye Diallo	APAE	Vice-President	Boundou Wandé	
103	12 Oct.	14 other people	-	Citizens	Boundou Wandé	
104	12 Oct.	Souleymane Bah	-	Doyen	Hore Lafou	
105	12 Oct.	Abderamane Bah	-	Citizen/Police officer in Sangarédi	Hore Lafou	
106	12 Oct.	Idrissa Bah	Mosque	Third Imam	Hore Lafou	
107	12 Oct.	Amadou Djoudjou Bah	Area office	Manager	Hafia 1	
108	12 Oct.	Bailo Sangué Bah	District office	Vice-President	Hafia 1	
109	12 Oct.	Mamadou Pathe Diallo	Area office	Manager/Blacksmith	Ndiarinde Roundé	

110	12 Oct.	Mane Aldjiouma	-	Karamoko/Healer	Ndiarinde Roundé	
111	12 Oct.	Mamadiou Aliou Barry	Mosque	Muezzin	Ndiarinde Roundé	
112	12 Oct.	Algassim Barry	-	Citizen	Ndiarinde Misside	
113	12 Oct.	Ibrahim Barry	Area office	Assistant Manager	Ndiarinde Misside	
114	12 Oct.	Abdoulaye Barry	Area office	Youth Representative	Ndiarinde Misside	
115	12 Oct.	Mamadou Ouri Diallo	Area office	Manager	Sintiourou Hafia	
116	12 Oct.	Mamadou Hafia Bah	-	Citizen	Sintiourou Hafia	
117	13 Oct.	Ibrahim Sory Diallo	Area office	Manager	Parawol Aliou	
118	13 Oct.	Ousmane Bangoura	-	Citizen	Parawol Aliou	669 28 85 48
119	13 Oct.	Amadou Oury Diallo	Council of Elders	Elder	Parawol Aliou	
120	14 Oct.	Mamadou Diakité	Area office	Manager	Sangarédi/Silidara/Dounsi	621 42 36 26 631 21 71 18
121	14 Oct.	Mamadou Aliou Camara	Area office	Assistant Secretary	Sangarédi/Silidara/Dounsi	
122	14 Oct.	Amadou Ouri Bah	Area office	Security Officer	Sangarédi/Silidara/Dounsi	
123	14 Oct.	Amadou Ouri Bah	Area office	Secretary	Sangarédi/Silidara/Dounsi	
124	14 Oct.	Mamadou Lamarana Diallo	-	Guide	Sangarédi/Silidara/Dounsi	668 01 27 77
125	14 Oct.	Bassambatenen Bah	Area office	Assistant Manager	N'danta Fongné (Silidara)	621 92 67 66 631 46 11 25
126	14 Oct.	Ibrahim Bah	Area office	Manager	Dounsi village	621 91 71 67
127	14 Oct.	Boubacar Bah	-	Citizen	N'danta Fongné (Silidara)	
128	14 Oct.	Ibrahim Bah	-	Citizen	N'danta Fongné (Silidara)	
129	14 Oct.	Seikou Oumar Toure	Area office	Assistant Manager	Cogon lingué	631 34 64 89
130	14 Oct.	Mamadou Saliou Toure	-	Citizen	Cogon lingué	
131	14 Oct.	Ibrahima Garanke Diallo	-	Citizen	Cogon lingué	
132	14 Oct.	Aguibou Bah	Area office	Youth Officer	Sambou	631 21 94 97
133	14 Oct.	Thierno Amadou Bah	-	Citizen	Sambou	
134	14 Oct.	Saliou Tenen Bah	Bureau	Village Chief	Passago	
135	14 Oct.	Souleymane Bah	-	Citizen	Passago	
136	14 Oct.	Moktar Toure	-	Citizen	Hore sella 1	
137	14 Oct.	Mamadou Lamarana N'diaye	-	Citizen	Hore sella 2	664 40 81 49

138	14 Oct.	Mamadou Saliou Diallo	-	Citizen	Hore sella 2	666 09 51 30
139	14 Oct.	Abderamane Diallo	-	Citizen	Daba	631 76 26 90
140	14 Oct.	Mamadou Dian Diallo	-	Citizen	Daba	
141	14 Oct.	Mamadou Alou Diallo	-	Citizen	Daba	
142	14 Oct.	Thierno Bachir	-	Village Chief	Hore sella 3	
143	14 Oct.	Mamadou Saliou Bah	-	Village Chief	Sella rounde	
144	14 Oct.	Tola Senda	-	Citizen	Sella rounde	631 39 19 05
145	14 Oct.	Thierno Mamadou Bah	-	Citizen	Sella rounde	
146	14 Oct.	Oumar Touré	-	Blacksmith	Madina Kambalaré	
147	14 Oct.	2 people	-	Citizens	Filo Bowal	
148	14 Oct.	Sabou Camara	-	Doyen	Doubi	
149	14 Oct.	Sadiouma Diallo	Area office	Area Manager	Tinguinlinta	
150	14 Oct.	2 people	-	Citizens	Gobiré	
151	14 Oct.	Abdoulaye Bah	-	Citizens	Ballan	
152	14 Oct.	Mamadou Karfa Bah	-	Citizens	Ballan	
153	14 Oct.	Abdoul Karim Diallo	Area office	Area Manager	Belli Thindi	621923890
154	14 Oct.	1 person	-	Citizen	Bourundou Lengueré	
155	14 Oct.	1 person	-	Citizen	Tantouloumani	
156	14 Oct.	Moly Moussa Bangoura	Mayor's Office	Manager, Technical Department	Boké	
157	14 Oct.	Ibrahima Barry	Mayor's Office	Mayor	Boké	
158	14 Oct.	Ibrahima Camara	Mayor's Office	General Secretary	Kolaboui	664381665
159	14 Oct.	Malick Savané	Subprefecture	Deputy Subprefect	Kolaboui	621125906
160	14 Oct.	Ousmane Sangui Sampou	Mayor's Office	Facilitator	Kolaboui	
161	14 Oct.	Siba Foster Koivogui	Mayor's Office	Local Development Officer	Kolaboui	
162	14 Oct.	Youssouf Ndiaye	Mayor's Office	Mayor	Tanéne	
163	14 Oct.	Ali Camara	Area office	Area Manager	Dawaf	
164	14 Oct.	Diallo	-	Citizen	Taïbata	
165	14 Oct.	Boubacar Bah	-	Citizen	Guidali	
166	14 Oct.	Cheick Ahmed Tidjane Diallo	-	Citizen	Guidali	

