Environmental and Social Impact Assessment (ESIA) Report

Koloma Administrative City Project
Koloma, Conakry, Guinea

ACC UK Group Ltd

Project number: 60713383

31 May 2024

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
00	15/12/2023	Initial Draft to ACC	Y	Iain Bell	Regional Director
01	10/01/2024	First Draft to ACC	Y	Iain Bell	Regional Director
02	18/01/2024	Second Draft to ACC	Y	Iain Bell	Regional Director
03	07/02/2024	Third Draft to ACC	Y	Iain Bell	Regional Director
04	31/05/2024	Forth Draft to ACC	Y	Iain Bell	Regional Director

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EXECUTIVE SUMMARY

Introduction

AECOM Limited (AECOM) has been appointed by ACC (the "*Design & Build Contractor*" or the Client) to undertake the work necessary to prepare an Environmental and Social Impact Assessment (ESIA) in accordance with the Applicable Lenders Standards, including the Equator Principles 4 (2020), Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (The "OECD Common Approaches") 2016, the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability (2012) and the accompanying Environmental, Health, and Safety Guidelines (the 'EHS Guidelines') for the Project.

This ESIA Report sets out the applicable requirements of the Lenders' Standards for this type of the Project, describes the Project and it's components sufficient to undertake the assessment of impacts; defines the methodology and approach to be used in assessing impacts; identify the likely key environmental and social issues associated with the construction and operation phases of the Project; frame the scope for the baseline studies that support the ESIA; and identify potential Project impacts and proposes mitigation measures against the identified impacts.

A national Environmental and Social Impact Assessment (EIES) Report was prepared in November 2022 by Administration et Controle des Grands Projects (ACGP) for the Project in line with the national legislation. An Environmental Conformity Certificate was obtained as reported by SONAPI during the meeting held on 13th September 2023 and later the conformity was put on hold by the authorities for this Project. Another consultancy company, Chemas Consulting Group LLC., was appointed by SONAPI for the development of 2 Environmental and Social Impact Assessments (2 ESIAs), 2 Involuntary Resettlement Plans (2 IRPs), 1 Livelihood Restoration Plan (LRP) and a Socioeconomic Audit/Reference Situation (ASE/SR) as part of the Koloma Administrative City Project (PCCAK) in line with the national legislation for both for 9 ha of the area allocated for SONAPI (the same Project area which is subject of this ESIA study) and Koloma Directional Center (CDK) area which covers around 202 ha[1].

Project Description

The Project site is located on unoccupied land in Ratoma in the north-east of Conakry. The proposed development site ('Site') which is to house the Administrative City Construction Project covers an area of approximately 7 hectares (total site area is 70,591 square metres of surface area) and is located on a larger area of historically cleared brownfield land owned by the Guinean state that totals approximately 202 ha. The Project includes the development of twelve 7 storey buildings, two car park buildings, parking areas, utilities, restaurants, an auditorium, heritage pavilion and amphitheatre.

The Site is currently unoccupied and in the possession of the State through a land title N°09981/2007/TF, and reserved for constructions for public administration, republican institutions, diplomatic missions. Having said this, the Project site was historically occupied and subject to two evictions which occurred in 1998 and 2019. These evictions were carried out by the Ministry of Habitat and Construction and have been the subject of criticism by local communities and NGOs such as Human Rights Watch. SONAPI explained to AECOM that some compensation was awarded for evictions in 1998, however this is yet to be verified by the community. SONAPI has however confirmed that no compensation has yet been paid to displaced families who were evicted in 2019. SONAPI, with support from its consultant Chemas Consulting Ltd, has now recently begun engaging with evicted families and their representative group, "Collectif des déguerpis" (The Collective of the Evicted) with the intention of retrospectively paying compensation in the form of cash and replacement land and providing livelihood support.

IFC's Policy on Environmental and Social Sustainability (2012) uses a process of environmental and social categorization (A, B, C) to reflect the magnitude of risks and impacts. A very similar approach is set out in the OECD's Common Approaches. AECOM consider that the Project may meet the definition of Category A given the project has significant social risks and impacts associated with resettlement and livelihood restoration.

[1] It is noteworthy to mention that the surface areas mentioned in the Chemas Consultancy's ESIAs and associated studies (9 ha and 202 ha) might be slightly different from the areas considered within the scope of this ESIA study. Once the reports become publicly available and completed, the surface areas need to be revisited and confirmed.

Stakeholder Engagement

Stakeholder engagement activities for the Project have been undertaken as part of the ESIA Report preparation. Engagement undertaken to date included key informant interviews and small group meetings. Relevant stakeholders were identified including governmental authorities and non-governmental organizations (NGOs), neighbouring land users (particularly related to impacts from the Project activities) and the general public. The list of identified stakeholders are presented in *Section 5:Stakeholder Engagement* in this ESIA report. A Stakeholder Engagement Plan (SEP) has been prepared for the Project which sets out the process for undertaking engagement and consultation with stakeholders. The discussions made/information obtained during the face-to-face meetings are presented in relevant chapters of the ESIA report. Further details of the stakeholder engagement activities and the process for undertaking engagement and consultation with stakeholders are provided in the Project SEP which is a separate document.

Scope of the ESIA and Baseline Data Collection

This ESIA has assessed the potential impacts from the construction and operation of the proposed Project on the following environmental and socio-economic topics:

- Air quality
- Greenhouse gas assessment and climate change
- Biodiversity
- Noise and vibration
- Surface water, groundwater, and soil
- Waste management
- Traffic and transport
- Socio economic, community health and safety as well as labour and working conditions
- Archaeology and cultural heritage
- Cumulative impact assessment

Primary and secondary data have been collected for the Project Area of Influence to characterise the baseline conditions and identify sensitive receptors. Baseline field surveys included stakeholder interviews, ecological walkover survey, traffic and air, noise and water sampling. Climate Change Risk Assessment and Human Rights Screening have also been carried out and presented in the Appendices of this ESIA report.

Summary of the ESIA Study

The significance of potential Project impacts has been assessed taking into account embedded mitigation (including good international industry practices) that will be implemented by the Project. Where necessary, this ESIA also proposed additional mitigation measures to reduce the potential impacts to as low as reasonably practicable which are described in each respective section of this ESIA report.

Overall, the ESIA found that with implementation of the full suite of mitigation measures, the construction and operation of the Project will result in insignificant or low significance impacts except hazardous waste management, traffic and transport, climate change and social which are further discussed below.

Due to the lack of specialised facilities in the country, management of construction hazardous waste has been assessed as high adverse significance. In the absence of suitable waste management facilities in Guinea, any project that generate hazardous waste would have similar high adverse impact come along provision of adequate hazardous waste management facilities which is a strategic issue that need to be addressed by the national Government.

The anticipated level of additional vehicle movements during the construction phase (as an increase to baseline flows) has been set out in this ESIA report and the forecast level of construction traffic along this link is expected to result in a high degree of change a (with maximum increase in traffic of 592.51% and 182.92% during the worst-case AM development peak hour for Location 1 and 2, respectively). The level of impact is expected to be high and therefore significant**.** The residual impact is expected to remain due to the uncertainties of the proposed additional mitigations at this stage. The Project company is currently exploring varying work shifts (as per the proposed additional mitigation list) with respect to the peak number of construction workers. As the construction workforce approaches to its peak, the Project company will introduce and/or provide varying shifts to reduce vehicle movements to reduce the residual impact on the identified receptors.

Additionally, the greenhouse gas assessment was undertaken within the scope of the ESIA Study and has provided a benchmarked quantitative assessment of the emissions associated to the construction and operational use of the Project. When contextualised against the required emissions levels in order to be on track to meet the 1.5ºC Paris Agreement global temperature rise limit, the emissions that the Project contributes towards the global targets are not significant and so the impact will be low adverse. Considering the climate change projections for the region as well as the construction and operational context of the Project, a number of 'Significant' climate change risks were identified, that even with these embedded controls and additional

adaptation measures being implemented, the identified risks still pose a threat to the Project. As such it is vital the adaptation defined in this ESIA report are implemented from the onset of the construction and operational phases of the Project. Doing so will help reduce the risk of avoidable damage to equipment and assets, as well are preventable harm to personnels' health and safety.

In terms of social impacts, as mentioned above, the wider Koloma area, including the Project Site was cleared of its occupants in an eviction in 2019 (following an earlier eviction in 1998). It should be noted that the impacts on the community associated with displacement and associated violence have already occurred. The social receptors, the displaced community, has a high sensitivity; therefore the significance of the resulting impact is High Adverse. Chemas is developing Resettlement Action Plan (RAP) for the Administrative City Project Site as well as a separate RAP for the wider Koloma area and an accompanying Livelihood Restoration Plan. The plans are based on the principles of IFC PS5; however, it is acknowledged that complete compliance with IFC PS5 will be impossible due to the time that has passed since the eviction. The implementation of the RAP will go a long way to helping the lives of those affected however the trauma and stress which has occurred as a result of the eviction cannot be completely undone. Assuming the full implementation of the RAP and all supporting measures (such as effective monitoring and evaluation) the residual impact is still considered High Adverse given that the impacts have already occurred.

In the light of the abovementioned discussion, the summary of residual impacts for each environmental and social aspects covered within this ESIA study are presented further in table below.

Aspect	Project Phase/Stage	Impact ID	Impact	Residual Impact
Air Quality	Construction	AQ01	Dust soiling affecting amenity and vegetation on the surrounding existing residential areas, existing educational / research facilities, and existing Places of Worship.	Low Adverse
		AQ02	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of construction site from construction plant and road traffic on surrounding road network	Negligible
	Operational	AQ03	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of site from emergency generators	Negligible
Biodiversity	Construction	TE01	Physical Loss, Fragmentation and/ or Reduction/Loss of Ecological Function: • Demoudoulah and Kakimbo Forest Reserves • Konkuré & Ile Blanc IBA / Ramsar Sites • Urban mixed habitats, including bare ground, areas of herbaceous coverage	• Low Adverse
		TE02	Decrease in Abundance and/or Conservation Status of Plant Species	Low Beneficial
		TE03	Disturbance to Individuals and/or Populations Reductions and/or Conservation Status of Animal Species; • Common mammals, reptiles, amphibians and birds • African Manatee (VU) • Bottlenose Dolphin (DD) • Olive ridley sea turtle (EN)	Low Adverse
	Operational	TE04	Physical Loss, Fragmentation and/ or Reduction/Loss of Ecological Function: • Demoudoulah and Kakimbo Forest Reserves • Konkuré & Ile Blanc IBA / Ramsar Sites • Urban mixed habitats, including bare ground, areas of herbaceous coverage	• Low Adverse
		TE05	Decrease in Abundance and/or Conservation Status of Plant Species; Common plant species (mainly invasive species)	Low Beneficial
		TE06	Disturbance to Individuals and/or Populations Reductions and/or Conservation Status of Animal Species ; • Common mammals, reptiles, amphibians and birds • African Manatee (VU) • Bottlenose Dolphin (DD)	Low Adverse

Aspect	Project Phase/Stage	Impact ID	Impact	Residual Impact
			• Olive ridley sea turtle (EN)	
Noise and vibration	Construction	NV01	Temporary disturbance from works noise	Negligible/Low Adverse
		NV02	Temporary disturbance from traffic noise	Low Adverse
	Operational	NV03	Permanent disturbance from building services plant, HVAC systems, emergency/backup power generators, wastewater handling units and wastewater treatment plant	Low Adverse
Surface water, groundwater, and soil	Construction	SW01	Increased flood risk and change in flow regime	Low/ Negligible Adverse
		SW02	Degradation of water quality due to increased turbidity	Low Adverse
		S01	Soil erosion, compaction, and loss	Low Adverse
		SW04	Water source and supply	Low Adverse
	Construction and Operational	S02	Degradation of soil quality due to increased pollutants	Low Adverse
		GW01	Degradation of groundwater quality due to increased pollutants	Low Adverse
		SW03	Degradation of surface water quality due to increased pollutants	Low Adverse
	Operational	SW05	Change of flow regime and flood risk	Low Adverse
		SW06	Water source and supply	Low Adverse
		SW07	Pollution to surface water and groundwater quality due to wastewater	Low Adverse
Waste Management	Construction	WM01	Management of hazardous waste	High (Significant)
		WM02	Management of non-hazardous waste	Low Adverse
		WM03	Management of inert waste	Low Adverse
	Operation	WM04	Management of hazardous waste	High (Significant)
		WM05	Management of non-hazardous waste	Low Adverse
Traffic and Transport	Construction	TR01 - Location 1	Increase in traffic movements, as a result of construction Heavy Goods Vehicles (HGVs) and construction staff vehicles Increase in traffic movements	High (Significant)
		TR02- Location 2		High (Significant)
		TR03- Location 3		Low Adverse
		TR04 - Location 4		Negligible Adverse
		TR05- Location 5		Negligible Adverse
Socio-economic	Pre-Design Phase	SE 01	Historic Eviction & Displacement	High Adverse
	Construction	SE 02	Temporary increased local employment and supply demand	Moderate Beneficial
		SE 03	Project-induced population immigration	Low Adverse
		SE 04	Potential interaction between workforce and communities.	Low Adverse

Aspect	Project Phase/Stage	Impact ID	Impact	Residual Impact
		SE 05	Poor labour and working conditions	Negligible Adverse
		SE 06	Capacity strain of local public services and facilities	Negligible Adverse
		SE 07	Potential security related human rights violations	Low Adverse
		SE 08	Road Safety and disruption to pedestrian access	Low Adverse
		SE 09	Worker welfare and Sanitation	Negligible Adverse
		SE 10	Access to utilities which cross the site	Low Adverse
	Operation	SE 11	Increased local employment, local opportunities and supply demand	Moderate Beneficial
		SE 12	Improved and more efficient government facilities and services	Moderate Beneficial
		SE 13	Improved working conditions for government workforce	Moderate Beneficial
		SE 14	Capacity strain of local public services and facilities	Low Adverse
		SE 15	Economic Influx and Inflation during operation	Low Adverse
		SE 16	Loss of customer base and loss of business at original sites	Low Adverse
		SE 17	Potential security related human rights violations	Low Adverse
Archaeological and cultural heritage	Construction	ARCH 01	Disturbance, damage, removal	Low Adverse
		SACR 01 and 02	Changes to visual amenity and tranquillity	Negligible Adverse
	Operation	SACR 01 and 02	Changes to visual amenity and tranquillity	Negligible Adverse

1. Introduction

1.1 Background

The ACC UK - ACC GUINEE Consortium , wholly owned subsidiaries of ACC Group Ltd and herein to be referred to as Arabian Construction Company (ACC) has been awarded a design and build contract for the development of the Administrative City Construction Project of Koloma, a new office campus in Conakry, Guinea (the Project), by the Société Nationale d'Aménagement et la Promotion Immobilière de Guinée (SONAPI). SONAPI is a vehicle of the Presidency of the Republic, under the financial supervision of the Ministry of Economy and Finance of Guinea, whose role it is to implement and monitor government policy on land development and the construction of social, economic and residential housing. The Ministry of Economy and Finance of Guinea are seeking international funding to finance payments for the development of the Project. The location of the proposed Administrative City Project is shown in Figure 1-1.

AECOM Limited (AECOM) has been appointed by ACC (the "*Design & Build Contractor*" or the Client) to undertake the work necessary to prepare an Environmental and Social Impact Assessment (ESIA) in accordance with the Applicable Lenders Standards, including the Equator Principles 4 (2020), Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (The "OECD Common Approaches") 2016, the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability (2012) and the accompanying Environmental, Health, and Safety Guidelines (the 'EHS Guidelines') for the Project.

A national Environmental and Social Impact Assessment (EIES) Report was prepared in November 2022 by Administration et Controle des Grands Projects (ACGP) for the Project in line with the national legislation. An Environmental Conformity Certificate was obtained as reported by SONAPI during the meeting held on 13th September 2023 and later the conformity was put on hold by the authorities for this Project.

Another consultancy company, Chemas Consulting Group LLC., was appointed by SONAPI for the development of 2 Environmental and Social Impact Assessments (2 ESIAs), 2 Involuntary Resettlement Plans (2 IRPs), 1 Livelihood Restoration Plan (LRP) and a Socioeconomic Audit/Reference Situation (ASE/SR) as part of the Koloma Administrative City Project (PCCAK) in line with the national legislation for both for 9 ha of the area allocated for SONAPI (the same Project area which is subject of this ESIA study) and Koloma Directional Center (CDK) area which covers around 202 ha[2].

1.2 Purpose and Scope of this Report

The purpose of this ESIA Report is to:

- Set out the requirements of the Applicable Lenders' Standards for the Project;
- Provide a Project description, sufficient to undertake the assessment of impacts;
- Describe the methodology and approach to be used in assessing impacts;
- Describe the environmental and social baseline conditions within the Project Area of Influence;
- Identify the likely key environmental and social impacts associated with the construction and commissioning, operation and maintenance, and decommissioning phases of the Project; and
- Identify and assess Project impacts and develop appropriate mitigation measures.

This scope of this ESIA study has been determined based on a review of the existing national Environmental and Social Impact Assessment (EIES) Study, a terms of reference provided by the Lenders, and AECOM's and ACC's knowledge of similar urban development projects.

[2] It is noteworthy to mention that the surface areas mentioned in the Chemas Consultancy's ESIAs and associated studies (9 ha and 202 ha) might be slightly different from the areas considered within the scope of this ESIA study. Once the reports become publicly available and completed, the surface areas need to be revisited and confirmed.

1.3 Project Team

1.3.1 Project Proponent

SONAPI is the "*Loan Beneficiary"*) under the financial supervision of the Ministry of Economy and Finance of Guinea (the "*Borrower*"). SONAPI's role is to implement and monitor government policy on land development and the construction of social, economic and residential housing. SONAPI appointed Arabian Construction Company (ACC the "*Design & Build Contractor*") with a design and build contract for the development of the Project.

ACC's scope of works includes:

- Facilitate arrangement of Export Finance and fulfil related UKEF procurement compliance only;
- Design and engineering;
- Construction works including all building services and fixed finishes; and
- Testing and Commissioning prior to handover.

1.3.2 The Project Lenders

The Project Lenders are UK Export Finance (UKEF - the operating name of the Export Credits Guarantee Department which is the United Kingdom's export credit agency and a ministerial department of His Majesty's Government) and Deutsche Bank AG.

1.3.3 Environmental and Social Consultants

ACC has commissioned AECOM to lead the Project ESIA Study, associated consultation and reporting to align with the Applicable Lenders' Standards. AECOM works with client teams in designing, planning and implementing ESIAs which meet national and international standards and undertake all aspects of ESIA including: baseline data gathering, preparation of Stakeholder Engagement Plans (SEPs), engagement with affected communities and stakeholders; assessment of social and environmental impacts, defining mitigation and management plans; consultation, disclosure and advice on regulatory ESIA requirements and interaction with project funders.

AECOM has partnered with Société d'Expertises Environnementales et Sociales (SEES) in Guinea who provide support in undertaking field surveys and stakeholder engagement activities in order to assess and produce the documentation required for the ESIA. SEES is a consultancy based in Conakry with over 20 years experience in environmental and social studies and have supported both national and international clients.

1.4 Project Categorisation

IFC's Policy on Environmental and Social Sustainability (2012) uses a process of environmental and social categorization (A, B, C) to reflect the magnitude of risks and impacts. A very similar approach is set out in the OECD's Common Approaches. AECOM consider that the Project may meet the definition of Category A given the project has significant social risks and impacts associated with resettlement and livelihood restoration.

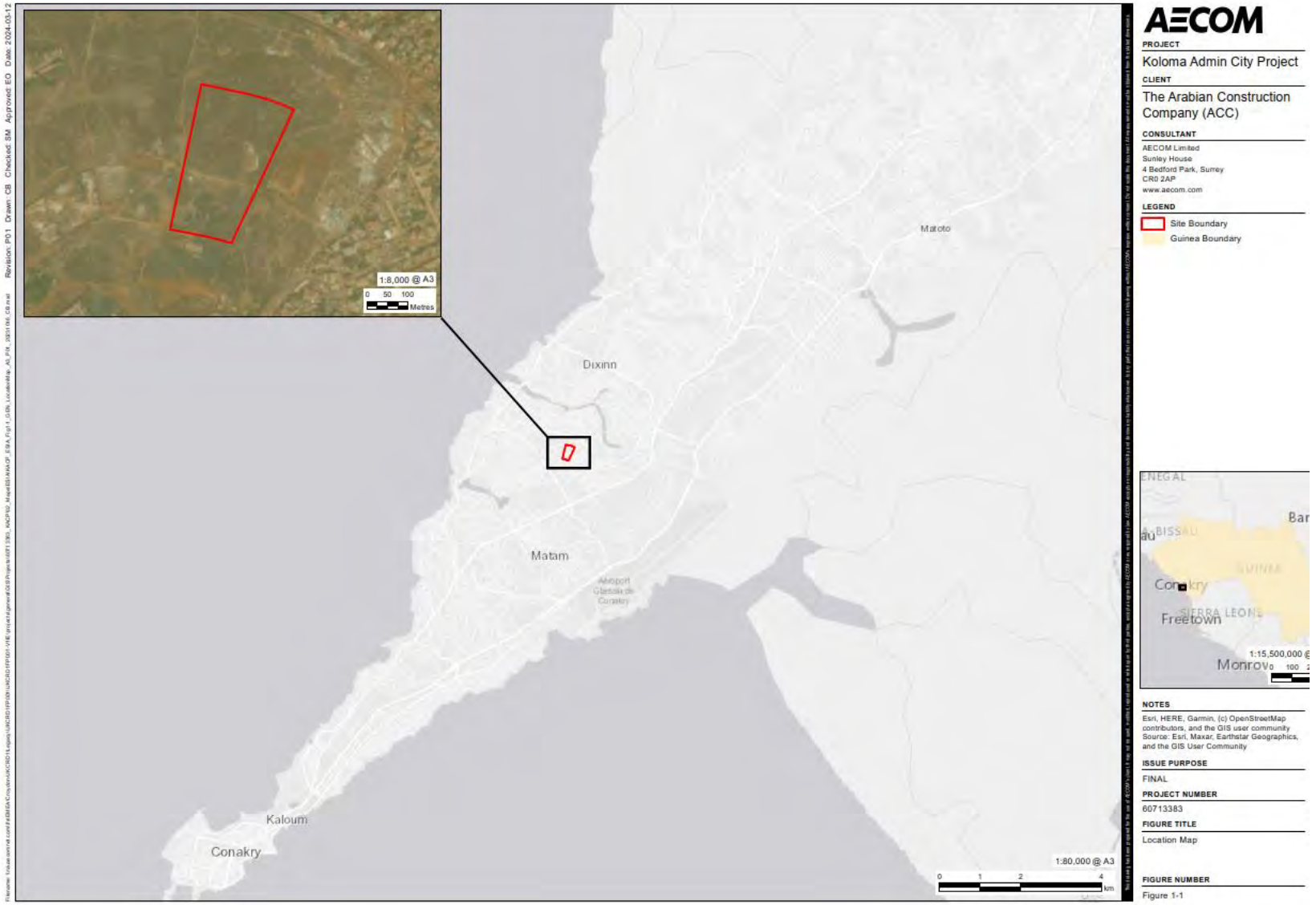

Figure 1-1: Location of Administrative City Project of Koloma

1.5 ESIA Report Structure

This ESIA Report is structured as shown in Table 1-1.

Table 1-1: ESIA report structure

Chapter		Contents
—	Non-Technical Summary (NTS)	A summary of the ESIA report in non-technical language.
1	Introduction (this chapter)	An introduction to the Project, purpose, scope and structure of this ESIA Report, the Project team.
2	Project Description	A description of the Project design, construction and operation.
3	Legislation and Institutional Framework	An overview of the national legislative framework, and international standards and guidelines applied by the lenders.
4	ESIA Methodology	A description of the ESIA methods, including the approach to assessing the significance of identified potential impacts and the application of mitigation hierarchy.
5	Stakeholder Engagement	An overview of consultation undertaken as part of the ESIA process and details of stakeholder engagement programme as well as details of how stakeholder feedback and concerns have been incorporated into the Project's design and ESIA study.
6–14	Impact Assessments	Topic-specific impact assessment chapters containing: • Environmental and social baseline conditions: Project setting and characterisation of the biophysical and social environment, with the identification of trends and changes that are continuing over time. • Environmental and social impact assessments: identification of potential Project-induced impacts to the biophysical and social environment, proposed mitigation measures, and assessment of residual impacts. • The topics included are air quality, GHG and climate change, biodiversity, noise and vibration, water, waste, traffic, socioeconomic and health (including human rights), cultural heritage, and stakeholder engagement.
15	Cumulative Impacts Assessment and Unplanned Events	Consideration of Project impacts in relation to other future developments that are planned and reasonably defined at the time of preparing the ESIA report.
18	References	—
—	Appendices	Supporting documents, reports and analyses.

ACC prepared two management plans, namely the Construction Site Health and Safety Management Plan (HSMP-PGSSC) and the Environmental and Social Management Plan (ESMP-PGESC), which present the actions necessary for managing environmental, social and health impacts, implementing mitigation and enhancement measures and detailing ongoing monitoring and auditing programmes during the construction phase. Since the construction activities with the mobilization and site preparation activities commenced in late September 2023, ACC prepared the abovementioned plans in advance of the ESIA.

2. Project Description

2.1 Project Location

The Project site is located on unoccupied land in Ratoma in the north-east of Conakry. The proposed development site ('Site') which is to house the Administrative City Construction Project covers an area of approximately 7 hectares (total site area is 70,591 square metres of surface area) and is located on a larger area of historically cleared brownfield land owned by the Guinean state that totals approximately 202 ha (see Figure 2-1).

The Project includes the development of twelve 7 storey buildings, providing 72,000m^2 of office space to house Government Ministry departments. The location of the new Administrative City Construction Project is intended to relieve congestion on the Kaloum peninsula and to improve urban mobility by transferring the headquarters of Government Ministries to Ratoma. It is noteworthy to mention that it is not definite at this stage that which governmental buildings/authorities/departments will be moved to the proposed Project site, however from discussions with SONAPI, it seems the vast majority of ministries will be relocated except for defence related ministries.

The Project site is located near the premises of Radiodiffusion Télévision Guinéenne (RTG), the US Embassy, Orange Guinea Headquarters' and Saudi Arabian Embassy's construction sites and the Ministry of Foreign Affairs.

There are also Chinese construction company, China Geo-Engineering Corporation (CEGEP), Kaporo Rail police station, sanitary materials depot, car/truck repair and garage, ACC's welfare facilities and site offices, SEG water tank/pumping station and Kaporo Rail cemetery in the vicinity of the Project site (to the west of the Project site). There is also Kipe Power Station (Central Electrique de Kipe) to the northwest of the Project site (approximately 500 m). The surrounding places and facilities are shown in Figure 2-2.

Access signages were placed at several locations to show access to the Project site. The Project Site is fully fenced off, and two control and guard points were established on site for controlled entrance and exit access (on the west and east of the fence).

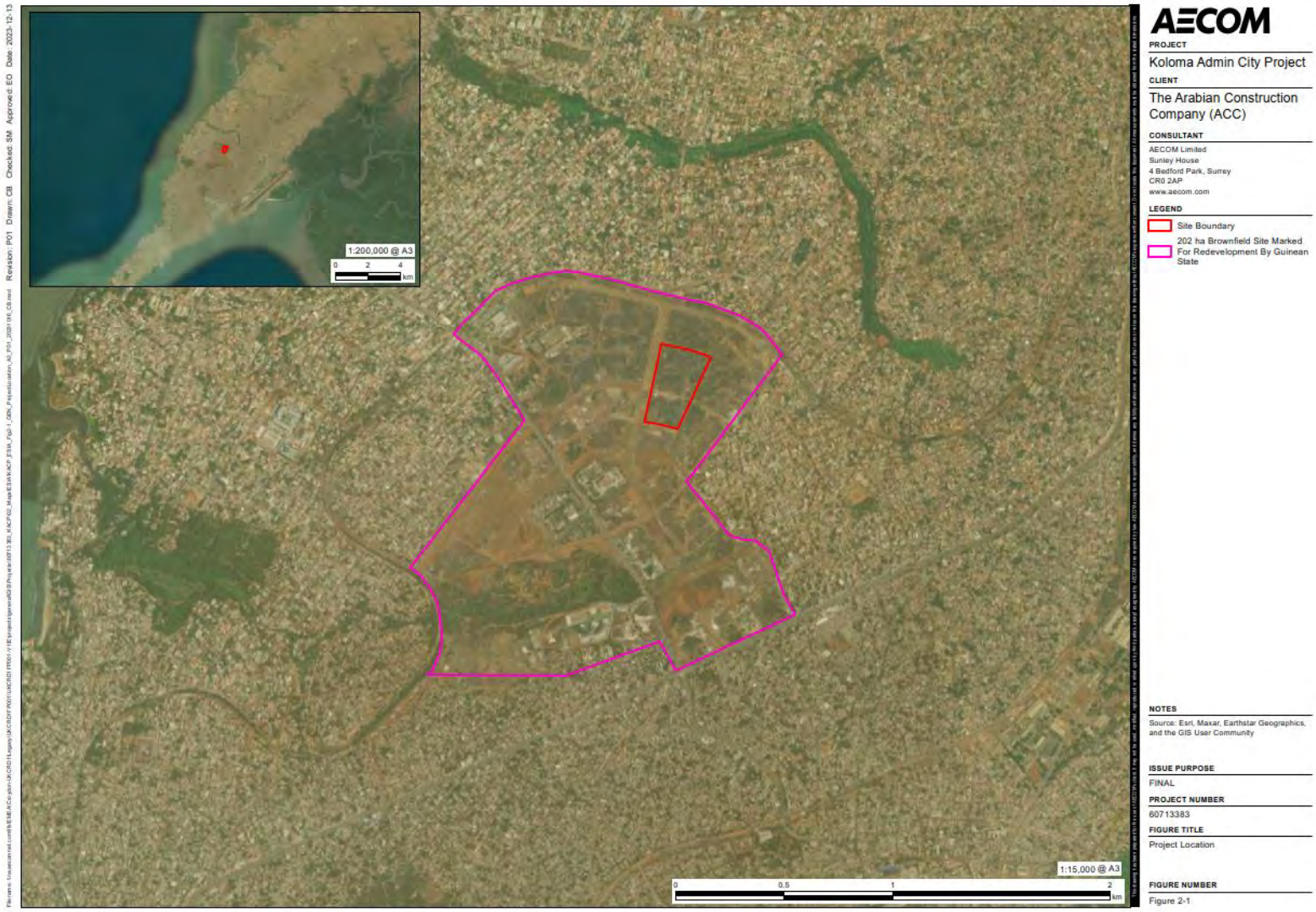

Figure 2-1: Project Location

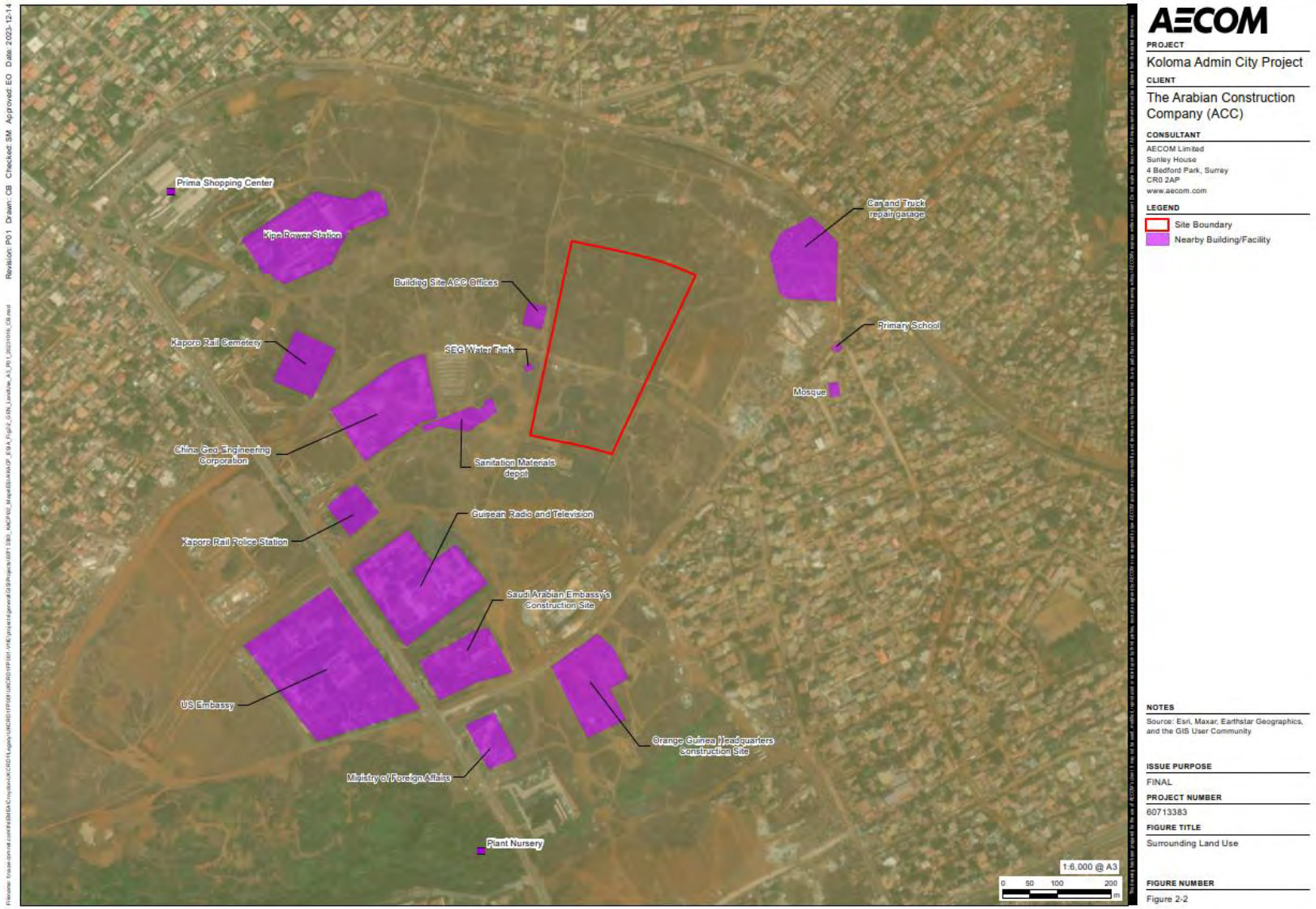

Figure 2-2: Surrounding land use, facilities/places

2.2 Land Ownership and Use

The Site is currently in the possession of the State through a land title N°09981/2007/TF, and reserved for constructions for public administration, republican institutions, diplomatic missions. The Project Site is accessible via Transversale 2 (to the west of the site), which is the main road providing access to the airport from the northern corniche, and RO308 (along the southeast of the site).

Whilst the site is currently unoccupied, as confirmed on the site visit, the site was historically occupied and subject to two evictions which occurred in 1998 and 2019. These evictions were carried out by the Ministry of Habitat and Construction and have been the subject of criticism by local communities and NGOs such as Human Rights Watch. SONAPI explained to AECOM that some compensation was awarded for evictions in 1998, however this is yet to be verified by the community. SONAPI has however confirmed that no compensation has yet been paid to displaced families who were evicted in 2019. SONAPI, with support from its consultant Chemas Consulting Ltd, has now recently begun engaging with evicted families and their representative group, “Collectif des déguerpis” (The Collective of the Evicted) with the intention of retrospectively paying compensation in the form of cash and replacement land and providing livelihood support.

2.3 Project Components and Design

The proposed Project which is envisaged to house the various government ministries in one location covers approximately 7.1 hectares that will be developed to include (built up areas):

- 12 x office buildings, 7 storey (830m^2 X 12 Buildings = 9,960m^2 of surface building footprint area)
- 2x Buildings that will house (carpark footprint area 3,655m^2 x 2 = 7,310m^2):
- Parking
- Utilities
- Restaurants
- An Auditorium (of surface footprint area 1,242m^2), Heritage Pavilion (of surface footprint area 671m^2) and Amphitheatre (of surface footprint area 886m^2).
- External works including landscaping, covered parking, roadways and associated infrastructure.

The layout for Administrative City Project is shown in the Figure 2-3 below. The detailed design was ongoing at the time of writing this ESIA report. Main construction permit for the Project will commence with the Detail Design Sign-off. The intended lifespan of the development is 60 years and can go further depending on the preservation techniques employed by the Owner and the way the building is utilized. A façade drawing of a typical building is presented Figure 2-4.

Figure 2-3: Project Components (Source: ACC)

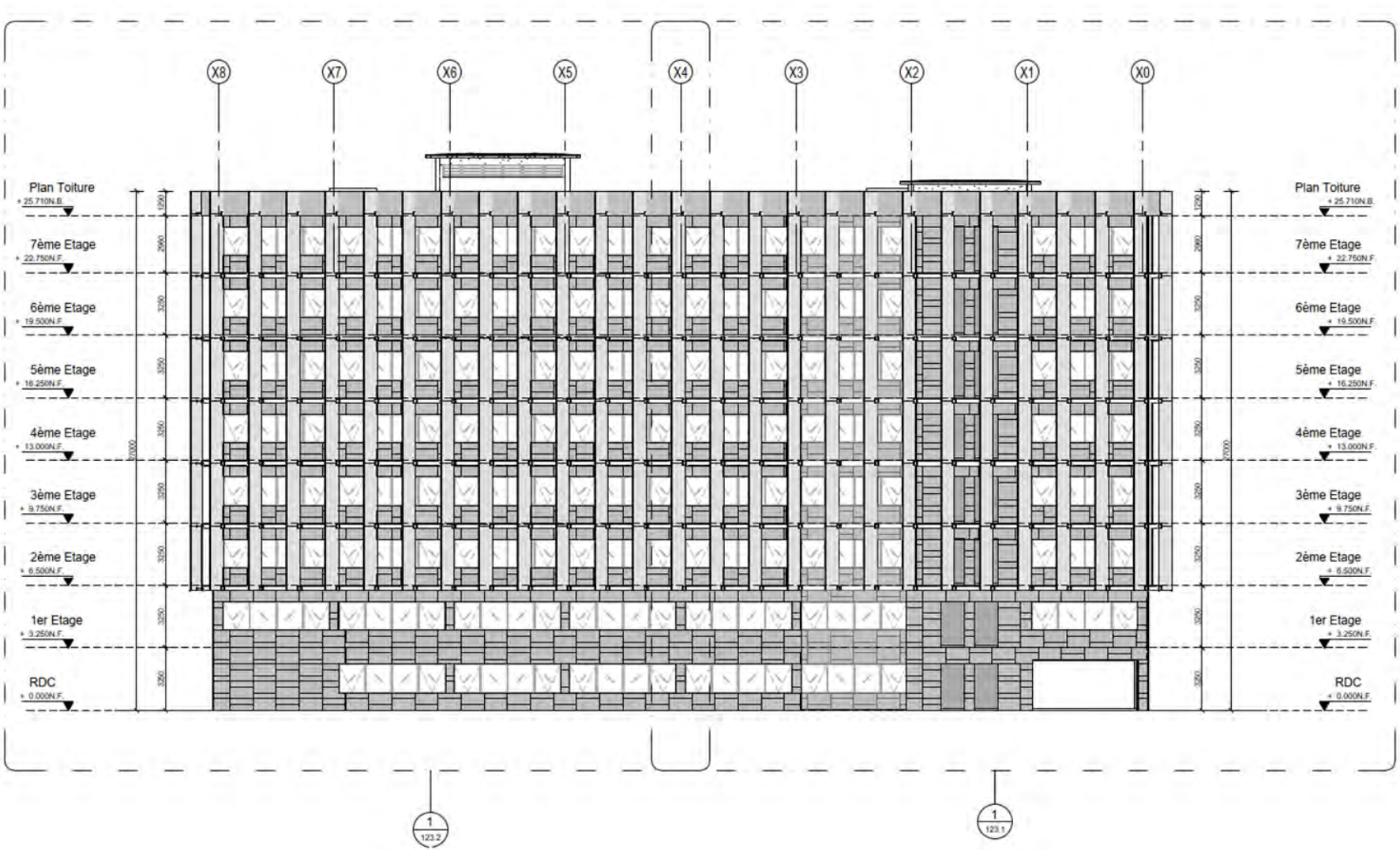

Figure 2-4: Façade drawing of a typical building (Source: ACC)

Figure 2-5: Project Visual (Source: ACC)

2.4 Associated Facilities

The OECD Common Approaches defines associated facilities as:

"those facilities that are not a component of the project but that would not be constructed or expanded if the project did not exist and on whose existence the viability of the project depends; such facilities may be funded, owned, managed, constructed and operated by the buyer and/or project sponsor or separately from the project". (OECD, 2016)

IFC Performance Standard 1 defines associated facilities as:

"facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable". (IFC, 2012)

As discussed under Section 2.5.4 of this Report, there is a Development Plan (1/3000 scale) which shows planned road network with associated utilities that are under the jurisdiction of the relevant Guinean public authority and to be constructed regardless of this Project. Currently, there are no associated facilities for this project.

2.5 Alternatives

2.5.1 Project Justification

Guinea is currently aiming to transition back to civilian rule in late 2025. The project is regarded as essential for the transition back to civilian rule in the country and will provide state of the art modern office facilities that will improve government efficiency, transparency and employment for women. Considering its importance, it is currently listed as the most important project on the priority list of projects in Guinea. The Guinea government currently spends more than Euro 17.5M annually in rental for the various ministries of which all goes to private sector landlords for substandard properties not suitable in purpose or transparency. It is estimated that the project will ultimately provide functional office space for over 8,000 Guinea employees with dedicated vocational training.

The project will help to modernize and promote professionalism and transparency for the Guinea Government in allowing it to house all of its various ministries, currently fragmented across the city in buildings no longer large or modern enough to satisfy their needs, in to one strategic, modern office park that will be up to key standards in terms of modern infrastructure and telecommunication requirements.

With the development of this Project, the Project will contribute to the following benefits/positive impacts of which have been discussed in the relevant sections of this ESIA report:

Construction Phase

- Local employment: Local employment will bring about positive impacts on the local economy and will improve the livelihoods of the workforce and their families. ACC will take steps to maximise local employment and where necessary provide training to the workforce.
- Opportunities for local businesses: There will be need for local service providers to support the construction process, this might include waste disposal contractors, catering, provision of building materials etc. The number of jobs estimated for local service providers is expected to include 80 individuals.
- Operational Phase:
- Improved government facilities: The main objective of the project is to provide a number of government ministries with improved modern offices and facilities which are all located in one place which will improve the working conditions of all government staff currently employed across Conakry. The new premises will be designed to promote more open participation of females the workplace with the inclusion of separate female toilets and will be able to cater for handicapped employees due to access and egress and dedicated washrooms.
- Increased employment: Although much of the government workforce who will be located at the Project will be relocated from the existing government offices, the new facilities will create a number of additional jobs, particularly facilities management and maintenance. It is estimated that 180 staff will be required for General Building and Facilities Management, 20 staff will be required for groundskeeping and 20 staff will be required for the auditorium/amphitheatre.
- Opportunities for local businesses: The arrival of government ministries at the Project will attract many local businesses seeking opportunities. This will include licenced service providers at the project and also informal vendors which will likely move to the area.
- The Project has other potential positive outcomes, but the magnitude and consequence are difficult to quantify at this stage or fall outside the scope of this ESIA (noting that the Administrative City as part of a much larger masterplan for the development of the Koloma area). These benefits includes:
- Promote Conakry Internationally: The project will likely allow Conakry to continue to expand its presence as the key economic and business hub for Guinea and a growing player on West Africa port cities.
- Improved inter-ministerial co-operation: Locating government ministries within the same locality will likely improve the ability of said ministries to communicate and work together which will likely improve overall governance in Guinea.
- Reduced traffic to downtown Conakry: Conakry currently experiences significant traffic congestion as many people make the daily commute southwest from residential areas in the morning to access government offices in downtown Conakry. A secondary objective of the project is to reduce this congestion. The location of the Project will likely reduce the need for this commute as many government staff will no longer be required to travel as far south along the peninsula.
- Contribute to the overall development of Conakry: The project is part of an overall government objective to build and modernize local infrastructure to improve connectivity between the local airport and the seaport as the future business hub or business district of Conakry thus promoting economic growth and contributing to development needs.
- Promote the efficiency and coverage of government service delivery across a wider spectrum of society.
- The savings made on rental charges will free up monetary resources to be allocated to other government expenditure.
- Long term benefits to local communities as a result of the resettlement action plans to be implemented, ensuring affected groups (i.e. those impacted by historical evictions) are able to access community engagement projects
- Promote the ease of opening up businesses and carrying out activities for locals and foreign companies alike.
- Promote greater transparency and efficiency between government departments.

- Promote modern, safe workspaces for employees that will be housed in the development which will ultimately reflect in increased professional development and efficiency.
- Promote more open participation of females the workplace with the inclusion of separate female toilets.
- Will be able to cater for handicapped employees due to access and egress and dedicated washrooms.
- Meet priority human development needs.

2.5.2 No Project Alternative

The first alternative considered for any new project is a no development option, which means not adding a new Administrative City Project for Conakry, as being essential for transition back to civilian rule, to improve government efficiency, professionalism and transparency for Guinea Government and employment for women.

Various ministry buildings are currently fragmented across the city in buildings which are no longer large or modern enough to satisfy their needs. The current state of these buildings are not fit for their purpose. With the development of this Project, it will turn into one strategic, modern office area that will be up to key standards in terms of modern infrastructure and telecommunication requirements. Several energy saving strategies have been considered in the building design (from buildings perspective, energy supply, use of renewables, drainage, resource efficiency) which is further detailed under Section 2.7.2 of this ESIA Report.

In case of a no development option, the opportunity to contribute to the achievement of the aims/purpose as mentioned in Section 2.5.1 of the Guinea Government will be missed.

2.5.3 Site Selection

The Guinea Government, under successive administrations, has identified the Project site and its close surrounding vicinity planned future administrative district of Conakry by the Guinea Government ensuring its importance for future development.

ACC is currently building an identical project for Benin, on a smaller scale, that is also backed by UK Export Finance (UKEF). SONAPI and relevant Guinea government officials carried out multiple visits to the Benin Administrative City before entering into negotiations with ACC for this Project. ACC was issued site coordinates and survey plans to ensure its design was suited for the selected site from the commencement of negotiations. There was no opportunity for ACC to influence the site selection.

2.5.4 Planning Around the Project Site

There is a 1/3000 Scale Development Plan for Ratoma Area from the Koloma Guinea Management Center, Ministry of Urban and Territorial Planning that cover the Project site. The Project site indicated with light purple on the Plan (Figure 2-6). The original copy of the Development Plan is presented in Appendix E of this Report.

It can be seen that the whole Koloma area will be developed with the introduction of the governmental/administrative/embassy's buildings. There are also planned road network indicated in the Plan. These components that are included in the master plan and under the jurisdiction of the relevant Guinean public authority outside the scope of this Project.

Figure 2-6: 1/3000 Scale Development Plan for Ratoma Area (*Source: Original document was obtained from SONAPI in French; AECOM translated and indicated the proposed Project Location*)[3]

2.6 Construction Activities

The site preparation activities started in September 2023. The Construction is planned to be undertaken in two phases (Phase 1 include the main works related with Building 7, 8, 11, 12 and Parking Building 2; Phase 2 include Building 1,2, 3, 4, 5, 6, 9, 10, Parking Building 1, Auditorium, Heritage Pavilion, Outdoor Theatre, warehouse, Guard House, road works). The construction (for both Phase and Phase 2 including test and commissioning) is expected to last approximately 27 months and planned to be finalized until the end of January 2026. The construction of the Project will be carried out by ACC and that the main site preparation and construction activities will be the following (but not limited to):

- Design and Conception Stage;
- Mobilization and Site Preparation (including excavation);
- Structural Works;
- Glazing, MEP (Mechanical, Electrical, Plumbing);
- Finishes and External Works; and
- Testing and Commissioning.
- ACC will directly deliver 50% of the Project which will be Structural works and the MEP services. It is planned that specialist subcontractors and suppliers will be sought for the balance of works.

[3] IMAAG HOLDING SA is a company incorporated under Guinean law specialising in urban land development, real estate development, studies and advice to local authorities. MUHAT: Ministry of Urban Planning, Housing and Territorial Development.

2.6.1 Construction materials and equipment

The construction equipment to be used are excavators, loaders, dump trucks, concrete pumps, tower cranes, mobile crane, telescopic handler, forklift, etc. The majority of the construction materials is planned to be brought to the Project site from the Port of Conakry. Two concrete batching plant are planned to be used i) Castor Guinea (which is located adjacent to the US embassy (less than 2km)) and Socit Guinea Concrete (which is adjacent to Alpha Conde Stadium (approximately 8km away)). The quantities of the construction materials with respect to the Project components are presented in Table 2-1.

Table 2-1: Construction Materials with Respect to the Project components

Construction Materials/Quantities	Office Buildings (x12)	Car Park Buildings (x2)	Ancillary Buildings
Concrete, m^3	49,800.00	10,000.00	4,000.00
Reinforcement Steel in tonnes	4,980.00	1,000.00	400.00
Gypsum Board Ceilings in m^2	76,800.00	-	2,000.00
Glazed or Gypsum Internal Partitions in m^2	37,200.00	-	600.00
External Façade - Aluminium/Glazing and general plaster in m^2	41,760.00	-	400.00

Source: ACC

Approximately 700 litres per day of fuel (diesel and petrol) will be used between generators and vehicles.

2.6.2 Workforce

It is expected that the construction workforce will be 2500 persons at peak. There will be also 95 supervisory and office staff (from ACC) at the peak. During the early stages of the construction works, the number of workers will be low (under 100) but will rise when the civil work begins. The breakdown of the anticipated peak workforce is presented in Table 2-2 below.

Table 2-2: Construction Workforce as per Construction Stages

Construction Stages	Peak Workforce
During Structural Works	1,000
During crossover of Structural and Glazing/MEP Works	1,500
During Glazing, MEP, Finish works	2,500
During Finish Wind Down and External Works	2,000
During Final Phase (test and commissioning (snagging))	500

Source: ACC

Construction works will take place 6 days a week. Project regular working hours will be from 07:30 to 17:30 (including a one hour break) between Monday and Saturday. Most of the workforce will be locally employed via a labour hire agency. It is expected that all ACC staff will be residing in the Kipe area with a 4 km commuting distance. The transportation to the Project site for ACC site staff will be provided via shuttle Company buses. The main commuting distance for the workforce is expected to be maximum 15 km from the Project site. There will be no shuttle bus services and/or any other transportation services provided for the remaining workforce. It is anticipated the majority of the workforce will be commuting via bicycle and/or motorcycles/mototaxis to the/from the Project site.

ACC developed a Training Programme. All employees shall be aware of their responsibilities, the dangers of their work and how to act in an emergency. All new employees will receive an environmental, health and safety orientation before they start work on site. Environmental, health and safety officer (EHS Officer) will prepare an EHS&S training matrix including mandatory and optional courses and distinguishing between "initial training" and "activity risk based" training for different work groups/risk activities. The trainings will include, but not be limited to orientation training, job-specific trainings, risk assessment, safety awareness including hazardous materials, human rights, emergency management procedures and emergency equipment etc. ACC will provide and ensure the appropriate PPE including, but not be limited to, hard hats, safety shoes, goggles, hearing protection, safety harnesses, gloves, etc to all employees, contractors as well as authorized visitors. Where deemed necessary,

additional PPE will be provided in accordance with "Hazard Identification, Risk Assessment and Controls" requirements and permits to work.

2.6.3 Construction Traffic and Access

The Project site is currently accessed by the surrounding roads (namely RO308, RO363 and RO251 as presented in *Section 12 Traffic and Transport*). There are no defined bus, minibus, taxi and motorcycle stations in the close surrounding of the Project site. There are no pedestrian crossings and traffic lights on the surrounding road network, and there is no dedicated pedestrian side pathways/walkways on the surrounding network; people are mainly walking on the side of the roads. Access signs have been placed at several locations to show access to the Project site.

ACC installed traffic signs on the site to regulate traffic flow. A pedestrian crossing as well as machine crossings will be clearly demarcated. Similarly, work areas and risk zones will be marked out using tape, protective netting and stakes. Strict speed limit to be applied (10km/h) in locations where it is necessary to reduce noise impacts and safety risks. The construction site layout and logistic plan is presented in Figure 2-7.

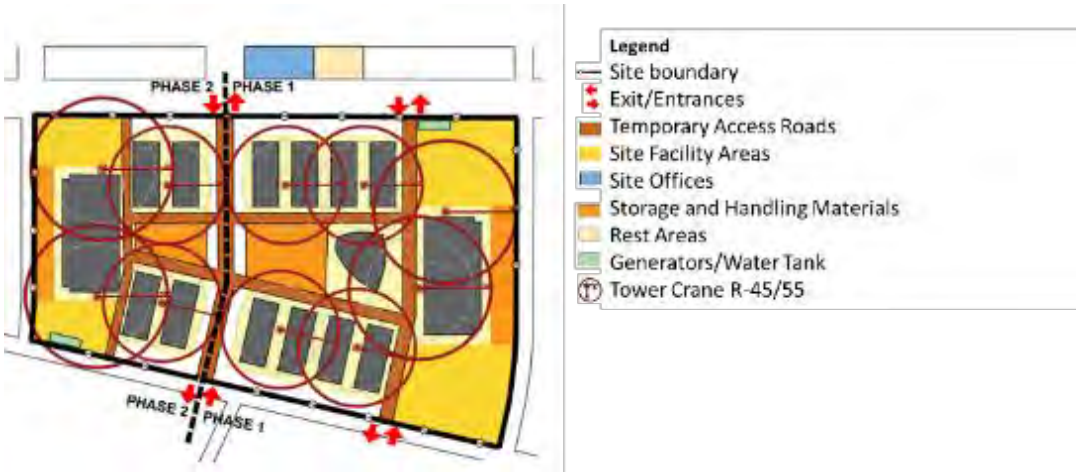

Figure 2-7: The Layout of the Construction Site and Logistic Plan

2.6.4 Workforce Accommodation/Welfare Facilities

No workers' accommodation facility is planned to be built for the workforce during the construction. As the construction workforce are Guinean nationals residing in Conakry, they `will be residing in their own homes. The workforce will comprise a mix of skilled & general labor level for all construction trades (concrete, steel, masonry, etc.). The workforce will be sourced locally, especially for the construction operatives. ACC will be hiring its workforce from organised labour agencies who shall be responsible for compliance with National Laws and insurance provisions.

Temporary welfare facility have been developed adjacent to the north of the Project site (see Figure 2-8). The temporary welfare facility will include prefabricated offices, built storage areas, toilets, rest and catering areas and a clinic. The prefabricated offices is planned to have two blocks. The first block A will consist of offices for the delegated project owner's teams and the various representatives of the project owner, and the second block B will consist of offices reserved for the company and its subcontractors. Within the welfare facility, ACC will set up a rest room and a catering area on site. There will be an infirmary which will provide first aid. The infirmary will be run by an occupational physician assisted by two nursing staff. The clinic will start with the first-aid nurse, and a second first-aid nurse will join as staff numbers increase. The infirmary will run from Monday to Saturday during working hours.

There will be changing rooms for use of all employees/workers which will be built in a respectful and gender segregated manner. ACC shall ensure that provision of basic services to workers are managed in line with the guidance note on worker's accommodation published by IFC and EBRD (Worker's Accommodation: Processes and Standards). Sanitary facilities will also be built for the workers. Each office block will have a men's washroom with washbasins and WCs, and a second women's washroom also with two washbasins and toilets. It is planned that women's toilets will be located in a strategic place (i.e in the site's main office only or in a separate area from the men's toilets). There will be no requirement for other land other than the defined Project site and temporary facility during construction.

Figure 2-8: The location and layout of the Temporary Project's Welfare Facility

2.6.5 Water Supply and Surface Water Drainage

Water will be needed for domestic purposes (drinking, washing, flushing the toilets). Drinking water requirements on the site are estimated at around 55 m^3 per day, for an average of one thousand one hundred (1100) worker on site.

The amount of water required during construction is estimated at up to 8900 m^3 at a rate of 371m^3/month. There will be water tanks (with a total capacity of 80 m^3) on site (including welfare facility area) in case of water cuts on the network, as well as a reserve in case of fire (Please see Figure 2-9 and Figure 2-10). The water will be provided by national water concessionaire Société des Eaux de Guinée (SEG). No water use is required for concrete mixing at the construction site. A non-potable water system (labelled "non-potable water") will only be permitted for purposes such as air conditioning, dust suppression and fire protection and will not be permitted for washing and bathing. The quantity of water consumed will be monitored through a register and water balance will be updated, checked, and communicated regularly. ACC will implement design and organisational measures to reduce water consumption including application of dry construction methods (wooden buildings, lightweight partitions; supply of concrete by a service provider, temporary checks for water pipes, site meters, applying rain harvesting points to allow water to be collected). A concrete batching plant will not be set up on the Project site since there are a number of batching plants within reasonable distance to the Project site which are more cost effective. In addition, the site is not large enough or isolated to warrant a site batching plant.

ACC may dig a well on site as required in a designated position to supply the site with non-portable water in order to minimise the use of the SEG's water supply.

2.6.6 Energy Supply

The Project site's electricity requirements are estimated at 2150KW. The Project site will be connected to the electricity grid; however, ACC will use generators to supply electricity. Nine generators, which will be mainly diesel-powered, with cooling systems will be installed to supply electricity to the site (operation of 7 at peak). It is expected that the generators will be operational for 10 hours/daily or as needed depending work load.
During construction phase, all cables will be placed underground/on-ground with appropriate protection.

2.6.7 Construction Waste and Wastewater Management

Three categories of waste are expected to be generated during construction phase of the Project; hazardous waste (during the maintenance of the construction plant and equipment), non-hazardous waste (food waste, packaging, paper, plastic, wood etc) and inert waste (surplus excavated uncontaminated soil, waste materials such as bricks and tiles and rebar etc.). The estimated amount of hazardous, non-hazardous and inert wastes are 206 m^3, 6,844 m^3, 2,338 tonnes, respectively. The estimated amount of wastewater and sludge is 2,800 **m^3.**

Solid waste materials generated by the Project during construction will be segregated and stored on-site prior to transport to licensed facilities. Currently, non-hazardous waste in Guinea is disposed at the Minière Landfill. There is a plastic waste recycling plant in Guinea. No management facilities exist for hazardous construction wastes.

All liquid effluents (e.g. from showers, canteen) will be collected in closed drainage systems. Wastewater and sewage will be temporarily stored onsite and then hauled to an appropriately licensed wastewater treatment facility. The Project will not construct or operate its own wastewater treatment, landfill, or recycling facilities during construction phase. Reinforced concrete septic tanks with a specific capacity and chamber with two compartments will be installed to retain wastewater on site. These septic tanks will be regularly maintained and emptied. Both effluent and sludge will be hauled by an appropriately licensed waste management company for its ultimate disposal. As long as the septic tanks are used, the septic tanks will be emptied regularly and checked, as needed. The site drainage plan for the construction site and the welfare facilities are shown in Figure 2-9 and Figure 2-10, respectively.

Figure 2-9: Site Drainage Plan (Toilet cabinets, septic tanks and the location of the water tanks are also indicated in the figure)

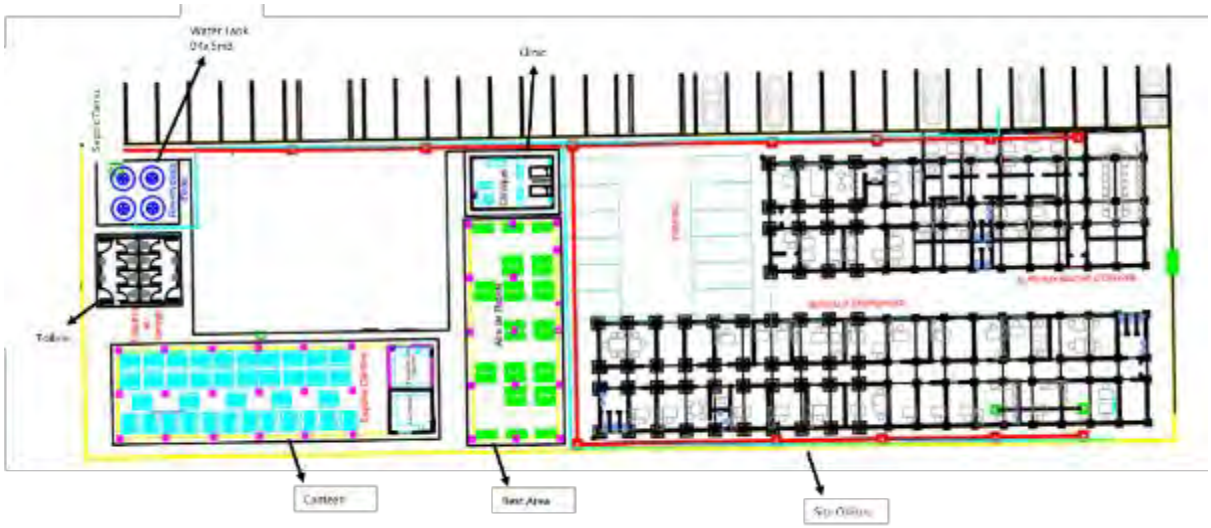

Figure 2-10: Site Drainage Plan for Welfare Facility

Construction waste will be managed responsibly, in line with good international industry practice. Refer to *Section 11 Waste Management* for waste management practices (embedded mitigations) which will be implemented during construction.

2.6.8 Security

Construction site has already been fenced off with a temporary galvanised sheet metal fence to prevent unauthorised access and protect the community from risks associated with typical construction activities. Two entrance and exit points has been pointed which are secured by unarmed security. Local site security staff have been hired by ACC from an authorised service provider. Since the Project will include

governmental/administrative buildings, the police forces will also be responsible for security to the immediate external vicinity of the plot and surrounding areas.

During the day, the Project site is expected to benefit from natural lighting. At night, or when there is a drop in natural light, ACC will use street lamps of at least 200 lux installed at various focal points on the site, around work areas and on mobile cranes. As informed by ACC, access badges, a time and attendance system and surveillance cameras will be installed.

It is noteworthy to mention that the temporary worker welfare facilities and motorbike park are located outside of the main Project site fence.

2.6.9 Decommissioning Works following Construction

At the end of the construction phase of the Project, ACC will restore all the areas used to their original state in particular removing any remaining materials, disposing of waste, dismantling and removing installations. ACC scope is for the completion of all external works including the landscaping, infrastructure works and site boundary. The company will also demobilise up all its equipment and machinery. No equipment or materials either on the site or in the surrounding area will be left. As informed by ACC, once all the equipment has been removed, a report (Procès-Verbal) recording the restoration of the site shall be drawn up and attached to the report on the acceptance of the work. There will be a requirement for Completion Tests prior to site handover. Such tests and handover may be in sections to facilitate a staged handover.

2.7 Project Operation

2.7.1 Organizational management

SONAPI was created in 2008 and attached to the Presidency of the Republic in July 2018. On 24 October 2022, a decree amended SONAPI's articles of association, making it a Société Anonyme (S.A.). SONAPI has built social housing including but not limited to in Conakry (Kéitaya), Kankan, Siguiri, Mandiana, Sinko, Labé, Faranah, Kérouané, Boké, Kindia. The main responsibilities of SONAPI are;

- Managing and carrying out, on behalf of the State, local authorities, republican institutions and public companies, urban land development operations made available to it by the Ministry of Housing and Town and Country Planning, and building basic infrastructure, social facilities and any other related activities.
- Partnering with foreign companies or private national companies in the design, financing, implementation and management of urban development programmes, projects and operations.
- Generally, to carry out any real estate transaction directly or indirectly related to one of the objects set out above or any similar or related object.

A management company will be established under SONAPI for the operation phase of the Project namely, SOJECAC, who will be responsible for the management of the defined operational services. Currently, the operational services to be served by the SOJECAC have not yet been agreed and defined. Therefore, the necessary information and assessment related to the operational services (likely to include cleaning, landscaping and waste removal) cannot be fully made in this ESIA report.

An operational environmental and social management plan (OESMP) will be developed and implemented for the Project; the relevant sub-plans within the OESMP will be prepared prior to operational phase of the Project by SONAPI. Prior to the completion of the construction phase and handover, ACC will provide guidance and support to SONAPI on the preparation of the necessary OESMPs to ensure the compliance with the operational commitments contained in the ESIA.

2.7.2 Operational Buildings and Utilities

The proposed Facility will include 12 office buildings, car parking buildings, an auditorium, heritage pavilion and amphitheatre. The intended lifespan of the development is 60 years and can go further depending on the preservation techniques employed by the Owner and the way the building is utilized.

Required electrical load is estimated to be 10.7 MVA. During operation, there will be no combustible fuel use. There will be 5 x 2,500 KVA emergency backup generators at the facility.

Site water requirements during operational phase are estimated at nearly 198m^3/day. Water will be supplied by the SEG (Societe des eaux de Guinee).

It is anticipated that the following energy saving strategies will be applied in the new building designs;

- Solar hot water systems;
- External lighting to be assisted by solar panels for example street lighting;
- STP system -- treated sewerage water to be used for irrigation;
- Rainwater harvesting - Stormwater holding tank to re-use rainwater for irrigation;
- Variable Frequency Drive (VFD)'s for fans, pumps and condenser units if not central chiller;
- LED lighting and associated sensors;
- Waterflow reducers for sanitary ware items;
- Energy saving devices will be integrated into offices and other site premises;
- Prefabricated construction methods for the infirmary and site offices;
- Monthly energy audits to analyse energy consumption and identify areas of over-consumption;
- Awareness training sessions on good energy saving practices displaying consumption figures on site;
- Pollution prevention measures transport of construction equipment and materials: regular inspection and maintenance of machinery and optimising travel routes and transporting materials; and
- Waste management Systems including recycling, recovery and disposal methods have all been implemented into design.

The Project drainage design considered the amount of water from buildings, paved and asphalted areas and the size of the pipes within the Project site were designed based on the surface run-off calculations. The surface water drainage developed within the Project site will be connected at multiple tie in points to the municipal surface water drainage network around the Project site which will be developed in the future and under responsibility of the relevant authorities. Rainwater drainage design has accounted for a network of pipes & manholes that will be connected to the city rainwater network/trenches. No provisions have been made for car wash; however, car parking areas have collection manholes prior to be connected to the external network. SUDS will be set-up just outside of the Project Site.

2.7.3 Operational employment

It is expected that the project will ultimately provide functional office space for over 8,000 Guinea employees with dedicated vocational training. The number of operational staff/employees as well as the administrative authorities' buildings, which will be relocated to the proposed project site, are not definite at the time of writing this ESIA report, however the vast majority of ministries will be relocated except defence related ministries. As reported by the representative of SONAPI the employees that will work at the office complex currently work in existing government administrations on various locations across the city. There will be no need to employ additional operational staff for the Project; the existing staff/employees will be relocated to the proposed Project site. However, as mentioned above, operation of the new facilities with the services particularly facilities management and maintenance may create a number of additional jobs.

No accommodation areas are planned to be included within the Facility premises for the operation phase of the Project. As informed, most of the existing staff/employees currently working in the administrations are residing in the nearby districts and neighbourhoods to the Project site.

2.7.4 Hygiene and Waste and Wastewater Management

There will be generation of mixed commercial/municipal waste and hazardous waste generation during the operation phase of the Project. It is anticipated that the hazardous waste generation will be generated from maintenance activities related with the Facility Buildings. The estimated amount of non-hazardous waste is 2,000 tonnes based on the approximate 8000 number of employees. Currently, non-hazardous waste in Guinea is disposed at the Minière Landfill. There is a plastic waste recycling plant in Guinea. No management facilities exist for hazardous construction wastes. Waste to be generated during the operational phase of the Project will be

managed responsibly, in line with good international industry practice. Refer to *Section 11 Waste Management* for waste management practices (embedded mitigations) which will be implemented during construction.

During the operational phase, domestic wastewater that are likely to be generated, is planned to be treated on-site wastewater treatment plant and discharged suitably with licensed disposal contractor. The treated water will be channelled through the city rainwater runoff network. The sludge will be disposed suitably through a licensed waste disposal company. Similar to the waste disposal, the necessary permits and protocols shall be maintained for with the relevant authority related with the collection and transfer of the wastewater.

2.7.5 Operational Traffic and Access

The necessary organizational management and arrangements related with the administrative/ministerial bodies' buildings to be relocated to the proposed Project site are still ongoing at the time of writing this ESIA report. Therefore, it is not definite which governmental authorities/ministerial bodies will be relocated. The design considers that the project will ultimately to provide functional office space for over 8,000 Guinea employees with dedicated vocational training.

There are two car park buildings (2 storey buildings with a usable floor area of 21,875 m²) included in the Project. The car parks will have 830 spaces (additionally 72 parking areas (6 parking area under x12 buildings) for management personnel positioned under the buildings). There will also be a provision for motorcycles and bicycle parking facilities in the Facility.

No accommodation areas are planned to be included within the Facility premises for the operation phase of the Project. As informed, most of the existing staff/employees currently working in the administrations are residing in the nearby districts and neighbourhoods to the Project site.

2.7.6 Security

During the operational phase, security arrangements will be provided within the proposed Facility. Considering the presence of the majority of the government's ministries being present, then it is expected that there will be official armed police officers and security personnel. The site will have a boundary wall as part of the construction process and general CCTV system. Access Control will be decided at a later stage as the end users haven't decided on this protocol yet. It is anticipated that there will be an access control system in the Facility. The Facility will be only accessible by it's workers and visitors. Public access/use of the Facility components will only be possible based on pre-agreed appointments.

Due to the presence of government buildings, the proposed facility will have a higher level of security compared to the surrounding planned developments. According to the master plan referred in Section 2.5.4 of this Project, there will be other commercial and administrative facilities developed in the wider Ratoma masterplan area whichwill likely be more accessible to the public with roads and pathways between them.

3. Legislation and Institutional Framework

This chapter present the summary of the key overarching legislation, standards and guidelines applicable to the Project. The Lender's Applicable Standards include the host country laws and the provisions of the OECD Common Approaches, the IFC Performance Standards and Equator Principle 4. The further topic-specific regulations and standards are summarised in respective Chapters 6-14 of this ESIA report.

3.1 National Institutional Framework

The key central, provincial and local governmental authorities relevant to the development and implementation of the Project are described in this section.

Societe Nationale D'amenagement Et La Promotion Immobiliere De Guinee (SONAPI as a "Loan Beneficiary for this proposed Project"

The main roles/responsibilities of Societe Nationale D'amenagement Et La Promotion Immobiliere De Guinee (SONAPI) is to to implement government policy on the development of land made available to it by the Ministry of Housing and Town and Country Planning for the purposes of public-law property development (On 24 October 2022, with the decree amended SONAPI's articles of association, making it a Société Anonyme (S.A.)). The main responsibilities of SONAPI are presented in Section 2.7.1 of this ESIA Report.

The Government of the Republic of Guinea, as part of its policy to protect and enhance the environment, has set up an institutional framework to deal with environmental challenges. Independently of their respective prerogatives, the ministries listed below are members of the CTAE (Comité Technique d'Analyse Environnementale) and are convened depending on the subject of the studies to be approved during the public hearings.

The Ministry of the Environment and Sustainable Development (MEDD)

The MEDD is responsible for but not limited to drawing up policies and strategies for safeguarding the environment, sustainable management of renewable natural resources, sanitation and the living environment, and overseeing their implementation; ensuring that the principles of environmental protection and preservation of natural capital are taken into account in sectoral policies; contribute to building the technical capacity of environmental stakeholders; ensure the ecosystem stability of catchment areas and the quality of water resources; issuing environmental permits.

The Ministry is supported by three national directorates and a general directorate; namely The National Department of Pollution, Nuisance and Climate Change, The National Forestry and Wildlife Department, The National Department of Sanitation and the Living Environment, and The Directorate-General for Nature Conservation. The MEDD is also supported by the Guinean Environmental Assessment Agency (AGEE) which was created by Decree No. D/2022/PRG/SGG and being a decision-making and coordination structure for the process of producing and validating environmental assessment tools.

The Ministry of Energy, Hydraulics and Hydrocarbons

The Ministry of Energy, Hydraulics and Hydrocarbons is responsible for designing, drawing up, implementing and monitoring policy in the fields of energy, hydraulics and hydrocarbons. The Ministry is organised into three national directorates: the National Directorate of Energy, the National Directorate of Hydraulics and the National Directorate of Hydrocarbons, which are particularly concerned by the project. The Ministry issues authorisations for water treatment systems and monitors compliance. It will therefore be involved in the project, which includes a living base and several water treatment systems, and must therefore comply with the Ministry's requirements. The National Energy Directorate issues energy production permits and this includes authorisations to build and operate power stations. There are two public establishments SNAPE and SEG. SNAPE (Service National des Points d'Eau) which was created in 1980, this public establishment is governed by decree No. 57/PRG/SGG/90 setting out its articles of association. SNAPE also hosts the mapping database of water points in Guinea. SEG (Société des Eaux de Guinée) which was created by Decree D/2001/096/PRG/SGG. SEG has the legal status of

a public limited company. It is responsible for urban water supply, with a view to ensuring the national policy of supplying drinking water to urban centres.

The Ministry of Justice and Human Rights

The Ministry of Justice and Human Rights has the following missions:

- Drawing up laws and regulations on judicial matters and human rights, and ensuring that they are applied.
- Ensuring that general legislation and regulations are consistent.
- Drawing up strategies, plans, programmes and projects initiated as part of the government's broad policy guidelines on justice and human rights.
- To coordinate the actions of technical and financial partners working in the field of justice, prison administration and access to rights and justice.

The Ministry of Economy and Finance

The Ministry of Economy and Finance has the following missions:

- To design, develop and monitor public policies.
- To monitor the preparation and execution of finance bills.
- To participate in setting monetary and exchange rate policy objectives in collaboration with the monetary authorities.
- To finance major government projects.

Other relevant ministries related to the environmental and social aspects are (including but not limited to);

- Ministry of Mines and Geology.
- Ministry for the Advancement of Women, Children and Vulnerable Persons.
- Ministry of Labour and the Civil Service.
- Ministry of Transport.

3.2 National Legal Framework

3.2.1 National Transition Charter

Following the coup d'état of 5 September 2021 and a national consultation from 14 to 23 September 2021, the Transition Charter was signed on 27 September 2021 by the President of the Transition, Head of State and Supreme Commander of the Armed Forces, Colonel Mamadi Doumbouya. Articles 8 and 9 guarantee the fundamental rights and freedoms of citizens, who are equal in rights and duties. Article 10 recognises the right to respect for physical and moral integrity, and Article 17 recognises the inviolability of the home.

3.2.2 Environmental and Social Legislations

The key environmental and social legislation of Guinea are summarized Table 3-1 below.

Table 3-1: Key Environmental-Related Legislation from Guinea

Legislation	Year
Fundamental Law	1990 revised in 2001
Law L/2019/0034/AN on the Environment Code	04 July 2019
Law L/2019/035/AN on the Civil Code	04 July 2019
Act L/2017/040/AN on the Code of Local Authorities	24 February 2017
Law L/99/013/AN on the Land and Property Code	30 March 1992
Law L/97/021/AN on the Public Health Code	19 June 1997

Legislation	Year
Law L/2015/020/AN on the Construction and Housing Code	13 August 2015
Law L/2017/060/AN on Forestry Code	12 December 2017
Law L/94/005/CTRN on the Water Code	14 February 1994
Law L/94/006/CTRN on the Social Security Code	14 February 1994
Law L/2014/072/CNT on the Labour Code	10 January 2014
Law L/2018/028/An on Public Procurement Code	05 July 2018
Law L/2019/0059/AN on Children's Code	30 December 2020
Law L/2005/006/AN on Abstraction and Pollution (LRPP) of Water Resources	04 July 2005
Law L/2016/063/AN on to the protection, conservation and enhancement of the national cultural heritage	09 November 2016
Law L/2015/020/AN on the responsibilities of the Guinean State in the management and development of the national territory	13 August 2015
Ministerial Order 2791/MTASE/DNTLS/96 Working Conditions for Employees under 18 years of age	22 April 1996
Ministerial Order 2015/342/MIPMEPSP/CAB on Discharge Thresholds	27 February 2015
Ministerial Order A/2011/3927/MEE/CAB/SGG on Authorisations and Permits for the Use and Exploitation of Guinea's Water Resources	10 August 2011

3.2.2.1 Environmental Code

Environmental legislation is governed by the Environmental Code (Decree No. D/2019/221/PRG/SGG promulgating Law No. L/2019/0034/AN of 04 July 2019 on the Environmental Code in Guinea) which sets out the legal framework for the preservation, management, use and restoration of natural resources.

Article 11 states: "*The Ministry in charge of the environment shall receive, for its opinion, all draft texts directly or indirectly affecting the environment, all programmes, policies, strategies, plans and projects, and all authorisations involving an impact on natural resources and the environment*.

Article 25 requires any player whose activities may have a potential impact on the environment to carry out an environmental assessment. Articles 27 to 34 describe the purpose, procedure, content and validation of the environmental assessment. The first article (No. 69) of the Code states that "*Sites of historical, archaeological, scientific and cultural importance, as well as plant and animal species of ecological, aesthetic or medical interest, are protected by this Code*".

3.2.2.2 Order on Administrative procedure for Environmental Assessment (amending order A/2022/1646/MEDD/CAB/SGG of 25 July 2022)

Article 15 states that all development projects, works or operations likely to harm the environment and classified in one of categories A, B, C or D are subject to a prior Environmental and Social Impact Assessment (ESIA). In accordance with the procedure set out in Order 1595, the various stages in carrying out the ESIA are as follows:

- Submission of the project notice;
- Preliminary sorting;
- Drawing up the scope (scoping) and terms of reference;
- Carrying out the study;
- Examination/analysis of the report;
- Decision-making;
- Implementation; and
- Environmental monitoring and control.

Order specifying the content of the reports required for Strategic Environmental Assessments, Environmental and Social Impact Assessments, Environmental and Social Impact Notices, Relocation Action Plans and Simplified Relocation Action Plans.

A Local Environmental and Social Impact Assessment (EIES) Report was prepared in November 2022 by Administration et Controle des Grands Projects (ACGP) for the Project in line with the national legislation. An Environmental Conformity Certificate was obtained as reported by SONAPI during the meeting held on 13th September 2023 and later the conformity was put on hold by the authorities for this Project.

Another consultancy company, Chemas Consulting Group LLC., was appointed by SONAPI for the development of 2 Environmental and Social Impact Assessments (2 ESIAs), 2 Involuntary Resettlement Plans (2 IRPs), 1 Livelihood Restoration Plan (LRP) and a Socioeconomic Audit/Reference Situation (ASE/SR) as part of the Koloma Administrative City Project (PCCAK) in line with the national legislation for both for 9 ha of the area allocated for SONAPI (The same Project area which is subject of this ESIA study) and Koloma Directional Center (CDK) area which covers around 202 ha[4].

3.2.3 International Conventions

Order A/2015/342/MIPMEPSP/CAB of 27 February 2015 order/decree approves six standards relating to environmental protection throughout France. It takes account of IFC guidelines and European Union environmental standards. The following standards apply and the project must comply with them:

- The standard on wastewater discharges (NG 09-01-010 : 2012/CNQ. 2004) ;
- The standard on atmospheric emissions and pollution (NG 09-01-011 2012/CNQ: 2004);
- The standard relating to maximum exposure limits to certain chemicals and noise in the workplace (NG 09-01-012 / CNQ : 2004);
- The standard on environmental inspection procedures for industrial and commercial facilities (NG 09-01-013-2012/CNQ : 2004);
- The standard on environmental management systems and guidelines for its use (NG 09-05-001-2012/ISO 14001: 2004);
- The standard on guidelines for quality and/or environmental management systems auditing (NG 09-05-002:2012/CNQ: 2004).

Guinea is a party to several international conventions and regional agreements relating to the consideration of environmental and social issues. The key international agreement signed by Guinea is presented in Table 3-2 below.

Table 3-2: Key International Agreements signed by Republic of Guinea

Legislation	Year
Convention on Climate Change (New York, 09/05/1992)	Signed on 12/06/1992; Ratified on 07/05/1993; Came into force in March 1994.
Paris Agreement on Climate Change. (Paris, Le Bourget on 12/12/2016)	Signed on 22/04/2016; Ratified on 21/09/2016; Entry into force on 21/10/2016
Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, 11/12/1997)	Ratified on 07/09/2000; Entered into force on 16 /02/ 2005.
Vienna Convention for the Protection of the Ozone Layer (Vienna, 22/03/1985)	Joined on 25/06/1992
Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 16/09/1987)	Ratified on 25/07/1992; Entry into force: 23/09/1992
Stockholm Convention on Persistent Organic Pollutants (POPs)	Ratified on 11/12/2007
Convention on Biological Diversity (Rio de Janeiro, 05/06/1992)	Signed on 12/06/1992; Ratified 07/05/ 1993; Entry into force on 29/12/1993
Bonn Convention on Conservation of Migratory Wildlife Species	Came into force in August 1993.
RAMSAR The Convention on Wetlands	Ratified on 18/03/1993

[4] It is noteworthy to mention that the surface areas mentioned in the Chemas Consultancy's ESIAs and associated studies (9 ha and 202 ha) might be slightly different from the areas considered within the scope of this ESIA study. Once the reports become publicly available and completed, the surface areas need to be revisited and confirmed.

Legislation	Year
African Convention on the Conservation of Nature and Natural Resources (Algiers, 15/09/1968) revised version (Maputo, 2003)	Ratified on 10 June 2016 under Law L/2016/016/AN/SGG of 10 June 2016, authorising ratification of the African Convention on the Conservation of Nature and Natural Resources.
Basel Convention (Basel, 22/03/1989)	Accession on 26/04/95 (not ratified); Entry into force 09/05/2003
Bamako Convention on the Ban of the Import into Africa of Hazardous Wastes and on the Control of Transboundary Movements and Management of Hazardous Wastes within Africa signed on 31 January 1991 in Bamako.	Adopted in 1991; Entry into force in 1998
Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 23/11/1972)	Ratified on 18/03/1979; Entry into force on 18/07/1979
ILO Minimum Age Convention, 1973 (No. 138) (Geneva, 19/06/1973)	Ratified on 06/06/2003.
Convention on the Elimination of All Forms of Discrimination against Women	Ratified on 09/08/1982
Convention on the Rights of Persons with Disabilities	Ratified on 08/02/2008
Universal Declaration of Human Rights (Paris, 10 December 1948)	Enshrined in the Fundamental Law of 1er March 1992
International Covenant on Economic, Social and Cultural Rights	Signature 28/02/19967; Ratification 24/01/1978
Convention on the Rights of the Child	Ratification 13/07/1990

3.3 International Requirements: Standards, Agreements and Guidelines

3.3.1 OECD Common Approaches

OECD Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (Common Approaches) 2016, set out common approaches for undertaking environmental and social due diligence to identify, consider and address the potential environmental and social impacts and risks relating to applications for officially supported export credits as an integral part of Members' decision-making and risk management systems. The Common Approaches requires that Members should, amongst other actions:

- Encourage the prevention and the mitigation of adverse environmental and social impacts of projects and the consideration of environmental and social risks associated with existing operations and take into account the benefits of any projects and existing operations supported, thereby enhancing the overall financial risk assessment process.
- Undertake appropriate environmental and social reviews and assessments for projects and existing operations respectively, as part of their due diligence relating to applications for officially supported export credits.
- Encourage protection and respect for human rights, particularly in situations where the potential impacts from projects or existing operations pose risks to human rights.
- Foster transparency, predictability and responsibility in decision-making, by encouraging disclosure of relevant environmental and social impact information, with due regard to any legal stipulations, business confidentiality and other competitive concerns.
- Continue to encourage the application of the international standards referenced in this Recommendation or their equivalent by non-Members, to promote the adherence to this Recommendation by non-Members including through an active dialogue to increase awareness and understanding of the benefits of its application, and to take other appropriate measures with the aim of promoting a global level playing field for officially supported export credits.

- The ESIA should be benchmarked against the relevant aspects of the IFC Performance Standard, EHS Guidelines, as described below.

3.3.2 IFC Standards

The Performance Standards (PSs) provide guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

The IFC PSs that are considered to be relevant to the Project are presented in Table 3-3.

Table 3-3: Applicable IFC PSs

IFC PS	Applicability	Notes
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	Establishes requirements for social and environmental performance management throughout the life of a project.
PS 2: Labour and Working Conditions	Yes	Highlights the need for workers' rights regarding income generation, employment creation, relationship management, commitment to staff, retention and staff benefits.
PS 3: Resource Efficiency and Pollution Prevention	Yes	Defines an approach to pollution prevention and abatement in line with current internationally disseminated technologies and good practice.
PS 4: Community Health, Safety and Security	Yes	Specific requirements for mitigating any potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials.
PS 5: Land Acquisition and Involuntary Resettlement	Yes	Involuntary resettlement and economic displacement has occurred as a result of the Project.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	Sets out an approach to protect and conserve biodiversity, including habitats, species and communities, ecosystem diversity, and genes and genomes, all of which have potential social, economic, cultural and scientific importance.
PS 7: Indigenous Peoples	No	Recognises that Indigenous Peoples (IPs) can be marginalised and vulnerable (e.g., if their lands and resources are encroached upon by or significantly degraded by a project). There are no IPs in the study area which is located within an urban area and therefore no IPs have traditional or customary rights to the land or natural resources.
PS 8: Cultural Heritage	Yes	Aims to protect irreplaceable cultural heritage, to provide guidance for protecting cultural heritage throughout a project's life cycle and to promote the equitable sharing of benefits from the use of cultural heritage in business activities.

IFC General EHS Guidelines, 2007

The IFC General EHS Guidelines are technical reference documents. They contain examples of Good International Industry Practice (GIIP) in all industry sectors. The purpose is to use the Guidelines together with relevant GIIP during the appraisal of a project, to minimise, avoid and control environmental, health and safety impacts during construction, operation and decommissioning of a project. The Guidelines contain performance levels for which to assess the project against. Performance levels are those considered acceptable by the World Bank Group (i.e., levels considered achievable in new facilities at reasonable costs using existing technology).

3.3.3 Equator Principle 4

The Equator Principles (EPs) is a risk management framework used by financial institutions to assess and manage environmental and social risk in projects aiming to support responsible risk decision-making. The EPs apply to all new project financings with total capital costs of USD10 million or more across all industry sectors globally. The EPs represent a framework for project financing, which is underpinned by the IFC Performance Standards (PS).

The extent to which the EPs apply to a project depends on whether the country in which the project is located is “Designated” or “Non-Designated”. Projects within Non-Designated countries such as Guinea are required to follow the standards and guidelines as set out in the IFC PSs and Environmental Health and Safety Guidelines. In addition to the IFC standards note that the EPs also have specific requirements for climate change risk assessment and human rights risk assessments.

4. Environmental and Social Impact Assessment Methodology

4.1 Introduction

This chapter describes the methodology adopted to identify and characterise the environmental and socio-economic impacts associated with the Project. The methodology has been developed to meet the ESIA Standards of the Project as set out in Chapter 3 of this ESIA report.

4.2 ESIA Process

Environmental and Social Impact Assessment (ESIA) is a systematic approach to identifying the potential impacts of a project, and describing the mitigation, management and monitoring measures that need to be implemented to address these impacts. Beneficial impacts are also identified, so that positive outcomes arising from the Project can be identified and enhanced to the extent possible.

To ensure a robust and detailed impact assessment, the ESIA process is structured over a series of progressive and iterative stages. Stakeholders, the Project Proponent, and the Environmental and Social Consultant team provided input to these stages during the ESIA process.

An initial stage in assessing potential changes to the baseline conditions resulting from the Project was to identify environmental and social aspects. Environmental aspects are defined in International Standard for Environmental Management (ISO 14001:2015) as:

> *"An element of an organization's activities, products or services which can interact with the environment."*

In the above definition, environment can be applicable to both natural and socio-economic environment. Identification of aspects requires a good understanding of the project design, construction activities, its operation and maintenance, and (where applicable) decommissioning approach. Project alternatives, including not implementing the project, locations, design and construction techniques, are also considered. Details on Project design, construction, operation and alternatives are provided in *Chapter 2 Project Description*.

As part of the ESIA process, potential receptors within the study area that might be affected by project activities are identified. A receptor can be defined as:

> *"An entity that receives a contaminant or pollutant, change in status, and which can be subject to an environmental or social impact. It can be a body of water, air, parcel of land, individual, household, community, ecosystem or individual organism, or property."*

Once the aspects and receptors are identified, the interactions that might lead to potential impacts from the proposed activities are considered and evaluated.

For the purpose of this ESIA an environmental or social impact is defined as:

> *"Any change to the environment or social setting, whether adverse or beneficial, wholly or partially resulting from an organisation's activities or services."*

Key components of the ESIA are described in further detail in sections in the chapter.

4.3 Stakeholder Engagement

Stakeholder engagement is defined by IFC PS1 (IFC, 2012, p. 7) as follows:

> *"Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities."*

To allow for early understanding of stakeholder concerns and to help guide stakeholder engagement, a Stakeholder Engagement Plan (SEP) was prepared within the scope of this ESIA process. The approach to stakeholder engagement for the Project is described in *Chapter 5:Stakeholder Engagement*.

4.4 Project Area of Influence and Study Area

The initial step in the baseline characterisation is the definition of the Project Area of Influence (AOI) and the Study Area. The AOI (based on the definition in IFC PS1) adopted by the Project is the area likely to be affected by:

- Project activities and facilities that are directly owned, operated, or managed (including by contractors) by the Project Proponent and that are a component of the Project;
- Impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location; or
- Indirect Project impacts on biodiversity or on ecosystem services upon which 'Affected Communities'[5] livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the Project and that would not have been expanded if the Project did not exist and without which the Project would not be viable. It is anticipated there will not be any associated facilities for the Project; and
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Study Area is the geographical extent of the area for which baseline conditions will be characterised. It is defined by the AOI and may be equal to but is usually larger than the AOI. Different types of Project activities (planned and unplanned) may have different Study Areas, based on the type of impact and receptor. In general, for each of the impact assessments the Study Area will include the Project Site and appropriate buffer. The Study Area and AOI is described for each environmental and social aspect in *Chapters 6 to 15 of this ESIA Report*.

4.5 Data Collection and Baseline Characterization

The baseline characterisation of the physical, biological, and social environment is based on secondary (desktop research) data, supplemented by primary (field surveys) data where necessary.

As part of the ESIA Scoping Report, a desktop study was undertaken to collate available baseline data from published sources. The information was evaluated by the technical study teams and data gaps were identified. The desktop study was supplemented by field studies (field surveys/studies were held by SEES at selected locations and defined period). Details on the baseline study methods, sampling locations and receptor sensitivities, are presented in impact assessment *Chapters 6 to 15 of this ESIA Report*.

There are also two initial field study/site visits held in the beginning of the ESIA process with the participation of both AECOM and SEES's team. The initial site visit was conducted by SEES's team in August 2023. SEES undertook a site walkover survey and visited the surrounding of the Project site. AECOM's Team comprised of Elif Oc (Environmental Lead) and James Askwith (Social Lead) have then visited Conakry and the site between the 12th and 15th September 2023. The site visit was accompanied by SEES and ACC.

4.6 Impact Assessment Methodology

Potential impacts arising from planned and unplanned activities linked to the development of the Project were assessed. These were split into Project phases: Construction and Operation.

Planned activities include routine and non-routine Project activities or events required for each phase of the Project. Unplanned events are those not anticipated to occur during the normal course of Project activities.

There will be likely to have decommissioning activities related to the temporary welfare facilities.

[5] Local communities who are directly impacted by the Project.

4.6.1 Impact Magnitude

The magnitude of a given impact is a measure of the degree of change from the baseline conditions, and was typically determined through the consideration of the following factors (which were considered in parallel):

- *Extent*: the spatial extent (e.g. the area impacted) or population extent (e.g. proportion of the population/ community affected) of an impact;
- *Duration*: how long the impact will last (e.g. hours, weeks, months or years);
- *Frequency*: how often the impact will occur (e.g. a one-off event, periodic, or continuous); and
- *Reversibility*: the length of time and effort required for baseline conditions to return (e.g. reversible in the short-term or long-term, or irreversible).

The following criteria provide a general definition for determining the magnitude of a particular effect:

- *High Magnitude*: Total loss or major alteration to key elements/features of the baseline conditions such that post-development character/composition of the baseline condition will be fundamentally changed.
- *Medium Magnitude*: Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
- *Low Magnitude*: Minor shift away from baseline conditions. Changes will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
- *Negligible Magnitude*: Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

The criteria for each of these ratings are tailored for each study topic and are defined in each technical chapter of this ESIA Report.

4.6.2 Receptor Sensitivity

Receptors are environmental components (e.g. physical, ecological or biological), people and cultural heritage assets that may be affected, adversely or beneficially, by the Project. Receptor sensitivity considers the degree to which a receptor may be susceptible to an environmental or social aspect. More sensitive receptors may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable.

The concept of receptor sensitivity is based on multiple characteristics, typically:

- *Vulnerability*: the degree to which a receptor is vulnerable to change (i.e. higher or lower sensitivity);
- *Value*: the degree to which a receptor is valued or protected, with higher value receptors (based on ecological, cultural, social, economic, or other grounds) having a higher sensitivity; and
- *Resilience*: the degree to which a receptor is able to recover from an impact.

The following criteria provide a general definition for determining the sensitivity of receptors:

- *High Sensitivity*: The receptor has low capacity to absorb change without fundamentally altering its present character, is of high environmental or social value, or of national importance.
- *Medium Sensitivity*: The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental social value, or is of national importance.
- *Low Sensitivity*: The receptor is tolerant of change without detriment to its character, is of low environmental or social value, or local importance.
- *Negligible Sensitivity*: The receptor is resistant to change or is of little environmental or social value.

The criteria for each of these ratings are tailored for each study topic and are defined in each technical chapter of this ESIA Report.

4.6.3 Impact Significance

Following the rating of impact magnitude and receptor sensitivity, the overall significance of the impact was predicted. This was assisted by an impact assessment matrix (see Table 4-1) and the impact significance definitions (see Table 4-2), which ensure a consistent approach throughout the impact assessment.

Table 4-1: Impact significance matrix

		Sensitivity of Receptor			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	High	High	Moderate	Low / Negligible*
	Medium	High	Moderate	Moderate / Low*	Negligible
	Low	Moderate	Moderate / Low*	Low	Negligible
	Negligible	Low / Negligible*	Negligible	Negligible	Negligible

** Professional expertise will determine the impact significance*

Table 4-2: Impact significance definitions (adverse impacts)

Significance	Definitions
High Significance	Significant. Potential or residual impacts with a **high** significance are predicted to have damaging and lasting changes to the functioning of a receptor and may have broader consequences (e.g. on ecosystem health or community well-being). Potential impacts of **high** significance are a priority for mitigation in order to avoid or reduce their significance.
Moderate Significance	Significant. Potential or residual impacts with a **moderate** significance are predicted to be noticeable and result in lasting changes which may cause hardship to or degradation of the receptor. Broader consequences for the ecosystem or community are not anticipated. Potential impacts of **moderate** significance are a priority for mitigation in order to avoid or reduce their significance.
Low Significance	Detectable but not significant. Potential or residual impacts with a **low** significance are predicted to be noticeable changes to baseline conditions, beyond what would naturally occur, but are not expected to cause hardship or degradation. However, potential impacts of **low** significance still warrant the attention of decision-makers and should be avoided or mitigated where practicable.
Negligible	Not significant. Potential or residual impacts that are **negligible** are expected to be indistinguishable from the baseline or within the natural level of variation. These potential impacts do not require mitigation and are not a concern of the decision-making process.