167	14 Oct.	Ibrahim Diallo	-	Citizen	Guidali	
168	14 Oct.	Sataba Kanté	-	Citizen	Guidali	
169	14 Oct.	Dian Sadio Diallo	-	Citizen	Guidali	
170	14 Oct.	Diallo	-	Citizen	Sintiourou Madina	
171	14 Oct.	2 people	-	Citizen	Diarabata	
172	14 Oct.	M'Bida	-	Citizen	Sintiourou Hafia	
173	14 Oct.	2 people	-	Citizen	Bingal	
174	14 Oct.	Hadja Aissata Traore	Subprefecture	President of "Promotion Féminine"	Sangarédi	631 83 27 86
175	14 Oct.	Fatoumata Keita	Commune	Advisor, Mayor's Office/In charge of the Sangarédi saponification and tinting group	Sangarédi	631 32 01 28
176	14 Oct.	Lansiné Condé	CONAG	Subprefecture inspector (Corporation Nationale de Guinée)	Sangarédi	628 92 49 24
177	14 Oct.	Souleymane Bamba	CONAG	In Charge of Groups	Sangarédi	621 34 98 68
178	14 Oct.	Thierno bachir Diallo	Subprefecture coordination of youth associations	Secretary in charge of external relations	Sangarédi	621 70 00 00
179	14 Oct.	Jeanette Bangoura	CAAF (center to promote women's self-advancement)	Director	Sangarédi	662 85 32 23
180	16 Oct.	Sherif Idrissa Camara	District office	District President	Souka	631829455
181	16 Oct.	Ibrahima Camara	District office	Municipal police	Souka	
182	16 Oct.	Satenen Camara	-	Village notable	Souka	
183	16 Oct.	Sabou Camara	-	Citizen	Souka	
184	16 Oct.	Aïssata Camara	-	Citizen	Souka	
185	16 Oct.	Thierno Moktar Bah	Mosque	Imam	Souka	
186	16 Oct.	Daouda Kanté	-	Village notable	Souka	
187	16 Oct.	Mamadou Houdi Bah	Health post	Health Officer	Souka	631734428 628045366
188	16 Oct.	Amadou Bah	-	Livestock farmer	Petoum Coloni	
189	16 Oct.	Tierno sherif diallo	-	Livestock farmer	Wadiya	
190	16 Oct.	Alfa Oumar Bah	Area office	Area Manager	Wossou	621908871
191	16 Oct.	Thierno Ousman Bah	-	Elder	Wossou	
192	16 Oct.	Mamadou Boyi Bah	-	Elder	Wossou	
193	16 Oct.	El Hadji Siré Bah	-	Elder	Wossou	

194	16 Oct.	Mamadou Alfa Bah	-	Elder	Wossou	
195	16 Oct.	Mamadou Alpha Bah	-	Elder	Wossou	
196	16 Oct.	Mamadou Aliou Bah	Mosque	Imam	Wossou	
197	16 Oct.	Abdoulaye Bah	Mosque	Karamoko	Wossou	
198	16 Oct.	Mamadou Lamarana Bah	-	Elder	Wossou	
199	16 Oct.	Mamadou Lamarana Tella Bah	-	Elder	Wossou	
200	16 Oct.	Mohamed Lamine Bah	-	Elder	Wossou	
201	16 Oct.	Mariama Siré	-	Citizen	Wossou	
202	16 Oct.	Aïssatou Bah	-	Citizen	Wossou	
203	16 Oct.	Abdoulaye Bah	-	Citizen	Wossou	
204	16 Oct.	Souleymane Bah	-	Citizen	Wossou	
205	16 Oct.	Amadou Oury Bah	-	Citizen	Wossou	
206	16 Oct.	Alsan Bah	-	Citizen	Wossou	
207	16 Oct.	Mamadou Kenda Diallo	-	Citizen	Wossou	
208	16 Oct.	Amadou Lamarana Bah	-	Citizen	Wossou	
209	16 Oct.	Kadiatou Bah	-	Citizen	Wossou	
210	16 Oct.	Djeneba Silla	-	Citizen	Wossou	
211	16 Oct.	Sallimatou Bah	-	Citizen	Wossou	
212	16 Oct.	Mamadou Lamine Bah	-	In Charge of Environmental Protection	Wossou	620264977 631179387
213	16 Oct.	Mamadou Talibé Bah	Elementary school	Teacher	Wossou	
214	16 Oct.	Mamadou Bah	-	Elder	Kalinko Guessoré	
215	16 Oct.	Ansoumani Bah	-	Elder	Kalinko Guessoré	
216	16 Oct.	Fatoumta Bah	-	Citizen	Kalinko Guessoré	
217	16 Oct.	Mamadi Yero Bah	-	Citizen	Kalinko Guessoré	
218	16 Oct.	Ibrahima Bah	Area office	Area Manager (Village Chief?)	Kalinko Guessoré	621978161
219	16 Oct.	Mamadou Samba Kanté	Area office	Area Manager	Parawol	
220	16 Oct.	Saliou Dian Mané	-	Elder	Parawol	
221	16 Oct.	Amadou Bah	-	Elder	Parawol	
222	16 Oct.	Mamadou Bobo Touré	Mosque	Imam	Parawol	

223	16 Oct.	Dian Bailo Camara	-	Elder	Parawol	
224	16 Oct.	Samba Alarba Diallo	-	Citizen	Parawol	
225	16 Oct.	Abdoulaye Diallo	-	Citizen	Parawol	
226	16 Oct.	Mamadou Bhoie Barry	-	Village Animator/Guide	Sangarédi	622 34 83 04
227	16 Oct.	Mamadou Saliou Bah	Area office	Manager	Kahel M'body	628 90 06 45 (fils)
228	16 Oct.	Mamadou Alimou Diallo	Mosque	Second Imam	Kahel M'body	
229	16 Oct.	Sadaba Diallo	Council of Elders	Elder	Kahel M'body	621 40 35 48
230	16 Oct.	Souleymane Hawa Diallo	Area office	In Charge of Youth	Kahel M'body	628 26 58 55
231	16 Oct.	26 other people	-	Citizens	Kahel M'body	
232	16 Oct.	Alpha Oumar Bah	District office	Member	Kourawel	621 22 47 26
233	16 Oct.	Satoun Bah	Council of Elders	Elder	Kourawel	
234	16 Oct.	Abdul Karim Bah	-	Village Animator PACV	Kourawel	622 98 95 31
235	16 Oct.	Mamadou Seïdou Diallo	District office	In Charge of Youth	Kourawel	
236	16 Oct.	21 autres participants	-	Citizens	Kourawel	
237	16 Oct.	Abdoulaye Toure	-	Village Chief	Nyalé Djaiman	
238	16 Oct.	Mamadou Aliou Toure	-	Elder	Nyalé Djaiman	
239	16 Oct.	Djakariaore Bah	Area office	Area Manager	Nyalé Moussa	
240	16 Oct.	Koulibaly Souleymane	Council of Elders	Elder	Nyalé Moussa	
241	16 Oct.	Mamadou Oury Diallo	Area office	Manager	Nyalé Hogo	
242	16 Oct.	Abdoulaye Diallo	Area office	Member	Nyalé Hogo	
243	16 Oct.	Thierno Mamadou Bobo Diallo	Council of Elders	Elder	Nyalé Hogo	
244	16 Oct.	Abdoulaye Diallo	Area office	Manager	Nyalé Boussoura	631289925 622841535
245	16 Oct.	Souleymane Touré	Bureau de la jeunesse	Member	Nyalé Boussoura	
246	16 Oct.	Lamarana Diallo	-	Village Chief	Sintiourou Boussoura	
247	16 Oct.	Manga Bossy	-	Village Chief	Nyalé Missidé	
248	16 Oct.	Mamadou Aliou Diallo	-	In Charge of Youth	Nyalé Missidé	662 76 38 22 621 70 07 19
249	17 Oct.	Fode Mamadou Sako	Subprefecture	In Charge of Water and Forests, Technical	Sangarédi	

250	17 Oct.	Ibrahima Diakhabi	NGO Entreprise Prestation Agricole (EPA)	Member	Sangarédi	669 32 08 47
251	17 Oct.	Amadou Dioulde Bah	-	Citizen (younger brother of Village Chief)	Daba ley	
252	17 Oct.	Adama Hawa Bah	-	Citizen (wife of Village Chief)	Daba ley	
253	17 Oct.	Yero Djouma	-	Village Chief	Selawol	
254	17 Oct.	Yero Bah	-	Village Chief	Doumoun Cogon	669 29 24 73
255	17 Oct.	Aboubacar Sané	District office	President	Tanéné	622032323
256	17 Oct.	Youssouf Ndiaye	Rural Commune	Mayor	Tanéné	
257	17 Oct.	Babagalé Kaltamba	District office	Vice-President	Tanéné	
258	17 Oct.	Mr. Sampo	Subprefecture	Deputy Subprefect	Tanéné	
259	17 Oct.	Mr. Diallo	Rural Commune	General Secretary	Tanéné	
260	17 Oct.	Ibrahima Mané	Subprefecture	Director of Education	Tanéné	
261	17 Oct.	Koumabssa dit Oscar	Prefecture development committee	President	Boké	
262	17 Oct.	Barry Mamadou Saliou Soko	Region	Commerce inspector	Boké	
263	17 Oct.	Ibrahima Kiniero Kourouma	Region	Environment inspector	Boké	
264	17 Oct.	Kandé Ibrahima Soumah	Region	HR Director	Boké	
265	17 Oct.	Pascal Dembadouno	Prefecture	General Inspector of Communities	Boké	
266	17 Oct.	Alphonse dopavogui	Bureau de la jeunesse	Youth Representative	Kondayiré	
267	17 Oct.	Michel Camara	-	Young person	Kondayiré	
268	17 Oct.	Idrissa Camara	-	Young person	Kondayiré	
269	17 Oct.	Ismael keita	-	Young person	Kondayiré	
270	17 Oct.	Aliou Daba	-	Young person	Kondayiré	
271	17 Oct.	Alassane Keita	Area office	Assistant Area Manager	Diendien bourré	
272	17 Oct.	Souleyman Barry	Council of Elders	Elder	Diendien bourré	
273	17 Oct.	Souleyman Keita	Council of Elders	Elder	Diendien bourré	
274	17 Oct.	Abdul Karim Camara	Council of Elders	Elder	Diendien bourré	
275	17 Oct.	Youth group	-	Youth	Kakoumba	
276	17 Oct.	Cheik Oumar Keïta	Council of Elders	Elder	Segueya Sini	
277	17 Oct.	Mohamed Bangoura	-	Citizen	Danayah	