The above matrix and significance definitions were used to assess adverse impacts of the Project. Where possible, the same criteria was used to identify the significance of beneficial impacts (only looking at the positive changes). However, where this was not possible, the beneficial impact was described in qualitative terms and, where applicable, measures to maximise benefits were also described. This is the approach that has been adopted for each of the technical topics unless clearly stated otherwise in the following technical ESIA chapters.

It should be noted that impacts assessed as ‘High’ or ‘Moderate’ are classed as being significant; whilst those classed as ‘Low’ or ‘Negligible’ are deemed to be not significant. This allows the Project Proponents to primarily focus resources and mitigation measures on those potential impacts which are considered significant, although measures are incorporated to reduce the significance of all impacts.

4.7 Assessment of Cumulative Impacts

A cumulative impact is an impact that results from incremental changes caused by other past, present, or reasonably foreseeable actions by others outside of the Project scope together with those from the Project, for example the incremental noise from a number of separate developments. The rapid cumulative impact assessment (CIA) methodology has been based on the identification of valued environmental and social components (VECs) and following the “IFC Good Practice Handbook, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets” **(IFC 2013).**

4.8 Impact Mitigation and Management

To alleviate possible impacts as far as reasonably practicable, a mitigation hierarchy of prioritised steps through avoidance, minimisation (or reduction) and restoration has been established, as illustrated in Figure 4-1. Mitigation measures are most effective when applied at the source of the impact; however, where this is not possible or does not completely mitigate the possible impact, other forms of mitigation are applied.

In many cases, measures to reduce or eliminate the impact/risk of an activity have been embedded within the Project design and / or standard construction and operating procedures, which are based on good international industry practice. Where significant (i.e. Moderate or High) impacts are identified within the ESIA, even after design factors and mitigatory industry practices are taken into account, additional mitigation measures have been identified and evaluated for their effectiveness.

Mitigation measures can include but are not limited to, the following:

- Modification of the project design;
- Alteration of the timing/scheduling of project implementation;
- Operational management (e.g. waste management); and
- Behavioural management (e.g. training and competency).

The selection of mitigation measures will consider a standard mitigation hierarchy, whereby preference is given to avoiding impacts altogether and subsequently to minimising the impact, repairing its effects, and/or offsetting the impact through actions in other areas as illustrated in Figure 4-1.

Where mitigation measures are identified, they will be communicated to the Project Team to be fed back into the Project design and incorporated into the Project Environmental and Social Management Plan (ESMP). Activities which are deemed to have a significant level of residual impact after mitigation will be identified and evaluated. These impacts will be subject to the environmental and social monitoring program and will be characterised by appropriate indicators.

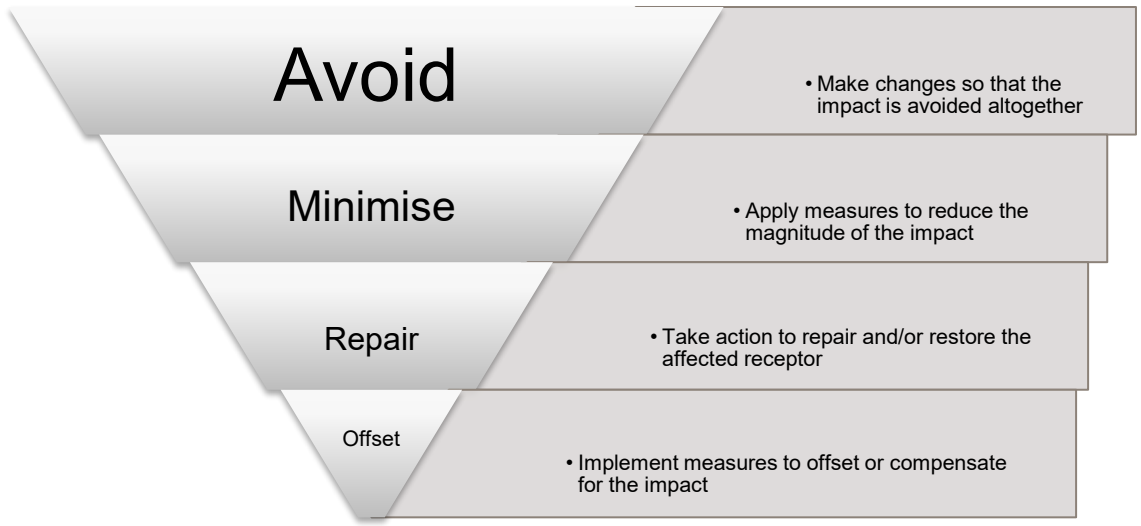

Figure 4-1: Mitigation hierarchy

4.9 Assessment of Residual Impacts

After mitigation measures were identified, the significance of each impact was re-evaluated to predict the post-mitigation ('residual') significance. Residual significance was used to support decision making and conclusions about the Project.

4.10 Unplanned/Accidental Events

The above assessment approach has been formulated to assess potential impacts resulting from planned or routine Project activities. The method therefore assumes that the Project activity that may cause the impacts will occur. The impact assessment has also considered events that are not planned but may occur during the Project lifecycle. Such 'non-routine events' are generally accidents or disasters, that have the potential to result in a greater impact than routine events. Accidents are considered to be an occurrence resulting from uncontrolled developments in the course of construction and operation of a development (e.g. major emission, fire or explosion). 'Disasters' are considered to be naturally occurring extreme weather events or ground related hazard events (e.g. earthquake).

Potential unplanned events associated with the Project include:

- Accidental leaks and spills of fuel and chemicals (e.g. lubricants, oil);
- Road traffic accidents;
- Damage to third party assets;
- Fire caused by Project components;
- Vandalism and damage by animals and people; and
- Extreme weather events and natural disasters (extreme heat, flooding, earthquake, wildfire).

The evaluation of impacts arising from unplanned events differs from routine events because, by their very nature, they are not expected to happen, but would likely result in significant impacts if they did occur. The significance criteria above have therefore will not be applied to unplanned and accidental impacts; instead the focus is on mitigation measures that will be put in place to reduce the likelihood of occurrence and the consequence of an impact if the unplanned event did occur.

4.11 Data Limitations

This ESIA Report has been prepared based on design information available at the time of its preparation, and predictions were made using accepted impact assessment methods ranging from qualitative assessment and expert judgement to quantitative modelling. Where necessary, conservative assumptions have been made and discussed in the relevant chapters.

It is noteworthy that construction activities for the proposed development commenced in late September 2023. Baseline surveys within the scope of this ESIA study were undertaken in advance of the excavation activities with exception of air quality measurements (NO_2 measurement via diffusion tubes). During water (from a borehole inside the Project premises), noise and PM measurements that were undertaken in October 2023, there were limited constructional activities on site and it was ensured that the constructional activities has been suspended in order not to be compromised with the abovementioned measurements. Further details of the air quality, noise and water sampling and measurements are presented in *Chapter 6: Air Quality*, *Chapter 9: Noise* and *Chapter 10: Surface Water, Groundwater and Soils* of this ESIA report.

At the time of writing this ESIA report, the number of operational staff/employees as well as the administrative authorities' buildings, which will be relocated to the proposed project site, are not definite. Similar to the relocation of the existing administrative/ministerial bodies, the operational services to be served by the SOJECAC have not been agreed and defined during the ESIA process. Therefore, the necessary information and assessment related to the relocation as well as operational services cannot be fully made in this ESIA report.

5. Stakeholder Engagement

5.1 Overview

Stakeholder engagement is essential to obtaining the social acceptance and facilitating the successful completion of the Project. On the basis of the international requirements, stakeholders including local communities potentially affected by the Project activities and other stakeholders not directly affected but who have an interest in these activities or who could affect their progress are consulted to seek their views and opinions regarding the Project before they are implemented.

This chapter gives an overview of the identified stakeholders and presenting their feedback on the Project received during the engagement activities. A stand-alone Stakeholder Engagement Plan (SEP) has been prepared for the Project which outlines a cultural appropriate approach and key steps to be undertaken by the Client, to plan and manage stakeholder engagement activities throughout the Project lifecycle.

5.2 Stakeholder Identification

The key primary stakeholder group will be the local communities around the Project site including neighbouring land users (particularly related to impacts from the Project activities) and the general public. Other important stakeholders include authorities at national, regional and district level, and non-governmental organizations (NGOs). The stakeholders identified for the Project as well as their specific relevance to or interest in the Project are presented in Table 5-1.

Table 5-1: List of Identified Stakeholders

Stakeholder Group	Stakeholders	Interest/Relation to the Project
Internal Stakeholders	SONAPI	Project Owner
	Workers from ACC, the Project Contractor	Contractor
	Construction Workers & Workers Representatives	Workforce
	Civil Servants and support staff that will be located at project during operation.	Workforce Representatives
	Ministries and workforce to be relocated to the Project	Workforce Representatives
Based on the immediate surrounding	Local businesses and residences on the roads to the north and southeast of the site on roads RO308, RO363 and RO251	• Close proximity to the site • Potential perceivable impacts of the Project (dust, noise, glare, visual, water- and land use-related, load on communal infrastructure) • Potential opportunities (employment, community development) • Interested in the compensation process.
	China Goe-Engineering Corporation (site to the west of the project)	
	Kapro Rails Cemetery	
	Kapro Rails Police Station	
	Community within Kapro Rail Ward	
	Community within Kaloma Soloprimo Ward	
	Guinea Radio and Television	
	Sanitation material depot	
	Centrale électrique thermique (Thermal Power Plant to the west of the site)	
	Orange Guinea headquarters construction site	
Distance >500m	United States Embassy	
	Ministry of Foreign Affairs, International Cooperation, African Integration and Guineans Abroad	
Authorities and Regulators	Police Department	• Approvals for and assistance in Project activities within each of the authorities' remit (land issues, water use, energy, transportation,
	Ministry of Energy Département Nationale d'Hydraulique (DNH)	

Stakeholder Group	Stakeholders	Interest/Relation to the Project
	Société des Eaux de Guinée (SEG)	archaeology, investment support, etc.) • Support with providing various baseline information on the area of Project implementation (from the rural district level to the republican level) • Potential assistance in interaction with other authorities and local population/organisations • Regulatory Approvals where necessary
	Ministry of Urban Development, Habitat, and Territorial Administration	
	Ministry for the Advancement of Women, Children, and Vulnerable People	
	Ministry of Security and Civil Protection	
	Ministry of Health and Public Hygiene	
	Ministry of Pre-university Teaching	
	Ministry of Work and Civil Service	
	Ministry of Economy, Finances, and Planning	
	Ministry of Culture Tourism and Handcrafts	
Regional, Provincial and Local	Office of Mayor of Ratoma	
	Soloprimo district chief	
	Collective of the Evicted	
National-General	Grand Imam of Conakry	• Support with providing various baseline information on the area of Project implementation • Potential assistance in interaction with other stakeholder groups • Assistance with identification of impacted people • Potential support on the consultation process • Potential to provide opinion on the facility design to facilitate disable people/patient's/employee's access.
	Archbishop of Conakry	
NGO	Human Rights Watch	• National newspapers that can disseminate Project information to a wide audience, may have a general interest on Project activities.
	UN Agencies (UN Habitat Regional Office for Africa, UNDP)	• Interest related to research and education • Support with providing various baseline information on the area of Project implementation

5.3 Stakeholder Programme

This section presents a summary of the stakeholder engagement programme, namely in two parts: previous engagement activities held during the national ESIA process as well as present engagement activities held during ESIA process and future engagement activities.

5.3.1 Previous Engagement Activities

5.3.1.1 National EIA/ESIA Report Phase

Two national EIA/ESIAs processes have been carried out, one in 2022 by SONAPI and Administration et Contole des Grand Projets (ACGP) for the Administrative City and the other in 2023 by Chemas Consulting Limited (Chemas) for the wider Ratoma masterplan area. The engagement activities for both ESIAs are summarised below.

The engagement activities held during wider Ratoma masterplan area ESIA process in 2023 (Conducted by Chemas Consulting Ltd) are presented in Table 5-2 below.

Table 5-2: Engagement Activities held during wider Ratoma masterplan area ESIA process in 2023 (Conducted by Chemas Consulting Ltd)

Stakeholders Present	Method/Location/Date	Responsibility
Communal Director of the Environment	2022	SONAPI and ACGP

Stakeholders Present	Method/Location/Date	Responsibility
The Municipal Director of the Environment of Ratoma		
Joint public consultation with Sector 4 victim	Nongo Youth Centre 09/08/2023	Chemas (on behalf of SONAPI)
Focus group with women from sector 4	Nongo Youth Centre 09/08/2023	Chemas (on behalf of SONAPI)
Focus group with young people from sector 4	Nongo Youth Centre 09/08/2023	Chemas (on behalf of SONAPI)
Joint public consultation with residents of the Kaporo-rails neighborhood	Ward manager's yard 18/08/2023	Chemas (on behalf of SONAPI)
Joint public consultation with residents of the Koloma Soloprimo district	School classroom public of Soloprimo 18/08/2023	Chemas (on behalf of SONAPI)
Guinean Environmental Assessment Agency (AGEE)	Meeting room AGEE 22/08 /2023	Chemas (on behalf of SONAPI)
Center for Geophysics and Seismology (CGS)	CGS Director's Office 22/08/2023	Chemas (on behalf of SONAPI)
National Wildlife and Forestry Directorate (DNFF)	DNFF meeting room 23/08/2023	Chemas (on behalf of SONAPI)
Commune de Ratoma,	Office of the Director of Microprojects 24/08/2023	Chemas (on behalf of SONAPI)
Members of the collective board	Collective headquarters 26/08/2023	Chemas (on behalf of SONAPI)
Société des Eaux de Guinée (SEG)	Office of the Head of the SEG Communal Centre in Ratoma 29/08/2023	Chemas (on behalf of SONAPI)
Regional Operations Center d'Intervention et de Secours (CORIS)	CORIS meeting room 30/08/2023	Chemas (on behalf of SONAPI)
Direction Nationale de l'Aménagement du Territoire et de l'Urbanisme (DATU) (National Department of Town and Country Planning and Urban Development)	DATU meeting room 30/08/2023	Chemas (on behalf of SONAPI)

- The key issues raised during these engagements include:
- Risk of pollution of the head of the kakimbo spring.
- The felling of valuable trees within the project area.
- The destruction/profanation of cemeteries and/or isolated graves.
- The inconvenience caused by the noise, dust and exhaust gasses of machinery during the construction phase.
- The effects of climate change.
- Collaboration of all the technical departments in the various soil and subsoil studies was raised as a challenge.
- Compliance with specifications, in particular the types of buildings that must not exceed a certain height.
- Run-off water and waste management issues could impact the immediate neighbourhood and pollute the Kakimbo river.
- Compensation and social support of those evicted.
- Non-recruitment of residents during the works and risks of unmet expectations leading to unrest.

- The project will relieve congestion on the Kaloum peninsula, improve urban mobility and, offer job opportunities.
- Cohabitation of workers and local populations, and the risks of GBV inherent in the project, are also among the major fears expressed.
- Labor issues, such as risk of increased demand for labour, discrimination against local workers, frustrations and industrial action.
- Influx risk including Gender-Based Violence (GBV) or sexual harassment.
- Risks of transmission and spread of STI/HIV/AIDS on the site and in the surrounding neighbourhoods.
- Traffic disruption and road safety risks.

5.3.1.2 ESIA Report Phase

During the preparation of ESIA Report, stakeholder engagement meetings were undertaken by AECOM's local partner, SEES, between August and November 2023. A site visit was also undertaken by AECOM between 12th and 15th September 2023. The engagement activities held during the ESIA process and summary of key issues raised by the stakeholders are presented in Table 5-3 below.

Table 5-3: Engagement Activities and summary of key issues raised by the stakeholders during the ESIA process

Stakeholders Present	Location/Date /Method	Summary of Key Issues Discussed	Respon sibility
Ministry of Culture Tourism and Handcrafts	3rd October 2023 Ministry Office	• Introduce the project. • The ministry explained they did not know the area. • They asked to do a site visit and survey.	SEES
National Director of Security of Roads Cournel Tun Kara	10th October 2023	• Introduce the project.	SEES
Director or Urbanism and Land Management	1 November 2023	• Introduce the project. • SEES asked for the original land demarcation but it was explained that this cant be shared.	SEES
Soloprimo District Chief	12TH September 2023 Meeting held at the chief's residence	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • The Chief gave his own personal account of the historic evictions and his view of the motivations. • The Chief also stated he was unaware of any compensation process. • The Chief expressed his support for the project but stated that victims of the evictions should be compensated. • The Chief also explained how the current site is not safe and they welcome the building of public buildings.	SEES and AECOM
Mayor of the Commune of Ratoma	12TH September 2023 Meeting at the major's office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • The Mayor gave his own personal account of the historic evictions and his view of the motivations. • The Mayor stated he was aware of the compensation process underway and he himself has been identified as someone to receive compensation. • The Mayor expressed his support for the project but stated that victims of the evictions should be compensated.	SEES and AECOM
Archbishop Vincent Coulibaly of Conakry	13th September 2023 Meeting held at the Archbishop's office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • The Archbishop stated that the evictions were politically motivated and nothing to do religion. • The Archbishop stated that the land at Ratomo site has been promised for a cathedral near the US embassy,	SEES and AECOM

Stakeholders Present	Location/Date /Method	Summary of Key Issues Discussed	Respon sibility
		• The Archbishop confirmed there were no religious tensions between Christian and Muslims in Conakry and he has a good relationship with the Grand Imam. • The Archbishop confirmed that Muslims and Christians are evenly distributed in Conakry and that the site is not in an area which contains a specific religious community.	
AGEEE	14th September 2023 Meeting held at the AGEEE office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • Information was gathered wastewater treatment and waste disposal in Guinea. • The direct stated he was familiar with the project and was part of the impact studies. They spent a week searching for sites of heritage importance without success.	SEES and AECOM
Representatives of Collective of the Evicted	15th September 2023 Meeting held at the residence of the chairman	• SONAPI raised a concern that the collective was expecting compensation before construction can start. • The Collective explained that the project is welcome and that construction can start and that compensation will follow. • SEES explained that the collective had a responsibility to communicate the message to its members so that no issues occurred when construction starts.	SONAPI and SEES
Land users and residents of Kaporo rail ward	25th September 2023	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • Discussion of the community history and profile, minority and vulnerable groups, demographic trends and migration, location of community assets, sources of income, access to healthcare. • Mobility and traffic in Conakry was raised as an issue and a concern by the participants • Environmental protection was seen as important but the current empty space at the project site was seen as a reminder of their neighbours who were evicted. • Tensions and conflicts within the community were mentioned but they were being managed by religious leaders. • Participants expressed frustration over the loss of access across the whole Koloma site, the lack of compensation and lack of engagements before the project fences were erected. • Frustration was also expressed over the current site perceived as a “bandit nest” and unsafe. • Concern was raised about dust noise and traffic. • Perceptions of the project were positive but high expectations were expressed regarding youth employment.	SEES
Land users and residents of Koloma rail ward	22th September 2023	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • Discussion of the community history and profile, minority and vulnerable groups, demographic trends and migration, location of community assets, sources of income, access to healthcare. • Traffic and domestic waste in Conakry was raised as an issue and a concern by the participants • Environmental protection was seen as important but the current empty space at the project site was seen as a reminder of their neighbours who were evicted. • Tensions and conflicts within the community were mentioned but they were being managed by religious leaders. • Participants expressed frustration over the loss of access across the whole Koloma site has hindered business and the fenses going up has blocked shortcuts. • Participants were concerned about the high cost of living that the opening of the site could cause in the ward.	SEES
Women of Koloma ward	26th September 2023	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared.	SEES

Stakeholders Present	Location/Date /Method	Summary of Key Issues Discussed	Respon sibility
		• Discussion regarding livelihoods of women, family and domestic responsibilities, distribution of control over household finances social issues including domestic violence. • Participants expressed support for the project but had high expectation of employment for the project. • Concerns were raised regarding traffic accidents and also unwanted attention given to young women and girls by the construction workforce.	
Women of Kapro rail ward	27th September 2023	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • A map of the site was shared. • Discussion regarding livelihoods of women, family and domestic responsibilities, distribution of control over household finances social issues including domestic violence. • Participants expressed support for the project but had high expectation of employment for the project and training for women.	SEES
Ministry of Education Djene Mady CONDE	1st November 2023 At the Ministry Office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • The Minister raised an issue that there is not enough quality teachers at all levels and not enough infrastructure (e.g school buildings) this is because the level of pay is too low to retain teachers. • It was explained that normally the law says no more that 2000m between home and school (but this is not the reality). • Level of success of moving from primary to secondary is 50%. • They have a challenge finding technical courses. • They have no information on the parents and children so there is not enough students in this type of school. • The minister didn't know anything about the evictions.	SEES
Guinea Water Society (director of technical management) Mamady Komara	1st November 2023 At the Ministry Office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • The Minister explained they need 250,000 cubic meters by this year for pipeline plus the long term source of water. Likely to have a drought. This is why quality of water is not good. When the pipe is empty, then bacteria and oxidisation then fill up again and water. • All the water comes from the south coast, all the water needs to be pumped over the mountain, the tank near the site is very important for them. • The issue with illegal water extraction. This year there have been 6184 illegal connections. • They have a few projects to increase distribution for the Conakry and they found finance for first part but they other money for the rest.	SEES
Ministry of Health Balde Mamadou Saydou (chief of risk management department) (national director for monther and child and nutriciain) Kaba Fadima	1st November 2023 At the Ministry Office	• SEES introduced the project and explained the purpose of the meeting and the ESIA process. • The Minister explained they lack of qualified medics and infrastructure. • There is no education of medics. • Most doctors are from other countries in Africa. • Greatest illness were malaria, water borne diseases, Ebola and Covid 19. • Traditional medicine is agreed by the ministry, this form of medicine is very important for population, first they go traditional medicine and after that they go to the hospital. There is not enough control on this type of medicate. Traditional medicine specialists must have an agreement from the ministry to do to the job. • 25% of children less than 5 years old are malnourished. 46% of pregnant are anemic.	SEES
AGEEE	Meeting held at the AGEEE office 31st of January 2024	• Monkey Forest Consulting and SEES interviewed AGEEE to understand the status of the conformity certificate and discuss the impacts of the project.	

Stakeholders Present	Location/Date /Method	Summary of Key Issues Discussed	Respon sibility
DATU	Meeting held at the DATU office 31st of January 2024	• Monkey Forest Consulting and SEES interviewed DATU to understand the process for land titling for the replacement land.	
Guinea Water Society (director of technical management) Mamady Komara	Phone Call 8th May 2024	• SEES called Guinea Water Society to understand the water capacity and demand in Conakry and understand the plans for increased capacity over the next 10 years. •	
DATU	Meeting held at the DATU office 9th May 2024	• Meeting with DATU to discuss drainage on the site. It was explained that there are no maps of drainage in the Ratoma area.	

5.3.2 Future Engagement Activities

The future planned engagement methods are divided into the following categories:

- **Notification methods:** Used to inform stakeholders and the general population of the SEP activities and the project development process.
- **Disclosure and consultation methods:** Used to provide information to stakeholders or to engage in a two-way dialogue by which information is shared with the stakeholders and these in turn can express their views and concerns about the project.
- **External grievance mechanism:** System to receive and facilitate resolution of the stakeholder's concerns and grievances about project-related issues.

Table 5-4 describes the proposed timeline for the stakeholder engagement during the ESIA, construction and operation phase of the Project and the tools that are proposed for each stakeholder engagement phase and for each type of stakeholder.

Table 5-4: Stakeholder Engagement Programme

Stakeholder Category	Stakeholder Engagement Methods	Location/ Timeline	Purpose	Consultation Disclosure Materials	Mean of Advance Notification	Responsibility
ESIA DISCLOSURE PHASE						
All stakeholder groups	• Disclosure online for 30 days	June-July 2024 ACC Website	• Disclose the results of the ESIA study online. This will include: • The ESIA (English Only) • The SEP (English Only) • The NTS (English and French)	• ESIA, non-technical summary (NTS) and SEP	• Media announcements • Website announcements	SEES on behalf of ACC
CONSTRUCTION PHASE						
All stakeholder groups	• Leaflets in public places • Media announcements • Noticeboards	Monthly/Quarterly updates as required	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction.	• Notices • Leaflets	• Media announcements • Website announcements. • Notice posted in public locations.	ACC/SEES
Soloprimo District Chief	• One-to-one meetings • Phone calls	Quarterly District Chief Office	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction. • Explanation of grievance mechanisms • Discus strategies to manage labour influx • Gather feedback on local perceptions or issues with the project	• Notices, leaflets, letters.	• Phone Call	ACC/SEES
Mayor of the Commune of Ratoma	• One-to-one meetings • Phone calls	Mayors Office Quarterly	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction. • Explanation of grievance mechanisms • Discus strategies to manage labour influx • Gather feedback on local perceptions or issues with the project	• Notices, leaflets, letters.	• Phone Call	ACC/SEES
Local communities in the immediate surrounding	• One-to-one meetings • Phone calls • Public event	To occur at least every six months at an appropriate venue	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction. Raise awareness of community health	• Notices • Leaflets	• Media announcements • Notice posted in public locations	SEES on behalf of ACC

Stakeholder Category	Stakeholder Engagement Methods	Location/ Timeline	Purpose	Consultation Disclosure Materials	Mean of Advance Notification	Responsibility
			and safety and any dangers around the construction zone. • Explanation of grievance mechanisms • Advertise potential employment opportunities or local procurement opportunities. • Manage expectations about opportunities and direct workers to the employment agencies. • Explain that anyone coming directly to the site entrance looking for work will be turned away and that local hiring agencies should be used for jobs. • Discourage small informal vendors from setting up too close to the project where it might be unsafe.			
Local Hiring Agencies	• One-to-one meetings • Phone Calls • Emails	Monthly or Quarterly (As required)	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction. • Advertise potential employment opportunities or local procurement opportunities.	• Notices • Leaflets	• Phone Calls • Emails	ACC
Employees/Workers	• Notices • Internal Meetings	Site offices To occur at least monthly	• Disclosure upcoming changes in workforce uptake/slowdowns or retrenchment. • Raise awareness of HSE as per internal HSE plans • Communicate internal grievance mechanism.	• Notices • Induction meetings • Weekly/Monthly meetings	• Notices • Site Announcements • Phone Calls • Emails	ACC
Regional Government Agencies	• One-to-one meeting	Government Offices To occur at least Quarterly	• Disclose and discuss the construction status and any major events due to take place such as major labour uptake, commencement of new phases or the end of construction, component delivery or any new activity which may require notice given or authorisation.	• TBC	• Personal interaction	ACC
OPERATION PHASE						
General Stakeholders	• Leaflets in public places • Media announcements	Monthly for the first 6 months as operation commences, then annually.	• Disclose and discuss the status of operation activities and any changes in environmental policy, plans and procedures that are followed. • Disclose the opening of Administrative City and the various ministries moving in. • Promote the various services available at the Administrative City. • Raise awareness of community health and safety • Explanation of grievance mechanisms	• Notices • Leaflets	• Website announcements. • Notice posted in public locations.	SONAPI (Or operating entities)

Stakeholder Category	Stakeholder Engagement Methods	Location/ Timeline	Purpose	Consultation Disclosure Materials	Mean of Advance Notification	Responsibility
			• Advertise potential employment opportunities (if applicable) • Advertise potential procurement and local business opportunities.			
Local communities	• Leaflets in public places • One-to-one meetings • Phone calls	Monthly for the first 6 months as operation commences, then annually or as and when required.	• Discuss other community benefits and mange expectations • Raise awareness of community health and safety • Implementation of grievance mechanism • Making comment/complaint forms available at the gates	• Notices • Leaflets	• Website announcements. • Notice posted in public locations • Personal interaction	SONAPI (Or operating entities)
Workers at Administrative City	• One-to-one meetings	Monthly for the first 6 months as operation commences, then annually or as and when required.	• Disclosure upcoming changes in workforce uptake/slowdowns or retrenchment. • Raise awareness of HSE as per internal HSE plans • Implementation of the grievance mechanism	• Notices • Leaflets	• Website announcements.	SONAPI (Or operating entities)

5.4 Community Grievance Mechanism

A key requirement of the IFC PS1 is the establishment and communication of an effective and adequate Grievance Mechanism. Effective implementation of a Grievance Mechanism is crucial to the management of grievances from the local community and other stakeholders. A locally based grievance resolution mechanism provides a promising avenue by offering a reliable structure and set of approaches where local people and the company can find effective solutions together. ACC will only be responsible for the management of grievances related with the services it provides during the construction phase and also grievances of workers that are working at these services. Grievances related with the compensation process or historic grievances related to the evictions will be under the responsibility of SONAPI.

AECOM, on behalf of ACC in this SEP document, has developed a grievance mechanism for the Project in accordance with IFC's Performance Standards and Guidance Notes which present various principles and good practice measures on grievance mechanisms.

The further details on the mechanism including responsibilities and procedures related with the implementation of the grievance mechanism are presented in the Project SEP.

6. Air Quality

6.1 Introduction

This Chapter presents the baseline data and impact assessment for Air Quality relating to the proposed Project. It considers the significance of potential air quality impacts on human health and amenity relative to baseline conditions. It does so by estimating potential impacts against applicable air quality limit values and guidelines.

6.2 Impact Assessment Methodology

6.2.1 Regulations and Guidelines

The assessment was undertaken in alignment with international guidelines (discussed under Section 3.3) and, where relevant, with reference to the laws and regulations of the Republic of Guinea (see Section 3.2). Relevant ambient air quality limit values have been sourced from Ministerial Order 2015/342/MIPMEPSP/CAB. The national limit values as published are shown in Table 6-1.

Table 6-1: Guinean National Air Quality Concentration Limit Values

Pollutant	Concentration Limit Value (µg/m^3)	Averaging Period
Sulpur dioxide (SO_2)	50	Annual mean
	125	24 hour mean
Nitrogen dioxide (NO_2)	40	Annual mean
	200	1 hour mean
Carbon monoxide (CO)	30[a]	24 hour mean
PM_{10}	80	Annual mean
	260[a]	24 hour mean
$PM_{2.5}$	65	Annual mean

a – 24 hour mean not to be exceeded more than once per year

To provide additional context, the World Health Organization (WHO, 2021) ambient air quality guidelines relevant to this study are presented in Table 6-2. The WHO guideline values are generally more stringent in comparison to the equivalent Guinean standards.

Table 6-2: Selected WHO Ambient Air Quality Guidelines

Substance	Averaging Period	Guideline Value
NO_2	Annual	40 µg/m^3
	1-hour	200 µg/m^3
	24-hour[a]	25 µg/m^3
PM_{10}	Annual	20 µg/m^3
	24-hour[a]	50 µg/m^3
$PM_{2.5}$	Annual	10 µg/m^3
	24-hour[a]	25 µg/m^3
SO_2	24-hour[a]	20 µg/m^3
	10-minute	500 µg/m^3
CO	24-hour[a]	4 mg/m^3

a – as the 99th percentile of daily values, equivalent to 3-4 exceedances per year)

It should be noted that the WHO guideline value for carbon monoxide has been set at 4 mg/m^3, equivalent to 4,000 µg/m^3, while the Guinean standard has been set to 30 µg/m^3. Other international standards for carbon

monoxide are of a similar scale to the WHO guideline value, and for the purpose of this assessment, the WHO guideline value has been used to determine potential significant effects, with reference to the Guinean standard provided to allow comparison. The Guinean standards for all other pollutants have been used.

6.2.2 Receptor Sensitivity

In air quality assessment terms, a sensitive receptor is most frequently defined as a location where people are likely to either live or work or engage in recreational activities or may be reasonably expected to do so in the future. Designated sensitive ecological habitats or features can also be considered sensitive receptors to changes in air quality. The overall criteria used to define impact receptor sensitivity is set out in Table 6-3.

Table 6-3: Air Quality Receptor Sensitivity Criteria (General)

Sensitivity	Description		
	Human Health	Amenity	Ecology
High	A location where there is relevant exposure for a period of time equal to the long-term and short-term pollutant averaging periods of the Project environmental assessment levels (EAL) (see Section 6.2.1) (e.g. dwellings, medical facilities, schools), where existing pollutant concentrations are 75% or more of the relevant EAL.	A location where people can reasonably expect an enjoyment of a high level of amenity; or a location where people would reasonably be expected to be present continuously, or for extended periods.	Habitat type which is recognised to be of ecological importance at an international scale (i.e. IFC defined Critical Habitat (IFC, 2012)), and Natural Habitat that is highly sensitive to the pollutants considered.
Moderate	A location where there is relevant exposure for a period of time that could potentially be equal to the short-term averaging period of the Project EALs (see Section 6.2.1) (e.g. places of work); OR A location where there is relevant exposure for a period of time equal to the long-term and short-term pollutant averaging periods of the Project EALs (e.g. dwellings, medical facilities, schools), where existing pollutant concentrations are between 50% and 75% of the relevant EAL.	A location where people would expect to enjoy a reasonable level of amenity or the appearance, aesthetics or value of their property could be diminished by dust soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land (e.g. places of work).	Habitat type which is recognised to be of ecological importance at a national scale (i.e. IFC defined Legally Protected and Internationally Recognised Areas (IFC, 2012)), and Transient Habitat that is sensitive to the pollutants considered.
Low	A location where there is unlikely to be relevant exposure for a period of time that could potentially be equal to the averaging period of the Project EALs (see Section 6.2.1) (e.g. transient locations such as markets); OR A location where there is relevant exposure for a period of time equal to the long-term and short-term pollutant averaging periods of the Project EALs (see Section 6.2.1) (e.g. dwellings, medical facilities, schools), where existing pollutant concentrations are less than 50% of the relevant EAL.	A location where the enjoyment of amenity would not reasonably be expected, or where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land (e.g. farmland).	Habitat type which is recognised to be of ecological importance at a local scale (i.e. IFC defined Modified Habitat (IFC, 2012)).

Sensitivity	Description		
	Human Health	Amenity	Ecology
Negligible	A location where there is no relevant exposure for a period of time that could potentially be equal to the averaging period of the Project EALs; OR There is exposure but they are Workers and should therefore be considered against relevant occupational health exposure standards, which are an order of magnitude greater than EALs used in this assessment.	A location devoid of amenity, with an absence of people or property or land which has a commercially sensitive use.	Habitat type which is not recognised to be of ecological importance.

The criteria for defining receptor sensitivity specifically in relation to impacts arising from construction dust emissions have additionally been considered according to a method adapted from the Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction (IAQM, 2023). The sensitivities of individual receptors have been categorised by their nature using the criteria in Table 6-3, while receptor sensitivity to dust and finer particulate matter can be further defined by the number of sensitive receptors that are located in close proximity, i.e. within 250 m of the construction site boundary or off-site sources. Key additional receptor sensitivity criteria in this regard are summarised in Table 6-4 and Table 6-5.

Table 6-4: Sensitivity Criteria for Areas to Dust Soiling (Construction Dust)

Individual Receptor Sensitivity	Distance from Source [Note 1]			
	<20m	<50m	<100m	<350m
High	**High**	**High**	**Moderate**	**Low**
Moderate	**Moderate**	**Low**	**Low**	**Low**
Low	**Low**	**Low**	**Low**	**Low**

Note 1: For trackout, the distances are considered from the side of roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500m from large sites, 200m from medium sites and 50m from small sites, as measured from the site exit. The impact declines with distance from the site and it is only necessary to consider trackout impacts up to 50m from the edge of the road.

Table 6-5: Sensitivity Criteria for Areas to Human Health Impacts (Construction Dust)

Individual Receptor Sensitivity	Annual Mean PM_{10} Concentration	Distance from Source [Note 1]			
		<20m	<50m	<100m	<350m
High	>20 µg/m^3	**High**	**High**	**High**	**Moderate**
Moderate	-	**High**	**Moderate**	**Low**	**Low**
Low	-	**Low**	**Low**	**Low**	**Low**

Note 1: For trackout, the distances are considered from the side of roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500m from large sites, 200m from medium sites and 50m from small sites, as measured from the site exit. The impact declines with distance from the site and it is only necessary to consider trackout impacts up to 50m from the edge of the road.

Note 2: Table 6-5 has been adapted from the IAQM assessment methodology to reflect local conditions and assessment limits.

6.2.3 Impact Magnitude

The magnitude of a potential impact is comprised of multiple factors including severity, spatial extent, duration frequency, probability and reversibility. Overarching criteria for defining impact magnitude for the purpose of this study are presented in Section 4.6.1., however supplementary criteria – specific to air quality – have also been considered. The latter are discussed and presented in the sections below.

6.2.3.1 Construction Dust

The method by which the impact magnitude has been determined is summarised in Table 6-6. The table is adapted from the IAQM guidance on the assessment of dust from demolition and construction.

Table 6-6: Air Quality Impact Magnitude Criteria (Construction Dust)

Dust Emission Magnitude	Description			
	Demolition	Earthworks	Construction	Trackout
High	Large total building volume. Potentially dusty construction material (e.g. concrete), on-site crushing and screening. Demolition activities >20 m above ground level.	Large total site area. Potentially dusty soil type (e.g. clay). >10 heavy earth moving vehicles active at any one time. Formation of bunds > 8 m in height. Total material moved >100,000 tonnes.	Large total building volume. Piling, on-site concrete batching, sandblasting.	>50 HGV outward movements in any one day. Potentially dusty surface material. Unpaved road length >100 m.
Moderate	Medium total building volume. Potentially dusty construction material. Demolition activities 10-20 m above ground level.	Medium total site area. Moderately dusty soil type (e.g. silt). 5 – 10 heavy earth moving vehicles active at any one time. Formation of bunds 4 – 8 m in height. Total material moved 20,000 – 100,0000 tonnes.	Medium total building volume. Potentially dusty construction material (e.g. concrete). On-site concrete batching.	25 – 50 HGV outward movements in any one day. Moderately dusty surface material. Unpaved road length 50 – 100 m.
Low	Small building volume. Construction material with low potential for dust release (e.g. metal cladding or timber). Demolition activities <10m above ground. Demolition during wetter months.	Small total site area. Soil type with large grain size (e.g. sand). <5 heavy earth moving vehicles active at any one time. Formation of bunds <4 m in height. Total material moved <20,000 tonnes. Earthworks during wetter months.	Small total building volume. Construction material with low potential for dust release (e.g. metal cladding or timber).	<25 HGV outward movements in any one day. Surface material with low potential for dust release. Unpaved road length <50 m.
Negligible	No or negligible levels of activity			

The construction phase dust impact assessment has considered potential air quality impacts associated with four different environmental aspects, grouped according to the nature/type and location of emission sources. It is not possible to model the dispersion of fugitive emissions from construction activity, due to uncertainty in dust and finer particulate emission rates, which vary depending on construction activity, methods and equipment used, and the characteristics of the surface and construction materials, including their moisture content. Instead, a qualitative assessment methodology has been undertaken to estimate the dust impact magnitude (risk of dust impacts occurring) as a result of construction activities. The risk of dust impacts occurring (potential effect) is determined by comparison of the dust emission magnitude and the sensitivity of the area to impacts of fugitive dust and finer particulates. The criteria upon which this has been based are summarised in Table 6-7.

Table 6-7. Risk of Dust and Finer Particulate Matter Impacts Occurring

Phase of Works	Sensitivity of Area	Dust Emission Magnitude		
		High	Moderate	Low
Demolition	High	High	Moderate	Moderate
	Moderate	High	Moderate	Low
	Low	Moderate	Low	Negligible

Phase of Works	Sensitivity of Area	Dust Emission Magnitude		
		High	Moderate	Low
Earthworks	High	High	Moderate	Low
	Moderate	Moderate	Moderate	Low
	Low	Low	Low	Negligible
Construction	High	High	Moderate	Low
	Moderate	Moderate	Moderate	Low
	Low	Low	Low	Negligible
Trackout	High	High	Moderate	Low
	Moderate	Moderate	Low	Negligible

In line with IFC General EHS Guidelines[6] (IFC, 2007), the assessment of fugitive emissions from construction dust takes account of the emphasis that the regulation and control of such emissions should be through the adoption of good working practices on-site. Good design practice is a process that is informed by impact assessments and is able to avoid the potential for significant adverse environmental effects at the design stage. This approach assumes that mitigation measures, beyond those inherent in the proposed design, that are identified as being necessary in the impact assessment will be applied during works to ensure that adverse effects do not occur. Examples of accepted good site practice include international guidelines published by the IFC (2007)[7], US Western Regional Air Partnership (WRAP, 2006), and the Australian (2012) and South African (2013) governments.

6.2.3.2 General Combustion Sources

The criteria presented in Table 6-8 have been used for categorising the likely magnitude of air quality impacts associated with emissions arising from road transportation and diesel powered equipment and plant (including generators) at the Project site. It is highlighted that the impact assessment of emissions from these sources has been undertaken qualitatively and therefore assignment of impact magnitude values to specific impacts has been based on professional judgement and experience, coupled with interpretation of available baseline and Project information.

Table 6-8: Air Quality Impact Magnitude Criteria (General)

Magnitude	Description
High	An expected change of more than 25% of an applicable EAL where the total predicted concentration (taking into account the baseline conditions and impact attributed to the Project) is considered likely to exceed the EAL, OR an expected change of more than 50% of the EAL where the total predicted concentration is considered likely to comply with the EAL.
Moderate	An expected change of 15% to 25% of an applicable EAL where the total predicted concentration is considered likely to exceed the EAL, OR an expected change of 25-50% of the EAL where the total predicted concentration is considered likely to comply with the EAL.
Low	An expected change of 5% to 15% of an applicable EAL where the total predicted concentration is considered likely to exceed the EAL, OR an expected change of 10-25% of the EAL where the total predicted concentration is considered likely to comply with the EAL.
Negligible	An expected change of less than 5% of an applicable EAL where the total predicted concentration is considered likely to exceed the EAL, OR an expected change of less than 10% of the EAL where the total predicted concentration is considered likely to comply with the EAL.

The IFC General EHS Guidelines[8] (IFC, 2007) advise that emissions associated with a project should not contribute a significant proportion to the attainment of relevant ambient air quality standards. As a general rule, the Guidelines suggest that project emissions should not contribute greater than 25% of the applicable air quality standards (in this case, considered to be the Guinean ambient air quality limit values) to allow for additional future sustainable development in the same airshed. A change in pollutant concentrations of more than 25% of the AQC value is therefore described as a high magnitude impact. A change of pollutant concentration of less than 10% of the AQC value is described as a low magnitude impact.

[6] Specifically, the section relating to Air Emissions and Ambient Air Quality.
[7] Specifically, the section relating to Construction and Decommissioning.
[8] Specifically the section relating to Air Emissions and Ambient Air Quality.

6.2.4 Impact Significance

In line with IFC General EHS Guidelines, the assessment of the significance of air quality impacts uses an approach that does not follow the generic impact significance matrix used in other sections of this EIA (see Section 4.6.3). The approach used is to establish the magnitude of the change in pollutant concentration (impact magnitude; Table 6-8) and to consider this in the context of absolute air quality criteria set for the protection of human health or amenity. The dose response relationship (i.e. sensitivity) for human exposure to specific air pollutants has been considered by the Guinean government in the setting of the air quality standards used as assessment criteria. A receptor sensitivity of 'high' has been applied to all human receptors, irrespective of the number or location of the receptors.

The significance matrix for the air quality assessment is presented in Table 6-9.

Table 6-9: Airborne pollutant impact significance matrix

Future Ambient Air Quality with Development	Impact Magnitude		
	High	Moderate	Low
Ambient pollutant concentration >100 % of AQC	High	Moderate	Low
Ambient pollutant concentration is 75%-100% of AQC	Moderate	Low	Negligible
Ambient pollutant concentration is <75% of AQC	Low	Negligible	Negligible

6.2.5 Assessment Methodology

6.2.5.1 Construction dust

An assessment of the risk of significant effects on nearby sensitive receptors has been undertaken in line with the guidance published by the IAQM, and following the criteria set out in Table 6-4 to Table 6-7. The assessment considers the four general construction related activities (demolition, earthworks, construction and trackout), the scale of the activity and the sensitivity of the surrounding area to determine the level of risk from the construction works. The risk category has been used to determine the control measures that should be implemented to ensure that no significant effects are anticipated at nearby sensitive receptors.

The assessment of construction dust considers those receptors closest to the Project site, as it is anticipated that these locations would experience the greatest potential impact and are of equal sensitivity to receptors further from the Project boundary.

6.2.5.2 Road Traffic and Generator Emissions

The assessment of road traffic emissions relating to the Project has been undertaken using dispersion modelling to determine the predicted change in concentrations at sensitive receptors located adjacent to roads included in the traffic and transport assessment. The future year scenarios represent the construction phase scenario of the Proposed Development. Baseline peak Traffic flows have been used for the following scenarios:

- Current year baseline (2023)
- Peak construction year (using 2023 baseline)

During the operational phase of the Proposed Development, there is anticipated to be up to 8,000 employees on the site. The current plan of the site does not include sufficient car parking for every employee to drive to site, and it is expected that a large number will commute in using public transport where available, or other active travel methods (i.e. walking or cycling). Currently, government offices are spread throughout Conakry, and employees travel across the city. As discussed in Chapter 12: Traffic and Transport of this ESIA Report, the trips associated with the operational phase of the Project are existing trips on the network being diverted from the existing government buildings in the city centre (Kaloum peninsula) to the location of the Project site; no additional trips associated with the Project will be added to the wider road network. As part of the wider Development Plan, there are some highways and transport infrastructure improvements are being provided to accommodate the traffic and transport requirements. Because of these reasons, operational road traffic emissions have not been included in this assessment as they are not considered likely to give rise to any significant effects beyond those reported for construction traffic.

The assessment of road traffic emissions has used the ADMS Roads (v6.0) advanced dispersion model to predict concentrations at receptors locations. There is no detailed national emissions inventory available to determine fleet composition and emissions rates, and therefore the emissions rates used in this assessment have been determined using professional judgement and familiarity with in-country driving conditions. The software uses locational information of the modelled road links and receptors from ArcGIS, alongside emission factors which account for fleet size, composition, and speed and meteorological information from a suitable nearby meteorological station.

The traffic data used in this assessment is shown in Table 6-10, and is derived from data reported from traffic counts and reported in Section 12 Traffic and Transport.

Table 6-10: Road traffic data

Link ID	Description	Baseline AADT			Construction Phase AADT		
		LDV	HDV	Motorbikes	LDV	HDV	Motorbikes
Link 1	Site Access	3688	18	6463	3855	326	12796
Link 2	US Embassy Road	13007	18	14658	13174	326	20991
Link 3	Kaporo	9657	32	26895	9740	32	30062
Link 4	Kipe Kakimbo	10227	85	34269	10310	393	37436
Link 5	Route de Donka	27076	352	46141	27118	652	47724

AADT – Annual Average Daily Traffic, LDV – Light Duty Vehicles (e.g. cars, vans), HDV – Heavy Duty Vehicle (e.g. vehicles >3.5T)

Modelled concentrations have been compared against measured roadside concentrations, and adjusted through a process called model verification. The process involves comparing the modelled results against the measured concentrations, then applying a factor to adjust the modelled results to improve the model performance. The baseline data collected is shown in Section 6.3 and the verification process is set out in Section 6.4.3.

The predicted change in pollutant concentrations between the future year scenarios is representative of the contribution to pollutant concentrations at receptor locations due to changes in traffic flows associated with the Project. This change is assessed in combination with background concentrations, in line with the process set out in Section 6.2.3 and 6.2.4.

The assessment of emissions from the operation of the construction and emergency generators have been considered qualitatively, based on the proposed number and size of generators required, the expected frequency of use and the location of sensitive receptors relative to the proposed generator locations.

General model input parameters are shown in Table 6-11.

Table 6-11: General Model Parameters

Parameter	Input
Surface roughness	0.5
Surface roughness at meteorological site	0.2
Receptors	See Table 6-14, Section 0
Source Location	See Table 6-10
Emissions	Roads: NOx, PM_{10}, $PM_{2.5}$ Generators: NOx, SOx, $PM_{2.5}$. See Table 6-2 for emission limits
Meteorological data	Roads: 1 Year (2022) hourly sequential meteorological data from Ahmed Sékou Touré International Airport Meteorological Station
Terrain data	Flat terrain
Building that may cause building downwash effects	None

A surface roughness coefficient of 0.5 metres (representative of parkland and open suburbia) was applied across the study area. The surface roughness is important in the approximation of turbulent conditions within the atmospheric boundary layer and thus in the estimation of pollutant concentrations at receptors.

Minimum Monin-Obukhov length (to reasonably limit the occurrence of very stable atmospheric conditions) was defined as 30 metres at the dispersion site (representative of mixed urban / large town areas). This parameter limits the occurrence of very stable boundary layer conditions (i.e. when the air is still) to a degree that is appropriate to the general land-use. In general, the potential for very stable conditions is lowest in large urban areas where the 'heat island' effect promoting turbulent motion in the boundary layer is strongest.

6.3 Baseline

6.3.1 Baseline Data Collection

6.3.1.1 Study Area

The study area includes areas in the vicinity of the Project site and includes monitoring data from across Conakry where available.

6.3.1.2 Desktop Study

The Department of State (US) currently undertakes air quality monitoring at US embassies across the world to inform overseas personnel of the air quality. The data is collected by continuous monitors at the US Embassy in Conakry to determine the concentration of fine particulate matter $PM_{2.5}$, and is located approximately 500m to the south west of the site (US Embassy in guinea, 2023). The Conakry air quality station is not currently in operation at this time and the last update received form the station was 31st October 2023. The data collected for $PM_{2.5}$ for the year 2023 exhibits a maximum recorded concentration of 171.1 µg/m^3 and a minimum of 1 µg/m^3 with an average concentration of 18.1 µg/m^3. Monitoring indicates that concentrations of particulate matter are above the WHO guideline values, and therefore above the Guinean national standards. Table 6-12 illustrates the AQI and the relevant concentrations for $PM_{2.5}$.

Table 6-12: Data from the US Embassy for The AQI and Concentration of $PM_{2.5}$ for 2023

	Concentration / µg/m^3	AQI	US AQI Level
Average	18.1	57.3	Unhealthy
Maximum	171.7	222	Very unhealthy
Minimum	1	1	Good

There is currently no published data available on ambient concentrations of other pollutants, including nitrogen dioxide, at locations within Conakry.

6.3.1.3 Primary Data Collection

A diffusion tube survey to determine concentrations of nitrogen dioxide was undertaken at roadside locations in the vicinity of the proposed development. The survey was started on the 11th October 2023, and decommissioned on the 2nd January 2024. The diffusion tube locations and recorded concentrations are shown in Table 6-13. Diffusion tube locations are shown in Figure 6-1. In addition to the diffusion tube monitoring, Particulate Matter monitoring survey has been undertaken at a location within the site boundary. Monitoring was undertaken on the 12th October for a period of 24 hours. The survey reported concentrations of PM_{10} 161.1 µg/m^3 and concentrations of $PM_{2.5}$ of 25.4 µg/m^3, similar to average concentrations reported by the data obtained from the US Embassy. However, as the site has been cleared prior to the survey, these concentrations are likely to be higher than would otherwise be the case following the completion of the Proposed Development.

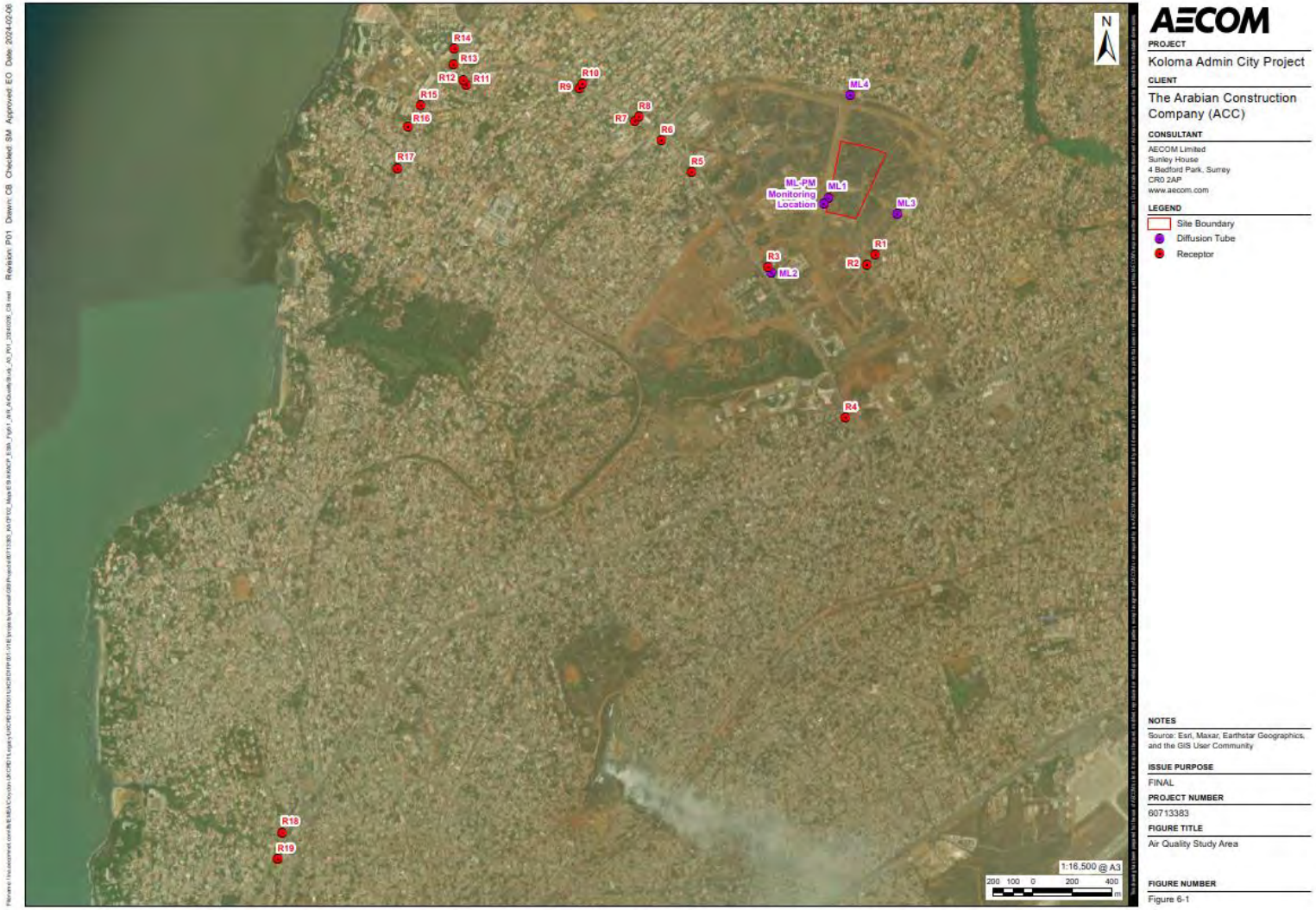

Figure 6-1: Diffusion tube locations

Table 6-13: Site Specific Nitrogen Dioxide Diffusion Tube Data

Site ID	Coordinates*		Recorded concentration (µg/m^3)			Annual mean concentration (µg/m^3)
	X	Y	Month 1	Month 2	Month 3	
ML-PM monitoring location**	650022	1061457	16.3	17.3	21.7	18.4
ML1	650021	1061453	11.3	13.6	19.0	14.6
ML2	649737	1061074	23.1	31.3	33.7	29.3
ML3	650369	1061374	20.1	18.3	26.7	21.7
ML4	650129	1061971	31.1	-	40.8	35.9

** coordinates used are WGS 1984, UTM Zone 28N*

***PM is at the same location as the PM monitoring.*

To determine background concentrations where no monitoring data is available, it has been assumed that short-term concentrations (1- and 24-hour means) are twice the annual mean concentration.

6.3.2 Receptors

For the construction dust risk assessment, receptor locations are any location where people may be impacted by fugitive emissions of dust, either for impacts on health, on amenity or on ecological receptors. Receptors included in the assessment are those located within 250m of the construction activities, and within 50m of site access roads up to 500m from the site entrance.

Discrete receptor locations have been selected adjacent to the modelled road network to represent locations where receptors may experience changes in pollutant concentrations due to changes in traffic flow on the road network. These receptor locations are shown in Table 6-14 and Figure 6-1. All human health receptors are modelled at a height of 1.5m, to represent human health exposure.

Table 6-14: Discrete Receptor Locations

Receptor ID	Location	Grid Reference*	
		X	Y
R1	Site access road	650257	1061163
R2	Site access road	650216	1061117
R3	Transversal 2/US Embassy Road, north of site access road	649722	1061101
R4	Transversal 2/US Embassy Road, south of site access road	650111	1060343
R5	Transversal 2/US Embassy Road, north of site access road	649338	1061578
R6	Transversal 2/US Embassy Road, north of site access road	649186	1061740
R7	Transversal 2/US Embassy Road, north of site access road	649052	1061837
R8	Transversal 2/US Embassy Road, north of site access road	649073	1061855
R9	Transversal 2/US Embassy Road, north of site access road	648774	1061999
R10	Transversal 2/US Embassy Road, north of site access road	648788	1062020
R11	Transversal 2/US Embassy Road, north of site access road	648208	1062015
R12	Transversal 2/US Embassy Road, north of site access road	648193	1062034

Receptor ID	Location	Grid Reference*	
		X	Y
R13	Kaporo	648144	1062119
R14	Kaporo	648147	1062197
R15	Kipe Kakimbo	647981	1061911
R16	Kipe Kakimbo	647916	1061803
R17	Kipe Kakimbo	647865	1061593
R18	DI 814	647302	1058243
R19	DI 814	647280	1058110

Coordinates are given in WGS84

6.3.3 Assumptions and Limitations (if Any)

Assumptions were developed to inform the assessment on the construction phase are as follows:

- The proposed route for HGV deliveries are expected to arrive from Conakry Port, avoiding the Bambeto exchange and approaching the site from the north. This assumption has been considered with the current traffic situation in Conakry.
- The daily number of construction vehicles in the peak has been assumed to be the following:
  - HGVs - 300 movements
  - Shuttles – 8 movements
  - Cars – 167 movements
  - Motorbikes – 5333 movements
  - Tuks – 1000 movements
- Shuttles and HGVs are added together for total Heavy Duty Vehicle (HDV) movements
- Tuks and motorbikes have been added together for total motorbike movements
- The following Euro engine standards have been assumed for each vehicle type:
  - Passenger cars – Euro 3
  - Heavy Duty Vehicles – Euro II
  - Motorcycles – Euro 1
- Diesel cars make up 60% of passenger vehicles (Doumbia et al, 2018)
- The 12 hour traffic flows for each link are assumed to be similar to the total daily flow.
- Construction traffic has been assigned to each road link as follows:
  - Links 1 and 2 – 100% of the construction traffic
  - Links 3 and 4 – 50% of the construction traffic
  - Link 5 – 25% of the construction traffic

6.4 Impact Assessment and Mitigation

The following section applies the ESIA impact methodology (see Section 4.6) and the additional discipline-specific criteria discussed in Section 6.2.3 and 6.2.4. Potential air quality Project impacts are compared against international guidelines and national standards aimed at understanding the overall impact to human health, amenity and ecology. The Section considers both embedded mitigation measures and additional mitigation to reduce impact significance.

6.4.1 Potential Impacts

The potential impacts associated with the development are set out in Table 6-15.

Table 6-15: Project Activities and Potential Impacts

Project Activities	Impact Pathway	Receptor	Impact ID/ Description
Construction Phase			
On-site construction works	Fugitive emissions of dust from construction activities – dust soiling, impacts on health and ecological receptors	Surrounding existing residential areas, educational / research facilities. commercial properties, administrative buildings/offices, and existing Places of Worship.	Temporary disturbance. [AQ01]
On-site construction works	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of construction site from construction plant and road traffic on surrounding road network		Temporary disturbance. [AQ02]
Operational Phase			
Emergency Generators	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of site from emergency generators	Surrounding existing residential areas, existing educational / research facilities, and existing Places of Worship.	Temporary Disturbance [AQ03]

6.4.2 Embedded Mitigations

A number of mitigation measures are set out in the Project's Environmental and Social Management Plan of the Site (PGESC). Section 7 of the Plan: Pollution Prevention Plan includes measures to reduce air emissions and dust, and identifies a number of essential measures to be taken:

- Protecting lorries with tarpaulins when transporting materials.
- On-site speed limits to reduce carbon monoxide, smoke and dust emissions;
- Regulatory checks and ensuring that machinery and vehicles are in good condition;
- Adequate watering of work areas, storage areas, etc. with water tanks equipped with sprinklers depending on requirements and climate;
- All on-site storage of materials and/or spoil is protected by tarpaulins;
- No burning in and around the Project site will be allowed:
- Compliance with the waste management plan in general; specifically, the management of green waste will favour the reuse of cut tree trunks;
- Use machinery and vehicles only when necessary, and always stop after use; and
- Reducing dust emissions from the movement of vehicles (Trackout) by ensuring the watering of roads adjacent to the proposed development and residential areas.
- The Pollution Prevention Plan also includes a commitment to undertake monitoring of NO_2, SO_2, PM_{10}, $PM_{2.5}$, VOC and CO in the vicinity of the construction site. A monitoring plan will be developed to specify frequency, duration, location and reporting of the monitoring survey.

6.4.3 Assessment of Impacts during Construction

6.4.3.1 AQ01: Fugitive emissions of dust from construction activities – dust soiling, impacts on health and ecological receptors

Project related activities such as site clearance, earthworks, general construction processes and materials handling (plus vehicle trackout) have the potential to temporarily increase dust emissions and PM_{10} concentrations at nearby sensitive receptor locations. It is noted that the site has already been cleared of vegetation, and no demolition activities have been undertaken for the Project; therefore, it is not included in this assessment.

A range of vehicles and plant are anticipated to be required during the construction phase, including (but not necessarily limited to) bulldozers, excavators, loaders dump trucks, telehandlers and concrete pumps.

While activities will be undertaken in a phased manner, the overall construction programme of approximately 27 months means that potential impacts can occur for more than 2 years, although across different areas of the site.

Increased dust soiling and PM_{10} concentrations have the potential to cause an adverse effect on three receptor categories/types; human health, amenity and ecology.

The dust impact risk magnitude associated with earthworks and construction activities is considered to be **high**, while for trackout it is considered to be **moderate.**

The Project site is situated within a broadly heavily urbanised area where there are several highly sensitive receptors (including existing barrack accommodation buildings and offsite residential properties and religious buildings) located close by. Background PM_{10} concentrations have been considered to be high (~80 µg/m^3). Overall, the sensitivity of the Project area to changes in PM_{10} concentrations (human health indicator) is conservatively considered to be high. The number of residential and commercial land uses and their proximity to the Project site has resulted in the sensitivity of the Project area to dust soiling impacts (amenity indicator) being considered moderate. There are no ecological sites within 50m of the site boundary or the site access roads up to 500m from the site entrance.

Overall, there is a high risk that direct, temporary adverse impacts of up to high significance could occur without the implementation of suitable mitigation measures. With the implementation of the measures set out in section 6.4.1.**6.4.2,** dust emissions should be suitably controlled and reduced such that any magnitude of impact would be negligible or low, which would be of a **low significance.**

6.4.3.2 AQ02 : Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of construction site from construction plant and road traffic

During the construction phase, there will be a number of construction plant operating on the site. Plant operating on site will be required for earthworks and construction, with the majority of the activity centred on the building locations. Construction plant do not represent a single source location, as plant is expected to move around the site and would be unlikely to remain stationary for prolonged periods of time. Construction plant would not be active continuously for the duration of the construction phase.

While emissions from on-site construction plant and vehicles may have the potential to aggravate existing respiratory ailments in sensitive individuals, significant impacts to human health are considered to be unlikely, on the basis of:

- The transient nature of construction;
- Distance to sensitive receptors; and
- Commitment to following general good practice with respect to the operation of combustion equipment.

In addition to the presence of construction plant, there will also be nine generators on site for the provision of electricity, with up to seven operational at any given time. Each generator will be approximately 300KW each, and will be operational for 10 hours per day. Four generators will be grouped on the western boundary, with the others spread around the site providing power to specific activities. Due to the size of each generator and the distance from sensitive receptors, it is considered that impacts from the generators would be negligible at any offsite receptor, and this is considered to be of **low significance.**

Construction traffic on the surrounding road network have the potential to increase pollutant concentrations at nearby sensitive receptors. The change in traffic flows associated with the construction phase are shown in Table 6-10, and show that there are significant changes in traffic flows on several road links in the vicinity of the site. The change in traffic emissions and their potential effects on sensitive receptors has been assessed.

Modelled emissions of nitrogen dioxide have been compared against measured roadside concentrations from the diffusion tube survey. The comparison showed a good agreement between measured nitrogen dioxide concentrations and modelled concentrations, assuming 100% of emitted oxides of nitrogen are converted to nitrogen dioxide over longer periods of time. It is considered that a factor of 1 should be applied to all modelled outputs.

Predicted concentrations at representative receptor locations are reported in **Table 6-16** to **Table 6-20**. The results indicate that there are locations adjacent to the modelled road links where the predicted annual mean concentrations of nitrogen dioxide and PM_{10} are likely to be above the relevant Air Quality Limit Values. For PM_{10}, this is due to a high background concentration. For nitrogen dioxide, it is likely that the higher concentrations are due to road traffic emissions and the proximity of receptors to the road. Predicted changes in concentration at

receptors R7, R10, R11, R12, and R17 are of a Moderate magnitude, which is considered to have a Moderate significance. At the locations where these moderate effects occur, concentrations in the baseline were generally exceeding the Air Quality Standard criteria, or were at risk of exceeding the criteria. The changes in traffic flow due to construction is considered to represent a peak in construction activity, and concentrations are expected to decrease back to similar to baseline concentrations. The predicted impacts are considered to be temporary, limited to the construction period. Overall, due to the limited duration of the construction work, this is likely to be **negligible**.

Table 6-16: Annual Mean Nitrogen Dioxide Concentrations - Road Contributions

Receptor ID	Grid Reference		Background Concentration (µg/m^3)	Annual Mean Concentration (µg/m^3)		
	X	Y		2023 Baseline	2023 Construction	Change
R1	650257	1061163	14.6	25.6	25.0	-0.5
R2	650216	1061117	14.6	29.6	30.3	0.7
R3	649722	1061101	14.6	25.2	28.8	3.7
R4	650111	1060343	14.6	27.0	26.1	-0.9
R5	649338	1061578	14.6	24.9	28.5	3.6
R6	649186	1061740	14.6	28.9	33.8	4.9
R7	649052	1061837	14.6	33.2	39.6	6.5
R8	649073	1061855	14.6	31.3	37.1	5.8
R9	648774	1061999	14.6	31.5	37.3	5.8
R10	648788	1062020	14.6	34.9	**41.8**	7.0
R11	648208	1062015	14.6	38.2	**45.5**	7.3
R12	648193	1062034	14.6	36.6	**43.1**	6.6
R13	648144	1062119	14.6	37.7	39.8	2.2
R14	648147	1062197	14.6	22.1	22.8	0.7
R15	647981	1061911	14.6	**60.1**	**65.4**	5.3
R16	647916	1061803	14.6	33.4	35.6	2.2
R17	647865	1061593	14.6	**69.2**	**75.4**	6.2
R18	647302	1058243	14.6	38.4	**40.3**	1.9
R19	647280	1058110	14.6	**56.9**	**60.2**	3.3
Criteria						40

Table 6-17: Maximum 1-hour Mean Nitrogen Dioxide Concentrations - Road Contributions

Receptor ID	Grid Reference		Background Concentration (µg/m^3)	Max 1-hr Mean Concentration (µg/m^3)		
	X	Y		2023 Baseline	2023 Construction	Change
R1	650257	1061163	29.3	44.2	45.2	1.0
R2	650216	1061117	29.3	50.5	55.9	5.5
R3	649722	1061101	29.3	45.3	51.0	5.7
R4	650111	1060343	29.3	56.7	54.4	-2.3
R5	649338	1061578	29.3	49.1	56.2	7.0
R6	649186	1061740	29.3	53.2	61.7	8.5
R7	649052	1061837	29.3	60.8	71.9	11.2
R8	649073	1061855	29.3	55.9	65.1	9.2
R9	648774	1061999	29.3	56.0	65.5	9.5

R10	648788	1062020	29.3	62.1	73.4	11.2
R11	648208	1062015	29.3	62.3	72.5	10.3
R12	648193	1062034	29.3	65.5	78.3	12.8
R13	648144	1062119	29.3	56.7	59.0	2.2
R14	648147	1062197	29.3	51.6	54.9	3.3
R15	647981	1061911	29.3	90.5	97.4	6.9
R16	647916	1061803	29.3	73.3	78.4	5.1
R17	647865	1061593	29.3	107.5	116.3	8.8
R18	647302	1058243	29.3	88.7	93.3	4.6
R19	647280	1058110	29.3	84.4	88.8	4.3
Criteria						200

Table 6-18: Annual Mean PM_{10} Concentrations - Road Contributions

Receptor ID	Grid Reference		Background Concentration ($\mu g/m^3$)	Annual Mean Concentration ($\mu g/m^3$)		
	X	Y		2023 Baseline	2023 Construction	Change
R1	650257	1061163	**80.6**	**81.1**	**81.0**	<0.1
R2	650216	1061117	**80.6**	**81.3**	**81.3**	<0.1
R3	649722	1061101	**80.6**	**81.0**	**81.2**	0.1
R4	650111	1060343	**80.6**	**81.1**	**81.1**	<0.1
R5	649338	1061578	**80.6**	**81.0**	**81.1**	0.1
R6	649186	1061740	**80.6**	**81.2**	**81.4**	0.2
R7	649052	1061837	**80.6**	**81.4**	**81.6**	0.2
R8	649073	1061855	**80.6**	**81.3**	**81.5**	0.2
R9	648774	1061999	**80.6**	**81.3**	**81.5**	0.2
R10	648788	1062020	**80.6**	**81.5**	**81.7**	0.2
R11	648208	1062015	**80.6**	**81.6**	**81.9**	0.2
R12	648193	1062034	**80.6**	**81.6**	**81.8**	0.2
R13	648144	1062119	**80.6**	**81.7**	**81.8**	0.1
R14	648147	1062197	**80.6**	**80.9**	**80.9**	<0.1
R15	647981	1061911	**80.6**	**82.8**	**82.8**	0.1
R16	647916	1061803	**80.6**	**81.5**	**81.5**	<0.1
R17	647865	1061593	**80.6**	**83.2**	**83.3**	0.1
R18	647302	1058243	**80.6**	**81.6**	**81.7**	<0.1
R19	647280	1058110	**80.6**	**82.5**	**82.5**	0.1
Criteria						80

Table 6-19: Maximum 24-Hour Mean PM_{10} Concentrations - Road Contributions

Receptor ID	Grid Reference		Background Concentration ($\mu g/m^3$)	Max 24-hr Mean Concentration ($\mu g/m^3$)		
	X	Y		2023 Baseline	2023 Construction	Change
R1	650257	1061163	161.1	162.0	161.9	-0.1
R2	650216	1061117	161.1	162.3	162.4	0.1
R3	649722	1061101	161.1	162.0	162.2	0.2

R4	650111	1060343	161.1	162.6	162.5	-0.1
R5	649338	1061578	161.1	162.3	162.5	0.3
R6	649186	1061740	161.1	162.5	162.8	0.3
R7	649052	1061837	161.1	162.9	163.3	0.4
R8	649073	1061855	161.1	162.6	162.9	0.3
R9	648774	1061999	161.1	162.6	163.0	0.4
R10	648788	1062020	161.1	162.9	163.3	0.4
R11	648208	1062015	161.1	163.0	163.4	0.4
R12	648193	1062034	161.1	163.1	163.6	0.5
R13	648144	1062119	161.1	162.9	163.0	0.1
R14	648147	1062197	161.1	162.2	162.3	0.1
R15	647981	1061911	161.1	164.7	164.7	0.1
R16	647916	1061803	161.1	163.6	163.7	0.1
R17	647865	1061593	161.1	165.5	165.6	0.1
R18	647302	1058243	161.1	164.0	164.1	0.1
R19	647280	1058110	161.1	164.3	164.4	0.1
Criteria						260

Table 6-20: Annual Mean $PM_{2.5}$ Concentrations - Road Contributions

Receptor ID	Grid Reference		Background Concentration ($\mu g/m^3$)	Annual Mean Concentration ($\mu g/m^3$)		
	X	Y		2023 Baseline	2023 Construction	Change
R1	650257	1061163	18.1	18.6	18.6	<0.1
R2	650216	1061117	18.1	18.8	18.8	<0.1
R3	649722	1061101	18.1	18.6	18.7	0.1
R4	650111	1060343	18.1	18.7	18.6	<0.1
R5	649338	1061578	18.1	18.6	18.7	0.1
R6	649186	1061740	18.1	18.8	18.9	0.2
R7	649052	1061837	18.1	19.0	19.2	0.2
R8	649073	1061855	18.1	18.9	19.1	0.2
R9	648774	1061999	18.1	18.9	19.1	0.2
R10	648788	1062020	18.1	19.0	19.3	0.2
R11	648208	1062015	18.1	19.2	19.4	0.2
R12	648193	1062034	18.1	19.1	19.3	0.2
R13	648144	1062119	18.1	19.2	19.3	0.1
R14	648147	1062197	18.1	18.5	18.5	<0.1
R15	647981	1061911	18.1	20.3	20.4	0.1
R16	647916	1061803	18.1	19.0	19.0	<0.1
R17	647865	1061593	18.1	20.8	20.8	0.1
R18	647302	1058243	18.1	19.2	19.2	<0.1
R19	647280	1058110	18.1	20.0	20.1	0.1
Criteria						65

6.4.4 Assessment of Impacts during Operation

6.4.4.1 AQ03 – Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of site from emergency generators

It is proposed that there will be five generators for the purpose of emergency power in the event that grid electricity is unavailable, each with a capacity of 2500KVA. It is expected that these generators will only be in operation for emergency situations, and will be tested on a regular basis for a short duration to ensure effective operation. This testing is expected to occur for up to 1 hour per month for each generator, and it is considered that emissions from the emergency generators would be unlikely to give rise to significant effects at sensitive receptor locations. Any impacts would be of a short duration and temporary. It is considered that the magnitude of the impacts from the emergency generators would be negligible at any offsite receptor, and this is considered to be of **negligible significance**.

6.4.5 Impact Summary

An assessment of likely air quality impacts associated with construction and operational phase Project activities has been undertaken. The assessment considers local air quality impacts at nearby existing sensitive receptors. Provided that the embedded mitigation measures set out in this section are effectively implemented, the proposals are not anticipated to result in any significant impacts from an air quality perspective. These results are summarised in Table 6-21.

Table 6-21: Impact summary

Impact ID	Impact	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Significance
Construction Phase								
AQ01	Dust soiling affecting amenity and vegetation	Surrounding existing residential areas, existing educational / research facilities, and existing Places of Worship.	Moderate–High	Negligible	Low Adverse	None required beyond embedded mitigation. Monitoring plan to be developed.	Negligible	Low Adverse
AQ02	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of construction site from construction plant and road traffic on surrounding road network		High	Moderate	Moderate Adverse	None required – temporary works	Low	Negligible
Operation Phase								
AQ03	Change in ambient concentrations of air pollutants (PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2) in vicinity of site from emergency generators	Surrounding existing residential areas, existing educational / research facilities, and existing Places of Worship.	High	Negligible	Negligible	None required	Negligible	Negligible

7. Greenhouse Gas Assessment and Climate Change Resilience

7.1 Introduction

This chapter presents the assessment of greenhouse gas emissions and climate risks associated with the Project. To achieve this a Greenhouse Gas (GHG) assessment was undertaken to assess the GHG emissions expected to be created throughout the life of the Project. In addition, to understand and identify climate risks associated with the Project a climate change risk assessment (CCRA) was carried out.

For ease of use this chapter has been divided into a GHG Assessment (**Section** 7.2), to predict and quantify the lifecycle GHG emissions that could be released as a result of the Project, and a Climate Change Risk Assessment (**Section** 7.3), to assess the potential vulnerability and resilience of the Proposed development to the projected impacts of climate change.

Greenhouse Gas Emission: GHG emissions are used as a measure and indicator of the Project's impact on the climate. The increase in concentration of GHG emissions in the global atmosphere is causing a change in climatic conditions, and in turn the negative impacts of climate change. Any GHG emissions arising as a result of the Project will therefore have an impact on the climate. **Section** 7.2 of this chapter outlines the GHG Assessment that was conducted to quantify the expected GHG emissions that will be released during the lifecycle of the Project. Based on this assessment, a number of mitigation measures have been identified that would reduce and minimise GHG emissions associated with the Project.

Climate Risk: As stated previously, the release of GHG emissions into the atmosphere is causing changes in climatic conditions and weather patterns across the globe. The effects and impacts of climate change are causing damage and disruption to the built environment, as well as the natural environment. As GHG emissions continue to be released and the effects of climate change become more pronounced, the risks associated with climate change at a local and global level must be assessed. **Section** 7.3 of this chapter looks at the resilience of the Project to climate impacts and presents the findings from a CCRA. Having first identified and assessed the potential climate risks to the Project over its lifecycle, adaptation and mitigation measures were identified to reduce or prevent their impacts.

7.2 Greenhouse Gas Assessment

7.2.1 Impact Assessment Methodology

7.2.1.1 Regulations and Guidelines

The GHG assessment has taken into account relevant legislation and guidance set out in various national policies.

The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement[9]

The central aim of the Paris Agreement, published by the United Nations Framework Convention on Climate Change (UNFCC), is to facilitate a global response to the threat of climate change and to keep global temperature rise this century well below 2ºC above pre-industrial levels. A more ambitious aim within the Paris Agreement includes limiting the temperature increase even further to 1.5ºC.

IFC Standards[10]

IFC requires to apply for Performance Standards (PSs) which are providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. The following IFC PSs have been considered in undertaking the GHG assessment for this project:

[9] UNFCC (2015); 'Paris Agreement'. [Online]. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf [Accessed 14 November 2023].
[10] International Finance Corporation (2012) IFC Performance Standard on Environment and Social Sustainability. Available at: ifc-performance-standards.pdf

- IFC PS1: Assessment and Management of Environmental and Social Risks and Impacts.
- IFC PS3: Resource Efficiency and Pollution Prevention.
- IFC PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- In line with the Greenhouse Gas Reporting Program[11], the IFC requires facilities to submit annual reports if:
- GHG emissions from covered sources exceed 25,000 metric tCO_2e per year.
- Supply of certain products would result in over 25,000 metric tCO_2e of GHG emissions if those products were released, combusted, or oxidized.
- The facility receives 25,000 metric tons or more of CO_2 for underground injection.

Equator Principles[12]

The Equator Principles (EPs) are a risk management framework adopted by financial institutions for determining, assessing, and managing environmental and social risk in projects. Currently, over 100 Equator Principles Financial Institutions (EPFIs) in 38 countries have officially adopted the EPs. The effective date for EP4 on all mandated transactions will be 1 July 2020 (Equator Principles, 2020).

The EPFIs will only provide financing to projects that meet the relevant requirements of Principles 1 to 10. The requirements of the principles of direct relevance to the Project are described below:

- **P2 – Environmental and Social Assessment** – Category A and, as appropriate, Category B projects, as defined using the International Finance Corporation's (IFC) environmental and social categorisation process (IFC, 2020)[13], will be required to undertake an environmental and social risk assessment, the documentation of which must include an ESIA.

  A Climate Change Risk Assessment is also required for "*all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of carbon dioxide equivalent (tCO_2e) annually. Consideration must be given to relevant Climate Transition Risks (as defined by the Task Force on Climate-Related Financial Disclosures (TCFD) and an alternatives analysis completed which evaluates lower Greenhouse Gas (GHG) intensive alternatives*."

- **P4 - Environmental and Social Management System and Equator Principles Action Plan** - For all Category A and Category B Projects, the EPFI will require the development of an Environmental and Social Management System (ESMS). Also, an Environmental and Social Management Plan (ESMP) must be prepared to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards.

Guinea's Nationally Determined Contribution (NDC)[14]

A NDC are non-binding national plans highlighting climate change mitigation, including climate-related targets for greenhouse gas emissions reductions. In accordance with the Paris Agreement, Guinea submitted its updated NDC in July 2021. Key highlights from Guinea's NDC are as follows:

Article I. Guinea moved to a 17% reduction target in GHG emissions (previously 13%), with unconditional contributions across sectors.

Article II. The potential for reductions to reach 49% by 2030by including land-use and forestry reductions.

Other relevant Policy, Standards and Guidance

- Institute for Environmental Management and Assessment (IEMA)[15]
- The World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) [16]

[11] Greenhouse Gas Reporting Program (2023) Available at: EPA's Greenhouse Gas Reporting Program (fas.org). [Accessed on 14 November 2023]
[12] Equator Principles (2020) The Equator Principles July 2020: A financial industry benchmark for determining, assessing and managing environmental and social risk in projects. Available at: The Equator Principles_EP4_July2020 (equator-principles.com)
[13] International Finance Corporation (2020). Available at: Environmental and Social Categorization | International Finance Corporation (IFC)
[14] Guinea's Nationally Determined Contributions (2021). Available at: Guinea | Climate Promise (undp.org)
[15] Institute of Environmental Management and Assessment (IEMA) (2022); 'Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance'.
[16] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD) (2004); 'The GHG Protocol: A Corporate Accounting and Reporting Standard'.

- Royal Institute of Chartered Surveyors (RICS) Professional Statement Whole Life Carbon Assessment[17]

7.2.1.2 Assessment methodology

This section of the ESIA Chapter presents the following:

- The guidance followed in conducting the GHG Impacts Assessment;
- The methodology behind the assessment of climate effects, including the criteria for the determination of sensitivity of receptor and magnitude of change from the existing of 'baseline' condition;
- The methodology for determining Demolition, Construction, and Operation Effects;
- The methodology for determining the Impacts of the Project;
- The limitations and assumptions in the approach taken in assessing the GHG impacts of the Project;
- Information sources that have been consulted throughout the preparation of this chapter;
- An explanation as to how the identification and assessment of potential climate effects has been reached; and
- The significance criteria and terminology for the assessment of climate residual effects.

Guidance published by IEMA in 2022 has been followed as it provides a framework for taking GHG emissions into account in the ESIA process (IEMA, 2022)[18]. The guidance sets out how to:

- Identify the GHG emissions baseline in terms of current and future emissions;
- Identify key contributing GHG sources and establish the scope and methodology of the assessment;
- Assess the impact of potential GHG emissions and evaluate their significance; and
- Consider mitigation in accordance with the hierarchy for managing project related GHG emissions (avoid, reduce, substitute, and compensate).

The following sources of information that define the Project have been reviewed and form the basis of the GHG assessment:

- Data from a whole life assessment has been used to undertake the quantified part of the GHG impact assessment. Whole life carbon assessments include the carbon emissions resulting from materials, construction activities and the operations of buildings over its entire life, up to its demolition and disposal.
- Documents provided by the client included:
    - Building footprint size and details around mitigation measures included within the Project design.
    - The Project's Environmental and Social Management Plan (PGESC Management Plan) provided further details around mitigation measures included within the construction and operation stages.
    - A detailed schedule of the construction period of the Koloma Admin City Administrative Project.

Methodology for Determining Baseline Conditions and Sensitive Receptors

The receptor for the GHG assessment is the global climate. As the effects of GHG emissions are not geographically constrained all GHG emissions have the potential to result in a cumulative effect in the atmosphere.

For the GHG assessment, the baseline is the 'business as usual' scenario where the Project is not implemented. The baseline typically consists of the GHG emissions from any existing site operations and the existing carbon stock within the soil and the above- and below-ground vegetation within the boundary of the Project site.

Methodology for determining Demolition, Construction, and Operation Effects

[17] RICS professional standards and guidance, UK (2023); 'Whole life carbon assessment for the built environment, 2nd edition'. [Online]. Available at Whole_life_carbon_assessment_PS_Sept23 (1).pdf [Accessed 16 November 2023].
[18] Institute of Environmental Management and Assessment (IEMA) (2022); 'Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance'.

To identify the impact of the Project, lifecycle GHG emissions for a 'do-something' scenario, i.e., where the proposed development is constructed and operated, have been compared to a 'do-nothing' future baseline scenario where the proposed development is not built.

For the purpose of the GHG assessment the 'do-nothing' future baseline scenario is zero This is considered to be a conservative approach.

For the do-something scenario, GHG emissions resulting from the Project are calculated in line with the GHG protocol and the principles set out in IEMA guidance19 and PAS: 2080.20

This approach considers emissions from different lifecycle stages of the Project including product stage, construction process stage and the operational stage.

Where activity data has allowed, expected GHG emissions arising from the construction and operational activities, of the Project, have been quantified using a calculation-based methodology, as per the following equation presented in the UK Defra 2023 emissions factors guidance:

Activity data x GHG emissions factor = GHG emissions value

In line with the WRI and WBCSD GHG Protocol guidelines[21], the lifecycle GHG impact assessment has been reported as tonnes of carbon dioxide equivalent (tCO_2e) and has considered the seven Kyoto Protocol gases:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N2O);
- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen Trifluoride (NF_3).

These GHGs are broadly referred to in this chapter under an encompassing definition of 'GHG emissions', with the unit of tonnes of CO2 equivalent (tCO2e).

Where data is not available, a qualitative approach to addressing GHG impacts has been followed, in line with the IEMA guidance.

A combination of following emissions factors have been used for the purpose of this assessment:

- UK Department for Environment, Food and Rural Affairs (DEFRA) and the Department of Business, Energy and Industrial Strategy (DBEIS) (DEFRA & DBEIS, 2023 GHG reporting conversion factors[22]; and
- Embodied carbon benchmark data from the RICS Global Methodology to Calculate Embodied Carbon (RICS, 2023)[23];

A set of standard data quality principles have been applied so that the results from the GHG assessment are as accurate and representative as possible.

[19] Institute of Environmental Management and Assessment (IEMA) (2022); 'Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance'.
[20] BSI (2016); 'Guidance Document for PAS 2080'. [Online]. Available at: Guidance-Document-for-PAS2080_vFinal.pdf (constructionleadershipcouncil.co.uk) [Accessed 14 November 2023].
[21] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD) (2004); 'The GHG Protocol: A Corporate Accounting and Reporting Standard'.
[22] Department for Business, Energy and Industrial Strategy (2023); 'Greenhouse gas reporting: conversion factors 2022'. (online). Available at: Greenhouse gas reporting: conversion factors 2022 - GOV.UK (www.gov.uk) [Accessed 14 November 2023].
[23] RICS professional standards and guidance, UK (2023); 'Whole life carbon assessment for the built environment, 2nd edition'. [Online]. Available at Whole_life_carbon_assessment_PS_Sept23 (1).pdf [Accessed 16 November 2023].

Where relevant GHG activity data was unavailable, assumptions and estimations have been developed. Any assumptions, inclusions and exclusions that inform the GHG emissions calculation have been clearly described in the sections below.

GHG 'hot spots (i.e., sources and activities likely to generate the largest amount of GHG emissions) have been identified to enable priority areas for mitigation to be targeted.

Potential activities related to the Project that could cause GHG emissions are presented Table 7-1.

Table 7-1: Potential sources of GHG emissions

Lifecycle Stage	Activity	Primary Emission Sources
Pre-construction (including demolition)	On-site pre-construction activity i.e. enabling works, demolition of existing structures, etc.	GHG emissions from fuel consumption by construction plant and vehicles, generators on-site, and worker commuting
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal of earthworks/ pre-construction waste
	Land clearance	GHG emissions associated with the loss of carbon stock
Product manufacture	Raw material extraction and manufacturing of products/ materials	Embodied GHG emissions associated with product and material manufacture
	Transport of products/ materials to Project site	GHG emissions from fuel consumption of transportation of products and materials to Site
Construction	On-site construction activity	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on-site, and material consumption
	Transport of construction workers	Energy (electricity, fuel, etc.) consumption from worker commuting
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal/treatment of earthworks/ construction waste
Operations	Operation of the Project	GHG emissions from energy use, additional traffic, provision of potable water, and treatment of wastewater
	Transportation and disposal of waste	GHG emissions from transportation and disposal of waste
	Building and grounds maintenance (out of scope)	GHG emissions associated with replacement materials/products
	Landscaping	Changes in GHG emissions/sinks from landscaping and re-vegetation
Decommissioning (out of scope)	Removal and or renewal of the Project	GHG emissions arising from fuel consumption for plant and vehicles and disposal of materials.

7.2.1.3 Receptor Sensitivity

The sensitivity of the climate to GHG emissions is considered to be 'high'. The rationale is as follows:

- GHG emission impacts could compromise Guinea's ability to reduce its GHG emissions and therefore its ability to meet targets and reductions;
- The extreme importance of limiting global warming to below 2°C above industrial levels, while pursuing efforts to limit such warming to 1.5 °C as set out in the Paris Agreement [24]and a recent report by the

[24] UNFCC (2015); 'Paris Agreement'. [Online]. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf [Accessed 14 November 2023].

Intergovernmental Panel on Climate Change (IPCC)[25] highlighted the importance of limiting global warming below 1.5 °C; and

- Disruption to global climate is already having diverse and wide-ranging impacts to the environment, society, economic and natural resources. Known effects of climate change include increased frequency and duration of extreme weather events, temperature changes, rainfall and flooding, and sea level rise and ocean acidification. These effects are largely accepted to be negative, profound, global, likely, long-term to permanent, and are transboundary and cumulative from many global actions.

The receptor for GHG emissions is the global climate as the effects of GHG emissions are not geographically constrained. All GHG emissions have the potential to result in a cumulative effect in the atmosphere.

7.2.1.4 Impact Magnitude

The significance of effects has been determined using the matrix in Table 7-2 below. This differs from the methodology described in **Chapter 4: ESIA Methodology**. The approach undertaken here acts in line with IEMA Guidance which are outlined in this section.
IEMA guidance describes five distinct levels of significance which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero.

Table 7-2 provides the five levels of significance presented in the IEMA guidance. The guidance emphasises that *"a project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the UK's net zero trajectory, or accepted aligned practice or area-based transition targets, results in a significant adverse effect. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. '**moderate**' or '**major**' adverse effects."* Moderate and Major adverse impacts are considered to be significant, while all other significance levels are deemed to be not significant.

A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change, aligning project emissions with a science-based 1.5°C compatible trajectory and achieving net zero by 2050.

A project's impact can shift from significant adverse to nonsignificant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero.

Table 7-2: Definition of levels of significance

Effects	Significance Level	Description	Example in the guidance
Significant adverse	Major adverse	A project that follows a 'business-as-usual' or 'do minimum' approach, or accepted aligned practice or area based transition targets. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects.	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the countries trajectory towards net zero.
	Moderate adverse		The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the countries trajectory towards net zero.
Not significant	Minor adverse	A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this

[25] IPCC (2018); 'Global warming of 1.5°C - Special Report'. [Online]. Available at: https://www.ipcc.ch/sr15/ [Accessed 14 November 2023].

Effects	Significance Level	Description	Example in the guidance
		to-date policy and 'good practice' reduction measures to achieve that. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario.	type. A project with minor adverse effects is fully in line with measures necessary to achieve the countries trajectory towards net zero.
	Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions. This project is playing a part in achieving the rate of transition required by nationally set policy commitments.	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	Beneficial	A project that causes GHG emissions to be avoided or removed from the atmosphere. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

7.2.2 Baseline

7.2.2.1 Baseline Data Collection

For the GHG assessment, the baseline is the 'business as usual' scenario where the Projectis not implemented. The baseline typically consists of the GHG emissions from the existing site operations and the existing carbon stock within the soil and the above- and below-ground vegetation within the boundary of the Project site. The quantity of GHG emissions would therefore remain unchanged from the current level.

As the current land use of the Project site is undeveloped land the baseline emissions for the lifecycle GHG impact assessment are zero.

7.2.2.2 Study Area

The study area adopted for the GHG impact assessment covers the direct GHG emissions (those arising from construction and operational activities undertaken within the respective Project boundary) and indirect GHG emissions (those associated with construction materials, the transportation of materials and waste, and worker transportation arising outside of the Proposed DevelopmProjectent boundary).

For a detailed description of the site refer to Section 2.1. The site is located in the Ratoma urban sub-prefecture, of Conakry in Guinea. The Project is on an unoccupied land and is located on a larger area of historically cleared brownfield land owned by the Guinean state that totals approximately 202 ha, as prior to development it had no buildings or infrastructure located on it. However, the site was historically occupied and subject to two evictions which occurred in 1994, 1998 and 2019.The site is in close proximity to a number of catchments, including the Kakimbo River, and is roughly 2.4 km from the coast.

7.2.3 Assumptions and Limitations

Limitations of the Lifecycle GHG Assessment

The information gathered to date is considered sufficient to provide the basis for a GHG assessment within the ESIA. However, the assessment has taken into consideration assumptions and limitations, as outlined in Table 7-3. For each limitation, an explanation of the possible result impact of the limitation has been provided, as well as a description of any corrective actions that will be taken to adjust for any limitations.

Table 7-3: Limitations within the Lifecycle GHG Impact Assessment

Limitation	Impact of limitation	Correction for limitation
There are no specific embodied carbon factors available for	Emissions factors presented may not directly represent embodied	Emissions factors have been used from several sources including

Limitation	Impact of limitation	Correction for limitation
construction activities and operational activities in Guinea.	carbon emissions associated to the project	ICEv3.0, CBSE, RICS and BEIS to calculate embodied carbon for construction and operation phases. These are UK focussed but will provide a reasonable indication of emissions. It is not anticipated that any inaccuracies will occur or affect the outcome of the overall assessment.
Due to a limited amount of information being available at this stage, benchmark data has been used to quantify GHG emissions associated to the Project.	Emissions calculated will not be wholly representative of the Project, however they will provide a magnitude of impact to assess.	Using benchmark data allows for a complete assessment of the GHG emissions associated to the Project. Although UK benchmarks, they provide a magnitude of impact.

A quantified GHG assessment has been undertaken based on a combination of project specific data and industry estimates where project data was not available.

Limited data was available for the different stages of the construction (A1-A5) and operational (B1-B9) energy separately. Instead, the GHG emissions presented in this report have used benchmark emission factors for similar building types. The assumptions section below highlights the information used for the construction and operational GHG assessments.

There are no specific embodied carbon factors for Guinea were available for construction and operational emissions. We have therefore used UK emissions factors to provide a substantial quantitative assessment of the GHG impacts of the Project. While they may not directly represent embodied carbon emissions associated with the construction and operational processes within Guinea, they will provide a reasonable indication of the magnitude of impact. However, a more accurate reflection would require the use of the countries grid intensity factor.

There are other potential sources of emissions that have not been quantifiably assessed as part of this GHG assessment:

- Operational phase waste disposal: quantitative analysis was excluded from the scope due to lack of available data for the GHG assessment.
- Operational phase water use: although the CIBSE standards used as part of the operational GHG emissions assessment cover most of the operational emissions such as electricity and fuel, water use has not been quantified within this assessment.
- Operational phase transport emissions: while it has been stated that the project will ultimately provide functional office space for over 8,000 Guinea employees with dedicated vocational training, this is yet to be confirmed by the ultimate owner. For that reason, transport emissions (e.g. worker commuting) have not been quantified as part of the GHG assessment.

Assumptions made in the Lifecycle GHG Impact Assessment

The following assumptions, inclusions and exclusions, made on a precautionary basis, have been used in the calculation of GHG emissions for the construction phase. The following assumptions have been made when undertaking the GHG assessment for this Project:

Construction emissions

Due to data being unavailable to allow for the calculation of emissions from construction of the Project, emissions benchmarks have been applied based on similar building types. The RICS[26] benchmark tool provides emissions factors for different building types, based on the squared metres footprint of each building. The RICS benchmark methodology includes all embodied carbon including the following product and construction stages:

[26] RICS professional standards and guidance, UK (2023); 'Whole life carbon assessment for the built environment, 2nd edition'. [Online]. Available at Whole_life_carbon_assessment_PS_Sept23 (1).pdf [Accessed 16 November 2023].

- A1 – Raw Material Supply
- A2 – Material Transport
- A3 – Material Manufacturing
- A4 – Construction Process Transport (material and worker)
- A5 – Construction Installation process

The following building type benchmarks have been used following this guidance:

- Offices – specific office construction emissions were available.
- Car park – previous benchmarking approach methodologies have been applied. The emissions factor applied to car park was the same as 'Infrastructure' building type.
- Auditorium – an educational facility building benchmark.
- Conference building – an educational facility building benchmark.
- Heritage pavilion – a recreational building benchmark.
- Open air theatre – a recreational building benchmark.

Due to the assumptions and limitations outlined in this section, construction emissions calculations have been used here as a relative measure to identify the main hotspots for emissions and to aid the identification of where emissions savings can be made.

Operational emissions

Like the construction GHG emissions calculations detailed above, a complete set of data was unavailable to calculate operational emissions. GHG operational benchmarking data published by CIBSE for similar building types has been used, which includes, maintenance, repair, refurbishment, replacement, and operational emissions accounting for both electricity and fossil fuels. The following building types have been applied to each building:

- Offices – office (central government).
- Car park – enclosed car park.
- Auditorium – Educational higher (lecture theatre/conference facility).
- Conference building – Educational higher (lecture theatre/conference facility).
- Heritage pavilion – entertainment (theatres).
- Open air theatre – entertainment (theatres).

7.2.4 Impact Assessment and Mitigation

7.2.4.1 Embedded Mitigations

This section details the GHG mitigation measures that have been proposed during construction and primarily through operation of the Project. The following renewable energy provisions/sustainability measures have been included in design:

- Solar hot water systems;
- External lighting, for example street lighting, to be assisted by solar panels;
- STP system -- treated sewerage water to be used for irrigation;
- Rainwater harvesting - Stormwater holding tank to re-use rainwater for irrigation;
- VFD's for fans, pumps and condenser units if not central chiller;
- LED lighting and associated sensors;

- Waterflow reducers for sanitary ware items;
- During operation, there will be no combustible fuel use. There are 5 x 2,500 KVA emergency backup generators. As per the project description, power will come directly from the grid. Alternative power sources such as PV panels and LED lighting (discussed within this section) will be considered to reduce GHG emissions; Energy saving devices will be integrated into offices and other site premises;
- Prefabricated construction methods for the infirmary and site offices;
- Monthly energy audits to analyse energy consumption and identify areas of over-consumption;
- Awareness training sessions on good energy saving practices displaying consumption figures on site;
- Pollution prevention measures transport of construction equipment and materials: regular inspection and maintenance of machinery and optimising travel routes and transporting materials.
- Waste management Systems including recycling, recovery and disposal methods have all been implemented into design.

7.2.4.2 Assessment of Impacts

Effects during Construction

The construction phase is anticipated to take approximately 27 months and includes the construction and fit out of the new offices, car park structures, auditorium, conference buildings, heritage pavilion and the open-air theatre. Full details of the GHG assessment can be found in the GHG assessment.

In order to assess the magnitude of the impact of the Project on the climate, GHG emissions associated with the construction of the Project have been calculated based on the methodologies discussed in Section 7.2.1.2.

As detailed in Table 7-4, the total GHG emissions estimated to be emitted from the 27-month construction period associated with the Project have been calculated to be approximately 242,708tCO_2e.
All these emissions are considered 'additional' and are included in the impact assessment of the Project. They are defined as additional as they are considered new and would not occur if the Project was not to go ahead.

For the construction commuting emissions no quantitative data was available at the time of writing this report. Worker commuting emissions has been considered as part of the benchmarking calculations undertaken as part of the GHG assessment.

Table 7-4: GHG emissions associated to the construction phase of the Project

Project Activity/ Emission Source	Total GHG Emissions for construction period (tCO_2e)
Offices	228,573.1
Car park	8,947.4
Auditorium	2,000.1
Conference building	956.6
Heritage pavilion	961.4
Open air theatre	1,269.5
Average annualised GHG Emissions over construction period (tCO2e)	**101,128**
Total GHG emissions over construction period (tCO_2e)	**242,708**

Embedded mitigation measures have been included in the design of the Project and are detailed in Section 7.2.4.1. Lower carbon materials will be sourced during the construction phase alongside implementing the embedded mitigation measures outlined above.

Effects during Operation

As detailed in Table 7-5 the total GHGs estimated to be emitted during the operational phase of the Project have been calculated to be approximately 214,34tCO2e over the course of the 60-year operational life of the Project. Average annual GHG emissions are therefore expected to be approximately 3,572tCO2e.

It should be noted that reported emissions from energy usage has not taken account of grid decarbonisation which will continue to reduce GHG emissions associated with operational energy usage. Emissions reported for the operational phase of the development are therefore considered to represent a worst-case scenario. It is anticipated that operational emissions will decrease over time in line decarbonisation and energy improvement efficiencies.

Table 7-5: GHG emissions associated to the operational phase of the Project

Project Activity/ Emission Source	GHG Annual Emissions (tCO_2e)	Total GHG Emissions for operational period (tCO_2e)
Offices	3,380	202,812
Car park	23	1,389
Auditorium	64	3,860
Conference building	31	1,846
Heritage pavilion	32	1,914
Open air theatre	42	2,527
Total GHG emissions over construction period (tCO_2e)	**-**	**214,348**
Average annualised GHG emissions during operation (tCO_2e)	**3,572**	

Construction and Operational Combined Impact

Table 7-6 highlights the contribution of the construction and operational GHG emissions when contextualised against the required levels to be on track to meet the 1.5ºC Paris Agreement global temperature rise. This compares the annual construction and operational emissions of the Project against Guinea's Nationally Determined Contribution emissions targets. The annual emissions targets scenario presented include emissions from the four main sectors, namely, energy, land use, agriculture, and waste.27 Although the construction period begins in 2023 and ends in 2026, 2020 annual emissions targets have been used to provide a comparison between current baseline emissions and future baseline emissions for 2030. No targets were available for 2050. Operational emissions have been compared to 2020 and 2030 targets.

The emissions that this project contribute towards Guinea's overall emissions targets are relatively minor, accounting for less than 0.01% in both construction and operational emissions. Therefore, it can be determined that the Project emissions are considered to be **Not Significant** and so the impact will be **Minor Adverse**. It should be noted however that due to limitations outlined within this GHG assessment section of the report it is likely that the emissions from the operational use of the Project could increase.

[27] Updated Nationally Determined Contribution in the Framework of the Paris Climate Agreement (2021). Available at: Updated NDC_Guinea-Bissau (unfccc.int). [Accessed on 14 November 2023]

Table 7-6: Contribution of the Project Construction and Operational Emissions to Emissions Levels Required to meet the 1.5ºC Paris Agreement Target

Scheme stage	Relevant reporting year	Annual emissions national target (tCO_2e)[28]	Annual GHG emissions for reporting year (tCO_2e)	% of emissions inventory
Construction	2020	11,600,000	101,128	0.009%
Operation	2020	11,600,000	3,572	>0.0001%
	2030	18,200,000	3,572	>0.00001%

Other potential impact considerations

As discussed in the limitations section above, due to the large scale and nature of the Project, it is likely that waste disposal, water use from the operational use of the development will have a material impact on the GHG emissions of Project. Further mitigation and consideration should be given to these items for a more accurate assessment. Mitigation and emissions reduction plans have been discussed in Section 7.2.4.2.

Global cumulative impacts consideration

It is acknowledged that there is a cumulative impact of GHG emissions on the global climate however it is not possible to quantitively assess these effects. While the impact of any individual development may be limited, it is the cumulative impact of many schemes over time that has a significant impact on climate change. The combined effect of the emissions from the Project together with all other GHG-emitting activities cannot be quantitatively assessed.

7.3 Climate Change Risk Assessment

Section 7.3 outlines the methodology, approach, assessment and procedure which was followed when undertaking the CCRA section of this chapter. The results of this CCRA are presented in Section 7.4.2.

7.3.1 Impact Assessment Methodology

The methodology in this chapter has been developed in line with appropriate industry guidance for assessing climate change resilience and adaptation, as well as those required by the lender. The following industry guidance were including, and informed, this CCRA;

- The International Finance Corporation (IFC) Performance Standard 1
- Equator Principle 4
- The Institute of Environmental Management and Assessment (IEMA),
- Task Force on Climate-related Financial Disclosures (TCFD)
- The EU Commission Notice (2021/C 373/01) 'Technical guidance on the climate proofing of infrastructure in the period 2021-2027'29.

It should be noted that the EU guidance document was used in the CCRA as it meets the legislative requirements set out in the Paris Agreement, which Equator Principle 4 lists as one of the key documents to refer to when assessing environmental and social issues, as well as Guinea being a signatory of The Paris Agreement. In addition to the justifications listed above, this EU guidance document is also seen as one of the best available guidance documents that addresses the climate proofing of infrastructure and provides a robust climate risk matrix, and as a result the CCRA team deemed it to be appropriate for use.

Based on the requirements set out in Equator Principle 4, relating to Environmental and Social Assessments, and in particular climate change, this CCRA was carried out in line with the TCFD. The TCFD document, *'Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures* [30], was also used to inform the methodology of this CCRA. The TCFD guidance document states the importance of assessing

[28] Projections according to the 'Planned policy projections' scenario
[29] EU Directive (2021/C 373/01); https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916(03)&from=EN
[30] Recommendations of the Task Force on Climate-related Financial Disclosures, 2017: https://assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf

an assets resilience against both types of physical climate change risks, acute and chronic. Chronic climate risks relate to the more long-term climate impacts, such as shifts in precipitation and temperature, along with more variability in weather patterns. Oppositely acute climate risks relate to the more immediate and abrupt or short-term impacts brought by climate change, such as increased severity in weather events, in the form of droughts, flood events and more intense storms. Subsequently this CCRA assessed both acute and chronic climate change risks that could pose a threat to the Project during construction and operation.

Based on the guidance listed above, a desk-based approach was taken to gather the relevant and available qualitative and quantitative climate data for the baseline period and projection periods. Following this a risk assessment was undertaken to identify potential physical climate risks, that could pose a threat to the Project and its associated assets, during both construction and operation.

7.3.1.1 Regulations and Guidelines

In parallel with this ESIA study, a 'Construction Health and Safety Management Plan-PGESSC' and an 'Environmental and Social Construction Management Plan- PGESC' were developed for this Project. These two management plans helped inform this CCRA. Table 7-7 below is a summary of the key regulation, policy and guidance documents, that helped guide the scope and methodology of this CCRA.

Table 7-7: Regulation, Policy and Guidance Documents used to inform this CCRA

Regulations and Guidelines:	Summary:
Institute of Environmental Management and Assessment (IEMA) 'Climate Change Adaptation Practitioner Guidance' (November 2022)[31]	IEMA developed this guidance document to provide an introduction to adaptation from a strategic perspective (i.e. why it must be a core activity for both public and private sector organisations) and from a practical one (i.e. how to get started).
International Finance Corporation's Guidance Notes: Performance Standards on Environmental and Social Sustainability[32]	This is one of the IFC Guidance Notes which corresponds to the Performance Standards on Environmental and Social Sustainability. These Guidance Notes were established by the IFC to offer helpful guidance on the requirements contained in the Performance Standards, including reference materials, and on good sustainability practices to improve project performance. Within this broader document it is Guidance Note 1 that corresponds to the application of Performance Standard 1, which relates to 'Assessment and Management of Environmental and Social Risks and Impacts'.
International Finance Corporation Performance Standards 1: Assessment and Management of Environmental and Social Risks and Impacts[33]	Performance Standard 1 establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project. Performance Standard 1 applies to all projects that have environmental and social risks and impacts. Clients are encouraged to apply the Environmental and Social Management System (ESMS) developed under Performance Standard 1 to all their project activities, regardless of financing source. A number of cross-cutting topics such as climate change, gender, human rights, and water, are addressed across multiple Performance Standards. The risks and impacts identification process will consider the emissions of greenhouse gases, the relevant risks associated with a changing climate and the adaptation opportunities, and potential transboundary effects, such as pollution of air, or use or pollution of international waterways.
Equator Principle 4[34]	The Equator Principles (EPs) are a risk management framework adopted by financial institutions for determining, assessing and managing environmental and social risk in projects. It's primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making. The EPs are updated periodically, with EP 4 being the latest version.

[31] IEMA 'Climate Change Adaptation Practitioner Guidance' (November 2022); https://www.iema.net/resources/blog/2022/11/11/iema-publishes-guidance-on-climate-change-adaptation
[32] IFC Guidance Notes: Performance Standards on Environmental and Social Sustainability (2012): https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standards-guidance-note-en.pdf
[33] IFC Performance Standard 1 (2012): https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standards-en.pdf
[34] Equator Principle 4 (2020): https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf

Task Force on Climate-related Financial Disclosures (TCFD) Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures (2021)[35]	The TCFD was established in 2015 by the Financial Stability Board to develop climate-related disclosures that "could promote more informed investment, credit [or lending], and insurance underwriting decisions" and, in turn, "would enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks." To achieve and facilitate this the TCFD developed a framework with four widely adoptable recommendations on climate-related financial disclosures applicable to organizations across sectors and industries. The purpose of this document is to give guidance and direction on implementing the recommendations of the TCFD on climate-related financial disclosures.
EU Commission (2021/C 373/01) "Technical guidance on the climate proofing of infrastructure in the period 2021-2027"[36]	This document gives guidance on the climate proofing of investment in infrastructure covering the programme period 2021-2027. The risk framework in the document outlines the steps which must be taken when rating and assessing climate risks, based on consequence and likelihood.
Kyoto Protocol	Guinea is one of the 192 Parties to have signed up to The Kyoto Protocol, in 2005. The Kyoto Protocol commits industrialised countries and economies to transition towards limiting and reducing GHG emissions in accordance with agreed individual targets. As Guinea is not a party to Annex I of the Protocol, it is not currently required to meet a specific greenhouse gas emissions reduction target.
The Paris Agreement	Guinea is one of the 194 Parties to have signed up to this legally binding international treaty, in 2015. Under the Paris Agreement Guinea has pledged to reduce its greenhouse gas emissions by 13% by 2030, doing so will help make Guinea more resilient to the impacts of climate change. Article 7 of the Paris Agreement addresses the need for countries to strengthen their own and the globes ability to adapt to the adverse impacts of climate change and foster resilience.
United Nations Sustainable Development Goals (SDGs)	The UN SDGs are a global call for action by all countries – developed and developing – to promote prosperity while protecting the planet. The goals were agreed to by UN member states in 2015 and reflect the economic, social and environmental dimensions of sustainable development.

7.3.1.2 Climate Change Context

The Intergovernmental Panel on Climate Change (IPCC) has confirmed in its Assessment Reports that the anthropogenic influence on the climate system is clear and growing, with impacts observed across all continents and oceans. Human activities have increased the concentration of carbon dioxide (CO2) in our atmosphere, with observed levels of global atmospheric CO2 rising from their pre-industrial levels of 280 parts per million (ppm) up to 418.51 ppm as of September 2023.[37] Given CO2 is a GHG that absorbs and radiates heat, these increases have resulted in the warming of Earth's atmosphere. According to an ongoing temperature analysis by NASA, the average global temperature on Earth has increased by at least 1.1 °C since 1880, with the rate of warming since 1981 at roughly 0.18 °C per decade[38].

Globally, climate change is creating a more unpredictable and potentially turbulent environment for infrastructure and the communities it serves, through the prevalence of increased extreme heat days, more frequent and intense extreme weather events, extended periods of drought, and rising sea levels.

In order to understand how the global climate may change in the future, the IPCC's Sixth Assessment Report (AR6) developed Shared Socioeconomic Pathways (SSPs) that describe five illustrative 21st Century pathways of GHG emissions and mitigation actions undertaken between now and the end of the century (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5)[39]. More information on the SSPs considered for this study can be found

[35]Task Force on Climate-related Financial Disclosures (TCFD) Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures (202): https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Implementing_Guidance.pdf
[36] EU Directive (2021/C 373/01); https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916(03)&from=EN
[37] Global Monitoring Laboratory 'Trends in Atmospheric Carbon Dioxide': https://gml.noaa.gov/ccgg/trends/

[38] NASA: https://climate.nasa.gov/vital-signs/global-temperature/
[39] IPCC AR6 Summary for Policymakers: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

in **Section 7.3.5.1**. These emission pathways are used for developing climate change projections which can then be used by policymakers, scientists, and other professionals to estimate and plan for climate risks and impacts.

7.3.1.3 Risk Assessment Approach & Methodology

The approach taken for this CCRA will be detailed in this section. The risk framework used for this assessment and the descriptors of likelihood and consequence were derived from the EU Technical guidance on climate proofing[40], of which the risk matrix can be found inTable 7-10**.** As aforementioned this guidance document was used for this CCRA as it is aligned with the Paris Agreement, which Guinea is a signature of, and therefore was deemed to be appropriate for use in this CCRA. In addition to this the risk framework outlined in the EU Guidance document is one of the most robust and comprehensive risk matrix available, that's relevant to undertaking a climate change risk assessments specifically.

In this CCRA, climate risks were assigned a risk rating based on the likelihood of occurrence and the consequence should the risk eventuate. Risk likelihood refers to how likely the identified climate hazard is to occur and cause the identified impact within a given timescale e.g. the lifetime of the project. The likelihood was determined for both of the climate change scenarios (SSP2-4.5 and SSP5-8.5) and considers the climate baseline and projection data presented in Table 7-12. Yhe 'likelihood' factor associated with the initial risk rating takes into account the existing or planned controls embedded within the design[13], whilst the 'likelihood' associated with the residual risk rating takes into consideration the adaptation measures identified. The 'likelihood' descriptors are provided in Table 7-8 below.

'Consequence' factor refers to the severity or magnitude of the impact on the Development, should the climate risk eventuate. As with likelihood, it was determined for each of the climate change scenarios considered, for both the initial and residual risk rating. The consequence descriptors are provided in Table 7-9 below. When assessing the consequence of a specific risk, several categories are considered including:

- Asset damage / engineering / operational
- Safety and health
- Environmental
- Social
- Financial (for single extreme event of annual average impact)
- Reputation
- Cultural heritage and cultural premises

Table 7-8: Likelihood Analysis

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

Table 7-9: Consequences Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage / Engineering / Operational	Impact can be absorbed through normal activity	An adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity actions	Disaster with the potential to lead to shut down or collapse or loss of the asset / network

[40] Commission Notice — Technical guidance on the climate proofing of infrastructure in the period 2021-2027: https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Safety and Health	First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury or disability	Single or multiple fatalities
Environment	No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect. Recovery in one year	Significant harm with local effect. Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery
Social	No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups (1). National, long-term social impacts	Loss of social licence to operate. Community protests
Financial (for single extreme event or annual average impact) (*)	x % IRR (**) < 2 % of turnover	x % IRR 2-10 % of turnover	x % IRR 10-25 % of turnover	x % IRR 25-50 % of turnover	x % IRR > 50 % of turnover
Reputation	Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short-term impact on public opinion; negative national media coverage	National, long-term impact with potential to affect the stability of the government
Cultural Heritage and cultural premises	Insignificant impact	Short term impact. Recovery or repair.	Serious damage with wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

Table 7-10: Risk Matrix

		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Rare	Low	Low	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	Extreme
	Moderate	Low	Medium	High	Extreme	Extreme
	Likely	Medium	High	High	Extreme	Extreme
	Almost certain	High	High	Extreme	Extreme	Extreme

7.3.1.4 Receptor Sensitivity

As stated, the purpose of this CCRA, is to assess the likelihood and consequences of climate risks identified during the CCRA, which were deemed to pose a threat to the main receptors outlined below.

Consequences posed from climate risks that are associated with health and safety concerns during both phases of the Project are treated as high priority receptors. During the construction and operational phases of the Project the natural environments receptors, such as nearby catchments and greenery, were taken into account when assessing climate risks. Infrastructure, equipment and other built environment receptors associated with the Project, were also taken into account.

7.3.1.5 Impact Significance

As stated, the risk rating for this CCRA was based on the risk framework outlined in Section 7.3.1.3. Risks rated in the initial risk rating as ‘High’ or ‘Extreme’ were considered ‘Significant’, and as a result adaptation measures were provided. In addition other risks rated below ‘High’, that were associated with known and favourable adaptation measures were also provided. Further detail on the initial and residual risk ratings carried out for this Project will be outlined in Section 7.3.5 and 7.4.2 respectively.

7.3.2 Baseline

7.3.2.1 Baseline Data Collection

This section outlines the current and historic climate conditions and extreme weather events experienced in the local area of the Project, as well as at a more regional level. For the purposes of this CCRA, the baseline conditions were based upon historic quantitative climate data, that was obtained from the World Bank 'Climate Change Knowledge Portal' (CCKP)[41]. This qualitative baseline climate data was gathered for the baseline period 1995-2014, this data is presented in Table 7-12 alongside the projection data which was also gathered from the World Bank CCKP.

To effectively conduct a CCRA and establish past and current climate and extreme weather events experienced in the area, it is important to use not just historic data from the baseline period but also more recent qualitative data on the climate conditions and extreme weather events that were experienced in the area of the Project, as well as the wider region.

7.3.2.2 Study Area

The 'study area' for the Project is the site where it will be constructed, refer to Section 2.1. for further details on the site itself. The site of the Project is located in the Ratoma urban sub-prefecture, of Conakry in Guinea. The Project site is on an unoccupied land and is located on a larger area of historically cleared brownfield land owned by the Guinean state that totals approximately 202 ha, as prior to development it had no buildings or infrastructure located on it. However, the site was historically occupied and subject to two evictions which occurred in 1998 and 2019.The site is located near a number of catchments, including the Kakimbo River, and is roughly 2.4 km from the coast. It is also within close proximity to a number of densely forested areas including the Forêt de Demoudoulah.

7.3.2.3 Desktop Study

As aforementioned qualitative as well as quantitative climate data was collected for the local region where the Project will be located, as well as at a more macro level.

Qualitative:

To inform the screening process and gain an understanding of the climate hazards relevant to the sites location, the Global Facility for Disaster Reduction and Recovery's (GFDRR) 'ThinkHazard!' tool was used [42]. This tool provides a high-level understanding of the hazards present within a select location. The data gathered was done so at a micro level, assessing the climate risks for the Ratoma urban sub-prefecture in the Conakry Region of Guinea, where the Project will be located. The results of which are presented in Table 7-11. Those hazards rated low and above were taken into account when undertaking the climate risk assessment and rating the identified climate risks.

Table 7-11: Results of the ThinkHazard Tool-Ratoma

Type of Natural Hazard	Likelihood Natural Hazards Occurring
Coastal Flooding	High
Wildfire	High
Extreme Heat	Medium
Urban Flood	Low
Earthquake	Low
Landslide	Low
Tsunami	Low
Water Scarcity	Very Low
River Flood	Very Low

Past Extreme Weather Events

Hurricane/Storm Conditions (August 2023): Conakry was hit with max wind speeds of up to 269 km/h as a result of a nearby hurricane being formed.

[41] World Bank 'Climate Change Knowledge Portal; https://climateknowledgeportal.worldbank.org/download-data
[42] Global Facility for Disaster Reduction and Recovery's (GFDRR). 2020. ThinkHazard! Available from: https://thinkhazard.org/en/

Flooding (August 2023): In August 2023 Guinea was faced with prolonged periods of intense heavy rainfall. Low lying areas in Conakry were inundated with heavy rainfall and became flooded, in addition to major roads in Conakry and Siguiri becoming flooded rendering them impassable. [43]

Flooding (September 2022): At least three people were killed in Conakry following heavy rainfall that caused areas to become flooded, with nearly 2,600 people being impacted by the flooding. [44]

Dust Storm (April 2012): Guinea and Mali were hit with a large dust storm.[45]

Quantitative:
Table 7-12 below presents the baseline data gathered for the Project, alongside the projection data. The justification and reasoning for the time periods and SSP scenarios chosen for the CCRA will be elaborated on further in **Section 7.3.4** and **7.3.5.1**.

[43] https://reliefweb.int/report/guinea/guinea-floods-dref-operation-mdrgn015
[44] https://floodlist.com/africa/guinea-floods-conakry-september-2022
[45] https://www.earthobservatory.nasa.gov/images/77807/dust-storm-in-western-africa

Table 7-12: Climate Change Baseline and Projection Data for Guinea

Climate Variable	Baseline Period (1995-2014)		Climate change projection				Projected Trend (for 50th percentile)	Source
		Month	Moderate scenario SSP4.5 (2020-2039)	Extreme scenario SSP8.5 (2020-2039)	Moderate scenario SSP4.5 (2080-2099)	Extreme scenario SSP8.5 (2080-2099)		
Temperature								
Average Mean Surface Air Temperature (°C)	26.5		0.8	0.8	2.3	4.4	↑	1
			27.2	27.3	28.7	30.9		1
Average Maximum Surface Air Temperature (°C)	31.6		0.7	0.8	2.2	4.3	↑	1
			32.3	32.4	33.8	35.9		1
Average Maximum Summer Surface Air Temperature (°C) (Jun, July, Aug)	28.8		0.7	0.8	2.1	4.3	↑	1
			29.5	29.6	30.9	33.1		1
Average Minimum Surface Air Temperature (°C)	21.4		0.8	0.8	2.3	4.5	↑	1
			22.2	22.2	23.7	25.8		1
Average Minimum Winter Surface Air Temperature (°C) (December, January & February)	19.4		0.7	0.7	2.4	4.7	↑	1
			20.1	20.1	21.7	24.1		1
Warmest Month on Average (°C)		April	30.27	30.32	31.91	34.05	↑	1

Climate Variable	Baseline Period (1995-2014)		Climate change projection				Projected Trend (for 50th percentile)	Source
		Month	Moderate scenario SSP4.5 (2020-2039)	Extreme scenario SSP8.5 (2020-2039)	Moderate scenario SSP4.5 (2080-2099)	Extreme scenario SSP8.5 (2080-2099)		
Coldest Month on Average (°C)		August	19.5	19.5	21.1	25.1	↑	1
Average Number of Hot Days (Tmax > 30°C)	19.9		2.4	2.8	6.4	9.1	↑	1
			22.3	22.7	26.2	29.0		1
Frost days per annum (days)	0		0	0	0.0	0.0	↑↓	1
Rainfall								
Average aggregated accumulated rainfall (mm)	149.4		2.4	1.7	-0.3	-9.8	↑↓	1
			151.8	151.1	149.1	139.6		1
Mean summer rainfall (mm) (June, July & August)	319.9		4.0	2.0	0.1	-30.0	↑↓	1
			323.8	321.8	319.9	289.9		1
Mean winter rainfall (mm) (December, January & February)	5.0		-0.4	-0.4	-0.2	-0.5	↓	1
			4.6	4.6	4.7	4.5		1
Wettest month on average (mm) (Average monthly rainfall)		August	August	August	August	September		1
Driest month on average (mm) (Average monthly rainfall)		January	January	January	January	January		1

7.3.3 Receptors

As stated in **Section 7.3.1.4** there were a number of key receptors identified for this CCRA, with the main one relating to the health and safety of personnel and visitors. In relation to the natural environment the following receptors were identified:

- Local catchments, including the Kakimbo River
- Forested areas, including Forêt de Demoudoulah
- Local mangroves
- The Conakry coast
- Agricultural areas

The receptors identified for the built environment were as follows:

- Construction equipment
- Construction materials
- Paved areas of the Projecte.g. footpaths and car parks
- Infrastructure associated with utilities e.g. power lines and pipes
- Buildings, including the ministerial buildings, auditorium, heritage pavilion, open theatre and conference centre

7.3.4 Assumptions and Limitations

It is important to understand when using climate change projections that they contain inherent uncertainty. The uncertainty is the result of limitations of available measurements and challenges in evaluating causation in complex and multi-component processes. Uncertainty in climate change projections is derived from multiple sources including:

- Uncertainty in how GHG emissions will change overtime due to key unknowns in the drivers of this change. Such drivers include economic and population growth, lifestyle and behavioural changes, associated changes in energy use and land use, technology, and climate policy.
- Variable confidence levels in how well the climate models predict different climate variables. For example, climate models perform less well in their simulation of large-scale precipitation patterns than for surface temperature.

It is common consensus that when conducting CCRAs at least two SSP scenarios should be used, as doing so gives a more conclusive assessment of the potential GHG emissions that could arise if mitigation measures are or are not implemented. Based on these factors, it is important to use a range of projection scenarios (SSPs) when considering how climate may change in the future, as doing so will help provide decision-makers with a more holistic understanding of the range of potential climate futures possible, which is essential when understanding risk and developing appropriate adaptation measures. This will be elaborated on further in **Section 7.3.5.1**.

Two time periods were used for this CCRA, in addition to the baseline period, as the near-term time period 2020-2039 was chosen to reflect the potential climate risks that could arise during the construction phase, which is expected to be completed by 2026. In addition, given the type of project this is, with multiple components of differing infrastructure, the farthest projection time period available, 2080-2099, was also chosen to capture projected climate conditions which could be experienced in the long term. As stated, given the Project will consist of multiple components, that'll have differing lifecycles and design standards, it is important that each component is reviewed towards the end of its lifecycle to assess if it needs to be replaced, repaired or upgraded with more robust adaptation measures to reflect the current climate conditions being experienced.

7.3.5 Impact Assessment and Mitigation

7.3.5.1 Potential Impacts

Climate Projection Data

As aforementioned, given the inherent uncertainty surrounding climate change projections, in addition to using two future projection time periods in this CCRA, two climate change scenarios (SSPs) were also used. The SSP scenarios represents an integrated description of the possible future human-environment system, incorporating impact future emissions and the effectiveness of possible mitigation strategies. This provides decision-makers with a more holistic understanding of the range of potential climate futures possible, which is essential when understanding risk and developing appropriate adaptation measures.

For this assessment, the climate change projections used are based on the below SSP climate change scenarios:

- **SSP2-4.5** was chosen to represent a moderate climate change scenario where global average temperature increase is limited to 3°C above pre-industrial levels by 2100, due to a significant reduction in emissions and the implementation of various mitigation strategies.

- **SSP5-8.5** represents an extreme climate change scenario, where very little mitigation measures are implemented and GHG emissions continue unregulated. In this scenario global average temperature increases in excess of 4°C by 2100[46].

For this CCRA projection climate data was sourced for Guinea, as due to the constraints of the available data, a more granular breakdown was not available.

Table 7-12 in **Section 7.3.2.3** displays the climate baseline data for 1995-2014 alongside the climate projection data for the two time periods 2020-2039 and 2080-2099, under SSP 4.5 and SSP 8.5. The projection data gathered in Table 7-12 alongside the natural hazards presented in Table 7-11 and the qualitative data were used to inform this CCRA. The subsequent sections will outline the CCRA process and the consequent risk ratings.

Identified Climate Risk

Throughout the construction and operational phases of the Project, the following 'Climate Variables' were listed based on the risks associated with them. The climate risks identified for this Project were based upon the geographical location and region where the Project will be constructed, as well as the type of infrastructure, assets and personnel/visitors associated with the construction and operation of the Project. Table 7-13 below displays the 'Climate Variables', that had climate risks associated with them that were deemed relevant to the Project. For further details on each climate risk and a detailed description of its impacts, please refer to the 'Risk Register' in Appendix A.

Table 7-13: Climate Variables identified and deemed a risk to the Project

Climate Variables
Extreme Temperature (heat)
Wildfires
Flooding (including extreme rainfall, coastal and fluvial flooding)
Storm Events
Storm Events (Sad & Dust)
Water Scarcity

7.3.5.2 Embedded Mitigations

This section states any of the known embedded controls and mitigation measures that will be implemented during the construction and operational phases of the Project. Below is a summary of some of the key embedded measures, for a full list of planned controls/embedded measures please refer to the Risk Register in Appendix A.

Construction

[46] The Shared Socioeconomic Pathways and their energy, land use and greenhouse gas emissions implications: An Overview, Riahi et al., 2017, Global Environmental Change

- A construction Health and Safety Management Plan (Project's Management plan-PGSSC) has been developed for the construction site. This document outlines key health and safety procedures, emergency plans and measures that will be in place on the construction site.
- Onsite areas for workers will have sufficient air conditioning integrated, to allow construction workers to get out of the heat and cool down during breaks.
- Construction equipment and machinery will be checked regularly to see if maintenance is required, for instance reoccurring periods of extreme heat in combination with rainfall can lead to humid conditions, causing corrosion of equipment and construction materials.
- Equipment and supplies will be stored appropriately to prevent damage from the elements.
- Hazardous and combustible liquids will be stored in containers that are protected from the weather by enclosed structures.
- The site will have fire detection systems, alarms, fire equipment, fire wardens and fire procedures in place.
- Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of adverse weather conditions. Part of this will include equipment being stored appropriately to avoid damage.
- The site will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system.
- The Project will have a construction water management plan, that will include measures to collect and dispose of runoff water. This plan will be implemented as part of the wider ESMP for the Project.
- Cranes will not be used in adverse weather conditions that are likely to compromise their stability.
- Soil will be stored and covered with tarpaulins and excavated soil will be watered regularly in dry/windy conditions.
- Dust prone areas will be watered with non-potable water to help suppress the dust.

Operation

- Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of adverse weather conditions. Part of this will include equipment being stored appropriately to avoid damage.
- The Project will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system.
- The Project will have an operational water management and monitoring plan, which will be implemented as part of the wider ESMP for the Project.
- Rain gardens will be established to facilitate infiltration directly into the soil.
- There will be appropriate stormwater drainage outlets incorporated into the site.

7.3.5.3 Assessment of Impacts during Construction

The risk assessment approach and methodology used for this CCRA is detailed in the earlier **Section 7.3.1.3**. The initial risk rating for the climate risks identified and deemed relevant to the construction phase of the Project are presented in Table 7-14 below, for the time period 2020-2039 under SSP 4.5 and SSP 8.5.

For each risk identified, the asset components impacted were noted and the planned or embedded controls listed. Embedded controls represent measures that'll be incorporated into the construction site, that will work to mitigate climate risk. Based on these measures and the projection data outlined in Table 7-12 an initial assessment of the identified climate change risks was undertaken, assessing both the likelihood and consequence, in order to determine a risk rating. For more detailed nuances for each climate risk refer to the Risk Register presented in Appendix A.

Initial risk rating - Construction Phase

There were 17 climate risks identified for during the construction phase of the Project, as displayed in Table 7-14**.**

Table 7-14: Initial Risk Profile for the Project- Construction

Risk rating	Moderate emissions scenario SSP 4.5 2020 - 2039	High emissions scenario SSP 8.5 2020 - 2039
Low	2	2
Medium	10	10
High	5	5
Extreme	0	0

7.3.5.4 Assessment of Impacts during Operation

The risk assessment approach and methodology used for this CCRA is detailed in the previous **Section 7.3.1.3**. The initial risk rating for the climate risks identified and deemed relevant to the operational phase of the Project are presented in Table 7-15 below, for the future time periods 2020-2039 and 2080-2099, under SSP 4.5 and SSP 8.5. For more detailed nuances for each climate risk refer to the Risk Register presented in Appendix A.

For each risk identified, the asset components impacted were noted and the planned or embedded controls listed. Embedded controls represent measures that'll be incorporated into the design of Project, that will work to mitigate climate risk. For example, sunshades have been installed on all administration buildings between to the 2nd floor and the roof to minimise solar gain. Furthermore, there will be a surface water drainage plan implemented within the Project site. Based on these measures and the projection data outlined in Table 7-12 an initial assessment of the identified climate change risks was undertaken, assessing both the likelihood and consequence, in order to determine a risk rating. For more detailed nuances for each climate risk refer to the Risk Register presented in Appendix A.

Initial risk rating – Operational Phase

There were 18 climate risks identified for during the operational phase of the Project, as displayed in Table 7-15.

Table 7-15: Initial Risk Profile for the Project- Operation

Risk rating	Moderate emissions scenario SSP 4.5 2020 - 2039	High emissions scenario SSP 8.5 2020 - 2039	Moderate emissions scenario SSP 4.5 2080 - 2099	High emissions scenario SSP 8.5 2080 - 2099
Low	7	7	0	0
Medium	6	6	9	9
High	5	5	7	7
Extreme	0	0	2	2

7.3.6 Adaptation Measures

7.3.6.1 Adaptation Principles

Climate change adaptation for infrastructure projects is the process of adjustment to actual or expected climate and its effect to increase resilience, moderate harm and exploit beneficial opportunities. There are a range of measures or options that are available and appropriate for addressing climate change adaptation often described as either Grey, Green or Soft:

- Grey Actions – technical or engineering-oriented responses to climate impacts, for example the construction of a sea wall in response to sea level rise or the consideration of climate change projections in the design of drainage structures.

- Green Actions – use nature-based solutions to enhance the resilience of human and natural systems (which includes the use of green and blue infrastructure), for example the addition of green spaces to infrastructure projects to counteract urban heat island effect, or the use of drought and heat tolerant species in landscaping.

- Soft Actions – alterations in behaviour, regulation, or systems of management such as increased monitoring of climate change impacts during operation, or the consideration of climate risk in asset management plans. They are flexible and inexpensive to implement.

When addressing climate risks it is vital that not only adaptation measures be implemented and integrated into the Project design, but also that monitoring measures are established so that contingency plans and measures can be in place in the lead up to expected extreme weather events and adverse weather conditions. Given the uncertainty surrounding climate change and its unpredictability, it's important that weather forecasts and patterns be monitored not only for during the construction stage but also for when the Project is operational, as doing so will avoid disruption and minimise potential damage to assets.

7.3.6.2 Adaptation Measures Identified for the Project

Based on this CCRA, a number of adaptation measures have been identified for implementation during the construction and operation of the Project. Table 7-16 provides some examples of the additional adaptation measures that have been deemed as suitable for the Project, to mitigate the identified climate risks and strengthen the Projects overall resilience. For further detail on these adaptation measures and associated climate risks please refer to Appendix A.

During the operational and construction phases of the Project a 'Weather Monitoring' procedure will be developed and implemented for during both construction and operation of the Project. This 'Weather Monitoring' procedure will act as an early warning system that'll allow for adaptation measures and contingency plans to be initiated, in advance of the expected adverse weather conditions. Monitoring weather forecasts is one of the best procedures which address all the climate risks identified during the CCRA. By having advance warning on expected adverse weather conditions and extreme weather events, the appropriate actions can be planned and taken prior to the weather impacting the Project.

Table 7-16: Adaptation measures for consideration for the Project

Project phase	Example Adaptation Measures
Construction	• A 'Heat Stress Prevention Guidelines' procedure will be established for during construction. • Work schedules will be reflective of weather conditions. During expected periods of extreme weather events and adverse conditions work undertaken on site will be minimal.. e.g. outdoor work will be scheduled to avoid the hottest time of day • Shaded and indoor cool facilities will be provided for staff to get out of the heat, and water will be provided to help re hydrate. Hydration kits will be provided to those suffering for heat exposure. • Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. • Fuel breaks and buffer zones will be integrated into the surrounding area. • Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. • Water pumps will be located at key areas of the construction site, and in close proximiety to critical infrastructure. This will help increase the sites surface drainage capacity. • Loose materials will be stored correctly, and bunded where appropriate. e.g. soil and clay will be bunded to protect them from periods of heavy rainfall which could cause the materials to be washed onto the construction site or into the local area. • Workers will be provided with appropriate PPE to facilitate working in dust prone environments e.g. dust mask and googles.
Operation	• Through monitoring the weather forecast maintenance and operational task that would be exposed to the hot temperatures can be scheduled or moved to a time period or future date where temperatures will not be as hot. • Outdoor and non-essential work will cease, if working conditions are deemed to be too dangerous and a hazard to workers safety. • Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. • Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. • Fuel breaks and buffer zones will be integrated into the surrounding area.

Project phase	Example Adaptation Measures
	• An emergency stock supply of potable water will be stored on the site. • Windows and other openings will be sealed to prevent dust entering. Air conditioning systems will help filter dust.

7.4 Impact Summary

7.4.1 GHG

This section will provide a summary of the key findings from the GHG assessment that has been completed in section 7.2. It will consider the GHG assessment of the construction phase and the operational phase as well as including a closing statement for the GHG assessment.

The overall embodied carbon within the 27-month construction period equates to 242,708tCO_2e between 2023 and 2026, resulting in 101,128tCO_2e emissions annually. The operational emissions associated to the project have been calculated to be 3,572tCO_2e on annual basis, resulting in total emissions of 214,348tCO_2e over the 60-year lifespan of the project.

When contextualised against the required emissions levels in order to be on track to meet the 1.5ºC Paris Agreement global temperature rise limit, GHG emissions as a result of the Project account for 0.009% of emissions during the construction phase, and >0.0001% during operation, for both 2030 and 2050, respectively. The emissions that this project contributes towards the global targets are **Not Significant** and so the impact will be **Minor Adverse**.

As the GHG emissions are of low significance, and various mitigation, monitoring and efficiency improvements have been included within the design of the project, no further recommendations are required.

Conclusion for GHG Assessment

Overall, the GHG assessment has provided a benchmarked quantitative assessment of the emissions associated to the construction and operational use of the project. In the context of the Paris Agreement to keep global temperatures to below 1.5ºC, the project is deemed to have a minor adverse impact. Details around the assessment's methodology can be found in **Section 7.2.1**, as well as the limitations and assumptions that have been made available in **Section 7.2.3.**

7.4.2 CCRA

This section will give a summary of the key climate risks that were identified during the CCRA and state the residual risk ratings for the construction and operational phases, before outlining the closing statement for this CCRA in the conclusion.

The initial risk ratings for the construction and operational periods presented in Table 7-14 and Table 7-15 represent the current risk posed to the site, if no further adaptation measures are implemented. Table 7-17 and Table 7-18 below displays the residual risk ratings that were reached, based on the adaptation measures being implemented. If these adaptation measures are not implemented than the risk rating for the Project will remain unchanged from the risk ratings presented in the Initial Risk Rating Tables.

Residual risk rating

Table 7-17 and Table 7-18 present the residual risk ratings, based on the adaptation measures, or similar, being implemented. It's important to note that the risk rating only declines when further adaptation measures are integrated into the Project. A total of 35 risks were identified for the Project, 17 for the construction phase and 18 for the operational phase.

As observed in Table 7-17 the implementation of the identified adaptation measures results in a reduction in the construction periods initial risk profile, which had 5 risks rated as 'High' and therefore deemed 'Significant', to 1 risk rated 'High'. The risk that remained 'High' related to the construction site becoming flooded, and although the likelihood of the risk occurring was reduced based on the proposed adaptation measures being implemented the consequence remained unchanged. This was based on the understanding that should the construction site flood,

there would be considerable disruption and damage to the site. For further details on this risk see Appendix A, row 9.

Table 7-17: Residual Risk Profile for the Project - Construction

Risk rating	Moderate emissions scenario SSP 4.5 2020 - 2039	High emissions scenario SSP 8.5 2020 - 2039
Low	9	9
Medium	7	7
High	1	1
Extreme	0	0

Table 7-18 presents the residual risk profile for the operational phases of the Project, following the adaptation measures being implemented. The initial risk rating, for 2020-2039, had 5 risks rated 'High', and therefore classed as 'Significant', while the period 2080-2099 had 7 classed as 'high' and 2 risks rated 'Extreme'. Following the adaptation measures being implemented there were no risks rated as 'Extreme'. For the period 2020-2039 one risk relating to wildfires remained classed as 'High', as in the event that this risk occurred the consequence could result in fatalities and therefore could not be reduced. The period 2080-2099 had 3 risks remaining rated as 'High', these related to the climate risks causing wildfires, water scarcity and strong winds. Further details on each individual risk, and the justification for the risk rating, can be found in Appendix A.

Table 7-18: Residual Risk Profile for the Project - Operation

Risk rating	Moderate emissions scenario SSP 4.5 2020 - 2039	High emissions scenario SSP 8.5 2020 - 2039	Moderate emissions scenario SSP 4.5 2080 - 2099	High emissions scenario SSP 8.5 2080 - 2099
Low	10	10	4	4
Medium	7	7	11	11
High	1	1	3	3
Extreme	0	0	0	0

Conclusion for CCRA

As outlined in **Section 7.3.5.2**, a number of embedded controls were already included in the Project to help mitigate the impacts of climate change during the construction and operational phases. However, when considering the climate change projections for the region as well as the construction and operational context of the Project, a number of 'Significant' climate change risks were identified, that even with these embedded controls and additional adaptation measures being implemented, the identified risks still pose a threat to the Project. As such it is vital the adaptation measures in **Section 7.3.6, or similar, are** implemented from the onset of the construction and operational phases of the Project. In addition to these adaptation measures, the weather monitoring system will l allow early warning systems and contingency measures to be put in place in advance of expected extreme weather events and adverse weather conditions. Doing so will help reduce the risk of avoidable damage to equipment and assets, as well are preventable harm to personnels' health and safety.

8. Biodiversity

8.1 Introduction

This chapter presents the terrestrial ecological baseline and impact assessment for the Koloma Administrative City Project and considers the details of Project-related activities that may result in impacts on sensitive biodiversity receptors, relative to baseline conditions.

The Project site is located on unoccupied land in Ratoma in the north-east of Conakry covering an area of approximately 7 ha. The Site is located on a larger area of historically cleared brownfield land owned by the Guinean state that in total covers approximately 202 ha. The Project includes the development of twelve 7-storey buildings, providing 72,000m^2 of office space to house Government Ministry departments.

Other design elements include additional buildings to house carparks, utilities and restaurants as well as an auditorium building. External works will include landscaping, covered parking, roadways and associated infrastructure. It should be noted that at the time of writing there are no approved associated facilities relating to this project.

It should be noted that the site was historically occupied and subject to two evictions which occurred in 1998 and 2019. These evictions were carried out by the Ministry of Habitat and Construction. In addition, the site is mainly surrounded by other urban development and similarly cleared land. Therefore, the habitats at the site are entirely modified and it is likely that the ecological value of the site is low.

Nevertheless, there is still a requirement to consider potential impacts on ecological receptors within the Area of Influence (AoI) of the Site. However, as the site comprises previously developed / occupied land that is completely surrounded by urban development, with no watercourses or other potential pathways leading from the site, the AoI is likely to be limited. Consequently, for this assessment the AoI has been defined as up to a maximum of 1 km from the Site boundary, which means that in all directions the AoI does not extend significantly beyond the edge of the city.

This chapter therefore sets out the terrestrial ecological baseline in the vicinity of the development and considers the likely impacts on the ecological receptors that have been identified.

8.2 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts on biodiversity. It builds on the general ESIA assessment method set out in *Chapter 4; ESIA Methodology*.

The first stage in the assessment is to determine what receptors are likely to be affected by the Project, through desk study and field work. Having identified the receptors that are present or are likely to be present at and around the Project site, in order to undertake the assessment, it is necessary to understand the likely impacts of the Project and the receptors that may be impacted by it.

The Project may have impacts on a number of receptors, and it is necessary to evaluate those receptors so that the significance of the potential and, ultimately, the residual effects of the Project can be determined. This is because, in impact assessment terms, an impact of similar magnitude affecting a more important or 'sensitive' receptor is deemed to have a more significant impact than an impact on a less sensitive receptor[47].

This type of approach therefore allows the Project to identify where the potential impacts are likely to be the most significant and therefore to identify the appropriate actions needed to mitigate (be this offset, minimise or avoid altogether) those potentially significant impacts.

Therefore, for this assessment each receptor has been assigned a 'value' in terms of its importance or sensitivity in a biodiversity context. The assignment of value is based on a number of consistent factors as set out below. The valuation of receptors is based on the approach defined by the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2018). Once the value of the receptor is known, it can be considered in the context of the character (in simple terms, the 'magnitude', which for consistency with other

[47] 'Importance' is the term preferred in the CIEEM 2018 guidance rather than 'sensitivity', because a species may be very sensitive to impacts but may not be important in terms of its conservation status (i.e,, it is a very common species), and indeed vice versa. However, for consistency within the ESIA the term sensitivity has generally been used to mean 'importance'.

assessment chapters is the term used here) of the impact on the receptor and the significance of the impact can therefore be determined.

It should also be noted that the impact on the receptor that is most relevant to the assessment is the residual impact, i.e., the impact after agreed mitigation, following the mitigation hierarchy, has been taken into account. If at that the stage the residual impact is still defined as significant, then further mitigation and management is likely to be required.

Identifying and evaluating receptors and defining the impacts of the Project on them in this systematic way provides a robust assessment and framework for understanding what receptors are likely to be affected by the project. This therefore allows the identification of mitigation and clear management/ mitigation measures for these receptors that will be required during appropriate stages of the Project's life.

8.2.1 Applicable Laws and Regulations

8.2.1.1 Legislative Context

The natural ecological environment in and around Guinea is protected by the Constitution of Guinea and certain Acts, Regulations and Policies. The Ministry of the Environment and Sustainable Development (MEDD) is directly responsible for conservation of all environments of the country, including implementing government policy with regard to environment and sustainable development, as well as monitoring implementation of such policies.

Adopted in 2010, the Guinean constitution contains five articles related to environmental matters (16, 17, 21, 92 and 119). Of these, the most important is article 21, which forms the legal basis for the management of natural resources in Guinea.

The main pieces of legislation that relate to biodiversity conservation include the Environment Code (Law L/2019/0034/AN, 4 July 2019), intended to provide the environmental assessment tools applicable to development policies, plans, programs and projects. Other relevant laws include the Forestry Code (law L/2017/060/AN, 12 December 2017) and its implementing regulations, and decree N°200/PRG/SGG/89 on the legal status of establishments classified for environmental protection.

8.2.1.2 Policy Framework

Guinea has developed a number of national policies relevant to biodiversity as summarised Table 8-1 below:

Table 8-1: Policy Framework

Policy	Summary
National Action Plan for the Environment	The aims of this action plan are to: i) improve the quality of life ii) ii) enhance biodiversity and rare cultural resources, and more generally ensure rational management of all natural resources, including marine resources iii) prevent major risks, not only climatic, but also linked to human activities in both urban and rural areas iv) organize mining and industrial development, better control and ad hoc prevention (impact studies) of pollution The first three objectives are in line with the concerns of the National Climate Change Adaptation Plan.
National Climate Change Adaptation Plan	The aim of this plan is to reduce losses due to climate risks and improve people's living conditions, including urgent and immediate measures to be taken to adapt to the adverse effects of climate change. The policy is structured around 10 adaptation options: i) Promoting agroforestry ii) Valuing positive endogenous knowledge and practices iii) Promoting appropriate adaptation technologies iv) Promotion of fire management and set-aside v) Protecting and restoring fragile ecosystems vi) Information, education and communication vii) Promotion of integrated development and management of small hydraulic structures viii) Protection of spawning area ix) Hydro-agricultural development of plains and lowlands x) Promotion of income-generating activities

Policy	Summary
National Biodiversity Strategy and Action Plan	This plan highlights the six causes of biodiversity degradation in Guinea, comprising: i) Population poverty ii) Population growth iii) Insufficient human, financial and institutional capacity iv) Bad governance in biodiversity management v) The tangle of competencies vi) Low level of awareness of the value and role of biodiversity The strategy to respond to these issues is based on the five strategic goals defined by the Convention on Biological Diversity (CBD) Strategic Plan which includes the Aichi Biodiversity Targets. These four strategic goals cover 18 of the 20 Aichi Biodiversity Targets, which are referred to as Objectives in the Guinea National Biodiversity Strategy. i) Strategic Goal A: Manage the underlying causes of biodiversity loss by nitrating biological diversity in all government and societal programmes (Objectives 1,2,3,4). ii) Strategic Goal B: Reduce direct pressures on biological diversity and encourage sustainable use (Objectives 5,6,7,9). iii) Strategic Goal C: Improve the state of biological diversity by safeguarding ecosystems, species and genetic diversity (Objectives 11,12,13). iv) Strategic Goal D: Strengthen the benefits for all from biological diversity and ecosystem services (Objectives 14,15,16). v) Strategic Goal E: Strengthen implementation through participatory planning, knowledge management and capacity building (Objectives 17,18,19,20).
National Strategy for the Management of Protected Areas	This strategy has led to the creation of a national network of protected areas with a ten-year action plan, which covers 8% of the national territory. It includes two national parks, four biosphere reserves, one world heritage site, sixteen Ramsar sites, four marine protected areas as well as several state or community-managed nature reserves.
Ten-Year Action Plan for Protected Areas	Includes: i) Support for the management of biodiversity reserves and World Heritage sites ii) Management of ecosystems and marine protected areas iii) Management of transboundary protected areas, iv) National capacity building v) Support for national action research, monitoring and evaluation of management effectiveness.
National Action Plan to Combat Desertification	This is a strategic framework to combat land degradation and deforestation, including safeguarding the ecosystems of the Fouta Djallon massif and its physical extensions, combating poverty, rational and integrated management of natural resources, decentralization and effective participation of stakeholders at grassroots level and partnership between stakeholders. The plan comprises a reference framework for the fight against land degradation and deforestation, comprising the following sub-programmes: 01 Improving the legal and institutional framework 02 Building the capacity of stakeholders for better land use and sustainable management of forest resources 03 Setting up a monitoring and evaluation system to improve knowledge of the biophysical reference framework, etc. 04 Participatory management and sustainable management of Guinea's forests *05* Restoring degraded ecosystems and improving production systems. The project will strive to minimize the destruction of vegetation cover in the implementation of its activities.
Guinea's Forest Policy	The forestry policy has six main objectives: 1. Ensure the sustainability of the national heritage of renewable natural resources 2. Guarantee and manage areas that must be permanently dedicated to forestry 3. Applying the best methods for delivering the maximum number of goods and benefits for a given period of time unlimited 4. To support and monitor the various aspects of the harvesting, processing and marketing of forest products 5. Closely involve all government departments, companies, associations, local authorities and all other stakeholders in the process *6.* Ensure the effective operation of policy instruments

8.2.1.3 Conventions and Guidelines

Guinea is a signatory to all main international environmental conventions including the Ramsar Convention, the Convention on Biological Diversity and the Bonn Convention on conservation of migratory wildlife species, the latter of which has been transposed into Guinean legislation via the *Code de protection de la faune sauvage et des règles de la chasse*.

In addition, reference is made within this ESIA to the International Finance Corporations (IFC) Performance Standard 6 (PS6). This defines the specific requirements with regard to identifying potentially important receptors, in particular the requirement to identify natural, modified and critical habitats (IFC, 2012; IFC, 2019).

8.2.2 Receptor Sensitivity

The biodiversity baseline section identifies the receptors likely to be affected by the Project. The impact assessment defines the sensitivity (i.e. importance) of the receptor in an objective way and compares this against the impact magnitude to determine the level of impact on the receptor.

The assignment of sensitivity is based on a number of consistent factors as set out below. Once the sensitivity of the receptor is known, it can be considered in the context of the magnitude of the impact on the receptor. Whether this is deemed to cause a significant effect, and what that effect is, can therefore be determined.

Based on the information collected from literature, data collection and field surveys, a sensitivity value (high / medium / low / negligible) was assigned to each identified habitat and species affected by, or likely to be affected by the Project.

The sensitivity value of receptors is defined based on a combination of vulnerability (e.g., level of extinction risk) and irreplaceability (e.g., relating to issues of species considered to have a restricted range). Extinction risk is defined principally by the IUCN Red List of Threatened Species (IUCN, 201). The sensitivity of receptors also refers to the five criteria which relate to critical habitat, as set out in IFC PS 6 (IFC, 2012; IFC, 2019).

Therefore, species and habitats were assigned broad categories of sensitivity based on the standard conservation parameters of vulnerability and irreplaceability. The sensitivity of the receptor was also considered in terms of its geographical frame of reference, and how widespread the receptor is in relation to the effects of the Project. Consequently, in combination with information about the character of the impact, the significance of the impact(s) on the identified receptor was determined. Table 8-2 is used to assign sensitivity values to receptors.

Table 8-2: Receptor sensitivity

Sensitivity of Receptor	Selection criteria
High (International / National Importance)	• Legally protected and international or nationally recognised areas, such Ramsar sites, Important Bird Areas, National Parks, Wildlife Reserves, or areas of high biodiversity value that meet the criteria for such designation, irrespective of whether or not they have yet been designated. • Critically Endangered (CR) and Endangered (EN) species (PS6 Criterion 1). • Endemic/ Restricted Range Species (PS6 Criterion 2). • Migratory/ Congregatory Species (PS6 Criterion 3). • Endangered (EN) Highly Threatened / Unique Ecosystems (PS6 Criterion 4). • Key Evolutionary Processes (PS6 Criterion 5). • Species which are fully legally protected.
Medium (Regional Importance)	• Sites that are of regional importance such as local wildlife reserves. Regionally important areas that may meet the published ecological selection criteria for designation but are not designated as such. • Species not meeting the criteria for 'high' but are assessed by IUCN as Vulnerable (VU), Near Threatened (NT) or Data Deficient (DD), whichever is the higher category. • Vulnerable (VU) Highly Threatened / Unique Ecosystems (PS6 Criterion 4) • A regularly occurring, locally significant number of a regionally important species. • Features functioning as wildlife corridors or migration routes, but which may not be designated or protected. • Species with some level of legal protection (e.g., seasonal, life phases).
Low (Local Importance)	• Areas of habitat considered to appreciably enrich the habitat resource within the context of the local area. Less usual ecological features. • A significant population of a locally important species. Sites/features that are scarce within the locality or which appreciably enrich the local area's habitat resource.

Sensitivity of Receptor	Selection criteria
	• Species that do not meet the criteria for ‘‘high’ or ‘medium’ but are notable for other reasons (e.g., of socio-economic importance).
Negligible Importance	• Areas with no protected status or designation. • Species and natural habitats that are common and widespread.

8.2.3 Impact Magnitude

To determine the character/magnitude of an impact the following parameters are considered in relation to each receptor:

- **Extent**: Relates to the location and proportion of the feature’s area or population in the landscape that will be affected by the project. This also includes an element of connectivity, which is how connected the receptor is to Project activities and therefore how likely it is to be affected. Where receptors are far away and/or there is no connectivity, directly or indirectly, there will be no impact.
- **Severity**: Is a measure (or estimation) of how severe the impact is on that proportion of the population or location defined by the scope. Such parameters would include extent of habitat degradation, loss of integrity of protected areas (including connectivity) and changes ranging from disturbance to measurable demographic extent on species populations.
- **Duration**: Is defined by whether the impact is short term, temporary or long term.
- **Permanence** / Reversibility: Defines the capacity for the species or habitat to recover once the cause of the impact has been removed. This includes the time it might take for population or status to recover and also what proportion of that impact will also be reversible.

This assessment has been undertaken with reference to Table 8-3 where the impact magnitude is defined based on consideration of these parameters. It should be noted that where parameters within one level of impact character differ radically, the higher level of category is used to determine the impact character.

Note that the assessment undertaken for this ESIA has not been a fully quantitative exercise because in most cases figures for populations, trends and spatial distribution of species are not fully known. Therefore, where required, professional judgement has influenced the level of impact magnitude ultimately assigned.

Table 8-3: Impact magnitude criteria

Character (magnitude) of impacts	Assessment criteria
High Adverse	• Extent: A high proportion of the feature’s population and/or distribution within the Project site of Influence (AoI) will be affected by the impact. • Severity: Complete loss or severe degradation or disturbance of ecological function, species population, habitat coverage or functionality, or protected site integrity, including connectivity, will occur. Change may result in reduction in conservation status (as defined by IUCN) of the species or habitat. • Duration: The impact will be long term (10 to 20 years). • Permanence / Reversibility: The impact cannot be reversed with 10 years of the activity causing the impact has ceased.
Medium Adverse	• Extent: A moderate proportion of the feature’s population and/or distribution within the AoI will be affected by the impact. • Severity: Moderate degradation or disturbance of ecological function, species population, habitat coverage or functionality, or protected site integrity, including connectivity, will occur. Change likely to result in change in conservation status of the species or habitat. • Duration: The impact will be temporary and medium term (between 5 and 10 years). • Permanence / Reversibility: The impact can be reversed to baseline levels within 5 years of the activity causing the impact having ceased.
Low Adverse	• Extent: A low but measurable proportion of the feature's population and/or distribution within the AoI will be affected by the impact. • Severity: A low but measurable level of degradation or disturbance of ecological function, species population, habitat coverage or functionality, or protected site integrity, including connectivity, will occur. Change will not be enough to result in change in conservation status of the species or habitat. • Duration: The impact will be temporary and short term (between 1 and 5 years).

Character (magnitude) of impacts	Assessment criteria
	• Permanence / Reversibility: The impact can be reversed to baseline levels within 2 years of the activity causing the impact having ceased.
Negligible	• Extent: A negligible proportion of the feature's population and/or distribution within the AoI will be affected by the impact. • Severity: No discernible degradation or disturbance of ecological function, species population, habitat coverage or functionality, or protected site integrity, including connectivity, will occur. • Duration: The impact will be temporary and short term (less than 1 year). • Permanence / Reversibility: The impact can be reversed to baseline levels within 2 years of the activity causing the impact having ceased and will be fully reversed and restored.

8.2.4 Assessing Impact Significance

Project biodiversity impacts have been assessed using the standard ESIA assessment method and cross-referencing receptor sensitivity (importance) against the magnitude (character) of the impact. Resultant impact significance is determined according to the impact significance matrix shown in Table 4-1 of the **Chapter 4 ESIA Methodology**.

Determination of whether an impact is therefore considered to be significant is based on a combination of the sensitivity (importance) of the receptor and the predicted magnitude (character) of the potential impact. Based on this approach an impact of Moderate or above is regarded as significant. Those effects defined as Low or below are not significant.

The assessment of significance has also been informed by the Guidelines for Ecological Impact Assessment (CIEEM, 2018). These guidelines emphasise the principle of valuing an ecological resource at a defined geographic scale but advocates that the effects are evaluated simply as significant or not significant for the geographic level at which the ecological resource is valued.

Therefore, whether an effect is significant or not is based on whether the integrity of a defined site or species is affected. This allows some flexibility in defining significance based on geographical scale because, if an effect is found not to be significant at the level at which the resource or feature has been valued, it could be that it is significant at a more local level.

8.2.5 Baseline Methods

8.2.5.1 Objective

The objective of this terrestrial ecological environment study has been to document the terrestrial flora and fauna and their habitat values within the study area, with particular reference to the presence of habitats and species of conservation concern. The approach to collecting baseline information has included:

- Desk-based study consisting of a review of existing relevant literature and data.
- Field survey to document existing ecological features such as habitats, terrestrial flora and fauna.
- Descriptions and mapping of essential habitats and threatened ecological communities that may occur in the study area.

8.2.5.2 Study Area

The Project site is situated on unoccupied land in Ratoma in the north-east of Conakry. The Project site covers an area of approximately 7 ha (total site area is 70,591 square metres of surface area). It is located within a larger area of recently cleared brownfield land owned by the Guinean state that totals approximately 202 ha, which had formerly been occupied by low level housing settlements (refer to Chapter 2 of this report for a fuller site description and site location.

The Project site is therefore surrounded by cleared brownfield sites and beyond that, extensive areas of existing urban development, where the nearest 'undeveloped' area (used as a plant nursery) which still contains trees and other vegetation is located 600m to the south with no direct pathway between it and the Project site. In addition, the nearest watercourse within the riparian Demoudoulah Forest, is located 1 km north-east of the site at its closest point. This watercourse is narrow, is likely to be entirely fed by urban drainage and appears to be partially canalised. It is also separated from the Site by extensive urban development.

8.2.5.3 Desktop Study

Desktop study was used to identify species and ecologically sensitive locations in and around the study area that may need further study. Information was gathered from the following sources:

- Published literature especially previous EIA studies and research papers
- Grey literature
- Satellite images
- Available topographical maps and habitat maps.

Aerial photographs of the site, satellite images, topographic data, existing preliminary wetland and watershed mappings, geology and soil survey maps of the study area and surrounding areas were reviewed.

In addition, information on international sites was collected from sources such as Birdlife International and the Ramsar website, amongst others. Other information sources are referenced as appropriate throughout the text.

This information was used to help characterise the study area, identify any potential habitat on a preliminary basis, and to guide the field surveys.

8.2.5.4 Field Survey

A initial walkover survey was conducted on 25 August 2023 by AECOM's local partner, SEES. This was carried out during the daytime enabling the surveyors to record habitats, notable plants, as well as animals and birds active at that time. The overall objective was to determine the spatial distribution of habitats across the site and to identify important terrestrial ecological species and features that could be affected by the Project, if any. Subsequently, AECOM and SEES undertook a site visit on 12 September 2023, and then re-visited the site and the surrounding areas again on 14 and 15 September 2023.

The walkover method comprised a 'wandering' transect which was used to identify fauna and flora distributed in the area and to define habitats.

The survey defined the habitat types present and the occurrence of any important floral communities and associated fauna. This included primarily a walk through the study area to determine habitat heterogeneity and to define natural, semi-natural or anthropogenic habitats.

Direct (visual) and indirect (signs, tracks, calls or sounds, scats, dung, pellets, pugmarks/footmarks etc.) observations were made to gather relevant information and to help identify the presence of species that may not have been directly seen. Opportunistic observations of faunal species were also recorded.

For the collection of floral data, higher plants and selected lower plants were identified to their families, general and species.

8.2.5.5 Data Limitations

Desk study information included access to available information and reviewed websites including site maintained by IUCN, BirdLife, Ramsar and others. It is likely that there is data available that was not identified, but it is nevertheless considered that sufficient desk study data was collected to define the Project site and surrounding area and to indicate what the likely biodiversity receptors would be.

The site surveys were undertaken in August and September 2023 and was therefore confined to one season. No trapping or other intrusive methods of data collection were used at the site and no quantitative data regarding species populations was collected. In addition, part of the site had already been developed (with a workers' temporary welfare facility) by the time the site visits took place. However, it is considered that the level of field work undertaken is adequate to assess the impacts of the development on relevant receptors for this site, considering its status and condition.

8.3 Ecological Context

8.3.1 Overview

This section provides a description of the wider context of the site, noting that the biodiversity described here may not necessarily be present at the site considering that the site itself is located within, and is entirely surrounded by, the dense urban development of the city of Conakry.

8.3.2 Eco-Region

The coastal regions of Guinea fall within the West African Coastal Forests & Savanna Ecoregion (reference AT19) (OneEarth, 2023), located in the Equatorial Afrotropics. This ecoregion consists of tropical coastal forests and mangroves as well as Guinean mountain forests and forest-savanna and supports seven ecoregions comprising Guinean Forest-Savanna, Guinean Montane Forests, Western Guinean Lowland Forests, Eastern Guinean Forests, Jos Plateau Forest-Grassland, Guinean Mangroves and Central African Mangrove, with a land area of more than 113 million hectares. The Guinean forests are considered to be a biodiversity hotspot with over 9,000 species, 20% of which are endemic to the region.

Conakry itself lies within the Western Guinean Lowland Forests eco-region, which stretches from eastern Guinea, across Sierra Leone and Liberia, to the Sassandra River in south-western Côte d'Ivoire. The topography is flat to undulating with an altitude ranging between 50 and 500 m, with a few isolated mountains of higher elevation. The soils are generally poor and heavily leached, except along river valleys and within inland swamps.

The warm and humid climate within the eco-region has permitted the development of rainforest vegetation, with moist evergreen forests found in the wetter areas, and moist semi-deciduous forests further inland. Swamp and riparian forests are embedded in the other forest types. In addition, 'farmbush', the secondary growth forest that follows slash-and-burn agriculture, is increasingly the dominant vegetation type in this ecoregion. However, in and around Conakry the natural habitats at the site and in the surrounding area are urbanised and therefore these habitats have been lost. Nevertheless, the remaining forests are highly diverse and support well over 3,000 plant species, at least 200 of which are endemic (OneEarth, 2023).

8.3.3 Endemic Bird Area (EBA)

Endemic Bird Areas (EBAs) are designated areas of importance for endemic bird species (Birdlife International 2023), where two or more restricted-range species overlap. The Study Area is located within the Upper Guinea Forests EBA (BirdLife, 2023a).

This EBA comprises one of Africa's two major lowland rain forest regions and originally covered most of Sierra Leone, south-east Guinea, Liberia, southern Ivory Coast and south-west Ghana. However, much of this area is now lost. Consequently, most of the restricted-range bird species are mainly confined to the lowland rain forests of Upper Guinea.

The distribution and status of the birds of the Upper Guinea forests are generally rather poorly known. However, all of the species that are endemic to the Upper Guinea forest are here considered to have restricted ranges, because, although the forest originally covered several hundred thousand square kilometres, this area was already much reduced when ornithological exploration began, and few (if any) of the species appear now to occur throughout the region.

Fifteen restricted-range bird species are confined to this EBA (including one species, the Sierra Leone Prinia (*Schistolais leontica*) which is classed as Endangered (EN). However, all are forest birds and none of these species is likely to be present at or close to the Project site. Therefore, although the Study Area is technically within this designation, the EBA is so large, variable and diffuse that is has not been considered further in this assessment.

8.3.4 Recognised and Designated Areas

The nearest designated area to the Project site is the riparian Demoudoulah Reserve Forest located 1 km to the north of the site. This forms a narrow meandering strip flanking a watercourse which drains into the Baie de Sangaréya and is described as a park.

A more substantial area of forest is the Kakimbo Reserve Forest located 1.75km to the south-west of the Project site. This area was classified as a "reserve forest" in 1943 and declared an "area of public interest" in October 1983. However, since then the Kakimbo Forest has decreased in surface area by 75 percent, thus falling from 117 ha to less than 15 ha (BirdLife, 2023b). The forest is highly degraded and is under pressure from urban encroachment and general disturbance, therefore although in theory it is protected in practice it is not. It should be noted that there is small watercourse that runs through the forest, the Kakimbo 'marigot' ('backwater') but this is highly polluted from urban run-off and sewage over-spill.

Further afield, there are two internationally recognised sites in the vicinity of Conakry, both of which have been designated as Important Bird and Biodiversity Areas (IBA) and Ramsar sites. However, none of these are on or close to the Project Site.

The Konkuré IBA (IBA GN011) and Ramsar (Site 575) is located approximately 15 km north of the Project Site. This IBA includes the Rio Konkouré and the Rio Bouramaya deltas as well as part of the Baie de Sangaréya. Habitats comprise 28,000 ha of mangroves, mudflats and sandbanks, as well as a small area of rice-fields (BirdLife, 2023b).

This IBA supports a significant population of waterbird species in particular western reef-egret (*Egretta gularis*) (LC), pied avocet (*Recurvirostra avosetta*) (LC) and common redshank (*Tringa tetanus*) (LC). Other non-avian species associated with this IBA / Ramsar include African manatee (*Trichechus senegalensis*) (VU) found in the mangroves and the bottlenose dolphin (*Tursiops truncatus*) (DD) recorded in the bay. Mangrove habitat is also important as a spawning ground for various species of fish, including sharks and rays. Part of this Ramsar site is included within the remit of an EU-funded project to promote sustainable management of mangrove resources.

The Ile Blanche IBA (GN015) and Ramsar (Site 618) is the southernmost island of the Iles de Los archipelago, located more than 20 km south-west of the Project site. This IBA / Ramsar is a rocky, lateritic island with a surface area of some 10 ha, divided into three islets at high tide. The island is generally sandy with, except for a few mangroves, little vegetation and is used as a roosting site for terns including the royal tern (*Thalasseus maximus*) (LC) and other seabirds. In addition, sea turtles such as the endangered olive ridley turtle (*Lepidochelys olivacea*) (EN) may nest on the island's beaches, although the island is subject to significant human disturbance (BirdLife, 2023c).

8.3.5 Threatened Species

Guinea supports a rich and varied ecology centred on the forests, deltas and other important habitats present within the country and numerous species of conservation concern area associated with these areas. However, none of these habitat types are present within the AoI of the Project site, which is entirely urban, and therefore the presence or otherwise of threatened species has been discounted from this assessment.

The only areas in the vicinity of the Site which do support species of concern are the two IBA / Ramsar sites discussed above and various marine species likely to be present within the waters surrounding Conakry. However, none of these marine areas fall within the Project site's AoI and therefore the species associated with these have not been included in this assessment.

8.4 Field Survey Results

8.4.1 Habitats and Flora

A site walkover and rapid field survey of the Site was undertaken in August 2023 by SEES (AECOM's local partner) to define habitats and species present at the site and to characteristics and identify any ecological important features (Flora and Fauna) . The site walkover and rapid field survey on the Project site identified the habitat types at the Site at that time and recorded plant and other species that were present.

The site walkover survey concluded that the habitats at the Project site comprised bare ground (recently cleared) in the northern eastern quadrant of the Project site, with the remainder of the Project site comprising general low herbaceous vegetation. Both of these habitats indicate that the site has been heavily disturbed and therefore comprises Modified Habitat.

As noted, the Project site is clearly highly disturbed with the vegetation consisting principally of seasonal grasses and forbs. However, several plant species derived from cultivated varieties were observed, which are likely to be remnants of the previous houses and gardens that formerly occupied the Project site. No signs of active cultivation were observed at the Project site. The habitat map of the Project site and site vegetation before the commencement of the construction activities are shown in Figure 8-1 and Figure 8-2, respectively.

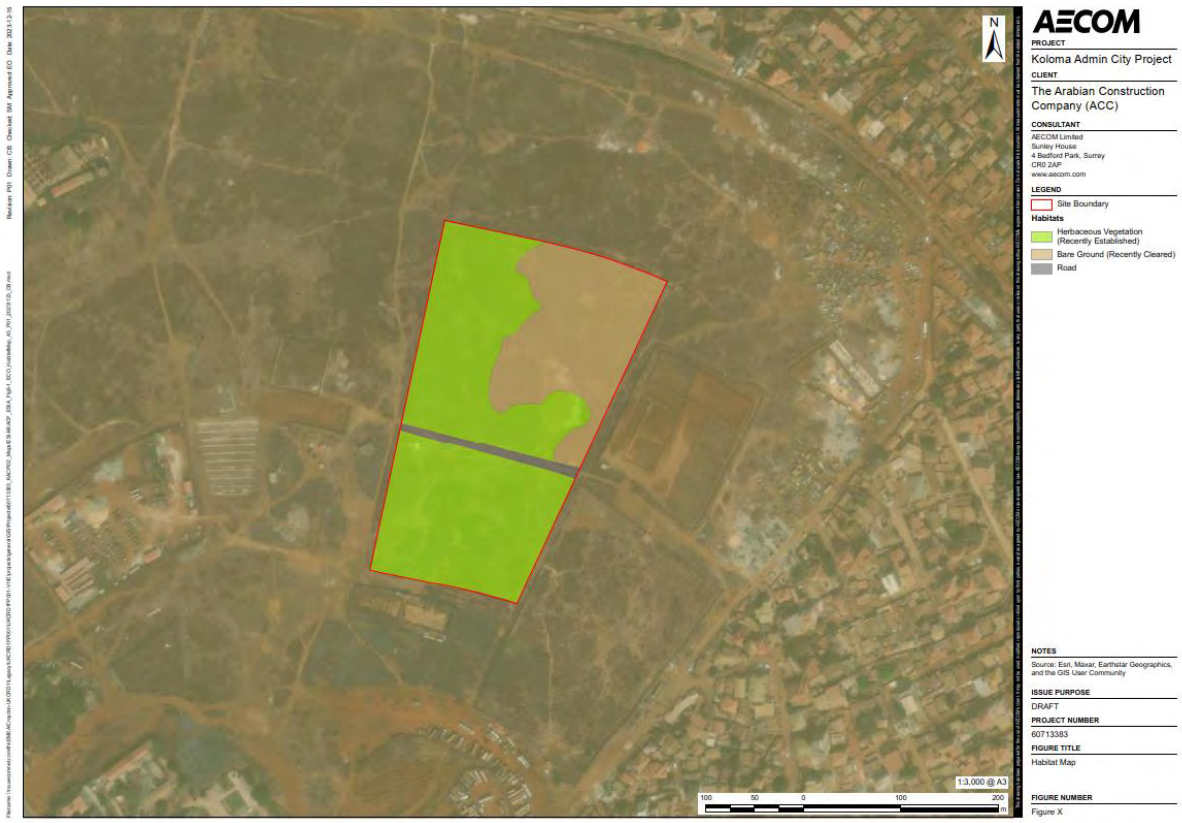

Figure 8-1: Habitat Map

Figure 8-2: Site Vegetation *(the photo was taken in August 2023 during the initial site walkover undertaken by SEES*)

A list of plant species recorded at the Project site is given in Table 8-4 below. None of these species are of conservation concern.

Table 8-4: Recorded Flora

Scientific Name	Common Name (English)	Common Name (French)	IUCN Status*	MNDG Status*
Achyranthes aspera	Devil's horsewhip	Herbe d'Eugène	LC	NE
Ageratum conyzoides	Billygoat weed	Herbe à bouc	LC	NE
Bidens pilosa	Black-jack	Herbe à aiguilles	LC	NE
Calopogonium mucunoides	Wild ground nut	Arachide sauvage	DD	NE

Scientific Name	Common Name (English)	Common Name (French)	IUCN Status*	MNDG Status*
Chromolaena odorata	Jack in the bush	Herbe du Laos	NE	NE
Crotalaria retusa	Devil bean	Cascavelle jaune	LC	NE
Gomphrena serrata	Prostrate globe amaranth	Immortelle violette	NE	NE
Laportea aestuans	n/a	Ortie tropicale	LC	NE
Ludwigia octovalvis	Primrose willow	Herbe bourrique	LC	NE
Phyllanthus amarus	Black catnip	Graine en bas des feuilles	NE	NE
Sesbania sesban	Scarlet wisteria	Chanvre Egyptien	LC	NE
Sida acuta	Common wireweed	Herbe à balais	NE	NE
Spigelia anthelmia	West Indian pinkroot	Herbe à la Brinvillier	NE	NE
Urena lobata	Caesarweed	Hérisson rouge	NE	NE

- *LC: Least Concern, DD: Data Deficient, NE: Not Evaluated.*

8.4.2 Alien invasive plant species

As the Project site has been formerly occupied and has in some places been cleared, it has been rapidly colonised by various species as listed above. All of these species, to a lesser or greater extent, are regarded as alien invasive species.

8.4.3 Fauna

A total of 11 fauna species were recorded during the field survey at the site, comprising 2 mammals, 4 reptile species and 5 bird species. The species recorded are listed in Table 8-5 below.

Table 8-5: Recorded Fauna

Scientific Name	Common Name (English)	Common Name (French)	IUCN Status*	MNDG Status*
Mus musculus	House mouse	Souris commune	LC	NE
Cricetomys gambianus	Gambian pouched rat	Rat de Gambie	LC	NE
Agama agama	Agama	Margouillat	LC	NE
Hemidactylus albivertebralis	White-lined half-toed gecko	Gecko à ligne claire	DD	NE
Hemidactylus angulatus	A species of gecko	Gecko commun africain	NE	NE
Trachylepis affinis	Senegal mabuya (a skink)	Mabouya du Sénégal	NE	NE
Apus affinis	Little swift	Martinet des maisons	LC	NE
Larus sabini	Sabine's gull	Mouette de Sabine	LC	NE
Columba guinea	Speckled pigeon	Pigeon roussard	LC	NE
Corvus albus	Pied crow	Corbeau pie	LC	NE
Hirundo lucida	Red-chested swallow	Hirondelle de Guinée	LC	NE

- *LC: Least Concern, DD: Data Deficient, NE: Not Evaluated.*

None of the animal species recorded are of conservation concern.

8.4.4 Natural and Modified Habitat

One of the requirements of IFC Performance Standard 6 (PS6) is to determine the physical areas of different habitat types, particularly to identify how much of the habitats are 'natural' and how much are 'modified'. In line with the requirements of PS6, this habitat definition is important because where there are significant impacts on natural habitat, there is in principle a requirement to mitigate these impacts to achieve a "no net loss" of biodiversity.

Based on field surveys, all of the habitats within and surrounding the Project site are clearly Modified Habitat.

8.4.5 Critical Habitat

A key requirement of IFC PS6 is to identify areas of Critical Habitat that may be affected by the Project, based on five criteria. Critical Habitat Assessment is a process for identifying significant biodiversity risks associated with the Project. To determine whether Critical Habitat is present, IFC PS6 and its Guidance Note 6 (GN6) consider five main criteria for which quantitative or qualitative thresholds have been defined:

- Criterion 1: Critically Endangered and/or Endangered Species
- Criterion 2: Endemic / Restricted-Range Species
- Criterion 3: Migratory / Congregatory Species
- Criterion 4: Highly Threatened and/or Unique Ecosystems
- Criterion 5: Key Evolutionary Processes

Critical Habitat therefore comprises an area of high biodiversity value that includes one or more of these five values. In addition, PS6 makes provision for Legally Protected Areas, for example National Parks, and Internationally Recognised Areas, to be assessed as Critical Habitat, if the ecological values within them meet any of Criteria 1-5. In this context, Internationally Recognised Areas include UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas (KBA), Important Bird Areas (IBA), Important Plant Areas (IPA) and wetlands designated[48] under the Convention on Wetlands of International Importance ('the Ramsar Convention').

Identification of Critical Habitat is important because where there are significant impacts on Critical Habitat, there is a requirement for "net gain". However, based on the available information it is very unlikely that any part of the Project site comprises Critical Habitat.

However, based on the presence of significant congregations of birds it is likely that the Konkuré IBA and the Ile Blanc IBA (which lie approximately 15km to the north and 20 km southwest of the Project site, respectively) will represent Critical Habitat under Criterion 3, not to mention the potential presence of Criterion 1 species such as olive ridley sea turtles associated with the Ile Blanc IBA / Ramsar.

8.5 Receptors

The identified receptors are listed in the Table 8-6 and their receptor sensitivity level has been assigned based on the criteria described in *Section 8.2.3* of this Report.

Table 8-6: Identified Receptors

Receptor	Name	Commentary	Sensitivity
Recognised / Designated Areas within 20km of the Project site	Demoudoulah Forest	A forest reserve 1 km to the North of the Project site. Likely to be much degraded.	Medium
	Kakimbo Forest	A forest reserve 1.75 km south-west of the Project site. Much reduced in size and degraded.	Medium
	Konkuré IBA / Ramsar Site	Approximately 15 km north of the Project site and may qualify as Critical Habitat.	High
	Ile Blanche IBA / Ramsar Site	Approximately 20 km south of the Project site and may qualify as Critical Habitat.	High
Habitats	Urban	Dense urban development surrounding the Project site	Negligible
	Bare ground	Northern part of the Project site	Negligible
	Herbaceous coverage	Herbaceous ground cover comprising predominantly invasive species	Negligible
Flora	Common species	No notable species of flora recorded	Negligible
Fauna	Common mammals, reptiles and birds	Various species recorded	Low
	African manatee	A threatened species (VU) associated with the Konkuré IBA / Ramsar	Medium
	Bottle-nose dolphin	Status is not clear (DD) but may be of conservation concern	Medium
	Olive ridley sea turtle	A threatened species (EN) species associated with the Ile Blanc IBA / Ramsar	High

[48] Performance Standard 6 adopts the terminology "internationally recognized area" instead of "internationally designated area," as designated is often used to describe protected areas that are designated by governments. In terms of international designations, conventions differ in their terminology (for example, inscribed, adopted, designated, recognized), and therefore the more generic term recognized was deemed more appropriate (GN93, IFC, 2019)

Two remnant forest reserves are located within 2 km of the Project site (Demoudoulah Forest and Kakimbo Forest). In addition, there are two internationally recognised areas located within 20km of the Project site. These comprise the Konkuré IBA 15 km to the north and the Ile Blanc IPA located 20km to the south.

The habitats at the Project site itself are entirely modified and are of low sensitivity, where most vegetation cover comprises invasive species. There are no animal species of conservation concern at or close to the Project site. The only species that may be of concern are those associated with the two IBA / Ramsar, including manatee, bottlenose dolphin, sea turtles and congregations of seabirds. However, neither IBA / Ramsar is within the likely AoI of the Project site.

8.6 Impact Assessment and Mitigation

8.6.1 Potential Impacts

To complete the assessment, it is necessary to understand the nature and extent of the Project during construction and operation[49] and to consider any mitigation that has already been incorporated into the design (i.e., embedded mitigation).

The activities with the potential to affect ecological receptors have been identified and the aim of the assessment is to consider the sensitivity (importance) of the receptors and compare that to the magnitude of impact associated with project related activities. The key activities likely to result in impacts to biodiversity are included below in Table 8-7.

Table 8-7: Project activities and potential impacts on biodiversity

Phase	Activity
Construction & Commissioning	• Fencing off of the construction site • Site clearance including felling of trees, cutting undergrowth • Establishment of workers' compound / offices / lay down areas • Vehicle movements on, to and from the site for deliveries, etc. • Site levelling, earthworks and foundation trenches • Stockpiling of soil and construction materials • Excavations and trenching (e.g., for pipes and cables) • Construction of the drainage channels and outfalls • Waste management (collection and temporary storage) and sanitary arrangement for workers • Refuelling and maintenance of site vehicles • Fuel and chemical storage • Temporary site drainage and spill control • Construction of buildings, internal roads and footpaths • Night-time flood-lighting • Presence of construction workers on site • Landscaping and ornamental planting
Operations	• Vehicle movements at all times of the day and night • Site drainage including through the outfall, spill control and rainwater runoff • Permanent external lighting • Chemical spills and/or pollution incidents

Although identified activities may impact ecological receptors to various degrees, site clearance during early phases of the work is likely to be the most significant activity that may have an impact on receptors. This is the phase when habitats and the species associated with them will be largely lost.

In addition, there may be edge effects where areas not directly lost to the Project could experience indirect effects from physical disturbance, human activity, and the presence of infrastructure in previously undeveloped areas. Furthermore, during construction activities, vehicle movements also have the potential to affect ecological receptors, including transference of invasive species into or out of the Project site. Such impacts may continue through the operational life of the Project.

Finally, there is the potential for indirect impacts on receptors located further from the Project site boundary such as recognised or designated areas and the biodiversity features associated with them. Such impacts could be

[49] And the decommissioning phase if that is appropriate.

associated with release of contaminants from the site into aquatic habitats, through directed drainage or from general run-off.

8.6.2 Mitigation

8.6.2.1 Embedded Construction Phase Mitigation

Standard operating procedures will be implemented during the construction phase, based on the Project's Environmental and Social Management Plan (ESMP /PGESC) developed by ACC. Typical embedded mitigation actions during construction is that all construction and administrative workers at the Project site shall be provided with environmental training. This shall include a strict prohibition on hunting of animals and resource gathering within the site and surrounding area.

8.6.2.2 Additional Mitigation: Construction

The following additional mitigation will be implemented during construction:

- The site boundaries shall be marked prior to site clearance work. Any fencing used at these boundaries shall be open enough to allow large animals to escape from the site during site clearance. Once the vegetation has been cleared from the site, more formal fencing shall be installed. This shall be secure but be open enough to allow small animals to pass through.
- Where any felling of trees is required, these shall be removed first. Soft felling techniques (trees cut and lowered to the ground in a controlled manner) shall be used where appropriate. Cut branches and trunk sections shall be left on the ground to allow any animals present to escape before the wood is taken from the site. Undergrowth and shrubs shall then be cleared. A watching brief by trained personnel (e.g., an environmental clerk of works) shall be kept, to look out for any animals and to allow them enough time to escape. Thickets and shrubs shall be cleared after the removal of trees. A watching brief by trained personnel shall be kept looking out for any animals and to allow them enough time to escape.
- Where possible topsoil shall be retained for use in subsequent landscaping.
- Except for security and safety oriented peripheral lighting, exterior lighting shall be planned in low angles and be directional to reduce light pollution.
- Should any aspect of the design change to include development of additional land, an ecological walkover survey will be undertaken prior to construction commencing. This will be to map habitats and to determine the presence of natural and or modified habitat.
- Based on the requirements of Objectives 9.3 & 9.4 of the Guinea National Biodiversity Strategy, there is a requirement to control the introduction of invasive / exotic species. Therefore, any invasive plant species and/or plant waste material, including waste soils that may contain plant material, will be treated to destroy that plant material prior to being disposed of off-site or reused on-site.
- Any soil brought onto the site should be checked for the presence of invasive species that may be introduced and/or spread.

8.6.2.3 Embedded Operation Phase Mitigation

The site operator will adopt the following measures as part of the overall operational site management as mitigation for site activities that may have the potential to impact on biodiversity:

- Pollution prevention and drainage management measures
- Waste management measures
- The Project will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system. Design and management of the discharge systems from the Site will ensure that pollutants from the site do not enter the coastal or rivers systems. Drainage connecting to any outfalls shall incorporate hydrocarbon separators and Sustainable drainage systems (SuDS) elements.
- An operational phase Project ESMP (including Pollution Prevention Plan), which covering measures against spills, will be developed. It will be ensured that necessary environmental trainings (including management of environmental emergencies/means of intervention/incident management procedures) will be provided to the staff.
- All operational and administrative workers at the site shall be provided with environmental training. This shall include guidance on pollution prevention and drainage management as well as waste management. In

addition, there will be a strict prohibition on hunting of animals and resource gathering within the site and surrounding area.

8.6.2.4 Additional Mitigation: Operation

The following additional mitigation during operation will be required:

- Any release of chemicals or hydrocarbons will be contained and not released to the water environment.
- Should any aspect of the design change to include development of additional land, the Management of Change Procedure shall be applied and necessary.
- Where landscaping and planting is included as part of the design, priority will be given to using indigenous plants of local origin sourced from local nurseries / garden suppliers where possible. Care will be taken to avoid introducing ornamental species that comprise exotic / invasive species.

8.6.3 Assessment of Impacts: Construction

The first stage in the assessment is to consider the potential initial impacts associated with construction activities on the identified receptors, taking embedded mitigation into account. This is the process of thinking through what might happen to the identified receptors and whether any additional mitigation is required. Potential initial impacts from the construction phase on each group of receptors identified in the review of baseline information are discussed below and where additional mitigation has been identified, the residual impacts on that receptor are discussed further.

8.6.3.1 Impact TE-01: Recognised and Designated Areas

The nearest designated areas to the Project site comprise the riparian Demoudoulah Reserve Forest located 1 km to the north of the site and the Kakimbo Reserve Forest located 1.75km to the south-west. Both of these forests are degraded and subject to significant pressures from urbanisation and pollution although are of regional importance.

However, despite their relative proximity to the Project site, neither of these forests is likely to be directly or indirectly affected by construction activities at the Project site and level of impact is likely to be Low Adverse at worst. Consequently, the overall impacts during construction will be **Low Adverse**, which is not significant.

Further afield, there are two internationally recognised sites in the vicinity of Conakry, both of which have been designated as IBA and Ramsar sites. However, none of these are on or close to the Project Site. The Konkuré and Ramsar Site is located approximately 15 km north of the Project Site and the Ile Blanche IBA and Ramsar Site is located more than 20 km to the south-west.

Both of these sites have a high sensitivity due to their international importance, specifically in terms of the substantial congregations of birds associated with both areas. However, neither site is likely to be directly or indirectly affected by construction activities at the Project Site and the magnitude of any impacts would be negligible. Consequently, the overall impact on these internationally recognised sites would be **Low Adverse**, which is not significant.

8.6.3.2 Impact TE-01: Habitats

Habitats at the Project site itself either comprise bare ground or land with a low ground coverage of plants, most of which comprise invasive plant species. Both of these habitats are therefore of negligible sensitivity.

Construction works and site clearance will result in loss of most of these habitats, which will be replaced by buildings, hardstanding or landscaping. The overall magnitude of impact will be medium, resulting in a Low Adverse impact, which is not significant. In addition, for the surrounding urban habitats, where there will be no direct effects from the site, the overall level of impact during construction will be **Negligible**.

8.6.3.3 Impact TE-02: Flora

No endangered or otherwise notable plant species were identified at the Project site. This is partly because the site had previously been developed with housing and had been recently cleared. Therefore, the vegetation at the site comprises remnants of domestic plants but mainly early pioneer species, almost all of which have been identified as invasive and/or aggressive species. The receptor sensitivity with regard to flora is therefore negligible.

Construction works and site clearance will result in loss of many of these plants, which will be replaced by buildings, hardstanding or landscaping. The overall magnitude of impact will be medium, resulting in a **Low Adverse** impact, which is not significant.

However, as most of the plants that will be lost represent invasive and/or aggressive species, there is arguably a net benefit associated with their removal. Consequently, as long as site activities do not contribute to the further spread of these species, there is the potential for a **Low positive** impact to be achieved.

8.6.3.4 Impact TE-03: Common Fauna Species

The field survey recorded few animal species at the Project site, all of which were common species defined as LC by the IUCN. This included two species of mammal, four reptile species and 5 species of birds. All of these species are common and are therefore of low sensitivity. The magnitude of construction impact on these species is likely to be low as they are widespread species with stable populations, where loss of individuals will not significantly change population numbers. The significance of the construction impact is therefore **Low Adverse** overall.

8.6.3.5 Impact TE-03: Threatened Fauna Species

Baseline study indicates the potential presence of at least three species of conservation concern within a 20 km radius of the Project site. These comprise the African manatee and bottlenose dolphin, associated with the Konkuré IBA / Ramsar Site, and olive ridley sea turtles, associated with the Il Blanc IBA /Ramsar site respectively.

African manatee are defined as threatened (VU) and are therefore of medium sensitivity. However, construction activities are not likely to have any effect on these species and consequently the magnitude of impact can be defined as negligible. The overall impact on this species is therefore **Low Adverse**, which is not significant.

Bottlenose dolphin is defined as ‘data deficient’ (DD) but is included in this assessment as a sensitive receptor because of the importance of cetaceans generally. As with the African manatee this has been ascribed a medium sensitivity, but likewise, construction activities at the African manatee are not likely to have any effect on these species and consequently the magnitude of impact can be defined as negligible. The overall impact on this species is therefore **Low Adverse**, which is not significant.

Finally, the olive ridley sea turtle has been identified as being associated with the Ile Blanc IBA / Ramsar, where it is thought to breed. This species is very sensitive, is endangered (EN) and consequently has been ascribed a high sensitivity in this assessment. However, impacts during construction are likely to be negligible on this species as there is no pathway between the Project Site and the sea or the Ile Blanc IBA / Ramsar. Consequently, the magnitude of impact is negligible and therefore the overall construction impact is **Low Adverse**, which is not significant.

8.6.4 Summary of Construction Impacts

Table 8-8 below summarises the potential and residual impacts on identified receptors for the construction phase of the Project.