278	17 Oct.	Mamadou Cissé	-	Younger brother of the Area Manager	Kiaye	
279	17 Oct.	Cabo Cresse	Area office	Area Manager	Hamdallaye	
280	17 Oct.	Hansouman Camara	Area office	Area Manager	Madina Toumbata	
281	17 Oct.	Bafodé Fofana	Council of Elders	Elder	Madina Toumbata	
282	17 Oct.	El Hadje Mamadou Dansogo	Council of Elders	Elder	Madina Toumbata	
283	17 Oct.	Malick Camara	Council of Elders	Elder	Katomou	
284	17 Oct.	Sekou Kouyate	-	Citizen	Katomou	
285	17 Oct.	El Hadje Kouyate	Council of Elders	Elder	Katomou	
286	17 Oct.	Lamine Conté	Area office	Area Manager	Madina Bobof	
287	17 Oct.	Mamadou Dian Conté	-	Younger brother of the Area Manager	Madina Bobof	
288	18 Oct.	Keoulen Kourouma	Subprefecture	Manager, Quality Control	Kamsar	622 30 41 47
289	18 Oct.	Namori Keita	Subprefecture	Trainee, Quality Control	Kamsar	666 25 99 96
290	18 Oct.	Ibrahima Ogou	Prefecture	Director, Trade, Industry and SME	Boké	622 14 10 84
291	18 Oct.	Dr. Ndiaye	CBG	Director SSE	Kamsar	
292	18 Oct.	Dr. Ndiaye	CBG	Director SSE	Kamsar	
293	18 Oct.	Robert Ibaro Bangoura	Mayor's Office	Commune Receiver	Kamsar	
294	18 Oct.	Idrissa Camara	Mayor's Office	Area Manager Kamsar II	Kamsar	
295	18 Oct.	El Hadje Tidjane Sylla	Mayor's Office	Mayor	Kamsar	
296	18 Oct.	Djibril tresor Bangoura	Mayor's Office	Commune Councillor	Kamsar	
297	18 Oct.	Younoussa Doune Camara	Mayor's Office	Commune Councillor	Kamsar	
298	18 Oct.	Kourouma Samah Kaba	Subprefecture	Subprefect	Kamsar	
299	18 Oct.	Ibrahima Sorry Keita	CBG	Director, HSE	Kamsar	
300	18 Oct.	Stephane ?	CBG	Training center	Kamsar	
301	18 Oct.	Mr. Barry	CBG	Training center	Kamsar	
302	18 Oct.	Amadou Saikou Bah	Area office	Assistant to the Manager	Lougal	
303	18 Oct.	Alpha Oumar Bah	Area office	Youth Representative	Lougal	631 64 37 33
304	18 Oct.	Abdoul Karim Diallo	Elementary school	Teacher	Lougal	
305	18 Oct.	Lamarana Barry	-	Merchant	Lougal	
306	18 Oct.	Boubacar Bah	-	Citizen	Djoloun	

307	18 Oct.	Alpja Oumar Sall	-	Citizen	Djoloun	
308	18 Oct.	Boubacar Sall	-	Village Chief	Djoloun	
309	18 Oct.	Amadou Ouri Bah	-	Village Chief	Sindiare Mangaya	
310	18 Oct.	Thierno Sadou Bah	-	Manager	Tala Bobhi	
311	18 Oct.	Mamadou Lamarana Bah	-	Citizen	Tala Bobhi	
312	18 Oct.	Mamadou Kounsiwi Diallo	-	Manager	Ghaïga Diabere	
313	18 Oct.	El Hadj Mamadu Dian Diallo	Council of Elders	Elder	Ghaïga Diabere	
314	18 Oct.	Ibrahima Cissé	Elementary school	Principal	Ghaïga Diabere	631 52 90 41 666 90 88 16
315	18 Oct.	Mamadou Lamarana Diallo	-	Citizen	Ghaïga Diabere	
316	18 Oct.	Oury Dantawi Bah	-	Manager	Dantawi	
317	18 Oct.	Hamidou Bah	-	Citizen	Dantawi	622 78 89 77
318	18 Oct.	Rachidou Bah	-	Citizen	Dantawi	
319	18 Oct.	Mamadou Sanoussi Sow	-	Citizen	Dantawi	
320	18 Oct.	Mamadou Saliou Diallo	Area office	Manager	Sindiare Misside	
321	18 Oct.	Abdoul Gadiri Bah	-	Citizen	Sindiare Misside	
322	18 Oct.	Ibrahima Sory	Area office	Member	Sindiare Misside	628 04 49 60 631 20 89 41
323	18 Oct.	Souleymane Diallo	-	Citizen	Sindiare Misside	
324	18 Oct.	Ibrahima Sory Barry	-	Manager	Doukire Lopé	
325	18 Oct.	Mamadou Hatim Barry	-	Citizen	Doukire Lopé	
326	18 Oct.	Yakouba Mané	-	Citizen	Doukire Lopé	662 08 49 87
327	18 Oct.	Amadou Bela Barry	Area office	Security	Pobadjel	
328	18 Oct.	Mamadou Alpha Bah	-	Citizen	Pobadjel	
329	18 Oct.	Mamadou Douga Diallo	-	Manager	Madina lopé	
330	18 Oct.	Boubacar Bah	-	Citizen	Madina lopé	662 14 01 92
331	18 Oct.	Hawa Bella Bah	-	Village Animator	Bappa sergent	
332	19 Oct.	Alassane Diallo	Area office	Youth Representative	Fofodoro	622 78 68 03
333	19 Oct.	Mohamed Souma	Elementary school	Teacher	Fofodoro	