Table 8-8: Summary of construction impacts

Impact	Impact Description	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
TE01 Physical Loss, Fragmentation and/ or Reduction/Loss of Ecological Function	Construction works are unlikely to have any adverse effects on these designated areas.	Demoudoulah and Kakimbo Forest Reserves	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
	Construction works are unlikely to have any adverse effects on these designated areas.	Konkuré & Ile Blanc IBA / Ramsar Sites	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
	Construction works will result in loss of these habitat types within the site and potentially indirect impacts on adjacent habitats.	Urban mixed habitats, including bare ground, areas of herbaceous coverage	Negligible	Medium	Negligible	• Site boundaries shall be marked prior to site clearance work. Fencing shall be open enough to allow animals to escape from the site during site clearance. • Where any felling of trees is required, these shall be removed first and soft-felling techniques shall be used where appropriate. • A watching brief by trained personnel (e.g., an environmental clerk of works) shall be kept, to look out for any animals and to allow them enough time to escape. • Where possible topsoil shall be retained for use in subsequent landscaping. • Except for security and safety oriented peripheral lighting, exterior lighting shall be planned in low angles and be directional to reduce light pollution.	Medium	Negligible
TE02 Decrease in Abundance and/or Conservation Status of Plant Species	Construction works will result in loss of individuals of these plant species at the Site, reduction in population abundance and therefore reduction in conservation status. However, as these species are mainly invasive / aggressive	Common plant species (mainly invasive species)	Negligible	Medium	Low Adverse	• Based on the requirements of Objectives 9.3 & 9.4 of the Guinea National Biodiversity Strategy, there is a requirement to control the introduction of invasive / exotic species. Therefore, any invasive plant species and/or plant waste material, including waste soils that may contain plant material, will be treated to destroy that plant material prior to being disposed of off-site or reused on-site. • Any soil brought onto the site should be checked for the presence of invasive	Medium	Low Beneficial

Impact	Impact Description	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
	species there may a net benefit overall.					species that may be introduced and/or spread.		
TE03 Disturbance to Individuals and/or Populations Reductions and/or Conservation Status of Animal Species	Construction works may result in loss of individuals of these species particularly during excavation, cut and fill and compaction activities. Species may also be subject to persecution and/or hunting. Noise, emissions, dust, vibration and artificial lights may disturb the usual breeding and feeding habits of some species impacting their survival.	Common mammals, reptiles, amphibians and birds	Low	Low	Low Adverse	• A watching brief by trained personnel (e.g., an environmental clerk of works) shall be kept, to look out for any animals and to allow them enough time to escape.	Low	Low Adverse
	Construction works may result in changes to loss of habitat and changes to water quality in marine and coastal areas through run-off and pollution incidents. This may impact on populations of species of conservation concern.	African Manatee (VU)	Medium	Negligible	Low Adverse	• No additional mitigation required.	Low	Low Adverse
		Bottlenose Dolphin (DD)	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
		Olive ridley sea turtle (EN)	High	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse

8.6.5 Assessment of Impacts: Operation

This section considers the potential impacts from the operational phase on the identified receptors, taking embedded mitigation into account. As noted above, this is part of the process of considering what might happen to the identified receptors and to identify an additional mitigation that may be required.

Accounting for embedded and additional mitigation, the main issues with regard to residual operational impacts will relate to control of drainage and any contaminated run off and the likelihood of diffuse pollution entering surface drainage systems. However, the location is already highly urbanised and there are no sensitive ecological receptors within the Project site's AoI.

Additional mitigation regarding drainage and waste management as well as non-point run-off will be implemented. In addition, spill response and other measures will be in place in order to prevent and/or contain any major incidents that could affect other habitats.

8.6.5.1 Impact TE-04: Recognised and Designated Areas

The nearest designated areas to the Site comprise the riparian Demoudoulah Reserve Forest located 1 km to the north of the site and the Kakimbo Reserve Forest located 1.75km to the south-west, although neither is in good condition both are under significant pressure from urbanisation and pollution.

Overall, neither of these forests is likely to be directly or indirectly affected by operational activities at the Site and level of impact is likely to be Low Adverse at worst. Consequently, the overall impacts during operation will be **Low Adverse**, which is not significant.

With regard to the two internationally recognised sites in the vicinity of Conakry, both IBA and Ramsar sites, neither is on or close to the Project Site. The Konkuré and Ramsar Site is located approximately 15 km north of the Project Site and the Ile Blanche IBA and Ramsar Site is located more than 20 km to the south-west.

Both of these sites have a high sensitivity due to their international importance, specifically in terms of the substantial congregations of birds associated with both areas. However, neither site is likely to be directly or indirectly affected by operational activities at the Project Site and the magnitude of any impacts would be negligible. Consequently, the overall impact on these internationally recognised sites would be **Low Adverse**, which is not significant.

8.6.5.2 Impact TE-04: Habitats

Habitats at the Project site itself either comprise bare ground or land with a low ground coverage of plants, most of which comprise invasive plant species. Both of these habitats are therefore of negligible sensitivity.

However, by the operational phase, the habitats on the Project site will have either been lost beneath buildings or landscaped and therefore those habitats will not exist as such. Therefore, there will be no impacts on these habitats during operation.

In addition, for the surrounding urban habitats, where there will be no direct effects from the site, the overall level of impact during operation will be **Negligible**.

8.6.5.3 Impact TE-05: Flora

No endangered or otherwise notable plant species were identified at the site, basically because the site had previously been developed with housing and had been recently cleared. In addition, most if not all plants identified are invasive and/or aggressive species. The receptor sensitivity with regard to flora is therefore negligible.

As with habitats, during operation most of these plants will no longer be present due to site clearance and replacement with buildings, hardstanding or landscaping. The overall operational magnitude of impact will be low, resulting in a **Negligible** impact.

In addition, as most of the plants that will be lost represent invasive and/or aggressive species, there may be a net benefit associated with their removal. Consequently, as long as site activities do not contribute to the further spread of these species, there is the potential for a **Low beneficial-positive** impact to be achieved.

8.6.5.4 Impact TE-06: Common Fauna Species

The field survey recorded few animal species at the site, all of which were common species defined as LC by the IUCN. This included two species of mammal, four reptile species and 5 species of birds. All of these species are

common and are therefore of low sensitivity. The magnitude of operational impacts on these species is likely to be low as they are widespread species with stable populations, where loss of individuals will not significantly change population numbers. The significance of the operational impact is therefore **Low Adverse** overall.

8.6.5.5 Impact TE-06: Threatened Fauna Species

Baseline study indicates the potential presence of at least three species of conservation concern within a 20 km radius of the Site. These comprise the African manatee and bottlenose dolphin, associated with the Konkuré IBA / Ramsar Site, and olive ridley sea turtles, associated with the Il Blanc IBA /Ramsar site respectively.

African manatee are defined as threatened (VU) and are therefore of medium sensitivity. However, operational activities are not likely to have any effect on these species so the magnitude of impact can be defined as negligible. The overall impact on this species is therefore **Low Adverse**, which is not significant.

Bottlenose dolphin is defined as 'data deficient' (DD) but is included in this assessment as a sensitive receptor because of the importance of cetaceans generally. As with the African manatee this has been ascribed a medium sensitivity, but likewise, operational activities at the Site are not likely to have any effect on these species and so the magnitude of impact can be defined as negligible. The overall impact on this species is therefore **Low Adverse**, which is not significant.

Finally, the olive ridley sea turtle has been identified as being associated with the Ile Blanc IBA / Ramsar, where it is thought to breed. This species is very sensitive, is endangered (EN) and consequently has been ascribed a high sensitivity in this assessment. However, impacts during operation of the Site are likely to be negligible on this species as there is no pathway between the Project Site and the sea or the Ile Blanc IBA / Ramsar. Consequently, the magnitude of impact is negligible and therefore the overall operational impact is **Low Adverse**, which is not significant.

8.6.6 Summary of Operational Impacts

Table 8-9 below summarises the potential and residual impacts on identified receptors for the operational phase of the project.

Table 8-9: Summary of operational impacts

Impact	Impact Description	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
TE04 Physical Loss, Fragmentation and/ or Reduction/Loss of Ecological Function	Operational activities are unlikely to have any adverse effects on these designated areas.	Demoudoulah and Kakimbo Forest Reserves	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
	Operational activities are unlikely to have any adverse effects on these designated areas.	Konkuré & Ile Blanc IBA / Ramsar Sites	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
	Operational activities will not result in further loss of these habitat types within the site or any potential indirect impacts on adjacent habitats.	Urban mixed habitats, including bare ground, areas of herbaceous coverage	Negligible	Low / None	Negligible / None	• Should any aspect of the design change to include development of additional land, the Management of Change Procedure shall be applied and necessary	Low / None	Negligible / None
TE05 Decrease in Abundance and/or Conservation Status of Plant Species	Operational activities will not result in additional loss of individuals of these plant species at the Site as these will have already been removed in the construction phase, therefore there will be no further reduction in population abundance or conservation status. However, as these species are mainly invasive / aggressive species operational management may confer a net benefit overall.	Common plant species (mainly invasive species)	Negligible	Low	Negligible	• Where landscaping and planting is included as part of the design, priority will be given to using indigenous plants of local origin sourced from local nurseries / garden suppliers where possible. Care will be taken to avoid introducing ornamental species that comprise exotic / invasive species.	Low	Low Beneficial
TE06 Disturbance to Individuals	Operational activities are unlikely to result in loss of individuals of	Common mammals, reptiles, amphibians and birds	Low	Low	Low Adverse	• Should any aspect of the design change to include development of additional land,	Low	Low Adverse

Impact	Impact Description	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
and/or Populations Reductions and/or Conservation Status of Animal Species	these species, although some species may also be subject to persecution and/or hunting. Noise, emissions, dust, vibration and artificial lights may disturb the usual breeding and feeding habits of some species impacting their survival.					the Management of Change Procedure shall be applied and necessary		
	Operational activities are unlikely to result in changes to loss of habitat or changes to water quality in marine and coastal areas through run-off and pollution incidents.	African Manatee (VU)	Medium	Negligible	Low Adverse	• No additional mitigation required.	Low	Low Adverse
		Bottlenose Dolphin (DD)	Medium	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse
		Olive ridley sea turtle (EN)	High	Negligible	Low Adverse	• No additional mitigation required.	Negligible	Low Adverse

9. Noise and Vibration

9.1 Introduction

This chapter provides details of Project-related activities that may result in impacts from noise and vibration on local sensitive receptors, during the construction and operational phases of the development.

The key activities likely to result in noise and vibration effects are as follows:

- Construction phase noise from construction traffic on local roads and equipment on site.
- Operational phase noise from fixed plant and building services, such as those associated with Heating, Ventilation and Air Conditioning (HVAC) and emergency/backup power generators, wastewater handling units and wastewater treatment plant.
- Operational phase noise from additional traffic on the local road network as a result of the development.

Activities that have little potential to affect noise and vibration have been scoped out of the assessment (with justification details being provided below):

- Construction phrase vibration is scoped out as no major vibration generating activities are proposed. Chapter 2: Project Description advises that no piling will be required for construction of foundations and buildings.
- Operational phase vibration is scoped out as no major vibration generating industrial plant are proposed.

9.2 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts related to the waste management. It builds on the general ESIA assessment methodology described in **Chapter 4 ESIA Methodology** to take account of the range of likely significant effects arising from the construction and operation phases of the Project.

9.2.1 Regulations and Guidelines

9.2.1.1 Ministerial Order 2015/342/MIPMEPSP/CAB of 27 February 2015

The Ministerial Order 2015/342/MIPMEPSP/CAB of 27 February 2015[50] is a Guinean ministerial order that came into force on 27th February 2015 to provide for the establishment of an appropriate thresholds relating to atmospheric pollution, water contamination and maximum exposure limits in Guinea.

The following thresholds regarding noise are presented and replicated below in Table 9-1.

Table 9-1: Guinea Noise Standards

Period	Maximum Ambient Noise Level in L_{eq} over 1 hours (dB (A))		
	Class 1 Residential Area	Class 2 Commercial Area	Class 3 Industrial Area
06:00 – 13:00	50	55	70
13:00 – 15:00	45	50	
15:00 – 22:00	50	55	
22:00 – 06:00	45	50	

The Guinean regulation maximum permissible noise levels align with those of the International Finance Corporation for residential areas and industrial areas (presented below in Table 9-2).

[50] Arrêté ministériel 2015/342/MIPMEPSP/CAB du 27 Février 2015, République de Guinée, 2015

9.2.1.2 Law L/2019/0034/AN of 04/09/2019 on the Republic's environmental code of Guinea

Law L/2019/0034/AN of 04/09/2019 on the Republic's environmental code of Guinea[51] was adopted on 4th July 2019 and sets out the fundamental national principles relating to the promotion of sustainable development, the maintenance and protection of the environment against any forms of harm.

Noise and vibration is considered in 'Chapitre IV: Des nuisances sonores, vibratoires et olfactives' and states:

"*Article 134 Noise emissions likely to lead to adverse health effects, a disturbance to the local area or to the environment are not permitted. Those responsible for these noise emissions must implement all necessary measures to reduce or inhibit them. If necessary, the environmental minister will implement measures to cease noise emissions.*

Article 202 A prison sentence of 15 days up to 3 months and a fine of 500,000 up to 5,000,000 GNF will be given to those who, with no prior authorisation from the relevant parties, create noise or light emissions likely to lead to adverse health effects, a disturbance to the local area or to the environment. In the case of a repeat infraction, the original fine will be doubled, a prison sentence of 3 months up to 1 year given, and all equipment and tools that lead to the infraction will be seized by the State."

9.2.1.3 International Finance Corporation / World Bank Group Environmental, Health and Safety (EHS) Guidelines

The International Finance Corporation (IFC) / World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines[52] were published in 2007 and serve as technical reference documents with general and industry-specific examples of Good International Industry Practice.

Table 17.1 of the 2007 IFC General EHS Guidelines for management of environmental noise prescribe thresholds for the day and night periods. It is stated that "*Noise impacts should not exceed the levels presented in Table 1.7.1, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site*". These noise thresholds are reproduced in Table 9-2.

Table 9-2: Noise Level Guidelines

Receptor	One Hour $L_{Aeq,T}$ (dBA)	
	Daytime 07:00 – 22:00 (T=15h)	Night-time 22:00 – 07:00 (T=9h)
Residential; institutional; educational	55	45
Industrial; commercial	70	70

9.2.1.4 World Health Organisation Guidelines for Community Noise

The World Health Organisation's (WHO) Guidelines for Community Noise[53] recommends external daytime and evening environmental noise limits and internal night-time limits to avoid sleep disturbance, as presented in Table 9-3.

Table 9-3: WHO Noise Level Guidelines

Specific environment	Critical health effect(s)	Guideline noise level(dB)		
		Day 07:00-23:00	Night 23:00-07:00	
		Continuos noise dB $L_{Aeq,T}$	Continuos noise dB $L_{Aeq,T}$	Maximum noise dB L_{Amax}
Outdoor living area	Serious annoyance, daytime and evening	55	-	-
	Moderate annoyance, daytime and evening	50	-	-
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	-	-

[51] Loi L/2019/0034/AN du 04 juillet 2019,portant Code de l'Environnement de la République de Guinée, République de Guinée 2019
[52] Environmental, Health and Safety (EHS) Guidelines, International Finance Corporation / World Bank Group, 2007
[53] World Health Organisation Guidelines for Community Noise, World Health Organisation, 1999

Specific environment	Critical health effect(s)	Guideline noise level(dB)		
		Day 07:00-23:00	Night 23:00-07:00	
		Continuos noise dB $L_{Aeq,T}$	Continuos noise dB $L_{Aeq,T}$	Maximum noise dB L_{Amax}
Inside bedrooms	Sleep disturbance, night-time	-	30	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	-	45	60
Ward rooms, indoors	Sleep disturbance, night-time	-	30	40
	Sleep disturbance, daytime and evenings	30	-	-

9.2.2 Receptor Sensitivity

Sensitive receptors are defined based on the zones identified in the Guinean ministerial order of 27th February 2015 in Table 9-1. As such, assessment criteria relate directly to each receptor type and a significance of impact directly identified from the assessment criteria.

Impacts assessed as 'High' or 'Moderate' are classed as being significant; whilst those classed as 'Low' or 'Negligible' are deemed to be not significant. Professional expertise will also determine the impact significance e.g. the likely scale and duration of any high noise levels.

9.2.3 Impact Magnitude

The Guinean ministerial order of 27th February 2015 presents guidelines for maximum permissible ambient noise levels, and these have been used to derive the following tiered construction noise thresholds of 70 dB $L_{Aeq,1h}$ for the daytime and 45 dB $L_{Aeq,1h}$ for the night-time. Where baseline ambient noise levels exceed the noise thresholds of 70 dB $L_{Aeq,1h}$ during the day or 45 dB $L_{Aeq,1h}$ at night, the noise threshold is set at the measured ambient noise level.

Assessment criteria for operational noise affecting surrounding residential and commercial receptors have been prepared using a tiered approach based on the noise limits set out in the Guinean ministerial order of 27th February 2015 for Class 1 residential areas and Class 2 Commercial Area and IFC Noise Guidelines, which sets thresholds of 50 dB $L_{Aeq,1h}$ for the daytime and 45 dB $L_{Aeq,1h}$ for the night-time. Where baseline ambient noise levels exceed the noise thresholds of 55 dB $L_{Aeq,1h}$ during the day or 45 dB $L_{Aeq,1h}$ at night, the noise threshold is set at the measured ambient noise level.

Criteria used to define the significance of a noise impact are presented in Table 9-4.

Table 9-4: Significance of Impact Criteria

Significance of impact	Construction noise level criteria $L_{Aeq,1hr}$ (dB)
High	More than 5 dB above the threshold
Moderate	No more than 5 dB above the threshold
Low	No more than 5 dB below the threshold
Negligible	More than 5 dB below the threshold

Assessment criteria for assessing the impact of road traffic noise are provided in Table 9-5 below have been defined as follows:

- EHS Guidelines, Section 1.7: Noise state that noise should not increase by 3 dB. Consequently, a Moderate impact is identified if the ground noise increases by more than 3 dB.
- WHO Guidelines state that a significant increase in noise is typically equivalent to a greater than 5 dB increase. Consequently, a High impact is identified if noise increases by more than 5 dB.
-

Table 9-5: Operational Traffic Noise Assessment Criteria

Significance of impact	Noise Change Band dB
High	Greater than or equal to 5
Moderate	3.0 to 4.9
Low	1.0 to 2.9
Negligible	Less than 1.0

9.3 Baseline

9.3.1 Baseline Data Collection

9.3.1.1 Study Area

The study area for baseline data and impact assessment is defined as 250 metres (m) from the Project boundary. At greater distances, construction and operational sound will attenuate such that negligible impacts would occur, as well as reduce to below existing ambient noise levels in the local area. This 250 m study area is also defined as the Area of Influence (AOI).

9.3.1.2 Desktop Study

An initial desktop study was carried out to identify noise-sensitive receptors within 250 m of the Project that have the potential to experience significant noise effects from construction and operational phase noise. This study was used to determine the baseline sound survey methodology and monitoring locations representative of the local sound environment and nearby identified noise-sensitive receptors.

9.3.1.3 Primary Data Collection

A baseline sound survey in support of the proposed development was undertaken in September 2023 by AECOM's local partner, Société d'Expertises Environnementales at Sociales (SESS)54. The survey consisted of short-term attended daytime, evening, and night-time measurements at five different locations within the site as shown on the monitoring location plan in Figure 9-1.

The measurements were carried out between Friday 22nd September 2023 and Wednesday 27th September 2023 for a period of one hour during the morning (06:00 – 13:00) at all locations apart from at ML-3 where a 40-minute measurement was done, for one hour during the afternoon/evening (13:00 – 22:00) and for 30 minutes during the night-time (22:00 – 06:00) at all locations. The sound monitoring locations are described below in Table 9-6.

Table 9-6: Sound Monitoring Locations

Location ID	Description	Coordinates
ML-1	Southwest corner of the site	9°35'52.15"N 13°38'1.29"W
ML-2	South-west of the site along RO251 Road	9°35'44.74"N 13°38'7.26"W
ML-3	West of the site near RO308 Road	9°35'56.31"N 13°37'47.03"W
ML-4	North of the site along RO363 Road	9°36'15.87"N 13°37'54.73"W
ML-5	Within the site, near middle of western boundary	9°35'58.93"N 13°37'58.28"W

9.3.2 Baseline Characteristics

Measurements of the following sound level indicators were taken over 15-minute sample periods: $L_{Aeq,T}$ and L_{AFmax}. The dominant sound sources observed during the measurements are described below in Table 9-7.

Table 9-7: Dominant Sound Sources

Location ID	Sound Source
ML-1	Noise from vehicles on site (motorbikes, cars), noise from security patrol vehicle, pedestrians passing the monitoring location
ML-2	Road traffic noise from RO251 Road, pedestrians passing the monitoring location

[54] Mesure Bruit Cité Administrative, SESS, 2023

Location ID	Sound Source
ML-3	Road traffic noise from RO308 Road, pedestrians passing the monitoring location
ML-4	Road traffic noise from RO363 Road, railway noise from Rusal mining train, natural sounds such as birds chirping
ML-5	Construction noise from activities (generators, site clearance) within the development site and from workers

The results of the attended measurements are summarised in Table 9-8 to Table 9-10.

Table 9-8: SEES Attended Morning (06:00 – 13:00) Sound Measurement Results Summary

Location ID	Morning ambient sound level $L_{Aeq,T}$ (dB)	Morning maximum sound level $L_{AF,max}$ (dB)	Morning minimum sound level $L_{AF,min}$ (dB)
ML-1	48	78	33
ML-2	74	99	54
ML-3	63	84	38
ML-4	74	101	52
ML-5	53	79	31

Table 9-9: SEES Attended Afternoon (13:00 – 22:00) Sound Measurement Results Summary

Location ID	Afternoon ambient sound level $L_{Aeq,T}$ (dB)	Afternoon maximum sound level $L_{AF,max}$ (dB)	Afternoon minimum sound level $L_{AF,min}$ (dB)
ML-1	49	83	34
ML-2	75	96	53
ML-3	66	92	43
ML-4	71	103	54
ML-5	44	69	34

Table 9-10: SEES Attended Night-time (22:00 – 06:00) Sound Measurement Results Summary

Location ID	Night-time ambient sound level $L_{Aeq,T}$ (dB)	Night-time maximum sound level $L_{AF,max}$ (dB)	Night-time minimum sound level $L_{AF,min}$ (dB)
ML-1	47	67	38
ML-2	71	94	50
ML-3	52	69	36
ML-4	66	87	36
ML-5	47	82	36

At locations ML-1 & ML-5, measured daytime and afternoon sound levels adhere to the noise limits from the WHO and IFC / WBG Guidelines for outdoors areas of 50-55 dB $L_{Aeq,16hr}$ during the daytime. These thresholds are exceeded at all other monitoring locations (ML-2, ML-3 & ML-4).

All locations exceed the noise limit of 45 dB $L_{Aeq,8hr}$ during the night from the WHO and IFC / WBG Guidelines for outdoors areas.

Additionally, only the morning (06:00 -13:00) measured sound levels at ML-1 comply with the Guinean Ministerial Order 2015/342/MIPMEPSP/CAB of 27 February 2015 noise limits for Class 2: Commercial Area i.e. daytime limit of 55 dB $L_{Aeq,1hr}$.

During the afternoon period (13:00 – 22:00), solely the measured levels at ML-1 and ML-5 adhere to the Guinean Ministerial Order 2015/342/MIPMEPSP/CAB of 27 February 2015 noise limits for Class 2: Commercial Area i.e. afternoon limit of 50 dB $L_{Aeq,1hr}$ between 13:00 and 15:00 and 55 dB $L_{Aeq,1hr}$ between 15:00 and 22:00.

During the night-time, ML-1 and ML-5 again are the only monitoring locations that meet the Guinean Ministerial Order 2015/342/MIPMEPSP/CAB of 27 February 2015 noise limits for Class 2: Commercial Area i.e. limit of 50 dB $L_{Aeq,1hr}$.

However, it is expected that the building envelopes (including building façade and windows when closed) of the future administrative buildings will reduce noise levels such that the internal noise limits from the WHO Guidelines (i.e. 30-35 dB $L_{Aeq,16hr}$ during the daytime, 30 dB $L_{Aeq,8hr}$ during the night) can be achieved. Therefore, the ambient noise environment at the site is considered suitable for this type of development.

9.3.3 Receptors

Receptors such as commercial and industrial facilities are not sensitive to noise and not expected to experience any significant effects from noise. As such this assessment has been based on effects at noise sensitive receptors such as residential properties, places of worship, educational facilities and facilities of national significance.

The main sensitive receptors that have been identified as potentially being affected by construction and operational phase noise in the vicinity of the site are primarily residential. Two main mixed residential areas have been identified, directly east of the site on RO308, directly north of the site on RO363.

Several non-residential receptors are also located in the vicinity of the site. The Guinea Broadcasting Service (NR01) approximately 200 m to the south-west, the United States Embassy (NR02) approximately 400 m to the south-west, the Ministry of Foreign Affairs and Saudi Arabia Embassy (NR03) approximately 400 m to the south of the site boundary.

Five educational facilities are within the vicinity of the site. Primary School De Soloprimo (EF01) approximately 380 m to the south-east, Complex School La Plume (EF02) approximately 420 m to the south-east, Sabiloul Felaah School approximately 250 m to the east (EF03), ISIM-UAB (EF04) approximately 415 m to the north-east and xx Primary School (EF05) approximately 270 m to the east of the site boundary.

Four Places of Worship have been identified in the vicinity of the site. The Saudi Kaporo Rail Mosque (PoW01) which is located approximately 400 m to the north-west, the Centre Abdoulahi Boun Mas-oud (PoW02) approximately 430 m to the north-west and the Diallo Samba Mosque (PoW03) approximately 550 m to the north and Mosque (PoW05) approximately 280 m to the east of the site boundary. The Kaporo Rails cemetery (PoW04) is also located near the site approximately 390 m to the west of the site boundary.

Identified sensitive areas and receptors are presented in Table 9-11 and illustrated in Figure 9-1.

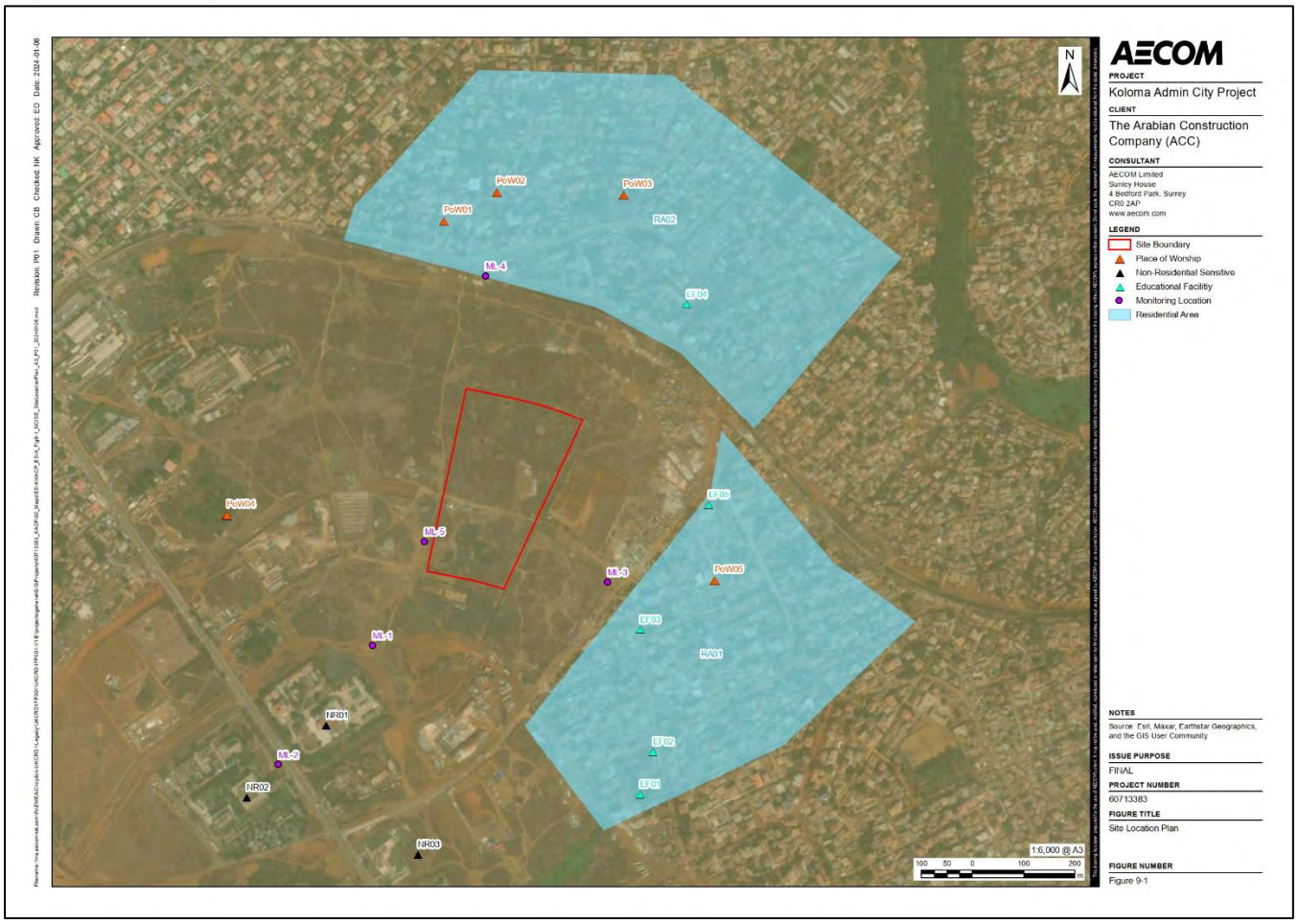

Figure 9-1: Site Location Plan

Table 9-11: Sensitive Receptors Areas

Receptor ID	Receptor Areas	Receptor Type
RA01, RA02	Existing residential areas	Mixed Residential (with some commercial and places of entertainment)
EF01, EF02, EF03, EF04, EF05, NR01, NR02, NR03	Existing educational / research facilities	Isolated non-residential sensitive
PoW01, PoW02, PoW03, PoW04, PoW05	Existing Places of Worship	Place of Worship

Table 9-12: Assessment Locations

Assessment Location	Description	Receptor Type
R1 (RA01)	Residential properties on RO296 Road	Residential
R2 (RA01)	Residential properties on RO296 Road	Residential
R3 (RA01)	Residential properties on RO302 Road	Residential
R4 (RA01)	Residential properties on RO302 Road	Residential
R5 (RA01)	Residential properties on RO296 Road	Residential
R6 (RA01)	Residential properties on RO296 Road	Residential
R7 (RA01)	Residential properties on RO308 Road	Residential
R8 (RA01)	Residential properties on RO308 Road	Residential

Assessment Location	Description	Receptor Type
R9 (RA01)	Residential properties on RO308 Road	Residential
R10 (RA01)	Residential properties on RO308 Road	Residential
R11 (RA01)	Residential properties on RO308 Road	Residential
R12 (RA01)	Residential properties on RO308 Road	Residential
R13 (RA01)	Residential properties on RO308 Road	Residential
R14 (RA01)	Residential properties on RO308 Road	Residential
R15 (RA02)	Residential properties on RO363 Road	Residential
R16 (RA02)	Residential properties on RO363 Road	Residential
R17 (RA02)	Residential properties on RO363 Road	Residential
R18 (RA02)	Residential properties on RO363 Road	Residential
R19 (RA02)	Residential properties on RO363 Road	Residential
R20 (RA02)	Residential properties on RO363 Road	Residential
R21 (RA02)	Residential properties on RO363 Road	Residential
R22 (RA02)	Residential properties on RO363 Road	Residential
R23 (RA02)	Residential properties on RO363 Road	Residential
R24 (RA02)	Residential properties on RO363 Road	Residential
R25 (RA02)	Residential properties on RO363 Road	Residential
R26 (RA02)	Residential properties on RO363 Road	Residential
Centre Abdoulahi Boun Mas-oud (PoW02)	Mosque on RO363 Road	Place of Worship
Complex School La Plume (EF02)	School on RO296 Road	Educational Facility
Diallo Samba Mosque (PoW03)	Mosque on RO363 Road	Place of Worship
Guinea Broadcasting Service (NR01)	Broadcasting centre on RO251 Road	Non-Residential Sensitive
Ministry of Foreign Affairs and Saudi Arabia Embassy (NR03)	Government offices on RO251 Road	Non-Residential Sensitive
Primary School De Soloprimo (EF01)	Primary school on RO296 Road	Educational Facility
Sabiloul Felaah School (EF03)	Preparatory school on RO308 Road	Educational Facility
Saudi Kaporo Rail Mosque (PoW01)	Mosque on RO363 Road	Place of Worship
United States Embassy (NR02)	Government offices on RO251 Road	Non-Residential Sensitive
Mosque (PoW05)	Mosque on RO308 Road	Place of Worship
Primary School (EF05)	Primary School RO308 Road	Educational Facility

Assessment locations in Table 9-12 that fall outside of the AOI of 250m from the project boundary are situated at such distances that not significant negligible impacts are likely to occur.

9.3.4 Assumptions and Limitations

The baseline noise surveys comprised one set of short-term attended measurements during a daytime period and an evening/night-time period. While there may be natural variations in ambient noise levels across a single day as well as seasonal variations, the measured levels are considered to be representative of the typical ambient level in each location.

Construction plant sound source data have been on information in British Standard (BS) 5228-1 ‘Code of practice for noise and vibration control on construction and open sites’. These sound sources are taken to be representative of the plant and/or activities that will be used during the construction process. Noise predictions have been carried out to provide a conservative scenario where construction plant is operational nearest to the identified receptors

and do not take into account quieter periods when limited activities take place or at further distances. Consequently, noise predictions may overestimate construction noise levels and are therefore considered to be a reasonable likely worst case.

9.4 Impact Assessment and Mitigation

9.4.1 Potential Impacts

Table 9-13 outlines the key activities that are likely to interact with and potentially impact existing and future receptors.

Table 9-13: Project Activities and Potential Impacts

Project Activities	Impact Pathway	Receptor	Impact ID/ Description
Construction Phase			
On-site construction works	Noise from vehicles and equipment on site.	Surrounding existing residential areas, existing educational / non-residential sensitive buildings, and existing Places of Worship.	Temporary disturbance. [NV01]
Construction traffic	Noise from vehicles on local roads		Temporary disturbance. [NV02]
Operations Phase			
Fixed plant and building services	Noise from building services plant, HVAC systems, emergency/backup power generators, wastewater handling units, and wastewater treatment plant	Surrounding existing residential areas, existing educational / non-residential sensitive buildings, existing Places of Worship, and future users of the development.	Permanent disturbance. [NV03]
Operational traffic	Noise from additional vehicles associated with project on local roads		Permanent disturbance. [NV04]

9.4.2 Embedded Mitigations

The following measures will be adopted where reasonably practicable during the construction phase to minimise noise levels at the receptor locations:

- Noise emissions from construction activities will be subject to meeting suitable construction noise limits in order to not exceed the Guinean noise regulations (i.e. noise impacts should not exceed 70 dB in the daytime and 45 dB in the night-time).
- Project regular working hours will be from 07:30 to 17:30 with a one-hour break between Monday and Saturday. There will be no night-time works outside those specified hours.
- No noisy activities will be undertaken outside of regular project working hours or for excessively long periods to avoid disturbance to local residents.
- Transportation of construction materials to site will be scheduled to avoid peak hours (07:00 – 09:00 and 16:00 – 18:00) where possible.
- Machinery and equipment in good working order will be used.
- Daily plant and equipment inspections to identify any maintenance requirements.
- Careful handling of materials and waste such as lowering rather than dropping items.
- Wherever possible, light signals (strobes) will be used to replace whistles, bells and other audible alarms to signal crew changes, possible concrete pours, lifting manoeuvres where applicable and other site activities.
- Audible alarms will primarily be used as emergency signals.
- All generators will be within a sound proof enclosure.
- Avoidance of unnecessary noise (such as engines idling between operations, shouting, loud radios or excessive revving of engines) by effective site management.
- All noise-generating operations will be monitored by the ESSS supervisor before they begin.
- The use of fast-moving machinery will reduce exposure to noise.

- Where control at source is not practicable or adequate, the distance between noise/vibration sources and sensitive neighbours would be maximised and the transmission path interrupted, with options considered in the order of source-pathway-receptor. Where practical this can be achieved by:
  - Siting of stationary plant and loading/unloading areas.
  - Breaking of concrete will be undertaken using hydraulic pulveriser 'muncher' techniques where possible.
  - Static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures / screening and sited away from sensitive facades.
  - When plant is not being used it will be shut down and not left to idle.
- Methods and programme of work and vehicular routes will be selected with regard to minimising noise and vibration impact.
- Site personnel will be instructed on methods to reduce noise and vibration as part of their induction training and as required prior to specific work activities.
- Careful handling of tools, placement, and shouting on the site will be covered in activity plans and/or briefings as appropriate.
- Training and briefings will be delivered to the site team to inform them of noise and vibration issues and the location of nearby receptors.
- Liaison is undertaken with occupiers of sensitive receptors that may be affected by construction noise. Providing information regarding construction works and advance notice of when high noise generating activities are to take place can reduce significant impacts. All communications will contain contact details for the person to whom any questions or complaints should be directed.
- Communications will be undertaken with the Guinea Broadcasting Service, United States Embassy and Ministry for Foreign Affairs to pre-emptively warn of noisy construction activities in close proximity to these receptors.
- Consideration will also be given to traffic routing, timing and access points to the site so as to minimise noise impacts at existing receptors following contractor appointment, and as construction working methods are developed. Contractors will issue a project route map and delivery schedule to control construction traffic. Traffic management will be employed to guide and control both public and construction traffic during deliveries.
- ACC will install traffic signs on the site to regulate traffic flow.
- A speed limit of 10km/h will be applied in locations where it is necessary to reduce noise impacts and safety risks.

The following measures will be adopted where reasonably practicable during the operational phase to minimise noise levels at the receptor locations.

- In order to control noise emissions from operational activities, any proposed installations will be subject to meeting suitable operational noise limits as to not exceed the IFC General EHS Guidelines (i.e. noise impacts should not exceed 55 dB in the daytime and 45 dB in the night-time or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site);
- The specification of plant machinery with low noise emission and properly attenuated supply and extract terminations will help to mitigate noise emissions.
- The use of enclosures, local screening, mufflers and silencers will also be used as appropriate.
- Note that specific plant noise assessments and mitigation requirements (if necessary) will be undertaken during detailed design.
- A traffic management plan will be prepared.

9.4.3 Assessment of Impacts during Construction

9.4.3.1 Impact NV01: Temporary disturbance due to noise from vehicles and equipment on site

The main construction activities associated with the project that are likely to produce high levels of noise are during the demolition and clearance works, excavation and foundation works, installation of the sub-structure and external works. These activities will require the use of earthmoving equipment to clear and excavate the site, including excavators, breakers, dozers, wheel loaders and tippers.

The construction programme is anticipated to last three years, between May 2023 and the end of January 2026. The construction assessment simplifies the construction phase and represents a 'worst-case' scenario where construction activities are taking place on all Project components.

Details regarding construction activities and the project are presented in Chapter 2: Project Description.

SoundPLAN® acoustic modelling software (version 9.0) implementing the calculation procedures of ISO 9613[55] has been employed to predict the propagation of sound from the site in all directions and to quantify resultant sound levels at the identified noise-sensitive receptor locations.

The following assumptions and parameters were used to prepare the acoustic model:

- The ground absorption has been set to be mixed hard/soft absorptive ground conditions (0.5);
- No barriers or site hoarding have been assumed;
- Flat ground has been assumed;
- Building footprints in the surrounding area have been sourced from Satellite Imagery;
- Building heights outside of the site have been modelled with a standard height of 6 m;
- Building footprints from the proposed development have been used from design drawings;
- Construction areas have been modelled as area sources;
- Receiver points have been modelled as 1.5m above local ground level (representative of ground-floor windows during the day and evening);
- The maximum order of reflections was 1; and
- Construction working times are subject to regular project working hours (07:30 to 17:30 with a one-hour break).

Sound power levels for typical construction plant sources have been assumed and included in the model as set out in Table 9-14 below. These have been taken from BS 5228-1[56] and from the AECOM sound power library.

[55] ISO 9613, Acoustics – Attenuation of Sound During Propagation Outdoors. Part 1: Calculation of the absorption of sound by the atmosphere (1993) and Part 2: General Method of Calculation (1996).

[56] BS 5228:2009 + A1:2014 'Code of practice for noise and vibration control on construction and open sites', British Standards Institution, 2014

Table 9-14: Construction Plant Sound Power Levels

Source	Number of Plant	Total A-Weighted Sound Power, dB L_w	Reference
Excavators	3	105	BS 5228: Tab C.2 #19
Tower Crane	1	104	BS 5228: Tab C.4 #48
Mobile Sky Concrete Pump	1	95	BS 5228: Tab C.4 #57
Mobile Crane	1	98	BS 5228: Tab C.3 #30
Water Sprinkler	5	90	BS 5228: Tab C.2 #46
Dozer	2	106	BS 5228: Tab C.2 #13
Roller	1	101	BS 5228: Tab C.2 #38
Road Compactor	1	106	BS 5228: Tab C.2 #42
Power Float	6	100	Overall A-weighted sound power level from manufacturer. Spectrum from BS 5228: Tab C.4 #69
Concrete Mixers	6	108	BS 5228: Tab C.4 #20
Personal Vehicles	5	108	BS 5228: Tab C.2 #34
Power Generators	9 (max of 7 in operation at once)	88	BS 5228: Tab C.4 #77
Concrete Pump	1	106	BS 5228: Tab C.3 #25
Compactors	5	108	BS 5228: Tab C.2 #41
Tipper Lorry	3	107	BS 5228: Tab C.8 #20

These construction noise predictions represent a ‘worst-case’ scenario where construction activities are taking place on all Project components. The nature of construction work means that a worst-case scenario with the plant working at the closest approach may exist for only a matter of days or even hours and there would be regular periods, even during the course of a single day, when the assumed noisy plant will not be in operation during breaks or changes of working routine. Consequently, predicted construction noise levels are considered to represent a typical ‘worst-case’ day. Results of construction noise predictions for the worst affected residential and non-residential receptors are presented in Table 9-15 below.

Table 9-15: Daytime Construction Noise Predictions and Impact Magnitude

Assessment Location	Construction Noise Threshold $L_{Aeq,1h}$ – Day/ Night	Construction Noise Prediction $L_{Aeq,T}$ dB and Impact
R1 (RA01)	70 dB/ 45 dB	42 (Negligible)
R2 (RA01)	70 dB/ 45 dB	42 (Negligible)
R3 (RA01)	70 dB/ 45 dB	59 (Negligible)
R4 (RA01)	70 dB/ 45 dB	54 (Negligible)
R5 (RA01)	70 dB/ 45 dB	44 (Negligible)
R6 (RA01)	70 dB/ 45 dB	44 (Negligible)
R7 (RA01)	70 dB/ 45 dB	59 (Negligible)
R8 (RA01)	70 dB/ 45 dB	56 (Negligible)
R9 (RA01)	70 dB/ 45 dB	43 (Negligible)
R10 (RA01)	70 dB/ 45 dB	43 (Negligible)
R11 (RA01)	70 dB/ 45 dB	43 (Negligible)
R12 (RA01)	70 dB/ 45 dB	54 (Negligible)
R13 (RA01)	70 dB/ 45 dB	53 (Negligible)
R14 (RA01)	70 dB/ 45 dB	53 (Negligible)

Assessment Location	Construction Noise Threshold $L_{Aeq,1h}$ – Day/ Night	Construction Noise Prediction $L_{Aeq,T}$ dB and Impact
R15 (RA02)	70 dB/ 45 dB	51 (Negligible)
R16 (RA02)	70 dB/ 45 dB	52 (Negligible)
R17 (RA02)	70 dB/ 45 dB	53 (Negligible)
R18 (RA02)	70 dB/ 45 dB	52 (Negligible)
R19 (RA02)	70 dB/ 45 dB	51 (Negligible)
R20 (RA02)	70 dB/ 45 dB	51 (Negligible)
R21 (RA02)	70 dB/ 45 dB	51 (Negligible)
R22 (RA02)	70 dB/ 45 dB	50 (Negligible)
R23 (RA02)	70 dB/ 45 dB	51 (Negligible)
R24 (RA02)	70 dB/ 45 dB	49 (Negligible)
R25 (RA02)	70 dB/ 45 dB	50 (Negligible)
R26 (RA02)	70 dB/ 45 dB	43 (Negligible)
Centre Abdoulahi Boun Mas-oud (PoW02)	70 dB/ 45 dB	41 (Negligible)
Complex School La Plume (EF02)	70 dB/ 45 dB	46 (Negligible)
Diallo Samba Mosque (PoW03)	70 dB/ 45 dB	44 (Negligible)
Guinea Broadcasting Service (NR01)	70 dB/ 45 dB	55 (Negligible)
Ministry of Foreign Affairs and Saudi Arabia Embassy (NR03)	70 dB/ 45 dB	50 (Negligible)
Primary School De Soloprimo (EF01)	70 dB/ 45 dB	46 (Negligible)
Sabiloul Felaah School (EF03)	70 dB/ 45 dB	47 (Negligible)
Saudi Kaporo Rail Mosque (PoW01)	70 dB/ 45 dB	50 (Negligible)
United States Embassy (NR02)	70 dB/ 45 dB	47 (Negligible)
Mosque on RO308 Road (PoW05)	70 dB/ 45 dB	54 (Negligible)
Primary School on RO308 Road (EF05)	70 dB/ 45 dB	53 (Negligible)

It is anticipated that individual properties (R3, R7, R8) in the existing residential areas (RA01) with a direct line of sight to the development site are likely to experience the highest noise levels however, these result in a negligible magnitude of impact. High noise levels would be limited to short periods of time when construction works are taking place in close proximity to these receptors. This is considered to represent a worst-case scenario for construction noise.

Due to the close proximity of these receptors to the proposed development, noise is predicted, at worst, to represent a negligible impact magnitude on sensitive receptors. These impacts will occur at individual locations when work is taking place in close proximity; however, for the majority of the construction programme, works will be undertaken at other locations at the site. Consequently, the noise impacts identified in Table 9-15 are likely to only occur for limited periods of time.

Embedded mitigation measures allow for community engagement on the timings and duration of when they may be exposed to high levels of noise. This type of community engagement can make people more tolerable of high levels of noise for short periods of time. Community engagement would extend to the US Embassy, Ministry of Foreign Affairs and the Guinea Broadcasting Service to identify periods when noise may be disruptive to activities and to avoid noisy works during these periods.

Additionally, at the measurement location closest to these receptors (ML-3), daytime measured levels were 63 dB $L_{Aeq,T}$ during the morning period (06:00 – 13:00) and 66 dB $L_{Aeq,T}$ during the afternoon (13:00 – 22:00) meaning that the existing ambient sound levels are up to 7 dB louder than the predicted construction noise levels.

As such, it has been considered that significant construction noise effects can be avoided, and the significance of impact is classified as **Negligible and not significant**.

For all other receptors that are located further away from the Site and outside of the 250 m AOI (RA02, NR02, NR03, EF01, EF02, EF04, PoW01, PoW02, PoW03, PoW04) construction noise levels are lower and likely to experience no worse than a Negligible impact significance, which is not significant.

Noise will be greatest during the substructure stages of the works programme, where ground works are required as heavier plant is likely to be used. In practice, noise levels and resulting impacts are likely to vary during the different construction phases of the project depending upon the location of work sites and proximity of receptors. Any adverse noise effects during construction would be of a temporary nature and have no lasting residual effect.

9.4.3.2 Impact NV02: Temporary disturbance due to construction traffic noise

Construction traffic movements on public roads have the potential to cause temporary disturbance while it is passing by. It is therefore important that the routing and timing of vehicle movements is carefully managed. However, any increases in road traffic noise levels during works will be temporary, relatively short term, and although the effect will be dependent on the actual number of traffic movements, it is considered that adverse effects can be managed and avoided. Further information regarding construction traffic including construction traffic routes is available in Chapter 2: Project Description.

The main impact from construction traffic will be from the movement of HGVs as it is generally expected that light vehicles will not have a material influence on the existing noise climate. The expected daily hourly breakdown of HGV arrivals and departures to the site is provided in Table 12-6, which shows a worst-case of 50 hourly HGV movements from 12:00 to 14:00. Noise emissions from HGV movements have been calculated using HGV Sound Exposure Level (SEL) data from the AECOM sound power library. Calculated cumulative levels have been compared to the measured levels at noise monitoring locations ML2 and ML3, which are along the proposed construction traffic route. The results of calculations are presented Table 9-16 below.

Table 9-16: Construction Traffic Noise Predictions Worst-Case

Measurement Location	ML2		ML3	
	Morning	Afternoon	Morning	Afternoon
SEL dB	91	91	91	91
Distance to Middle of Carriageway	10	10	28	28
Number of HGV Movements	50	50	50	50
HGV Noise Level $L_{Aeq,1h}$ dB	72	72	63	63
Measured $L_{Aeq,T}$ dB	74	75	63	66
Cumulative Noise Level $L_{Aeq,1h}$ dB	76.3	76.9	66.3	67.9
Difference Cumulative and Measured dB	+2.3 (Low)	+1.9 (Low)	+3.3 (Moderate)	+1.9 (Low)

At measurement location ML2, HGV movements due to construction of the development are expected to lead to a low impact during the morning and afternoon which is classified as not significant. At measurement location ML3, a moderate impact is expected during the morning and a low impact in the afternoon.

The typical morning and afternoon scenarios are presented below and have assumed a total of 40 HGV movements over an hour. This scenario would occur for 5-hours during construction work hours. Results of calculations showing likely impacts due to typical construction traffic flows are presented in Table 9-17.

Table 9-17: Construction Traffic Noise Predictions Typical Case

Measurement Location	ML2		ML3	
	Morning	Afternoon	Morning	Afternoon
SEL dB	91	91	91	91
Distance to Middle of Carriageway	10	10	28	28
Number of HGV Movements	40	40	40	40
HGV Noise Level $L_{Aeq,1h}$ dB	71	71	63	63
Measured $L_{Aeq,T}$ dB	74	75	63	66
Cumulative Noise Level $L_{Aeq,1h}$ dB	75.9	76.6	65.8	67.6
Difference Cumulative and Measured dB	+1.9 (Low)	+1.6 (Low)	+2.8 (Low)	+1.6 (Low)

At both measurement locations, a low impact is expected during the morning and afternoon periods as a result of HGV movements relating to the construction of the proposed development.

A moderate impact is predicted during the morning period for the worst-case scenario however, this will only be temporary and last for a period of two hours throughout the day. During the typical expected scenario, a low impact is anticipated.

Taking the above into account, typical levels of construction traffic noise will result in a low impact.

9.4.4 Assessment of Impacts during Operation

9.4.4.1 Impact NV03: Permanent disturbance due to noise from building services plant, HVAC systems, emergency/backup power generators, wastewater handling units and wastewater treatment plant

The proposed development is comprised of a total of 12 administrative buildings, two 2-storey car parks, one auditorium, one open-air theatre and one heritage pavilion building.

It is not currently known if building services plant will be housed externally within individual buildings.

As such, it has been assumed that building services plant, wastewater handling units and wastewater treatment plant and will be proposed to be located on the technical floors within each building (which may be within a basement); therefore, noise breakout to surrounding receptors will be expected to be minimal.

There will be five 2,500 KVA emergency/backup power generators on the facility during the operational phase of the development.

It has also been assumed that external HVAC systems plant will be proposed to be located on the rooftop level of the buildings. The installation of plant on rooftops will help physically screen any noise emissions to surrounding receptors.

For all other receptors, it is considered that operational noise from building services plant, HVAC systems emergency/backup power generators, wastewater handling units and wastewater treatment plant would result in a **Low significance of impact**, which is not significant.

9.4.4.2 Impact NV04: Permanent disturbance due to operational traffic noise

The Project is part of a wider site development. As a result, assessment of the (permanent) operational traffic phase of the Project has been scoped out of this chapter as it is understood that operational traffic impacts of the Project will be assessed at the wider site development level. Due to this and given the size of the Project in the context of the wider site development, it is not expected that the Project alone will result in any significant impacts.

For further information related to the wider masterplan development and the interaction with the Project Site please refer to **Chapter 2**.

9.4.5 Impact Summary

Impact ID	Impact	Receptor	Potential Impact Significance	Additional Mitigation	Residual Impact Significance
Construction Phase					
NV01	Temporary disturbance from works noise	Surrounding existing residential areas, existing educational / non-residential sensitive buildings, and existing Places of Worship.	Negligible - Low	n/a	Negligible - Low
NV02	Temporary disturbance from traffic noise	Surrounding existing residential areas, existing educational / non-residential sensitive buildings, and existing Places of Worship.	Low	n/a	Low (not significant)
Operational Phase					
NV03	Permanent disturbance from building services plant, HVAC systems, emergency/backup power generators, wastewater handling units and wastewater treatment plant	Surrounding existing residential areas, existing educational / non-residential sensitive buildings, existing Places of Worship, and future users of the development.	Low	n/a	Low (not significant)

10. Surface Water, Groundwater and Soils

10.1 Introduction

This chapter presents an assessment of the impacts associated with the proposed Koloma Administrative City on surface water, groundwater, and soil. It includes an appraisal of the potential impacts associated with the Construction and Operation phases of the Project.

Mitigation measures required to prevent, reduce, or offset any significant adverse effects are presented, and the likely residual effects after these measures have been employed.

10.2 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts on groundwater, surface water and soils. It builds on the general ESIA assessment methodology described in **Chapter 4 ESIA Methodology** to take account of the range of likely significant effects on the groundwater, surface water and soils arising from the construction and operation phases of the Project.

Receptors considered in the impact assessment comprise all groundwater, surface water and soils features identified during the course of the desktop study and field surveys, which may be impacted by Project activities.

10.2.1 Regulations and Guidelines

The assessment was undertaken in alignment with the ESIA Standards. Relevant surface water, groundwater and soil standards include the following:

- Law L/2005/006/AN of 04 July 2005 abstraction and pollution (LRPP) of water resources
- Order A/2011/3927/MEE/CAB/SGG authorisations and permits for the use and exploitation of Guinea's water resources (August 2011)
- The Water Code (Law L/94/005 CTRN) (February 1994)
- National Water Policy (April 2018)
- Guidelines for Drinking-Water Quality, fourth edition incorporating the first addendum (WHO, 2017);

These standards/guidelines were selected as the applicable standards for the project and will be used as a benchmark to understand the baseline water and soil quality in the Project Area of Influence (AOI, defined in Section 10.3.1.1) before any construction activities commence.

Table 10-1: WHO and National Guinean Water Quality Standard values

Parameter	Units	WHO Water Quality Guidelines (2017)	Guinean Standards for Effluent Discharge
pH	—	—	5.5-9
Total Suspended Solids	mg/l	—	—
Oil and Grease	mg/l	—	—
Biochemical Oxygen Demand (BOD)	mg/l	—	200 if daily flow <100kg/d or 1000 if flow is >100kg/d
Chemical Oxygen Demand (COD)	mg/l	—	200 if daily flow <30L/d or 1000 if flow is >30L/d
Sodium	mg/l	50	—

Ammonium	µg/l as NH4	—	—
Chloride	mg/l	—	—
Sulphate	mg/l as SO4	—	—
Total Nitrogen	mg/l	—	30
Nitrate	mg/l as NO3	50	—
Nitrite	mg/l as NO2	3	—
Fluoride	mg/l as F	1.5	—
Total Phosphorus	mg/l	—	10
Aluminium	µg/l as Al	—	—
Mercury	µg/l as Hg	6	—
Arsenic	µg/l as As	10	—
Boron	µg/l as B	2,400	—
Cadmium	µg/l as Cd	3	—
Barium	µg/l as Ba	1,300	—
Copper	µg/l as Cu	2,000	—
Cyanide	µg/l as CN	—	—
Lead	µg/l as Pb	10	—
Total Chromium	µg/l as Cr	50	—
Selenium	µg/l as Se	40	—
Silver	µg/l as Ag	—	—
Nickel	µg/l an Ni	70	—
Zinc	µg/l as Zn	—	—
Antimony	µg/l	20	—
Total Coliforms Bacteria	MPN(4)/100ml	—	—
Phenol	µg/l	—	—
Benzo(k)pyrene	µg/l	0.7	—
Dissolved Iron	mg/l as Fe	—	—
Manganese	mg/l as Mn	—	—
Phosphate	mg/l as P 205	—	—
Hydrocarbons (dissolved)	µg/l	—	—
Polyaromatic hydrocarbons	µg/l	—	—
Hydrocarbons Total	mg/l	—	15
Pesticides	µg/l	—	—

The indicative guideline values applicable to sanitary wastewater discharges shown in **Table *10-2*** below.

Table 10-2: Values for Treated Sanitary Sewage Discharges of the IFC EHS Guidelines

Pollutants	Unites	Guideline Value
pH	**pH**	6-9
BOD	mg/l	30
COD	mg/l	125
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN[b]/100 ml	400[a]

a) Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation.
b) MPN = Most Probable Number

10.2.2 Receptor Sensitivity

The criteria used to define impact receptor sensitivity is set out in Table 10-3.

Table 10-3: Surface Water, Groundwater, and Soils Receptor Sensitivity Criteria

Sensitivity	Description
High	Major aquifer or main river. Groundwater or surface water providing a permanent source of good quality water for a large village or supporting sensitive habitats of national importance or regional economic activity. Good water quality. Groundwater providing significant baseflow to surface water courses. Soils suitable for agricultural use. *NOTE: Each of these criteria, individually or in combination, would qualify a receptor as highly sensitive.*
Medium	Minor aquifer or small river. Groundwater or surface water providing potable water for a medium sized village, supporting habitats or local economic activity. Moderate water quality. Groundwater providing moderate baseflow to surface water courses. Soils suitable for non-agricultural use e.g. forest. *NOTE: Each of these criteria, individually or in combination, would qualify a receptor as moderately sensitive.*
Low	Minor aquifer. Groundwater or surface water providing for a small village or single dwelling. Poor water quality. Groundwater providing limited baseflow to surface water courses. Shallow, poor soil cover.
Negligible	Non-potable quality groundwater, possibly present at depth. Non-aquifer. Small drainage channels. Soils absent.

10.2.3 Impact Magnitude

The criteria used to define groundwater surface water and soils impact magnitude is provided in Table 10-4.

Table 10-4: Surface Water, Groundwater, and Soils Impact Magnitude Criteria

Magnitude	Description
High	e.g. The potential for soil quality and/or physical structure, or surface water and groundwater flow or quality to be permanently impacted (> 10 years). The area affected is a significant percentage (>75%) of the soil or groundwater.

Medium	e.g. The impact on soil and, surface water and groundwater flow and quality and its condition may recover through natural processes and the impact will be medium term (5 to 10 years). The area predicted to be affected will be of medium extent (>25% and <75%). Impacts are partially reversible or reversible with interventions.
Low	e.g. The impact on soil and, surface water and groundwater flow and quality and its condition is predicted to recover rapidly through natural processes and the duration of impact is short term (up to 5 years). Impacts are reversible.
Negligible	e.g. No changes from the baseline are distinguishable from natural variability. Impacts are short term (up to 5 years). The area affected is predicted to be of minor extent (<25%). Impacts are reversible.

10.2.4 Impact Significance

Resultant impact significance is determined according to the impact significance matrix shown in Table 4-1 of the **Chapter 4 ESIA Methodology**.

10.3 Baseline

10.3.1 Baseline Data Collection

10.3.1.1 Study Area

For surface water, groundwater and soil, the Project Area of Influence (AOI) will encompass the proposed Project site, as well as a 300m buffer zone, extending out of the Project area.

10.3.1.2 Desktop Study

The desktop study included an initial phase of collection of information related to groundwater, surface water and soils. This information was mainly obtained from online literature sources and consisted mainly in maps (topographical, hydrological, geological, hydrogeological and soils) and technical documents (environmental and social impact assessment reports, site investigations reports, technical publications, research papers, etc).

A summary of literature sources is provided in Table 10-5.

Table 10-5: Surface Water, Groundwater, and Soil Literature Sources

Data Source	Source/Date	Brief Description/Comment
Geotechnical study for construction of an administrative city at Koloma G2_AVP REPORT.	AGTS, 2023	Geotechnical report for administrative city at Koloma
Guidelines for drinking water quality: Fourth edition	WHO, 2017	WHO water quality guidelines
Enviromental and social works for the development and construction of a a 9-hectare administrative center in Koloma (SONAPI)	CHEMAS GROUP, 2023	EIA/ESIA for Koloma project

10.3.1.3 Primary Data Collection

A site walkover and water features survey was undertaken on 27 September 2023 and 12 October 2023 at the Project site by AECOM's local partner SEES. A total of eight (8 No) groundwater features (6 boreholes and 2 wells) were identified during the site visit and monitoring was subsequently undertaken.

Four (4 No) of the groundwater features monitored were sampled for water quality laboratory analysis, whilst all the water features monitored were measured for physicochemical parameters. Photographs of the groundwater features are presented in Appendix B of this ESIA Report.

Table 10-6 presents the list of the groundwater features monitored, whilst Figure 9-1 shows their location. Table 10-7 presents the groundwater feature survey physicochemical parameters which were collected during in-situ testing.

Additionally, during the site visit undertaken by AECOM Team between 12 and 15 September 2023, the AECOM team observed two damaged water pipelines leaking water to the surface within the Project site. These were

supplied from a water tank and pumping station belonging to SEG (Société des Eaux de Guinée) located to the north of the Project boundary (Please see Figure 2-2). ACC and SONAPI were notified on the damaged water pipelines, and ACC investigated this issue to seal the pipelines and to identify the routes of the pipelines back to the main pipe head. ACC informed AECOM that the water pipelines discovered by AECOM are the branches of the main pipe which have been identified. The water pipelines needed to be relocated outside the Project site boundary in a manner than minimises disruption to local users. An excavation works related to the water pipeline is ongoing which is undertaken and under responsibility of the competent authority. Photographs of the rerouting of the pipelines and the new route are presented in Appendix B of this ESIA Report.

Table 10-6: List of water features monitored

Water Feature Number	Date and time of Water Feature Survey	Type of Water Feature and Description	Latitude (WGS84)	Longitude (WGS84)
Forage GW1	27 Sep 2023 16:21	Borehole for domestic use (''forage public''). Sampled for water quality.	09.598599	-13.628793
Forage GW2	27 Sep 2023 16:04	Borehole for domestic use (''forage public'')	09.598672	-13.628630
Forage GW3	27 Sep 2023 15:45	Borehole for domestic use (''forage public'')	09.599237	-13.628700
P1	27 Sep 2023 14:44	Well for domestic use (''puits traditionel'') Sampled for water quality.	09.605193	-13.629059
P2	12 Oct 2023 13:20	Well for domestic use (''puits traditionel'')	09.596863	-13.629623
SONAPI PZ2	27 Sep 2023 12:02	Piezometer constructed for hydrogeological studies. (‘piézomètre SONAPI'')	09.601068	-13.632181
SONAPI PZ3	27 Sep 2023 13:25	Piezometer constructed for hydrogeological studies. (‘piézomètre SONAPI''). Sampled for water quality.	09.601520	-13.631315
SONAPI PZ4	27 Sep 2023 12:41	Piezometer constructed for hydrogeological studies. (‘piézomètre SONAPI'').	09.600757	-13.631192

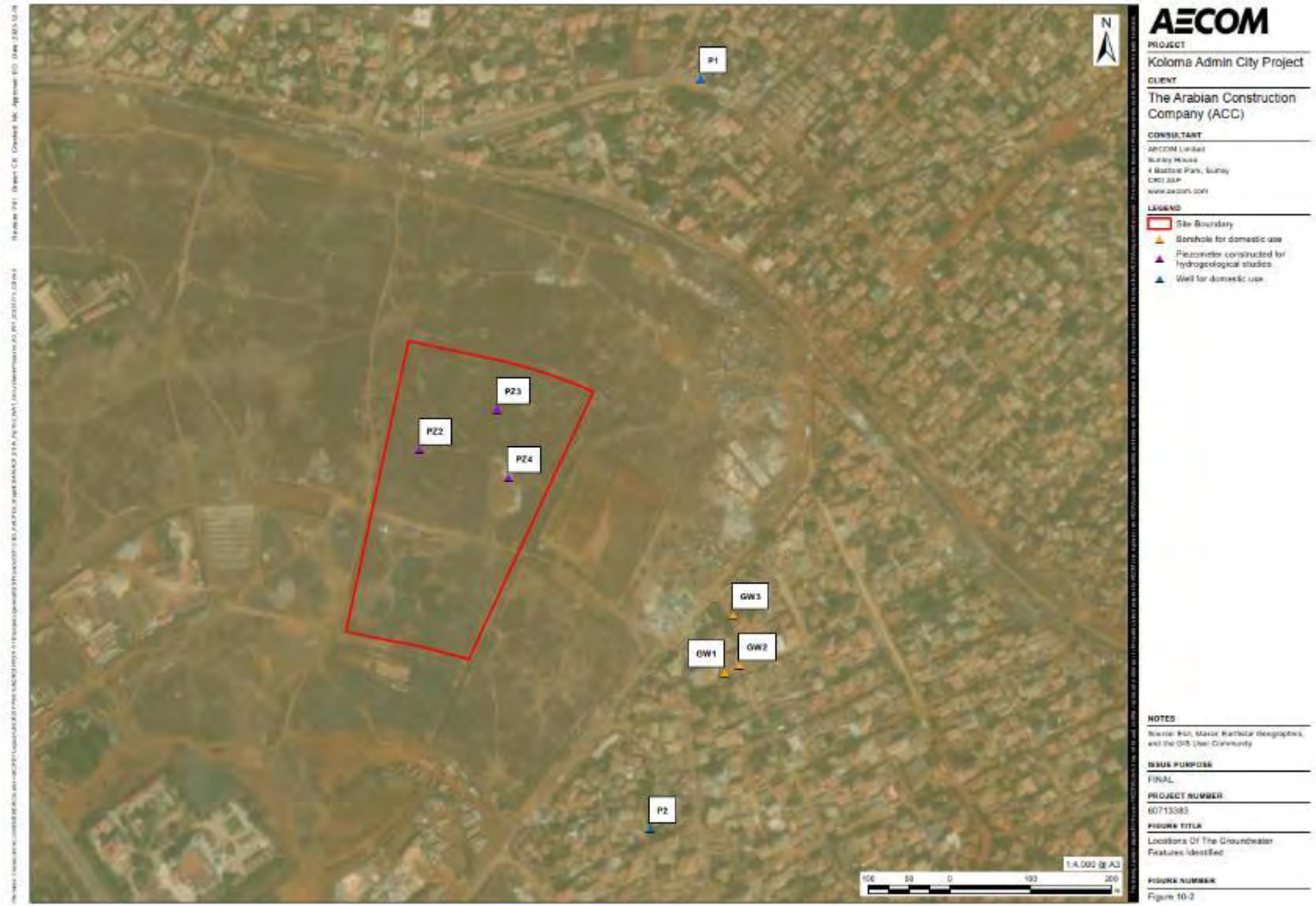

Figure 10-1: Locations of the monitored water features

Table 10-7: Water Features Survey In-Situ Physicochemical Parameters

Location		GW1	GW2	GW3	P1	P2	PZ2	PZ3	PZ4	Guideline Limit	
Sample Type		GW	GW	GW	GW	GW	GW	GW	GW	WHO Guidelines	Guinean Values
FIELD PARAMETERS											
Water level	m	N/A	N/A	N/A	13.9	14.1	16.3	12.7	14.89	—	—
pH	pH unit	6.23	**4.61**	**4.19**	6.82	6.32	**4.25**	6.62	**4.56**	—	5.5-9
Temperature	°C	31.1	30.3	29.3	31.2	30.5	31	30.5	32.6	—	—
Redox Potential	Mv	278	375	306	356	293	320	339	67	—	—
Dissolved Oxygen	mg/l	5.3	5.7	8.5	4.8	5.2	3.2	4.4	1.5	—	—
Salinity	mg/l	0.1	0.01	0.02	0	0.01	0	0	0.1	—	—
TDS	mg/l	151	171	245	262	170	116.9	121	80.4	—	—
Electrical Conductivity	µS/cm	210	257	365	407	236	179.5	172	118.9	—	—
Turbidity	T°C	0	0.2	0.5	0	0.2	39	0.1	8.41	—	—
Colour/Smell		Clear,no smell	Clear, no smell	Clear, no smell	Clear, no smell	Clear, no smell	Reddish, earthy smell	Clear, no smell	Slightly cloudy, rusty smell	—	—

10.3.2 Preliminary Geotechnical Investigation

Preliminary geotechnical investigations in the Project Area of Influence were undertaken in June 2023 by AGTS on behalf of ACC. A report presenting the findings was issued in September 2023 (AGTS, 2023).

The purpose of the geotechnical investigation was to assess the feasibility of constructing the administrative city on the proposed site and included in situ surveys, sampling and laboratory testing of soil samples, determining the groundwater depth and borehole logging.

- Fifteen (15 No) **boreholes with Standard Penetration Tests (SPT)** were drilled to 25 mbgl depth at 0.5-1 m intervals to provide an indication of the strength of the soil penetrated.
- Seven (7 No) **boreholes** were drilled to depths of 30 or 50 mbgl to record the geology across the site.
- Seven **destructive drilling with Pressuremeter Test (PMT)** were drilled to depths of 20 or 30 mbgl to test the plasticity and pressure limit of the soil.
- Five **piezometers** were installed on boreholes at depths of 30 or 50 mbgl to determine groundwater depth.
- Ten **trial pits** were completed to depths ranging from 0.3-3 mbgl.

Information related to these geotechnical surveys are presented in Table 10-8 and Table 10-9. Their location is presented in Figure 10-3.

Table 10-8: Location and elevation of geotechnical surveys

Type of Structure	Structure No	Longitude (UTM Z28P)	Latitude (UTM Z28P)	Elevation (m)	Total depth (mbgl)
Boreholes with SPT	SPT-01	650134	1061400	111.799	25
	SPT-02	650073	1061415	112.848	25
	SPT-03	650088	1061483	112.395	25
	SPT-04	650089	1061547	113.189	25
	SPT-05	650091	1061637	108.973	25
	SPT-06	650161	1061673	105.178	25
	SPT-07	650223	1061664	104.220	25
	SPT-08	650227	1061604	107.482	25
	SPT-09	650202	1061550	109.618	25
	SPT-10	650213	1061506	109.481	25
	SPT-11	650188	1061458	110.147	25
	SPT-12	650150	1061436	111.768	25
	SPT-13	650154	1061602	112.394	25
	SPT-14	650144	1061541	113.233	25
	SPT-15	650123	1061478	112.204	25
Boreholes	BH-01	650114	1061405	111.724	30
	BH-02	650073	1061486	112.907	30
	BH-03	650096	1061600	110.581	30
	BH-04	650195	1061663	104.260	30
	BH-05	650220	1061579	108.978	50
	BH-06	650159	1061472	111.850	30
	BH-07	650149	1061591	110.792	30
Destructive Drilling with PMT	PMT-01	650128	1061486	112.445	20
	PMT-02	650076	1061580	112.685	30
	PMT-03	650191	1061687	103.542	20
	PMT-04	650235	1061566	109.302	30

Type of Structure	Structure No	Longitude (UTM Z28P)	Latitude (UTM Z28P)	Elevation (m)	Total depth (mbgl)
	PMT-05	650171	1061427	111.310	30
	PMT-06	650090	1061427	111.722	20
	PMT-07	650048	1061462	113.357	30
Piezometer boreholes	PZ-01	650114	1061405	—	30
	PZ-02	650096	1061600	—	30
	PZ-03	650195	1061663	—	30
	PZ-04	650220	1061579	—	50
	PZ-05	650132	1061480	—	30
Trial Pits	TP-01	650029	1061425	3.00	—
	TP-02	650049	1061525	1.40	—
	TP-03	650079	1061707	0.60	—
	TP-04	650194	1061607	3.00	—
	TP-05	650270	1061607	0.30	—
	TP-06	650216	1061485	1.90	—
	TP-07	650171	1061387	3.00	—
	TP-08	650094	1061374	3.00	—
	TP-09	650135	1061508	1.80	—
	TP-10	650176	1061644	1.40	—

Table 10-9: Groundwater Depth Investigations

Structure No	Date	Groundwater depth (m)
BH-01	23/06/2023	10.27
BH-02		10.50
BH-03		18.10
BH-04		13.69
BH-05		17.37
BH-06		17.10
BH-07		18.30
PMT-01	21/06/2023	17.10
PMT-02		16.30
PMT-03		9.40
PMT-04		17.00
PMT-05		9.60
PMT-06		11.02
PMT-07		11.60
SPT-01	23/06/2023	11.50
SPT-02		10.60
SPT-03		10.10
SPT-04		15.60

Structure No	Date	Groundwater depth (m)
SPT-05		17.20
SPT-06		18.09
SPT-07		14.00
SPT-08		16.40
SPT-09		15.96
SPT-10		11.00
SPT-11		11.20
SPT-12		9.20
SPT-13		13.20
SPT-14		15.10
SPT-15		13.55
PZ-01	05/06/2023 to 21/06/2023	10.16 – 12.50
PZ-02		18.10 – 21.96
PZ-03		13.69 – 18.64
PZ-04		17.37 – 21.40
PZ-05		17.01 – 19.60

The results of the geotechnical investigations are summarised above. A geological cross-section (Figure 10-2) was prepared using the lithological and geotechnical information obtained from these tests.

The results of the geotechnical investigations indicated that 4 distinct lithological layers were encountered from top to bottom, as follows:

1. **Topsoil** – A shallow formation with a maximum depth of 0.7 m composed of vegetable debris and organic soils.
2. **Weathered Cuirass** – A shallow formation with various levels of weathering. The thickness ranges from 3.60 to 12 m. Compressive strength tests give a maximum compressive strength of 11 MPa and a minimum of 3.64 MPa which are relatively low. The Young's modulus gives measures of 1000-1150 MPa.
3. **Lateritical Gravel** – A shallow formation of lateritic gravels with thicknesses ranging from 0.1-5 m.
4. **Clayey Silt** – The clayey silt is encountered at depths up to 50 m. The SPT tests shows this varied from very soft to hard across the site. Shear box tests confirm this has a high cohesion and plasticity values, but a swelling test show this isn't swelling. An oedometer test shows this is highly compressible.

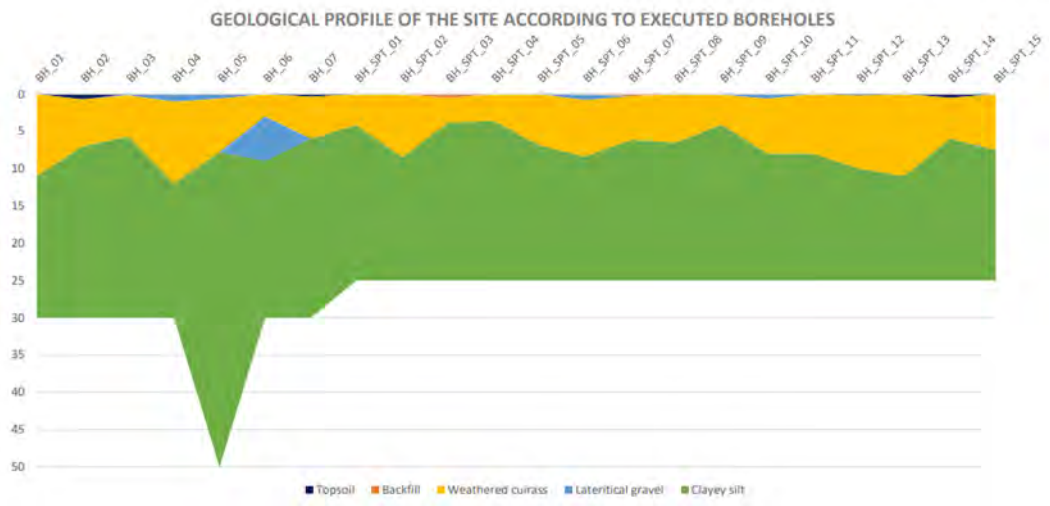

Figure 10-2: Geological Cross Section of the proposed site from borehole data (Source: AGTS, 2023)

Figure 10-3: Location of geotechnical investigations (Source: AGTS, 2023)

10.3.3 Baseline Characteristics

10.3.3.1 Topography

The Project is located in Koloma, Conakry, Guinea. The Project site is adjacent to existing government offices and the US Embassy and is approximately 7 hectares in size. Ground elevation ranges between 80 and 107 metres above sea level in the project area with this being lowest towards the northeast and highest towards the southwest. This is a higher elevation that the surrounding neighbourhoods of Ratoma, Kipè and Kaporo and therefore the risk of flooding of these neighbourhoods needs reduced or avoided.

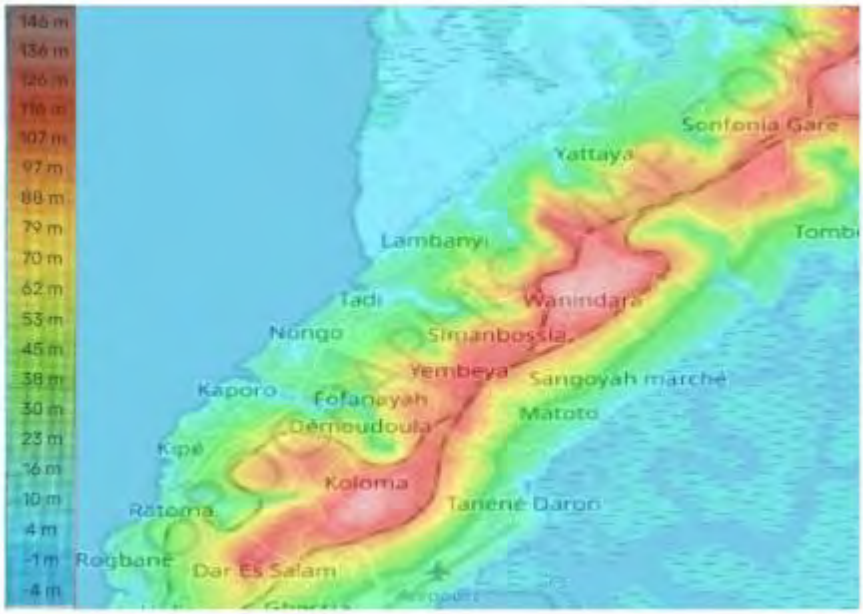

Figure 10-4: Topography of Conakry (CHEMAS GROUP, 2023)

10.3.3.2 Geology

Bedrock Geology

The bedrock geology in the general area of Conakry is composed of 2 main geological formations:

- An Ordovician to Devonian schistosandstone
- Mesozoic igneous formations including dolerites, gabbros, peridotites and dunites including dykes and sills.

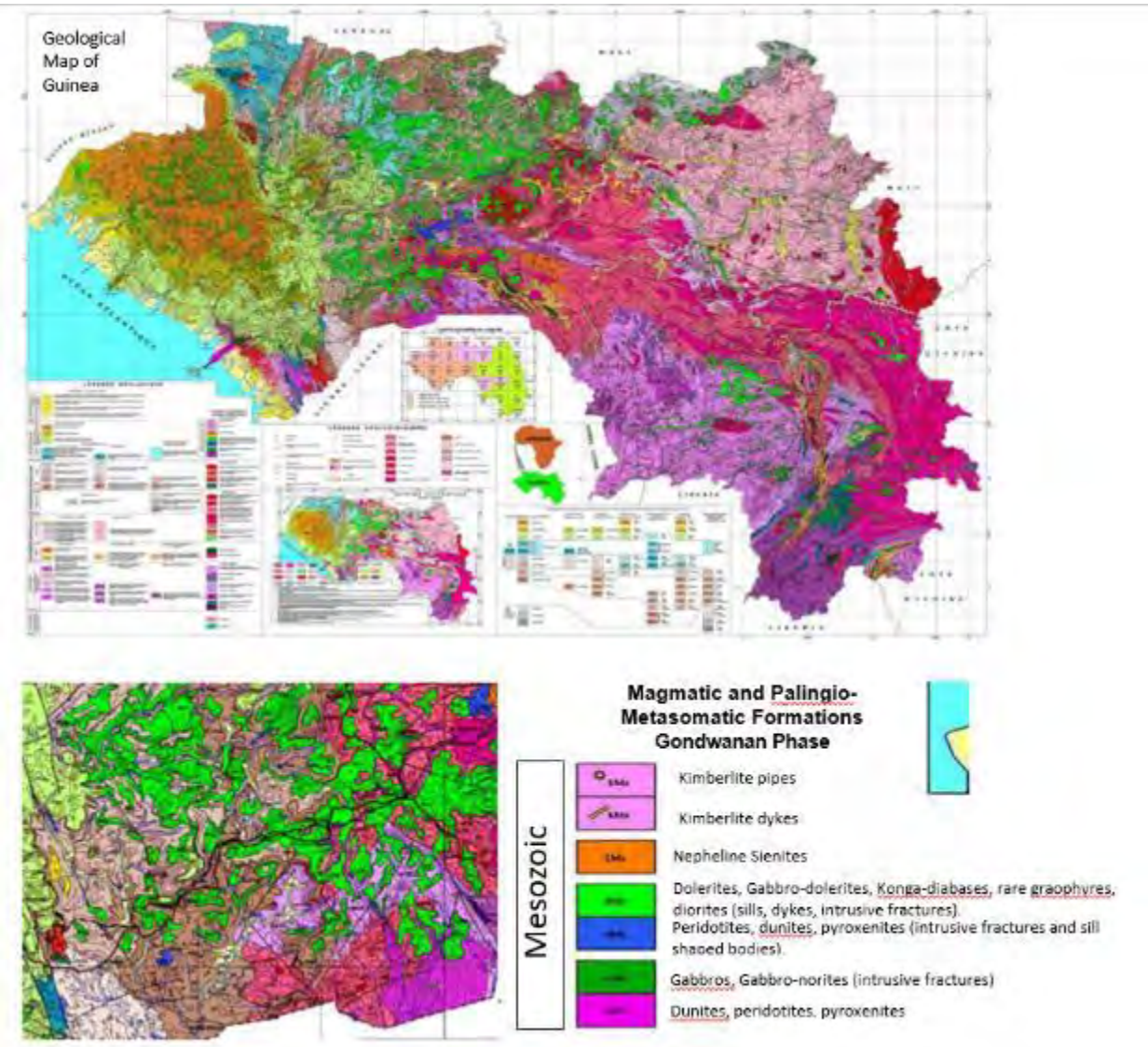

Figure 10-5: Geological Map of Guinea

Superficial geology

The superficial deposits in the general area of the Project are composed of several laterite layers at shallow depths which are underlain by a clayey silt formation as shown in the cross-section produced from the geotechnical investigation in Figure 10-5. A summary of the superficial deposits from top to bottom is as follows:

- **Topsoil** – A shallow formation with a maximum depth of 0.7 m composed of vegetable debris and organic soils.
- **Weathered Cuirass** – A shallow formation with various levels of weathering and a thickness ranging from 3.60 to 12 m.
- **Lateritical Gravel** – A shallow formation of lateritic gravels with thicknesses ranging from 0.1-5 m.
- **Clayey Silt** – A combination of clay and silt layers at depths up to 50 m.

10.3.3.3 Rainfall

Conakry has a humid tropical climate with monthly temperatures ranging between 17°C in July and 35°C in March. The year is split into 2 seasons: a dry season from November to April and a wet season from May to October. Rainfall data is obtained from the monthly averages from Conakry station collected by CHEMAS GROUP up to August 2023. The average annual rainfall in Conakry is 4.2 m/year and the wind direction is predominantly from the west except from in December when this is from the east.

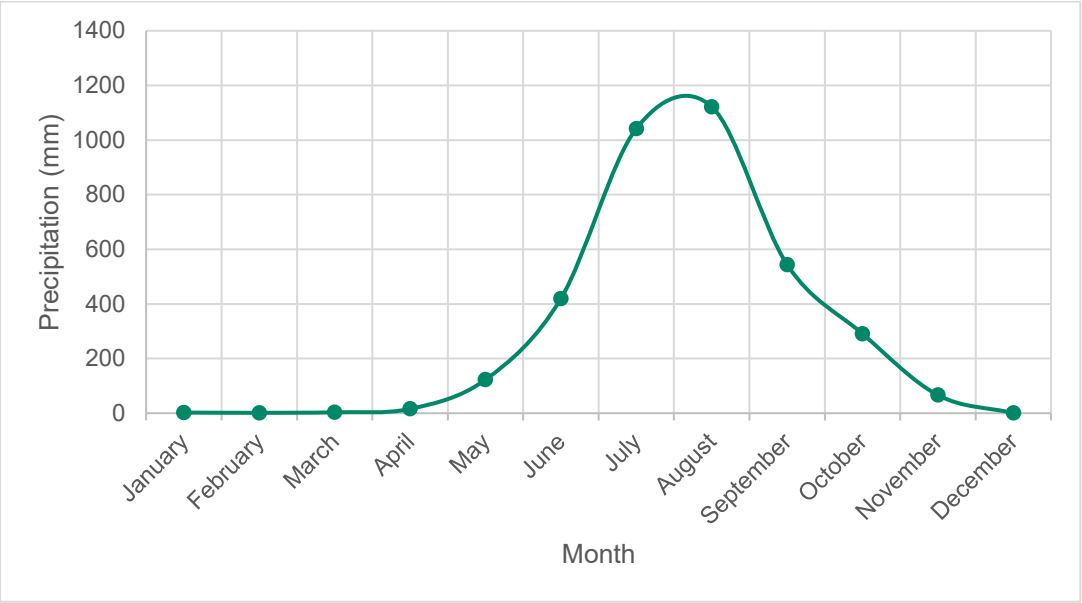

Figure 10-6: Average monthly precipitation data from Conakry Station (Source: CHEMAS GROUP, 2023)

10.3.3.4 Drainage

Guinea is bordered by the Atlantic Ocean to the west and features several estuaries along this coastline. There are also several major rivers including the Rio Compony, Rio Nunez, Fatala, Konkouré, Kakimbo and Mélakoré as well as many smaller rivers.

The nearest watercourse within the riparian Demoudoulah Forest, is located 1 km north-east of the site at its closest point. This watercourse is narrow, is likely to be entirely fed by urban drainage and appears to be partially canalised. It is also separated from the Site by extensive urban development.

The Project site is the one of the highest elevation points in Conakry and has a much higher elevation than the surrounding neighbourhoods. This area is also subject to heavy winter flooding which will drain into these lower lying neighbourhoods. This area therefore will need an effective drainage system and stormwater management to minimise the risk of flooding to these lower elevation neighbourhoods.

Direction Nationale de l'Aménagement du Territoire et de l'Urbanisme (DATU) (National Department of Town and Country Planning and Urban Development) is responsible for Planning (design, development), implementation of government policies relating to land use planning, urban development and sanitation. As mentioned in Section 2.7.2 of this Report, further consultation was undertaken with DATU within the scope of this ESIA on 11th May 2024 regarding surrounding drainage network and flood risks in the area. The authority mentioned that existing drainage is limited to existing ditches and trenches along the surrounding road network (along US embassy road and R0363). There is no drainage system in place yet for the broader Ratoma masterplan area. It was mentioned by the authority that proposed road networks indicated in Figure 2-6: 1/3000 Scale Development Plan for Ratoma Area will incorporate infrastructure for managing surface runoff, which is crucial given the anticipated increase in impervious surfaces due to proposed developments. The effectiveness of these surface runoff trenches will depend on their design, capacity, and maintenance. In addition, there are neither comprehensive hydrological study in the area undertaken by the authority to understand the current and future runoff patterns, peak flow rates, and potential flood zones within the Ratoma area nor evaluation of the capacity of existing ditches and trenches under various rainfall scenarios.

Figure 10-7: Drainage map of Guinea (Source: CHEMA GROUP, 2023)

10.3.3.5 Hydrogeology

In the vicinity of the Project site, the groundwater level is located within the clayey silt with the average depth to groundwater being 13.8 mbgl and ranging between 9.2 and 21.96 mbgl. Recharge to the aquifer is mainly from rainwater infiltrating down into the water table. Only 15% of the drinking water supply for Conakry is from groundwater, whilst the rest (85%) is supplied from surface water.

As of 2020, 64% of the national population had access to at least basic water services. The population increase means that new settlements around the Conakry do not have any water services and forcing the communities to drill private boreholes and purchasing water from tanker trucks. There have not been investments in the past related to the access to clean water. Based on the information sought from Société des Eaux de Guinée (SEG) in May 2024, current water supply capacity is 150,000 m^3 per day; however, Conakry city needs 400,000 m^3 per day (there is a deficit of 250,000 m^3 per day). There are some ongoing projects (Guinea Urban Water Project) for the Greater Conakry to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utility. The plan is to get to 400,000 m^3 per day by 2030 and 600,000 m^3 per day in 2040.

The wastewater treatment system in Guinea is mainly primitive and non-functional sewerage network in a few districts of the capital Conakry. Generally, households had built their own latrines and septic tanks (which required fecal sludge treatment). The management of the sanitation practices for households and wastewater facilities are under the responsibility of the Ministry of Housing, Urbanization and Territorial Development (Ministère de l'Habitat, l'Urbanisme et d'Aménagement de Territoire, MUHAT).

The groundwater field parameters (pH, temperature, redox potential, dissolved oxygen, salinity, TDS, electrical conductivity, turbidity, colour and smell) were measured in situ as seen in Table 10-6 above.

Groundwater quality data are available from the groundwater quality sampling and analysis carried as part of the baseline study within the scope of this ESIA study. The groundwater quality sampling was carried out by AECOM's local partner, SEES on 2 occasions. The groundwater quality analysis was carried out by 2 different laboratories, as follows:

- The laboratory of the SEG located in Conakry analysed the groundwater samples collected on 5 October 2023;
- The Eurofins laboratory, located in France, analysed the groundwater samples collected on 12 October 2023

The results of the water quality analysis carried out by the SEG laboratory are shown in Table 10-10 while the results of the water quality analyses carried out by the Eurofins laboratory are shown in Table 10-11. The groundwater levels measured during the geotechnical investigation are shown above in Table 10-9. The results of these water quality analyses show that all the results are within both the Guinean and WHO guideline limits and therefore are of a good standard.

Table 10-10: Groundwater Quality Results for the SEG Laboratory

Location		GW1	P1	P2	PZ3	Guideline Limit	
Date of Sampling		05 Oct 23	05 Oct 23	05 Oct 23	05 Oct 23	WHO Guidelines	Guinean Values
Physicochemical Parameters							
Total Hardness	mg/l	80	40	40	80	—	—
Major Ions							
Chloride	mg/l	13.8	7.6	9.2	6.9	—	—
Sulphate	mg/l	24	5	45	14	—	—
Calcium	mg/l	5.16	0.07	0.05	0.03	—	—
Magnesium	mg/l	2.26	2.42	2.36	2.31	—	—
Potassium	mg/l	11.1	12.8	7.8	6.9	—	—
Minor Ions							
Ammonia	mg/l	3.69	<0.02	<0.02	<0.02	—	—
Ammonical NH_3	mg/l	3.48	<0.02	<0.02	<0.02	—	—
Phosphate	mg/l	0.32	<0.02	<0.02	<0.02	—	—
Bicarbonate	mg/l	40	40	60	40	—	—
Cyanide	mg/l	<0.002	<0.002	<0.002	<0.002	—	—
Nitrate	mg/l	<0.3	<0.3	14.52	22.44	50	—
Nitrite	mg/l	0.026	0.023	0.026	0.02	3	—
Fluoride	mg/l	0.13	0.08	<0.02	0.03	1.5	—
COD	mg/l	5	<3	<3	<3		200 if daily flow <30L/d or 1000 if flow is >30L/d
Manganese	mg/l	0.8	0.3	0.4	0.009	—	—
Iron	mg/l	0.009	0.006	0.008	0.005	—	—
Phosphorous	mg/l	0.15	<0.02	<0.02	<0.02	—	10
Metals							
Aluminium	mg/l	0.019	0.016	0.008	0.02	—	—
Arsenic	mg/l	<0.02	<0.02	<0.02	<0.02	0.01	—
Chromium	mg/l	<0.01	<0.01	<0.01	<0.01	0.05	—
Copper	mg/l	0.002	0.002	0.003	0.001	2	—
Mercury	µg/l	<0.1	<0.1	<0.1	<0.1	6	—
Lead	µg/l	<3	<3	<3	<3	10	—

Location		GW1	P1	P2	PZ3	Guideline Limit	
Nickel	mg/l	**0.008**	<0.006	**0.007**	<0.006	0.07	—
Zinc	mg/l	<0.01	<0.01	<0.01	<0.01	—	—
Boron	mg/l	<0.05	<0.05	<0.05	<0.05	2.4	—
Cadmium	µg/l	<0.7	<0.7	<0.7	<0.7	3	—

Table 10-11: Groundwater Quality Results for the Eurofins Laboratory

Location		GW1	P1	PZ3	Guideline Limit	
Date of Sampling		12 Oct 23	12 Oct 23	12 Oct 23	Guinean Values	Guinean Values
Physicochemical Parameters						
Complete Alkaline Strength	°F	2.7	1.6	2	—	—
Alkaline Strength	°F	<0.5	<0.5	<0.5	—	—
Total Hardness	°F	4.3	4.1	6.2	—	—
Total Hardness in mg(CaCO3)/L	mg CaCO3/l	43	41	62	—	—
Major Ions						
Chlorides	mg/l	18	12	8	—	—
Sulphates	mg SO4/l	30	7.7	17	—	—
Calcium (Ca)	mg/l	16	16	24	—	—
Magnesium (Mg)	mg/l	0.66	<0.5	0.59	—	—
Sodium (Na)	mg/l	16	13	3.3	50	—
Potassium (K)	mg/l	7.7	9.5	3.7	—	—
Minor Ions						
Low grade ammonium	mg NH4/l	8.1	<0.004	0.007	—	—
Fluorides	mg/l	<0.01	<0.01	<0.01	1.5	—
Nitrates (NO3)	mg NO3/l	28	46	27	50	—
Nitrites (NO2)	mg NO2/l	<0.01	<0.01	<0.01	3	—
Kjeldahl nitrogen (NTK)	mg N/l	2.5	N/A	N/A	—	—
Global Nitrogen (NO2+NO3+NTK)	mg N/l	8.83	N/A	N/A	—	30
Phosphorous (P2O5)	mg P2O5/l	0.03	0.05	0.03	—	10
Phosphorous (P)	mg/l	0.01	0.02	0.01	—	10
Iron (Fe)	µg/l	19.5	243	274	—	—
Dissolved Iron	µg/l	4.1	<1.00	<1.00	—	—
Manganese (Mn)	µg/l	1.29	1.4	3	—	—
Dissolved Manganese (Mn)	µg/l	1.04	0.47	1.79	—	—
Easily Releasable Cyanides	µg/l	<0.2	<0.2	<0.2	—	—
Total Cyanides	µg/l	<0.2	<0.2	<0.2	—	—
Chemical Oxygen Demand (COD)	mg O2/l	7	11	5	—	200 if daily flow <30L/d or 1000 if flow is >30L/d
Metals						
Aluminium (Al)	µg/l	6.55	27.6	36.2	—	—
Zinc (Zn)	µg/l	12.9	<2.00	10.7	—	—

Location		GW1	P1	PZ3		Guideline Limit
Mercury (Hg)	µg/l	<0.01	0.01	<0.01	6	—
Arsenic (As)	µg/l	<0.20	<0.20	<0.20	10	—
Boron (B)	µg/l	<20.0	<20.0	<20.0	2400	—
Cadmium (Cd)	µg/l	<0.02	<0.02	<0.02	3	—
Chromium (Cr)	µg/l	49.6	41.6	16.6	50	—
Copper (Cu)	µg/l	<0.50	<0.50	1.01	2000	—
Nickel (Ni)	µg/l	4.52	3.08	2.39	70	—
Lead (Pb)	µg/l	<0.10	<0.10	0.2	10	—
Hydrocarbons						
Acenaphthene	µg/l	<0.01	<0.01	<0.01	—	—
Acenaphthylene	µg/l	<0.01	<0.01	<0.01	—	—
Anthracene	µg/l	<0.01	<0.01	<0.01	—	—
Benzo(a)anthracene	µg/l	<0.001	<0.001	<0.001	—	—
Benzo(a)pyrene	µg/l	<0.001	<0.001	<0.001	0.7	—
Benzo(b)fluoranthene	µg/l	<0.005	<0.005	<0.005	—	—
Benzo(ghi)Perylene	µg/l	<0.0006	<0.0006	<0.0006	—	—
Benzo(k)fluoranthene	µg/l	<0.005	<0.005	<0.005	—	—
Chrysene	µg/l	<0.0018	<0.0018	<0.0018	—	—
Dibenz(a,c/a,h)anthracene	µg/l	<0.005	<0.005	<0.005	—	—
Fluoranthene	µg/l	<0.005	<0.005	<0.005	—	—
Fluorene	µg/l	<0.01	<0.01	<0.01	—	—
Indeno (1,2,3-cd) Pyrene	µg/l	<0.0006	<0.0006	<0.0006	—	—
Naphthalene	µg/l	<0.05	<0.05	<0.05	—	—
Phenanthrene	µg/l	0.009	<0.002	<0.002	—	—
Pyrene	µg/l	0.002	<0.002	<0.002	—	—
PAHs 16	µg/l	0.011	<0.05	<0.05	—	—
Phenol	µg/l	<0.1	<0.1	0.31	—	—
Total Hydrocarbons	mg/l	****	<0.10	<0.10	—	15
Hydrocarbons (C5-C9)	µg/l	****	<25	<25	—	—
Hydrocarbons (C10-C40)	mg/l	<0.1	<0.1	<0.1	—	—

10.3.4 Receptors

Table 10-12 summarises the key receptors relevant to the surface water groundwater and soils assessment and the sensitivity thereof.