334	19 Oct.	Oudoussi Bah	-	Citizen	Fofodoro	
335	19 Oct.	Mamadou Diallo	-	Student	Fofodoro	
336	19 Oct.	Salimatou Bah	-	Citizen	Fofodoro	
337	19 Oct.	Ibrahima Karé Diallo	Area office	Manager	Karé	
338	19 Oct.	Mamadou Dian Diallo	Area office	Manager	Karé	622 78 77 10
339	19 Oct.	Alceny Bah	Area office	Manager	Yala Dané	
340	19 Oct.	Mamadou Ouri Bah	-	Citizen	Yala Dané	
341	19 Oct.	Almamy Mamadou Bah	Mosque	Imam	Yala Dané	
342	19 Oct.	Mamadou Ouri Bailo Bah	-	Citizen	Yala Dané	
343	19 Oct.	Moktar Bah	-	Citizen	Yala Dané	
344	19 Oct.	Souleymane Bah	-	Citizen	Yala Dané	622 78 98 58
345	19 Oct.	Mamadou Bhoie Bah	-	Citizen	Yala Dané	622 78 98 57
346	19 Oct.	Modi Idjou Bah	-	Manager	Wendou Baga	631 85 75 93
347	19 Oct.	Mamadou alpha Bah	-	Citizen	Wendou Baga	
348	19 Oct.	Thierno Souleymane Bah	Council of Elders	Elder	Wendou Baga	
349	19 Oct.	Mamadou Mayatou Bah	-	Citizen	Wendou Baga	
350	19 Oct.	Ibrahima Bah	-	Manager	Petoun Nyalbi	
351	19 Oct.	Mamadou Mouktar bah	-	Citizen	Petoun Nyalbi	
352	19 Oct.	Alceny Bah	-	Citizen	Petoun Nyalbi	666 95 56 93
353	19 Oct.	Amadou Bah	-	Manager	Pora Hodho	
354	19 Oct.	Mamadou Saliou Barry	Council of Elders	Elder	Pora Hodho	
355	19 Oct.	Souleymane Bah	Mosque	Muezzin	Pora Hodho	
356	19 Oct.	Mamadou Salio Bah	APAE	Member	Pora Hodho	
357	19 Oct.	Amadou Dian Bah	Bureau de la jeunesse	Secretary of Youth	Pora Hodho	
358	19 Oct.	Alhassane Diallo	-	Manager	Sintiourou Tiewere	
359	19 Oct.	Mamadou Tiewere Diallo	-	Citizen	Sintiourou Tiewere	
360	19 Oct.	Mariam Bah	-	Citizen	Sintiourou Tiewere	
361	19 Oct.	Saïkou Timbi Diallo	-	Manager	Sintiourou Saïkou Timbi	
362	19 Oct.	Malik Bah	-	Manager	Pora Bala	

363	19 Oct.	Ibrahima Bah	-	Citizen	Pora Bala	
364	19 Oct.	Alpha Oumar Diallo	-	Manager	Filo Bowé	
365	19 Oct.	Mamadou Bobo Diallo	Mosque	Imam	Filo Bowé	
366	19 Oct.	Moustapha Diallo	-	Citizen	Filo Bowé	621 97 82 50
367	19 Oct.	Amadou Dane Diallo	District office	President	Kourakoto	
368	19 Oct.	Mamadou Saraf Diallo	District office	Member and ATS	Kourakoto	628 05 86 34
369	19 Oct.	Mamadou Lamarana Bah	-	Citizen	Kourakoto	
370	19 Oct.	Djibril Diallo	Council of Elders	Elder	Kourakoto	
371	19 Oct.	Abdoulaye Bah	Area office	Assistant Area Manager	Gueguéré	
372	19 Oct.	Thierno Mamadou Oury Bah	Mosque	Imam	Gueguéré	
373	19 Oct.	Amadou Sadjo Bah	Council of Elders	Elder	Gueguéré	
374	19 Oct.	Thierno Sidi Camara	Council of Elders	Elder	Fassaly Belenderé	
375	19 Oct.	Mamadou Aliou Diallo	Council of Elders	Elder	Fassaly Belenderé	
376	19 Oct.	Abdoulaye Diakité	-	Young person	Fassaly Belenderé	
377	19 Oct.	Ibrahima Coulibaly	-	Young person	Fassaly Belenderé	
378	19 Oct.	Mamadou Dian Diallo	Mosque	Imam	Bandodji Tougouyé	
379	19 Oct.	Thierno Dia Ndiaye	-	Area Manager	Bandodji Nyalbi	
380	19 Oct.	Ousmane Ndiaye	Area office	Area Manager	Bandodji Nyalbi	
381	19 Oct.	Mamadou Saliou Bah	Council of Elders	Elder	Bandodji Nyalbi	
382	19 Oct.	Mamadou Biko Camara	Council of Elders	Elder	Bandodji Nyalbi	
383	19 Oct.	Mamadou yaya bah	-	Young person	Bandodji Nyalbi	
384	19 Oct.	Lamarana Camara	-	Young person	Bandodji Nyalbi	
385	19 Oct.	Abderahman Ndiaye	-	Young person	Bandodji Nyalbi	
386	19 Oct.	Abdoulaye Bah 1	-	Young person	Bandodji Nyalbi	
387	19 Oct.	Abdoulaye Bah 2	-	Young person	Bandodji Nyalbi	
388	19 Oct.	Mamadou Hadi Bah	-	Young person	Bandodji Nyalbi	
389	19 Oct.	Mamadou Pathé Diallo	-	Young person	Bandodji Nyalbi	
390	19 Oct.	Kanfori Bangoura	Council of Elders	Elder	Bosseré	
391	19 Oct.	Mohamed ALI Camara	Council of Elders	Elder	Bosseré	

392	19 Oct.	Samba Keita	Council of Elders	Elder	Bosseré	
393	19 Oct.	SouleymaneDiallo	Council of Elders	Elder	Bosseré	
394	19 Oct.	Mamadou Saliou Bangoura	-	Young person	Bosseré	
395	19 Oct.	Djibril Bah	-	Young person	Bosseré	
396	19 Oct.	Djenebou Bah	-	Woman	Bosseré	
397	19 Oct.	Aïssatou Malado Touré	-	Woman	Bosseré	
398	19 Oct.	Mariama Bienta Diallo	-	Woman	Bosseré	
399	19 Oct.	Aïssatou Diallo	-	Woman	Bosseré	
400	19 Oct.	Amadou Barry	-	Citizen	Boundi Foullasso	
401	19 Oct.	Young person	-	Citizen	Boundi Foullasso	
402	19 Oct.	4 women	-	Citizen	Boundi Foullasso	
403	19 Oct.	Ibrahima Diallo	District office	Assistant to the Youth Representative	Madina Djan	
404	19 Oct.	Amadou Sara Diallo	District office	Youth Representative	Madina Djan	628 75 32 66
405	19 Oct.	Samba Diouma Diallo	District office	Commune police	Madina Djan	
406	19 Oct.	Mamadou Samba Camara	-	Citizen	Madina Djan	
407	19 Oct.	Samba Diouma Diallo	-	Citizen	Madina Djan	
408	19 Oct.	Mamadou Baïlo Diallo	Council of Elders	Elder	Madina Djan	
409	19 Oct.	Amadou Ouri Diallo "Bembeya"	-	Representative of Village Chief	Bembeya	631 80 34 44
410	19 Oct.	Abdoulaye Bah	-	Elder	Sintiourou Abudlaye	622 23 76 86
411	19 Oct.	Boubacar Hotia Diallo	-	Veterinarian, interim with Livestock Industry technical service	Missira	
412	19 Oct.	Alpha Oumar Diakite	Subprefecture	Subprefect	Missira	622 40 49 34
413	19 Oct.	Mamadou Bhoie Bah	Commune	Mayor (absent)	Missira	621 70 07 07
414	19 Oct.	Amid Diallo	Commune	Treasurer	Missira	
415	19 Oct.	Bailo Cissé	Commune	Councilor	Missira	
416	19 Oct.	Ibrahima Diallo	Area office	Manager	Missira	
417	19 Oct.	Moussa Diop	-	Secretary RPG	Missira	
418	19 Oct.	Alpha Talibe Diop	-	Secretary GPT	Missira	
419	20 Oct.	El Hadje Dioulde Diallo	Mayor's Office	Mayor	Sangarédi	