Table 10-12: Groundwater, surface water and soils receptor sensitivity

Receptor Group	Receptor	Sensitivity	Sensitivity Description
Bedrock aquifers	Igneous rocks including dolerite, peridotite, gabbro and dunite	**Low**	Aquifer capable of providing groundwater to nearby villages and towns via boreholes.
Superficial deposits aquifers	Superficial deposits	**Low**	Minor aquifers (partially saturated to dry) to non-aquifers.
Groundwater users	Nearby groundwater users who use boreholes and shallow wells	**Low**	Groundwater source providing groundwater to a community.

Surface waters	Permanent and ephemeral streams	**Low**	Permanent and ephemeral streams draining the surface water catchment.
Soils	Lateritic soils	**Low**	Shallow, poor soil cover.

10.4 Impact Assessment and Mitigation

10.4.1 Potential Impacts

The scope of the assessment considers the construction and operational phases of the Project. The following Project activity has been scoped out of the impact assessment due to its lack of discernible impacts to groundwater, surface water and soil:

- Provision of water for use during construction and operation. During construction and operation, the water supply to the Project site (including for workforce accommodation) will be from the Société des Eaux de Guinée (SEG) with boreholes providing groundwater through connections or storage tankers. ACC may also dig a well on site to supply the site with non-portable water. The required volume of potable water during construction has been estimated to be up to 8900 m^3.

The main sources of impacts expected to occur during construction and operation are, as follows:

- Construction:
  - Vegetation clearance, earthworks, installation of hardstanding, road construction, culverting of ephemeral streams, addition of channels, swales and outfalls;
  - Vegetation clearance, earthworks, handling of construction materials;
  - Vehicle movements, construction of hardstanding, road construction, culverting of ephemeral streams, additional drainage channels, swales and outfalls.
- Construction and Operation:
  - Storage and handling of fuels and chemicals, including refuelling activities;
  - Activities creating wastewater or contaminated runoff (e.g. wastewater during operation, wash water from on-site activities, general and domestic waste water, fuel, sewage treatment and road drainage).
  - Accidental terrestrial leaks and spills.

Table 10-13 outlines the key activities that are likely to interact with and potentially impact existing receptors.

Table 10-13: Project activities and potential impacts

Project Activities/ Facilities	Impact Pathway	Receptor Group	Impact ID/ Description
Construction Phase			
Vegetation clearance, earthworks, installation of hardstanding, road construction, additional drainage channels.	Alteration of ground surface materials, topography, and drainage. Physical changes to the drainage system and the flow regime.	Surface waters	SW01: Increased flood risk and changes in flow
Vegetation clearance, earthworks, handling of construction materials.	Mobilisation of terrestrial sediment discharged to surface water.	Surface waters	SW02: Degradation of water quality due to increased turbidity
Vehicle movements, construction of hardstanding, road construction, additional drainage channels.	Change of flow and runoff characteristics, and loss of vegetation, leading to erosion and changes in the natural sediment regime.	Soils	S01: Soil erosion, compaction, and loss
Construction and Operations Phase			

Project Activities/ Facilities	Impact Pathway	Receptor Group	Impact ID/ Description
Storage and handling of fuels and chemicals, including refuelling activities **Activities creating waste water or contaminated runoff (e.g. wastewater from on-site portable wastewater treatment plant during operation, wash water from on-site activities, general and domestic wastewater, fuel and road drainage)**	Spills, leaks, discharges and runoff leading to surface water contamination during the wet season and subsequent soil contamination, and direct soil contamination during the dry season	Soils	S02: Degradation of soil quality due to increased pollutants
	Infiltration and discharge to groundwater of contaminants associated with spills, leaks, discharges and runoff via seepage	Bedrock and Superficial deposit aquifers	GW01: Degradation of groundwater quality due to increased pollutants
Accidental terrestrial leaks and spills during operations.	Spillages, leaks, discharges, runoff and uncontrolled release of contaminant containing elevated suspended sediment, fuel, foul water, chemicals	Surface Waters	SW03: Degradation of surface water quality due to increased pollutants
Operations Phase			
Areas of hardstanding, roads, and culverts	Increased volumes of runoff from impermeable surfaces	Surface water	SW04: Change of flow regime and flood risk

10.4.2 Embedded Mitigations

The following groundwater, surface water and soils mitigation measures will be implemented by the Project to avoid or reduce negative impacts on soil, surface water and groundwater as described in the Project's ESMP-PGESC.

10.4.2.1 Pollution Prevention and Control

Appropriate management, storage and disposal procedures for materials, wastes (solid and liquid), fuels or chemical wastes will be prepared and implemented to avoid soils, groundwater and surface water contamination.

Construction

Embedded mitigations include:

- Pollution prevention measures associated with waste management – refer to Section 11.4.2 of this ESIA Report.
- Drip trays will be placed under generators and other equipment that may drip oil. This includes any vehicles that are required to stand for long periods.
- Spill response and emergency plans will be prepared and implemented to address potential accidental releases.
- Hazardous liquids such as diesel fuel will be securely stored on flat hardstanding, and fuel will be protected either by double-walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume;
- Spill kits will be available on the Site in watertight containers.
- Regular monitoring and maintenance of machinery and vehicles to ensure these are not leaking contaminants.
- Provide washing areas for machinery and a separate washing area for concrete mixers which are fitted with oil and grease separators to prevent runoff of pollutants.
- Set up a separate sewerage system for domestic, washing and rain water.
- Provide watertight storage which is enclosed to protect from the weather and fenced with restricted access.
- Supply absorbant material and watertight containers to reduce leakage of pollutants.
- Collect used oils, residue oils and hazardous materials/ waste to prevent releasing these to the environment.

10.4.2.2 Drainage Mitigation

The following mitigation measures will be implemented to reduce potential impacts associated with drainage:

Construction

- Pooling of water will be minimised and release of contaminated water to the environment will be avoided through use of drainage systems and application of GIIP for storm water management.
- Cut-off drains will be installed to intercept, divert and/ or treat runoff from working areas.
- A layer of high permeability fill material (e.g. sand of gravel) will be installed where ever possible to facilitate effective drainage and prevent the creation of barriers and reduce flood risk.
- Culverts will be designed to accommodate peak flows and prevent blockage. Culverts and diversions will be inspected and maintained regularly to prevent blockages.
- Drainage channels will be engineered and installed to capture and divert storm water.
- Sedimentation ponds will be engineered and installed in the drainage system to reduce the sediment load prior to discharge.
- Necessary communications and engagement will be undertaken with the relevant authorities related to the connection to the existing drainage network and confirmation of available capacity to accommodate the Project during construction.

Construction and Operation

- The Project will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system. Design and management of the discharge systems from the Site will ensure that pollutants from the site do not enter the coastal or rivers systems.
- To maintain their effectiveness, drainage channels and sediment ponds will be cleaned out regularly throughout construction and operations by reclaiming the captured eroded soils
- Regularly monitoring weather forecasts to ensure that contingency plans are in place for adverse weather conditions.
- Where suitable, the installation of interceptors to capture pollutants to naturally filter contaminants before connection to the network.
- Undertake regular inspections and maintenance activities shall be applied on site during the operational phase of the Project to ensure the ongoing effectiveness of the measures to manage operational runoff.
- All operational and administrative workers at the site shall be provided with environmental training. This shall include guidance on pollution prevention and drainage management as well as waste management.
- An agreement will be put in place with the relevant authority/professional waste disposal licensed companies regarding the collection, transfer and disposal of effluents.
- Wastewater will not be permitted to enter watercourses or to soakaway. There will be on-site wastewater treatment plant.
- Periodic inspection and maintenance if the treatment plant shall be undertaken on monthly basis; these shall be managed by Administrative Facilities' Operational Management Team.

10.4.2.3 Water Management Plan

An Operational WMP and a Construction WMP will be prepared and implemented as part of the ESMP and will include:

Construction Water Management Plan

- Plans and schematics of water features and activities;
- Collection and disposal of runoff;
- Treatment for sediment and contaminants;
- Waste water disposal details.

- Chemical and fuel storage (including the design of the storage infrastructure);
- Spill response procedures;
- Monitoring regime (quarterly monitoring of quality, levels and flow), including a summary of baseline conditions, standards, and trigger levels;
- Action/ remediation plans for adverse effects to quality, levels and flow;
- A Construction monitoring report will be prepared monthly that summarises monitoring activities undertaken, findings (including non-compliances), and actions taken to address non-compliances.
- Relevant groundwater will also be monitored before construction works to confirm no significant impact to users and ecosystems. Monitoring will consist of water level, flow and field physicochemical parameters measurements. Water quality laboratory analyses can be carried out if field physicochemical parameters measurements show a deterioration of water quality.
- A Construction Water Management and Monitoring Plan will be prepared and implemented that requires regular monitoring of the water quality, level and flow of any groundwater and surface water features. It will summarise baseline conditions, standards and trigger values, and outline actions plans for adverse effects to quality, levels or flow. Monitoring will be undertaken quarterly and/or if, and may be pared back thereafter should quality, levels and flow be shown to be unchanged.
- Solid and liquid waste will be appropriately treated and disposed of to decrease the risk of leak/spills/leaching of contaminants to surface water, groundwater and soil.
- Runoff from areas used for potentially contaminating substances will be captured and treated to meet national and international standards prior to discharge.

Operation Water Management Plan

- An Operational monitoring report will be prepared yearly that summarises monitoring activities undertaken, findings (including non-compliances), and actions taken to address non-compliances.
- An Operational Water Management and Monitoring Plan will be prepared and implemented that requires regular monitoring of groundwater and surface water quality, levels and flow. It will summarise baseline conditions, standards and trigger values, and outline actions plans for adverse effects to quality, levels or flow. Monitoring will be undertaken yearly, and may be pared back thereafter should quality, levels and flow be shown to be unchanged.

10.4.3 Assessment of Impacts during Construction

10.4.3.1 Impact SW01: Increased flood risk and changes in flow

Construction activities have the potential to impact on the hydrological regime of the Project Area of Influence during the wet season.

The physical changes to the land as a result of the building construction will modify and potentially adversely affect the hydrology of the catchments. Additional structures like new drainage channels, swales and outfalls will be required to redirect the run-off within the Project Area surface water catchments.

Increases in the volume of run-off caused by an increase in impermeable cover across the Project site could lead to increased volumes of flow in the catchment resulting in flooding in places during the wet season. The changes in the flow regime would lead to changes in the flow volumes, velocities, channel characteristics and also alter the natural sediment regime of the catchment.

The embedded mitigation that will be implemented relating to the drainage are listed in Section 10.4.2.2.

The sensitivity of the surface water receptors is low. The increased flood risk and change in flow regime will result in a low magnitude and low adverse initial significance impact and a **Low Adverse** residual impact.

10.4.3.2 Impact SW02: Degradation of water quality due to increased turbidity

Construction activities have the potential to impact on surface water quality during the wet season, due to sediments run-off. Impacts could be direct and/ or indirect and could last for the duration of the construction phase and beyond.

Sediment-rich runoff may occur as a result of vegetation clearance, earthworks, and handling construction materials. Other contamination sources include sediment laden water discharged to the surface water drainage system.

The embedded mitigations relating to the Construction Water Management Plan (CWMP) section listed in in Section 10.4.2.3.

The sensitivity of the surface water receptors is low. Release of sediments can have an impact on water quality, which should be reversible over a relatively short period of time.

Given the area of development and the changes to the runoff characteristics during the wet season, the degradation of surface water quality due to increased turbidity will result in a low magnitude and low adverse initial significance impact and a **Low Adverse** residual impact.

10.4.3.3 Impact S01: Soil erosion, compaction, and loss

Construction activities include: vehicle movements, stripping, construction of hardstanding, road construction and additional drainage channels.

The increase in runoff during the wet season from impermeable areas and access road drainage will result in permanent changes to runoff. These changes to runoff during the construction phase have the potential to increase soil erosion, leading to long term changes in the natural sediment regime. In some areas there would be loss of soils and increased rates of soil erosion; in other areas there is the potential for increased deposition of soils.

The embedded mitigations relating to the Soil and Drainage Mitigation section listed in Section 10.4.2.2.
Additional Mitigation: Stripping will also be restricted to only areas where this is required for construction and excavated soil will be covered with tarpaulin.

The sensitivity of the soil receptors is low. The soils erosion, compaction and loss will result in a low magnitude impact and Low Adverse initial significance, and a **Low Adverse** residual impact.

10.4.3.4 Impact S02, GW01 and SW03: Degradation of Soil, Groundwater, and Surface Water Quality due to Contamination

Construction (construction activities, vehicle movements, accidental spills etc) and operational activities (vehicle activities and car washing) have the potential to impact on soil, groundwater, and surface water quality due to contamination by fuel, oil and other potentially polluting substances. During the dry season, soils could mainly be directly impacted by spills and leaks of hazardous materials, while during the wet season soils will be mainly indirectly impacted as a result of polluted discharges passing via surface water to soils. The impacts could last for the duration of the construction and operation phases and beyond.

There is potential for mobilisation of large quantities of sediment and the risk of fuel spillage or other materials used in construction and operations, although the magnitude of impacts upon individual receptors will also be dependent on the nature and extent of an event.

SUDS will be set-up just outside of the Project Site where the land isn't planned for development, and over which run-off would flow to mitigate issues related to any excess run-off that can't be accommodated by the existing drainage systems. This would be a temporary measure to reduce flood until a wider drainage plan is implemented for Ratoma masterplan area.

The embedded mitigations relating to pollution prevention and control and drainage mitigation listed in Section 10.4.2.1 and 10.4.2.2 respectively.

Additional Mitigation: Develop and implement a Spill Prevention Plan/ Water Pollution Management Plan, monitor for pollutants every six months and have spill response equipment readily available.

Soil, groundwater and surface water receptors are of low sensitivity. The degradation of soil, groundwater and surface water quality due to contamination will result in a low magnitude and a low, adverse and irreversible initial significance impact and a **Low Adverse** and irreversible residual significance impact.

10.4.3.5 Impact SW04: Water Source and Supply

During the construction phase of the Project, water will be needed for domestic purposes (drinking, washing, flushing the toilets). Drinking water requirements on the site are estimated at around 55 m^3 per day, for an average of one thousand one hundred (1100) worker on site. The amount of water required during construction is estimated at up to 8900 m^3 at a rate of 371m^3/month. There will be water tanks (with a total capacity of 80 m^3) on

site (including welfare facility area). The water will be provided by national water concessionaire Société des Eaux de Guinée (SEG). The quantity of water consumed will be monitored through a register and water balance will be updated, checked, and communicated regularly.

ACC may dig a well on site as required in a designated position to supply the site with non-portable water in order to minimise the use of the SEG's water supply.

Population growth is putting pressure on the existing water sources and infrastructure. In many areas, where lack of access to piped water, the residents are relying on alternative sources such as wells, boreholes, water vendors. However, there are some ongoing projects (Guinea Urban Water Project) for the Greater Conakry to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utility (increasing water supply capacity in the city to 400,000 m^3 per day by 2030 and 600,000 m^3 per day in 2040).

The impact will be short term over the during of the construction phase of the Project. The sensitivity of the social receptors, local and wider communities have medium sensitivity. The magnitude of the impact is considered to be low given the quantity of the water being used and that the duration of the use of water would be limited to the construction phase. In addition, embedded mitigation measures would be applied including water usage targets, monitoring and water saving measures set out in the Project's ESMP. The significance of the impact is therefore **Low Adverse**.

10.4.4 Assessment of Impacts during Operation

10.4.4.1 Impact SW05: Increased Flood Risk and Change in Flow Regime

Operations activities have the potential to impact on the hydrological regime of the surface water catchments covering the Project site and surrounding areas particularly during the wet season.

Increase in the volume of run-off caused by an increase in impermeable cover across the Project Area could lead to increased volumes of flow in the catchment resulting in flooding in places during the wet season. The changes in the flow regime would lead to changes in the flow volumes, velocities, channel characteristics and also alter the natural sediment regime of the catchment.The embedded mitigations relating to the drainage mitigation section listed in Section 10.4.2. will ensure that the drainage within the Project site area will be effectively managed. Surface waters associate with the Project site are of low sensitivity. The surface water drainage developed within the Project site will be connected at multiple tie in points to the municipal surface water drainage network around the Project site which will be developed in the future and under responsibility of the relevant authorities. National Department of Town and Country Planning (DATU) is responsible for Planning (design, development), implementation of government policies relating to land use planning, urban development and sanitation.

Where feasible and appropriate, Sustainable Urban Drainage Systems (SUDS) will be applied to manage operational runoff. This may involve the installation of interceptors to capture pollutants or the establishment of reedbeds to naturally filter contaminants before connection to the network. Regular inspections and maintenance activities shall be applied on site during the operational phase of the Project to ensure the ongoing effectiveness of the measures to manage operational runoff.

As short to medium term mitigation, SUDS could also be set-up outside of the Project Site (surrounding land) for drainage purposes until the city drainage capacity is managed by the relevant authorities and a wider drainage plan is implemented for wider Koloma area. It is also suggested in the CHEMAS' EIA/ESIA to design retention basins for the Ratoma masterplan area. Within the scope of the CHEMAS' EIA/ESIA prepared for wider Ratoma masterplan area (193 ha), there are some recommendations and suggestions received from governmental regulators to set up a technical committee to deal with all technical issues relating to the development of the area and creating drainage channels for run-off water.

ACC will undertake continuous liaison with the technical departments of the competent authority, DATU, and other relevant authorities which is essential to stay updated on any new developments or changes in the masterplan regarding drainage network to minimize risks. The increased flood risk and change in flow regime at the Project site will result in a low magnitude and an overall **Low Adverse** impact.

10.4.4.2 Impact SW06: Water Source and Supply

During the operation phase of the Project, water requirements are estimated at around 198m^3/day. Water will be supplied by the SEG. A number of water saving strategies are already planned including; solar hot water systems; rainwater harvesting, and associated sensors; and waterflow reducers for sanitary ware items.

Population growth is putting pressure on the existing water sources and infrastructure. In many areas, where lack of access to piped water, the residents are relying on alternative sources such as wells, boreholes, water vendors. However, there are some ongoing projects (Guinea Urban Water Project) for the Greater Conakry to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utility (increasing water supply capacity in the city to 400,000 m^3 per day by 2030 and 600,000 m^3 per day in 2040).

The impact will be longer term throughout the lifetime of the Project. The sensitivity of the social receptors, local communities have medium sensitivity. The magnitude of the impact is considered to be medium given the quantity of the water to be used and the duration of the use of water. The Project will primarily provide new accommodation for activities currently carried out in the existing locations of the governmental authorities' in Conakry with the almost similar number of operational personnel/employee (the existing facilities are mainly spread within the southern part of the Conakry) and hence the operational water use from the Project would represent the water use/supply that would otherwise still be used from slightly at a different location, rather than an additional Project creating water consumption. Water use and supply during the operational phase of the Project could have still potential impacts capacity strain on the already struggling water network and lead to water shortages or drought which would then have an impact on the local community who depend on the current water supply in the area. The significance of the initial/ resulting impact is **Moderate Adverse**.

While the water saving strategies are already planned for the Project (as discussed above) will reduce the impact in the short term, they will all need to be maintained throughout the life of the project. **Additional mitigation:** An Water Management Plan for operational phase is to be developed and implemented in the operational phase to ensure the long-term effectiveness of the above measures. The Project will regularly engage with local service providers to ensure that facilities are able to cope with increased demand. Water resource management shall be included in the Project's OESMP setting water usage targets, monitoring and water saving measures. The residual impact is **Low Adverse** given the additional mitigation proposed**.**

10.4.4.3 Impact SW07: Pollution to surface water and groundwater quality due to wastewater

Domestic wastewater that are likely to be generated during operation phase of the Project, is planned to be treated on-site wastewater treatment plant and discharged suitably with licensed disposal contractor. The treated water any excess will be channelled through the city rainwater runoff network. The sludge will be disposed suitably through a licensed waste disposal company. Similar to the waste disposal, the necessary permits and protocols shall be obtained and maintained for with the relevant authority related with the collection and transfer effluents.

Wastewater has the potential to impact both the groundwater and the surface water, which are of low sensitivity. Assuming the measures outlined in Operational Phase Embedded Mitigation Measures are put in place, the magnitude of change would be negligible as all wastewater would be treated on site and discharged/disposed without a risk of contamination to the ground or surface water. The predicted potential impact significance during the operational phase from wastewater is therefore negligible.

10.4.5 Impact Summary

Table 10-14 summarises identified impacts on surface water, groundwater and soils during construction and operation of the Project.

Table 10-14: Impact Summary

Impact ID	Impact	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
Construction Phase								
SW01	Increased flood risk and change in flow regime	Surface Waters	Low	Low	Low Adverse	Not Required	Low	Low/ Negligible Adverse
SW02	Degradation of water quality due to increased turbidity	Surface Water	Low	Low	Low Adverse	Not Required	Low	Low Adverse

SW04	Water source and supply	Water sources/ Community	Medium	Low	Low Adverse	Not Required	Low	Low Adverse
S01	Soil erosion, compaction, and loss	Soils	Low	Low	Low Adverse	• Only stripping the soil required for construction • Cover excavated soil with tarpaulin	Low	Low Adverse
Construction and Operational Phase								
S02	Degradation of soil quality due to increased pollutants	Soils	Low	Low	Low Adverse	• Develop and implement a Spill Prevention Plan/ Water Pollution Management Plan • Monitor for pollutants (every six months) • Spill response equipment readily available.	Low	Low Adverse
GW01	Degradation of groundwater quality due to increased pollutants	Bedrock and superficial deposits aquifers, Groundwater users	Low	Low	Low Adverse		Low	Low Adverse
SW03	Degradation of surface water quality due to increased pollutants	Surface Waters	Low	Low	Low Adverse		Low	Low Adverse
Operational Phase								
SW05	Change of flow regime and flood risk	Surface Water Bedrock and superficial deposits aquifers, Groundwater users	Low	Low	Low Adverse	SUDS will also be set-up outside of the Project Site (surrounding land) for drainage purposes until the city drainage capacity is managed by the relevant authorities and a wider drainage plan is implemented for wider Koloma area.	Low	Low Adverse
SW06	Water source and supply	Water sources/ Community	Medium	Medium	Moderate Adverse	• The Project will regularly engage with local service providers to ensure that facilities are able to cope with increased demand. • Water resource management shall be included in the Project's OESMP setting water usage targets,	Low	Low Adverse

						monitoring and water saving measures.		
SW07	Pollution to surface water and groundwater quality due to wastewater	Ground and surface waters	Low	Low	Low Adverse	• Necessary permits and protocols to be obtained and maintained for with the relevant authority related with the collection and transfer effluents.	Low	Low Adverse

11. Waste Management

11.1 Introduction

This Chapter provides details of the project-related activities that may result in impacts related to the management of waste generated during construction and operation of the Project.

11.2 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts related to the waste management. It builds on the general ESIA assessment methodology described in **Chapter 4 ESIA Methodology** to take account of the range of likely significant effects arising from the construction and operation phases of the Project related with the waste management.

11.2.1 Regulations and Guidelines

The National Regulations and Guidelines for Waste Management as well as International Guidelines, Agreements and Conventions, all of which will be applicable to the Project are outlined below.

11.2.1.1 National Guidelines

The national regulations and guidelines for waste management are presented in Table 2-1.

Table 11-1: National Regulations, Policies and Guidelines

Law/Regulation	Objective
The Environment Code (Republique de Guinee, 2019)	This code sets out the legal framework for the use, management, preservation, and restoration of natural resources. Article 103 to 106 addresses waste, which is inherent in all human activity and must be treated in accordance with the legislation in force. In particular article 104 prohibits "the dumping or disposal by any process whatsoever of waste in continental waters and maritime waters under Guinean jurisdiction...".
The Public Health Code (National Assembly, 1997)	The Public Health Code is the cornerstone of the Guinean Republic's legislation on the protection and promotion of public health. It covers many aspects relevant to the project including the treatment of waste (Chapter 1 of Book II on sanitation and public health).
The Labour Code (Republique de Guinee, 2014)	Law L/2014/072/CNT on the Labour Code in the Republic of Guinea sets out the rules and relations between employers and employees, which will have to be applied within the framework of the project. In the field of construction operations, articles 231.22 to 231.27 set out the special provisions applicable to construction sites. For a site on the scale of the Koloma administrative centre project, it is essential that the site has: • At least one connection to the power grid, • At least one to the water supply network • At least one waste disposal point
National Solid Waste Management Strategy 2018-2028	This strategy outlines that local governments are responsible for their solid waste and its disposal. It also addresses the organisational structure of the waste management sector, technologies, and management of specially managed wastes in Guinea.
Joint decree on the Attribution of the Municipalities in the Management of Household and Similar Waste	The document states that municipalities are responsible for their solid waste management to be in accordance with waste strategies approved by the relevant authorities. Therefore, the municipalities have a responsibility to organise collection areas, the recruitment of small and medium-sized enterprises (SMEs)for collection and overall administrative management.
National Sanitation Policy (2011)	The policy aims to contribute to sustainable development and the improvement of quality of life. It promotes recycling, the development of hazardous waste facilities and final disposal facilities.

11.2.1.2 International Guidelines

The international conventions are presented in Table 11-2.

Table 11-2: International Agreements and Conventions

Agreement/Convention	Objective	Status and Date of Signature
Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (UNEP, 2011)	The Convention aims to protect human health and the environment from the dangers posed by the generation, management, transboundary movements and disposal of hazardous wastes and other wastes.	Accession on 26/04/1995 (not ratified) Entry into force 09/05/2003
Bamako Convention on the Ban of the Import into Africa of Hazardous Wastes and on the Control of Transboundary Movements and Management of Hazardous Wastes within Africa (UNEP, n/d)	The convention aims to prohibit the import of hazardous and radioactive waste and to limit and control the transboundary movement of such waste in Africa.	Adopted in 1991. Entry into force in 1998.

11.2.2 Receptor Sensitivity

For the purposes of the waste impact assessment, receptors are defined as the facilities that will be used to manage waste from the Project.

Avoidance of direct waste impacts on local receptors (such as watercourses and local populations) is considered at the project planning/ design stage and is fundament good practice, managed by embedded mitigation. It is, therefore, not considered relevant to incorporate the sensitivity of these potential receptors as part of the waste impact assessment, but instead the suitability of the available management route is assessed.

Table 11-3 describes the sensitivity of receptors.

Table 11-3: Waste Management receptor sensitivity

Receptor	Sensitivity	Reason
Hazardous waste management facilities	High	Poorly designed or operated hazardous waste management facilities have the potential to cause severe impacts on human health or the environment.
Non-hazardous waste management facilities	Medium	Non-hazardous waste management facilities have the potential to cause impacts on human health or the environment, but the impacts are likely to be less severe than for hazardous waste.
Inert waste management facilities	Low	Inert waste management facilities have a lower likelihood of causing impacts on human health and the environment than other types of waste facilities, since the waste is not hazardous, reactive, or biodegradable.

11.2.3 Impact Significance

The method focuses on identifying appropriate mitigation measures given the type and volume of wastes likely to be produced by the Project, and then identifying and assessing any potential residual impacts which may arise from considering the suitability and availability of facilities that will be used to manage these wastes.

The waste study method comprises the following steps:

- Estimate the types of quantities of waste likely to be generated by the Project.
- Identify the potential management route for each waste stream.
- Identify appropriate mitigation measures for the handling, temporary storage and transport of waste.
- Assess any residual impacts based on consideration of waste types and the suitability of the available waste management facilities.
- The magnitude of the impacts for each waste stream is assessed based on the:
- Sensitivity of the receptor (i.e., the type of waste management facility).

- Capacity of identified waste management facilities for managing the waste in compliance with relevant guidelines.
- Degree of certainty regarding the availability of these facilities.

Table 11-4 outlines the impact assessment criteria used for the various categories of waste, according to the proposed method of managing that waste type.

These criteria recognise that the highest potential impacts would be associated with managing hazardous wastes where suitable facilities are either not available or have not been identified. Suitable facilities are those which are licensed by the relevant regulatory authorities and are operating in accordance with GIIP. Using this approach, the significance of impacts is based on the magnitude of impact, with moderate and high magnitude impacts being deemed significant; although professional judgement is used in some cases to further define whether or not impacts are significant based on a more detailed consideration of specific waste types and quantities.

Table 11-4: Waste Management Magnitude Criteria

Impact	Receptor		
	Inert waste management facilities	Non-hazardous waste management facilities	Hazardous waste management facilities
Suitable facilities available with sufficient capacity to manage the quantities of wastes generated.	Negligible	Negligible	Low
Suitable facilities available but capacity to accept waste from Project may be constrained due to size of facility or distance from site.	Low	Medium / Low	Moderate
Facilities are unavailable or unsuitable; or means of management is uncertain.	Medium / Low	Medium / Low	Moderate/High

11.3 Baseline

11.3.1 Baseline Data Collection

11.3.1.1 Study Area

The study area for waste generation is the Project boundary. The area of influence (AOI) for impact extends to include facilities that will be used to manage project waste, which may be, local, regional, or national.

11.3.1.2 Desktop Study

Baseline data was collated from a review of published information. This information was mainly obtained from online literature sources, official websites of the national governmental bodies, international recognized organizations/institutions' websites, as well as technical documents/reports (technical publications, research papers, etc). List of the references used for the baseline section is provided at the end of this ESIA report.

11.3.1.3 Data Limitations

There is no available information on the management methods for hazardous waste in Guinea; therefore, it is assumed that hazardous waste is assumed as non-hazardous waste.

11.3.2 Baseline Characteristics

Waste management in Guinea and Conakry is currently limited to one main waste disposal facility, the Minière Landfill, located in Ratoma[57]. With a remaining lifetime of 3 years (as of 2020) and its present operating conditions having led to reports of fires, insufficient soil cover and fatal landslides, there are plans to construct alternative waste management facilities at a location referred to as the Baritodé Technical Centre (BTC) (Japan Internal Cooperation Agency, 2022). This facility will be located in Baritodé in the rural council of Kouria, approximately 50km from Conakry (Magoum, 2022).

Funded by the French Development Agency (Agence Francaise de Developpement, hereinafter referred to as the AFD), the Conakry City Urban Area Waste Management Plan intends to process and dispose 2,645 tonnes of

[57] There are likely to be smaller informal disposal facilities/areas elsewhere in the Country. These are very unlikely to conform to the Good International Industry Practice.

waste a day at the BTC which will comprise an engineered landfill and a Waste to Energy (WtE) facility. This aims to reduce illegal dumping by 20% (Japan Internal Cooperation Agency, 2022). There is no current information available on when the site will be constructed and become operational.

Currently residents can pay a fee to micro collection agencies for their household waste to be collected, otherwise their waste is burned or dumped on the road. Dumped waste is either collected and sent to Minière Landfill by Albayrak who are responsible for road cleaning in Conakry, or create informal areas known as 'Black Spots'. These are areas organised by neighbourhoods to control waste being picked up as for many people waste is a source of income (Stanghellini, 2022). The collection process is summarised in Figure 2-6.

Figure 11-1: Waste flow in Conakry (Japan Internal Cooperation Agency, 2022)

An informal recycling sector exists in Conakry where the collected waste is discharged into containers that are placed at collection points called "Regrouping Points". Plastics, aluminium cans, and metals are occasionally separated here. Within the Regrouping Points are 30 collection points known as Transit Zones (ZTT) which operate like small transfer stations (Japan Internal Cooperation Agency, 2022).

Since March 2023, Guinea's first plastic waste recycling plant was made operational. The facility contains machinery required to convert Guinean plastic waste into pavements (Plastic Odyssey, 2023).

Several private recycling companies also operate in Conakry (see Table 11-5).

Table 11-5: Private recycling companies within Conakry City (Japan Internal Cooperation Agency, 2022)

Private Recycling Companies Names
• Diaplastique
• Kimplast
• Orplaste
• Cegedi
• Plate forme de compostage (PP)
• Soguiplast

No management facilities exist for hazardous construction wastes.

11.3.3 Receptors

A list of identified facilities is provided in Table 11-6.

Table 11-6: Waste Facilities Identified in Desk Study

Facility	Receptor Sensitivity	Location	Waste Accepted	Capacity	Summary	Source
Minière Landfill	Medium for non-hazardous waste and high for hazardous waste	Ratoma/Dar es Salam (Concasseur) area	General waste, construction & demolition waste, agricultural waste, and hazardous waste	800 to 900 tonnes/day of waste delivered in total. From Ratoma only receives 353 tonnes/day on average.	PICCINI operates this landfill and disposes the waste using bulldozers.	(Japan Internal Cooperation Agency, 2022)
Plastic Processing Plant	Medium	Kagbélen	Plastic	Unknown	BGS Recyplast and other collaborators conducted a pilot installation of the facility in March 2023. Produces up to 300 paving stones a day from tonnes of plastic.	(Plastic Odyssey, 2023)

11.4 Impact Assessment and Mitigation

11.4.1 Potential Impacts

Table 11-7 outlines the key activities that are likely to interact with and potentially impact existing receptors.

Table 11-7: Project Activities and Potential Impacts

Project Activities	Impact Pathway	Receptor	Impact ID/ Description
Construction Phase			
Management of hazardous waste	Disposal of Project waste at facilities.	Hazardous & e-waste waste management facilities	WM-01
Management of non-hazardous waste	Disposal of Project waste at facilities.	Non-hazardous waste management facilities	WM -02
Management of inert waste	Disposal of Project waste at facilities.	Inert waste management facilities	WM -03
Operational Phase			
Management of hazardous waste	Disposal of Project waste at facilities.	Hazardous waste management facilities	WM -04
Management of non-hazardous waste	Disposal of Project waste at facilities.	Non-hazardous waste management facilities	WM -05

11.4.2 Embedded Mitigations

11.4.2.1 Construction

Mitigation measures for waste management will be embedded in the Project planning and design as described in the Project Solid and Liquid Waste Management Plan (in the Project's ESMP-PGESC). The ESMP provides guidance on:

- Waste minimisation strategies
- Recycling, recovery, and disposal methods

To minimise waste production the contractors will follow the waste hierarchy, placing priority on waste minimisation, followed by recycling or reuse if economically practicable, then by environmentally sound methods of waste treatment and/ or disposal. Such plans will be subject to review and agreement by the Project Proponent to confirm compliance with GIIP and the requirements of IFC, and audits will be carried out to confirm that the plans are properly implemented by the contractor.

Processes will be designed and operated by the contractor to prevent or minimise the quantities of wastes generated, and hazards associated with generated wastes in accordance with the following strategy:

- Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes.
- Applying manufacturing process that convert materials efficiently, providing higher product output yields, including the modification of the production process, process controls and operating conditions.
- Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs.
- Instituting procurement measures that recognise opportunities to return usable materials such as containers and which prevents the over ordering of materials.
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed.
- Organising the worksite so that the loss of new materials is avoided by optimising the off cuts through their reuse and ensuring fragile materials are protected.
- Collaborating with suppliers to reduce the amount of packaging products arrive in, with a focus on packaging that cannot be reused or recycled easily.

Consideration will be given to the following measures to maximise the amount of Project waste that can be recycled:

- Evaluation of waste production processes and identification of potentially recyclable materials.
- Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site.
- Investigation of external markets for recycling by other industrial processing operations located in the neighbourhood or region of the Project.
- Establishing recycling objectives and formal tracking of waste generation and recycling rates.
- Provide training and incentives to employees to meet objectives.

All wastes will be stored in suitable containers which are appropriate for the materials in question, and which are clearly labelled. The contractor will:

- Separate waste types by category and subcategory by utilising different collection facilities (drums, bins, skips, containers, etc.) and train staff to ensure waste is sorted upstream to enable optimum recovery. ACC will supply skips of at least 1m3 for rubble and inert materials on site.
- Correctly identify different wastes according to colour code. Hazardous waste will be stored in yellow containers marked “DANGER”. Non-hazardous waste will be identified in their different sub-categories with the colours blue, green, and black.
- Provide distinctive waste skips and bins in the waste storage area. Yellow bins will be assigned to hazardous wastes (HHW). Green bins/bagsters will be for common industrial waste (CIW). 200-litre drums will be available for used oils.
- Use waste tracking slips to maintain chain-of-custody records for waste transferred off-site.

Hazardous waste will be stored to prevent or control accidental releases to air, soil, and water resources and in accordance with the following measures:

- Waste will be stored in a manner that prevents the commingling or contact between incompatible wastes and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs.

- Store in closed containers away from direct sunlight, wind, and rain.
- Secondary containment systems will be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment. Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 litres. The available volume of secondary containment will be at least 110% of the largest storage container, or 25% of the total storage capacity (whichever is greater), in that specific location.
- Provide adequate ventilation where volatile wastes are stored.
- Use dedicated fittings and pipes specific to materials in tanks and use transfer equipment which is compatible to the characteristics of the materials being transferred.
- Regular inspection, maintenance and repair of fittings, pipes, and hoses.
- Hazardous waste storage activities will also be subject to special management actions, conducted by employees who have received specific training in handling and storage of hazardous wastes. The contractor will:
- Establish a handling and storage procedure for each material. Including the preparation and implementation of spill response and emergency plans to address accidental releases.
- Provide readily available information on chemical compatibility to employees, including labelling each container to identify its contents.
- Limit access to hazardous waste storage areas to employees who have received proper training.
- Clearly identify and demarcate waste storage areas, including documentation of locations on a facility map or site plan.
- Conduct periodic inspections of waste storage areas and documenting the findings.
- Avoid underground storage tanks and underground piping of hazardous waste.

On-site and off-site transportation of waste will be conducted to prevent or minimise spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment will be secured and labelled with the contents and associated hazards, be properly loaded onto transport vehicles before leaving the Project Area and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards. Open burning of waste will be prohibited.

Monitoring activities associated with the management hazardous and non-hazardous waste will include:

- Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify correct labelling. When large quantities of hazardous waste are generated, additional activities are required, most are addressed above.
- Regular audits of waste segregation and collection practices
- Tracking of waste generation trends by type and amount generated
- Characterising waste at the beginning of generator of a new waste stream
- Keeping manifests or other records that document the amount of waste generated and its destination.
- Periodic auditing of third-party treatment and disposal services when significant quantities of hazardous wastes are managed by third parties.
- Regular monitoring of groundwater quality in cases of hazardous waste on site and/or pre-treatment and disposal
- Monitoring records for hazardous waste collected, stored, or shipped.

11.4.2.2 Operational

The following embedded mitigation measures will be adopted for managing operational waste.

Management Plan

Waste management measures will be based on the implementation of a waste management system (WMS). The WMS will ensure that on site everyone understand and comply with their roles and responsibilities which will translate into human, material, and financial commitments. A Waste Management Plan will be prepared for the operational phase of the Project.

The Facility operators should undertake regular assessment of waste generation quantities and categories to facilitate waste management planning and investigate opportunities for waste minimization on a continuous basis.

11.4.3 Assessment of Impacts during Construction

During the construction phase, three categories of waste is expected to be generated: hazardous waste, non-hazardous waste and inert waste.

11.4.3.1 Impact WM01: Management of Hazardous Construction Waste

During construction, hazardous waste will be generated during the maintenance of the construction plant and equipment. Other activities may generate small quantities of hazardous waste such as discarded containers for hazardous construction materials (e.g., paints and other coatings containing solvents) and small quantities of biomedical waste from first aid facilities

The estimated quantities of hazardous wastes generated during construction are shown in Table 11-8, taken from the Project's ESMP (PGESC).

Table 11-8: Hazardous construction waste arisings

Hazardous construction waste	Quantity of waste produced (m^3)
Electrical Equipment	109
Other hazardous waste	42
Oils and Fats	30

Considering the small quantities of hazardous waste generated, the relatively short construction timeframe, and the fact that the hazardous wastes generated by this Project are no different to those generated daily by multiple construction projects across Conakry, it would be unrealistic and disproportionate to develop stand-alone hazardous waste management facilities specifically for manging Project waste.

Additional mitigation: Measures should be focussed on reducing the likelihood of harm from hazardous waste management, by auditing any vendors recycling used oils, and reducing the mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal.

The management of hazardous construction waste will result in an adverse and irreversible impact of high magnitude as the management of hazardous waste is highly sensitive based on the lack of availability of waste facilities in the Country. The impact significance (initial and residual) is therefore **High Adverse**. In the absence of suitable waste management facilities in Guinea, any project that generate hazardous waste would have similar high adverse impact come along provision of adequate hazardous waste management facilities which is a strategic issue that need to be addressed by the national Government.

11.4.3.2 Impact WM02: Management of Non-Hazardous Construction Waste

During construction, non-hazardous wastes will be generated by the activities of the construction workforce. Types of waste generated will include food waste, packaging waste from construction materials, office waste (e.g., paper) and surplus or damaged non-inert construction materials (such as wood and plastic).

The estimated quantities of non-hazardous waste generated during construction are shown in Table 11-9. The type and quantities are taken from the ESMP.

Table 11-9: Non-hazardous construction waste arisings

Waste Type	Waste arisings (m^3)	Management Route
Canteen/Office/ad-hoc	1,149	Minière Landfill
Metals	588	Recycling (if local outlets available); otherwise disposal to Minière Landfill
Insulation	724	Minière Landfill

Waste Type	Waste arisings (m^3)	Management Route
Wood	1,883	Recycling (if local outlets available); otherwise disposal to Minière Landfill
Plastics	700	Recycling (if local outlets available); otherwise disposal to Minière Landfill
Paper and Cardboard	1,800	Recycling (if local outlets available); otherwise disposal to Minière Landfill

The current route for management of general non-hazardous waste in Guinea is disposal at the Minière Landfill, which is not likely to meet GIIP for a sanitary engineered landfill site. However, the quantities of waste generated by the Project during construction are expected to be relatively small compared to the overall quantities of non-hazardous waste generated by the region, and as a result the Project waste is expected to make a very small contribution to any environmental effects caused by the operation of these dumpsites.

Non-hazardous waste management facilities are of medium sensitivity. The management of non-hazardous construction waste will result in an adverse and irreversible impact of low magnitude, given the relatively small contribution made by Project waste to the overall amount of waste received by Minière Landfill. The impact significance (initial and residual) is therefore **Low Adverse**.

11.4.3.3 Impact WM03: Management of Inert Construction Waste

Inert construction waste will comprise surplus excavated uncontaminated soil, waste concrete and asphalt, and any other similar waste materials such as bricks and tiles and rebar.

Table 11-10 shows the estimated quantities of inert waste generated during construction, taken from the ESMP.

Table 11-10: Inert construction waste arisings

Materials	Waste arisings (tonnes)	Management Route
Inert	445	Local beneficial reuse; otherwise disposal to Minière Landfill
Concrete	1,893	Local beneficial reuse; otherwise disposal to Minière Landfill

Embedded mitigation will minimise the likelihood of environmental nuisance from inert construction waste. As part of the embedded mitigation, the Project Proponent will identify opportunities for the beneficial reuse of inert construction waste in the vicinity of the Project Area. If no such outlets are available, the waste will be disposed of at Minière Landfill.

Additionally, as referred under Section 8:Biodiversity, based on the requirements of Objectives 9.3 & 9.4 of the Guinea National Biodiversity Strategy, there is a requirement to control the introduction of invasive / exotic species. Therefore, any invasive plant species and/or plant waste material, including waste soils that may contain plant material, will be treated to destroy that plant material prior to being disposed of off-site or reused on-site. Any soil brought onto the site should be checked for the presence of invasive species that may be introduced and/or spread.

Inert waste management facilities are of low sensitivity. The management of inert construction waste will result in an adverse and irreversible impact of low magnitude, because there are numerous potential outlets for the beneficial reuse of the relatively small quantities of inert waste that will be generated. The impact significance (initial and residual) is therefore **Low Adverse**.

11.4.4 Assessment of Impacts during Operation

11.4.4.1 Impact WM04: Management of Hazardous Waste

Hazardous waste is likely to be minimal during its operational phase due to the nature of the facility. Any hazardous waste which is likely to be generated would originate from maintenance activities.

The values in Table 11-11 are estimated based on the number of occupants expected to be in the facility.

Table 11-11: Hazardous operational waste arisings

Materials	Waste arisings (m3 per annum)	Management Route
Paints/Solvents	<5	Minière Landfill
Miscellaneous household hazardous wastes	<20	Minière Landfill

Considering the small quantities of hazardous waste generated, and the fact that the hazardous wastes generated by this Project are no different to those generated daily by multiple offices and other commercial buildings across Conakry, it would be unrealistic and disproportionate to develop stand-alone hazardous waste management facilities specifically for manging Project waste.

Additional mitigation: Measures should be focussed on reducing the likelihood of harm from hazardous waste management, by auditing any vendors recycling hazardous waste, and reducing the mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal.

The management of hazardous operational waste will result in an adverse and irreversible impact of high magnitude as the management of hazardous waste is highly sensitive based on the lack of availability of waste facilities in the Country. The impact significance (initial and residual) is therefore **High Adverse**.

It is noteworthy to mention that the necessary organizational management and arrangements related with the administrative/ministrial bodies' buildings to be relocated to the proposed Project site are still ongoing at the time of writing this ESIA report. However, having said that the Project will primarily provide new accommodation for activities currently carried out in the existing locations of the governmental authorities' in Conakry and hence the operational waste from the Project represents waste that would otherwise still be produced at a different location, rather than a new source of waste. As mentioned above, in the absence of suitable waste management facilities in Guinea, any project that generate hazardous waste would have similar high adverse impact come along provision of adequate hazardous waste management facilities which is a strategic issue that need to be addressed by the national Government.

11.4.4.2 Impact WM05: Management of Non-hazardous Waste

Non-hazardous waste during the operational phase of the facility is expected to make up most of the waste generated by the site.

Assuming the site accommodates approximately 8000 workers during operation, and assuming each worker generates 1kg of office waste per working day, this is equivalent to approximately 2000 tonnes of waste per year. Table 11-12 shows the estimated quantities of non-hazardous waste generated during operation.

Table 11-12: Non-hazardous operational waste arisings

Materials	Waste arisings (tonnes)	Management Route
Mixed commercial/municipal waste	2000	Recycling (if local outlets available); otherwise disposal to Minière Landfill

The current route for management of general non-hazardous waste in Guinea is disposal at the Minière Landfill, which is not likely to meet GIIP for a sanitary engineered landfill site. However, the quantities of waste generated by the Project during operation are expected to be relatively small compared to the overall quantities of non-hazardous waste generated by the region. Currently, the administrative buildings/governmental offices are fragmented across the Conakry city. With the development of the Project, governmental offices will be relocated from the existing buildings. It is noteworthy to mention that the necessary organizational management and arrangements related with the administrative/ministrial bodies' buildings to be relocated to the proposed Project site are still ongoing at the time of writing this ESIA report. However, having said that the Project will primarily provide new accommodation for activities currently carried out in the existing locations of the governmental authorities' in Conakry and hence the operational waste from the Project represents waste that would otherwise still be produced at a different location, rather than a new source of waste. As a result the Project waste is expected to make a very small contribution to any environmental effects caused by the operation of the existing dumpsite.

Non-hazardous waste management facilities are of medium sensitivity. The management of non-hazardous construction waste will result in an adverse and irreversible impact of low magnitude, given the relatively small

contribution made by Project waste to the overall amount of waste received by Minière Landfill. The impact significance (initial and residual) is therefore **Low Adverse**.

11.4.5 Impact Summary

Table 11-13 summarises identified impacts on waste management during construction and operation of the Project.

Table 11-13: Impact Summary

Impact ID	Impact	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Significance
Construction Phase								
WM01	Management of hazardous waste	Hazardous & e-waste waste management facilities	High	High Adverse	Significant	Audit any vendors recycling used oils Reduce mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal	High	Significant
WM02	Management of non-hazardous waste	Non-hazardous waste management facilities	Medium	Low Adverse	Not Significant	Not required	Low Adverse	Not Significant
WM03	Management of inert waste	Inert waste management facilities	Low	Low Adverse	Not Significant	Not required	Low Adverse	Not Significant
Operational Phase								
WM04	Management of hazardous waste	Hazardous & e-waste waste management facilities	High	High Adverse	Significant	Audit any vendors recycling used oils Reduce mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal	High	Significant
WM05	Management of non-hazardous waste	Non-hazardous waste management facilities	Medium	Low Adverse	Not Significant	Not required	Low Adverse	Not Significant

12. Traffic and Transport

12.1 Introduction

This chapter provides details of Project-related activities that may result in impacts on transport sensitive receptors, highlighting key traffic impacts of concern. It considers the significance of potential traffic impacts in comparison to baseline conditions during the construction period only. It does so by estimating potential impacts during the (temporary) construction period of the Project against baseline traffic levels.

The Project is part of a wider site development (the Development Plan, see Section 2.5.3). As a result, a quantitative assessment of the (permanent) operational phase of the Project has not been undertaken at this stage. Instead, a high-level qualitative assessment of the operational phase has been undertaken and it is understood that the operational phase impacts of The Project will be assessed at the wider site development level.

For further information related to the wider masterplan development and the interaction with the Project Site please refer to **Chapter 2:Project Description**.

12.2 Impact Assessment Methodology

12.2.1 Regulations and Guidelines

The assessment was undertaken in alignment with international guidelines (discussed under **Chapter 3)** and, where relevant, with reference to the Guidelines for the Environmental Assessment of Traffic and Movement (IEMA, July 2023). This document establishes the criteria that should be assessed from a transport perspective in an Environmental and Social Impact Assessment (ESIA) and a suggested methodology for preparing traffic and transport ESIA Chapters.

12.2.2 Receptor Sensitivity

The criteria used to define receptor sensitivity typically includes vulnerability, value and resilience as set out within **Chapter 4:ESIA Methodology**. For the purposes of the Traffic Assessment, receptor sensitivity has been determined by the vulnerability and value of the main routes in the vicinity of the Project site. This route is considered to have a high value to the Project by providing the main (and only) route to/ from the Project site. The level of vulnerability has been determined by daily traffic flows as a representation of sensitivity to change, including as a result of the Project.

It is considered that the ability for a route to recover from an impact (i.e. its resilience) will primarily be determined by the phase of the Project i.e. construction (temporary impact), which will therefore be assessed as part of the magnitude of any impact, rather than receptor sensitivity. The criteria for determining receptor sensitivity is set out in **Table 12.1** below.

Table 12-1 Traffic Receptor Sensitivity Criteria

Sensitivity	Description	Value	Vulnerability
High	The receptor has low capacity to absorb change without fundamentally altering its present character, is of high environmental or social value, or of national importance.	A location which will directly serve the site (i.e. site access) and therefore has high value for the Project Site.	A location where the daily baseline traffic flow along a link (in both directions combined) is less than 15,000 vehicles (high sensitivity to change)
Medium	The receptor has medium capacity to absorb change without significantly altering its present character, has some environmental social value, or is of regional importance.	A location which will provide a main route to/ from the site (but not direct site access) and therefore has medium value for the Project Site.	A location where the daily baseline traffic flow along a link (in both directions combined) is between 15,000 and 30,000 vehicles (medium sensitivity to change)
Low	The receptor is tolerant of change without detriment to its character, is of low environmental or social value, or local importance.	A location which will provide a secondary route to/ from the site	A location where the daily baseline traffic flow along a link (in both directions combined) is between

Sensitivity	Description	Value	Vulnerability
		and therefore has low value to the Project Site.	30,000 and 50,000 vehicles (low sensitivity to change)
Negligible	The receptor is resistant to change or is of little environmental or social value.	A location which is unlikely to be utilised by Project-related traffic and therefore has negligible value to the Project Site.	A location where the daily baseline traffic flow along a link (in both directions combined) is more than 50,000 vehicles (negligible sensitivity to change)

The sensitivity of a receptor has been considered based on both value and vulnerability. The sensitivity level reflects the average of these two criteria where this falls within a single category e.g. a medium value and negligible vulnerability (or vice-versa) would equate to a low sensitivity. However, the level of vulnerability is considered to have a greater influence on the sensitivity level where the average falls between two categories, given that this category is assessed quantitatively (numerically) compared to value which is assessed qualitatively. Therefore, the vulnerability category has been attributed a greater weighting where differing levels of vulnerability and value have been identified for a given receptor. For example, a receptor with a high level of vulnerability and a negligible value would be attributed with a medium level of sensitivity. Conversely, a receptor with a negligible level of vulnerability and a high value would be attributed with a low level of sensitivity.

12.2.3 Impact Magnitude

As set out in **Chapter 4:ESIA Methodology**, the magnitude of a given impact is a measure of the degree of change from the baseline conditions and is determined through the consideration of several factors including the extent, duration, frequency and reversibility of the change. **Table 12.2** presents a description of the impact magnitude criteria for the traffic receptors. The overall magnitude of change (high/ medium/ low/ negligible) is then assigned based on a review of these factors.

Table 12-2 Traffic Magnitude Criteria

Magnitude	Description
Extent (Degree of Change)	• Negligible: Minimal change to traffic flows (less than 30% compared to baseline) along the defined route • Low: Limited change to traffic flows (between 30% and 60% compared to baseline) along the defined route, with some potential to cause increased delay and/ or congestion • Medium: Moderate change to traffic flows (between 60% and 90% compared to baseline) along the defined route, with some potential to cause increased delay and/ or congestion • High: Fundamental change to traffic flows (more than 90% compared to baseline) that will potentially significantly increase delay, congestion and/ or journey times over the baseline conditions
Duration	• Temporary: Less than five years • Long-term: Above five years
Frequency	• One-off: An event which is expected to occur on a single occasion • Periodic: An event which is expected to occur periodically, but not continuously • Continuous: An event which is expected to occur continuously
Reversibility	• Reversible: Potential for change to be reversed/ restored over time • Irreversible: Lasting change – change cannot be reversed

Resultant impact significance is subsequently determined according to the impact significance matrix shown in **Table 4-1**. Where significant (i.e. Medium or High) impacts are identified within the ESIA, even after design factors and mitigatory industry practices are considered, additional mitigation measures have been identified.

12.2.4 Impact Significance

The significance criteria in **Table 4-1** in **Chapter 4:ESIA Methodology** has been applied in this assessment to determine the impact significance.

12.3 Baseline

The review of baseline conditions with respect to the study area and data collection focusses on the surrounding highway network and the vehicular routes which are expected to be utilised by the Project Site during the construction phase.

12.3.1 Baseline Data Collection

12.3.1.1 Study Area

The Project Site is located on unoccupied land in Ratoma in the north-east of Conakry, the capital city of Guinea. A plan showing the proposed Project Location is provided within **Figure 2.1, Chapter 2:Project Description** of this ESIA report.

The Project Site which is to house the Administrative City Construction Project covers an area of approximately 7 hectares and is expected to be accessed via RO308 (road which forms a junction with RO251 (Transversal 2) in the west), approximately 715m to the north of *'Échangeur de Bambeto'* (Bambeto Interchange). The existing land is currently considered as unoccupied with little development in the surrounding area and the wider area is considered as a residential area. Details related to the Project Description are set out in **Chapter 2** of this report.

A plan showing the study area, including the location of the Project Site, is provided within **Figure 12.1** below.

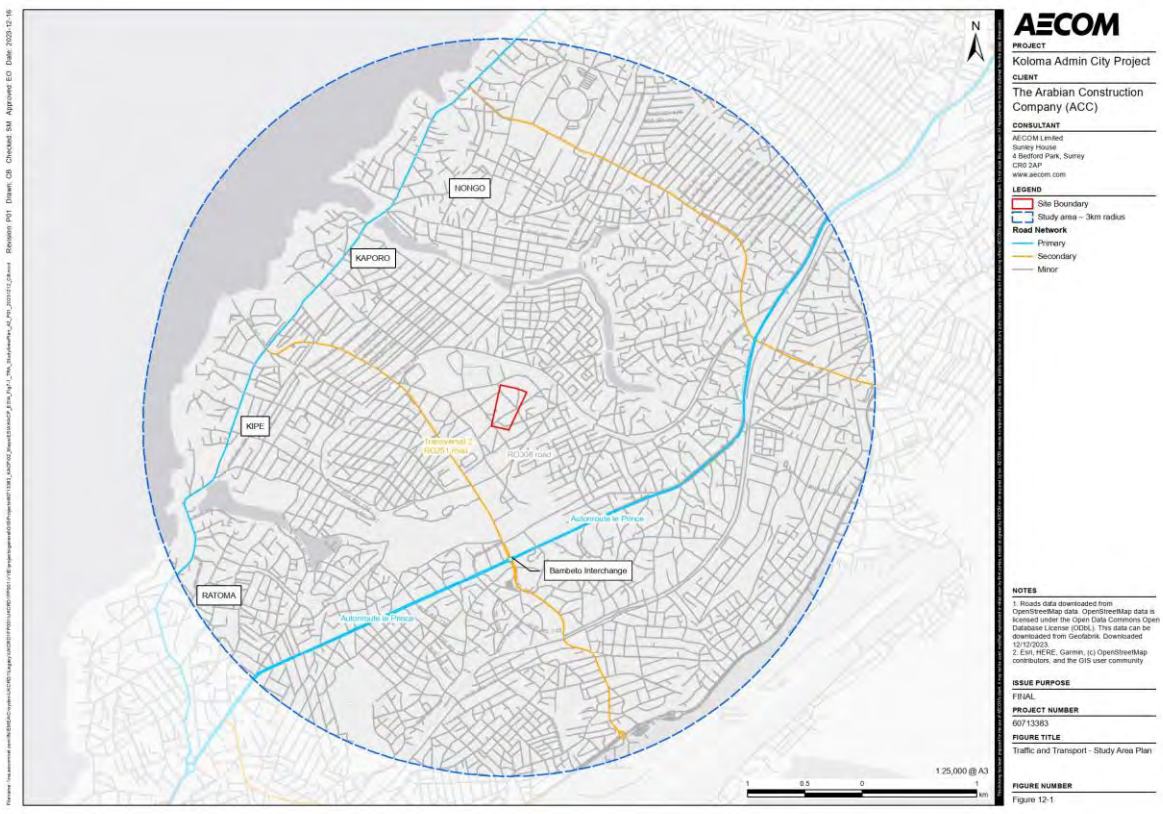

Figure 12.1 Study Area Plan

The study area for the baseline data and impact assessment comprises a circa. 3km radius of the area in the vicinity of the Project Site. This includes the area in and around the Project Site including Simbaya and Kaporo (to the north), Kipe Kakimbo (to the northwest) and Ratoma to the west. The study area does not cover an assessment of the area to the south of the Project Site due to the limitation caused by the ongoing, long-term road diversion/ closure at the Bambeto Interchange during the construction phase of works. It is however assumed that once the road works are completed, the Bambeto Interchange junction will provide the access for the majority of the trips to/from the Project Site from the western, southern and eastern extents of Conakry and surrounding areas.

The Area of Influence (AOI) for the purposes of traffic and transport is considered to represent the study area.

To provide a robust assessment and to inform the study area, all construction deliveries will be assumed to travel to and from the Project Site to/ from the 'Port de Conakry' (Conakry Port) via the access road, RO308 to/from the west, RO251 (Transversale 2) to/ from the north (towards Kaporo/ Kipe Kakimbo), west via Kipe Kakimbo towards Route de Donka/ Route le Prince roundabout. The proposed HGV construction route is considered to be the most suitable route to the Project Site from Conakry Port, located approximately 17km to the south-west of the Project Site. As detailed above it has been assumed that the proposed construction route for the delivery of materials to the Project Site will avoid routing via the N1 and the Bambeto Interchange due to the current ongoing, long-term road works being undertaken at the Interchange which will still be in place (and so overlap) with the proposed construction phase of the project programme.

A plan showing the proposed HGV construction route including the route from Conakry Port (indicated with blue line) and the alternative routing (indicated with purple line) to the Project Site once the Bambeto Interchange is operational is provided within **Figure 12.2** below.

Figure 12.2 Proposed Construction HGV Route

12.3.1.2 Desktop Study

A desktop study of the local highway network in the vicinity of the Project Site and the wider highway network has been undertaken based on a high-level review of the limited available information using (free online) satellite /aerial imagery.

12.3.1.3 Primary Data Collection

The following observations (recorded in September 2023 by the Project team which visited the Project Site) were as follows:

- Tuk-Tuk and motorcycle-taxi's form a large proportion of movements on the local network;
- There was a relatively low number of Heavy Goods Vehicles (HGVs) on the local network during the site visit, although the numbers vary and there are some truck stop/rest areas in the vicinity of the Koloma area;
- There were limited Public Transport facilities in the vicinity of the Project Site;

- Construction works were underway at the Bambeto Interchange which resulted in long delays, closures and diversions on the local roads surrounding the junction, therefore limiting the access to/from the Project Site from the south (which provides connections to the local trunk road N1).

Primary traffic data was collected by AECOMs local partner, SEES, at five locations in the vicinity of the Project Site on one midweek day (Monday 13th November 2023). The traffic survey counts consisted of two-way link counts covering 3-hour peak periods, (07:00-10:00 in the AM) and (16:00-19:00 in the PM).

The five traffic survey data locations are displayed in **Figure 12.3** below and information relating to each of the survey locations is provided below.

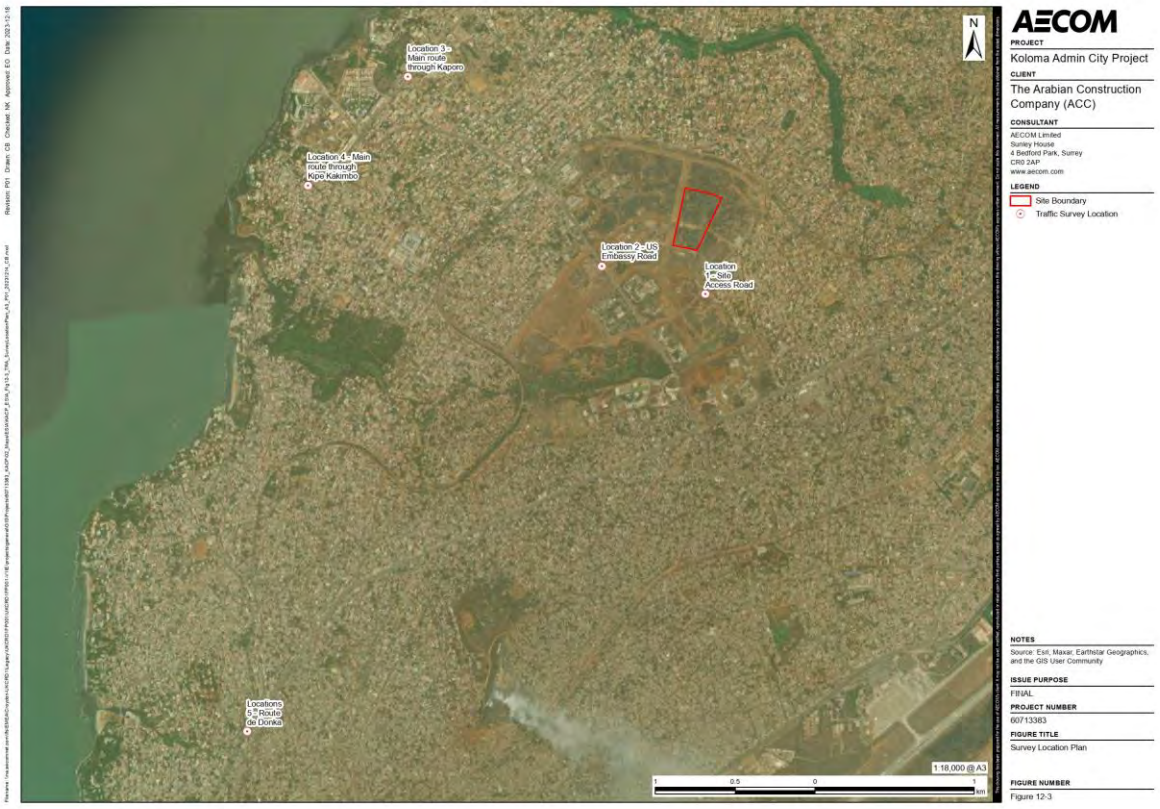

Figure 12.3 Survey Location Plan

Location 1 - Site Access Road, RO308 – a local road with one lane in each direction. The road appears to be unsurfaced and unlit with no footways, however it has wide verges on both sides. To the west the road connects with Transversal 2, RO251, whilst in the east it connects to a number of unnamed local residential roads.

Location 2 - Transversal 2 - RO251, US Embassy Road – a main road with one lane in each direction. The road appears to be surfaced with street lighting and footways along part of its extent. To the north the road provides links to the Kaporo suburbs (in the northeast) and the Kipe/Ratoma suburbs (in the northwest). To the south the road connects with Autoroute le Prince at the Bambeto Interchange. No parking is permitted on the road side due to security requirements of the US Embassy and the TV station which is opposite

Location 3 – Main road link through Kaporo - a main road with one lane in each direction. The road appears to be surfaced with street lighting and footways along part of its extent. To the east the road provides a link to the Nongo suburbs and to the west to the Kipe/ Ratoma suburbs and links with Transversal 2, RO251.

Location 4 - Main road link through Kipe Kakimbo - a main road with one lane in each direction. The road appears to be surfaced with street lighting and footways along part of its extent. To the east the road provides a link into the Kaporo suburbs and links with Transversal 2, RO251. To the west it links with Route de Donka and Autoroute le Prince.

Location 5 - Route de Donka – a key strategic route with two lanes in each direction with a central reservation. The road appears to be surfaced with street lighting and footways along part of its extent. The road provides a

direct link with Conakry city centre in the west and the wider suburb areas in the east where it connects with Autoroute le Prince.

The two-way daily traffic data collected by the external consultant (SEES) provided data for 3-hours in the AM (07:00-10:00) and 3 hours in the PM (16:00-19:00). From this data the AM hour network peak was identified as 08:00-09:00, with 07:00-08:00 and 09:00-10:00 representing the 'shoulder' peaks in the morning hours. The PM hour network peak was identified as 17:00-18:00, with 16:00-17:00 and 18:00-19:00 representing the 'shoulder' peaks in the afternoon hours.

Due to the limitations of the data not providing a full overview of the trips along the network across the day, trips between the hours of 10:00 and 16:00 were estimated, with the late morning shoulder peak of 09:00-10:00 used as an estimate for trips for each of the hours between 10:00 to 13:00. Similarly, the early afternoon shoulder peak of 16:00-17:00 was used as an estimate for trips for each of the hours between 13:00 to 16:00. Where the counts indicated that 16:00-17:00 represented the network peak, the flows between 17:00-18:00 for those counts were adopted in order to not overestimate the daily baseline., The above allowed a robust estimate of total trips to be calculated over a 12-hour period (06:30-18:30).

It is understood that the Project Site would not generate many trips outside of the above 12-hour period i.e. before 06:30 or after 18:30. Therefore, in order to provide a robust assessment of the scheme, the daily assessment has been based on this 12-hour period, resulting in higher forecast proportional increases in trips as a result of the Project Site than would be identified if comparing against 24-hour baseline flows (and so offering a robust and worst case assessment).

The PM network peak has been adopted as 16:00-17:00 as this was identified as the PM network peak for a number of the counts. Whilst the PM Development peak overlaps with the remaining network peaks identified (occurring either between 17:00-18:00 or 18:00-19:00) this was considered to provide a more robust overview of the trips on the network. The baseline flows assessed for the study area are set out in **Table 12.3** below.

Table 12-3 Baseline Traffic Flows for the Study Area

Location	Total Traffic Flow				
	Daily Traffic (06:30-18:30) 12-hour flow	AM Network Peak (08:00-09:00)	PM Network Peak (16:00-17:00)	AM Dev Peak (06:30-07:30)	PM Dev Peak (17:30-18:30)
Two-way link flow					
Location 1 – Site Access Road - RO308	10,169	1,009	807	549	1,104
Location 2 - Transversal 2 - RO251, US embassy Road	27,684	2,971	2,264	1,779	2,727
Location 3 – Main road link through Kaporo	36,584	3,419	3,201	2,708	2,766
Location 4 - Main road link through Kipe Kakimbo	44,580	4,352	3,702	3,960	4,265
Location 5 - Route de Donka	73,569	7,096	6,890	5,997	5,686

12.3.2 Receptors

A summary of the key receptors which have been examined as part of the traffic assessment is set out below in **Table 12.4**, based on the traffic counts which have been conducted. These receptors are listed in order from north to south. The identified level of sensitivity for each receptor has been based on the criteria set out in Table 12-1 earlier within this chapter.

Table 12.4 Key Receptors and Sensitivity

Receptor	Type	Sensitivity	Reason(s)
Location 1 – Site Access Road - RO308	Road Link	High	• This link has an approximate daily traffic flow of 10,169 vehicles (see **Table 12-3**) which represents a high level of vulnerability based on the criteria set out in **Table 12-1**. • This link will provide a main route to the Project Site and has therefore been attributed a high level of value. • This link has been assigned a high level of sensitivity overall based on the above.

Receptor	Type	Sensitivity	Reason(s)
Location 2 - Transversal 2 - RO251, US embassy Road	Road Link	Medium	• This link has an approximate daily traffic flow of 27,684 vehicles (see **Table 12-3**) which represents a medium level of vulnerability based on the criteria set out in **Table 12-1**. • This link provides a main route to/ from the Project Site (but not direct site access) and has therefore been attributed a medium level of value. • This link has been assigned a medium level of sensitivity overall based on the above.
Location 3 – Main road link through Kaporo	Road Link	Low	• This link has an approximate daily traffic flow of 36,584 vehicles (see **Table 12-3**) which represents a low level of vulnerability based on the criteria set out in **Table 12-1**. • This link provides a strategic route for the community and will provide a secondary route to/ from the Project Site and has therefore been attributed a medium level of value. • This link has been assigned a low level of sensitivity overall based on the above.
Location 4 - Main road link through Kipe Kakimbo	Road Link	Low	• This link has an approximate daily traffic flow of 44,580 vehicles (see **Table 12-3**) which represents a low level of vulnerability based on the criteria set out in **Table 12-1**. • This link provides a strategic route for the community and will provide a secondary route to/ from the Project Site and has therefore been attributed a medium level of value. • This link has been assigned a low level of sensitivity overall based on the above.
Location 5- Route de Donka	Road Link	Low	• This link has an approximate daily traffic flow of 73,569 vehicles (see **Table 12-3**) which represents a negligible level of vulnerability based on the criteria set out in **Table 12-1**. • This link provides a strategic route for the community and will provide a secondary route to/ from the Project Site and has therefore been attributed a medium level of value. • This link has been assigned a low level of sensitivity overall based on the above.

12.3.3 Assumptions and Limitations

The expected travel patterns during the construction phase with respect to vehicle trips have been informed by several assumptions as listed within the Impact Description section of the traffic assessment (Section 12.4.3 and 12.4.5).

The following limitations are applicable to the traffic and transport assessment:

- No collision review or review of highway safety has been carried out due to an absence of any available collision data;
- No information relating to public transport has been provided (i.e. on the local roads within a reasonable walking distance of the Project Site) and the assessment therefore excludes consideration of public transport as a potential travel mode to/ from the Project Site; and,
- A review of walking and cycling has been excluded due to limited information or surveys relating to existing walking/ cycling routes to/ from the Project Site.

12.4 Impact Assessment and Mitigation

12.4.1 Potential Impacts

The Project Site involves the construction of various government ministries which will include the buildout of 12 office buildings; two additional buildings are proposed to provide facilities such as parking (car park of up to 830 spaces), utilities, an Auditorium and a pavilion area. The Project will replace the existing government buildings currently located in the city centre of Conakry.

Details related to the construction activities are set out in **Section 2.6** of this report. The construction activities are expected to last approximately 27 months, with a proposed completion date of January 2026.

Table 12.5 outlines the key activities that are likely to interact with and potentially impact existing receptors.

Table 12.5 Project Activities and Potential Impacts

Project Activities	Impact Pathway	Receptor	Impact ID/ Description
Construction Phase (27-months)			
Construction of the new Administrative City	Increase in traffic movements, as a result of construction Heavy Goods Vehicles (HGVs) and construction staff vehicles	**Location 1**	Increase in traffic movements as a result of construction vehicles associated with the Project [TR01]
		Location 2	Increase in traffic movements as a result of construction vehicles associated with the Project [TR02]
		Location 3	Increase in traffic movements as a result of construction vehicles associated with the Project [TR03]
		Location 4	Increase in traffic movements as a result of construction vehicles associated with the Project [TR04]
		Location 5	Increase in traffic movements as a result of construction vehicles associated with the Project [TR05]

12.4.2 Embedded Mitigations

To alleviate possible impacts as far as reasonably practicable, measures to reduce or eliminate the impact/ risk of an activity have been embedded within the Project Site design and/ or construction procedures.

The following embedded mitigation has been included as part of the Project with respect to construction vehicle movements:

- Traffic management measures (e.g. signage, flagmen) will be employed to safely manage construction vehicle movements to and from the construction site access point and within the Project Site;
- With the exception of skilled specialists for certain tasks, the workforce will be sourced locally where possible, reducing the need for workers to travel a long distance;
- A Shuttle bus service will be provided for ACC staff only. Thereby reducing the potential number of individual of vehicle trips associated with the ACC staff;
- Local construction staff will be encouraged to vehicle share when travelling to/ from the Project Site by car, motorcycle (taxi) and tuk-tuk (taxi), to reduce the number of vehicle movements to/ from the Project Site;
- Deliveries will be co-ordinated and consolidated where possible, to reduce the number of Heavy Goods Vehicle (HGV) movements across the construction programme;
- Deliveries will be staggered across the day, to reduce the peak number of HGV movements for any given hour of the day, and to avoid the morning and evening network peak hours where possible;
- Construction vehicles will be kept in good condition and regular inspections will be carried out to ensure they remain roadworthy; and,
- Driver training will be offered and provided where required.

12.4.3 Assessment of Impacts during Construction

This section reviews the impact of construction traffic on the surrounding highway network, by reviewing the forecast increase in traffic against the estimated baseline traffic flows on the local network within the vicinity of the Project Site.

12.4.3.1 Impact Description

The following impact assumptions have been considered for the Site:

- **Construction HGVs:**
  - There will be 150 deliveries (300 HGV movements) made during the peak construction phase across a 7-hour period between 09:00 and 16:00 each day;
  - The arrivals and departures of the delivery vehicles will be completed within the hour; no delivery vehicles are expected to stay on the Project Site after the delivery/ pick up has been made;
  - The construction HGVs will follow the designated route from Port Conakry to the Project Site avoiding the Bambeto Interchange, consequently they will be travelling from the north-west via Ratoma/ Kipe suburbs and Transversal 2, RO251 road from the north until reaching the Project Site access via RO308 road.
  - Peak hour deliveries (between 07:00-09:00 and 16:00-18:00) will be avoided where possible.
  - All deliveries (100%) will adopt the designated HGV route.
  - One waste collection will take place every other day during peak construction, equating to less than one servicing trip per 24-hour period (incorporated as part of the above).
- **Construction Staff:**

  Peak Construction workforce:

  - The proposed construction working hours will occur between 07:30 and 17:30 (10-hour working day), Monday to Saturday;
    - Based on the proposed working hours, the AM development peak is expected to occur in the hour before the start of the working day (06:30-07:30) when workers will be commuting to the Project Site;
    - The PM development peak is expected to occur in the hour after the completion of the working day (17:30-18:30) when workers will be commuting from the Project Site;
  - There will be 2595 construction workers during the peak construction phase
  - Of these, 2500 construction workers would be made up of the local labour workforce living within close proximity to the Project Site.
  - This local labour workforce are all assumed to be living in the local areas of Ratoma/ Kipe (to the north-west of the Project Site) (50% of the workforce) and Kaporo (to the north-east of the Project Site) (50% of the workforce).
  - The labour workforce movement mode share has been assumed based on the survey data collected, assuming the average peak hour mode share along the main road network and adopting this approach as part of the trip generation associated with the labour workforce;
  - For the labour workforce it is assumed: 5% of the workforce will arrive/ depart by car (adopting the vehicle occupancy of 1.5 workers per vehicle), 80% of the workforce will arrive/ depart by motorbike (taxi) (occupancy of 1.5) and 15% of the workforce will arrive/ depart) by tuk-tuk (taxi) (occupancy of 1.5)
  - All trips associated with the labour workforce will be expected to arrive/ depart to/ from the north;
    - All trips (100%) will travel to/ from the west along the Site Access Road, RO308;
    - All trips (100%) will travel to/ from the north along the Transversal 2, RO251 US Embassy Road
    - Trips will then disperse with half of the labour workforce (50%) originating from the north-east of the Project Site (the suburbs of Kaporo) and the other half of the labour workforce (50%) originating from the north-west, suburbs of Kipe;
    - Half of the latter workforce (50%, so 25% of the total workforce) is expected to originate from further afield, suburbs of Ratoma (west of Kipe).
  - The remaining 95 construction workers would be made up of ACC operational workforce (skilled workers)

- The ACC operational workforce is expected to be commute from the north-west of the Project Site (most likely in the Kipe suburbs). These workers are expected to be transported to/from the Project Site via a shuttle bus service;
- It has been assumed that two shuttle bus services will be required to transport all 95 ACC workers (each bus with an occupancy of up to 50 workers);
  - This would require 2 shuttle bus services in the AM development peak (06:30-07:30) and 2 shuttle bus services in the PM development peak (17:30-18:30).
  - The shuttle bus services would then be expected to leave the Project Site within circa. 15 minutes of making the drop off/ pick up (generating additional 2 movements in the AM development peak and the PM development peak.

A summary of the proposed daily construction phase vehicle trip generation is set out within **Table 12-6** below. These vehicles will all utilise the Transversal 2, RO251 (Location 2), as well as the Site Access Road, RO308 to the southeast of the US Embassy and the construction access road.

Table 12-6. Total Proposed Construction Vehicle Trip Generation (Location 1 and 2)

Time	HGVs			Labour Workforce (Car, Motorcycle, TUK-TUK)			ACC Workforce (Shuttle only)			Total		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
06:00 – 06:30	0	0	0	0	0	0	0	0	0	0	0	0
06:30 – 07:30	**0**	**0**	**0**	**1,667**	**1,583**	**3,250**	**2**	**2**	**4**	**1,669**	**1,585**	**3,254**
07:30 – 08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:00 – 09:00	0	0	0	0	0	0	0	0	0	0	0	0
09:00 – 10:00	20	20	40	0	0	0	0	0	0	20	20	40
10:00 – 11:00	20	20	40	0	0	0	0	0	0	20	20	40
11:00 – 12:00	20	20	40	0	0	0	0	0	0	20	20	40
12:00 – 13:00	25	25	50	0	0	0	0	0	0	25	25	50
13:00 – 14:00	25	25	50	0	0	0	0	0	0	25	25	50
14:00 – 15:00	20	20	40	0	0	0	0	0	0	20	20	40
15:00 – 16:00	20	20	40	0	0	0	0	0	0	20	20	40
16:00 – 17:00	0	0	0	0	0	0	0	0	0	0	0	0
17:00 – 18:00	0	0	0	0	0	0	0	0	0	0	0	0
18:00 – 18:30	0	0	0	0	0	0	0	0	0	0	0	0
18:30 – 19:30	**0**	**0**	**0**	**1,583**	**1,667**	**3,250**	**2**	**2**	**4**	**1,585**	**1,669**	**3,254**
19:30 –20:00	0	0	0	0	0	0	0	0	0	0	0	0
Total	**150**	**150**	**300**	**3,250**	**3,250**	**6,500**	**4**	**4**	**8**	**3,404**	**3,404**	**6,808**

The above indicates that there will be **6,808** two-way vehicle movements to and from the Project Site associated with construction across a 12-hour period. The proposed development peak hours in terms of construction traffic are expected to be 06:30-07:30 (AM) when there will be **3,254** two-way vehicle movements and 18:30-19:30 (PM)_when there will be **3,254** two-way vehicle movements. These development peak hours have therefore been appraised within the impact assessment.

Appendix D provides further breakdown of the trip generation for each of the assessed traffic location (1-5).

Impact Assessment

The anticipated level of additional vehicle movements during the construction phase (as an increase to baseline flows) has been set out in **Table 12.7** below for the development peak hours and across the 12-hour period, based on the trips identified in **Table 12.6** above.

Table 12.7 Construction Vehicle Impact Assessment

Receptor	Total Traffic Flow											
	Daily (12-hour)				AM Dev Peak (06:30-07:30)				PM Dev Peak (17:30-18:30)			
	Base	Dev	Total	Uplift	Base	Dev	Total	Uplift	Base	Dev	Total	Uplift
All Construction vehicle movements												
Location 1	10,169	+6,808	**16,977**	66.95%	549	+3,254	**3,803**	592.51%	1,104	+3,254	**4,358**	294.74%
Location 2	27,684	+6,808	**34,492**	24.59%	1,779	+3,254	**5,033**	182.92%	2,727	+3,254	**5,981**	119.32%
Location 3	36,584	+3,250	**39,834**	8.88%	2,708	+1,625	**4,333**	60.00%	2,766	+1,625	**4,391**	58.75%
Location 4	44,580	+3,558	**48,138**	7.98%	3,960	+1,629	**5,589**	41.13%	4,265	+1,629	**5,894**	38.19%
Location 5	73,569	+1,928	**75,497**	2.62%	5,997	+813	**6,809**	13.55%	5,686	+813	**6,499**	14.29%

Location 1 – Site Access Road - RO308

The above shows that the forecast level of construction traffic along this link is expected to result in a maximum increase in traffic of **592.51%** during the worst-case AM development peak hour, which represents a high degree of change. The impact is categorised as temporary (27-month construction programme) and will be reversible, given the impact relates to temporary construction traffic. However, the overall magnitude of the impact is categorised as **high** given the high degree of change during both peak hours.

As previously set out in **Table 12.4**, this link is considered to have a **high** level of sensitivity overall.

The level of impact is expected to be **high** and therefore **significant** based on the criteria set out in **Table 4.1**.

Location 2 - Transversal 2 - RO251, US embassy Road

The above shows that the forecast level of construction traffic along this link is expected to result in a maximum increase in traffic of **182.92%** during the worst-case AM development peak hour, which represents a high degree of change. The impact is categorised as temporary (27-month construction programme) and will be reversible, given the impact relates to temporary construction traffic. Therefore, the overall magnitude of the impact is categorised as **high** given the high degree of change during both peak hours.

As previously set out in **Table 12.4**, this link is considered to have a **medium** level of sensitivity overall.

The level of impact is expected to be **high** and therefore **significant** based on the criteria set out in **Table 4.1**.

Location 3 – Main road link through Kaporo

The above shows that the forecast level of construction traffic along this link is expected to result in a maximum increase in traffic of **60%** during the worst-case AM development peak hour, which represents a medium degree of change (just reaching the 60% threshold), however during the PM development hour there is expected to be a low degree of change (58.75%) The impact is categorised as temporary (27-month construction programme) and will be reversible, given the impact relates to temporary construction traffic. Therefore, the overall magnitude of the impact is categorised as **low**.

As previously set out in **Table 12.4**, this link is considered to have a **low** level of sensitivity overall.

The level of impact is expected to be **low** and therefore **not significant** based on the criteria set out in **Table 4.1**.

Location 4 - Main road link through Kipe Kakimbo

The above shows that the forecast level of construction traffic along this link is expected to result in a maximum increase in traffic of **41.13%** during the worst-case AM development peak hour, which represents a low degree of change. The impact is categorised as temporary (27-month construction programme) and will be reversible, given the impact relates to temporary construction traffic. Therefore, the overall magnitude of the impact is categorised as **negligible**.

As previously set out in **Table 12.4**, this link is considered to have a **low** level of sensitivity overall.

The level of impact is expected to be **negligible** and therefore **not significant** based on the criteria set out in **Table 4.1**.

Location 5- Route de Donka

The above shows that the forecast level of construction traffic along this link is expected to result in a maximum increase in traffic of **14.29%** during the worst-case PM development peak hour, which represents a negligible degree of change. The impact is categorised as temporary (27-month construction programme) and will be reversible, given the impact relates to temporary construction traffic. Therefore, the overall magnitude of the impact is categorised as **negligible**.

As previously set out in **Table 12.4**, this link is considered to have a **low** level of sensitivity overall.

The level of impact is expected to be **negligible** and therefore **not significant** based on the criteria set out in **Table 4.1**.

12.4.4 Additional Mitigation

The results of the impact assessment detailed above indicate that whilst negligible and non-significant impacts are expected at locations 3, 4 and 5, the impacts at locations 1 and 2 are anticipated to be significant (high) and significant (moderate) respectively. As a result, additional mitigation (further to the embedded mitigation detailed earlier in **Section 12.4.2**) will be required to reduce the impacts of the Project Site on these traffic and transport receptors.

- The following potential additional mitigation, not included in the assessment at this point, given it is understood that it cannot be committed to at this stage, should be considered to reduce staff numbers and/ or vehicle numbers accessing the Project Site:
    - Local construction staff will be encouraged to use non-motorised modes such as bicycles when travelling to/ from the Project Site to reduce the number of vehicle movements to/ from the Project Site;
    - Implement and/or provide varying shifts of work to reduce the number of vehicle movements accessing to/ from the Project Site to the extent possible once the construction workforce would be ramping up to peak.

12.4.5 Assessment of Impacts during Operation

The Project itself covers an area of approximately 7 hectares and is located within a larger area of historically cleared brownfield land for development (owned by the Guinean state) that totals approximately 202 hectares,. Limited information of the Development Plan for Ratoma (see Section 2.5.4 of Chapter 2: Project Description), including its build out programme, is available at this stage, however it is understood that significant infrastructure improvements (including a new local highway network and other transport measures) are proposed as part of the masterplan development.

The project will ultimately provide functional office space for over 8,000 Guinea employees. It has not yet been agreed which governmental authorities/ministerial bodies will be relocated to the proposed Project site and therefore the precise number of employees has not yet been determined. There are two car park buildings (2 storey buildings with a usable floor area of 21,875 m²) included in the Project. The car parks will have 830 spaces (also 72 (6 parking area under x12 buildings) parking areas for management personnel under the buildings). In addition, car parks will have allocated space for motorcycle parking. During the consultations held with SONAPI, we were informed that most of the existing staff/employees currently working in the administrations are residing in the nearby districts and neighbourhoods to the Project site. The trips associated with the operational phase of the Project are existing trips on the network being diverted from the existing government buildings in the city centre (Kaloum peninsula) to the location of the Project site; and as such therefore no additional trips associated with the Project will be added to the wider road network.

For the operational workforce, the breakdown by transport mode is not known; however, greater number of staff will be arriving by car (up to 10%) in comparison to the construction phase. It is also assumed that more people will arrive by tuk-tuk (taxi), however the majority is likely to arrive by motorcycle-taxi. There are limited public transport facilities in the vicinity of the Project Site. No plans related to the improvement and provision of the public transportation facilities in the area were made available to the ESIA team at the time of writing this ESIA report.

Given the number of employees (approx.8000) and assumed greater use of car and taxi, it is likely that the traffic flows generated during operation will be greater than those generated during construction. The construction phase

assessment determined that there will be significant adverse impacts at Location 1 and Location 2. Therefore, it can be assumed that at the year of opening there will be significant adverse impacts at these locations. However, in the medium to longer term, the impacts may be mitigated through the development of the road network in close vicinity of the Project site (as indicated in the wider Development Plan map presented in Section 2.5.4). It is believed that ultimately the new development will reduce the traffic load on the surrounding existing road network. The uncertainty behind the programme, detail and final layout etc of the wider Development Plan means that a longer-term quantitative assessment of the (permanent) operational phase of this Project cannot be provided at this time.

Given the potential adverse impacts during operation and uncertainties over the timing as well as effectiveness of future road developments in the area, it will be necessary to prepare an operational traffic management plan as part of OESMP which will need further study/analysis prior to its preparation.

12.4.6 Impact Summary

Table 12.8 provides the impact summary for the identified impacts on traffic during the construction phase of the Project.

Table 12.8 Impact Summary (Traffic and Transport)

Impact ID	Impact	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Significance
Construction Phase								
TR01	**Increase in traffic movements, as a result of construction Heavy Goods Vehicles (HGVs) and construction staff vehicles**	**Location 1**	High	High	High (Significant)	Encourage workers to use non-motorised modes. Implement and/or provide varying shifts of work ***(To be confirmed)***	High	High (Significant)
TR02		**Location 2**	High	High	High (Significant)		High	High (Significant)
TR03		**Location 3**	Low	Low	Low (Not Significant)	Not necessary however measures in Section 12.4.4 would reduce the impact further	Low	Low (Not Significant)
TR04	**Increase in traffic movements**	**Location 4**	Low	Negligible	Negligible (Not Significant)		Negligible	Negligible (Not Significant)
TR05		**Location 5**	Low	Negligible	Negligible (Not Significant)		Negligible	Negligible (Not Significant)

It can be seen from the above that in the absence of any additional mitigations the residual impact is expected to remain as per above due to the uncertainties of the proposed additional mitigations at this stage.

The Project company is currently exploring varying work shifts (as per the proposed additional mitigation list) with respect to the peak number of construction workers. As the construction workforce approaches to its peak, the Project company will introduce and/or provide varying shifts to reduce vehicle movements to reduce the residual impact on the identified receptors. However, further analysis shall be undertaken once ACC introduced the shifts considering the peak number of workforce during construction.

During the operation phase, traffic flow generation will be greater than that generated during construction due to the greater number of staff likely to use greater use of car and taxi. Similar to the construction phase, significant adverse impacts are expected at Locations 1 and 2 at the beginning of the operation phase. However, in the subsequent years of the operational phase, traffic load and flow are expected to decrease with the development of the road network. Given the uncertainty behind the programme, detail and final layout etc of the wider Development Plan, a longer term quantitative assessment cannot be made at this time; however, it will be necessary to prepare an operational traffic management plan as part of OESMP which will require further and study/analysis.

13. Socio-Economic

13.1 Introduction

Social impacts are defined as “the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society” (ICGPSA), 1994). To understand the full extent of any social impacts arising from the Project, directly or indirectly, a detailed socio-economic baseline is required to appreciate current socio-economic conditions and therefore accurately assess the significance of any anticipated impacts, positive or negative. The baseline also helps determine what mitigation measures can be feasibly implemented within the Project’s socio-economic context to reduce the significance of negative impacts and enhance the significance of positive impacts. In order to provide the socio-economic context, statistics and other summary information will also be provided for Guinea as a whole.

Although the focus of the baseline study is the Project site and surrounding communities, some national and regional level baseline information may also be included to provide wider socio-economic context in order to assess impacts and monitor mitigation outcomes.

13.2 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts on socio-economic, community health and wellbeing receptors in accordance with Impact Assessment Methodology is set out in **Chapter 4: ESIA Methodology**.

13.2.1 Regulations and Guidelines.

13.2.1.1 National Requirements

The Constitution of Republic of Guinea states in Article 13 that: the Fundamental Law of 23 December 1990 states that "No one may be expropriated except in the legally established interest of all and subject to fair and prior compensation";

Another relevant piece of Guinean legislation is the Ordinance No. 92/019/PRG/SGG of March 30, 1992, on the land and property code which sets out regulations for property ownership and legal land titles. Land Expropriation procedures are contained within Article 13 of the Fundamental Law of 23 December 1990. It states that "No one may be expropriated except in the legally established interest of all and subject to fair and prior compensation"; It then goes on to state in Article 57 that public interest must be declared after a public enquiry or decree.

Guinea’s Labour Code, Law L/2014/072/CNT of 10 January 2014, sets out all the rules and relations between employers and employees. The Labour Code states that all workers are entitled to a minimum hourly wage as decreed statutorily or by a more favourable collective agreement. Wages must be paid at least monthly, or fortnightly under some circumstances. Salaries may be paid partially in-kind if it serves the interest of the worker and their family and is valued fairly.

The labour code states a normal working week in 40 hours. However, the following workplaces and professions are authorized to increase normal working hours through a principle of work time equivalence:

- Pharmacies and commerce: 42 hours,
- Hospitals, bakeries, hotels, bars, restaurants, and clubs: 42 hours,
- Salons: 45 hours,
- Taxis: 45 hours,
- Staff transportation: 48 hours, and
- Guards and janitors: 55 hours.

A worker may be required to work overtime if hours do not exceed 10 per day or 48 per week. An employer can require 100 overtime hours per week, beyond which a labour inspector must issue an overtime certificate. Overtime premium wages must also be paid. A worker does not have the right to refuse overtime. Night work must also be compensated at a premium. Compensatory days off are provided if an employee works on a rest day, but not a public holiday.

After 12 months of service the Labour Code provides 30 working days of paid annual leave. All workers are entitled to 2.5 days of leave per month of service. At least 12 consecutive days of annual leave must be taken at a time. Employees must be paid during public holidays. Employees are entitled to 24 hours (consecutive) of rest weekly. The Order on Weekly Rest Periods (1996) requires Sunday be a rest day for all workers except some listed exceptions.

Employment contracts may be verbal or written. A fixed term contract must be in writing. Fixed term contracts may continue for two years maximum, including renewals, at which point it converts to indefinite work. Probation periods may last three months for managerial roles and one month for all other roles. Written notice is required before termination, and contracts may be cancelled by either party in writing. Employers may only terminate indefinite contracts in certain circumstances. Notice periods must be 1-3 months depending on the seniority of the employee. During the notice period the worker is provided eight hours per week to search for a new job. All workers except those terminated for serious misconduct are entitled to severance pay.

Mothers are entitled to 14 weeks of paid maternity leave, after which they may avail themselves of unpaid leave for an additional nine months. There is no provision for paternity leave. Women are entitled to paid nursing breaks.

Workers must be protected from accidents and diseases. Businesses with 25+ employees must have safety and health committees to ensure safety at work. Employers must provide PPE, conduct safety training, and comply with all safety regulations.

Sick leave may be taken for 13 weeks, or up to 26 weeks if the employee worked 300 days in the last year. Sick leave wages are equivalent to 50% of the employee's salary. After six months an employee may be terminated. There are various compensation provisions for work injuries and disabilities.

The Social Security Code (1994), Law L/94/006/CTRN of 14 February 1994, is the main legislation governing the protection of workers and their families against economic or social poverty and against the difficulties that may arise from a significant loss of income. Article 4 states that all workers in the Republic of Guinea, regardless of race, nationality, sex or origin, are subject to the general social security scheme. There is no unemployment benefit. The Labour Code requires equal pay without discrimination and has provisions against harassment and discrimination. The minimum age for employment is 16, or 14 as apprentices, or 12 for light work. Forced labour is prohibited.

The Constitution and Labour Code provide for freedom of association and allow workers and employees to form and join unions, engage in collective bargaining, and strike (Bigirimana and Ahmad, 2023). However, strikes are banned in essential services, defined broadly.

The new Children's Code in the Republic of Guinea was published on 19 June 2020. The Children's Code is governed by Law L/2019/0059/AN of 30 December 2020. The purpose of the code is to protect children in compliance with international texts, conventions and agreements ratified by Guinea or of which Guinea is a party. Forced or compulsory labour by a child and any violence at work are prohibited in accordance with Articles 912 and 913 of this Code.

Guinea has ratified International Labour Organisation (ILO)'s nine (9) out of ten (10) of the fundamental ILO Conventions but has not yet ratified C155- Occupational Health and Safety Convention, 1981 (No.155).

Table 13-1: ILO Fundamental Ratifications in Guinea (ILO, 2023)

Fundamental ILO conventions ratified	Date	Status
C029- Forced Labour Convention, 1930 (No.29)	13 Jan 1964	In Force
C087- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	21 Jan 1959	In Force
C098- Right to Organise and Collective Bargaining Convention, 1949 (No.98)	13 Jan 1964	In Force
C100- Equal Renumeration Convention, 1951 (No. 100)	07 May 2001	In Force
C105- Abolition of Forced Labour Convention, 1957 (No.105)	13 Jan 1964	In Force
C111- Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	07 May 2001	In Force
C138- Minimum Age Convention, 1973 (No. 138); Minimum age specified 16 years	09 Apr 1979	In Force
C182- Worst Forms of Child Labour Convention, 1999 (No.182)	07 May 2001	In Force

Fundamental ILO conventions ratified	Date	Status
C187- Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	25 Apr 2017	In Force

The National Social Protection Policy (PNPS) December 2016 includes requirements for public and private organisations to reduce impacts on vulnerable populations by strengthening resilience in the face of socio-economic and environmental shocks and they can benefit from the National Economic and Social Development Plan 2016-2020.

The Public Hygiene Policy, April 2010 includes the development of strategies to reduce the prevalence of diseases caused by poor hygiene.

The National Action Plan for the Advancement of Women, 1997 includes objectives to reduce illiteracy and improve women's access to opportunities in legislation and decision making, education, health, economic development and environmental protection.

13.2.1.2 International Requirements

The following International Finance Corporation (IFC) Performance Standards (PSs) are found applicable for the social effects within the context of the Project.

Table 13-2: Applicable IFC PSs to Social Aspects

IFC PSs	Applicability	Description/Notes
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	There is need to identify and evaluate the potential social impacts of the Project and to identify necessary mitigation measures in order to be in line with the requirements if the international standards which is the scope of this ESIA Study. Stakeholder engagement activities are also undertaken and included within the scope of this ESIA study which is also a requirement as per PS1.
PS 2: Labour and Working Conditions	Yes	PS 2 requires that a project protects the rights of workers and creates fair and safe working conditions. A high-level description of workers conditions is included in the Project description.
PS 3: Resource Efficiency and Pollution Prevention	No	Not directly applicable to social aspects and limited to potential impacts on community health and safety, however the capacity strain on public services is considered.
PS 4: Community Health, Safety and Security	Yes	The Project is required to identify potential risks and impacts on community health, safety and security and propose necessary mitigation measures to address them. Community health, safety and security are considered as part of the Project activities' effect on local community as well as through the extended provision of health services behind the Project's objectives.
PS 5: Land Acquisition and Involuntary Resettlement	Yes	Historic evictions have occurred at the site and surrounding area.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	Not directly applicable.
PS 7: Indigenous Peoples	No	PS 7 is not applicable as no indigenous peoples were found in the Project site and in its surroundings.
PS 8: Cultural Heritage	No	Cultural heritage is assessed separately in Chapter 14.

13.2.2 Impact Significance

As discussed above, the significance of impacts on socio-economic, community health and wellbeing receptors has been assessed in accordance with Impact Assessment Methodology is set out in **Chapter 4: ESIA Methodology.** The following receptor sensitivity criteria is included to add more details on social receptors. Magnitude and significance criteria remain the same as **Chapter 4: ESIA Methodology.**

13.2.3 Receptor Sensitivity

The degree of sensitivity of a social receptor is based on an individual's abilities to adapt to changes and maintain their quality of life, livelihood and health. Sensitivity can also be understood in terms of resilience to change. In this context, a social receptor's resilience is defined as their capacity to cope with socio-economic changes. Variables that can determine a receptor's sensitivity include age, gender, ethnicity, access to employment opportunities, livelihood, education, health, level of marginalisation, family support and dependence on common resources. A qualitative appraisal of the sensitivity of social receptors has been undertaken by applying the criteria presented in Table 13-3.

Table 13-3: Receptor Sensitivity

Sensitivity Level	Description
Negligible	No shortage of access to adequate physical, financial, social and human resources, resulting in no vulnerability; consequently, the receptor will not have any difficulty adapting to changes brought by the Project or accessing opportunities associated with it.
Low	High level of access to adequate physical, financial, social and human resources, resulting in minimal vulnerability; consequently, the receptor has a high ability to adapt to changes brought by the Project and opportunities associated with it.
Medium	Moderate access to adequate physical, financial, social and human resources, resulting in some, but few areas of vulnerability; still retaining an ability to at least in part adapt to change brought by the Project and opportunities associated with it.
High	Limited access to adequate physical, financial, social and human resources, resulting in profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project and opportunities associated with it.

Key receptors are identified in **Table 13-6**, including their sensitivities based on the above methodology.

13.3 Baseline

13.3.1 Baseline Data Collection

13.3.1.1 Study Area

The socio-economic area of influence (AOI) consists of the geographical area that are likely to be affected by the Project activities during construction and operation. It includes:

- Direct AOI is comprised of the Project site location plus a 300m buffer around it where physical disturbance of environmental and social receptors (including the neighbouring communities) might take place as a result of the presence of Project and traffic movement.
- The indirect AOI is an area up to 1 km radius from the site which could potentially be affected by dust/noise, visual/landscape changes, hindered access to places and indirect socio-economic impacts.
- The communities around the immediate surrounding of the Project site and at a wider distance within Conakry were considered. These are areas likely to be affected by economic benefits of the project and may also include labour sending areas.

13.3.1.2 Desktop Study

Existing socio-economic and health data were obtained from the following sources:

- Databases from international organisations such as the World Health Organization (WHO), the World Bank, and the United Nations Programme.
- Official Letters obtained from the Governmental Authorities.
- Data/information obtained from the selected stakeholders during the consultations held within the scope of the ESIA study.
- Human rights reports from recognised international agencies such as Amnesty International, and the United States Department of State.
- Information provided by the Mayor of Ratoma.
- Observations during AECOMs visit to the Project Site and surrounding areas.

13.3.1.3 Primary Data Collection

During the ESIA stage, a social study was carried out by AECOM and its local partner (SEES) between September and December 2023. Data collection methods included within the ESIA stage as follows:

- Key informant interviews
- Focus Group Discussions
- Site visit walkover

A complete list of engaged stakeholders is presented Chapter 5:Stakeholder Engagement.

13.3.2 Baseline Characteristics: Socio-Economic Conditions

13.3.2.1 National and Regional Development Context

The Republic of Guinea (also known as Guinea-Conakry) is a West African country bordering the North Atlantic Ocean and was formerly part of French West Africa until declaring independence from France in October 1958. It has an area of 245,860 square kilometres and shares borders with six other countries: Cote d'Ivoire, Liberia, Mali, Senegal, and Sierra Leone.

As of 2022, the estimated total population was 13,859,341, 62% of whom live in rural areas (World Bank, 2023). The largest ethnic groups are Fulani (Peuhl) (33.4%), Malinke / Mandinka (29.4%), and Susu (21.2%), with the remaining population broken between Guerze, Kissi, Toma, and other groups, including foreigners. The Fulani have historically been the most disadvantaged and discriminated against from among the largest ethno-linguistic tribes. The highest population density is in the west and south, and 2.11 million people live in the capital of Conakry (CIA, 2023).

There are no indigenous peoples with traditional or customary rights to the land which were identified within the project area.

French is the official language and over 40 other ethnic languages are spoken, including Pular, Maninka, and Susu. The majority faith is Islam (89.1%), with the remaining population following Christianity, animism, other, or no faith (CIA, 2023).

Maternal and infant mortality are high (10th and 19th in the world respectively) and 45.3% of the population is literate (31.3% of women and 61.2% of men) (CIA, 2023). In 2020 49% of the urban population lived in slums[58]. In 2018 30.3% of children under five were stunted, and in 2021 49.% of the population was severely food insecure (World Bank, 2023). The labour force is dedicated mostly to agriculture (76%) and the rest to industry (24%).

The primary agricultural products are rice, cassava, groundnuts, maize, oil palm fruit, fonio, plantains, sugar cane, sweet potatoes, and vegetables. The primary industries are bauxite, gold, diamonds, iron ore, light manufacturing, and agricultural processing, and it also has hydroelectric potential (CIA, 2023). In 2022 Guinea's GDP per capita was USD$1,531.7, with an annual growth rate of 4.7% (World Bank, 2023). The acceleration of Guinea's economic growth is largely due to increased mining activities. Real GDP is projected to grow to 5.5% in 2023 due to mining production, energy availability, and infrastructure investment (AFDB, 2023).

Guinea is separated into four natural regions with distinct human, geographic, and climatic characteristics: Maritime Guinea (la Basse-Guinée or Guinée maritime), Middle Guinea (Moyenne Guinee or Fouta Djallon), Upper Guinea (Haute Guinee), and Forested Guinea. Maritime Guinea is mostly flat coastland lowlands and historically the land of the Susu, with some Baga living by the coast as well. Middle Guinea has mountainous plateaus and a tropical climate, and is dominated by the Peuhl population. Upper Guinea is dominated by highlands of cuestas and savannahs and its largest ethnic group is the Malinkes. Forested Guinea is characterised by dense vegetation and is known for being ethnically diverse and hosting several smaller groups, though the Malinkes are still the most numerous among them (DHS, 1992), (PRG, 2023).

[58] A slum household is defined as a group of individuals living under the same roof lacking one or more of the following conditions: access to improved water, access to improved sanitation, sufficient living area, housing durability, and security of tenure (WBD, 2023).

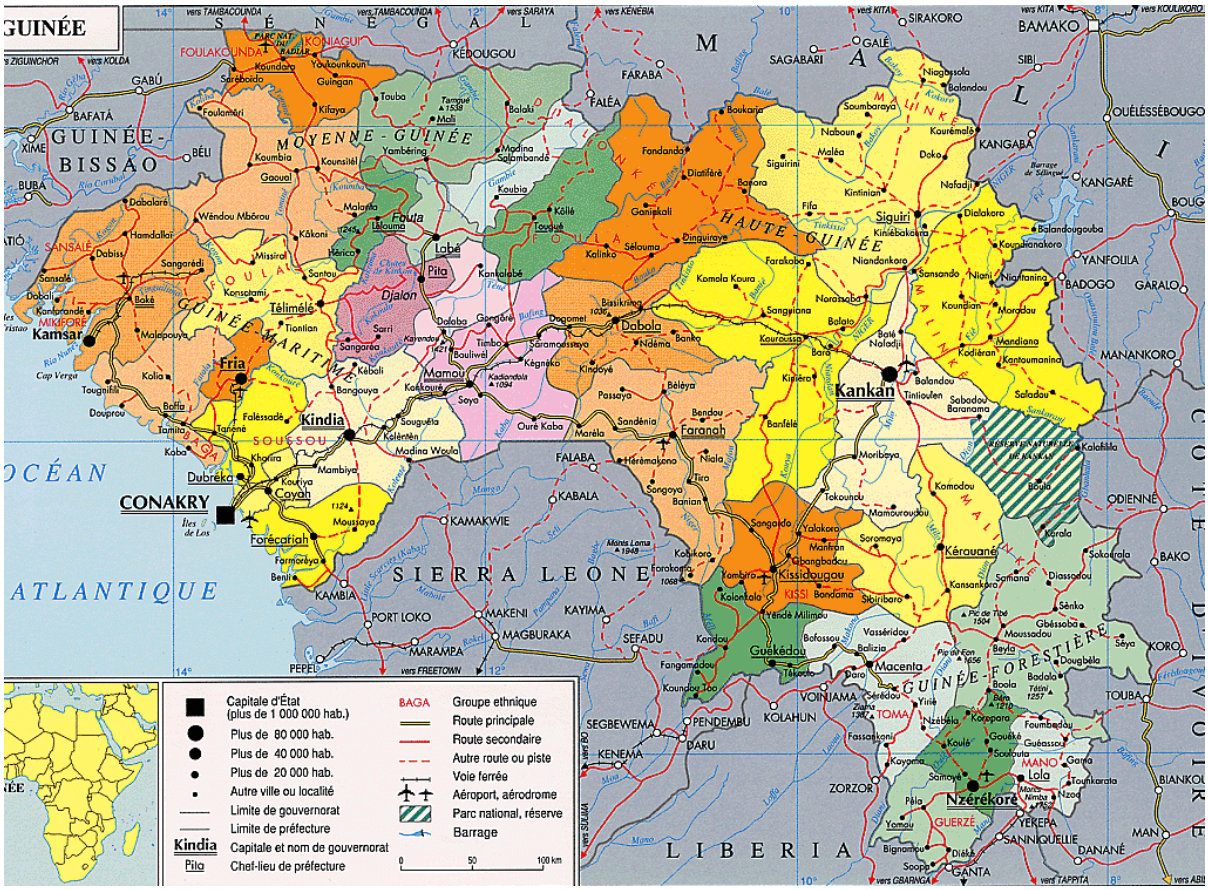

Figure 13-1: Republic of Guinea Map, Source: (PRG, 2023)

Guinea is also divided in eight administrative regions, including the special administrative region of the capital of Conakry. The regions are divided further into 33 prefectures, and into additional sub-prefectures (303 rural, 38 urban, of which 5 compose the Conakry greater urban area). Sub-prefectures are further divided into local units such as districts, quarters, villages, and sectors. Until the recent coup d'état Guinea a presidential representative democratic republic whereby the President is both the head of state and head of government. Executive power is exercised by the government and legislative power by both the government and the National Assembly. The unicameral National Assembly has been suspended since the 2021 coup d'état, with the National Council of the Transition acting as the country's legislature, as appointed by Colonel Doumbouya's government.

Since September 2021 Guinea has been ruled by the National Committee of Reconciliation and Development (or CNRD), led by Colonel Mamady Doumbouya. The transitional government has committed to civilian elections by the end of 2024.

During the 1990s Guinea as many as half a million refugees from Sierra Leone, Liberia, and Cote d'Ivoire sought refuge in Guinea (CIA, 2013).

13.3.2.2 Local Context

The project site is located in Koloma, Ratoma, one of five urban sub-prefectures in Conakry, Guinea's capital. Conakry is estimated to have 2 million inhabitants. Ratoma covers an area of 62 square kilometres with 34 districts and 211 sectors (SONAPI, 2020).

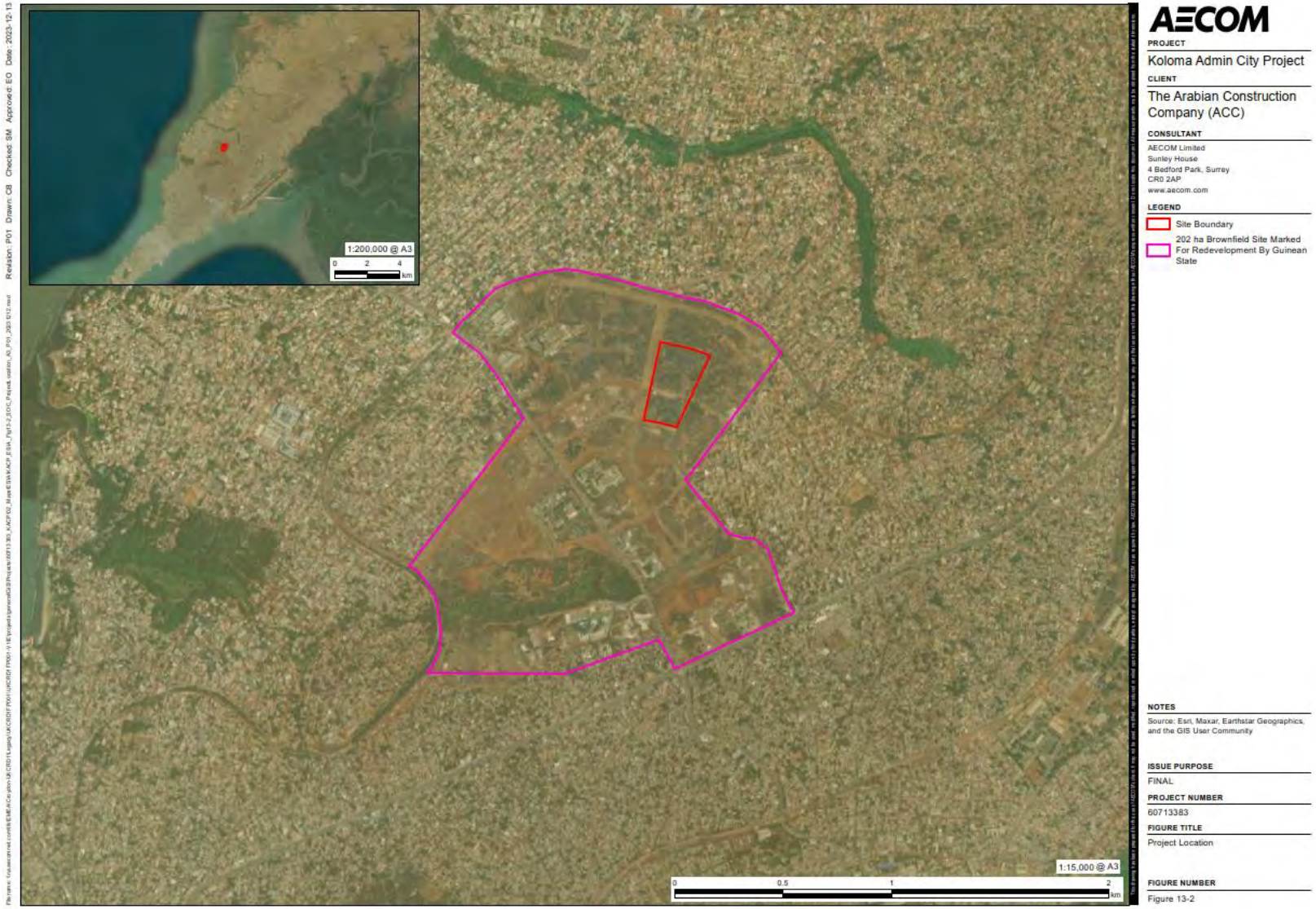

Figure 13-2: Project location view (Red line boundary – 202 ha brownfield site marked for redevelopment by Guinean state and Orange line boundary – 7 ha site allocated to the Administrative City Construction Project)

The Project is located within a brownfield site marked for redevelopment by the Guinean state which also includes several points of interest listed in Table 13-4 below. The location of the nearby points of interests (land users, places, businesses are shown in Figure 2-2.

Table 13-4: Nearest Points of Interest to the Project and their respective distance to the Project Site

Points of interest	Approximate Distance from the Project Site (km)	Direction	Comments
ACC's Workers Welfare Facility	200 m	west	Under construction
SEG Water Pumping Station and Tank	200 m	west	Operational
Security/Military Guard Housing	700 m	west	Operational-no further information
Sanitation Materials Depot	700 m	west	Operational-no further information
Car and Truck Garage	0.15 km	east	Operational-no further information
Street Traders/Small Business (along the Road RO308 to the souteast)	0.2 km	East/southeast	Operational (markets, plastic bag sellers, motorbike repair, pharmacy etc)
China Geo-Engineering Corporation (CEGEP)	0.20 km	west	Operational-no further information
Guinea Radio and Television (RTG)	0.25 km	southwest	Operational-no further information
Primary School (De Lecole Primare Koloma Ratoma)	0.3 km	east	Operational
Kapora rail police station	0.30 km	west	Operational
Orange Guinea Headquarters Site	0.35 km	south	Underconstruction-no further information
Saudi Arabia Embassy	0.35 km	southwest	Underconstruction-no further information
Grand Cimitiere Kaporo Rails (cemetery)	0.40 km	west	Operational
United States Embassy	0.50 km	southwest	Operational
Central Electrique de Kipe	0.50 km	west	Operational-no further information
Ministry of Foreign Affairs	0.50 km	southwest	Operational
Prima Commercial Centre	0.70 km	west	Operational
Kakimbo Plant Nursery	0.70 km	southwest	Operational
Station Star Oil de Kipe (gas station)	0.70 km	west	Operational
Autorité de Régulation des Postes Et Télécommunications	0.70 km	south	Operational
Cimitiere de Bambeto (cemetery)	0.85 km	south	Operational
KAKI restaurant (inside the twin apartment complexes)	0.85 km	southwest	Operational
Les tour jumelles de kakimbo (twin apartment complexes)	0.95 km	southwest	Operational
Mosquee Turke de Koloma (mosque)	0.90 km	south	Operational
Railway Station	0.90 km	west	Operational

Ministère des affaires étrangères, de la Coopération Internationale, de l'Intégration Africaine et des Guinéens de l'Étranger de la République de Guinée (government ministries)	0.55 km	south	Operational

13.3.2.3 Formal Governance and Institutional Structure

Typically, and as written in the 2020 constitution, the President of Guinea is elected by absolute majority through a two-round system for a five-year term. The Prime Minister is appointed by the President. The National Assembly had 114 seats, 76 of which are filled by members elected by nationwide proportional representation system and 38 by plurality vote in individual districts.

However, in September 2021 Alpha Condé's civilian government was overthrown by the military led by Lieutenant Colonel Mamady Doumbouya, who suspended the constitution and dissolved the National Assembly. In late September they released a charter outlining the structure of the transitional government and established themselves as the National Committee for Reunification and Development (CNRD), led by Doumbouya, and the 81-member National Transitional Council (CNT), responsible for drafting a new constitution.

Decentralised politics

In 1985 President Lansana Conté began a process of decentralisation aiming to reform public affairs to better address the needs of local people, and allow localities to own and direct their own governance and development.

The Code of Local and Regional Authorities adopted in 2006 and revised in 2017 recognised the financial autonomy of local authorities, transferring numerous responsibilities to the rural municipalities, urban municipalities, and regions.

In 2012 the National Decentralisation and Local Development Policy Letter and its action plan were approved; this letter is an instrument to strengthen decentralisation and local development. Its inter-ministerial steering committee was set up in 2010 to monitor the plan's implementation. The committee (CIP or Comité de pilotage interministériel) is composed of representatives from different ministries and the National Association of Guinean Communes (Association Nationale des Communes de Guinée).

In 2016 a national local development fund (FNDL or Fonds national de développement local) was created and its management entrusted to a Public Administration Establishment (EPA or Etablissement public administrative) called the National Agency for the Financing of Local and Regional Authorities (ANAFIC or Agence Nationale Financement des Collectivités). The FNDL finances investment in local authorities.

Article 136 of the 2020 constitution states that "local authorities are administered autonomously by elected councils under the control of a delegate of the State, who represents the national interest and ensures that the law is respected" (SNG-WOFI, 2023).

State Administration

The 2020 Constitution states that Guinea's administration consists of administrative constituencies called regions (eight in total, including Conakry), prefectures (33 in total, plus Conakry), and sub-prefectures ("sous-prefectures").

Each administrative region is headed by a governor appointed by the President. Prefectures offer various services.

Devolved Administration

Decentralised government power exists at the regional level as well as in urban communes and rural communes. Rural communes are divided into districts and urban communes are divided into neighbourhoods. As of 2021 there were 362 communes in Guinea, 323 rural and 39 urban, including 6 communes in Conakry. As of 2021 there were 4,142 districts / neighbourhoods (SNG-WOFI, 2023).

The land area of rural communes and sub-prefectures correspond to one another, meaning that these two entities have the exact same geographical boundaries. Urban communes correspond to the chief towns of the prefectures (excluding Conakry's six communes). Communes have a communal council, mayor, and mayoral deputies. The mayor and deputies are elected by the communal council from its members. Basic services are

provided at the communal level through revenue collected and invested in implementing their local development plan. The administrative hierarchy of Ratoma in the Republic of Guinea is presented in Figure 13-3.

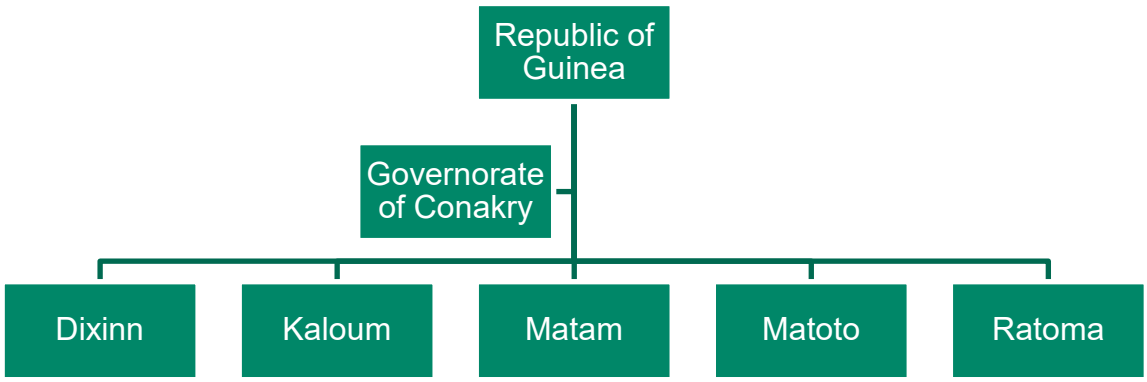

Figure 13-3: Administrative hierarchy of Ratoma in the Republic of Guinea

Conakry's city council and the president of the council are responsible for city management. The city council is composed of 15 elected members from the communal councils and of representatives from other city bodies who have been appointed under presidential degree. Ratoma is divided into districts, each of which has its own mayor and a supporting council composed of district leaders. These blocks are the smallest administrative subdivisions. The current mayor of Conakry is M'Mahawa Sylla, the only woman to achieve the rank of General in Guinea's army since its creation in 1960. She was appointed mayor after the September 5th change of government.

The current mayor of Ratoma is M Alpha Oumar Sakho. In February 2023 he officially launched an awareness-raising campaign about evictions in his district ("démarrage des opérations de déguerpissement des encombrants physiques"), acting on the CNRD's announcement requiring the clearing of all obstructions on public roadways in Conakry and elsewhere.

13.3.2.4 Informal Governance and Institutional Structure

Over 250 associations, groups, and cooperatives operate in Ratoma commune, engaging in activities such as dyeing, sewing, gardening, and other small trades. Tribal identity remains an important component of life across Guinea. One's ethno-linguistic and tribal identities and kinship will be a key element of a person's power, influence, and life practices.

13.3.2.5 Demographic Profile

Ratoma's population is estimated at 776,770 inhabitants (357,314 men and 419,455 women, representing just under 47% of the population). It is divided into 34 districts and 211 sectors. There are 118,560 households. The commune's ethnic breakdown is 50% Peuhl / Fulani, 30% Sousou, 35% Malinké, and 5% other ethnic groups (SONAPI, 2020). The closest neighbourhoods are Kapora Rail and Koloma-Soloprimo. According to the statistical information obtained from the Mayor of the Ratoma area (from neighbourhood health center statistics), the estimated population of the Kaporo rail District and Koloma-Soloprimo District are 33,622 and 23,422, respectively.

13.3.2.6 Inter-ethnic Group Relations

The Peuhl (or Peul, French) are also referred to as Fulbe (English), Fula (Portuguese) and Fulani (Hausa). Though they are the biggest group and represent the "main intellectual, economic and religious power" there exist reports that the group is marginalised by other communities". A Peuhl has never led the country (EASO, 2018)

During the leadership of Guinea's first president, Sekou Ahmed Toure (1958-1984), the Malinke were promoted to top government posts and implemented policies against the Peuhl. Under Lansana Conte (1984-2008), power was transitioned from the Malinke to the Soussou.

During the 2010 election the Malinke candidate Alpha Conde defeated the Peuhl presidential candidate Cellou Dalein Diallo (EASO, 2018). Diallo contested the results, stating that the electoral commission had not thrown out results from two prefectures where Peuhls were not able to vote because they had fled the areas en masse after ethnically-motivated attacks against them in October in which one person was killed. Studying the post-election

protests, Human Rights Watch found that security forces "used excessive force and displayed a lack of political neutrality when responding to the election-related violence" in Conakry and other cities, stating that through interviews with over 80 people they determined that the security forces were dominated by ethnic groups supporting Conde's party and used violence to suppress Peul opposition. They found that:

> "…members of the security forces used ethnic slurs against members of the Peuhl ethnic group, collaborated with civilian mobs from ethnic groups that largely supported Conde, and in several cases looted and stole property from people who were perceived to have supported Diallo" (HRW, 2010).

In Conakry specifically, Human Rights Watch documented an exception to this pattern where they documented more attacks by Peul against Conde supporters than the reverse (HRW, 2010). Attacks against Conakry residents include being dragged out of homes and cars to be beaten, singling out at informal checkpoints, rape, robbery, and arson (HRW, 2010).

In September 2012 clashes between Malinke and Peul communities broke out in the Madina market in Conakry "after ethnic Peul merchants found their market stalls ransacked Friday morning, and blamed ethnic Malinkes" (Reuters, 2012). In March 2013 these communities clashed again in Conakry after Peul shops were looted ((ECOWAS/ISS, 2013)

In 2015 there was further violence in Conakry after Alpha Conde won a second term over Cellou Dalein Diallo and in February 2018 local elections were held and results were contested by the opposition, leading to mass protests and several deaths. Protests were mainly in the opposition stronghold of Ratoma (ACLED, 2018). There were clashes between government and opposition supporters during which homes were set on fire and five people were killed in Kalinko (HRW, 2018).

In March 2018 a large fire destroyed over 300 shops in Conakry's Madina market, with opposition leaders alleging that government supporters had committed arson (HRW, 2018).

In October 2020 a presidential election was held in which incumbent President Alpha Conde was declared winner, but opposition leader Diallo again contested the results. In opposition-led demonstrations in the following days 21 people were killed. Human Rights Watch reports that excessive force was used against protestors, many of whom were Peul (HRW, 2020).

13.3.2.7 Land Regulations, Tenure, and Use

Guinea has approximately 245,720 square kilometres of land. Of this, 59% is agricultural land, 12.6% is arable land, 2.9% is permanent cropland, and 25.2% is forested (World Bank, 2023). More than 70% of the population works in agriculture, livestock, fishery, forestry, and mining.

Farms are typically family-owned and -operated, and two-thirds are less than three hectares in size. Pastoralists will move herds seasonally between the coast and inland grasslands and plains (traditionally the Fulani, by negotiating with the Susu and Baga for land access). However, the extension of farmland, increased livestock numbers, and increased pressure on natural resources have disrupted this system.

Land access has been influenced by political regimes. Prior to Touré's regime (1958-1984) the upper class kept slaves and reaped the benefits of slaves' herding activities. Touré declared all land state-owned and granted former slaves land-use rights as well as rights over their herds. Since the fall of this regime there have been efforts by upper classes to reappropriate their former land holdings, conflicting with efforts by former slaves to maintain use-rights (USAID, 2023).

In the post-independence environment Guinea has transitioned from a country where property rights were not reflected statutorily to one where private property rights and the promotion of private investment are prioritised. Today, land tenure regulation is more oriented to urban rather than rural holdings, though efforts are being made to formalise rural tenure as well.

The legal foundation for all land tenure in Guinea is contained in the following documents:

- The Constitution, 2020 ("Constitution de la république de Guinée")
    - Article 13 guarantees property rights, and states that property cannot be expropriated without this being in everyone's legally established interest and compensated in a just and prior manner.
- Guinea Land Code, 1992 ("Code Foncier et Domanial")
    - The Code affirms state ownership of land and granting individuals the right to own land. Land ownership is confirmed through land registration. This code also provides for the establishment

of Land Commissions in each commune and Conakry, though in rural areas it is largely unenforced. Some public land can be alienated. Ownership rights under customary law may be registered and converted to formal rights in some circumstances.

- Pastoral Rights Law, 1995 (“Loi du 29 aout 1955 Portant Code Pastoral”)
    - Allows herders open and free access to pastoral areas and the resources within them, excepting overuse and requiring the respect of others’ customary rights.
- Rural Land Policy, 2001 (“Déclaration de la Politique Foncière en Milieu Rural”)
    - Recognizes certain customary land rights and calls for the development of legislation to formalise these customary rights. This code suggests principles to improve the effectiveness and security of existing land tenure legislation and property rights, as well as improving administration and increasing local participation, but these are not yet in practice.

Implementation of these laws is a challenge, and some provisions are contradictory. Statutory policies and customary practices also remain significantly disjointed (USAID, 2023). Only 2.5-3% of landowners in Guinea have a land title (LandPortal, 2022). In rural areas, customary property and land rights are dominant. Whoever cleared the land generally has customary rights to it. Management and use rights fall to the founder’s family or descendants, but ownership remains with the state. Usufruct land rights are recognised in the formal and customary rights systems. Islamic law may also affect property transactions given that the majority of the population is Muslim, meaning that outside of the formal court system formal statutory law, customary law, and Islamic law may be considered (USAID, 2023).

Women are responsible for nearly 80% of the country’s food production and are guaranteed equal property ownership rights but only a small percentage own land. In most cases women’s use-rights to agricultural land and continued land access is obtained through husbands and sons (USAID, 2023).

In urban areas and Conakry in particular there is greater demand for land than is available and residents rely on legal titles to determine land ownership (USAID, 2023).

13.3.2.8 Current Land Use in Project Area

The project site Currently the site itself is unoccupied and there is no observable evidence of land use which existed since the 2019 eviction. The Project site has since been fenced with two entrances which are secured by unarmed security and confirmed that no one is currently occupying the site.

One new structure has been built close to the eastern gate of the site. Site security confirmed it was erected a few days before the site visit. This is currently the closest social receptor to the site, however it is likely that it will not remain there permanently. Given this is outside the project fence, it will not be hinder the start of construction but it will be the responsibility of SONAPI to responsibly notify the owner of this household to dismantle the structure and relocate it.

Access signages were placed at several locations to show access to the Project site. ACC has started to mobilize the unused plots adjacent to the Project Site as temporary welfare facilities and site offices during construction which has been reported as wholly owned governmental land. Some illustrative photos for guarding points, adjacent structure, signage, fences, and welfare areas which are under construction are presented between Figure 13-4 and Figure 13-7.

Figure 13-4: Site fence and security gate

Figure 13-5: Signage

Figure 13-6: ACC's welfare facility area

Figure 13-7: Adjacent Structure

The surrounding of the Project site (on the surrounding roads namely RO308, RO363 and RO251) are mainly occupied by informal business such as shops, restaurants, car washes, garages brick making factories and residences (Figure 13-8 and Figure 13-13). The access road into the Koloma area and the site is also flanked by informal traders.

Figure 13-8: Informal Garage viewed from the north east corner of the site.

Figure 13-9: Informal traders located in front of Ministry of Foreign Affairs.

Figure 13-10: Informal traders located in front of the RGT

Figure 13-11: Shops along the RO308.

Figure 13-12: Pharmacy along the RO308.

Figure 13-13: Informal traders along the RO363.

13.3.2.9 Residences and Housing

According to the National Public Hygiene Strategy (2014-2018) published by the Ministry of Health and Public Hygiene, housing conditions do not generally meet hygiene standards; average 3 people share per 10 m^2 of floor space. Conakry is rapidly urbanising in a highly spontaneous and unplanned manner. Rapid urbanization lead of overcrowded suburban neighbourhoods and resulted in housing safety risks with poor hygiene condition.

The housing in the close vicinity of the Project site (in Kaporo Rail district and Soloprimo District) are mainly multi storey concrete buildings with balconies and some of them having regular roof covering (ranges between 1-5 storey). Some illustrative visuals for the housings in the vicinity of the Project site are shown in Figure 13-14 and Figure 13-16.

There are residential properties along the roads RO308 (to the east), RO363 (to the north and RO251 (to the west). The closest residential properties to the site are those to the east of the site, approximately 200m away from the site boundary. The closest residential properties begin approximately 250 m to the north and 500m west of the site.

Additionally, there is a Security/Military Guard post approximately 700 m to the west of the Project site (as indicated in Table 13-4.

Figure 13-14: Views of housings along RO308 (to the east)

Figure 13-15: Views of housings along Traversale (RO251 to the west)

Figure 13-16: Views of housings along RO363 (to the north)

13.3.2.10 Historic Land Use and Evictions

Whilst the site is currently unoccupied, as confirmed on the site visit, the site was historically occupied and subject to two evictions which occurred in 1998 and 2019. These evictions were carried out by the Ministry of Habitat and Construction and have been the subject of much criticism by local communities and NGOs such as Human Rights Watch. As reported by SONAPI that some compensation was awarded for evictions in 1998, however this is yet to be verified by the community. SONAPI has however confirmed that no compensation has yet been paid to displaced families who were evicted in 2019.

Verbal accounts from various interviews stated that that before the first eviction the area contained a mixture of established buildings and shacks and was steadily built up over time into a formal district before the first eviction then occurred in 1998. The gradual reoccupation of the Kaloma area after the first eviction is visible from historic satellite imagery and shows that larger residences were built first following the eviction and then shipping

containers arrived later. Following the eviction in 2019 the satellite imagery also indicates that considerable vegetation, including trees were present at the Project site were later removed.

Evidence suggests that both evictions were conducted with little warning and without a proper resettlement or compensation process in place, with no support offered to residents and businesses affected. There is little evidence to suggest the national expropriation process was followed or principles of international best practice applied. During interviews with The Collective of the Evicted and local leaders it was explained that these evictions have contributed to homelessness, loss of education, loss of livelihood, break up of families, physical and mental distress and increased poverty.

SONAPI, with support from its consultant Chemas Consulting Ltd, has now recently begun engaging with evicted families and their representative group, “Collectif des déguerpis” (The Collective of the Evicted) with the intention of retrospectively paying compensation in the form of cash and replacement land. SEES and AECOM met with The Collective of the Evicted who confirmed that this process is underway, and they have been engaged as part of this process. A Resettlement Action Plan developed by Chemas has been reviewed by AECOM.

13.3.3 Baseline Characteristics: Community Infrastructure and Resources

Conakry is currently the site of an EU-funded UN-Habitat project called the Sustainble Cities SANITA Project (Projet SANITA Villes Durables). The urban planning, financial management, housing, construction, and basic services of Conakry are being supported and improved through this institution- and capacity-building project (ONU Habitat, 2020).

13.3.3.1 Community Services and Facilities

Community services and facilities, also known as social infrastructure, includes many ways that local needs are met and a good quality of life is enabled. This may include the provision of healthcare, education, recreation and sport, faith, and emergency facilities.

The number of clinic/health centers and educational facilities in Kapora Rail and Koloma-Soloprimo districts are presented in *Section 13.3.3.3: Community Health* and *13.3.3.4: Education of this Report.*

There is an open plant nursery located in the Kakimbo (approximately 0.7 km to the southwest of the Project site) and the nursery stretches on a hilly area (approximately 20 m elevation difference) (Figure 13-17). During the site visit, it was observed that there is a creek flowing from the bottom level of the area and people were using the water to wash their stuff (clothes etc.) (Please see Figure 13-18). As informed during the stakeholder engagement activities within the scope of the ESIA report, the area is also used for recreational purposes by the community.

Figure 13-17: Open plant nursery in Kakimbo

Figure 13-18: Creek flowing from the bottom level of plant nursery area

There are two nearby cemeteries to the Project site (Kapora Rail cemetery located 0.40 km to the west and Bambeto Cemetry located 0.85 km to the south).

13.3.3.2 Utilities

There are some problems providing adequate electricity and access to clean water in the country. With support from international lenders, Guinea is working to improve the potable water supply and to refurbish and extend the electricity network in the capital, Conakry, and beyond.

In 2021 46.8% of Guineans had access to electricity, and only 1% had access to clean fuels and technologies for cooking.

According to the National Public Hygiene Strategy (2014-2018), national drinking water coverage rate was 74% (92% in urban area and 71% in rural area). Boreholes accounted for 47% of the household drinking water supplies. 22% of the population in the country use tap water and 16.1% use surface water. Approximately over one household in ten treats its water before consumption.

In the country, approximately one household in five (22.5%) has no toilet and more than third of these households (34.5%) use uncovered pits or latrines (the data presented for 2007 in the Strategy Report).

There is a SEG (Société des Eaux de Guinée) water pumping station and tank located adjacent to the Project Site (200 m to the west) which is providing water to the surrounding community (i.e. Soloprimo to the southeast of the Project site) (in Figure 13-19 and Figure 13-20). As identified during the site walkover survey within the scope of the ESIA study, there are water pipelines (main heads and branches) crossing the Project site to provide water supply for the community from the water pumping station/tank adjacent to the project site. ACC investigated the pipelines and to identify the routes of the pipelines back to the main pipe head. An excavation works related to the water pipeline is ongoing which is undertaken and under responsibility of the competent authority, SEG (Société des Eaux de Guinée). Photographs of the rerouting of the pipelines and the new route are presented in Appendix B of this ESIA Report.

Figure 13-19: SEG Water Pumping Station and Water Tank (view from outside) adjacent to the Project site

Figure 13-20: SEG Water Pumping Station and Water Tank (view from inside) adjacent to the Project site

There are some public, private and traditional groundwater wells available in close vicinity of the Project site. During the scope of the ESIA study, groundwater samples were collected form the selected groundwater wells and analysed for certain parameters. The locations and conditions of the groundwater wells are discussed under *Section 10: Surface Water, Groundwater and Soils* in detail. Photographs of the groundwater features are presented in Appendix B of this ESIA Report.

13.3.3.3 Community Health

Life expectancy at birth in Guinea has been steadily increasing from 1960 to 2021, the most recent data available; 60 years for women and 58 years for men (World Bank, 2023).

Healthcare services across Guinea are extremely limited. The maternal mortality rate in 2020 was 553 deaths per 100,000 live births, a major improvement but still far above the 2020 global average of 157.1. Currently the under-five mortality rate is 98.7 deaths per 1,000 live births, compared to a global average of 37 in 2020. 95% of girls and women aged 15-49 have undergone female genital mutilation. 28% of children are stunted, representing insufficient nutrition, and only 31% of the population uses basic sanitation services (World Bank, 2023).

There are 0.23 physicians per 1,000 people as of 2018, and 0.3 hospital beds per 1,000 people as of 2011. There is a high risk of communicable diseases (CIA, 2023). From 2014 to 2016 Ebola spread across Guinea and resulted in over 2,000 deaths.

Focus groups with residence of Kaporo Rails ward revealed that access to medicine is a challenge and they only have access to private clinics within this ward and so in order to access cheaper healthcare most residents travel to other wards. It was also mentioned in focus groups that for everyday illnesses residences use traditional medicine which they claimed was cheaper and cures illnesses that modern medicine can't.

Focus groups with women only revealed that the community have frequent cases of malaria, high and low blood pressure, respiratory illnesses, sinusitis, gastric illnesses, yellow fever, typhoid fever, haemorrhoids, urinary tract infections, hepatitis A and B and sexually transmitted diseases.

According to the statistical information obtained from the Mayor of the Ratoma area (from neighbourhood health center statistics), there are 1 public health centre and 5 private health clinics in Koloma-Soloprimo whereas there are 5 private health clinics in Kaporo Rail.

According to the National Public Hygiene Strategy (2014-2018), hand hygiene, instrument treatment, maintenance related to infectivity and biomedical waste management are often regarded as fail to comply with hospital hygiene standards and procedures.

According to the National Public Hygiene Strategy (2014-2018) published by the Ministry of Health and Public Hygiene, hand washing facilities are lacking in most of the schools which lead parasitic and diarrheal diseases. In towns, some schools are connected to the drinking water network. In rural areas, recent school projects include water points on the school project premises (Ministry of Health and Public Hygiene, (2014-2018)).

Rapid urbanization has led food safety issue which is regarded as the major public health issue in the country. The biggest food hygiene problems are related with drinking water supply, unhygienic practices, shortcomings in the institutional arrangements to protect customers.

As observed during the site visit undertaken within the scope of the ESIA study, the household wastes are mainly disposed and burnt in open air at some locations along the RO308 and RO363in the surrounding of the Project site (Figure 13-21 and Figure 13-22). The disposal and burning of wastes in open air can cause public health issues. This issue was also raised by residents in Focus Groups who explained the lack of management of domestic waste contributes to the destruction of water sources and the pollution of our environment because accumulated piles of rubbish are burnt on site.

Figure 13-21: Waste dumps observed along the RO363

Figure 13-22: Waste dumps observed along the RO363

In the country, main causes of the consultations were recorded for malaria, acute diarrheal diseases, intestinal parasitosis, acute respiratory infections, gynaecological ailments, cardiovascular diseases. Additionally, AIDS, diabetes mellitus and high blood pressure were also noted on the rise (Ministry of Health and Public Hygiene, (2014-2018)).

13.3.3.4 Education

Education in Guinea is compulsory from the ages of 7-12, with the academic year lasting from October to June. Both public and private schools exist, and the public infrastructure is much less robust than the private system, increasing inequalities between children of different socioeconomic statuses as well as gender and rural/urban inequality.

As of 2020, 59% of children in the relevant age group had completed primary education (World Bank, 2023). 28.5% of girls and 37.8% of boys complete lower secondary school in Guinea as of 2020, compared to a regional average of 43% and 46% respectively. The male literacy rate is 61.2% and female 31.3% (World Bank, 2023).

According to the statistical information obtained from the Mayor of the Ratoma (from neighbourhood health center statistics), the number of public and private schools and universities as well as the number of students are presented in Table 13-5.

Table 13-5: Educational Facilities in Kaporo Rail and Soloprimo

District		Kaporo Rail	Soloprimo
Primary	**Private**	**7**	**14**
	Public	-	1
	No of Children	2530	7983
Colleges	**Private**	3	13
	Public	-	1
	No of Children	788	3063
High Schools	**Private**	4	10
	Public	-	-
	No of Children	369	1346
Universities	**Private**	1	-
	Public	-	-
	No of Children	228	-

During women only focus groups with residents it was explained that boys are more likely to go on to higher education than girls. Girls are forced to drop out of school in favour of early marriage, and girls are often channelled into trades such as sewing, hairdressing and dyeing.

13.3.4 Baseline Characteristics: Economy and Employment

13.3.4.1 Economy

Guinea is classified by the World Bank as a lower middle income country, as a country with an income in which 2022 GNI per capita was between USD $1,136 and $4,465. Guinea's was $2,840. GDP growth in 2022 was 4.7%, and unemployment was 5.7%.

Growth is driven primarily by the mining sector, mainly bauxite. Investment in infrastructure and positive agricultural performance have also helped. While COVID-19, the September 2021 coup d'etat, and global price shocks have caused some disturbance, growth remains strong.

Guinea is at moderate risk of debt distress. The IMF's main priorities for Guinea are strengthening domestic revenue mobilization, repaying appears to support the private sector and improve credit intermediation, and increase investments in infrastructure and social sectors (Lloyd's Bank, 2023).

13.3.4.2 Livelihoods

In Guinea, 60.7% of people are employed in agriculture, 5.8% in industry, and 44.6% in services (Lloyds Bank, 2023). The unemployment rate in 2022 was 7.9% (World Bank, 2022).

There are many local businesses located near the site along the roads namely RO308, RO363 and RO251. The local businesses include such as shops, restaurants, car washes, garages brick making factories as shown in Figure 13-8 to Figure 13-13.

Focus groups with residences revealed that there are many sources of income and livelihood in the nearby communities including: civil servants, entrepreneurs, informal vendors, private sector employees, shopkeepers, tailors, mechanics, drivers, motorbike taxis, journalists, security guards, private employers and farmers.

There is no agricultural areas and farming activities in the immediate surrounding of the Project site. However, some grazing activities (cattle and goats) observed in the close vicinity of the Project site (Figure 13-23 to Figure 13-25). Some cattle were observed roaming the wider Koloma area near the site. Their owners were not present at the time of site visit undertaken within the scope of the ESIA study (in September 2023).

Figure 13-23: Cattle observed in the Koloma area outside the site

Figure 13-24: Some goats observed close to the site entrance from RO308.

Figure 13-25: Some cattle observed close to RO308.

13.3.4.3 Poverty

In 2018 43.7% of Guineans were below the national poverty line (World Bank, 2023). The World Food Programme states that 55% of people live in poverty (World Bank, 2023).

The most holistic widely-used measure of poverty is the multidimensional poverty index (MPI). Guinea's MPI nationally is 0.373, above the poverty cut-off of 0.3333. This varies geographically, with the urban MPI at 0.124 and the rural MPI at 0.503. Conakry's MPI is lowest among Guinea's administrative regions, sitting at 0.063.

13.3.4.4 Transportation

There is limited urban mobility in Conakry; most people travel by personal vehicle and there is no official public transportation, though some limited form of communal transportation such as taxis, buses and railway exist (ONU Habitat, 2020).

Conakry's roads are in poor condition and there are frequent traffic jams. Taxis, mini buses and motorcycles are often overloaded and public transportation options are limited. Traffic and poor mobility was an issue raised by residents who were interviewed in focus groups. It was explained that as the ward is already built-up, they have problems with mobility. Traffic is slow on the main roads because of the frequent traffic jams and with the majority of people using small buses.

It was explained that following the construction of the Bambeto interchange, traffic jams have worsened and it is especially difficult to get to the motorway. Getting out of Conakry to attend events in the interior of the country or for family visits was sited as a challenge for residences due to the deterioration of the road causes traffic problems, especially in winter.

The access to the Project site is currently provided by the surrounding roads (namely RO308, RO363 and RO251) as presented in Figure 13-26. There are no defined bus, minibus, taxi and motorcycle stations in the close surrounding of the Project site. There are no pedestrian crossings and traffic lights on the surrounding road network. There are no safety lights on the railway crossings. No dedicated pedestrian side pathways/walkways

on the surrounding network; people are mainly walking on the side of the roads. As observed during the site visit undertaken within the scope of the ESIA study, the RO251 was observed to be busier than the other surrounding network.

According to the information obtained from the representative of the Road Management Agency in Guinea, there is an ongoing construction at Bambeto junction to build a new junction/overcrossing bridge which is planned to be finalized within 10 months. The ongoing construction created a traffic issue in the surrounding road networks around the Route le Prince Road. Bambeto junction is providing access between Conakry airport and the Project site. Currently, due to the ongoing construction on the junction, alternative streets around the Bambeto junction are used to provide access around the Route le Prince Road.

There is a Kaporo Railway providing access to the Project site (on the RO363). The railway station is located 0.9 km to the northwest of the Project site.

Conakry has one public airport called the Conakry International Airport (approximately 3 km to the southeast of the Project site). Details on the surrounding traffic network are further discussed under ***Chapter 12: Traffic and Transport.***

13.3.4.5 Gender

Maternal mortality remains high, as does the adolescent fertility rate – 117 of every 1,000 girls aged 15-19 gave birth in Guinea in 2020. Fewer girls than boys complete secondary school (28.5% vs 37.8%) as was confirmed in Focus Groups, and adult literacy in Guinea is lower among women than men (31.3% vs 61.2%). The labour force participation rate is 41.7% for women, 63.7% for men in 2022.

Vulnerable employment is that which is unlikely to have any formal arrangements, formal protection, or safety nets. Vulnerable employment among women has also remained nearly the same since 1991, hovering around 97%, while is it around 85% for men. 88% of men owned a business in 2018, and 12% of women. In 2017 19.7% of women owned a bank account and 27.3% of men. Home ownership in 2018 (alone or jointly) was 48.4% for men and 33% for women. In 2018 30.4% of women participated in making major decisions, such as about major purchases, healthcare decisions, or decisions to visit family or friends. The percentage of women in Guinea aged 15-49 who have experienced intimate partner violence is 37% (World Bank, 2023).

Survivors of sexual violence face serious social stigma, have difficulty accessing medical care, and face serious barriers to justice (Amnesty International, 2023).

Women only Focus Groups confirmed that women are subjected to domestic and conjugal violence, including when married.

While it was explained in the focus groups that forced marriage no longer exists in this ward and it is the girls who choose their husbands. It was explained by residents that early marriage still exists however and girls are pushed into marriage as soon as possible to avoid pregnancy before marriage. These marriages often end in divorce.

Figure 13-26: Nearby road network

13.3.4.6 Vulnerable Groups

Vulnerable groups are those individuals or groups who may be directly and differentially or disproportionately affected by the Project's negative impacts and/or less able to participate in and benefit from the Project's positive impacts because of their disadvantaged or vulnerable status. This status may stem from ethnicity, property, level of income, economic situation, gender, language religion, national or social origin, age, culture, literacy, physical or mental disability, and dependence on unique natural resources (IFC, 2012). Based on the above definition, the following groups within the project social area of influence are considered vulnerable:

- Young families (where the parents are under 30) who have lost both parents
- Children and young people
- Families with disabled parents or children
- A widow
- A single parent family
- A single retired person
- An elderly person (over 65 years old)
- Women in the family
- People in poor health
- People who are discriminated against
- Households under the poverty line
- Households in financial difficulty
- Households who do not have access to water
- People who evicted and do not receive compensation
- Refugees or internally displaced

These categories should simply be used as a guide, though. Other people will be vulnerable due to other specific circumstances that are not captured in this list.

Some more specific insights into vulnerability may be identified based on Guinea and Conakry's specific circumstances.

Young people are also highly vulnerable to poverty due to the high rates of unemployment and underemployment, which often drive their movement to urban areas and into criminal activity (IFAD, 2019). This is especially true for Conakry, where more than two thirds of higher education graduates are unemployed, with worse rates for female graduates (World Bank, 2023) (AFDB, 2023).

Groups facing discrimination include women and girls who have not undergone FGM, sexual and gender minorities, survivors of sexual violence, those living in rural areas or poverty, disabled people, people with albinism, and people with HIV / AIDS (UN, 2019) (Amnesty International, 2023).

Guineans may also be subject to ethnic discrimination and violence when they are in neighbourhoods where they are an ethnic minority.

13.3.4.7 Community Security

Guinea, especially Conakry's, security environment remains volatile. Common risks include armed robberies, car jackings, and muggings. Ethnic tensions and violence as well as political violence are a risk in all regions of Guinea. Guinea's security often intervene in civil unrest and demonstrations, which has previously led to injuries and fatalities (Amnesty International, 2023).

UN-Habitat is engaged in a project called Youth Promotion Initiative (YPI) aimed at reducing nighttime insecurity and urban violence by engaging youth in community development through labour intensive work and income generating activities. They are also improving the governance of police services in Guinea (ONU Habitat, 2020).

13.3.4.8 Ecosystem Services

Ecosystem Services are the benefits that people, including businesses, derive from ecosystems. Based on the framework used for the Millennium Ecosystem Assessment, ecosystem services are organised into four categories:

1. Provisioning services, which are the products people obtain from ecosystems, including food, freshwater, timber, fibres, and medicinal plants. No current use of the project site itself was observed however some grazing activities/livestock herders were observed nearby.

2. Regulating services, which are the benefits people obtain from the regulation of ecosystem processes, such as surface water purification, carbon storage and sequestration, climate regulation, and protection from natural hazards. No regulating services were found on site.
3. Cultural services, which are the nonmaterial benefits people obtain from ecosystems, such as natural areas endowed with sacred value, recreational areas, and areas with aesthetic value. Limited cultural services were observed in the Project site.
4. Supporting services, which are the natural processes that maintain the other services, such as soil formation, nutrient cycling, and primary production. No supporting services identified in the project area, however, the Project site previously occupied and the site was historically cleared and subjected to two evictions which occurred in 1998 and 2019.The site comprised disturbed and modified habitat, with clear evidence of site clearance, including stockpiling of soil and cleared vegetation.

13.3.5 Baseline Characteristics: Labour and Working Conditions

13.3.5.1 Working Conditions and Forced Labour

Most employed people in Guinea (91%) are vulnerably employed, meaning that they are either contributing family workers (who are generally unpaid) or own-account workers (self-employed without hired employees). Vulnerable workers are the most likely to fall into poverty, and least likely to have formal work arrangements, social protection, safety nets to guard against shocks, and are often incapable of generating sufficient savings to offset shocks (World Bank, 2023).

Rates of child labour and trafficking are high. Traffickers exploited children especially boys in agriculture, mining, fishing, and on coffee, cashew, and cocoa plantations. Women and children were regarded as the most vulnerable to trafficking. According to the Country Report on Human Rights in Guinea (2022), migrant laborers constitute a small portion of forced labour victims. The Labour code does not regulate the work of migrants. The Ministry of Foreign Affairs created an office to monitor the number of migrant worker and take necessary measures to ensure their protection (US Department of State, Country Report on Human Rights:Guinea, 2022)

13.3.5.2 Construction Phase Working Conditions

The number of construction workers on site during the peak construction phase is estimated to be around 2595. Standard working hours are from 7:30 to 17:30 (including one hour break). However, based on the information from ACC, the working hours are subject to change as construction progress requires adjustments. There is a workers' welfare facility built adjacent to the Project site (to the west) including offices for the construction activities. Workers' will not be planned to accommodate in the welfare facility. As the construction workforce are Guinean nationals residing in Conakry, they `will be residing in their own homes. Non-local staff will be commuting from Kipe area (with a 4 km commuting distance). The transportation to the Project site for ACC site staff will be provided via shuttle Company buses. It is anticipated the majority of the workforce will be commuting via bicycle and/or motorcycles/mototaxis to the/from the Project site. Peak hour deliveries (between 07:00-09:00 and 16:00-18:00) will be avoided where possible. The proposed routes and alternative roads to be used for the construction vehicle deliveries are not definite at the time of writing this ESIA report. Further details related to the construction traffic are presented in ***Chapter 12: Traffic and Transport***.

13.3.5.3 Operation Phase Working Conditions

The number of operational staff/employees as well as the administrative authorities' buildings, which will be relocated to the proposed project site, are not definite at the time of writing this ESIA report, however the vast majority of ministries will be relocated except for defence related ministries. It is expected that the project will ultimately provide functional office space for over 8,000 Guinea employees with dedicated vocational training. It is reported by the representative of SONAPI that there is an abundance in the number of existing employees/staffs currently working in the administrations. There will be no need to employ additional operational staff for the Project; the existing staff/employees will be relocated to the proposed Project site. A management company will be established under SONAPI for the operation phase of the Project namely, SOJECAC, who will be responsible for the management of the defined operational services.

No accommodation areas are planned to be included within the Facility premises for the operation phase of the Project. As informed, most of the existing staff/employees currently working in the administrations are residing in the nearby districts and neighbourhoods to the Project site.

13.3.6 Potential Receptors

The baseline study has identified the potential socio-economic receptors that exist within the site and the project-affected communities. For the purposes of the assessment, potential receptors are defined as elements of the socio-economic environment which may interact with the Project activities or perceive an effect or change to their life conditions / quality of life as compared to their baseline characteristics. Receptors may be affected, directly or indirectly, positively or negatively, during the Project's construction, operations, and decommissioning phases. Table 13-6 below lists the potential socio-economic receptors drawn from the baseline study.

Table 13-6: Potential socio-economic receptors

Receptor	Description	Sensitivity	Sensitivity
Project workforce	The construction workforce will not be based on site in a workers' camp. Non local staff will be coming from Kipe area (in the vicinity of the Project site). There is no workers' accommodation area established for the construction workers to accommodate; however, there is a workers' welfare facility adjacent to the Project site which includes offices. Regarding the operation phase of the Project, as informed, existing staff/employees working currently in the administrative authorities are mainly residing in the surrounding neighbourhoods/districts. The number of staff/employees and their locations are not definite at the time of writing this ESIA report. However, operational workforce will likely be from the surrounding neighbourhoods as well. Associated risks of accident and ill health due to living or working conditions are relevant for this receptor, as well as their potential social interactions with nearby communities.	Medium	The construction workforce are likely to contain people from nearby informal. This workforce may not have many employment options and therefore would likely accept poorer working conditions.
Local economically active population	Project related employment and training needs may interact with the local economically active population. This receptor may encompass people living within nearby communities.	Low	The local economically active population in the area will have the ability to adapt to the potential economic dynamism in the area.
Local businesses, services providers, and equipment suppliers	Project related procurement needs may interact with the local economically active population. Additionally, the project workforce may interact with this population as well. This receptor may encompass people living in nearby communities.	Low	Local businesses will have general access to financial and human resources to adapt and support the supply chain of the Project.
Surrounding Communities	The project may interact with other neighbourhoods in the commune of Ratoma: Kapora Rails and Soloprimo	Medium	The surrounding community will include vulnerable groups. As previously been subject to shocks such as the historic evictions. While not directly affected by the eviction the surrounding community would have been impacted by the aftermath of the evictions

Receptor	Description	Sensitivity	Sensitivity
			and many displaced families will have moved into neighbouring areas.
Vulnerable groups	See 'Vulnerable Groups' above for groups that have limited coping / adaptation abilities. No Indigenous peoples have been identified as part of the baseline study.	High	Vulnerable groups in the AOI include: • Non-Guinean ethnical minorities in the Project workforce; • Individuals or groups that carry out informal jobs (unlicensed service providers); • Children, women and elderly individuals and persons with disabilities.
Road users	Existing and future road users on RO308, RO363 and RO251.	Low	There are alternative routes providing the same access from east to west and vice versa.
Informal and formal street traders/shops/rent/repair areas along the roads in the surrounding of the Project	There are informal and formal street business such as shops, restaurants, car washes, garages brick making factories along roads namely RO308, RO363 and RO251. Construction and operational activities may interact with these businesses. Formal businesses located within the immediate AOI may have ability to adapt to changes as a result of the Project activities and will be able to raise their concerns through the community grievance mechanism. However, informal businesses/street traders and users may not be have ability to adapt changes and may not be willing to submit their grievances/complaint through the community grievance mechanism.	Low	Established businesses located within the AOI have the ability to adapt to changes caused by the project, can withstand shocks and can also raise issues or concerns with the local authorities (if a project grievance mechanism is not available).
People undertaking grazing activities around the Project Site	There are some grazing activities undertaken in the surrounding of the Project site. Construction and operational activities may have an adverse effect on livestock health. No herders were observed/seen during the site visits undertaken within the scope of the ESIA study.	Medium	These receptors have ability to control over the area where they undertake their activities and can raise any issues/concerns through the community grievance mechanism.
Historically Evicted Community	There is no current land occupiers or users on site. However, former land occupiers and users were impacted by historic evictions and clearances occurred in 1998 and 2019.	High	These occupiers and users were subject to eviction without compensation and have been severely impacted which makes most of them vulnerable to further change.

13.4 Impact Assessment and Mitigation

This section identifies the potential social impacts from planned Project activities, firstly for the construction phase and followed by the operations phase. In some cases, impacts may continue from phase to phase or be relevant in both. Additionally, other potential impacts that can have changes in social receptors are detailed and assessed in their respective chapters. Potential impacts such as increases in noise, dust, groundwater runoff, decreased air quality, affectations to landscape or climate change are therefore not included here.

13.4.1 Potential Impacts

Table 13-7 outlines the key activities that are likely to interact with and potentially impact existing receptors from a social community health perspective.

Table 13-7: Project activities and potential impacts

Project Activities	Impact Pathway	Receptor	Impact ID/ Description
Pre-Design Phase			
Site clearing	Historic Evictions & Displacement	**Displaced Community**	SE-01
Construction Phase			
Project announcement and start of construction activities	Temporary increased local employment and supply demand	Economically active population and general local businesses	SE-02
Project announcement and start of construction activities	Project-induced population immigration	Local communities within the wider AOI	SE-03
Start of construction activities	Potential interaction between workforce and communities.	Local communities within the wider AOI	SE-04
Project construction activities	Poor labour and working conditions	Project construction workforce	SE-05
Public services used during construction	Capacity strain of local public services and facilities	Local communities within the wider AOI	SE-06
Provision of site security	Potential security related human rights violations	Local communities within the wider AOI	SE-07
Transportation of construction goods and workers commute/access	Disruption to pedestrian access and Community Safety on Roads and in parking areas	Local communities within the wider AOI	SE-08
On site worker catering and sanitation	Worker welfare and Sanitation	Project construction workforce	SE-09
Site clearing of topsoil and levelling for construction	Access to utilities which cross the Project site	Project construction workforce	SE-10
Operational Phase			
Local and regional employment and procurement of goods and services during operation	Increased local employment and supply demand	Local communities within the wider AOI	SE-11
Use as government facilities	Improved more efficient government facilities and services	Guinea Population as a whole	SE-12
Use as government facilities	Improved working conditions for government workforce	Operational workforce	SE-13
Public services used during project operation	Capacity strain of local public service	Local communities within the wider AOI	SE-14
Relocation of workers to this new site	Economic influx and inflation	Local businesses at the old ministerial sites	SE-15
Relocation of workers to this new site	Loss of customer bas/business at original sites	Local communities within the wider AOI	SE-16
Provision of site security	Potential security related human rights violations	Local communities within the wider AOI	SE-17

13.4.2 Embedded Mitigations

The following embedded mitigation measures were described in ***Chapter 2: Project Description*** and will be considered during the pre-mitigation assessment of impacts.

- With exception of skilled specialists for certain tasks, the workforce will be sourced locally as much as practicable.
- ACC, SONAPI and the Government Ministries which will move into the site will abide by all national laws and regulations, in particular the following apply to labour management: Law L/2014/072/CNT on the Labour Code.
- All employees in the operational and construction phase will be paid the national minimum wage or above, as required by the Labour Code of Guinea.
- Under no circumstance will an applicant below the age of 18 years of age be recruited to work at the Project site. All employees will be required to show identification at the point of recruitment to proof their age and eligibility to work.
- Construction works will take place 6 days a week. Project regular working hours will be from 07:30 to 17:30 (including a one hour break) between Monday and Saturday.
- The Project's constructional ESMP (PGESC) includes provisions for night time work should it be required, this includes adequate lighting, supervision, food and water.
- Traffic management measures will be employed to safely manage construction vehicle movements to and from site access points and within the site. This includes vehicle and driver checks and a 10 km an hours speed limit when on site.
- All construction workers will be provided with EHS&S induction training and issued with Personal Protective Equipment.
- All security will be provided with basic security training.
- The Project will develop and implement a Stakeholder Engagement Plan and Grievance Mechanism to provide regular Project updates to local authorities, identify stakeholder concerns and manage any related grievance and complaints.
- All hazardous materials, chemicals pressurised, and flammable substances will be stored used in accordance with national permits.
- All employees shall receive awareness training on human rights and gender equality and prohibition of harassment.

13.4.3 Assessment of Historic Impacts

13.4.3.1 Impact SE-01: Historic Eviction & Displacement

While the land has been provided for the project unencumbered, the wider Koloma area, including the Project Site was cleared of its occupants in an eviction in 2019 (following an earlier eviction in 1998). These evictions were carried out by the Ministry of Habitat and Construction and have been the subject of criticism by local communities and NGOs such as Human Rights Watch. SONAPI, with support from its consultant Chemas Consulting Ltd (hereafter referred as Chemas), has now recently begun engaging with evicted families and their representative group, "Collectif des déguerpis" (The Collective of the Evicted) with the intention of retrospectively paying compensation in the form of cash and replacement land. During the eviction it was reported that violence resulted in the injury of some community members.

The Collective stated that people were notified three days before houses were demolished. Three days is not enough time for people to find alternative accommodation and move belongings. Many people had invested heavily in their existing property and would understandability need more time to process the news of upcoming demolition and negotiate with government authorities.

Chemas have identified that 50 households located within the Project site were included in the eviction.

The displacement impact felt by these evicted communities were severe and long lasting. In particular, the following issues were mentioned by the Collective and local leaders:

- Loss of physical property: The eviction involved the demolition of residential property, business premises and secondary structures without compensation. The collective reported that many people had invested significant funds into their property and photo evidence shows established buildings constructed from brick and concrete which were destroyed.

- Homelessness: Directly after the eviction took place most people who were unable to stay with friends or family in Conakry would have become homeless until they were able to find new accommodation. Human Rights Watch reported that many families spent the first nights after the eviction sleeping where the property had been or under nearby trees (Human Rights Watch, 2019).

- Loss of education: The Collective reported that many children and minors were separated with their parents, some of whom had moved out of Conakry leaving the children in the city. These children are likely to have experienced significant interruptions to their education or at worst may have dropped out of schooling.

- Loss of jobs and livelihoods: The eviction would have likely caused many impacts on income and livelihood either through the displacement of businesses located within the Koloma area of eviction or through disruption to livelihood or income in the immediate aftermath of the eviction. Many families chose to leave Conakry after the evictions and would therefore need to find an alternative source of income or livelihood.

- Break-up of families and loss of social networks: It is widely reported that families became separated during the eviction and some family members left the city leaving family members behind. The Mayor of Ratoma and the Collective said that many teenagers chose to stay in the city when their parents left. Family and friend support networks would have also been broken, this was something echoed by participants of focus groups from the nearby areas of Kapro Rails and Koloma Wards which had not been evicted. These participants described those evicted as their neighbours with whom business was good.

- Physical and mental distress: The families who were evicted would have experience significant physical and mental distresses caused by the fear of eviction process, the trauma of losing a home and anxiety when trying to find new accommodation and restore the quality of life. The Collective reported that a number of people experienced heart attacks as a result of the evictions. These specific claims could not be verified by AECOM but are consistent with the expected outcomes of such a forced eviction.

- Increased poverty: The immediate impacts on livelihood of those evicted will have undoubtedly resulted in an increase in poverty among those affected but also will have harmed the whole area economically as many businesses customer base will have been impacted.

It should be noted that the impacts on the community associated with displacement and associated violence have already occurred. The impact has been adverse, would have long term duration, and is not fully reversable. The spatial extent is at the local and regional level, this impact has a high magnitude. The social receptors, the displaced community, has a high sensitivity. The significance of the resulting impact is High Adverse.

Chemas is developing Resettlement Action Plan (RAP) for the Administrative City Project Site as well as a separate RAP for the wider Koloma area and an accompanying Livelihood Restoration Plan. The plans are based on the principles of IFC PS5 however it is acknowledged that complete compliance with IFC PS5 will be impossible due to the time that has passed since the eviction. The RAP includes a socio-economic survey, asset survey, identification of vulnerable groups, requirements for compensation for property destroyed, stakeholder engagement measures, grievance mechanism, budget and monitoring framework.

The objective of the RAP improve the lives of those affected going forward thus shortening the duration of the impact. The implementation of the RAP will go a long way to helping the lives of those affected however the trauma and stress which has occurred as a result of the eviction cannot be completely undone. Assuming the full implementation of the RAP and all supporting measures (such as effective monitoring and evaluation) the residual impact is still considered High **Adverse** given that the impacts have already occurred**.**

13.4.4 Assessment of Impacts during Construction

13.4.4.1 Impact SE-02: Temporary Increased local employment and procurement

As mentioned in the Project description, construction activities were originally planned to take 27 months to complete. It is expected that the construction workforce will peak at 2500. There will be also 95 supervisory and office staff (from ACC) at the peak. During the early stages of the construction works, the number of workers will be low (under 100) but will rise when the civil work begins rising to 2500 for the finishing works. With exception of skilled specialists and supervisory staff, most of the expected workforce will be sourced locally as much as reasonably feasible and will likely come from within Conakry hired through contracting agencies. Construction works will take place 6 days a week (no work on Sundays) and are expected to be carried during daytime between 07:30 and 17:30 hours. Some specific activities may be undertaken 24/7 like site security.

According to the social baseline, 7.9% of the total labour force in Guinea were unemployed. This potential impact would be beneficial, have a medium duration, and will be reversible. Its spatial extent could reach a regional level depending on the technical needs of the construction activities and the availability of professional skills.

The Project's constructional Environmental and Social Management Plan and Health and Safety Management Plan (PGESC and PGSSC) are already in place which includes a commitment to prioritise the employment of local people.

This potential impact has a low magnitude. The social receptor, the economically active population and the general local businesses, have low sensitivity. Considering a low sensitivity, the resulting impact is of **Low Beneficial significance**.

Additional Mitigation: In order to improve this positive impact, the Project will develop local recruitment and procurement goals and performance indicators and a Local Content Plan to maximise local opportunities. The plan shall include an analysis of the project needs for employment and services and an evaluation of the capacity of the surrounding community. Where gaps in capacity exist, measures could but in place to address those gaps where possible.

The plans will cover direct hires and also subcontractors and workers in the primary supply chain. Employment opportunities must be published and made accessible in a manner that is appropriate to local residents (e.g. employment centres, internet websites, etc.) and clearly communicating the recruitment process. First priority in employment for non-specialised jobs will be given to residents in Conakry. Women shall be encouraged to apply for available positions given there are less women in employment as noted in the baseline. Where possible training will be provided to local people as part wider community investment in order to increase their capacity to be employed.

Following additional mitigation, this potential benefit could have a **Moderate Beneficial significance**.

13.4.4.2 Impact SE-03: Project-induced population immigration

Potential Project-induced population immigration may occur from the Project announcement and the start of construction likely coming within Conakry. Additional non-workforce population may immigrate in search of opportunities, along with their potential families. This might include people looking for direct employment but also local traders and venders seeking to sell their products and services to the workforce. Population influx may be expecting indirect economic benefits even if they are perceived and not actual.

Any project induced migration would likely be from within Conakry into the Ratoma Commune which has a population of 776,770 inhabitants according to the baseline. Project induced immigration, which is likely to involve more men looking for work may also change the local gender balance. This potential impact would be adverse, have a medium term, and be reversible. The spatial extent could reach local and regional levels, depending on the actual or perceived growth of associated goods and services that the construction activity may require. Therefore, this impact has a low magnitude. The social receptors, the local communities have a medium sensitivity. This impact could have a **Medium Adverse significance**.

Additional Mitigation: The ESMP and HSMP includes a code of conduct for all employees to abide by. In addition to the Project's ESMP and HSMP (PGESC and PGSSC), the Project will also implement the Stakeholder Engagement Plan, which is prepared specific to this Project along this ESIA report as a standalone document, which will include steps to manage the expectations of the surrounding community. This will reduce the magnitude of the impact to negligible and as such the residual impact significance is **Low Adverse**.

13.4.4.3 Impact SE-04: Potential interaction between workforce social receptors and communities

The area surrounding the project is currently empty with roads, communities and businesses set back from the project over 250 metres away. However, through the use of local commerce or services, the Project workforce may interact with local communities, which could potentially result in an increased exposure to communicable diseases, such as STIs. The existing Project's ESMP and HSMP (PGESC and PGSSC)already includes measures to manage communicable diseases.

Without adequate controls in place, worker behaviour can have an impact on local communities. The increased number of workers in the area and also members of the public looking for work can create a social, economic or gender in-balance which can lead to resentment, abuse, harassment and Gender Based Violence (GBV).

Uncontrolled interactions may also increase tension between local residences, and businesses in the AoI and the workforce which will likely travel from elsewhere in Conakry potentially leading to disruption.

This potential impact would be adverse, have a medium-term, and would be mostly reversible. The spatial extent could reach the local level. Therefore, this potential impact has a general low magnitude. The local communities have a medium sensitivity. The resulting highest impact significance is **Medium Adverse**.

Additional Mitigation: In addition to the Project's ESMP and HSMP (PGESC and PGSSC), the Project will implement the Code of Conduct and " Regalement Interieur" (Internal Regulations) . The Project will assess the risks of harassment and GBV and take steps to limit negative interactions between the workforce and the community and other social receptors. The requirements in the Code of Conduct and the Regalement Interieur will include both direct hires, subcontractors workers in the primary supply chain. Induction training will be provided to the workforce which will highlight the sensitive receptors in the area and will include rules about worker behaviour.

The project will also take steps to inform and raise awareness of local populations and students and school staff on the nature and the programme of work Sexually Transmitted Infections (STIs), raise awareness of STIs and HIV-AIDS among site staff and the general public. Workers will be briefed regarding harassment and the laws which existing which treat sexual harassment and gender-based violence as a prosecutable offence.

The grievance process will be made available to the local community and will include a gender sensitive channel for reporting gender-based issues or concerns. This will reduce the magnitude of the impact to negligible and as such the residual impact significance is Low Adverse.

13.4.4.4 Impact SE-05: Poor labour practices and working conditions

The project workforce has the potential be subject to poor labour practices and working conditions or subject to occupational health and safety risks. These might include, discrimination, forced labour, poor welfare conditions, contractual safeguards or poor health and safety management. The project has already developed a HSMP (PGSSC) which includes health and safety management measures, commitments regarding worker welfare facilities and induction training.

Given the embedded mitigation included within the HSMP(PGSSC) Labour and working conditions, are considered to be of medium-term duration throughout the construction phase and are expected to be of potential low magnitude and the workforce has a medium sensitivity to take into account extreme cases they could entail permanent impacts (e.g. death or permanent disability). As such the pre-mitigation significance of the resulting impact is **Low Adverse.**

Additional Mitigation: In addition to the Project's ESMP and HSMP (PGESC and PGSSC), the Project will implement the Code of Conduct and Regalement Interieur. which will ensure there is no discrimination based on gender, age, ethnicity or religion, workers receive fair employment contracts, safeguards against child labour, forced labour, protection of collective bargaining and have an internal grievance mechanism from which to raise concerns. These measures which will reduce the magnitude of the impact to Negligible Adverse and as such the residual impact significance is **Negligible Adverse.**

13.4.4.5 Impact SE-06: Capacity strain on local public services and facilities

The baseline reveals that access to water is a challenge in Conakry due to poor pipework and the fact that water pipes become contaminated often due to lack of water flowing through them. The amount of water required during construction is estimated at up to 8900 m^3 at a rate of 371m^3/month. The water will be provided by national

water concessionaire Société des Eaux de Guinée (SEG). No water use is required for concrete mixing at the construction site. A non-potable water will be used for some purposes (Dust suppression, air conditioning and fire safety) to save potable water.

The Project site's electricity requirements are estimated at 2150KW. The Project site will be connected to the electricity grid; however, ACC will use generators to supply electricity. Nine generators with cooling systems will be installed to supply electricity to the site (operation of 7 at peak). It is expected that the generators will be operational for 10 hours/daily or as needed depending on workload.

There is a risk that water use by the project during the construction phase could put strain on the already struggling water network and lead to water shortages or drought which would then have an impact on the local community who depend on the current water supply.

Contained within the Project's ESMP is a plan for water resource management including setting water usage targets And monitoring and water saving measures.

This potential impact would be adverse, have a medium-term duration, and would be reversible. The spatial extent would be at the regional level however due to the mitigation measures already in place, this potential impact has a low magnitude. The social receptors, the local community, has a medium sensitivity. The significance of the impact is **Low Adverse**.

Additional Mitigation: The Project shall liaise with SEG to agree water usage limits and targets where necessary. Any change in water usage should be communicated to SEG in advance. Following this mitigation, the residual impact is **Negligible Adverse**

13.4.4.6 Impact SE-07: Potential security related human rights violations

Unarmed security will be hired by ACC at the site, however ACC also have an agreement with local police to also guard the site by setting up patrols and permanent presence around the perimeter of the site. Armed public security forces were seen at security posts near the project site.

The project itself and the construction of it is supported by the community, however it should be noted that there is a history of violent protests in Conakry and due to the evictions that occurred at the site the chances of industrial action against the construction of the project or in the area are slightly elevated. Industrial action could occur due to unmet expectations around compensation or local employment. The site security (including police) will need to be trained to de-escalate violent situations and avoid the use of force. Any inappropriate or excessive use of force against a community member(s), unjustified detainment of community members may result in human rights violations.

The risk of Security and Human rights Violations will remain medium-term duration throughout the construction phase whenever armed security is present. While any confrontation with community might have long lasting impacts in extreme cases (e.g death or permanent disability), the low frequency of a potential negative interaction results in the impact having a potentially low magnitude and the wider community has a medium sensitivity. As such the pre-mitigation significance of the resulting impact is **Moderate Adverse.**

Additional Mitigation: The project will develop provisions for vetting, managing and training security personnel in accordance with the Voluntary Principles of Security and Human Rights reducing the magnitude of the impact resulting in a residual impact significance of **Low Adverse.**

13.4.4.7 Impact SE-08: Road Safety and disruption to pedestrian access

The construction traffic presents a health and safety risk to community members using the roads, pavements or crossing the Koloma area. It will also impact the level of access as many pedestrians may have to wait to cross the road if construction traffic does not stop. There will also be vehicles including trucks and bike parks located outside the Project site which may be dangerous to other people walking around the site.

The south-eastern entrance to the Koloma area is a busy interchange where pedestrians, including school children were observed crossing. The wider Koloma site itself was being used for grazing purposes (around the Project site but not inside). The increased construction traffic will increase the risk of collision with a community member or livestock belonging to the community.

Construction traffic will therefore disrupt pedestrian access but also increase the risk of collision with a vehicle.

The Project's ESMP and HSMP already contains community health and safety and traffic management sections as well as embedded generic measures for the management of road safety, including visual checks on vehicles, driver tests, signs and a 10km speed limit inside the Project Site.

Considering these existing measures, the potential impact is considered to be of medium-term duration throughout the construction phase, is reversable and is expected to be of potential low magnitude. The sensitivity of children and pedestrians moving around the site high and as such the pre-mitigation significance of the resulting impact is **Moderate Adverse.**

Additional Mitigation: Once the specific access routes for the constructional vehicles are agreed, the speed limits shall be communicated with the drivers considering the pedestrian walkways as well as vulnerable groups (i.e. school children). Site specific details of high risk junctions and convergence points between pedestrian walkways and roads shall be identified along the route with specific risk management measures in place. The Project will develop provisions for employing flag person near the entrances to the Koloma area where construction traffic and pedestrians will interact. The flag person can stop traffic allowing pedestrian to pass providing adequate time for someone to cross before letting construction traffic commence. Speed limits shall be established outside the Project Site (i.e within the Koloma Area) and within Conakry. Measures shall also be taken to protect the truck and bike parking areas from community members, such as children wandering inside by providing physical barriers. Community awareness raising shall form part of the plan.

These measures will reduce the magnitude of change to **negligible** resulting in a residual impact significance of **Low Adverse.**

13.4.4.8 Impact SE-09: Worker welfare and Sanitation

The worker welfare facilities currently under construction include prefabricated offices, built storage areas, toilets, rest and catering areas and a clinic. Within the welfare facility, ACC will set up a rest room and a catering area on site.

There will be an infirmary which will provide first aid. The infirmary will be run by an occupational physician assisted by two nursing staff. There will be necessary changing rooms for use of all employees/workers which will be built in respectful and gender segregated manner. Sanitary facilities will also be built for the workers. Each office block will have a men's washroom with washbasins and WCs, and a second women's washroom also with two washbasins and toilets. It is planned that women's toilets will be located in a strategic place (i.e in the site's main office only or in a separate area from the men's toilets).

The facilities mentioned above are considered adequate in accordance with best practice however if the welfare facilities are not carefully managed the workforce itself may also experience impacts on poor hygiene and sanitation.

This potential impact is considered to be of medium-term duration throughout the construction phase, is reversable and is expected to be of potential low magnitude. The workforce has a medium sensitivity and as such the pre-mitigation significance of the resulting impact is **Low Adverse.**ACC shall ensure that provision of basic services to workers are managed in line with the guidance note on worker's accommodation published by IFC and EBRD (Worker's Accommodation: Processes and Standards). (IFC, EBRD, 2009). It will be ensured the Project's ESMP and HSMP (PGESC and PGSSC) are in place and implemented. These will include provisions for the regular cleaning and management of worker welfare facilities. These measures which will reduce the magnitude of the impact to Negligible and as such the residual impact significance is **Negligible Adverse.**

13.4.4.9 Impact SE-10: Access to utilities which cross the Project site

Two community water pipes were found to be crossing the site which are linked to the water tank to the west of the site boundary. If these pipes are destroyed it will result in a reduction of water reaching the community.

This potential impact is considered to be of medium-term duration throughout the construction phase, is reversable and is expected to be of potential medium magnitude. The community sensitivity is medium and as such the pre-mitigation significance of the resulting impact is **Moderate Adverse.**

ACC will undertake the necessary communications with the competent authority that these utilities are re-routed with a minimal disturbance to water supply. It is anticipated that once the pipelines are rerouted/new pipes are built, the water would need to be turned off for a few hours. This short stop in supply will need to be communicated to the surrounding community in advance.

These measures will reduce the magnitude of change to negligible resulting in a residual impact significance of **Low Adverse**

13.4.5 Assessment of Impacts during Operation

13.4.5.1 Impact SE-11: Increased local employment and supply demand for local businesses

The intended lifespan of the development is at least 60 years. As reported by the representative of SONAPI the employees that will work at the office complex at the currently work in existing government administrations on various locations across the city. There will be no need to employ a significant amount of additional operational staff for the Project; the existing staff/employees will be relocated to the proposed Project site. Other operational jobs such as building, facilities and grounds management, catering, waste and cleaning and security will provide opportunities for local people. SOJECAC, who will be responsible for the management of the defined operational services will require employment from the local population in Conakry, however the number of jobs created is unknown at this stage. The arrival of government ministries at the Project will attract many local businesses seeking opportunities. This will include licenced service providers at the Project and also informal vendors which will likely move to the area. Increased economic dynamism in the AOI and job sector diversification will continue as supply chains become more complex and extend to other regions to cover demand of specialised government ministries.

This potential impact would be beneficial, have very long-term duration throughout the operations phase, and be reversible. Its spatial extent could reach regional levels. Therefore, this impact has a medium magnitude. The social receptor, the Project workforce and the economically active population, have low sensitivities, resulting in an impact of **Moderate beneficial** significance.

13.4.5.2 Impact SE-12: Improved and more efficient government facilities and services

The main objective of the Project is to provide a number of government ministries with improved modern offices and facilities which are all located in one place and is part of an overall government objective to improve connectivity between ministries. Locating government ministries within the same locality will likely improve the ability of said ministries to communicate and work together which will likely improve overall governance in Guinea.

This potential impact would be beneficial, have very long-term duration throughout the Project life cycle, and be reversible. Its spatial extent could reach regional levels. This results in a medium magnitude impact. The social receptor, the population of Conakry, have a low sensitivity level. Therefore, this impact has a **Moderate Beneficial** significance.

13.4.5.3 Impact SE-13: Improved working conditions for government workforce

The Project will improve the working conditions of all government staff currently employed across Conakry. The government buildings will be improved quality, safer, more modern and more comfortable for workers. The Project will offer outdoor space and services near to the offices to improve wellbeing. The new premises will be designed to promote more open participation of females the workplace with the inclusion of separate female toilets and will be able to cater for handicapped employees due to access and dedicated washrooms. Regarding difficult access for people with reduced mobility (PRM) will include measures for PRMs in the design, creating access ramps, building toilets adapted for PRMs.

This potential impact would be beneficial, have very long-term duration throughout the Project life cycle, and be reversible. Its spatial extent could reach regional levels. This results in a medium magnitude impact. The social receptor, government workers, have a low sensitivity level. Therefore, this impact has a **Moderate Beneficial** significance.

13.4.5.4 Impact SE-14: Capacity strain of local public services and facilities

Required electrical load is estimated to be 10.7 MVA. During operation, there will be no combustible fuel use. There will be 5 x 2,500 KVA emergency backup generators on the Facility.

Site water requirements during operational phase are estimated at nearly 198m^3/day. Water will be supplied by the SEG. A number of energy saving strategies are already planned including; Solar hot water systems; External lighting to be assisted by solar panels; rainwater harvesting, LED lighting and associated sensors; and Waterflow reducers for sanitary ware items.

There is a risk that water use by the project during the operational phase could put strain on the already struggling water network and lead to water shortages or drought which would then have an impact on the local community who depend on the current water supply. This potential impact would be adverse, have a long-term duration, and would be reversible. The spatial extent would be at the regional level, this potential impact has a negligible magnitude. The social receptors, the local community, has a medium sensitivity. The significance of the resulting impact is **Moderate Adverse**.

Additional Mitigation: While the above energy and resource strategies will reduce the impact in the short term, they will all need to be maintained throughout the life of the project. It is recommended that an Environmental and Social Management Plan for operational phase (OESMP) is developed and implemented in the operational phase to ensure the long-term effectiveness of the above measures. The Project will regularly engage with local service providers to ensure that facilities are able to cope with increased demand. The residual impact is **Low Adverse.**

13.4.5.5 Impact SE-15: Economic influx and inflation during operation

The presence of government ministries and the economic opportunities, that will come with the Project, will cause an influx in local businesses and increases in demand for local goods and services. While this will have a positive impact as described under SE-11, it will also likely cause prices to be inflated which will have an adverse impact on existing residences who may not be economically involved with the project. The government workers based at the administrative city who are likely paid significantly more than the surrounding community will have a great disposable income which will encourage the sale of more expensive produce. It is also likely that cost of accommodation will increase as government workers may seek accommodation closer to their work.

This potential impact would be adverse, have a long-term duration, and is not reversible. The spatial extent would be at the local and regional level, this potential impact has a medium magnitude. The social receptors, the local community, have a medium sensitivity. The significance of the resulting impact is **Moderate Adverse**.

The Project should develop a Local Content Plan and Community Development Plan which will assist local people who are at risk of being priced out the area take advantage of the increased economic opportunities. The project will also a maintain it's Stakeholder Engagement Plan and Grievance Mechanism. The residual impact is **Low Adverse.**

13.4.5.6 Impact SE-16: Loss of customer base and loss of business at original sites

As government ministries and their staff relocate to the administrative city, businesses based at or near the existing ministry buildings will experience changes to their customer base. While many service providers may be able to relocate to the new area some will not be able to. This may include local food venders or shops based at the existing locations, or service providers whose existing contracts are not renewed in the new location.

The uncertainty over the number of ministries to be relocated and the number of contracted service providers at the existing buildings and informal business which serve staff there makes it difficult to quantify the impacts. It should however be considered changes of this kind are typical in a dynamic and changing economy and the fact that the ministries are not all currently located in one location will disperse the changes in customer footfall.

This potential impact would be adverse, have a long-term duration, and is reversible. The spatial extent would be at the local level, this potential impact has a medium magnitude. The social receptors, local businesses at existing premises, have a low sensitivity. The significance of the resulting impact is Low **Adverse**.

The Project will implement a Local Content Plan, and Stakeholder Engagement Plan so that business opportunities will be aware of the project and can seek opportunities at the new site. The residual impact is **Negligible Adverse.**

13.4.5.7 Impact SE-17: Potential security related human rights violations

During the operation phase, there will be official armed police officers who are assigned responsibility to guard the government complex. The Project site will have a boundary wall and general CCTV system. Access Control is yet to be determined at this stage and a protocol is yet to be developed.

The Project is currently supported by the community, however it should be noted that there is a history of violent protests in Conakry and due to the fact the site will be a government facility it is likely to be targeted in future protests or industrial action. The site security (including police) will need to be trained to de-escalate violent situations and avoid the use of force. Any inappropriate or excessive use of force against a community member(s), unjustified detainment of community members may result in human rights violations.

The risk of Security and Human rights Violations will remain long-term duration throughout the operational phase whenever armed security is present. While any confrontation with community might have long lasting impacts in extreme cases (e.g death or permanent disability), the impact having a potentially high magnitude and the wider community has a medium sensitivity. As such the pre-mitigation significance of the resulting impact is **High Adverse.**

The Project will conduct a Security and Human Rights risk assessment to identify potential risks of security issues resulting in human rights violations from both public and private security. These risks should be managed primarily through the selection of reputable security firms which meet international practice, but should also include the provisions for vetting, managing and training public and private security personnel in accordance with the Voluntary Principles of Security and Human Rights reducing the magnitude of the impact resulting in a residual impact significance of **Low Adverse.**

13.4.6 Impact Summary

Table 13-8 summarises identified impacts on waste management during construction and operation of the Project.

Table 13-8: Impact Summary Table

Code	Impact	Receptor	Sensitivity	Magnitude	Potential Significance	Additional Mitigation	Residual impact magnitude	Residual impact Significant
Pre-Design Phase								
SE-1	Historic Eviction & Displacement	Displaced Community	High	High	High Adverse	RAP & LRP	High	High Adverse
Construction Phase								
SE-2	Temporary increased local employment and supply demand	Economically active population and general local businesses	Low	Low	Low Beneficial	Enhancement measure: The project will develop a local content plan	Medium	Moderate Beneficial
SE-3	Project-induced population immigration	Local communities within the wider AOI	Medium	Low	Medium Adverse	Project's ESMP and HSMP (PGESC and PGSSC) along with SEP will contain steps to manage project induced in-migration	Negligible	Low Adverse
SE-4	Potential interaction between workforce and communities.	Local communities within the wider AOI	Medium	Low	Medium Adverse	Project's ESMP and HSMP (PGESC and PGSSC) include the Code of Conduct should be update to include measures on worker behaviour.	Negligible	Low Adverse
SE-5	Poor labour and working conditions	Project construction workforce	Medium	Low	Low Adverse	Project's ESMP and HSMP (PGESC and PGSSC) and the règlement intérieur will include measures to ensure working conditions are more than adequate.	Negligible	Negligible Adverse
SE-6	Capacity strain of local public services and facilities	Local communities within the wider AOI	Medium	Low	Low Adverse	Engage with SEG to agree water usage limits	Negligible	Negligible Adverse
SE-7	Potential security related human rights violations	Local communities within the wider AOI	Medium	Low	Medium Adverse	The project will develop and implement a Security Management Plan	Negligible	Low Adverse
SE-8	Road Safety and disruption to pedestrian access	Pedestrians including in general [Schoolchildren Herders and or free grazing animals Pedestrians on southern roads]	High	Low	Moderate Adverse	Project to implement a Traffic Management Plan The speed limits should be communicated with the drivers. Site specific details of high risk junctions and convergence points between pedestrian walkways and roads should be identified along the route with specific risk management measures in place.	Negligible	Low Adverse

SE-9	Worker welfare and Sanitation	Workforce	Medium	Low	Low	Provision of basic services to workers are managed in line with Worker's Accommodation: Processes and Standards. (IFC, EBRD, 2009).	Negligible	Negligible Adverse
SE-10	Access to utilities which cross the site	Neighbouring communities	Medium	Medium	Moderate Adverse	Re-route/replace any affected utilities	Negligible	Low Adverse
Operational Phase								
SE-11	Increased local employment, local opportunities and supply demand	Economically active population and general local businesses	Low	Medium	Moderate Beneficial	Not Required	Medium	Moderate Beneficial
SE-12	Improved and more efficient government facilities and services	All citizens of Guinea	Low	Medium	Moderate Beneficial	Not Required	Medium	Moderate Beneficial
SE-13	Improved working conditions for government workforce	Operational Workforce	Low	Medium	Moderate Beneficial	Not Required	Medium	Moderate Beneficial
SE-14	Capacity strain of local public services and facilities	Local communities within the wider AOI	Medium	Low	Moderate Adverse	The Project will regularly engage with local service providers to ensure that facilities are able to cope with increased demand.	Negligible	Low Adverse
SE-15	Economic Influx and Inflation during operation	Local communities within the wider AOI	Medium	Medium	Moderate Adverse	Local Content Plan, Community Development Plan, Stakeholder Engagement Plan and Grievance Mechanism	Low	Low Adverse
SE-16	Loss of customer base and loss of business at original sites	Existing service providers (formal and informal) to government facilities	Low	Medium	Medium Adverse	Local Content Plan, Community Development Plan, Stakeholder Engagement Plan and Grievance Mechanism	Low	Low Adverse
SE-17	Potential security related human rights violations	Local communities within the wider AOI	Medium	High	High Adverse	The project will develop and implement a Security Management Plan	Negligible	Low Adverse

14. Archaeology and Cultural Heritage

14.1 Introduction

This chapter presents an assessment of the impacts associated with the proposed Koloma Administrative City upon tangible and intangible archaeology and cultural heritage. It includes an appraisal of the potential impacts associated with the Construction and Operation phases of the Project.

Mitigation measures required to prevent, reduce, or offset any significant adverse effects are presented, and the likely residual effects after these measures have been employed.

14.1.1 Impact Assessment Methodology

This section summarises the methodology specific to assessing impacts on archaeology and cultural heritage. It builds on the general ESIA assessment methodology in ***Chapter 4: ESIA Methodology*** to take account of the range of likely significant effects on the fabric and setting of archaeology and cultural heritage arising from the construction and operation of the Project.