420	20 Oct.	Mr. Tounkara	Mayor's Office	General Secretary	sangarédi	
421	21 Oct.	Samba Diouma Diallo	-	Guide	Madina Djan	
422	21 Oct.	Thierno Mahmaoud Diallo	Mosque	Imam	Bourreti	
423	21 Oct.	Boubacar Camara	Bureau du district	Member	Bourreti	
424	21 Oct.	Mamadou Alpha Bah	-	Second doyen	Ndantari (Daramagnaki)	
425	21 Oct.	Alassane Camara	Bureau de la jeunesse	Youth Representative	Ndantari (Daramagnaki)	
426	21 Oct.	Ibrahima Sorry Bah	-	Doyen	Sitako	
427	21 Oct.	Amatamou Bah	Bureau de la jeunesse	Youth Representative	Sitako	620 18 81 01
428	21 Oct.	Mamoudou Bah	-	Manager	Sintiourou Daroul Diandian	
429	21 Oct.	Hiero dioulde Sane	Council of Elders	Elder	Kourani	
430	21 Oct.	Hiero Djouma Mane	Council of Elders	Elder	Kourani	
431	21 Oct.	Mama Saliou Toure	-	Citizen	Kourani	
432	21 Oct.	Diambobo Barry	-	Citizen	Thiankoye	664 82 45 80
433	21 Oct.	Manga Yero Bah	Area office	Manager	Toumbeta	
434	21 Oct.	Mamadou alpha Bah	Council of Elders	Elder	Toumbeta	
435	21 Oct.	Mamadou Bhoeye Sow	Council of Elders	Elder	Diandian	
436	21 Oct.	Mamadou Yaya Bah	Council of Elders	Elder	Diandian	
437	21 Oct.	Ibrahima Bah	Council of Elders	Elder	Diandian	
438	21 Oct.	Mamadou Gando Sow	Bureau de la jeunesse	Youth Representative	Diandian	
439	21 Oct.	Mamadou Bhoeye Bah	Area office	Security	Diandian	
440	21 Oct.	Mamadou Bailo Bah	-	Citizen	Diandian	
441	21 Oct.	Mamadou Issa Bah	-	Citizen	Diandian	
442	21 Oct.	Djibril Diallo	Elementary school	Teacher	Diandian	
443	21 Oct.	6 other people	-	Citizens	Diandian	
444	21 Oct.	Mamadou Gando Bah	-	Technical Health Officer	Gaïdhe Djeli	
445	21 Oct.	Amadou Ouri Bah	Council of Elders	Elder	Hounsire	
446	21 Oct.	Alhassane Bah	Area office	Manager, also Secretary of Diandian district	Limbiko	631 99 94 92
447	21 Oct.	Amadou Seikou Ba	-	Doyen	Kareda Bel	
448	21 Oct.	Mamadou Ouri Bah	-	Citizen	Kareda Bel	

449	21 Oct.	Mamadou Saliou Bah	-	Recent graduate from <i>lycée</i>	Kareda Bel	
450	21 Oct.	Amadou Bailo Bah	Area office	Manager, also Secretary of Madina Dian district	Missira	
451	21 Oct.	Irabhima Lamarana Balde	-	Citizen	Pora KP 130	
452	21 Oct.	Thierno Lama Souka Bah	Council of Elders	Elder	Kalinko Poutaï	
453	21 Oct.	Yero Djouma Diallo	Area office	Manager	Gnangaba	
454	21 Oct.	Amadou Ouri Maro	-	Citizen	Gnangaba	
455	21 Oct.	Yero Diallo	-	Citizen	Gnangaba	
456	21 Oct.	Mamadou Aliou Diallo	Area office	Member	Gnangaba	
457	21 Oct.	Mamadou Oudi Bah	Area office	Manager	Kalinko ley	
458	21 Oct.	Moustapha Bah	-	Manager	Sintiourou madina	
459	21 Oct.	Amadou Tidiane	-	Manager	Sintiourou hafia	
460	21 Oct.	Mamadou Moumini Bah	Area office	Assistant to the President of Youth	Kalinko ley	
461	21 Oct.	Thierno Mamadou Aliou	Council of Elders	Elder	Kalinko ley	
462	21 Oct.	Lama Toure	Area office	Manager	Telibofi	
463	21 Oct.	Negue Diallo	Council of Elders	Elder	Telibofi	
464	21 Oct.	Mamadou Foula Diallo	-	Manager	Carrefour Gnangaba	
465	21 Oct.	Ibrahima Sory Sidibe	-	Manager	Kankalaré	
466	21 Oct.	Samba Sidibe	Area office	Manager of hamlets Parawi Saleah + Parawi	Parawi Saleah 1	
467	21 Oct.	Younoussa Sidibe	-	Founder of Parawi	Parawi Saleah 1	
468	21 Oct.	Thierno Sidibe	-	Citizen	Parawi Saleah 1	
469	21 Oct.	Harouna Sidibe	-	Citizen	Parawi Saleah 1	
470	21 Oct.	Dian Sadjo Touré	-	Manager	Parawi Saleah 4	
471	21 Oct.	Yakouba Keita	-	Manager	Parawi	
472	21 Oct.	Fode Bailo Diallo	-	Manager	Feto Parawi 2	
473	21 Oct.	Sara Mané	-	Citizen	Feto Parawi 2	
474	21 Oct.	Pété Camara	-	Manager	Sintiourou Barkéré	
475	21 Oct.	Mariama Keïta	-	Citizen	Sintiourou Barkéré	
476	21 Oct.	Nene Galé Camara	-	Citizen	Sintiourou Barkéré	