Receptors carried through to impact assessment comprise all archaeology and cultural heritage sites identified during the course of desktop research and field visits which may be impacted by Project activities within the construction footprint.

The assessment of impacts has been undertaken by identifying and evaluating a range of activities and scenarios that are likely to occur throughout the phases of the Project. The key activities likely to result in impacts to the known and potential heritage assets during each of the Project phases are included below in Table 14-1.

Table 14-1: Project activities which may lead to potential impacts on archaeology and cultural heritage

Phase	Activity
Construction	• Mobilisation of plant and construction vehicles to the Project Site • Physical movement of construction vehicles and plant within the Project Site • Clearing and grubbing, vegetation clearance • Earthworks, including ground levelling, installation of drainage ditches, trenching for cables, construction of internal site roads and topsoil stripping • Installation of temporary construction facilities including labour camp, welfare facilities, office, laydown areas and vehicle parking • Construction of new buildings and their associated foundations (incl. piling) and basements • External works including landscaping; covered parking, roadways and associated infrastructure and utilities • Presence of construction workforce
Operation	• Presence of new buildings • Presence of ancillary buildings • Presence and use of new roads and parking • Presence of onsite workforce

14.1.2 Regulations and Guidelines

The approach to the archaeology and cultural heritage assessment and mitigation has been devised to address the specific effects likely to result from developments of this scale and nature. The significance criteria utilised are based on applicable legislation of the Republic of Guinea and the ESIA Standards. Where Guinean legislation does not provide standards and guidance for a given aspect, or where international criteria are more stringent than the Guinean equivalent, international standards have been adopted.

14.1.2.1 Guinean Legislative Context

A summary of the applicable legislation considered in the ESIA process is presented in Table 14-2.

Table 14-2: National legislation, standards and guidelines applicable to the archaeology and cultural heritage

Law/ act/ regulation	Objective
Decree No 012 20/073 RG/SGG promulgating the Guinean Constitution on 6th April 2020 and abrogated in 2021	Article 22 states the protection of cultural heritage is afforded by the legislative framework enshrined in the Constitution.
Law L/2016/063/AN on the protection of cultural heritage adopted on 09 November 2016	This law relates to the protection, conservation and enhancement of the national cultural heritage. Article 42 states that "archaeological subsoil is the property of the State". If a site or group of elements can be considered part of the country's tangible and intangible cultural heritage, the discoverer, owner, lessee or operator "is required to make an immediate declaration to the administrative authority, which shall immediately notify the Minister of Culture". (Article 52).
Decree No. D/2019/221/PRG/SGG promulgating Law No. L/2019/0034/AN of 04 July 2019 on the Environmental Code in Guinea	The first article (No. 69) of the Code states that "Sites of historical, archaeological, scientific and cultural importance, as well as plant and animal species of ecological, aesthetic or medical interest, are protected by this Code".

14.1.2.2 Guinean Agreements and Conventions

Guinean environmental and social conventions and agreements of relevance to the archaeology and cultural heritage are outlined in Table 14-3.

Table 14-3: Guinean environmental and social agreements and conventions relevant to the archaeology and cultural heritage

Agreement/ convention	Objective	Status and date of signature
UNESCO Convention for the Protection of Cultural Property in the Event of Armed Conflict (Hague Convention) and Protocol to the Convention – 1954	Sparing cultural heritage from consequences of possible armed conflicts.	Accepted 20/09/1960
UNESCO Protocol to the Hague Convention of 1954 for the Protection of Cultural Property in the Event of Armed Conflict – 1954	Sparing cultural heritage from consequences of possible armed conflicts.	Accepted 11/12/1961
UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (Convention on Cultural Property) – 1970	Prohibits and prevents the illicit import, export and transfer of ownership of cultural property and aims to discourage the pillage of archaeological sites and cultural heritage by controlling international trade in looted antiquities through import controls and other measures.	Ratified 18/03/1979
UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) – 1972	To ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage on states' territories.	Ratified 18/03/1979
UNESCO Convention on the Protection of the Underwater Cultural Heritage – 2003	To enable States to better protect their submerged cultural heritage.	Ratified 13/07/2021
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage – 2003	To safeguard and ensure respect for the world's Intangible Cultural Heritage, including raising awareness of the importance of intangible heritage and encouraging international cooperation and assistance.	Ratified 20/02/2008
UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions – 2005	Recognises the rights of states to protect and promote the diversity of cultural expressions, encompassing cultural and natural heritage, movable cultural property, intangible cultural heritage and contemporary creativity.	Ratified 20/02/2008
OAU African Cultural Charter (Organisation of African Unity) – 1976	Includes rehabilitating, restoring, preserving and promoting the African cultural heritage; asserting the dignity of the African and popular culture. Will be superseded by African Union 2006 Charter for African Cultural Renaissance.	Deposited 02/02/1978

Agreement/ convention	Objective	Status and date of signature
OAU African Charter on Human and Peoples' Rights (Banjul Charter, Organisation of African Unity) – 1981	Regional human rights instrument designed to reflect the history, values, traditions, and development of Africa.	Deposited 13/05/1982
ACP Cotonou Agreement (African, Caribbean and Pacific Group of States and EU) – 2000	Integrate the cultural dimension at all levels of development cooperation. Recognise, preserve and promote cultural values and heritage and identities; supporting capacity development; developing cultural industries, cultural goods and services.	Signed 23/06/2000
African Union 2006 Charter for African Cultural Renaissance	Asserts the popular foundations African culture; promotes cultural democracy; preservation, restoration, rehabilitation and promotion of African cultural heritage; promoting traditional knowledge systems. Will replace OAU 1976 Cultural Charter.	Deposited 16/07/2021

14.1.2.3 International Standards and Guidelines

ACC has committed to align the Project to the IFC Performance Standards (IFC 2012a and IFC 2012b). International standards and guidelines relevant to the archaeology and cultural study are outlined in Table 14-4.

Table 14-4: International standards and guidelines applicable to the archaeology and cultural heritage study

Standard / guideline	Objective
ICOMOS 1990 Charter for the Protection and Management of the Archaeological Heritage (Lausanne Charter) (ICOMOS, 1990)	Sets out the principles relating to the different aspects of archaeological heritage management.
ICOMOS 2022 Guidance and Toolkit for Impact Assessments in a World Heritage Context (ICOMOS, 2022)	Provides guidance on assessing the significance of and impacts upon cultural heritage sites.
IFC Performance Standard 8 Cultural Heritage (IFC, 2012a)	IFC Performance Standard 8: Cultural Heritage aims to protect cultural heritage from the adverse impacts of project activities and support its preservation.
IFC Guidance Note 8 Cultural Heritage (IFC, 2012b)	Scope includes tangible cultural heritage, unique natural features or objects that embody cultural values, intangible forms of culture proposed to be used for commercial purposes, and Critical Cultural Heritage – internationally recognised or legally protected cultural heritage areas or heritage used by communities for long-standing cultural purposes.
CIfA Standard and Guidance for Historic Environment Desk-based Assessment (CIfA, 2020)	Provides guidance on desktop study methodologies.
CIfA Standard and Guidance for Archaeological Field Evaluation (CIfA, 2020)	Provides guidance on archaeological field reconnaissance and evaluation.
World Bank Environmental and Social Standard 8: Cultural Heritage (World Bank, 2018)	ESS8: Cultural Heritage recognises that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. ESS8 sets out measures designed to protect cultural heritage throughout the project life-cycle.
World Bank Environmental and Social Standard 8: Cultural Heritage Guidance Note (World Bank, 2018)	Sets out general provisions on risks and impacts to cultural heritage from project activities.
Vermillion Accord on Human Remains (World Archaeological Congress, 1989)	Code of conduct for the treatment of human remains.

14.1.3 Receptor Sensitivity

While UNESCO maintains a register of tangible and intangible heritage assets which cover Guinea, the Republic itself does not hold a database of recognised heritage assets granted protection through national legislation or policy. Nevertheless, those archaeological or cultural heritage receptors that are not afforded protection under Guinean national legislation, policy, conventions and agreements or international standards (referred to herein as ‘no-designated’ heritage receptors) can be of national, regional or local interest.

In the absence of any national or international consensus on impact assessment methods for non-designated heritage receptors, the criteria used to determine receptor sensitivity, magnitude, nature and significance of impacts on archaeology and cultural heritage are based on the International Commission on Monuments and Sites (ICOMOS) 2022 Guidance and Toolkit for Impact Assessments in a World Heritage Context (ICOMOS, 2022). It is acknowledged that this guidance document refers to World Heritage and Protected Areas, but the assessment principles are widely applicable to non-designated heritage receptors.

The significance and sensitivity of non-designated heritage receptors is judged upon the extent of survival, current condition, rarity, representativeness, the importance of the period to which the remains date, fragility, connection to other sites (group value), potential to contribute to knowledge, understanding and appreciation, potential for future research, the values assigned by local experts and the extent of documentation enhancing the heritage receptor's value.

The vulnerability and resilience of a heritage receptor reflects how vulnerable or robust a site, monument, artefact, assemblage or complex is to damage or destruction by a number of factors, including:

- Natural conditions, such as erosion, flooding and chemical deterioration;
- Environmental conditions, such as faunal and floral impacts;
- Human conditions, such as vandalism or interference, vehicular damage, pollution; and
- Project-related conditions, including construction and operational impacts.

The sensitivity of intangible cultural heritage practices depends upon a number of factors, including their authenticity, representativeness, cultural importance and economic viability; stakeholder value; the promotion for their transmission; the persistence of key materials and locations for the performance of practices; and the vulnerability of practitioners and practices to cultural, social and economic change.

Table 14-5 below presents the sensitivity criteria specific to this study.

Table 14-5: Archaeology and cultural heritage sensitivity criteria

Sensitivity	Criteria
High	• Sites of acknowledged international importance inscribed as World Heritage Sites (i.e. UNESCO World Heritage List) or UNESCO Global Geoparks. Individual attributes that convey Outstanding Universal Value. • Nationally-designated archaeological monuments, sites, buildings or historic landscapes protected by national laws. Undesignated sites, structures or historic landscapes of demonstrable national value. • Receptors that can contribute significantly to acknowledged national or international research objectives, whether designated or not. • Well or extremely well-preserved historic landscapes with considerable or exceptional coherence, time-depth, or other critical factors. • Intangible Cultural Heritage inscribed on national registers, or associated with movements or individuals of national or global significance.
Medium	• Designated or undesignated archaeological sites, landscapes or seascapes that can contribute significantly to regional research objectives. • Designated or historic buildings that have exceptional qualities or historical associations, with important historic integrity and contributing significantly to historic character. • Designated or undesignated historic landscapes or seascapes of regional value, which would warrant designation. • Intangible cultural heritage areas in local registers, or associated with movements or individuals of local importance.
Low	• Designated or non-designated receptor of local importance. Receptors compromised by poor preservation and / or poor survival of contextual associations, or with little or no surviving archaeological interest. • Receptors with potential to contribute to local research objectives. • Historic buildings of modest quality in their fabric or historical associations, or buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character. • Undesignated historic landscapes or seascapes with importance to local interest groups, whose value is limited by poor preservation and / or poor survival of contextual associations. Landscapes or seascapes of little or no significant historical interest. • Intangible cultural heritage activities of local significance, or associated with individuals of local importance. Poor survival of physical areas in which activities occur or are associated. Areas with few intangible cultural heritage associations or vestiges surviving.
Negligible	• Receptors with little or no surviving archaeological interest. • Buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character. • Areas with few intangible cultural heritage associations or vestiges surviving.

Sensitivity	Criteria
Unknown	• The importance of the resource cannot be ascertained.

14.1.3.1 Tangible heritage: archaeological, cultural and palaeoenvironmental remains

- All of the archaeological sites identified within the study area are considered to be typical of the region. None have been designated according to local, national or international standards in terms of their outstanding visual, historical, religious, communal, aesthetic or evidential value (ICOMOS 2022).

- None of the sites or objects within the Project Site have been previously recorded or designated, so there are no assigned national designation rankings to apply. The sensitivity of identified heritage receptors is presented in Table 14-5.

- For practical purposes, the scientific potential of archaeological and palaeoenvironmental sites has been assessed based on observations made during the Site visit. The assessment of the scientific value of sites may change following pre-construction and construction-stage intrusive investigation and recording work, if required. It is considered that it will be possible to mitigate project impacts upon archaeological remains by a staged programme of archaeological investigation and recording.

14.1.3.2 Intangible cultural heritage: archaeological remains

Unique natural features or tangible objects that embody cultural values, such as sacred groves, sacred trees, rocks, lakes, and waterfalls, are also significant aspects of the cultural landscape (IFC 2012a).

No intangible cultural heritage activities have been recorded within the Project Site. Consultation with local communities did not indicate any significant cultural practices or landmarks, or any associations with particular innovations, technical or scientific developments, movements or specific individuals of regional or national significance (see ***Chapter 13: Socio Economic***).

14.1.4 Impact Magnitude

The Assessment of the magnitude of impact is based on an understanding of how, and to what extent, the Project will impact on archaeology and cultural heritage resources.

Table 14-6 presents a description of the impact magnitude of change for archaeology and cultural heritage receptors.

Table 14-6: Archaeology and cultural heritage impact magnitude criteria

Magnitude	Description
High	• Changes to most or all key archaeological sites such that the resource is totally altered or destroyed. • Changes to key architectural and artistic building elements such that the resource is totally altered or destroyed. • Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit. • Comprehensive changes to setting. • Major changes to an area affecting intangible cultural heritage activities, associations, visual links and cultural appreciation.
Medium	• Changes to many key materials of archaeological sites, such that the resource is clearly modified. Changes to setting that affect the character of the receptor. • Changes to many key historic building elements, or to the setting of an historic building, such that the resource is significantly modified. • Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character. • Considerable changes to an area affecting intangible cultural heritage activities, associations, visual links and cultural appreciation.

Magnitude	Description
Low	• Minor changes to key archaeological sites, such that the resource is slightly altered or clearly modified. Slight changes to setting, or changes to setting that affect the character of the receptor. • Slight changes to the setting of key historic building structures. Changes to many key historic building structures, or to the setting of an historic building, such that the resource is slightly different and noticeably changed. • Change to many key historic landscape elements, parcels or components; slight or minor visual change to many key aspects of the historic landscape; limited but noticeable differences in noise or sound quality; changes to use or access; resulting in limited to minor changes to historic landscape character. • Minor changes to area that affect intangible cultural heritage activities, associations, visual links and cultural appreciation.
Negligible	• Very minor or no changes to archaeological receptor, historic building fabric or setting. • Very minor or no changes to elements, parcels or components of landscapes; no visual or audible changes. • Very minor or no changes in amenity or community factors.

14.1.5 Impact Significance

Assessment to classify the effect is determined using the impact significance matrix at Table 4-7 (***Chapter 4: ESIA Methodology***), which takes account of the sensitivity of receptors (Table 14-5) and the magnitude of change (Table 14-6). Effects can be neutral, adverse or beneficial.

14.2 Baseline

14.2.1 Baseline Data Collection

This section presents the baseline data collection and evaluation methods, including desktop study and field visit.

The scope of the archaeology and cultural heritage baseline studies follows the definition set out in International Finance Corporation (IFC) Performance Standard 8 Cultural Heritage (2012a, para. 3). Its scope includes:

- Tangible cultural heritage with archaeological, palaeoenvironmental, historical, cultural, artistic, and religious values.
- Unique natural features or tangible objects that embody cultural values, such as sacred groves, sacred trees, rocks, lakes, and waterfalls.
- Intangible forms of culture proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.
- Critical cultural heritage; internationally recognized or legally protected cultural heritage areas, including proposed World Heritage Sites. Heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes.

The baseline study considers archaeological and cultural heritage sites ranging in date from the prehistoric to the modern period, and considers both tangible and intangible heritage.

14.2.2 Study Area

The archaeology and cultural heritage Study Area has been defined based on the urban context of the Project Site and professional judgement in consultation with relevant stakeholders.

- It includes the area inside the Project Site Boundary and an outer buffer of 250m. The area inside the Project Site Boundary will undergo physical impacts upon archaeology and tangible cultural heritage. The buffer reflects the potential for ground-borne vibration and the development of secondary impacts, such as traffic outside the Project Site.
- A wider area of c. 40 km² was considered when researching the archaeological and historical background, in order to identify relevant sites in the vicinity of Conakry and the wider region.

No impacts on intangible cultural heritage have been identified.

14.2.2.1 Desktop Study

The aim of the desk-based assessment is to determine, as far as is reasonably possible from existing records, the nature, extent and significance of the archaeological, historic, cultural and palaeoenvironmental heritage within the Study Area.

Desk-based assessment of available topographic, soils and geology mapping, aerial photographs and satellite imagery was undertaken. Historical and modern mapping, aerial and satellite imagery was assessed, as well as topographic mapping (Service Géographique des Colonies), geological and soil mapping (Office de la Recherche Scientifique et Technique d'Outre-Mer (ORSTOM), 1969). Available archaeological excavation and survey records were consulted, including regional atlases, academic studies, studies undertaken in association with environmental or development projects, and relevant regional and period archaeological and landscape studies.

14.2.2.2 Data Limitations

The initial site visit was conducted by SEES's team in August 2023. SEES undertook a site walkover survey and visited the surrounding of the Project site. A limited walkover visit by the ESIA coordinators was then carried out between the 12th and 15th September 2023. Although photographs were taken, no archaeologist was present during the visit to assess both the presence and potential survival of cultural heritage receptors. The Environmental Evaluation Agency noted that, during the stakeholder consultations, a committee from Environmental Evaluation Agency had undertaken site visit. As stated by the Authority, the Committee's opinion was that there were no known sites or features of cultural value, and no buried human remains on site. This conclusion cannot be verified by AECOM and while surface features have been removed from the site during historic clearances, there remains the possibility that buried remains of archaeological or cultural interest exist.

The Project site was historically occupied and subject to two evictions (subject to two modern land clearance events) which occurred in 1998 and 2019 (Please see Section 2.2 of this ESIA Report). Both of these will have included some topsoil stripping but the original depth of topsoil and potential archaeological preservation prior to these events is unknown. Furthermore, surface wind-blown sands and vegetation are liable to mask low-lying archaeological features, earthworks and surface/near-surface sites such as finds scatters. Archaeological sites may be deeply buried beneath wind-blown sands.

Certain categories of archaeological site are difficult to recognise via non-intrusive field survey and purposive sampling, in particular, artefact scatters and dispersed occupation areas.

Given the nature of the terrain and the scale of the Study Area, it is possible that archaeological sites may remain undetected at reconnaissance/evaluation stage and will only be discovered in the course of ground clearance works. The significance of sites as reported in this assessment may alter as further investigations are undertaken.

14.2.3 Baseline Characteristics

This section presents the archaeology and cultural heritage baseline conditions. The archaeological baseline information available is relatively limited, in large part due to the dearth of archaeological works undertaken across the country (ICOMOS 2003).

14.2.3.1 Topography and Soils

The Project Site is situated in the centre of the Kaloum Peninsula, which forms a long and narrow ridge of high land extending approximately 41km from Mount Kakoulima to the north-east (and the Fouta Djallon beyond) to Tombo Island to the south-west. At its widest, the ridge measures 6km wide and it extends approximately 15.5 km beyond the coastline into the Atlantic Ocean. The surrounding coastline is relatively flat, but the Kaloum Peninsula itself rises sharply to 60-120m above the coast plain. Tombo Island, although forming part of the same ridge of land, historically formed a separate island which is now connected by a causeway.

The Los Islands are a small archipelago formed of the above sea level landmasses of a submerged volcano 4km offshore and south-west from Tombo Island. They include the islands of Tamara, Kassa, Roume, Blanche, and De Corail, along with several smaller islets. The islands are named collectively as Los Idolos after the discovery of ancient idols by Portuguese navigators in the post-medieval period.

The Project Site is located on an elevated area to the west of the ridge's central spine, approximately 14 km north-east of the peninsula's south-western tip and 26.5 km south-west of Mount Kakoulima. The Project Site is located on a slight rise approximately 95m above sea level and overlooks a small watercourse which flows out to the bay area by Ratoma to the west of the Project Site.

The area is currently largely covered in low-lying scrubland which has grown since the land was cleared in 2019. The remains of hardstanding and former foundations from recent occupation are still visible throughout the Project Site.

The soil type within this region is commonly lateritic soil, clay soil, and mangrove soil. High seasonal rainfall causes intense leaching of these lateritic soils and the sub-bases. Highly active soil organisms, rapid weathering and acidity result in the relatively poor preservation of organic materials, bone and metal objects. Although pottery, stone tools, iron smelting and ironworking debris, shell, pollen and burnt materials survive.

14.2.3.2 Geology and Palaeoenvironmental Context

Conakry is located upon the Conakry Igneous Complex, which is a is an eroded mafic-ultramafic (meaning low silica) magmatic intrusion. This complex was formed during a short and widespread magmatic event dated from 202 to 190 million years ago (MA) (close to the boundary of the Triassic and Jurassic periods) which is largely responsible for the creation of the Central Atlantic Magmatic Province during the breaking of Pangaea. The Conakry Igneous Complex itself is dated to Roughly 200 MA in the Mesozoic. Sills and dykes formed by this event are relatively common in West Africa, but few are as prominently exposed as the Conakry Igneous Complex or the Freetown complex further south-east. The Triassic period, a sub-period of the Mesozoic is known to contain fossils from therapsids, thecodonts, and the first true mammals such as shrew like omnivores and reptiles. Oceanic fossils include ammonites, gastropods, fish, shark, and marine reptiles such as plesiosaurs. However, given the magmatic origins of the Conakry Igneous Complex, such fossils are unlikely to exist within the Project Site (Freinex 1966).

Given the geology of the Project Site, no superficial deposits are expected. Colluvium may exist along the slopes of the small watercourse to the south of the Project Site or at the base of the Conarky Igneous Complex, but these would not extend into the Project Site. Indeed, recently completed geotechnical studies of the Project Site (Geotechnical Study for Construction of an Administrative City at Koloma, AGTS 2023) confirmed the absence of superficial deposits. Of the 22 boreholes excavated, only three recorded topsoil deposits ranging in thickness from 0.2m (BH-07 and BH-SPT-14) in the centre of the Project Site to 0.7m (BH-2) in the western central part of the Project Site. Only a single borehole documented ‘backfilled’ deposits. All other investigations reported that the uppermost deposits consisted of laterite, a type of weathered bedrock typical of tropical regions. It is possible that much of the topsoil has been removed either during the construction of housing formerly occupying the Project Site or during their removal and clearance.

During the early prehistoric period, the region experienced alternating stages of humid and arid climatic conditions, which in turn affected environmental conditions and patterns of human occupation. During the Maluekian Phase (<70,000 – c. 40,000 BP), the climate was arid. This was succeeded by the humid Njilian Phase (c. 35,000 BP), and the relatively arid Leopoldvillian Phase (c. 30,000 – 12,000 BP). The region has experienced the humid Kibangian Phase from 12,000 BP to present. The area has also experienced phases of marine transgression and regression. During dry periods, the landscape was characterised first by deciduous forest, then by savannah, with islands of forest; in humid periods, areas of hydromorphic forest expanded (Clist, 1995; Perrusset 1983; Peyrot and Oslisly 1985).

14.2.3.3 Archaeological and Historical Background

There is a dearth of archaeological research undertaken in Guinea as a whole, with much of the focus of research aimed at later periods of history. The few studies that have taken place have largely explored the remains of the former Malian Empire in the north-eastern areas of the country and the nation’s colonial history. Much as the rest of sub-Saharan West Africa, few efforts have been made research earlier periods of history and prehistory.

The limited knowledge for this region can be, in large part, attributed to the prevailing climatic and geological conditions in Sub-Saharan West Africa greatly reducing the visibility and preservation of archaeological material. Aside from the wide presence of acidic lateritic soils, Pliocene and Pleistocene sediments are also generally absent due to regular flooding which has led to extensive sediment erosion in what is a generally low-lying region of Africa (Scerri, 2017). Soil acidity and general lack of sedimentation has also resulted in poor preservation of later Holocene material, which has compounded the paucity of data on late prehistoric and early historic remains.

Overview of regional archaeological context

Early Stone Age (c. 2.6 million BP — c. 100,000 BP)

The earliest phase of the Early Stone Age (ESA) is largely characterised in the archaeological records by Oldowan stone tool technology used by hominins *c*. 2.6 million BP – *c*. 1.7 million BP. While an Oldowan

presence in West Africa is certainly possible, there is currently no clear evidence to support it. This is possibly due to dense forest cover during humid periods rather than poor survival of remains or lack of investigation. Indeed, undisturbed ESA material is virtually unrepresented in West Africa because there are almost no exposed early Pleistocene deposits (Mcintosh, 1981).

The Acheulean (*c*. 1.8 million BP – *c*. 100,000 BP) which followed was characterised by distinctive oval and pear-shaped hand-axes made by Homo ergaster/ Homo erectus. The IFAN (Fundamental Institute of Black Africa) contains numerous Acheulean-like artefacts from all over West Africa. However, there are currently no direct chronometric age estimates from primary context in association with such artefacts from anywhere in the region. No Acheulean has yet been reported in the far south and most tropical regions of West Africa, such as Sierra Leone, Liberia and the lowlands of the Ivory Coast. Such a lack of reported finds may reflect the absence of focused fieldwork in these regions and the difficulties of field conditions, rather than a true gap in the record.

Middle Stone Age (<c. 70,000 – c. 40,000 BP)

The first stratified Middle Stone Age (MSA) assemblages in West Africa were recovered from the sites of Asokrochona and Tema West, in Ghana. Both sites are close to the coast on the Accra Plains and with occupations apparently associated with open savannah conditions. The assemblages are considered MSA due to the high percentage of flakes recovered, but have been defined as the distinct Sangoan stone tool industry due to the presence of heavy-duty elements, such as the picks, hand axes, flaked knives and choppers (Clist 2006; Scerri, 2017). Dating and typology are disputed however, and 'Sangoan' sites may include Acheulean material (Matoumba, 2013). Redeposited stone tools have been recorded within or on top of 'stone line' deposits which are linked to abrupt changes in climatic conditions. The date of these stone-lines is uncertain, and some may date to the lower Pleistocene period.

In southern Mali, in Dogon country along the Bandiagara escarpment, classic MSA artefacts from a series of river cuts have been reported from the locality of Ounjougou, a complex of sites extending over about 10km. The sites within the Ounjougou locality preserve a somewhat disjointed record of occupation, which varied from sporadic to significant over a timeframe largely ranging from 100- 22ka. At the site of Kokolo II at Ounjougou, cores and core tools were dated to between ~80-60ka and may therefore represent a MSA dating to MIS 5 (~125-72ka). Stratigraphic discontinuities and a high degree of technological variation between assemblages is strongly indicative of frequent population turnovers, and as a result, it has been difficult to link the Ounjougou sequence with any single site or technocomplex known from elsewhere in Africa.

Undated Acheulean artefacts are abundant across the region of West Africa and attest to the presence of archaic Hominids. The emerging record of the Middle Stone Age (MSA) indicates core and flake technologies have been present in West Africa since at least the Middle Pleistocene, and that they persisted until the Terminal Pleistocene/Holocene boundary, which make them the youngest examples of such technology anywhere in Africa. The presence of MSA populations in forests remains an open question, however technological differences may correlate with various ecological zones (Scerri, 2017).

Late Stone Age (< c. 40,000 – c. 3,000 BP)

Knowledge of West Africa's past is largely confined to later prehistory, from the Late Stone Age (LSA) onward. During the Early Neolithic (c. 5,000 – c. 3,500 BP), populations engaged in hunting, gathering, small-scale sedentary agriculture and pottery manufacturing technology. Sites are characterised by plain pottery, grain/food grindstones, a wide range of finely manufactured stone tools including microliths, bladelets and polished stone axes, and tool-making waste (debitage). River craft may have been used for trading and fishing. In the Late Neolithic (c. 3,500 – c. 3,000 BP), there were increasing networks of trading and exchange with forest hunters and gatherers. Decorated pottery developed, and this pottery is most frequently decorated with comb impressions, which characterise southern Saharan/Sahelian ceramics during this time (McIntosh & McIntosh 1981).

Across the region, the character and frequency of aceramic geometric microlith assemblages appears to be varied in West Africa. The earliest indications of a ceramic LSA come from the Ravin de la Mouche site at the Ounjougou locality in Mali, where ceramic sherds have been dated to a minimum age of ~9.4ka. The dates coincide with humid conditions in the Sahara and the pottery is thought to form part of a new subsistence strategy, together with small bifacial arrowheads, exploiting an ecology associated with abundant wild grasses. These early sherds are decorated with impressions which were too fragmentary to be identified.

Macrolithic LSA assemblages featuring heavy duty elements such as large flaked or ground stone axes, picks, and celts succeed aceramic microlithic at several sites such as Rim in Burkina Faso, and Afikpo in Nigeria, and may reflect the digging of tubers (Coulibaly 2017).

Later ceramic microlithic sites are widely distributed in West Africa from Senegal and the Malian Sahel at Nioro to the forest regions of Liberia, Nigeria, and Cameroon. This technological base may have persisted up to 1000 years ago at rock shelter sites in the Liberian forest and Sierra Leone.

Before or at the inception of the development of agriculture, the late LSA (~3.5ka) in the forests and savannahs of central Ghana features sandstone "rasps", polished stone axes and bracelets, grindstones, and comb-impressed pottery, as well as a microlithic component. Described as the ‘Kintampo Industry’, this culture also extended into southern Ghana and the Ivory Coast and may have been influenced by Saharan groups moving southwards with aridification.

Agriculture expanded from c. 2,900 – c. 2,800 BP onwards, including the cultivation of oil palms. Coastal sites were often located within the sandy mantle of coastal dunes. Clay was extracted to plaster the walls of buildings, and the resulting pits were backfilled with broken pottery, hones, stone tools, quern stones, burnt nuts and seeds, charcoal and ash etc. There was extensive use of small boats for transport, trade and fishing.

Later Stone Age evidence is significant as it shows that there was technological diversification, including both microlithic and macrolithic traditions. There is a limited amount biological evidence which demonstrates that at least some of the populations during this period manifested a unique mixture of modern and archaic morphological features, drawing West Africa into debates about possible late admixture events between late surviving archaic populations and Homo sapiens.

It is possible that population movements throughout the Stone Age were influenced by ecological bridges and barriers. West Africa evidences a number of refugia and ecological bottlenecks which may have played such a role in human prehistory in the region. By the end of the Stone Age, West African groups became increasingly sedentary, engaging in the construction of durable monuments and intensifying wild food exploitation.

Fossil finds for the region have been analysed to evaluate population-level hypotheses regarding early and mid-Holocene population expansions. West Africa is one of the potential source areas for populations expanding into the Sahara with the onset of the African Humid Period. However, there are significant morphological differences between the Iwo Eleru specimen and early Holocene samples, including those from 31 Gobero (~10ka) in the Sahara. These results that suggest that the peopling of the Sahara during the Holocene did not, at least immediately, involve populations from tropical West Africa.

Possible Neolithic tools, comprising bifaces and scrapers belonging to the Toumbien tradition, have been recorded within a rock shelter within the Kakimbo Forest approximately 2.3km south-west of the Project Site (Jelinek and Valoch 1964). These have been poorly studied and their exact stratigraphy and date not certain, and they have been found in close proximity to more recent finds that included 13th century coins. The cave is hypothesised as having been used as a ceremonial site associated with the fetishist beliefs common across West Africa. The cave shelter is located along the edge the perennial drainage channel that originates in the higher ground 600m south of the Project Site. Other such prehistoric cave and shelters are expected to exist along the coastline, but such sites are unlikely to be present with the Project Site.

Early Iron Age (c. 3,000 BP – c. AD 1000)

In West Africa the only metallurgy to precede the appearance of iron is the primitive moulding and cold-hammering of unalloyed copper in restricted areas of the Sahara from the 9th century BC onwards.

The Iron Age effectively began shortly after the advent of copper use when Iron came into use in West Africa in the early- to mid-first millennium BC, directly succeeding Late Stone Age assemblages in most places. As elsewhere in sub-Saharan Africa, there was no intervening period of bronze and copper use, a situation unique in the comparative history of iron metallurgy in antiquity. It is probable that West African iron technology was introduced to the Sahel from North Africa around the 9th century BC. Several pieces of Carthaginian-style bronze jewellery found in a sixth century BC context in western Mauritania testify to some contact between Punic North Africa and the southern Sahara. However, there is increasing evidence that an indigenous and independent invention of iron extraction metallurgy emerged along the Niger Delta and in Cameroon as far back as 2,500 BC (Pamela Eze-Uzomaka 2009, Augustin Holl 2009, Manfred 2014, Bandama and Babaolo 2023). There is no direct evidence to suggest which source led to the emergence of iron metallurgy in Guinea, but it appears that it did not spread through West Africa in a predictable, homogeneous fashion but rather sporadically, with different

chronologies for the process even in closely adjacent regions, a pattern reminiscent of the spread of food production (McIntosh, 1981). Sites of early iron using communities are generally distributed along the rivers. However, the scale and intensity of early iron production is not well understood. It is not known how it developed or indeed what the impact was upon the local environment.

Iron Age pottery is characterised by richly decorated vessels generally with twine roulette decoration applied from the lip to the base of the vessel. Pottery was used for cooking and storage, and may have been used for ritual activities. A number of small pots, containing many others in miniature, have been found in Iron Age settlements throughout the region and were probably used for ritual activities.

Research has suggested that, prior to the introduction of iron into West Africa, social stratification and hierarchical political structures were rare to non-existent. By the first millennium AD, the practice of building massive earthen funerary tumuli containing richly appointed burials became common along the Niger Bend and in Senegal. At Igbo-Ukwu in Nigeria, the discovery of a burial chamber with stunning funerary appointments in cast bronze, as well as thousands of glass and carnelian beads similarly suggests that wealth and power had become concentrated in the hands of relatively few individuals. The scale of social organization also increased demonstrably in certain areas, with the growth of urban settlement networks in the Inland Niger Delta and in southwest Nigeria being perhaps the best-documented examples.

The influence of Arab trade on the Sahel by the end of the first millennium AD is significant, and is particularly true in the northern Sahel, which was a direct contact zone where North African merchants and their agents settled. Tegdaoust and Koumbi Saleh, two Mauritanian sites thought to be, respectively, Audaghost and the capital of the Empire of Ghana named by early Arab authors, testify to an explosion of urban growth to a North African plan in the 9th and 10th centuries AD. The extent and timeline of this contact reaching the West African coast, however, is debatable but certainly played a central role by the 1st Millennium AD.

Ethnographic and historic studies suggest that, by approximately 900 AD, Susu and Malinké (Maninka) populations began to encroach on the Baga, Koniagi (Coniagui), and Nalu (Nalou) people who had been living in the area. The Susu ethnic group originated in the southern coastal regions of Guinea and the north-west of Sierra Leone, while the Malinke had already been dispersed across parts of Guinea, Ivory Coast, Mali, Senegal, The Gambia, and Guinea-Bissau. These indigenous populations interacted with the Fulani who had migrating from east Africa and brought with them Islamic traditions. Maninka populations came to prominence and dominance during the rise of Malian Empire in the 13th and 14th centuries following their conversion to Islam.

Precolonial/Contact Period (Medieval to early 19th century)

Guinea was located on the southern edge of the Mali Empire which held power from the early 13th century through to the late 17th century. The empire was founded by Sundiata Keita (c. 1214 – c. 1255) and became renowned for the wealth of its rulers, especially Mansa Musa (Musa Keita). At its peak, Mali was the largest empire in West Africa, widely influencing the culture of the region through the spread of its language, laws and customs. The empire began as a small Mandinka kingdom at the upper reaches of the Niger River, centred around the Manding region. It began to develop during the 11th and 12th centuries as the Ghana Empire, or Wagadu, declined and trade routes shifted southward. The empire's total area included nearly all the land between the Sahara Desert and coastal forests. It spanned the modern-day countries of Senegal, southern Mauritania, Mali, northern Burkina Faso, western Niger, the Gambia, Guinea-Bissau, Guinea, the Ivory Coast and northern Ghana.

The history of the Mali Empire before the 13th century is unclear, as there are conflicting and imprecise accounts by both Arab chroniclers and oral traditionalists, however, the Tarikh al-Sudan records that Mali was still a sizeable state in the 15th century. At that time, Portuguese traders confirmed that the peoples of the Gambia were still subject to the mansa of Mali. Upon Leo Africanus's visit at the beginning of the 16th century, his descriptions of the territorial domains of Mali showed that it was still a kingdom of considerable size. However, from 1507 onwards neighbouring states such as Diarra, Great Fulo and the Songhai Empire encroached upon Mali's borders. In 1542, the Songhai invaded the capital but were unsuccessful in conquering the empire. During the 17th century, the Mali Empire faced incursions from the Bamana Empire, who ultimately sacked and burned the capital in 1670. From that point on, the Mali Empire rapidly disintegrated and was replaced by independent chiefdoms.

The identity of the capital city of the Mali Empire is a matter of dispute among historians. Scholars have located the capital in Niani, or somewhere on the Niger, or proposed that it changed several times, that there was no true capital, or even that it lay as far afield as the upper Gambia River in modern-day Senegal. The identification of

Niani as imperial capital is rooted in an interpretation of the Arab traveller al Umari's work, as well as some oral histories. Niani is a village located on the extreme eastern edge of Guinea on the west bank of the Sankarani River.

Extensive archaeological excavations have shown that the area was an important trade and manufacturing centre in the 15th century, but no firm evidence of royal residence has come to light. The city had at least 100,000 inhabitants in the 14th century, and it is noted that the emperor and his courtiers lived in Niani at some point. The town developed as an outlet for two main trade routes, one northward, called the 'Mande route' (Manding-sila), and one southward, called the 'Sarakolle route' (Sarakolle-sila). Niani and other principal cities housed a garrison for the imperial army.

With the Malian Empire's capital itself located on the high lands along the Sankarani River some 600km north-east of the Project Site, it does not appear to have directly controlled the coastal area of Guinea, their dominance of inland trade with North Africa means that much of the wealth was concentrated away from the Guinean coast which was only nominally under the Empire's influence.

Starting in the 13th century, the Arab slave trade flourished in the region and the Gulf of Guinea. By the 1430s trade from West Africa was controlled by Muslim states on Africa's northern coast. Muslim trade routes across the Sahara, which had existed for centuries, transported salt, kola, textiles, fish, grain, and slaves.

Portuguese exploration in the Atlantic in the 15th century heralded a shift in emphasis in the African slave trade from the Sahara to the West African coast. The Portuguese quickly extended their influence along the coasts of Mauritania, Senegambia and by 1445 and had reached Guinea. By the late 16th century Upper Guinea had developed as the main centre of the slave trade. Rather than directly competing with the Muslim traders, they increased trade across the Sahara. Other European nations would eventually participate in the trade, which persisted into the mid-19th century.

The Portuguese did not establish slave-trading forts on the Upper Guinea Coast as they did on the Gold Coast; rather they sold licenses to acquire slaves to private traders, who obtained the slaves through contacts with resident Portuguese traders. The Portuguese residents lived in formal Portuguese settlements which were increasingly fortified, mainly for defence against other Europeans, while the traders were regarded by the Portuguese as outcasts and renegades and lived under the protection of African chiefs. Therefore, Portuguese settlement of the Upper Guinea Coast had been pioneered by lançados and became integrated into African society. Initially the main focus of Portuguese settlement was at Buguendo to the north of the Cacheu River among the Banhun. The Portuguese referred to it as São Domingos, a name that was often applied to the Cacheu River as well. Much of this territory is located within what is now recognised as Guinea Bissau, north of the Republic of Guinea.

A number of early colonial settlements can be seen on Jacodus Hondius' map of West Africa dated to 1619, but this does not appear to include any named settlements near the modern-day Conakry other than the Isla Dolos, now known as Isle de Los off the south-west coast of Conakry. A similar situation is shown on the Charles Earl of Peterborough and Monmouth map of Africa dated to 1710 and later 18th century maps. Though not shown, a slaving port is known to have existed in the Sangareya Bay, approximately 20km north of the Site. It is likely that a Portuguese presence was known on the Isle de Los which traded extensively with the slaving outposts along the coast. A trading presence along the south-western tip of Conakry, in the historic core of the later settlement, would be expected to include some 16th century remains of Portuguese presence.

Colonial and post-Colonial Period (19th Century - Present)

The colonial-era Europeans first encountered the Susu people of the Conakry Peninsula in the late 18th century and traded with coastal villages. However, as their interests in West African and cross-Atlantic trade increased, Portugal, Britain, and later France became increasingly militarily involved in the geopolitics of the continent. The Temne Wars, which saw the Susu (Soussou) people attacked along with other ethnic groups, was largely used as a pretext in their efforts to "stabilise" the situation, leading colonial powers to enact wide ranging measures to exert control over the coastal trade through direct military intervention from the early 19th century onwards.

Following a long period of Portuguese influence, the British took control of the Los Islands from the Baga Tribe in the early 19th century and established a garrison on Tamara to control a slave trade outpost and piracy. The British did not, however, exert much control on the mainland and as such Guinea's colonial period only began in earnest with French military penetration into the area in the early to mid-19th century, as France replaced Portugal as the dominant European power in the region.

Guinea itself had been largely depopulated by the Atlantic slave trade and the French colonialists expected little resistance by local populations in their efforts to expand their control over the area. Colonial presence was established first through building forts and occupying coastal towns, then gradually expanding inland. The French Empire first administrated the territory as part of its Senegalese colony, later establishing the colony of Rivières du Sud in 1882 and finally the colony of French Guinea in 1891. French domination was assured by the defeat in 1898 of the armies of Samori Touré, the Mansa (or Emperor) of the Ouassoulou state and leader of Malinké descent, whose defeat gave France control of what today is Guinea and adjacent areas.

Conakry was founded by the French in 1884 and quickly became the most important port of the future colony. The port derived its name from a local village inhabited by the Susu, descendants of Manding ancestors who migrated from the mountainous Mali-Guinea border. Conakry was chosen as the capital of the future French Guinea in 1885 and became a *Commune Mixte* (Mixed Township) in 1904. The suburbs had received administrative status earlier, in 1901, when they were defined as a 12-kilometer-wide prolongation of the planned urban area. The historic core of the city was initially limited to Ile de Tombo before extending onto the tip of the Kaloum peninsula.

The 20th century saw the rapid expansion of Conakry from the tip of the peninsula towards the north-east, following the line of the central ridge of land that dominates the city today.

The settlement became increasingly industrialized in the 1950s, with the development of iron mining on the Kaloum Peninsula and the exploitation of bauxite on the nearby Los Islands until the late 20th century. With increasing wealth, the local Guinean population developed strong anti-colonial sentiment throughout the mid-20th century, culminating in a referendum in 1958 that saw the firm rejection of integration with France and a declaration of independence, ending the over 80 years of French colonial rule.

The 1813 map of Western Africa by John Pinkerton shows Factory Island, Whites Island to the south-west of the Project Site, presumably where the British settlements were located. It also shows the Conakry peninsula labelled as Tianba Point. The 1842 map of Sierra Leone and the 1944 map of West Africa by John Arrowsmith shows the Island de Los and Factory Island off the coast of Conakry but no settlement on the mainland itself.

The 1902 map of 'Afrique de l'Ouest Atlantique' from the *Service géographique des colonies* shows a railroad connecting Tombo Island to the mainland along the centre of the peninsula's ridge of high land. Conakry itself only covers a small portion of the Tombo Island. A number of settlements are shown on the western coastline along Sangareya Bay, including Rotouma to the south-west of the Project Site and Kaporo to the north-east. Fewer settlements are shown on the east side, and the nearest settlement marked as Daragbe to the south-east of the Site. The 1927 map of the same series shows substantial expansion, with Tombo Island largely built up by then and encroaching upon the peninsula to the north-east. The Project Site is shown as undeveloped between the perennial streams of Kakimbon to the south and Bantonka to the north, although a settlement marked as Oakabé is shown to the south-east. Kakimbon stream has its source approximately 800m south of the Site and flows into Sangareya Bay 2.5km west of the Site. The source of the Bantonka stream is 1km east of the Project Site and it joins with Sangareya Bay 1.9km north-west. The major road connecting the peninsula to the mainland was erected by then, running in approximate parallel to the railway line.

By the mid-20th century, aerial photographs show the Site as having been largely subsumed by the urban conurbation of Conakry. From that point onwards, it formed part of the neighbourhood of Kaporo-Rails, which was cleared for development in 1998 and 2019.

14.2.3.4 Tangible Cultural Heritage

Overview of archaeological receptors

No tangible heritage sites have been identified within the Project Site Boundary and 250m buffer during the site walkover. A number of wells, including a 'traditional' well, were identified in the walkover undertaken by the ESIA team in September 2023, but these appear to have been installed in the late-20th and early 21st century as part of the residential developments of the Site. They are not considered of archaeological or historical interest.

Although no known archaeological receptors have been identified within the Project Site, its topographic location suggests the area holds archaeological interest. The Project Site is situated in a central and prominent location on a ridge of land connecting the culturally significant Mount Kakoulima in the north-east to the volcanic islands of the Los Islands to the south-west. Despite few archaeological studies in the vicinity, lithic scatters of likely Neolithic date and medieval finds have been noted in a cave shelter 2.3km south-west of the Site and it is likely that the Project Site has been subjected to human activity from the prehistoric period onwards. The depth of potential archaeological deposits is poorly understood as no intrusive evaluation of the Project Site has been

undertaken. Soil deposition is, however, expected to have been relatively slow on the exposed slopes of the peninsula, suggesting that, where soils survive, the archaeological horizons for the later prehistoric period could be relatively shallow. Geotechnical investigations carried out within the Site suggest that soils which could contain or seal archaeological deposits survive locally but are largely concentrated along the central and western portions of the Project Site.

Although the Project Site has been subject to recent land clearance on two separate occasions over the last 25 years, the depth of ground disturbance from these activities is unknown. The Project Site therefore retains a potential to contain previously unrecorded archaeological remains dating from any period of prehistory onwards (ARCH01).

14.2.3.5 Intangible Cultural Heritage

Intangible cultural heritage includes cultural knowledge, innovations, and practices of communities embodying traditional lifestyles (IFC, 2012).

Living Cultural Heritage

Intangible cultural heritage is defined as the practices, representations, expressions, as well as the knowledge and skills (including instruments, objects, artefacts, cultural spaces), that communities, groups and, in some cases, individuals recognised as part of their cultural heritage. Living cultural heritage includes oral traditions and expressions, including language; performing arts; social practices, rituals and festive events; knowledge and practices concerning nature and the universe; and traditional craftsmanship (UNESCO, 2003). It also includes cultural knowledge, innovations, and practices of communities embodying traditional lifestyles (IFC, 2012).

The process of inventorying Guinea's intangible heritage, implementing the Convention for the Safeguarding of Intangible Cultural Heritage, is currently in its early stages. Guinea has a single practice inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity, the use of the sacred balafon instrument known as the Sosso-Bala in the town of Nyagassola in north-east Guinea (Inscribed in 2008).

Largely as a consequence of the recent developments of the Project Site, no intangible cultural heritage activities are associated with, or performed within, the Study Area. Consultation (see ***Chapter 13: Socio-Economic***) has not indicated any associations with particular innovations, technical or scientific developments, movements or specific individuals of regional or national significance (ICOMOS 2022).

The Project does not propose to use any intangible forms of culture for commercial purposes.

Religious adherence

Although urban populations in Study Area mainly adhere to imported religions such as Islam, many retain syncretic beliefs in traditional rituals and practices, such as ancestor worship and initiatory sects (see **Chapter 13: Socio-Economic)**. The absence of traditional worship structures in the Project Site and 250m buffer does not mean that ancestral beliefs do not persist in surrounding populations.

Natural features and tangible objects with cultural values

Unique natural features or tangible objects that embody cultural values, such as sacred groves, sacred trees, rocks, lakes, and waterfalls, can be significant aspects of the cultural landscape.

The Project Site has formed part of the landscape in the centre of Conakry developed on the Kaloum Peninsua in the 20th century. The higher ground on the which the Project Site is located prominently overlooks Sangareya Bay to the west and the lowland marshlands of the coastal plain to the east. This ridge provides a natural corridor connecting Mount Kakoulima in the north-east to the volcanic islands of the Los Islands to the south-west. The Project Site is located between two perennial streams, the Kakimbon to the south and Bantonka to the north, which could have some intangible value but which do not reach the Project Site.

A rock shelter located within the Kakimbo Forest approximately 2.3km south-west of the Project Site has recorded instances of ritual activity dating back to the medieval period and perhaps earlier. The rock shelter is associated with the Kakimbon stream which has its source c. 500m south of the Site.

Despite the prominent topographic features, interviews with local communities within the socio-economic topic do not indicate the presence of any sacred streams, trees, plants, or other landscape features within the Project Site. The socio-economic study (***Chapter 13: Socio-Economic***) has not identified any evidence for the physical structures or objects associated with the practice of imported or traditional religions within the Project Site.

Cultural Uses of Natural Resources

The Project Site is part of the Administrative City which has been cleared of residences on two earlier occasions and is inaccessible to local populations. These evictions were carried out by the Ministry of Habitat and Construction. The area has been subject to past levelling and vegetation clearance. Plants within the Project site are not gathered for medicinal uses, craftworking or food.

Further details on local communities, land use and employment are presented in ***Chapter 13: Socio-Economic*** and information on plant ecology is presented in ***Chapter 8: Biodiversity***.

14.2.4 Critical Cultural Heritage

Critical cultural heritage is defined as 'one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use, or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation' (IFC, 2012).

14.2.4.1 Internationally Recognised or Legally Protected Cultural Heritage Areas

The Study Area does not contain any internationally recognised or legally protected cultural heritage areas. There are no World Heritage Sites or Tentative List World Heritage Sites located within or in the vicinity of the Study Area.

14.2.4.2 Community Use of Cultural Heritage – Sacred Sites and Burial Grounds

There are no known instances of sacred sites or burial grounds within the Project Site. Four modern sacred sites comprising two cemeteries and two mosques been identified in the Study Area.

The Kaporo-Rails cemetery (SACR 1) is located c. 325m west of the westernmost extent of the Project Site (9° 36.014'N, 13° 38.206'W) and while the Bambeto cemetery (SACR 2) is located c. 650m to the south (9° 35.441'N,13° 37.887'W).

The nearest mosques (SACR 3 and SACR 4) are situated within the residential neighbourhood approximately 300m to the east (9° 35.987'N, 13° 37.677'W) and 300m north (9° 36.294'N, 13° 37.980'W) of the Project Site respectively.

Several more distant mosques, such as the prominent Turkish Mosque on Route le Prince is situated 950m south-east of the Project Site, falls outside the Study Area and are not expected to be impacted by the Project.

14.2.5Archaeology and Cultural Heritage Receptors

There are no known archaeological or cultural heritage receptors, whether tangible or intangible, within the Project Site.

Four cultural heritage receptors have been identified within or in proximity to the Study Area. The Bambeto Cemetery has been included in this list due to its association with the land clearance and relevant cultural significance despite its location beyond the Study Area. The cultural heritage receptors are shown on shown on Figure 14-1.

- Kaporo-Rails cemetery (SACR 01), located c. 325m west of the westernmost extent of the Project Site (9° 36.014'N, 13° 38.206'W)
- Bambeto cemetery (SACR 02), located c. 650m to the south (9° 35.441'N,13° 37.887'W)
- Mosque (SACR 03), located c. 300m east of the Site (9° 35.987'N, 13° 37.677'W)
- Mosque (SACR 04), located c. 300m north of the Site (9° 36.294'N, 13° 37.980'W)

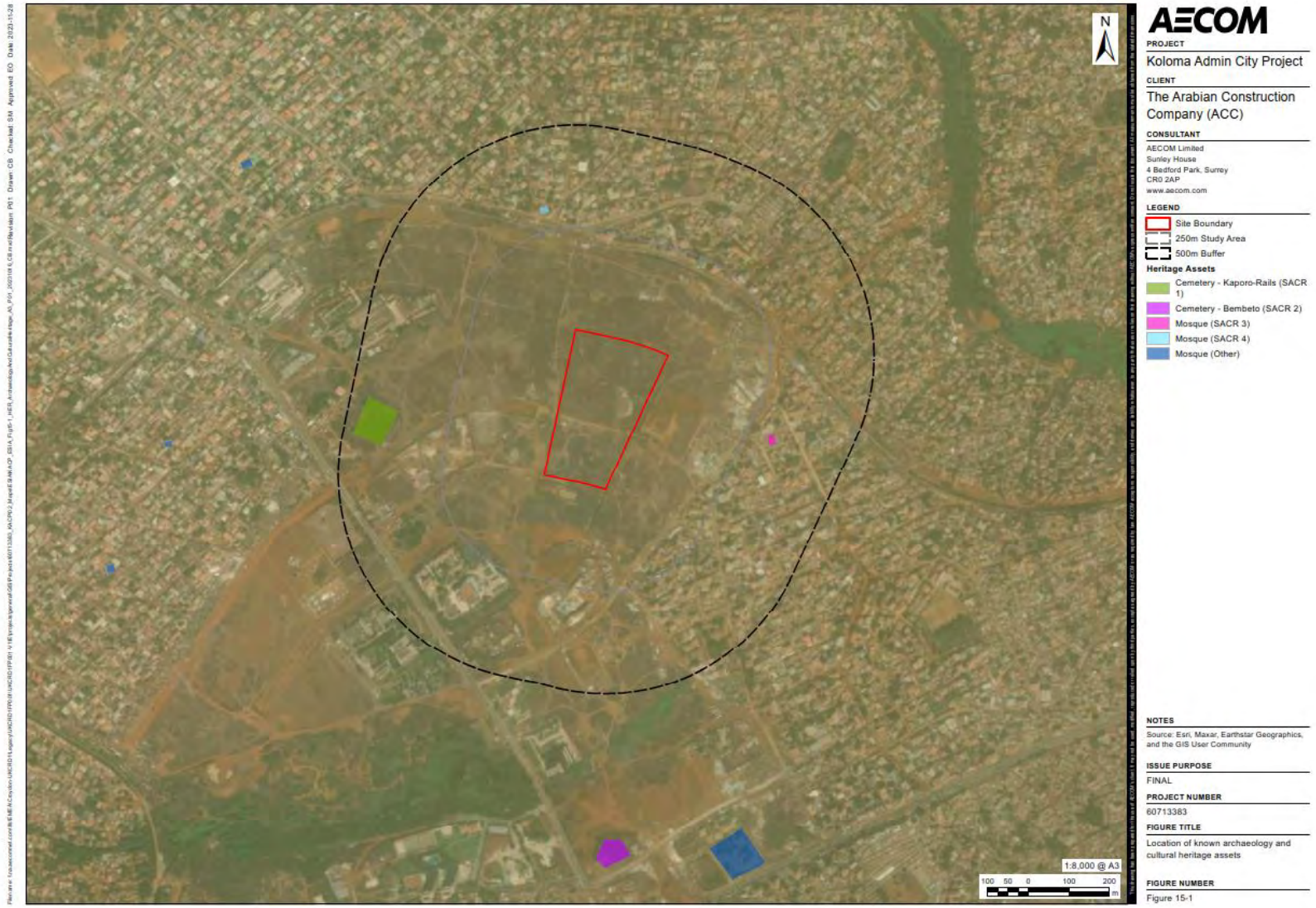

Figure 14-1: Archaeology and Cultural Heritage Receptors

All four sacred receptors are considered of High sensitivity to change due to their religious, funerary, historical and social significance.

The cemeteries (SACR 01, SACR 02) are particularly tied to the Kaporo-Rails area in which the Project Site is located and of substantial value to the former inhabitants. Their setting encompasses the former residential neighbourhoods of Kaporo-Rails. These have been entirely demolished and residences only survive to the west of the cemeteries, some distance from both the Project Site and the cemeteries themselves. While the wider Kaporo-Rails area is important to our understanding of the receptors, the Project Site itself contributes little to their significance. Due to the removal of the residential areas and their association with the displaced, the cemeteries' tranquillity is an important characteristic and relatively unique in Conakry where most mosques and cemeteries are surrounded by the urban conurbation.

The two nearest mosques (SACR 03, SACR 04) and those further away are all situated within dense urban neighbourhoods surrounding the cleared areas of Kaporo-Rails. They serve their local urban communities which do not include any residents within the Project Site. The Project therefore does not form part of their setting.

The assessment of the scientific value and sensitivity of previously unrecorded archaeological remains (ARCH 01) present within the Site would need to be evaluated through further intrusive investigation and recording work. However, given the level of previous ground disturbance and the poor soil preservation known to be pervasive in lateritic soils, such remains are likely to be, at most, of Medium sensitivity to change.

14.3 Impact Assessment and Mitigation

14.3.1 Potential Impacts

The following section presents the identified potential impacts associated with the Project construction and operation. The assessment does not include additional mitigation measures (see *Chapter 4 ESIA Methodology*, Section 4.5 Impact Mitigation and Management).

Archaeological and Cultural Heritage sites are a finite, irreplaceable and non-renewable cultural resource. Impacts on cultural heritage include the transformation of setting or context, and the significant loss of archaeological deposits and artefacts.

There is the potential for damage to or removal of tangible archaeological remains during the land clearance and earthworks activities. This would result in the loss of cultural heritage resources. Sites such as surface artefact scatters and buried settlement remains, where these survive, may suffer a direct impact from intrusive groundwork activities as set out in Table 14-7. There is a further potential for impacts to arise during the operation of the Project through changes to the setting of surrounding heritage receptors, which are also presented in Table 14-7. Impacts to cultural heritage during both construction and operation would be on a local scale.

Table 14-7: Potential Impacts on archaeology and Cultural Heritage Receptors

Project Activities	Impact Pathway	Receptor	Impact ID/Description
Construction: • Land clearance activities, including topsoil stripping and vegetation removal • Earthworks activities, particularly levelling, drainage and construction works, road construction, laydown areas, temporary supporting infrastructure and utilities • Construction activities, particularly foundations and basements • Landscaping, including landform modification and tree planting	Removal of archaeological artefacts, features and horizons Damage to archaeological artefacts, features and horizons (e.g. crushing, distortion, vehicle tracking damage) Illicit removal of archaeological remains	Previously Unrecorded Archaeological Remains (ARCH 01)	ACH - 01

Construction: • Construction stage dust and noise • Presence of buildings forming part of the Project changing the character and amenity of the Project Site and surrounding areas • Visual and lighting impacts (light spill and night-time lighting) and loss of tranquillity in Project Site and surrounding areas • Increase in construction related traffic Operation: • Presence and operation of new buildings and facilities, including vehicle movements, resulting in increase in light, noise and dust • Alteration of public access • Loss of night-time amenity and tranquillity	Degradation of the physical context and setting of mosques, cemeteries and archaeological remains Reduced visual and aural amenity, reduced tranquillity and increase in community disturbance Restriction or alteration of access to traditional sites & practices Changes to the tranquillity of places of worship Disruption of religious services Night-time lighting may have an impact on any ritual ceremonies that require darkness	Sites directly affected by changes to setting, visual and sound level change, affecting their cultural value and, for sacred sites, cultural activities: • Cemeteries (SACR 01; SACR 02) • Mosques (SACR 03; SACR 04)	ACH - 02

14.3.2 Embedded Mitigation

Cultural Heritage has not informed the design of the Project and as such no embedded mitigation has been included therein. All proposed mitigation measures are presented as additional mitigation detailed in Sections 14.3.3 and 14.3.4.

14.3.3 Assessment of Impacts during Construction

Construction activities would introduce noise, dust, light and increased traffic to the Project Site for the duration of the construction phase. These would result in the loss of tranquillity at the two cemeteries within the Study Area (SACR 01, SACR 02) during parts of the day and/or night for the duration of the construction phase. However, given the distance separating the Project Site from these receptors, construction activities would only result in a negligible change to our ability to understand and appreciate the receptors. The Project construction phase would therefore cause low magnitude impacts (ACH-02) to nearby cemeteries (SACR 01, SACR 02) of high sensitivity.

The same noise, dust, light and traffic derived from construction activities would, however, result in no changes to the setting of the nearest mosques (SACR 03, SACR 04) or other religious sites which are already located within dense urban neighbourhoods surrounding Kaporo-Rails. The Project Site does not contribute to their significance and as such the Project would not depreciate our understanding of these receptors.

To mitigate the loss of tranquillity at SACR01 and SACR02, construction traffic will avoid using roads adjacent to the two cemeteries in so far as it is possible to do so.

Construction activities have the potential to impact on previously unknown archaeological remains (ARCH 1) which survive below the level of modern ground disturbance. This potential has been greatly eroded by modern developments and two phases of land clearance. However, given the unknown depth of archaeological horizons, remains from any period of prehistory and history could survive within the Project Site. These are likely to have been truncated or disturbed and would therefore be considered of, at most, medium sensitivity to change. Intrusive construction activities such as, but not limited to those resulting from levelling, clearance, utilities installation, drainage, foundations and basements could result in the complete removal or truncation of archaeological features (ACH - 1). Therefore, archaeological remains of up to medium sensitivity would be subject to a high magnitude of change, resulting in **High Adverse** impact significance prior to mitigation and **Low Adverse** residual impact.

In order to mitigate risk of impacts to previously unrecorded archaeological remains during construction, the Project will implement a Chance Finds Management Plan to be secured in the Environmental and Social Management Plan (PGESC). This Chance Find Procedure will be implemented to reduce the likelihood of impacts occurring during construction. It will include contact details of responsible post-holders, contact details of approved archaeologists and any required agreements with the heritage authorities. It will set out notification requirements, response times and monitoring procedures for archaeologists.

A programme of cultural heritage awareness training will also be implemented and secured in the PGESC. This will set out how the workforce will be informed on the procedures of the Chance Finds Management Plan. The training should be delivered as part of site inductions and regular toolbox talks and may include training of machine drivers and banksmen in the detection, identification and preservation of archaeological remains and relevant soil horizons.

Should any archaeological remains be encountered, it is expected a programme of archaeological monitoring of intrusive investigations shall be carried out as additional mitigation alongside construction groundworks. Schedules and work phasing must, therefore, be sufficiently flexible to allow for the appropriate mitigation of any remains encountered in the course of groundworks.

In cases where impacts on remains cannot be avoided, appropriate mitigation will be undertaken in the form of investigation and recording by a programme of scientific excavation, recording, analysis, museum curation and public dissemination of information (publication). The resulting research dividend will contribute to off-setting the significant loss of archaeological remains.

The proposed construction-stage archaeological mitigation measures have been developed in line with national legislation, IFC PS 8 and other applicable GIIP and are summarised in Table 14-8.

Table 14-8: Proposed archaeological mitigation measures: Construction

Mitigation measure	Outline description
Protection against loss of tranquillity at SACR01 and SACR02	Construction traffic will avoid using roads adjacent to the two cemeteries in so far as it is possible to do so.
Protection of sites	Prior to construction groundworks, identified archaeological sites shall be protected by temporary flagging/ fencing and signage, ensuring an adequate buffer and staff awareness training. This will aim to prevent inadvertent trampling, excavation, vehicle rutting and collision damage.
Construction Environment Management Plan	**Chance Finds Management Plan** will be implemented to reduce the likelihood of impacts occurring without adequate mitigation. It will include contact details of responsible post-holders, contact details of approved archaeologists and any required agreements with the heritage authorities. It will set out notification requirements, response times and monitoring procedures for archaeologists.
	Cultural Heritage Awareness Training Cultural Heritage Awareness Training shall be integrated into workforce site inductions and toolbox talks for all Project staff, contractors and subcontractors. This includes training of machine drivers and banksmen in the detection, identification and preservation of archaeological remains and relevant soil horizons.
Excavation and recording of archaeological sites	An archaeological watching brief shall be implemented should any archaeological remains be identified or encountered during construction works. If archaeological remains are identified during the watching brief, construction groundworks shall be temporarily suspended in that area and the relevant government authorities informed, and a permit for archaeological excavation works requested. The authorities shall decide the mitigation measures to be applied to the site. Any ensuing archaeological excavation works may involve the manual stripping and hand excavation of archaeological deposits and structures. Earthmoving equipment and machinery may be only used in archaeological excavation works if their use is specified in the permit for field research.

14.3.4 Assessment of Impacts during Operation

The following section presents the identified impacts associated with the operation phase. The activities which may impact upon archaeological and cultural heritage sites located within the Project Site include the presence and operations of the new buildings within the landscape, changes to access and loss of night-time amenity and tranquillity. These would result in negligible changes to the significance of the two cemeteries (SACR 01, SACR 02) of high sensitivity, resulting in a **Negligible** magnitude of impacts. The two mosques within the Study Area (SACR 03, SACR 04), also of high sensitivity, would not be impacted by the operation of the Project.

Any impacts to the archaeological resource (ARCH 01) are expected to have occurred solely during the construction phase and no further impacts to buried remains are anticipated in the operation phase.

14.3.5 Impact Summary

Table 14-9 summarises identified impacts on archaeological and cultural heritage during construction and operation of the Project.

Table 14-9: Impact summary: Archaeology and Cultural Heritage

Impact ID	Impact	Receptor	Receptor Sensitivity	Potential Impact Magnitude	Potential Impact Significance	Additional Mitigation	Residual Impact Magnitude	Residual Impact Effect
Construction Phase								
ARCH 01 Archaeological sites (presently unknown)	Disturbance, damage, removal	Archaeological sites	Medium	High	High Adverse	• Chance Finds Management Plan (PGESC) • Cultural Heritage Awareness Training (PGESC) • Archaeological Watching Brief & Excavations (if required)	Low	Low Adverse
SACR 01 and 02 Kaporo-Rails Cemeteries	Changes to visual amenity and tranquillity	Modern burial grounds	High	Negligible	Low Adverse	• Traffic management	Negligible	Negligible
Operational Phase								
SACR 01 and 02 Kaporol-Rails Cemeteries	Changes to visual amenity and tranquillity	Modern burial grounds	High	Negligible	Negligible	• None	Negligible	Negligible

15. Cumulative Impact Assessment

15.1 Introduction

This Chapter of the ESIA provides an assessment of the potential cumulative effects of the Project together with other existing/planned developments that may also have effects within the Project's Area of Influence (AoI). The approach to this Cumulative Impact Assessment (CIA) is based on the IFC's Good Practice Handbook to Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (2013) (IFC, 2013).

15.2 Rapid Cumulative Impact Assessment

15.2.1 Approach to Assessment of Cumulative Impacts

IFC Performance Standards (PS) 1 (IFC, 2012c) defines cumulative impacts as:

"impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted".

The IFC Guidance sets out six key steps for rapid CIA (RCIA) as follows:

- **Step 1:** Determine Spatial and Temporal Boundaries: This entails defining an applicable geographic study area, together with defined temporal boundaries taking into account the characteristics of the Project.
- **Step 2a:** Identify Other Developments in the Project Area of Influence: This stage involves the identification of planned and/ or reasonably defined developments in the vicinity of the Project that could potentially exert a cumulative environmental or social impact. For the purpose of this CIA these would be major developments with the potential to result in significant impacts on the environment and therefore likely to require an EIA/ESIA.
- **Step 2b:** Identify Valued Environmental and Social Components (VECs): The recommended IFC approach to CIA focuses on the effects on VECs. VECs are environmental and social attributes that are considered to be important in assessing effects of projects, taking account of the prevailing environmental and social conditions in the vicinity of the Project and stakeholder concerns.
- **Step 3:** Determine Present Conditions of VECs: This entails defining the baseline conditions of VECs considered by the RCIA.
- **Steps 4 and 5:** Assess Cumulative Impacts: Taking into account the developments' predicted impacts upon identified VECs, the RCIA methodology then considers the ability of the development to interact with other planned and/ or reasonably defined developments in such a manner that could give rise to potentially significant cumulative impacts.
- **Step 6:** Design and Implement: (a) Adequate Strategies, Plans, and Procedures to Manage Cumulative Impacts, (b) Appropriate Monitoring Indicators, and (c) Effective Supervision Mechanisms: Should the RCIA indicate that there is a potentially significant cumulative impact, the need for additional mitigation or management actions (or monitoring) may then need to be specified.

15.2.2 Assumptions and Limitations

The RCIA is based on the Project's residual impacts, and so assumes that the mitigation measures as specified within this ESIA will have been implemented.

As discussed previously in this ESIA report, a draft EIA/ESIAs for the wider Ratoma Area was prepared by Chemas Consulting Limited (Environmental and Social Impact Assessment of the 193 ha Koloma Directional Centre (CDK) Development Works, February 2024). This section considers for the planned/future developments in the wider area as well as the information/assessment discussed under Chemas' EIA for wider Ratoma masterplan area where deemed necessary.

There are some certainties and gaps to undertake CIA;

- Limited information on the other developments in the master plan for Ratoma Area:
    - Although there is a master plan for Ratoma Area, details of which are provided in *Section 2.5.4 Planning around the Project Site* of this ESIA report, information on other major developments in the RCIA study area (Koloma Area) are limited or not available (construction schedule, type of constructional activities to be undertaken, number of employees etc). Given these factors, this RCIA is only able to consider the potential for cumulative impacts at a high level and on a qualitative basis.
- No plans related to the improvement and provision of the public transportation facilities in the area:
    - The design of the Project considers that the Project will ultimately provide functional office space for over 8,000 Guinea employees. The car parks will have 830 spaces (also 72 (6 parking area under x12 buildings) parking areas for management personnel under the buildings). In addition, car parks will have allocated space for motorcycle parking. It is also assumed that more people will arrive by tuk-tuk (taxi), however the majority is likely to arrive by motorcycle-taxi. There are limited public transport facilities in the vicinity of the Project Site. Additionally, no plans related to the improvement and provision of the public transportation facilities in the area were made available to the ESIA team from government regulators at the time of writing this ESIA report.
- Lack of detailed information on water supply/consumption:
    - The major other developments in the Ratoma Area will have potential to result in increased level of water use. In the Chemas' EIA for wider Ratoma masterplan area, there are set of mitigation measures proposed to address negative cumulative impacts of increased water consumption during the operational phase of these developments. These measures focus on enhancing water efficiency, promoting sustainable water use practices, and implementing advanced water-saving technologies across new developments. In addition to the measures proposed in the Chemas' EIA for wider Ratoma masterplan area, there are some ongoing projects (Guinea Urban Water Project) for the Greater Conakry to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utility (increasing water supply capacity in the city to 400,000 m^3 per day by 2030 and 600,000 m^3 per day in 2040). However, no further detail and information available on Guinea Urban Water Project. It is understood that efforts are underway to improve the efficiency of water distribution and reduce losses within the water utility system for Greater Conakry. There is a lack of detailed information on the Guinea Urban Water Project's implementation; therefore, it is not known at this stage on the timely realization of these benefits.
- No hydrological study in the area:
- As stated by the relevant authority, DATU, there is no drainage system in place yet for the broader Ratoma masterplan area. As mentioned by the authority that proposed road networks (in Figure 2-6) will incorporate infrastructure for managing surface runoff, which is crucial given the anticipated increase in impervious surfaces due to proposed developments. The effectiveness of these surface runoff trenches will depend on their design, capacity, and maintenance. There are neither comprehensive hydrological study in the area undertaken by the authority to understand the current and future runoff patterns, peak flow rates, and potential flood zones within the Ratoma area nor evaluation of the capacity of existing ditches and trenches under various rainfall scenarios. The increased volumes of flow in the catchment may result in flooding in places during the wet season. Sustainable Urban Drainage Systems (SUDS) shall be applied to manage operational runoff.
- It should be noted that AECOM has not verified the quality or accuracy of the Chemas' EIA for wider Ratoma masterplan area.
- Chemas' EIA for wider Ratoma masterplan area has not been validated by government regulators at the time of undertaken this ESIA.

Based on the above uncertainties and gaps identified, our recommendations proposed for monitoring and coordination of the key cumulative risks/impacts for wider area are presented in Section 15.2.8: Design and Implement.

15.2.3 Step 1: Determine Temporal and Spatial Boundaries

The spatial scope of the CIA is based on the Project Area of Influence (AOI). Although the AOI differs among the environmental and social aspects (i.e. air quality, archaeological/cultural heritage, social etc), generally, impacts

from the Project could occur within 500m of the of the Project site, or along key transport routes. However, for the purposes of identifying potential cumulative impacts an AoI of 3km was used.

The temporal scope for the CIA covers both the construction and operational phases of the Project. As discussed in ***Chapter 2: Project Description***, the construction is expected to last approximately 27 months and planned to be finalized until the end of January 2026. There are no plans to decommission the Project and the intended lifespan of the development is 60 years and can go further depending on the preservation techniques employed by the Owner and the way the building is utilized.

15.2.4 Step 2a: Identify Other Developments in the Project Area of Influence

Based on the site visits and observations undertaken[59] as well as stakeholder engagement undertaken to date within the scope of the ESIA study, AECOM with support from SEES identified the major projects/developments within the Project AOI. These projects may result in cumulative impacts. The locations of the developments are shown in Figure 2-2 in this ESIA report.

Table 15-1: Other Developments in the Area of Influence

Name of Development / Proponent	Description	Location Information
Ongoing and Planned/Future Development		
Orange Headquarter Construction Site	The Facility for the development of headquarters of the Orange Guinée Group which is a provider of telephony and money-services, is under construction. There is currently no information available related with the construction and operation of this facility (construction schedule, type of constructional activities to be undertaken, number of employees etc).	It is located 0.35 km to the south of the Project site and positioned on the RO308 where the access to the Project site is provided.
Saudi Arabia Embassy	The Embassy Building is under construction. There is currently no information available related with the construction and operation of this facility (construction schedule, type of constructional activities to be undertaken, number of employees etc). It is assumed that the embassy building should be typical office buildings. As the satellite imageries as well as observations on site indicated that there are two building/structures are under construction.	It is located 0.35 km to the southwest of the Project site (where the RO308 and RO251 joints). US Embassy's Building is located at the opposite site of this planned embassy development.
As Future Planned Development, as it is detailed under ***Section 2: Project Description*** of this Report that there is a 1/3000 Scale Development Plan for Ratoma that cover the Project site[60].	It can be seen from the Development Plan that the whole Koloma area will be developed with the introduction of the administrative/embassy's buildings. There are also planned road network indicated in the Plan. These components that are included in the master plan and under the jurisdiction of the relevant Guinean public authority outside the scope of this Project. No further information is available on the planned developments.	In Ratoma Area (See Figure 2-6)

[59] A initial walkover survey was conducted on 25 August 2023 by AECOM's local partner, SEES. AECOM and SEES also then undertook a site visit between 12 to 15th September 2023 to Guinea and then re-visited the Project site and the surrounding areas.
[60] The Development Plan is by Area from the Koloma Guinea Management Center, Ministry of Urban and Territorial Planning.

Ongoing Bambeto Junction Construction/Development	The Bambeto junction is currently under construction. The ongoing construction works are planned to be finalized the within 10 months. The Bambeto junction is located on the main road which is providing access between Conakry Airport to the Project site. All the four connection road entering to the junction are currently closed. The current access is provided through the nearby accessible streets. The current constructional activities on the junction have an effect on a larger area and resulted in increased travel times.	Bambeto junction is 1 km to the south of the Project site.
Existing Facilities:		
SEG Water Pumping Station and Tank	There is a pumping station and water tank which is currently operational. There is no information available at this stage on the SEG's existing facility if any capacity increase /any renovation are planned.	It is located 200 m to the west of the Project site.
China Geo-Engineering Corporation (CEGEP)	It is operational. The site includes an asphalt mixing plant for roads, construction vehicles, aggregate storage and buildings used as warehouses, offices and workshops. No further information available on this Facility.	It is located 200 m to the west of the Project site.
Sanitation Materials Depot	It is operational. Construction materials stored on a vacant lot which are mainly kerbstones, concrete elements for rainwater drains and concrete slabs. No further information available on this Depot Facility.	It is located 700 m to the west of the Project site.
Car and Truck Garage	It is operational and no further information available on this Garage Area.	It is located 150 m to the east of the Project site.
Guinea Radio and Television (RTG)	It is operational. Guinean radio and television headquarter, public broadcasting station, includes transmitters, transmitting antenna and satellite reception and generators within the Facility premises. The generators are used only for emergency power in the event of power cuts. No further information available.	It is located 250 m to the southwest of the Project site.
Central Electrique de Kipe	It is operational. The facility is reduced it's operations due to the commissioning of lines from hydroelectric dams. No further information available.	It is located 500 m to the west of the Project site.
US Embassy Building	It is operational and no further information available. The embassy building is typical office building for diplomatic use. There are also emergency generators during power cuts.	It is located 500 m to the southwest of the Project site.
Ministry of Foreign Affairs	It is operational and no further information available. The Ministry's building is typical office buildings.	It is located 500 m to the southwest of the Project site.

Prima Commercial Centre	It is operational. It includes shopping center, restaurants, and various services: hairdressers, reception center and driver's license centers. No further information available.	It is located 700 m to the west of the Project site.

It should be noted that all the facilities presented under existing facilities in the above table are operational. It should also be taken into consideration that, all the baseline measurements conducted within the scope of this ESIA (e.g. air quality, noise, traffic, water analysis etc.) reflect the existing impacts on these facilities on relevant VECs. The operation activities of those facilities will be in parallel with both construction and operation activities of this Project (Koloma Administrative City Project).

15.2.5 Step 2b: Identification of Priority Valued Environmental and Social Components (VECs)

The identification of the priority VECs to be considered by the CIA has been based on the results of the ESIA and takes into account issues of particular stakeholder concern. All VECs for which the Project itself is assessed to have a significant (Moderate or Major) adverse or positive impact are considered for inclusion in the CIA. These include waste management, traffic, and forced eviction. Projects impacts that are low can readily be managed through the application of mitigation measures, or are which discrete to the Project are considered a lower priority for the CIA. However, for completeness other environmental and social components are included for completeness and to confirm no significant contribution of the project to cumulative impacts.

The selection of VEC's has also been informed by the EIA/ESIA prepared by Chemas for wider Ratoma masterplan area (covering approximately 193 ha), which predicts both positive and adverse impacts. Positive impacts stated in the Chemas EIA/ESIA include the creation of employment opportunities for the local population and contribution to economic development in general. The main adverse environmental and social impacts are stated as an increase in GHG emissions, impacts on local air quality, waste generation, increased water consumption, loss of biodiversity and impacts on water sources (including water quality and disruption of the hydrological sources/network). It should be noted that AECOM has not verified the quality or accuracy of the Chemas ESIA.

15.2.6 Step 3: Determine Present Conditions of Valued Environmental and Social Components

The baseline conditions of the VECs covered by the RCIA are defined in this ESIA within each of the technical chapters. VEC baseline conditions have been defined through the review of available information as well as site visits/field studies.

15.2.7 Steps 4 & 5: Cumulative Impacts and their Significance

Potential cumulative impacts for each of the VECs are discussed below. The Project's impact significance is based on the results of the ESIA; a judgment is then made on whether the additional impacts from other developments would increase the overall significance of the impact.

Given the limited information available on the other developments and their impacts only a brief overview of potential cumulative impacts is provided.

Table 15-2: Potential Cumulative Impacts

VEC	Project Impact	Project's Residual Impact Significance	Potential Cumulative Effects	Cumulative Impact Significance
Local air quality	Construction: Increase in ambient concentrations of air pollutants (NO_2, SO_2, CO, PM_{10}/$PM_{2.5}$) in the vicinity of the Project development sites	Low adverse	For all planned sites: the other developments, related to the offices/governmental/embassy buildings (except the planned road network) in the Ratoma area, is expected to be similar in type of Project infrastructure and does not include any significant sources of additional emissions (dust generation from excavation activities, release of engine emissions from construction vehicles and equipment etc.). If the construction phases of other nearby developments (as presented in Table 15-1 above) overlap with the Project schedule then there is the potential for cumulative impacts from dust as well as other emission sources from the construction plant and traffic from construction vehicle movements.	Low adverse
	Operation: Increase in ambient concentrations of air pollutants (NO_2, SO_2, CO, PM_{10}/$PM_{2.5}$) in the vicinity of the Project development sites	Negligible	The other developments, related to the offices/governmental/embassy buildings (except the planned road network) in the Ratoma area, are likely to have back-up generators within their site premises. In case of any short term and temporary power supply cut occurred in the area, the operation of the generators of those facilities at the same time will likely contribute to cumulative impacts through increase in the ambient air pollutant concentrations. The planned road network development (as shown in the Master Plan) will contribute to the air emissions once the planned roads become operational.	Low adverse
Noise environment	Construction: Increase in background noise levels	Negligible-Low	As previously mentioned, since the facilities listed under existing facility in the Table 15-1 above are operational, the noise baseline results and assessment presented under this ESIA study are assumed to be reflecting and taken into account the existing noise resulting from these facilities. For all planned sites: the other developments, related to the offices/governmental/embassy buildings (except the planned road network) in the Ratoma area, is expected to be similar in type of Project infrastructure and do not include any significant sources of additional noise emissions. If the construction phases of other nearby developments (as presented in Table 15-1 above) overlap with the Project schedule then there is the potential for cumulative impacts.	Negligible-Low adverse
	Operation: Increase in background noise levels	Low adverse	For all planned sites: the other developments, related to the offices/governmental/embassy buildings (except the planned road network) in the Ratoma area, is expected to be similar in type of Project infrastructure and does not include any significant sources of additional noise emissions. As discussed above, planned office/governmental/embassy buildings (except	Low adverse

VEC	Project Impact	Project's Residual Impact Significance	Potential Cumulative Effects	Cumulative Impact Significance
			the planned road network) in the Ratoma area, are likely to have back-up generators within their site premises. In case of any short term and temporary power supply cut occurred in the area, the operation of the generators of those facilities at the same time will likely contribute to cumulative impacts. The planned road network development (as shown in the Ratoma Master Plan) will contribute increase in noise levels once the planned roads become operational and thereby would increase the overall magnitude of impacts on the local noise sensitive receptors.	
Surface water, groundwater, and soil	Construction and Operation: Flood risk.	Low adverse for flood risk	Ratoma is in an elevated location in the city and the development of up to 200 hectares of land in the Ratoma area will result in increased rainwater run-off with the potential to cause flooding in low lying areas, particularly during the wet season, unless managed appropriately. The construction activities of the planned facilities in the Ratoma Area have the potential to have cumulative negative impact on surface /groundwater water quality during wet season due to sediment run-off, if not mitigated properly (through spillages, improper management of waste/wastewater, site run-off, drainage etc.). Effluent discharges are also likely to have adverse cumulative impacts on surface water, groundwater and soil quality unless not managed appropriately. There is no existing drainage system established yet for the broader Ratoma area and general lack of capacity cater for increased run-off in Conakry.	Moderate adverse for flood risk
Surface water and water provision	Construction and operation: Provision of water	Low adverse for construction phase and Medium Adverse for operational phase Provision of water	The establishment of the planned facilities in the Ratoma Area have the potential to result in cumulative negative impacts due to the increased level of water use. The existing water sources are likely under increased pressure in the area. Population growth is putting pressure on the existing water sources and infrastructure. In many areas, where there is a lack of access to piped water, the residents are relying on alternative sources such as wells, boreholes, water vendors. However, there are some ongoing projects (Guinea Urban Water Project) to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utility (increasing water supply capacity in the city to 400,000 m^3 per day by 2030 and 600,000 m^3 per day in 2040).	Moderate adverse for Provision of water

VEC	Project Impact	Project's Residual Impact Significance	Potential Cumulative Effects	Cumulative Impact Significance
Waste management resources	Construction and Operation: Management of hazardous and non-hazardous waste	High adverse for hazardous waste Low adverse for non-hazardous	Currently, there is no information available on the planned/future projects in the Ratoma Area as presented under the Development Plan, with respect to waste generation and management. The planned/future development related to the offices/governmental/embassy buildings in the Ratoma area will be similar in type to existing and Project's impacts. Small quantity of hazardous waste to be generated (similar to those from multiple offices and buildings). The construction and operational wastes are therefore expected to be similar for non-hazardous and hazardous wastes. The management of hazardous waste is highly sensitive based on the lack of availability of waste facilities in the Country. Therefore, it is assumed that any project that generates hazardous waste (regardless of the amount) would have similar high adverse impact. This is regarded as strategic issue which need to be addressed by the Government.	High adverse for hazardous waste Low adverse for non-hazardous
Road transport	Construction and operation: Increase in traffic flow/movements	Construction: (High adverse for Location 1 &2; Low adverse for Location 3 and Negligible for Location 4 &5) Operation: Significant adverse impacts at Location 1 and Location 2	If the construction phases of other nearby developments (as presented in Table 15-1 above) overlap with the Project schedule, there will be additional traffic movements (daily commute of constructional workers, movements of constructional vehicles) to be generated which will increase the overall magnitude of impacts on traffic and transport. Once the proposed developments as well as the Project are operational, there will be significant additional traffic movements resulting in permanent increase in the traffic flows (staff commuting, and transportation of goods/materials based on the operational activities of the facilities/buildings). There is a planned road network development (as shown in the Master Plan). However, at this stage, there is no information on the construction schedule for the road network development. It is believed that ultimately the new development will reduce the traffic load on the surrounding existing road network. There are limited public transport facilities in the vicinity of the broader Ratoma area. Additionally, no plans related to the improvement and provision of the public transportation facilities in the area were made available to the ESIA team from government regulators at the time of writing this ESIA report.	Construction: (High adverse for Location 1 &2; Low adverse for Location 3 and Negligible for Location 4 &5) Operation: High adverse
Social and community health and wellbeing	Construction: Temporary Increased Local Employment	Moderate Beneficial	For all planned sites: the construction of the propose/planned developments as well as the Project construction will result in a temporary increase in local employment opportunities for local people.	Moderate Beneficial

VEC	Project Impact	Project's Residual Impact Significance	Potential Cumulative Effects	Cumulative Impact Significance
	Operation: Local employment	Moderate Beneficial	For all planned sites: The development of the proposed/planned buildings/facilities included in the Development Plan will create new employment opportunities for local people and opportunities to the local businesses.	Moderate Beneficial
	Construction and operation: Capacity strain of local public services and facilities	Low Adverse	The construction and operation of the proposed developments will increase cumulatively the pressure on the existing utilities which could lead to shortages for the communities.	Moderate Adverse
	Road safety and pedestrian access	Low Adverse	During construction of the proposed developments there will be an increase in road traffic which will result in negative cumulative impact on communities and limiting pedestrian access.	Low Adverse
	Population induced immigration for construction and operation	Low Adverse	The construction and operation of the proposed developments will increase the amount of people seeking opportunities which could result in increased magnitude of impacts on changing local gender balance, increasing social tension and strain on resource and causing economic inflation.	Low Adverse
	Potential interaction between workforce and community	Low Adverse	The construction and development of the proposed/planned buildings and facilities would result in cumulative adverse impacts due to potential interaction between increased number of workforce/staff and the community.	Low Adverse
	Historic resettlement	High Adverse	In addition to the 7 ha, all of the land of the Koloma area was subject to historic evictions which is affecting larger households. Wider Ratoma masterplan area will host a number of developments proposed in the Development Plan. This impact has already occurred cumulatively.	High Adverse

15.2.8 Step 6: Design and Implement

Following IFC Guidance, mitigation and management strategies for cumulative impacts should be 'commensurate with the project's contribution'. Project level mitigation measures (as set out in each of the technical sections the ESIA) can also mitigate the Project's contribution to cumulative impacts. The rationale for this is that the types of impact resulting from the Project on VECs are the same as those considered cumulatively (although on a greater scale) and therefore Project level mitigation will also be suitable for cumulative impacts (but again on a greater scale).

However, in order to manage all potential cumulative impacts effective collaboration is required between Government and developers. IFC guidance recognises that Government has ultimate responsibility for CIA and that measures to address potential cumulative impacts are often beyond the capacity of the Project to implement in isolation. The CIA therefore proposes a possible collaborative approach to implement mitigation to address potential cumulative impacts. An ESIA for the Ratoma masterplan area has been prepared by CHEMAS (for 193 ha area) and this assessment could act as a vehicle for comprehensively understanding cumulative impacts and for putting in place cumulative mitigation strategies for both construction and operational phases.

During the construction phase ACC will liaise with other developers that are undertaking nearby construction works simultaneously to avoid or manage any construction phase cumulative impacts e.g. timing or phasing of specific activities, traffic management. The Project proponents are also committed to promoting common standards and approaches to mitigation that should be applied to other developments. During operations, an

Operations Management Plan is proposed and this should include measures to address potential cumulative impacts. During the operational phase, the ultimate project owner, SONAPI, shall ensure mechanisms for the management and monitoring of cumulative impacts with the other developers in the area.

It is also recommended by the governmental regulators that a technical committee is set up to deal with all technical issues relating to the Ratoma masterplan development. The technical committee should be formed by SONAPI and other governmental regulators as well as other developers whose projects are included in the broader Ratoma area. Coordination shall be maintained with the stakeholders and developers involved in the Ratoma masterplan area on regular updates and detailed information on the implementation status and timelines.

Based on the cumulative risks and impacts assessment, the following recommendations are proposed for monitoring and coordination of the key cumulative risks/impacts for wider area (Table 15-3). The key cumulative impacts are those which are moderate or high significance.

Table 15-3: Recommendations are proposed for monitoring and coordination of the key cumulative risks/impacts for wider area.

Key Cumulative Impacts (moderate and above)	Mitigation for Cumulative Effects	Responsible Organizations/Parties and stakeholder engagement mechanisms
Flood risk	Undertake a flood risk assessment (quantitative) for broader Ratoma area and locations subject to potential flood risk beyond the area. As part of the Ratoma masterplan design, adequate drainage should be incorporated. Other areas subject to flood risk should be identified and suitable drainage systems (including SUDs) established to protect local communities against flood risks.	As it is stated in the Chemas Report; It is recommended by the governmental regulators that design, develop and implement a site development plan that takes into account the topography of the project's area of influence. The technical committee should work with other governmental departments, in particular the DATU and the Geophysics and Seismology Centre, to incorporate all suggestions for minimising risks.
Provision of water	There are ongoing projects (including Guinea Urban Water Project) to increase access to improved water services in the Greater Conakry area and improve the operational efficiency of the urban water utilities. This plans to increase water supply capacity in the city to 400,000 m3 per day by 2030 and 600,000 m3 per day in 2040. However, no further detail and information available on Guinea Urban Water Project. The other developments included in the broader Ratoma masterplan should include water resource conservation mitigation measures in their design and operation. These measures should focus on enhancing water efficiency, promoting sustainable water use practices, and implementing advanced water-saving technologies.	For wider area, continuous liaison shall be ensured with the technical committee (formed by SONAPI and other governmental regulators as well as other developers whose projects are included in the broader Ratoma area) to track the progress of the Guinea Urban Water Project and other related initiatives.
Management of hazardous waste	It would be unrealistic and disproportionate to develop stand-alone hazardous waste	For Ratoma area, continuous liaison shall be ensured with the technical committee (formed by SONAPI and other governmental regulators as well as other developers whose projects are included

Key Cumulative Impacts (moderate and above)	Mitigation for Cumulative Effects	Responsible Organizations/Parties and stakeholder engagement mechanisms
	management facilities specifically for manging waste from Ratoma area. However, Government regulators need to provide suitable hazardous waste disposal/recovery facilities for Conakry city. There is no facility in the country to deal with hazardous waste.	in the broader Ratoma area) to deal with hazardous waste. Waste management is the responsibility of the Agence Nationale de l'Assainissement et de la Salubrité Publique (ANASP) in Guinea.
Increase in traffic flow/movements	A Transport Management Plan should be prepared for the entire Ratoma Masterplan Area focused on longer term traffic generation. There is a planned road network development for Ratoma area which should be developed in a manner which mitigates traffic congestion. For Ratoma area, it will be necessary to engage with transportation authorities to explore opportunities to integrate public transport services to wider area development e.g. for the development of new bus/minibus routes or the extension of existing ones to serve the project area. Designated areas should be established/preserved within the Ratoma Masterplan as transport hubs-central point for public transport access.	For Ratoma area, continuous liaison shall be ensured between transport authorities and the technical committee (formed by SONAPI and other governmental regulators as well as other developers whose projects are included in the broader Ratoma area) to deal with traffic congestion and public transportation needs.
Historic resettlement	Development and implementation of RAP by undertaken by SONAPI and CHEMAS. This will include provision of cash compensation, replacement land, livelihood restoration, support vulnerable groups and grievance mechanism.	For Ratoma area, continuous liaison will occur between the Project Proponent (SONAPI) and governmental regulators such as Ministry of Finance and Ministry of Urbanism and Land Management. SONAPI and CHEMAS will be responsible for engagement with Collective of the Evicted and affected households to provide compensation and support. There will be limited direct engagement between Collective of the Evicted and ACC.

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Appendix A Climate Change Risk Assessment

Climate Change Risk Assessment - Koloma, Guinea

RISK IDENTIFICATION																					RISK ASSESSMENT												ADAPTATION MEASURES																	
Risk ID	Climate variable	Risk statement	Direct or Indirect, In-combination	Components Impacted																Impact type	Planned Controls	Initial risk rating SSP4.5 (2020-2039)			Initial risk rating SSP8.5 (2020-2039)			Initial risk rating SSP4.5 (2080-2099)			Initial risk rating SSP8.5 (2080-2099)			Justification	Adaptation Measures	Residual risk rating SSP4.5 (2020-2039)			Residual risk rating SSP8.5 (2020-2039)			Residual risk rating SSP4.5 (2080-2099)			Residual risk rating SSP8.5 (2080-2099)												
	e.g. flooding, extreme temperatures, storms	Description of impacts		Construction site and equipment	Human health & safety e.g. staff, visitors	Shopping Gallery	Conference Centre	Data Centre	Guidance Centre	Open Air Theatre	Government Heritage Pavilion	Hanging Garden	Ministry Buildings	Utilities e.g. water supply, power supply, sewage etc.	Pavements e.g. footpath , road, carpark	Landscaping & Vegetation		e.g. Asset damage, Health & Safety, Operational, Environmental, Financial, Reputation, Cultural	e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Rationale for likelihood and consequences and any changes between climate scenarios	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Construction:																																																	
1	Extreme temperature (heat)	Extreme heat days/and or heatwaves results in ambient temperatures to rise above optimal design temperatures of the equipment. This can causes overheating of construction equipment resulting in delays, repairs and additional costs.	Direct	•														Asset damage / Operational/ Financial	•All on-site storage of materials and/or spoil is protected by tarpaulins •Machinery will be regularly checked to see if maintenance is needed e.g. repair any damage caused from exposure to extreme heat	Unlikely	Minor	Low	Unlikely	Minor	Low								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations.	Unlikely	Minor	Low	Unlikely	Minor	Low														
2	Extreme temperature (heat)	Extreme heat event causes disruption and delays to the construction site due to working conditions being unsuitable e.g. Risk of workers experiencing sunstroke & dehydration	Direct	•	•													Health & Safety	•Equipment storage areas / offices will have air conditioning integrated into them. •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc.	Moderate	Moderate	High	Moderate	Moderate	High								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Shaded and indoor cool facilities will be provided for staff to get out of the heat, and water will be provided to help re hydrate. Hydration kits will be provided to those suffering for heat exposure. •Work schedules will be reflective of weather conditions. Expected periods of high temperatures should have minimal work that's exposed to the sun. e.g. schedule outdoor work to times during the day where the temperature is at it's lowest •Heat Stress Prevention Guidelines' procedure will be established for during construction	Moderate	Minor	Medium	Moderate	Minor	Medium														
3	Extreme temperature (heat)	Extreme heat causes disruptions in the supply chain due to supply chain worker stoppages and supply chain infrastructure damage.	Indirect	•														Asset damage / Operational/ Financial	•Supply chain members are likely to have their own heat stress guidelines, which may dictate when work has to cease during extreme temperatures.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Throughout construction weather forecasts will be consulted, and if needed alternative delivery slots will be scheduled. •Engage with supply chain to understand what measures they have in place for extreme heat, and help facilitate these.	Unlikely	Minor	Low	Unlikely	Minor	Low														
4	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to the construction site. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	Direct	•												•		Asset damage / Operational/ Financial	•Hazardous liquid products will be stored in containers protected from the weather by an enclosed structure. •All oily residues, used oils and other hazardous materials/waste will be collected. It is forbidden to release them into the environment. The site may not be used to dispose of them. •There are fire detection systems, alarms, fire equipment, fire wardens and fire procedures in place. These are outlined in the ESMP and Health and Safety Plan	Unlikely	Major	High	Unlikely	Major	High								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall. The site is in close proximity to a number of densely forested areas including the Forêt de Demoudoulah.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. •Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. •Fuel breaks and buffer zones will be integrated into the surrounding area.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium														
5	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, which could result in injury or fatality to personal. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	Direct		•											•		Health & Safety	•Hazardous liquid products will be stored in containers protected from the weather by an enclosed structure. •All oily residues, used oils and other hazardous materials/waste will be collected. It is forbidden to release them into the environment. The site may not be used to dispose of them. •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc. •There are fire detection systems, alarms, fire equipment, fire wardens and fire procedures in place. These are outlined in the ESMP and Health and Safety Plan	Unlikely	Major	High	Unlikely	Major	High								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall. The site is in close proximity to a number of densely forested areas including the Forêt de Demoudoulah.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. •Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. •Fuel breaks and buffer zones will be integrated into the surrounding area.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium														
6	Flooding (all)	All types of flooding can result in dangerous working conditions on the site which can pose health and safety risks. E.g. workers can trip on debris that was moved when the site flooded	Direct		•													Health & Safety	•An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc. •Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan	Unlikely	Minor	Low	Unlikely	Minor	Low								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity. •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any expected periods of heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. e.g. raise critical infrastructure above PMF level (Probable maximum flood).	Unlikely	Minor	Low	Unlikely	Minor	Low														
7	Flooding (Extreme rainfall)	A period of prolonged heavy and intense rainfall can result in a landslide occurring. Landslides can cause damage to construction equipment and the site, as well as creating hazardous environments for workers.		•	•													Asset damage/ Operational, Financial, Health & Safety	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium								West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity. •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any expected periods of heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. e.g. raise critical infrastructure above PMF level (Probable maximum flood). •Loose materials will be stored correctly, and bunded where appropriate.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium														

RISK IDENTIFICATION

Risk ID	Climate variable	Risk statement	Direct or Indirect, In-combination	Components Impacted													Impact type
	e.g. flooding, extreme temperatures, storms	Description of impacts		Construction site and equipment	Human health & safety e.g. staff, visitors	Shopping Gallery	Conference Centre	Data Centre	Guidance Centre	Open Air Theatre	Government Heritage Pavilion	Hanging Garden	Ministry Buildings	Utilities e.g. water supply, power supply, sewage etc	Pavements e.g. footpath, road, carpark	Landscaping & Vegetation	e.g. Asset damage, Health & Safety, Operational, Environmental, Financial, Reputation, Cultural
8	Flooding (Extreme rainfall)	Extreme rainfall events causes soil to be washed away and creates unstable ground conditions. This can delay construction and cause damage to ground level equipment, resulting in financial loss.	Direct	●													Asset damage/ Operational, Financial
9	Flooding (Extreme rainfall)	Extreme rainfall event causes surface water flooding of the construction site and local roads. This affects access to the site, causing potential delays to construction work, potential damage to ground level equipment, and financial loss.	Direct	●													Asset damage/ Operational, Financial
10	Flooding (Fluvial)	Extreme rainfall over an extended period and/or hightide levels can lead to the river exceeding its natural capacity causing flooding. This can delay construction and result in ground-level infrastructure and equipment being damaged, causing financial loss.	Direct	●													Asset damage/ Operational, Financial
11	Flooding (Costal)	Extreme rainfall events in combination with storm surge and sea level rise results in coastal flooding. This causes surface water flooding of the construction site and local roads. This affects viability of and access to the site, causing potential delays to construction work and damage to equipment.	Direct	●													Asset damage/ Operational, Financial
12	Storm events	Health and safety risks to the construction workforce during severe weather events. E.g. strong winds blow debris onto the construction site	Direct		●												Health and Safety
13	Storm events	Storm events (including high winds) make work environments and the use of construction equipment and machinery unsafe resulting in damage to construction equipment and/ or temporary building facilities causing delays. These delays and possible damage to the site can result in financial loss.	Direct	●													Asset damage / Operational/ Financial
14	Storm events	Inaccessible construction site due to severe weather events associated with storms. Resulting in restricted working hours, delays in the delivery of construction materials and equipment, which results to delays in construction work and potential financial loss.	Direct	●													Asset damage / Operational/ Financial

RISK ASSESSMENT

Risk ID	Planned Controls	Initial risk rating SSP4.5 (2020-2039)			Initial risk rating SSP8.5 (2020-2039)			Initial risk rating SSP4.5 (2080-2099)			Initial risk rating SSP8.5 (2080-2099)			Justification
	e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Rationale for likelihood and consequences and any changes between climate scenarios
8	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan	Likely	Minor	High	Likely	Minor	High							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall
9	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan	Likely	Moderate	High	Likely	Moderate	High							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall
10	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan	Rare	Moderate	Medium	Rare	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall
11	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •There is a site drainage plan •There will be a Water Management Plan	Rare	Moderate	Medium	Rare	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall
12	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds •Cranes will not be used in adverse weather conditions that are likely to compromise their stability. •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.
13	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds •Cranes will not be used in adverse weather conditions that are likely to compromise their stability.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.
14	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.

ADAPTATION MEASURES

Risk ID	Adaptation Measures	Residual risk rating SSP4.5 (2020-20399)			Residual risk rating SSP8.5 (2020-2039)			Residual risk rating SSP4.5 (2080-2099)			Residual risk rating SSP8.5 (2080-2099)		
	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
8	•Consideration will be given to installing a water pump for the areas with critical infrastructure and a key part of construction operations. This will help increase the sites surface drainage capacity. •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any expected periods of heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. e.g. raise critical infrastructure above PMF level (Probable maximum flood). •Loose materials will be stored correctly, and bunded where appropriate.	Moderate	Minor	Medium	Moderate	Minor	Medium						
9	•Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any expected periods of heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. e.g. raise critical infrastructure above PMF level (Probable maximum flood).	Moderate	Moderate	High	Moderate	Moderate	High						
10	•Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any periods of expected heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. During prolonged periods of heavy rainfall nearby rivers should be monitored to assess f they could burst their banks.	Rare	Moderate	Medium	Rare	Moderate	Medium						
11	•Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity •Raise critical infrastructure to be above PMF (Probable maximum flood). •Weather forecasts will be monitored so any expected periods of heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. e.g. raise critical infrastructure above PMF level (Probable maximum flood).	Rare	Moderate	Medium	Rare	Moderate	Medium						
12	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned in advance of predicted storm conditions. Doing so will help to avoid damage to the construction site or blocking access roads, in the event of a storm with high wind speed. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers.	Unlikely	Minor	Low	Unlikely	Minor	Low						
13	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned in advance of predicted storm conditions. Doing so will help to avoid damage to the construction site or blocking access roads, in the event of a storm with high wind speed. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers.	Unlikely	Minor	Low	Unlikely	Minor	Low						
14	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned in advance of predicted storm conditions. Doing so will help to avoid damage to the construction site or blocking access roads, in the event of a storm with high wind speed. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers. •Engage with supply chain to understand what measures they have in place for extreme weather events and storms, and help facilitate these. This may require scheduling of delivers for alternatives times/days.	Unlikely	Minor	Low	Unlikely	Minor	Low						

	RISK IDENTIFICATION																							RISK ASSESSMENT												ADAPTATION MEASURES											
Risk ID	Climate variable	Risk statement	Direct or Indirect, In-combination	Components Impacted															Impact type	Planned Controls	Initial risk rating SSP4.5 (2020-2039)			Initial risk rating SSP8.5 (2020-2039)			Initial risk rating SSP4.5 (2080-2099)			Initial risk rating SSP8.5 (2080-2099)			Justification	Adaptation Measures	Residual risk rating SSP4.5 (2020-2039)			Residual risk rating SSP8.5 (2020-2039)			Residual risk rating SSP4.5 (2080-2099)			Residual risk rating SSP8.5 (2080-2099)										
	e.g. flooding, extreme temperatures, storms	Description of impacts		Construction site and equipment	Human health & safety eg. staff, visitors	Shopping Gallery	Conference Centre	Data Centre	Guidance Centre	Open Air Theatre	Government Heritage Pavilion	Hanging Garden	Ministry Buildings	Utilities eg. water supply, power supply, sewage etc.	Pavements e.g. footpath, road, carpark	Landscaping & Vegetation		e.g. Asset damage, Health & Safety, Operational, Environmental, Financial, Reputation, Cultural	e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Rationale for likelihood and consequences and any changes between climate scenarios	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating									
15	Storm events - Dust & Sand	Sand and dust storms cause poor visibility on construction sites, making it difficult and hazardous to operate construction machinery. This can lead to downtime in construction work causing delays and potential financial loss.	Direct	•													Asset damage / Operational/ Financial	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds •Cranes will not be used in adverse weather conditions that are likely to compromise their stability. •Soil will be stored and covered with tarpaulins and excavated soil will be watered regularly in dry/windy conditions. •Non potable water will be used to suppress dust, this will be done by watering dust prone areas •Carry out the correct adjustment and maintenance of machines and construction equipment. •Require mandatory protection of the personnel with adequate and complete PPE •Requiring the mandatory covering of trucks transporting materials with waterproof tarpaulins •Ensure careful planning work periods	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers. •Erect cloth or plastic sheet curtains to limit dust entry into working areas. •Use water sprays or misters to reduce dust load in work areas. •Supply workers with the required PPE to facilitate working in dust prone environments e.g. dust mask and googles. •Cease construction work if working conditions are too dangerous, and could result in injury to workers and damage to equipment. An Early Warning System will be installed to help provide workers sufficient time to seek cover, and alert to dangers.	Unlikely	Minor	Low	Unlikely	Minor	Low																		
16	Storm events - Dust & Sand	Sand and dust storms create an unsafe environment for workers, as inhaling dust and sand particles can cause irritation and damage to the lungs, chest, eyes and skin. In addition to creating a hazardous work environment. These poor work conditions could lead to delays or downtime in construction.	Direct	•	•												Asset damage / Operational/ Financial/ Health and Safety	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc. •Soil will be stored and covered with tarpaulins and excavated soil will be watered regularly in dry/windy conditions. •Non potable water will be used to suppress dust, this will be done by watering dust prone areas •Carry out the correct adjustment and maintenance of machines and construction equipment. •Require mandatory protection of the personnel with adequate and complete PPE •Requiring the mandatory covering of trucks transporting materials with waterproof tarpaulins •Ensure careful planning work periods	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers. •Erect cloth or plastic sheet curtains to limit dust entry into working areas. •Use water sprays or misters to reduce dust load in work areas. •Supply workers with the required PPE to facilitate working in dust prone environments e.g. dust mask and googles. •Cease construction work if working conditions are too dangerous, and could result in injury to workers and damage to equipment. An Early Warning System should be installed to help provide workers sufficient time to seek cover, and alert to dangers.	Unlikely	Minor	Low	Unlikely	Minor	Low																		
17	Storm events - Dust	Dry temperatures and strong winds can result in excess dust being generated from the construction site. This can lead to delays in construction work if working conditions are too poor. In addition equipment may need to be repaired/maintained if there's dust after gathering in it, this can result in financial loss.	Direct	•	•												Asset damage / Operational/ Financial/ Health and Safety	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of storms and high winds •An onsite Health & Safety Management Plan has been developed which outlines health and safety procedures, emergency plans etc. •Soil will be stored and covered with tarpaulins and excavated soil will be watered regularly in dry/windy conditions. •Non potable water will be used to suppress dust, this will be done by watering dust prone areas •Carry out the correct adjustment and maintenance of machines and construction equipment. •Require mandatory protection of the personnel with adequate and complete PPE •Requiring the mandatory covering of trucks transporting materials with waterproof tarpaulins •Ensure careful planning work periods	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium							West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •The weather forecast will be consulted to help minimise the risk of workers being on the construction site during periods of strong winds, as this could lead to damage to equipment and injury to workers. •Erect cloth or plastic sheet curtains to limit dust entry into working areas. •Use water sprays or misters to reduce dust load in work areas. •Supply workers with the required PPE to facilitate working in dust prone environments e.g. dust mask and googles. •Cease construction work if working conditions are too dangerous, and could result in injury to workers and damage to equipment. An Early Warning System should be installed to help provide workers sufficient time to seek cover, and alert to dangers.	Unlikely	Minor	Low	Unlikely	Minor	Low																		
Operation:																																															
18	Extreme temperature (heat)	Extreme temperatures over prolonged periods can lead to shrink-swell subsidence. This can result in damage to infrastructure and weakening of the sites foundation. This can create health and safety risks should the infrastructure become unstable, as well as financial loss.	Direct			•	•	•	•	•	•	•	•	•	•		Asset damage / Operational/ Financial/ Health and Safety	None identified	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium									
19	Extreme temperature (heat)	Heatwaves result in heat stress for building occupants and outdoor workers, causing health and safety incidents. e.g. Sunstroke & dehydration	Direct		•												Health and Safety	None identified	Moderate	Moderate	High	Moderate	Moderate	High	Moderate	Moderate	High	Moderate	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather will should be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Through monitoring the weather forecast maintenance and operational task that would be exposed to the hot temperatures can be scheduled or moved to a time period or future date where temperatures will not be as hot. •Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. •Consult the weather forecast and if there is expected periods of extreme heat, make sure there is sufficient cooling measures available. •Cease outdoor and non essential work if working conditions are too dangerous, and could result in injury to workers.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium						

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	e.g. flooding, extreme temperatures, storms	Description of impacts		Construction site and equipment	Human health & safety e.g. staff, visitors	Shopping Gallery	Conference Centre	Data Centre	Guidance Centre	Open Air Theatre	Government Heritage Pavilion	Hanging Garden	Ministry Buildings	Utilities e.g. water supply, power supply, sewage etc	Pavements e.g. footpath, road, carpark	Landscaping & Vegetation	e.g. Asset damage, Health & Safety, Operational, Environmental, Financial, Reputation, Cultural	e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Rationale for likelihood and consequences and any changes between climate scenarios	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
20	Extreme temperature (heat)	Periods of extreme heat increases the energy required for cooling spaces in buildings.	Direct			•	•	•	•	•	•		•				Financial	None identified	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Consult the weather forecast and if there is expected periods of extreme heat, make sure there is sufficient cooling measures available.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium
21	Extreme temperature (heat)	Extreme heat can impact materials (e.g. asphalt) used in carparks and paved areas, resulting in reduced durability and/or design life. E.g. paved surface may melt under prolonged periods of extreme heat	Direct												•		Asset damage / Operational/ Financial	None identified	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Monitor and maintain key paved areas that may be impacted by extreme heat and result in design standards being compromised. Regular maintenance should be carried out to make sure the paved areas are fit for daily operations.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium
22	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to buildings and utilities. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	Direct			•	•	•	•	•	•	•	•	•	•	•	Asset damage / Operational/ Financial	None identified	Unlikely	Major	High	Unlikely	Major	High	Moderate	Major	Extreme	Moderate	Major	Extreme	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall. The site is in close proximity to a number of densely forested areas including the Forêt de Demoudoulah.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Ensure flammable materials are stored correctly, and that there is a fire safety plan and procedure in place. •Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. •Fuel breaks and buffer zones will be integrated into the surrounding area.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium
23	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, which could result in injury or fatality to personal. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	Direct		•											•	Health & Safety	None identified	Unlikely	Major	High	Unlikely	Major	High	Moderate	Major	Extreme	Moderate	Major	Extreme	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall. The site is in close proximity to a number of densely forested areas including the Forêt de Demoudoulah.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Ensure flammable materials are stored correctly, and that there is a fire safety plan and procedure in place. •Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. •Fuel breaks and buffer zones will be integrated into the surrounding area.	Unlikely	Major	High	Unlikely	Major	High	Unlikely	Major	High	Unlikely	Major	High
24	Flooding (all)	All types of flooding can result in dangerous conditions, that can cause health and safety risks for people in the area. E.g. trip on debris that was moved during flood	Direct		•												Health & Safety	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated •There will be a Water Management and Monitoring Plan	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there are not any loose or hazardous branches etc.	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low
25	Flooding (Extreme rainfall)	A period of prolonged heavy and intense rainfall can result in a landslide occurring. Landslides can cause damage to infrastructure, as well as creating hazardous environments for workers.	Direct		•	•	•	•	•	•	•	•	•	•	•	•	Asset damage/ Operational, Financial, Health & Safety	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated •There will be a Water Management and Monitoring Plan	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations.	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium
26	Flooding (Extreme rainfall)	Extreme rainfall events causes soil to be washed away and creates unstable ground conditions. This can cause damage to infrastructure, resulting in financial loss.	Direct			•	•	•	•	•	•			•	•	•	Asset damage/ Operational, Financial	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations.	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low

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27	Flooding (Extreme rainfall)	Extreme rainfall event causes surface water flooding of the area of the Proposed Development and local roads, resulting in accessibility to the area.	Direct			•	•	•	•	•	•	•	•	•	•	•	Asset damage/ Operational	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated •There will be a Water Management and Monitoring Plan	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations.	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low
28	Flooding (Fluvial)	Extreme rainfall over an extended period and/or highside levels can lead to the river exceeding its natural capacity causing flooding. This can result in ground-level infrastructure and equipment being damaged, causing financial loss.	Direct			•	•	•	•	•	•	•	•	•	•	•	Asset damage/ Operational, Financial	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated •There will be a Water Management and Monitoring Plan	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any periods of expected heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. During prolonged periods of heavy rainfall nearby rivers should be monitored to assess f they could burst their banks.	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low	Unlikely	Minor	Low
29	Flooding (Costal)	Extreme rainfall events in combination with storm surge and sea level rise results in coastal flooding. This causes surface water flooding of the Proposed Development and local roads. This can result in ground-level infrastructure and equipment being damaged, causing financial loss.	Direct			•	•	•	•	•	•	•	•	•	•	•	Asset damage/ Operational, Financial	•Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of heavy rainfall/possible flooding •In advance of severe weather conditions e.g. heavy rainfall and strong winds ground level equipment will be stored appropriately to avoid damage •Rainwater will be channelled into the local drainage system. •Rain gardens will be established to facilitate infiltration directly into the soil. •Appropriate stormwater drainage outlets will be incorporated •There will be a Water Management and Monitoring Plan	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•Weather forecasts will be monitored so any periods of expected heavy rainfall are prepared for in advance and measures can be in place to minimise disruption to the site. During prolonged periods of heavy rainfall nearby rivers should be monitored to assess f they could burst their banks.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium
30	Water Scarcity	Prolonged periods of extreme heat create drought conditions which disrupts and/or eliminates water supplies to buildings and utilities.	Direct			•	•	•	•	•	•	•	•	•			Asset damage / Operational/ Financial	•There will be a Water Management and Monitoring Plan •Water usage limits will be agreed with SEG for during operation.	Moderate	Moderate	High	Moderate	Moderate	High	Likely	Moderate	High	Likely	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•There will be an emergency stock supply of potable water stored on the site. •Rainwater harvesting and storage should be incorporated into the design, to allow rain be collect and used during periods of water shortages.	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium
31	Water Scarcity	Prolonged periods of extreme heat causes water scarcity, which can result in insufficient potable water supplies for people in the buildings. This can create a health hazard as workers will have insufficient access to water and could become dehydrated.	Direct		•												Health and Safety	•There will be a Water Management and Monitoring Plan •Water usage limits will be agreed with SEG for during operation.	Moderate	Moderate	High	Moderate	Moderate	High	Likely	Moderate	High	Likely	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall	•There should be an emergency stock supply of potable water stored on the site.	Moderate	Minor	Medium	Moderate	Minor	Medium	Likely	Minor	High	Likely	Minor	High
32	Storm events	Health and safety risks to the outdoor workers during severe weather events. E.g. strong winds can blow debris and or create dangerous conditions	Direct		•												Health and Safety	None identified	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Moderate	Moderate	Moderate	High	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there are not any loose or hazardous branches etc. •Cease outdoor and non essential work if working conditions are too dangerous, and could result in injury to workers.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium
33	Storm events (Wind)	Severe wind event has higher wind loading than that of the designed infrastructure. This causes stress on the infrastructure, resulting in damage or reduced design life and potential safety hazard.	Direct			•	•	•	•	•	•	•	•	•	•	•	Asset damage / Operational/ Financial	None identified	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Moderate	Moderate	High	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there are not any loose or hazardous branches etc.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Moderate	Moderate	High	Moderate	Moderate	High

RISK IDENTIFICATION

Risk ID	Climate variable	Risk statement	Direct or Indirect, In-combination	Components Impacted: Construction site and equipment	Human health & safety e.g. staff, visitors	Shopping Gallery	Conference Centre	Data Centre	Guidance Centre	Open Air Theatre	Government Heritage Pavilion	Hanging Garden	Ministry Buildings	Utilities e.g. water supply, power supply, sewage etc	Pavements e.g. footpath, road, carpark	Landscaping & Vegetation	Impact type
	e.g. flooding, extreme temperatures, storms	Description of impacts															e.g. Asset damage, Health & Safety, Operational, Environmental, Financial, Reputation, Cultural
34	Storm events (Wind)	Storm events and high winds can result in debris being blown onto infrastructure causing damage. This can result in financial loss.	Direct			●	●	●	●	●	●	●	●	●	●	●	Asset damage / Operational/ Financial
35	Storm events - Dust & Sand	Sand and dust storms create an unsafe environment for workers, as inhaling dust and sand particles can cause irritation and damage to the lungs, chest, eyes and skin. In addition to creating a hazardous work environment. These poor work conditions could lead to delays or ceasing of outdoor work.	Direct		●												Health& Safety

RISK ASSESSMENT

Risk ID	Planned Controls	Initial risk rating SSP4.5 (2020-2039): Likelihood	Consequence	Risk Rating	Initial risk rating SSP8.5 (2020-2039): Likelihood	Consequence	Risk Rating	Initial risk rating SSP4.5 (2080-2099): Likelihood	Consequence	Risk Rating	Initial risk rating SSP8.5 (2080-2099): Likelihood	Consequence	Risk Rating	Justification
	e.g. controls planned within the current design that mitigate the identified risk													Rationale for likelihood and consequences and any changes between climate scenarios
34	None identified	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Moderate	Moderate	High	Moderate	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.
35	None identified	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	Moderate	Moderate	High	Moderate	Moderate	High	West Africa is expected to experience an increase in temperatures and frequency of heatwaves. The uncertainty, variability and regional disparity around rainfall makes it more unpredictable, but it is expected that overall there will be a decline in rainfall but an increase in periods of extreme rainfall. Conakry generally experiences westerly winds, except during the harmattan period, which brings dry and dusty north-easterly winds. Guinea, experiences the seasonal West African Monsoon, which is associated with changing wind patterns and increased heavy rainfall.

ADAPTATION MEASURES

Risk ID	Adaptation Measures	Residual risk rating SSP4.5 (2020-20399): Likelihood	Consequence	Risk Rating	Residual risk rating SSP8.5 (2020-2039): Likelihood	Consequence	Risk Rating	Residual risk rating SSP4.5 (2080-2099): Likelihood	Consequence	Risk Rating	Residual risk rating SSP8.5 (2080-2099): Likelihood	Consequence	Risk Rating
	e.g. additional design or operational measures that can be implemented to further reduce the climate risk												
34	•Weather forecasts will be monitored so any extreme weather events or expected extreme temperatures are prepared for in advance and contingency measures can be in place to minimise disruption to operations. •Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there are not any loose or hazardous branches etc.	Unlikely	Minor	Low	Unlikely	Minor	Low	Moderate	Minor	Medium	Moderate	Minor	Medium
35	•Seal windows and other openings to prevent dust entering. Use air conditioning systems to increase dust filtering. •An Early Warning Systems will be in place to give people in the local area, enough time to get indoors and seek shelter from the dust storm.	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium	Moderate	Minor	Medium

Appendix B Supportive Information for Surface Water, Groundwater and Soils

Figure B-1: GW1 (views from GW1)

Figure B-2: GW2 (views from GW2)

Figure B-3: GW3 (views from GW3)

Figure B-4: P1 (views from P1)

Figure B-5: PZ2 (views from PZ2)

Figure B-6: PZ3 (views from PZ3)

Figure B-7: PZ3 (views from PZ3)

Figure B-8: Photographs of the re-routed pipelines (*approximate proposed reroute for the pipelines; Source:ACC*)

Appendix C Human Rights Screening

Appendix C Human Rights Screening

Introduction

This document presents the Human Rights Screening (HRS) as part of the Environmental and Social Impact Assessment (ESIA) study for the construction and operation of the of the Koloma Administrative City development in Conakry (the Project). The Project's activities and development phases are described in **Chapter 2** of the ESIA.

i) Purpose and Scope

This HRS aims to identify and assess the nature of potential adverse human rights impacts in which SONAPI the Project owners (Including the various Ministries which will occupy the project during operation) and ACC as the construction contractor may be responsible during the development and operation of the Project. Once the ESIA has been finalised and approved, it will be the responsibility of the SONAPI, and ACC implement and monitor the identified mitigations as part of the Project's Environmental and Social Management Plan. The HRS should be updated should any significant changes to the scope of the project or the context change .

The HRS assesses whether the Project's development and activities may infringe on human rights and determine if a complete HRIA is required. The HRS was scoped to an appropriate level of human rights due diligence for the Project's local context and in line with the applicable regulations and requirements for businesses and human rights, presented below.

The HRS process is aligned with the international standards presented in **Chapter 3** of the ESIA, and further detailed in below with a focus on human rights. As a coordinating framework, the HRS is based on the United Nations Guiding Principles (UNGP) for implementing the United Nations "Protect, Respect, Remedy" Framework, focusing on the business responsibility to respect human rights.

The HRS uses the following approach as presented by the UNGP and its Interpretative Guide (UNHR, 2012):

- Describing the human rights context in which the Project will be developed.
- Identifying the rights-holders who may be affected, with a focus on disadvantaged or vulnerable groups (see Section 13.3.4.6 of the ESIA).
- Identifying and assessing the nature of actual and potential adverse human rights risks and impacts.
- Describing how the Project and associated business relationships can address them.

Regulations and Requirements

ii) International Human Rights Conventions

Guinea has ratified the following international human rights conventions as of December 2023 (UN Human Rights-Office of High Commissioner on Human Rights, 2023):

- Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment (CAT)
- CAT-OP - Optional Protocol of the Convention against Torture
- International Covenant on Civil and Political Rights (CCPR)
- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)
- International Convention on the Elimination of All Forms of Racial Discrimination (CERD)
- International Covenant on Economic, Social and Cultural Rights (CESCR)
- International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (CMW)
- Convention on the Rights of the Child (CRC)
- Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (CRC-OP-AC)

- Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography (CRC-OP-SC)
- Convention on the Rights of Persons with Disabilities (CRPD)

These ratified conventions are considered as legally binding commitments for the state's responsibility to protect human rights, and the Project's responsibility to respect them.

The following international standards apply to businesses with regard to human rights. While the non-ratified conventions are not legally binding, the following standards represent implications of existing Project lender standards and include points covered in both international and national law.

Guinea has ratified International Labour Organisation (ILO)'s nine (9) out of ten (10) of the fundamental ILO Conventions as listed in Table 13-1 of the ESIA. Guinea has not yet ratified C155- Occupational Health and Safety Convention, 1981 (No.155).

Applicable International Standards

The United Nations (UN) Human Rights Office of the High Commissioner (OHCHR), endorsed the UNGP in 2011, requiring that business enterprises should:

- Comply with all applicable laws and respect internationally recognized human rights, wherever they operate.
- Seek ways to honour the principles of internationally recognized human rights when faced with conflicting requirements.
- Treat the risk of causing or contributing to gross human rights abuses as a legal compliance issue wherever they operate (UNHR, 2012).

The following international standards are relevant to the HRS:

UN Guiding Principles on Business and Human Rights: UNGP Principle 17 requires a human rights due diligence process to identify, prevent, mitigate and account for how projects will address their adverse human rights impacts. The human rights due diligence should cover impacts that the business may cause or contribute to through its own activities, or which may be directly linked to its operations, products or services by its business relationships. The process should be ongoing throughout project lifecycles and should focus on risks to rights-holders instead of material risks to the project company (UNHR, 2011).

IFC Performance Standards: The description and applicability of the IFC PS are presented in **Section 3.3.2** of the ESIA**.** In addition to that the IFC PS also recognise the responsibility of businesses to respect human rights. All of the IFC PS have elements related to human rights dimensions, including:

- IFC PS1 defines the overall scope of ESIA processes for projects, including human rights as a cross-cutting topic. PS1 defines that in limited high-risk circumstances, it may be appropriate to complement its ESIA process with specific human rights due diligence. Additionally, PS1 includes elements of human rights to be included in the context of the project's area of influence and project direct and indirect components.
- IFC PS 2 refers to the exercise of control where reasonably feasible in addressing the risks and impacts associated with primary supply chains.
- IFC PS 4 focus on community health and safety is connected to the potential use of security personnel and the respect of human rights while safeguarding project personnel and property.
- IFC PS 5 focus on involuntary resettlement and land acquisition which includes elements of human rights in the context of resettlement, livelihoods and quality of life. this Performance Standard is particularly applicable to the Project due to the history of evictions associated with the Project site.
- IFC PS 7 requires the full respect of the human rights, dignity, aspirations, culture and natural resource-based livelihoods of indigenous peoples. However, this Performance Standard is not applicable to the Project due to the lack of presence of indigenous peoples in the Project's Area of Influence as described in the ESIA.
- IFC PS8 focuses on the protection of tangible and non-tangible cultural heritage. Human rights include cultural rights and therefore an overlap between the protection of cultural heritage and safeguarding human rights. There are however limited cultural heritage impacts associated with this project as described in **Chapter 14** of the ESIA.

Equator Principles: The Equator Principles Association (EPA) acknowledges that their adhered financial institutions and clients have the responsibility to respect human rights. The EPA requires this responsibility to be fulfilled in alignment with the UNGP by developing human rights due diligences on the projects in which their financial institutions are involved (Equator Principles, 2020).

- The EP IV require each client to conduct a human rights due diligence and document that process in its assessment documentation, including:
- EP IV Principle 1 on Review and Categorisation requires the Project categorisation to be based on the magnitude of potential human rights impacts (refer to Chapter 1 of the ESIA);
- EP IV Principle 2 on Environmental and Social Assessment requires the assessment of potential adverse human rights impacts as part of the ESIA or related assessments. This includes the incorporation of provisions on relevel regulations for managing the impacts, updates on baseline conditions relevant to human rights and potential concerns and expectations towards the project, assessment of relevant human rights at risk by the project and the provision of recommendations for impact management and monitoring measures; and
- EP IV Principle 10 on Reporting and Transparency requires that a summary of the ESIA is accessible, including a summary of human rights risks and impacts when applicable.

OECD Common Approaches: The Common Approaches require a screening process to determine whether or not a project can have a high likelihood of sever human rights impacts occurring as part of its development (OECD, 2016). Severe human rights impacts are described by the OECD as impacts that are particularly grave in nature (e.g. threats to life, child/forced labour, human trafficking), widespread in scope (e.g. large-scale resettlement and working conditions across a sector), cannot be remediated (e.g. torture, loss of health and destruction of indigenous peoples' lands) or related to the project's operating context (e.g. conflict and post-conflict situations) (OECD, 2016)

Human Rights Context in Guinea

Based on the social baseline study (see Chapter 13 of the ESIA), the following potential human rights issues in Guinea were identified. These may range from potential gaps in national law and practice, or background history of human rights risks.

- **Rights to life:** Amnesty International's 2022/23 report on "The State of the Worlds Human Rights" concluded that security forces used excessive force and committed unlawful killings during protests. This includes the killing of a 19-year-old on Conakry during protests, the shooting and killing of 13 people during a protest to restore constitutional order, the shotting of two people who were protesting against a mining company. These instances were investigated by the Ministry of Justice and police have been detained but in some cases. (Amnesty International, 2022/2023). During the 2019 eviction which occurred at the Project site, it is alleged that police used fired tear gas to break up protests which resulted in the injury of a 14-year-old girl (Human Rights Watch, 2019).
- **The right to an adequate standard of living, including the right to adequate housing, food, water and sanitation:** Evictions without compensation or support have occurred in Conakry, both in Koloma and Kapro Rails communities as described in Chapter 13, but also in other parts of the city including Dimesse and Dar Es Salam neighbourhoods. These evictions were carried out by the government who claimed the land belonged to government and were needed for development (Human Rights Watch, 2019).
- **Freedom of expression and assembly:** On 13th May the National Committee of the Rally for Development which took power in a coup on 5 September 2021 announced a ban on "all demonstrations on the public highway likely to compromise social peace and proper execution of the activities contained in the timetable…for the time being until the election campaign periods". The National Front for the Defence of the Constitution was also dissolved. This was condemned by the UN high Commissioner for Human Rights as being an infringement to the right for Freedom of expression and assembly (Amnesty International, 2023). The Government has committed to transition back to civilian rule in elections in late 2025.
- **Child Labour:** Child labour is prohibited by law in Guinea, however the law does not meet international standards as it does not protect children in the informal sector and authorities were hesitant to pursue a law that goes against cultural norms. Child labour is still present in some sectors due to the law not being adequately enforced and many children between 5 and 6 worked 10 to 5 hours a day in the diamond and gold mines in hazardous conditions. (CIA, 2021).

- **Forced Labour:** Forced labour is prohibited by law with the exception of prison labour, this includes crimes related to political or religious expression. The laws are not effectively enforced and as such men, women and children are trafficked and forced into labour in the agriculture, fishing and mining sector. Women and children were found to be the most vulnerable to trafficking with migrant laborers being a small proportion of forced labour victims (CIA, 2021).
- **Worker's Rights:** While the government sets a guaranteed minimum wage and also mandates maximum working hours working conditions, these measures are not adequately enforced, and inspection and enforcement efforts were insufficient to deter violations. Occupational health and safety is also an issue as many workers were found not to be exercising their right to refuse work under unsafe conditions, likely to due to the fact that 60-70% of workers being within the informal sector.

Stakeholder Engagement & Vulnerable Groups

Project activities may represent a risk to human rights of different stakeholder groups both internally (e.g. direct employees, workers in the supply chain) and externally (e.g. community members and vulnerable groups).

A list of the identified stakeholders is presented in the Stakeholder Engagement Plan (SEP) as part of the ESIA process. The identified stakeholders were mapped and analysed, based on primary and secondary data information, to develop the basis of an engagement programme for the Project.

In alignment with UNGP Principle 17 and as part of the ESIA baseline studies and assessment process of potential adverse impacts, on-site visits were conducted (see **Chapter 5 of the ESIA)** as part of stakeholder engagement activities.

Identified vulnerable groups are described in **Section 13.3.4.7** of the ESIA.

Assessment and Risk Management

The human rights risk / impact review process included the identification of:

- Key human rights risks associated with the country context.
- Identified social impacts related to human rights issues.
- Collected data from baseline studies and stakeholder feedback.

As described above, the HRS comprises a high-level assessment of human rights risks and is not a complete Human Rights Impact Assessment (HRIA). The conclusion to this assessment is presented below the table. Project mitigations are considered from **Section 13.4 of the ESIA.**

The following table describes the type of human rights issue, their potential negative impact or risk, the source of the risk (external if the risk is pre-existing and part of the local context / internal if the risk is directly linked to Project activities), and the relevant management system with applicable mitigation measures.

The following risk assessment is a high-level approach on the EP IV Guidance on Human Rights Impact Assessment, and based on:

- The scale (i.e. gravity of the impact on human rights);
- Scope (number of individuals that could be affected);
- Irremediability (e.g. ability to restore the right affected to the pre-existing levels);
- Likelihood (probability of the impact occurring); and

Risk significance will be determined based on these elements and will range from low, medium and high risks.

Table B-1: Assessment of Human Rights Risks

Rights Category	Human Rights issue	Potential negative impact or risk	Source	Relationship between the Project and the impact / risk	Risk Assessment	Project Policies / Management Systems
Resettlement and Land Acquisition	ICESCR Art 11 The right to an adequate standard of living UNHR art 17 The right to property ICESCR Art 12 &13 The right to education and health. ICESCR Art 6.1 The right to work ICCPR Art 17 Right to non-interference with privacy, home and family ICCPR Art 2.3 & 26 The right to an effective remedy ICCPR Art 7 Freedom from cruel, inhuman and degrading treatment	Forced Evictions without warning, due process, compensation or support often result in a swathe of negative impacts on both the evicted community but also the surrounding communities. Forced evictions without any recourse or remedy are typically considered an infringement of internationally recognized Human Rights. The Committee on Economic, Social and Cultural Rights defines a forced eviction as "the permanent or temporary removal against their will of individuals, families and/or communities from the homes and/or land which they occupy, without the provision of, and access to, appropriate forms of legal or other protection" (UN Committee on Economic, Social and Cultural Rights (CESCR), 1997) The UN Habitat fact sheet 25 also defines forced evictions as those which involve: • A permanent or temporary removal from housing, land or both; • The removal is carried out against the will of the occupants, with or without the use of force; • It can be carried out without the provision of proper alternative housing and relocation, adequate compensation and/or access to productive land, when appropriate; • It is carried out without the possibility of challenging either the decision or the process of eviction, without due process and disregarding the State's national	External	The project site was historically occupied and subject to two forced evictions (meeting the requirements of those described by UN habitat) which occurred in 1998 and 2019. These evictions were carried out by the Ministry of Habitat and Construction and have been the subject of criticism by local communities and NGOs such as Human Rights Watch. The evictions were carried out across the wider Koloma area but included the 7ha Project site. Evidence suggests that both evictions were conducted with little warning and without a proper resettlement or compensation process in place, with no support offered to residents and businesses affected. There is little evidence to suggest the national expropriation process was followed or principles of international best practice applied. The displacement impacts felt by communities were therefore severe and long lasting. In particular, the following impacts were mentioned by the Collective of the Evicted and local leaders: • Loss of physical property: The eviction involved the demolition of residential property, business premises and secondary structures without compensation. • Homelessness: Directly after the eviction took place most people who were unable to stay with friends or family in Conakry would have become homeless until they were able to find new accommodation. • Loss of education: The Collective reported that many children and minors were separated with their	The risk of human rights infringements occurring as a result of these evictions is high/certain due to the fact they have already occurred. The risk has a high scale in terms of the gravity of the impact and a high irremediability as many of the impacts still have not been remedied at least 5 years after they occurred. SONAPI, with support from its consultant Chemas Consulting Ltd has now recently begun engaging with evicted families and their representative group, "Collectif des déguerpis" (The Collective of the Evicted or The Collective) with the intention of retrospectively paying compensation in the form of cash and replacement land. Chemas is developing a Resettlement Action Plan (RAP) which was viewed by AECOM in draft form. The RAP includes: • The identification of households (using maps of the area before demolition and satellite imagery. The process occurred in consultation with the Collective). • Socio-economic Survey. • Vulnerability Assessment and support. • Assessment of project damage. • Entitlement for compensation. • Stakeholder engagement. • Grievance Management. • Monitoring and Evaluation. • Organizational Responsibilities. A separate Livelihood Restoration Plan (LRP is being developed which includes the	Resettlement Action Plan and Livelihood Restoration Plan being developed by SONAPI and Chemas

Rights Category	Human Rights issue	Potential negative impact or risk	Source	Relationship between the Project and the impact / risk	Risk Assessment	Project Policies / Management Systems
		and international obligations. (UN Habitat, 2014) The UN Habitat fact sheet sites a number of internationally recognised human rights which are typically or indirectly directly affected by forced evictions of this sort, including those listed on the left.		parents and experienced significant interruptions to their education. • Loss of jobs and livelihoods: The eviction would have likely caused displacement of businesses or disruption to livelihood or income. • Break-up of families and loss of social networks: It is widely reported that families became separated during the eviction and some family members left the city leaving family members behind.	provisions for replacement land, however this has not yet been reviewed by AECOM. While the implementation of the RAP and LRP will go some way to finally remedy many of the human rights impacts identified, the time it has taken for remedy to become available means the risk is still high.	
Labour	Health and Safety ICCPR, Art. 6 Right to Life ICESCR, Art. 12 Right to Health	The Construction phase presents physical and chemical hazards that could be a threat to life and/or cause physical or mental injury with the nature of the industry. Physical hazards represent potential for accident, injury or illness or fatality due to repetitive exposure to mechanical action or work activity. Some of the potential physical hazards during the construction include noise, vibration, heat stress, moving equipment, ergonomics, electrical, hot work, heavy equipment/vehicle safety, working at heights, release of toxic or flammable materials, fires and explosions, hazardous environments and structural hazards. Chemical hazards also represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic, corrosive, sensitizing or oxidative substances.	Internal	The informal nature of construction work in Guinea has the potential undermine health and safety processes such as site induction and specialist training (e.g working at height or operating specialist machinery). Lack of formal contracts in place may also impair employers' liability to protect its workers and places those workers who have suffered injuries in a weaker position to hold their employers accountable.	The risk of death or injury of workers from during construction has a high scale in terms of the gravity of the impact and high irremediability as death cannot be remedied. There is a low scope in terms of the number of affected individuals, can be actively prevented by existing management practices and is unlikely to occur. Considering the implementation of mitigation measures in the ESIA and Construction Management Plans, this potential risk is predicted to be low.	Environmental and Social Management Plans ACC Code of Conduct
	Child Labour ICCPR Article 24: Rights of protection for the child ILO C 182	Children may not be engaged to do work that is hazardous, arduous, and for which they are underpaid, or to work for the same number of hours as adults. Child labourers are frequently denied the opportunity to undertake education as a result of going to work, and their mental and physical health can suffer due to poor working conditions,	External	Given the existing child labour risk in the national context, including the reported inefficiency of child labour laws and regulations in the informal sector as reported by (CIA, 2021) The Project could potentially contribute to this existing human rights risk, through direct and indirect employment (e.g. construction workers, supply chain workers	The risk of employing child labour directly or indirectly during Project activities has a high scale in terms of the gravity of the impact but low irremediability as child employment can be remedied after it has occurred. Child Labour has a low scope in terms of the number of affected individuals, can be	Environmental and Social Management Plans

Rights Category	Human Rights issue	Potential negative impact or risk	Source	Relationship between the Project and the impact / risk	Risk Assessment	Project Policies / Management Systems
		long hours of work, and ill-treatment by employers.		and sub-contractors who are hired informally could be under the age of 18).	actively prevented by existing management practices and is unlikely to occur. Considering the implementation of mitigation measures in the ESIA and Environmental and Social Management Plans, this potential risk is predicted to be low.	
	Worker rights ICESCR, Art 7: Right of everyone to the enjoyment of just and favorable conditions of work ICESCR, Art. 6: Right to work UDHR, Article 24: the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay ICCPR, Art. 22; ICESCR, Art. 8; Freedom of Association and Protection of the Right to Organise Convention; Right to Organise and Collective Bargaining Convention	Impact on workers' welfare and rights while working at the site, including poor cooking, toilets washing and sanitation facilities. The Project may impact this right if it created environmental pollution (emissions, discharges or noise) that could affect human health, if it contributed to the spread of disease, or if it affected Project worker health due to unsafe or unhealth working practices. Also it may impact workers right if workers were not given fair working conditions, including fair wages, safe and healthy working conditions, equal opportunity and reasonably rest, leisure holidays time and maternity leave.	External	The prevalence of informal work in Guinea, including for construction project limits the effectiveness of labour laws and safeguards for workers rights as reported by (CIA, 2021). The Project could potentially contribute to this existing human rights risk, through direct and indirect employment (e.g. construction workers, supply chain workers and sub-contractors who are hired informally may not be aware of their rights and will have less legal safeguards).	The risk of impacting workers rights or welfare during Project activities has a medium scale in terms of the gravity of the impact, a medium scope in terms of the number of affected individuals, can be actively prevented by existing management practices and is unlikely to occur. Considering the implementation of mitigation measures in the ESIA and Environmental and Social Management Plans, this potential risk is predicted to be low.	Environmental and Social Management Plans ACC Code of Conduct
Security	Security and Human Rights ICCPR, Art. 6 Right to Life ICESCR, Art. 12 Right to Health	Inappropriate use of force by police or security forces which causes distress, injury or fatalities or may be used as a way to intimidate members of the public. When security forces are armed and are not adequately trained how to de-escalate conflicts or tensions with the public it can in	External	Unlawful killings by police and security forces have been reported by (Amnesty International, 2022/2023). The project will contain government buildings and as such armed security will be present at the project during operation. The contractor also has contract with police to provide additional security during	The risk of violating human rights through unlawful use of force has a high scale has a high scale in terms of the gravity of the impact and high irremediability as serious injuries or death cannot be remedied after they have occurred. Security and human rights risks have low scope in terms of the	The project will conduct a Security and Human Rights Risk Assessment before project

Rights Category	Human Rights issue	Potential negative impact or risk	Source	Relationship between the Project and the impact / risk	Risk Assessment	Project Policies / Management Systems
	ICCPR, Art. 21 Right to freedom of assembly ICCPR, Art 10 Right of detained persons to humane treatment	extreme cases result in an escalation into violence. Security forces may also use their means to intimidate members of public who would otherwise whish to protest or make a complaint. Security may also prevent workers or community members from assembling.		the construction phase. Armed security could contribute to this existing human rights risk by intimidating members of public or in the event of future community protests in the vicinity of the police or security may be required to play a role in responding to this.	number of affected individuals and can be actively prevented by existing management practices and is unlikely to occur. Considering the implementation of mitigation measures in the ESIA and Environmental and Social Management Plans, this potential risk is predicted to be low.	operation commences. Security Management Measures contained within the Construction and Operation Management Plans Environmental and Social Management Plans Security and Human Rights Policy and Procedure which commit to the Voluntary Principles for Security and Human Rights

- *Source: AECOM*

Mitigation, Supply Chain and Leverage

The extent of appropriate implementation of mitigation measures to address human rights will vary based on: a) whether the Project causes or contributes to an adverse impact, or whether it is involved only through its operations, products or services by a business relationship; and b) the level of leverage in addressing the adverse impact (UNHR, 2012).

In case SONAPI or ACC are in a non-crucial business relationship with associated businesses (e.g. supply chain) and have leverage over the relation, then mitigation measures will aim to mitigate the human rights risk and, if unsuccessful, take steps to end the relationship. If there is no leverage over the relation, SONAPI or ACC will assess what reasonable options are available to increase the leverage and mitigate the risk and, if impossible or unsuccessful, end the relationship.

In case SONAPI or ACC are in a crucial business relationship with associated businesses and have leverage, the risk of continuation or recurrence of the human rights impact must be mitigated. If there is no leverage, the SONAPI or ACC will see to increase that leverage, seek to mitigate the risk if possible, and if unsuccessful, demonstrate the efforts made to mitigate the risk.

SONAPI or ACC will ensure that its suppliers are subjected to due diligence for human rights violations before engaging with them and will create a list of a preferred list of service providers and suppliers. Contracts with suppliers will contain clauses that require them to identify and manage their human rights risks.

SONAPI will ensure that the RAP and LRP are implemented and will apply leverage on other government departments which are involved in implementation where necessary.

Human Rights Policy

It is noted that within ACC's code of conduct, which is publicly available, there is a commitment to uphold human rights and the Code of Conduct makes specific commitments to safeguard against human trafficking, forced labour, child labour and maintaining labour practices. The Code of Conduct includes a commitment to take steps to mitigate risks in the business and the supply chain.

As part of the Project's commitment to respect human rights, SONAPI must develop a Human Rights Policy that should comprise the following elements as set out by the Global Compact (UN Global Compact, 2010):

- An explicit commitment to respect all internationally recognised human right standards. The commitment should be approved at the most senior level of business.
- Stated stipulations on SONAPI human rights expectations of personnel, business partners and other relevant parties in alignment with this Policy.
- Information on how SONAPI will implement its commitment through its integration in internal systems, including a summary of the human rights that are the most salient for the Project.

The Policy must be publicly available and communicated internally and externally through the SEP and the commitment to human rights should be reflected in all operational policies and procedures (UN Global Compact & Monash University, 2017).

Conclusion

Following this initial screening, human rights risks and potential impacts were found to be high and significant with respect to the forced evictions which have historically occurred at the site. It is considered that a complete human rights impact assessment (HRIA) is not required due to the fact that this impact has already occurred and mitigation in the form of a RAP and LRP is already under development.

Due to the presence of government facilities and likely armed security at the site, Security and Human Rights was also considered and a Security and Human Rights Risk Assessment should be completed before project operation. The risk assessment should consider the projects relationship with both private and public security. The risk assessment should consider how they might deal with any future protest or civil action directed at the project or occurring near the project. The risks should be mitigated through the implementation of Voluntary Principles for Security and Human Rights, including the training and vetting security personnel and monitoring of security incidents. Contracts with security providers should contain reference to the VPSHR and contain commitments for training on the appropriate use of force.

All other items were found to have a low risk due to the project specific management systems in place such as the Environmental and Social Management Systems as well as mitigation proposed in the ESIA. These and

therefore do not require further assessment, however, should any changes happen to the project or the local context they should be reviewed.

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Appendix D Supporting Information for Traffic and Transport

Appendix D Supporting Information Traffic and Transport

Table 1 Total Proposed Construction Vehicle Trip Generation (Location 1 and 2)

	HGV			Staff (CAR)			Staff (MOT)			Staff (TUK)			Staff (Shuttle)			TOTAL		
	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL
06:00 -06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30-07:30	0	0	0	83	0	83	1333	1333	2667	250	250	500	2	2	4	**1669**	**1585**	**3254**
07:30-08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00-09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00-10:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
10:00-11:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
11:00-12:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
12:00-13:00	25	25	50	0	0	0	0	0	0	0	0	0	0	0	0	25	25	50
13:00-14:00	25	25	50	0	0	0	0	0	0	0	0	0	0	0	0	25	25	50
14:00-15:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
15:00-16:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
16:00-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00-18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30-19:30	0	0	0	0	83	83	1333	1333	2667	250	250	500	2	2	4	**1585**	**1669**	**3254**
19:30-20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**150**	**150**	**300**	**83**	**83**	**167**	**2667**	**2667**	**5333**	**500**	**500**	**1000**	**4**	**4**	**8**	**3404**	**3404**	**6808**
															ROUNDING	**3404**	**3404**	**6808**

Table 2 Total Proposed Construction Vehicle Trip Generation (Location 3 only)

No HGV trips, 50% of labour staff trips (no shuttles)

	HGV			Staff (CAR)			Staff (MOT)			Staff (TUK)			Staff (Shuttle)			TOTAL		
	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL
06:00 -06:30			0	0	0	0	0	0	0	0	0	0			0	0	0	0
06:30-07:30			0	42	0	42	667	667	1333	125	125	250			0	**833**	**792**	**1625**
07:30-08:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
08:00-09:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
09:00-10:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
10:00-11:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
11:00-12:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
12:00-13:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
13:00-14:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
14:00-15:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
15:00-16:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
16:00-17:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:00-18:00			0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00-18:30				0	0	0	0	0	0	0	0	0				0	0	0
18:30-19:30			0	0	42	42	667	667	1333	125	125	250			0	**792**	**833**	**1625**
19:30-20:00			0	0	0	0	0	0	0	0		0			0	0	0	0
TOTAL	**0**	**0**	**0**	**42**	**42**	**83**	**1333**	**1333**	**2667**	**250**	**250**	**500**	**0**	**0**	**0**	**1625**	**1625**	**3250**
															ROUNDING	**1625**	**1625**	**3250**

Table 3 Total Proposed Construction Vehicle Trip Generation (Location 4 only)

100% HGV trips, 50% of labour staff, 100% shuttles

	HGV			Staff (CAR)			Staff (MOT)			Staff (TUK)			Staff (Shuttle)			TOTAL		
	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL
06:00 -06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30-07:30	0	0	0	42	0	42	667	667	1333	125	125	250	2	2	4	**835**	**794**	**1629**
07:30-08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00-09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00-10:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
10:00-11:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
11:00-12:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
12:00-13:00	25	25	50	0	0	0	0	0	0	0	0	0	0	0	0	25	25	50
13:00-14:00	25	25	50	0	0	0	0	0	0	0	0	0	0	0	0	25	25	50
14:00-15:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
15:00-16:00	20	20	40	0	0	0	0	0	0	0	0	0	0	0	0	20	20	40
16:00-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00-18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30-19:30	0	0	0	0	42	42	667	667	1333	125	125	250	2	2	4	**794**	**835**	**1629**
19:30-20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**150**	**150**	**300**	**42**	**42**	**83**	**1333**	**1333**	**2667**	**250**	**250**	**500**	**4**	**4**	**8**	**1779**	**1779**	**3558**
															ROUNDING	**1779**	**1779**	**3558**

Table 4 Total Proposed Construction Vehicle Trip Generation (Location 5 only)

100% HGV trips, 25% of labour staff (no shuttles)

	HGV			Staff (CAR)			Staff (MOT)			Staff (TUK)			Staff (Shuttle)			TOTAL		
	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL	Arr	Dep	TOTAL
06:00 -06:30	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
06:30-07:30	0	0	0	21	0	21	333	333	667	63	63	125			0	**417**	**396**	**813**
07:30-08:00	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
08:00-09:00	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
09:00-10:00	20	20	40	0	0	0	0	0	0	0	0	0			0	20	20	40
10:00-11:00	20	20	40	0	0	0	0	0	0	0	0	0			0	20	20	40
11:00-12:00	20	20	40	0	0	0	0	0	0	0	0	0			0	20	20	40
12:00-13:00	25	25	50	0	0	0	0	0	0	0	0	0			0	25	25	50
13:00-14:00	25	25	50	0	0	0	0	0	0	0	0	0			0	25	25	50
14:00-15:00	20	20	40	0	0	0	0	0	0	0	0	0			0	20	20	40
15:00-16:00	20	20	40	0	0	0	0	0	0	0	0	0			0	20	20	40
16:00-17:00	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
17:00-18:00	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
18:00-18:30	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
18:30-19:30	0	0	0	0	21	21	333	333	667	63	63	125			0	**396**	**417**	**813**
19:30-20:00	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
TOTAL	**150**	**150**	**300**	**21**	**21**	**42**	**667**	**667**	**1333**	**125**	**125**	**250**	**0**	**0**	**0**	**963**	**963**	**1925**
										126	126	252			ROUNDING	**964**	**964**	**1928**

Table 5 Construction Vehicle Impact Assessment

Receptor	Total Traffic Flow											
	Daily (12-hour)				AM Dev Peak (06:30-07:30)				PM Dev Peak (18:30-19:30)			
	Base	Dev	Total	Uplift	Base	Dev	Total	Uplift	Base	Dev	Total	Uplift
All Construction vehicle movements												
Location 1	10,169	6808	16,977	66.95%	549	3254	3,803	592.51%	1,104	3254	4,358	294.74%
Location 2	27,684	6808	34,492	24.59%	1,779	3254	5,033	182.92%	2,727	3254	5,981	119.32%
Location 3	36,584	3250	39,834	8.88%	2,708	1625	4,333	60.00%	2,766	1625	4,391	58.75%
Location 4	44,580	3558	48,138	7.98%	3,960	1629	5,589	41.13%	4,265	1629	5,894	38.19%
Location 5	73,569	1928	75,497	2.62%	5,997	813	6,809	13.55%	5,686	813	6,499	14.29%

Uplift
<30%
30% to 60%
60% to 90%
90%+

Appendix E 1/3000 Scale Development Plan for Ratoma Area (original document in French)

PLAN D'AMENAGEMENT
DU CENTRE DIRECTIONNEL DE KOLOMA GUINEE

NORD

LEGENDE

PARCELLES

- OCCUPATIONS AVANT LA CONVENTION (IMAAG): 228 644 m2
- BAUX ACTUELS (IMAAG): 120 128 m2
- ATTRIBUTIONS ACTUELLES (MUHAT): 295 065 m2
- BAUX FUTURS (IMAAG): 378 050 m2
- ATTRIBUTIONS FUTURES (MUHAT): 237 303 m2
- AMENAGEMENTS EXTERIEURS : 68 532 m2

PARCELLES : 1 327 722 m2 soit 132 Ha 77a 22ca

REPUBLIQUE DE GUINEE
TRAVAIL – JUSTICE – SOLIDARITE

MINISTERE DE LA VILLE ET DE L'AMENAGEMENT DU TERRITOIRE

COMMUNE DE RATOMA

PLAN D'AMENAGEMENT
CENTRE DIRECTIONEL
DE KOLOMA GUINEE

MAITRE D'OUVRAGE	CONCESSIONNAIRE
MINISTERE DE LA VILLE ET DE L'AMENAGEMENT DU TERRITOIRE	IMAAG HOLDING – AMENAGEUR FONCIER – PROMOTEUR IMMOBILIER – TRAVAUX PUBLICS

Date	Projété par	Date	Vérifié par	Date	Approuvé par
	IMAAG HOLDING		LE DIRECTEUR NATIONAL DE LA DATU		ARRETE N°..... LE MINISTRE DE L'URBANISME DE L'HABITAT ET DE L'AMENAGEMENT DU TERRITOIRE

Date: JUILLET 2019	PLAN N° 01	Echelle: 1/3 000

Date	Modifications	Ind.
23-01-2020	Elargissement de la voie entre l'ambassade du Nigéria et la caserne de 12 à 30 mètres Changement du terme cimetière en ZAC / Rond point à l'intersection route le prince et transversale n°2	A
23-04-2020	Augmentation du nombre de parcelles cessibles en morcelant certains équipements	B
26-11-2020	Déplacement de la voie tertiaire apres augmentation de la superficie de l'ambassade de turquie	C
16-06-2022	Recomposition de plusieurs Lots et requalification des voies primaires (V9-V3)	D
		E
		F

Appendix F Summary of Environmental and Social Management Measures for Project Phases

The mitigation measures are summarised in table below.

Table F-1: Summary of the mitigation measures for the construction and operation phase

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
Air Quality (Construction)	• Protecting lorries with tarpaulins when transporting materials. • On-site speed limits to reduce carbon monoxide, smoke and dust emissions. • Regulatory checks and ensuring that machinery and vehicles are in good condition. • Adequate watering of work areas, storage areas, etc. with water tanks equipped with sprinklers depending on requirements and climate. • All on-site storage of materials and/or spoil is protected by tarpaulins. • No burning in and around the Project site will be allowed. • Compliance with the waste management plan in general; specifically, the management of green waste will favour the reuse of cut tree trunks. • Use machinery and vehicles only when necessary, and always stop after use. • Reducing dust emissions from the movement of vehicles (Trackout) by ensuring the watering of roads adjacent to the proposed development and residential areas. • The Pollution Prevention Plan also includes a commitment to undertake monitoring of NO2, SO2, PM10, PM2.5, VOC and CO in the vicinity of the construction site.	• Dust Suppression measures • Vehicle inspection checks carried out • Minutes of stakeholder meetings. • Grievances received. • Construction Management Plan implemented • Adherence to maintenance/services schedule • Work schedules to update/monitor with weather conditions	ACC	• Monthly ESHS reports prepared by ACC • Inspection reports • Record of traffic accidents and near misses • Grievance Logs	• Prior to start of and during Construction. • Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.
Greenhouse gases and Climate Change Adaptation – Physical risks (Construction)	The following renewable energy provisions/sustainability measures: • Prefabricated construction methods for the infirmary and site offices; • Monthly energy audits to analyse energy consumption and identify areas of over-consumption; • Awareness training sessions on good energy saving practices displaying consumption figures on site;	• Safe working practises implemented	ACC	• Monthly ESHS reports prepared by ACC • Monitor work schedules	• Prior to start of and during Construction. • Monitoring carried out during monthly site inspections. Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Pollution prevention measures transport of construction equipment and materials: regular inspection and maintenance of machinery and optimising travel routes and transporting materials. • Waste management Systems including recycling, recovery and disposal methods have all been implemented into design. Climate Change Risks/mitigations: • A construction Health and Safety Management Plan (Project's Management plan-PGSSC) has been developed for the construction site. This document outlines key health and safety procedures, emergency plans and measures that will be in place on the construction site. • Onsite areas for workers will have sufficient air conditioning integrated, to allow construction workers to get out of the heat and cool down during breaks. • Construction equipment and machinery will be checked regularly to see if maintenance is required, for instance reoccurring periods of extreme heat in combination with rainfall can lead to humid conditions, causing corrosion of equipment and construction materials. • Equipment and supplies will be stored appropriately to prevent damage from the elements. • Hazardous and combustible liquids will be stored in containers that are protected from the weather by enclosed structures. • The site will have fire detection systems, alarms, fire equipment, fire wardens and fire procedures in place. • Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of adverse weather conditions. Part of this will include equipment being stored appropriately to avoid damage. • The site will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system. • The Project will have a construction water management plan, that'll include measures to collect and dispose of runoff water. This				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	plan will be implemented as part of the wider ESMP for the Project. • Cranes will not be used in adverse weather conditions that are likely to compromise their stability. • Soil will be stored and covered with tarpaulins and excavated soil will be watered regularly in dry/windy conditions. • Dust prone areas will be watered with non-potable water to help suppress the dust. Adaptation measures; • A 'Heat Stress Prevention Guidelines' procedure will be established for during construction. • Work schedules will be reflective of weather conditions. During expected periods of extreme weather events and adverse conditions work undertaken on site will be minimal. e.g. outdoor work will be scheduled to avoid the hottest time of day • Shaded and indoor cool facilities will be provided for staff to get out of the heat, and water will be provided to help re hydrate. Hydration kits will be provided to those suffering for heat exposure. • Trees and other vegetation in the surrounding areas will be monitored and pruned to make sure there is a safe distance between the greenery and the site. In addition pruning vegetation reduces the quantity of materials that act as fuel for the wildfires and allows them to burn for longer. • Fuel breaks and buffer zones will be integrated into the surrounding area. • Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. • Water pumps will be located at key areas of the construction site, and in close proximity to critical infrastructure. This will help increase the sites surface drainage capacity. • Loose materials will be stored correctly, and bunded where appropriate. e.g. soil and clay will be bunded to protect them from				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	periods of heavy rainfall which could cause the materials to be washed onto the construction site or into the local area. • Workers will be provided with appropriate PPE to facilitate working in dust prone environments e.g. dust mask and googles.				
Greenhouse gases and Climate Change Adaptation – Physical risks (Operation)	The following renewable energy provisions/sustainability measures have been included in design: • Solar hot water systems; • External lighting, for example street lighting, to be assisted by solar panels; • STP system -- treated sewerage water to be used for irrigation; • Rainwater harvesting - Stormwater holding tank to re-use rainwater for irrigation; • VFD's for fans, pumps and condenser units if not central chiller; • LED lighting and associated sensors; • Waterflow reducers for sanitary ware items; • During operation, there will be no combustible fuel use. There are 5 x 2,500 KVA emergency backup generators. As per the project description, power will come directly from the grid. Alternative power sources such as PV panels and LED lighting (discussed within this section) should be considered to reduce GHG emissions; Energy saving devices will be integrated into offices and other site premises; • Prefabricated construction methods for the infirmary and site offices; • Monthly energy audits to analyse energy consumption and identify areas of over-consumption; • Awareness training sessions on good energy saving practices displaying consumption figures on site; • Pollution prevention measures transport of construction equipment and materials: regular inspection and maintenance of machinery and optimising travel routes and transporting materials. • Waste management Systems including recycling, recovery and disposal methods have all been implemented into design. Of specific to the indoor air quality general measures;	• Safe working practises implemented	• Sonapi/Contractor assigned for operation	Monthly ESHS reports	• Prior to start of and during operation. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Ensuring good ventilation in buildings • Daily cleaning of the building • Appropriate waste collection and management • Providing surface technicians with appropriate PPE Climate Change Risks/mitigations: • Weather forecast will be monitored, and contingency measures will be put in place in advance of periods of adverse weather conditions. Part of this will include equipment being stored appropriately to avoid damage. • The Project will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system. • The Project will have an operational water management and monitoring plan, which will be implemented as part of the wider ESMP for the Project. • Rain gardens will be established to facilitate infiltration directly into the soil. • There will be appropriate stormwater drainage outlets incorporated into the site. Adaptation measures; • Through monitoring the weather forecast maintenance and operational task that would be exposed to the hot temperatures can be scheduled or moved to a time period or future date where temperatures will not be as hot. • Outdoor and non-essential work will cease, if working conditions are deemed to be too dangerous and a hazard to workers safety. • Flammable materials will be stored correctly, and a fire safety plan and procedure will be in place. • Increase and enhance monitoring and fire safety vigilance checks during periods of extreme temperature. • Fuel breaks and buffer zones will be integrated into the surrounding area. • An emergency stock supply of potable water will be stored on the site.				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Windows and other openings will be sealed to prevent dust entering. Air conditioning systems will help filter dust.				
Biodiversity (Construction)	• Standard operating procedures will be implemented during the construction phase, based on the Project's Environmental and Social Management Plan (ESMP /PGESC) developed by ACC. • Typical embedded mitigation actions during construction is that all construction and administrative workers at the Project site shall be provided with environmental training. This shall include a strict prohibition on hunting of animals and resource gathering within the site and surrounding area. The following additional mitigation will be implemented during construction: • The site boundaries shall be marked prior to site clearance work. Any fencing used at these boundaries shall be open enough to allow large animals to escape from the site during site clearance. Once the vegetation has been cleared from the site, more formal fencing shall be installed. This shall be secure but be open enough to allow small animals to pass through. • Where any felling of trees is required, these shall be removed first. Soft felling techniques (trees cut and lowered to the ground in a controlled manner) shall be used where appropriate. • Cut branches and trunk sections shall be left on the ground to allow any animals present to escape before the wood is taken from the site. Undergrowth and shrubs shall then be cleared. • A watching brief by trained personnel (e.g., an environmental clerk of works) shall be kept, to look out for any animals and to allow them enough time to escape. • Thickets and shrubs shall be cleared after the removal of trees. A watching brief by trained personnel shall be kept looking out for any animals and to allow them enough time to escape. • Where possible topsoil shall be retained for use in subsequent landscaping. • Except for security and safety oriented peripheral lighting, exterior lighting shall be planned in low angles and be directional to reduce light pollution. • Should any aspect of the design change to include development of additional land, an ecological walkover survey will be undertaken	• Training records	ACC	Site Inspection Reports	• Prior to start of Construction. • Monitoring carried out during site inspections. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	prior to construction commencing. This will be to map habitats and to determine the presence of natural and or modified habitat. • Based on the requirements of Objectives 9.3 & 9.4 of the Guinea National Biodiversity Strategy, there is a requirement to control the introduction of invasive / exotic species. Therefore, any invasive plant species and/or plant waste material, including waste soils that may contain plant material, will be treated to destroy that plant material prior to being disposed of off-site or reused on-site. Any soil brought onto the site should be checked for the presence of invasive species that may be introduced and/or spread.				
Biodiversity (Operation)	• All operational and administrative workers at the site shall be provided with environmental training. This shall include guidance on pollution prevention and drainage management as well as waste management. In addition, there will be a strict prohibition on hunting of animals and resource gathering within the site and surrounding area. • Any release of chemicals or hydrocarbons will be contained and not released to the water environment. • Should any aspect of the design change to include development of additional land, the Management of Change Procedure shall be applied and necessary. • Where landscaping and planting is included as part of the design, priority will be given to using indigenous plants of local origin sourced from local nurseries / garden suppliers where possible. Care will be taken to avoid introducing ornamental species that comprise exotic / invasive species.	• Training records	Sonapi/Contractor assigned for operation	• Operational Management Plans • Management of Change Procedure, if required	• Prior to start of and during operation. • Monitoring carried out (monthly). • Mitigation work to be carried out as and when identified.
Noise and vibration (Construction)	• Project regular working hours will be from 07:30 to 17:30 with a one-hour break between Monday and Saturday. There will be no night-time works outside those specified hours. • No noisy activities will be undertaken outside of regular project working hours or for excessively long periods to avoid disturbance to local residents. • Transportation of construction materials to site will be scheduled to avoid peak hours (07:00 – 09:00 and 16:00 – 18:00) where possible. • Machinery and equipment in good working order will be used.	• Number of Noise complaints received. • Number of technical inspections carried out on vehicles	ACC	Monthly ESHS reports	• Prior to start of and during Construction. • Monitoring following a complaint. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Daily plant and equipment inspections to identify any maintenance requirements. • Careful handling of materials and waste such as lowering rather than dropping items. • Wherever possible, light signals (strobes) will be used to replace whistles, bells and other audible alarms to signal crew changes, possible concrete pours, lifting manoeuvres where applicable and other site activities. • Audible alarms will primarily be used as emergency signals. • All generators will be within a soundproof enclosure. • Avoidance of unnecessary noise (such as engines idling between operations, shouting, loud radios or excessive revving of engines) by effective site management. • All noise-generating operations will be monitored by the ESSS supervisor before they begin. • The use of fast-moving machinery will reduce exposure to noise. • Where control at source is not practicable or adequate, the distance between noise/vibration sources and sensitive neighbours would be maximised and the transmission path interrupted, with options considered in the order of source-pathway-receptor. Where practical this can be achieved by: o Siting of stationary plant and loading/unloading areas. o Breaking of concrete will be undertaken using hydraulic pulveriser 'muncher' techniques where possible. o Static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures / screening and sited away from sensitive facades. o When plant is not being used it will be shut down and not left to idle. • Methods and programme of work and vehicular routes will be selected with regard to minimising noise and vibration impact. • Site personnel will be instructed on methods to reduce noise and vibration as part of their induction training and as required prior to specific work activities.				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Careful handling of tools, placement, and shouting on the site will be covered in activity plans and/or briefings as appropriate. • Training and briefings will be delivered to the site team to inform them of noise and vibration issues and the location of nearby receptors. • Liaison is undertaken with occupiers of sensitive receptors that may be affected by construction noise. Providing information regarding construction works and advance notice of when high noise generating activities are to take place can reduce significant impacts. All communications will contain contact details for the person to whom any questions or complaints should be directed. • Communications will be undertaken with the Guinea Broadcasting Service, United States Embassy and Ministry for Foreign Affairs to pre-emptively warn of noisy construction activities in close proximity to these receptors. • Consideration will also be given to traffic routing, timing and access points to the site so as to minimise noise impacts at existing receptors following contractor appointment, and as construction working methods are developed. Contractors will issue a project route map and delivery schedule to control construction traffic. Traffic management will be employed to guide and control both public and construction traffic during deliveries. • ACC will install traffic signs on the site to regulate traffic flow. • A speed limit of 10km/h will be applied in locations where it is necessary to reduce noise impacts and safety risks.				
Noise and vibration (Operation)	• The specification of plant machinery with low noise emission and properly attenuated supply and extract terminations will help to mitigate noise emissions. • The use of enclosures, local screening, mufflers and silencers will also be used as appropriate. • Note that specific plant noise assessments and mitigation requirements (if necessary) will be undertaken during detailed design. • A traffic management plan will be prepared.	• Number of Noise complaints received.	Sonapi/Contractor assigned for operation	• Monthly ESHS reports • Operational Management Plans	• Prior to start of and during operation. • Monitoring following a complaint. • Mitigation work to be carried out as and when identified.
Pollution Prevention for Fuels, oils and	Appropriate management, storage and disposal procedures for materials, wastes (solid and liquid), fuels or chemical wastes will be prepared and implemented to avoid soils, groundwater and surface water contamination.	• Appropriate number of spill kits available on Site	ACC	• Site Inspection Reports	• Prior to start of Construction.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
other hazardous material (Construction)-	• Pollution prevention measures associated with waste management. • Drip trays will be placed under generators and other equipment that may drip oil. This includes any vehicles that are required to stand for long periods. • Spill response and emergency plans will be prepared and implemented to address potential accidental releases. • Hazardous liquids such as diesel fuel will be securely stored on flat hardstanding, and fuel will be protected either by double-walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume; • Spill kits will be available on the Site in watertight containers. • Regular monitoring and maintenance of machinery and vehicles to ensure these are not leaking contaminants. • Provide washing areas for machinery and a separate washing area for concrete mixers which are fitted with oil and grease separators to prevent runoff of pollutants. • Set up a separate sewerage system for domestic, washing and rain water. • Provide watertight storage which is enclosed to protect from the weather and fenced with restricted access. • Supply absorbant material and watertight containers to reduce leakage of pollutants. • Collect used oils, residue oils and hazardous materials/ waste to prevent releasing these to the environment. • A Construction Water Management and Monitoring Plan will be prepared and implemented that requires regular monitoring of the water quality, level and flow of any groundwater and surface water features. It will summarise baseline conditions, standards and trigger values, and outline actions plans for adverse effects to quality, levels or flow. Monitoring will be undertaken quarterly and/or if, and may be pared back thereafter should quality, levels and flow be shown to be unchanged.	• Hazardous substances stored appropriately e.g. in bunded, marker area.		• Construction Water Management and Monitoring Plan and Pollution Prevention Plan	• Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Solid and liquid waste will be appropriately treated and disposed of to decrease the risk of leak/spills/leaching of contaminants to surface water, groundwater and soil. • Runoff from areas used for potentially contaminating substances will be captured and treated to meet national and international standards prior to discharge.				
Pollution Prevention for Fuels, oils and other hazardous material (Operation)-	• An Operational Water Management and Monitoring Plan will be prepared and implemented that requires regular monitoring of groundwater and surface water quality, levels and flow. It will summarise baseline conditions, standards and trigger values, and outline actions plans for adverse effects to quality, levels or flow. Monitoring will be undertaken yearly, and may be pared back thereafter should quality, levels and flow be shown to be unchanged. • Operational monitoring report will be prepared yearly that summarises monitoring activities undertaken, findings (including non-compliances), and actions taken to address non-compliances.	• Number of non-compliances	Sonapi/Contractor assigned for operation	• Site Inspection Reports • Operational monitoring report • Operational Water Management and Monitoring Plan	• Monitoring will be undertaken yearly
Surface Water, Groundwater and Soils (Construction)- Drainage	• Pooling of water will be minimised and release of contaminated water to the environment will be avoided through use of drainage systems and application of GIIP for storm water management. • Cut-off drains will be installed to intercept, divert and/ or treat runoff from working areas. • A layer of high permeability fill material (e.g. sand of gravel) will be installed wherever possible to facilitate effective drainage and prevent the creation of barriers and reduce flood risk. • Culverts will be designed to accommodate peak flows and prevent blockage. Culverts and diversions will be inspected and maintained regularly to prevent blockages. • Drainage channels will be engineered and installed to capture and divert storm water. • Sedimentation ponds will be engineered and installed in the drainage system to reduce the sediment load prior to discharge.	• Drainage channels • Sedimentation ponds, cut-off drains and culverts • Stakeholder engagements • Necessary permits	ACC	• Site Inspection Reports • Permit Register	• Prior to start of and during construction. • Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Necessary communications and engagement will be undertaken and secured with the authorities related to the connection to the existing drainage network and the capacity confirmation.				
Surface Water, Groundwater and Soils (Operation)- Drainage	• The Project will have a drainage plan, part of this plan will allow rainwater to be channelled into the local drainage system. Design and management of the discharge systems from the Site will ensure that pollutants from the site do not enter the coastal or rivers systems. • To maintain their effectiveness, drainage channels and sediment ponds will be cleaned out regularly throughout construction and operations by reclaiming the captured eroded soils. • Regularly monitoring weather forecasts to ensure that contingency plans are in place for adverse weather conditions. • Where suitable, the installation of interceptors to capture pollutants or the establishment of reedbeds to naturally filter contaminants before connection to the network. • Undertake regular inspections and maintenance activities shall be applied on site during the operational phase of the Project to ensure the ongoing effectiveness of the measures to manage operational runoff. • All operational and administrative workers at the site shall be provided with environmental training. This shall include guidance on pollution prevention and drainage management as well as waste management. • An agreement in place with the relevant authority/professional waste disposal licensed companies regarding the collection, transfer and disposal of effluents. • Wastewater will not be permitted to enter watercourses or to soakaway. There will be on-site wastewater treatment plant. • Periodic inspection and maintenance if the treatment plant shall be undertaken on monthly basis; these shall be managed by Administrative Facilities' Operational Management Team.	• Drainage Plan • Established Interceptors where necessary. • Number of grievances	Sonapi/Contractor assigned for operation	• Site Inspection Reports • Operational Management Plans • Grievance Mechanism	• Prior to start of and during operation. • Monitoring carried out during operational phase. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
Waste (Construction)	• Follow the waste hierarchy, placing priority on waste minimisation, followed by recycling or reuse if economically practicable, then by environmentally sound methods of waste treatment and/ or disposal. • Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes. • Applying manufacturing process that convert materials efficiently, providing higher product output yields, including the modification of the production process, process controls and operating conditions. • Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs. • Instituting procurement measures that recognise opportunities to return usable materials such as containers and which prevents the over ordering of materials. • Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed. • Organising the worksite so that the loss of new materials is avoided by optimising the off cuts through their reuse and ensuring fragile materials are protected. • Collaborating with suppliers to reduce the amount of packaging products arrive in, with a focus on packaging that cannot be reused or recycled easily. Consideration will be given to the following measures to maximise the amount of Project waste that can be recycled: • Evaluation of waste production processes and identification of potentially recyclable materials. • Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site.	• Quantity of solid waste generated. • Quantity of solid waste correctly disposed to licensed disposal sites.	ACC	Monthly ESHS reports.	• Prior to start of and during Construction. • Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Investigation of external markets for recycling by other industrial processing operations located in the neighbourhood or region of the Project. • Establishing recycling objectives and formal tracking of waste generation and recycling rates. • Provide training and incentives to employees to meet objectives. All wastes will be stored in suitable containers which are appropriate for the materials in question, and which are clearly labelled. The contractor will: • Separate waste types by category and subcategory by utilising different collection facilities (drums, bins, skips, containers, etc.) and train staff to ensure waste is sorted upstream to enable optimum recovery. ACC will supply skips of at least 1m3 for rubble and inert materials on site. • Correctly identify different wastes according to colour code. Hazardous waste will be stored in yellow containers marked “DANGER”. Non-hazardous waste will be identified in their different sub-categories with the colours blue, green, and black. • Provide distinctive waste skips and bins in the waste storage area. Yellow bins will be assigned to hazardous wastes (HHW). Green bins/bagsters will be for common industrial waste (CIW). 200-litre drums will be available for used oils. • Use waste tracking slips to maintain chain-of-custody records for waste transferred off-site. Hazardous waste will be stored to prevent or control accidental releases to air, soil, and water resources and in accordance with the following measures: • Waste will be stored in a manner that prevents the commingling or contact between incompatible wastes and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs. • Store in closed containers away from direct sunlight, wind, and rain.				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Secondary containment systems will be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment. Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 litres. The available volume of secondary containment will be at least 110% of the largest storage container, or 25% of the total storage capacity (whichever is greater), in that specific location. • Provide adequate ventilation where volatile wastes are stored. • Use dedicated fittings and pipes specific to materials in tanks and use transfer equipment which is compatible to the characteristics of the materials being transferred. • Regular inspection, maintenance and repair of fittings, pipes, and hoses. • Hazardous waste storage activities will also be subject to special management actions, conducted by employees who have received specific training in handling and storage of hazardous wastes. The contractor will: • Establish a handling and storage procedure for each material. Including the preparation and implementation of spill response and emergency plans to address accidental releases. • Provide readily available information on chemical compatibility to employees, including labelling each container to identify its contents. • Limit access to hazardous waste storage areas to employees who have received proper training. • Clearly identify and demarcate waste storage areas, including documentation of locations on a facility map or site plan. • Conduct periodic inspections of waste storage areas and documenting the findings. • Avoid underground storage tanks and underground piping of hazardous waste. • On-site and off-site transportation of waste will be conducted to prevent or minimise spills, releases, and exposures to employees				

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	and the public. All waste containers designated for off-site shipment will be secured and labelled with the contents and associated hazards, be properly loaded onto transport vehicles before leaving the Project Area and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards. Open burning of waste will be prohibited. Monitoring activities associated with the management hazardous and non-hazardous waste will include: • Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify correct labelling. When large quantities of hazardous waste are generated, additional activities are required, most are addressed above. • Regular audits of waste segregation and collection practices • Tracking of waste generation trends by type and amount generated • Characterising waste at the beginning of generator of a new waste stream • Keeping manifests or other records that document the amount of waste generated and its destination. • Periodic auditing of third-party treatment and disposal services when significant quantities of hazardous wastes are managed by third parties. • Regular monitoring of groundwater quality in cases of hazardous waste on site and/or pre-treatment and disposal • Monitoring records for hazardous waste collected, stored, or shipped. • Audit any vendors recycling used oils • Reduce mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal.				
Waste (operational)	• Waste management measures will be based on the implementation of a waste management system (WMS). The	• Quantity of solid waste generated.	Sonapi/Contractor assigned for operation	Monthly audits of the MPs.	• Prior to start of and during operation.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	WMS will ensure that on site everyone understand and comply with their roles and responsibilities which will translate into human, material, and financial commitments. A Waste Management Plan will be prepared for the operational phase of the Project. • The Facility operators should undertake regular assessment of waste generation quantities and categories to facilitate waste management planning and investigate opportunities for waste minimization on a continuous basis. • Audit any vendors recycling used oils. • Reduce mobility of other hazardous wastes by, for example, allowing used paints to harden and solvent to evaporate prior to disposal. •	• Quantity of solid waste correctly disposed to licensed disposal sites.			• Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.
Traffic	• Traffic management measures (e.g. signage, flagmen) will be employed to safely manage construction vehicle movements to and from the construction site access point and within the Project Site; • With the exception of skilled specialists for certain tasks, the workforce will be sourced locally where possible, reducing the need for workers to travel a long distance; • A Shuttle bus service will be provided for ACC staff only. Thereby reducing the potential number of individual of vehicle trips associated with the ACC staff; • Local construction staff will be encouraged to vehicle share when travelling to/ from the Project Site by car, motorcycle (taxi) and tuk-tuk (taxi), to reduce the number of vehicle movements to/ from the Project Site; • Deliveries will be co-ordinated and consolidated where possible, to reduce the number of Heavy Goods Vehicle (HGV) movements across the construction programme; • Deliveries will be staggered across the day, to reduce the peak number of HGV movements for any given hour of the day, and to avoid the morning and evening network peak hours where possible;	• Varying Shifts • Number of grievances recorded	ACC	• Monthly ESHS reports • Monthly audits • Grievance Log	• Prior to start of and during Construction. • Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	• Construction vehicles will be kept in good condition and regular inspections will be carried out to ensure they remain roadworthy; and, • Driver training will be offered and provided where required. The following potential additional mitigation, not included in the assessment at this point, given it is understood that it cannot be committed to at this stage, should be considered to reduce staff numbers and/ or vehicle numbers accessing the Project Site: • Local construction staff will be encouraged to use non-motorised modes such as bicycles when travelling to/ from the Project Site to reduce the number of vehicle movements to/ from the Project Site; • Implement and/or provide varying shifts of work to reduce the number of vehicle movements accessing to/ from the Project Site to the extent possible once the construction workforce would be ramping up to peak.				
Archaeology and cultural heritage (Construction)	• Construction traffic will avoid using roads adjacent to the two cemeteries in so far as it is possible to do so. • Prior to construction groundworks, identified archaeological sites shall be protected by temporary flagging/ fencing and signage, ensuring an adequate buffer and staff awareness training. This will aim to prevent inadvertent trampling, excavation, vehicle rutting and collision damage. • **Chance Finds Management Plan** will be implemented to reduce the likelihood of impacts occurring without adequate mitigation. It will include contact details of responsible post-holders, contact details of approved archaeologists and any required agreements with the heritage authorities. It will set out notification requirements, response times and monitoring procedures for archaeologists. • Cultural Heritage Awareness Training shall be integrated into workforce site inductions and toolbox talks for all Project staff, contractors and subcontractors. This includes training of machine drivers and banksmen in the detection, identification and preservation of archaeological remains and relevant soil horizons. • An archaeological watching brief shall be implemented should any archaeological remains be identified or encountered during	• Chance Find Procedure. • Number of recorded chance finds.	ACC National Cultural Heritage Authority	Monthly ESHS reports.	• Throughout the construction works.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
	construction works. If archaeological remains are identified during the watching brief, construction groundworks shall be temporarily suspended in that area and the relevant government authorities informed, and a permit for archaeological excavation works requested. The authorities shall decide the mitigation measures to be applied to the site. Any ensuing archaeological excavation works may involve the manual stripping and hand excavation of archaeological deposits and structures. Earthmoving equipment and machinery may be only used in archaeological excavation works if their use is specified in the permit for field research.				
Socio-economic – including employment (Construction)	• The Project will develop and implement a Stakeholder Engagement Plan and Grievance Mechanism to provide regular Project updates to local authorities, identify stakeholder concerns and manage any related grievance and complaints. • The Project will develop local recruitment and procurement goals and performance indicators to be included in a Local Content Plan to maximise local opportunities. The plan shall include an analysis of the project needs for employment and services and an evaluation of the capacity of the surrounding community. Where gaps in capacity exist, measures could but in place to address those gaps where possible. • The plans will cover direct hires and also subcontractors and workers in the primary supply chain. • Employment opportunities must be published and made accessible in a manner that is appropriate to local residents (e.g. employment centres, internet websites, etc.) and clearly communicating the recruitment process. • First priority in employment for non-specialised jobs will be given to residents in Conakry. • Women shall be encouraged to apply for available positions given there are less women in employment as noted in the baseline. • Where possible training will be provided to local people as part wider community investment in order to increase their capacity to be employed.	• Management Plan (which included local recruitment targets). • Stakeholder engagement activities. • Number of grievances recorded. • Number of local workers hired. • Minutes of stakeholder meetings. • Skills training.	ACC	• Grievance log. • Corrective Action Reports • Number of local people employed on the Project. • Training places provided and completed.	• Prior to start of Construction. • Monitoring carried out during weekly checks by the CLO and monthly inspections/audits by HR Responsible. • Monitoring carried out during weekly site inspections. • Mitigation work to be carried out as and when identified.
Project-induced population	• The ESMP and HSMP includes a code of conduct for all employees to abide by.	• PGESC • PGSSC	• ACC	• Monthly ESHS reports .	• Prior to start of Construction.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
immigration (Construction)	• The project will also implement the Stakeholder Engagement Plan, which is prepared specific to this Project along this ESIA report as a standalone document, which will include steps to manage the expectations of the surrounding community.	• Code of Conduct • Règlement intérieur • Stakeholder Engagement Plan • Monthly workforce statistics. •		• Inspection reports. • Grievance log. • Workers' grievance mechanism log. • Number of local people employed on the Project. • Training places provided and completed.	• Monitoring carried out during weekly site inspections. • Monitoring carried out during weekly checks by the CLO. • Monthly audits by HR Responsible. • Mitigation work to be carried out as and when identified.
Interaction between workforce, communities and local receptors (Construction)	• In addition to the Project's ESMP and HSMP (PGESC and PGSSC), the Project will implement the Code of Conduct. The project will assess the risks of harassment and GBV and steps to limit negative interactions between the workforce and the community and other social receptors. • The Code of Conduct will apply to both direct hires, subcontractors workers in the primary supply chain. • Induction training will be provided to the workforce which will highlight the sensitive receptors in the area and will include rules about worker behaviour. • The project will also take steps to inform and raise awareness of local populations and students and school staff on the nature and the programme of work Sexually Transmitted Infections (STIs), raise awareness of STIs and HIV-AIDS among site staff and the general public. Workers will be briefed regarding harassment and the laws which existing which treat sexual harassment and gender-based violence as a prosecutable offence *(CHEMAS' mitigation)*. • The grievance process will be made available to the local community and will include a gender sensitive channel for reporting gender-based issues or concerns. • Informing and raising the awareness of staff and local residents about the nature of the works *(CHEMAS' mitigation)*. • Put up an information board at the entrance to the site indicating the contact details of those in charge of the site and the work schedule *(CHEMAS' mitigation)*.	• PGESC • PGSSC • Code of Conduct • Règlement intérieur	ACC	• Training records. • Inspection reports.	• Prior to start of Construction. • Monitoring carried out during weekly site inspections. • Monitoring carried out during weekly checks by the CLO. • Monthly audits by HR Responsible. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
Labour and Working Conditions (Construction)	• ACC, SONAPI and the Government Ministries which will move into the site will abide by all national laws and regulations, in particular the following apply to labour management: Law L/2014/072/CNT on the Labour Code. • All employees in the operational and construction phase will be paid the national minimum wage or above, as required by the Labour Code of Guinea. • Under no circumstance will an applicant below the age of 18 years of age be recruited to work at the Project site. All employees will be required to show identification at the point of recruitment to proof their age and eligibility to work. • Construction works will take place 6 days a week. Project regular working hours will be from 07:30 to 17:30 (including a one hour break) between Monday and Saturday. • The Project's constructional ESMP (PGESC) includes provisions for night time work should it be required, this includes adequate lighting, supervision, food and water. • All construction workers will be provided with EHS&S induction training and issued with Personal Protective Equipment. • All security will be provided with basic security training. • In addition to the Project's ESMP and HSMP (PGESC and PGSSC), the Project will and implement the Règlement intérieure and Code of Conduct which will ensure there is no discrimination based on gender, age, ethnicity or religion, workers receive fair employment contracts, safeguards against child labour, forced labour, protection of collective bargaining and have an internal grievance mechanism from which to raise concerns. • Provision of basic services to workers are managed in line with Worker's Accommodation: Processes and Standards. (IFC, EBRD, 2009).	• Code of Conduct • Règlement intérieur • Workers' contracts. • Annual training programme.	ACC	• Monthly ESHS reports . • Inspection reports. • Workers' grievance mechanism log. • Training records.	• Prior to start of and during construction. • Mitigation work to be carried out as and when identified.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
Capacity strain contribution to local public services and facilities (Construction)	• The Project shall liaise with SEG to agree water usage limits and targets where necessary. Any change in water usage should be communicated to SEG in advance. • Contained within the Project's ESMP is a plan for water resource management including setting water usage targets and monitoring and water saving measures.	• Water usage targets and monitoring and water saving measures. • Stakeholder engagement activities. • Grievance records. •	ACC	• Stakeholder Engagement Activity Minutes. • Grievance log.	• Prior to start of Construction. • Monitoring carried out during weekly site inspections • Monitoring carried out during weekly checks by the CLO.
Increased presence of security personnel (Construction)	• The project will develop provisions for vetting, managing and training security personnel in accordance with the Voluntary Principles of Security and Human Rights. • The site security (including police) will need to be trained to de-escalate violent situations and avoid the use of force.	• Stakeholder Engagement Activities. • Number of grievance records. • Workers' Grievance records. • Training records.	ACC	• Security Management Plan • Monthly ESHS reports • Inspection reports. • Workers' grievance mechanism log. • Grievance log.	• Prior to start of and during construction. • Monitoring carried out during weekly checks by the CLO • Monitoring carried out during weekly site inspections.
Road Safety (Construction)	• Once the specific access routes for the constructional vehicles are agreed, the speed limits shall be communicated with the drivers considering the pedestrian walkways as well as vulnerable groups (i.e. school children). • Site specific details of high risk junctions and convergence points between pedestrian walkways and roads shall be identified along the route with specific risk management measures in place. • The Project will develop provisions for employing flag person near the entrances to the Koloma area where construction traffic and pedestrians will interact. • The flag person can stop traffic allowing pedestrian to pass providing adequate time for someone to cross before letting construction traffic commence. • Speed limits shall be established outside the Project Site (i.e within the Koloma Area) and within Conakry. • Measures shall also be taken to protect the truck and bike parking areas from community members, such as children wandering inside by providing physical barriers. • Community awareness raising shall form part of the plan.	• Stakeholder Engagement Activities. • Number of grievance records.	ACC	• Traffic Management Plan. • Monthly ESHS reports • Inspection reports. • Grievance log.	• Prior to start of and during construction. • Monitoring carried out during weekly checks by the CLO • Monitoring carried out during inspections.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
Socio-economic – including employment (Operation)	• There will be no need to employ additional operational staff for the Project; the existing staff/employees will be relocated to the proposed Project site. Other operational jobs such as building, facilities and grounds management, catering, waste and cleaning and security will provide opportunities for local people. SOJECAC, who will be responsible for the management of the defined operational services will require employment from the local population in Conakry, however the number of jobs created is unknown at this stage. • The Project should develop a Local Content Plan and Community Development Plan which will assist local people who are at risk of being priced out the area take advantage of the increased economic opportunities. • The Project will offer outdoor space and services near to the offices to improve wellbeing. • The new premises will be designed to promote more open participation of females the workplace with the inclusion of separate female toilets and will be able to cater for handicapped employees due to access and dedicated washrooms. • An Environmental and Social Management Plan for operational phase (OESMP) is developed and implemented in the operational phase. • The Project will regularly engage with local service providers to ensure that facilities are able to cope with increased demand. • The Project will implement a Local Content Plan, and Stakeholder Engagement Plan so that business opportunities will be aware of the project and can seek opportunities at the new site. Of specific to the operational phase of the Project regarding difficult access for people with reduced mobility; • Include measures for PRMs in the design • Creating access ramps • Building toilets adapted for PRMs	• Stakeholder Engagement Activities. • Number of grievance records • Workers' Grievance records. • Training records	Sonapi/Contractor assigned for operation.	• Local Content Plan and Community Development Plan. • Stakeholder Engagement Plan. • Grievance Log.	• Prior to start of and during operation. • Monitoring carried out during inspections.
Socio-Economic Capacity strain of local public services (operation)	• Of specific to the operational phase of the Project regarding energy and water savings will be in place. •	• Automatic system installed • Effectiveness of use of materials with insulation • Number of detectors installed • % of low-energy light bulbs	Sonapi/Contractor assigned for operation.	• OESMP • Grievance Log.	• Prior to start of and during operation.

Impact	Mitigation Measures	MP Reference and KPI (if appropriate)	Responsibility	Monitoring Means	Frequency
		• Number of grievance records			
Socio-economic – increased presence of security (operation)	• An Environmental and Social Management Plan for operational phase (OESMP) is developed and implemented in the operational phase. • The Project will conduct a Security and Human Rights risk assessment to identify potential risks of security issues resulting in human rights violations from both public and private security. These risks should be managed primarily through the selection of reputable security firms which meet international practice, but should also include the provisions for vetting, managing and training public and private security personnel in accordance with the Voluntary Principles of Security and Human Rights. • The site security (including police) will need to be trained to de-escalate violent situations and avoid the use of force.	• Number of grievance records • Workers' Grievance records • Training records	Sonapi/Contractor assigned for operation.	• OESMP • Grievance Log.	• Prior to start of and during operation. • Monitoring carried out during inspections.
Historic Eviction & Displacement	• Chemas prepared Resettlement Action Plan (RAP) for the Administrative City Project Site as well as a separate RAP for the wider Koloma area and an accompanying Livelihood Restoration Plan. The plans are based on the principles of IFC PS5 however it is acknowledged that complete compliance with IFC PS5 will be impossible due to the time that has passed since the eviction. • The RAP includes a socio-economic survey, asset survey, identification of vulnerable groups, requirements for compensation for property destroyed, stakeholder engagement measures, grievance mechanism, budget and monitoring framework. • The objective of the RAP improve the lives of those affected going forward thus shortening the duration of the impact. The implementation of the RAP will go a long way to helping the lives of those affected however the trauma and stress which has occurred as a result of the eviction cannot be completely undone.	• Completion of negotiation • Number of contracts signed • Number of households compensated • Number of land titles allocated • Infrastructure completion at replacement land	Sonapi/Contractor assigned for operation and implementation of LRP and RAP.	• RAP(Chemas) • LRP (Chemas)	• Prior to start of and during operation. • Monitoring carried out during the implement LRP and RAP.