477	21 Oct.	Adama Bah	-	Citizen	Sintiourou Barkéré	
478	21 Oct.	Ansata dané Camara	-	Citizen	Sintiourou Barkéré	
479	21 Oct.	Mariam Koulibali	-	Citizen	Sintiourou Barkéré	
480	21 Oct.	Ramatoulaye Camara	-	Citizen	Sintiourou Barkéré	
481	21 Oct.	Fode Baïlo Diallo	Area office	Manager	Feto Parawi	
482	21 Oct.	Facinet Camara	Subprefect Department of Commerce and Small Business	Director	Kamsar	620 90 91 41
483	21 Oct.	Mory Laye Foté Soumah	Regional coordination of Boké artisanal fishers	Regional Coordinateur	Kamsar	664 42 37 00
484	21 Oct.	Aboubacar Camara	Port of Kamsar	Vice-President	Kamsar	664 85 36 28
485	21 Oct.	Fodé Berete Camara	Port of Kamsar	Manager	Kamsar	666 17 42 13
486	21 Oct.	Mamadou Camara	Prefect Department of Fishing	Director	Kamsar	657 42 45 88
487	21 Oct.	Jean Faustin Camara	Prefect Department of Fishing	Assistant Director	Kamsar	664 02 41 03
488	21 Oct.	Mamadouba Sogueta Camara	Commune of Kamsar	General Secretary	Kamsar	628 49 20 03
489	21 Oct.	Amadou Sissoko	Chamber of Commerce	Head of Conflicts and Social Affairs	Kamsar	657 54 83 16
490	21 Oct.	Youssouf Bangoura	Chamber of Commerce	Assistant to the Head of Conflicts and Social Affairs	Kamsar	664 32 84 86
491	21 Oct.	El Hadj Boubacar Dara Baldé	Chamber of Commerce	President	Kamsar	664 42 51 29
492	21 Oct.	Oumou Coya Camara	Association des femmes du marché Sahara de Kamsar	President	Kamsar	-
493	22 Oct.	Koumbassa Sanoussy	TPE SONECI	Personnel Manager	Kamsar	664 32 78 15
494	22 Oct.	Ahmed Yomba Tore	TPE SONECI	Accountant	Kamsar	664 34 70 27
495	22 Oct.	Abdulaye Sané	TPE SOCOREM	Personnel Manager	Kamsar	664 33 24 43
496	22 Oct.	Kadiatou Sow	TPE SONECI	Secretary	Kamsar	666 62 00 57
497	22 Oct.	Mariam Barry Camara	TPE SOCANE	Member	Kamsar	664 33 43 23
498	22 Oct.	Seidouba Keita	TPE SOCANE	Member	Kamsar	664 00 83 00
499	22 Oct.	Sory Sano	TPE SOCOREM	Member	Kamsar	664 04 11 05
500	22 Oct.	Asma Diaby	TPE SOCANE	Member	Kamsar	655 49 63 56
501	22 Oct.	James Dean Mansaré	TPE SONECI	President	Kamsar	664 44 31 82
502	22 Oct.	Lamine Soumah	TPE SOCOREM	Member	Kamsar	664 33 80 29
503	22 Oct.	Mariam Diallo	TPE SOCOREM	Member	Kamsar	657 43 03 89

504	22 Oct.	Gnama Condé	Association des femmes enseignantes pour le développement socio-éducatif	President	Kamsar	622 69 50 49
505	22 Oct.	Lama Sidiki Doumbouya	Bureau de la société civile	Chairman	Kamsar	620 90 91 37
506	22 Oct.	M'mah Bangoura	Bureau de la société civile	Deputy Chairman	Kamsar	664 36 55 11
507	22 Oct.	Bangoura saidou ba	Subprefecture	Deputy Subprefect	Daramagnaki	
508	22 Oct.	Mamadou Yébé Diallo	Mayor's Office	Second Deputy Mayor	Daramagnaki	
509	23 Oct.	M'Balou Traoré	School delegation (Secondary-level education)	Archivist	Kamsar	621 41 68 48
510	23 Oct.	Yaya Camara	School delegation (Secondary-level education)	Delegate	Kamsar	664 77 69 04
511	23 Oct.	Youssef Diallo	School delegation (Secondary-level education)	Deputy Delegate	Kamsar	666 47 06 90
512	23 Oct.	Tidjane Soumah	School delegation (Secondary-level education)	Secretary	Kamsar	664 92 26 10
513	23 Oct.	Salif Bangoura	School delegation (Secondary-level education)	Second Archivist	Kamsar	666 09 79 92
514	23 Oct.	Mamadou Bangoura	NGO "Aigles"	Coordinator	Kamsar	664 96 70 86
515	23 Oct.	Mamadou Barry	NGO "Aigles"	Head of Training	Kamsar	664 70 36 55
516	23 Oct.	Aly Dembo Camara	NGO "Aigles"	Administrative Secretary	Kamsar	664 83 51 63
517	23 Oct.	Kémoko Touré	CBG	General Manager	Kamsar	
518	24 Oct.	Robert Max Aublet	CBG	Head of Communications	Kamsar	
519	24 Oct.	Dominique Traoré	CBG	Head of Taxation	Kamsar	
520	24 Oct.	Ms. Dramé Aïcha Barry	CBG	Administrative Director	Kamsar	
521	24 Oct.	Alpha Keita	CBG	In Charge of Community Projects	Kamsar	
522	24 Oct.	Ms. Sangare	CBG	Community Projects	Kamsar	

ANNEXE 7 – CONSULTATIONS DURING BIOLOGICAL SCOPING MISSION

Kamsar

Mr. Jean-Jacques Lagrange, former boat pilot for CBG, Oct. 14, 2013

Mr. Moussa Bangoura, fisherman, Île de Taïgbé, Terekhiné camp, Oct. 15, 2013

Messrs. Aboubacar and Sayon Bangoura, fishermen, Île de Taïgbé, Memsengren camp, Oct. 15, 2013

Sangarédi

Sangarédi Subprefecture, Oct. 10, 2013

Ms. Mariame Diallo, Director, Environment

Mr. Fodé Mamadou Sacko, Manager, Service des Eaux et Forêts

Mr. Salia Bah, Assistant to the Manager, Service des Eaux et Forêts