



Environmental and Social Impact Assessment

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

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Acronyms and Abbreviations

Name	Description
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling System
AMOTRANG	Associação dos Motoqueiros e Transportadores de Angola
ANATA	Associação Nova Aliança dos Taxistas de Angola
ANTT	National Agency of Terrestrial Transports
Aol	Area of Influence
AQS	Air Quality Significance
AR	Assessment Reports
AZEs	Alliance for Zero Extinction Sites
BS	British Standard
BSh	Hot Semi-Arid Climate
CBOs	Community-Based Organisations
CCRA	Climate Change Risk Assessment
CEACR	Committee of Experts on the Application of Conventions and Recommendations
CEDAW	Committee on the Elimination of Discrimination against Women
CFL	Caminhos de Ferro de Luanda
CGSILA	Central Geral de Sindicatos Independentes e Livres de Angola
CIA	Cumulative Impact Assessment
CIP	Climate Impact Platform
CLC	Community Liaison Coordinator
CLOs	Community Liaison Officers
CLT	Community Laison Team
CMIP6	Coupled Model Intercomparison Project 6
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Co2-Equivalent
CR	Critically endangered species
CRTN	Calculation of Road Traffic Noise
CSDI	Cold Spell Duration Index
dB	Decibels
dBA	A-w eighted decibel value.
DMP	Dust Management Plan
DNEC	National Director for the Economy of Concessions
DNIU	Direcção Nacional de Insfraestruturas Urbanas
DNPA IA	Directorate for the Prevention and Evaluation of Environmental Impacts
E&S	Environmental and Social
EA	Directorate for the Prevention and Evaluation of Environmental Impacts
EBRD	European Bank for Reconstruction & Development
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study

Name	Description
EN	Endangered Species
EP	Equator Principles
EPAL	Empresa Pública de Águas de Luanda
EPDA	Environmental Pre-Feasibility Study and Scoping
ERM	Environmental Resources Management Ltd.
ESA	European Space Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
GBV	Gender-Based Violence
GCD	Global Climate Database
GCM	Global Climate Model
GIWPS GDPR	Georgetow n Institute for Women Peace and Security General Data Protection Regulation
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
HDI	Human development index
H&S	Health and Safety
HGV	Heavy goods Vehicles
HR	Human Resources
HRRA	Human Rights Risk Assessment
HSE	Health, Safety and Environment
A	Impact Assessment
IAQM	Institute of Air Quality Management
IBAs	Important Bird and Biodiversity Areas
IBTrACS IFC	International Best Track Archive for Climate Stew ardship International Finance Corporation
IFC PS	International Finance Corporation Performance Standards
ILO	International Labour Organization
ITUC	International Trade Union Confederation
INCFA	Angola National Institute of Railroad
INE	National Institute of Statistics
INEA	Angola National Road Institute
IPCC	Intergovernmental Panel on Climate Change
ITCZ	Intertropical Convergence Zone
IUCN	International Union for Conservation of Nature and Natural Resources
KBA	Key Biodiversity Areas
KII	Key Informant Interview
Km	Kilometre
KPls	Key Performance Indicators
L	Location
L _{A10}	Equivalent A-w eighted sound pressure level, in decibels, used to express the background noise level w hich is exceeded for 10% of the time over a period stated

Angola

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM TOC HEADING DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Name	Description
L _{A90}	Equivalent A-w eighted sound pressure level, in decibels, used to express the background noise level w hich is exceeded for 90% of the time over a period stated.
L _{Aeq}	Equivalent sound pressure level, in decibels, comparable to the total A-w eighted sound energy measured over a stated period of time
L _{Amax}	The equivalent maximum A-weighted sound pressure level, in decibels, recorded over a time period stated
L _{Amin}	The equivalent minimum A-weighted sound pressure level, in decibels, recorded over a time period stated
LR	Luanda Railway
LRP	Livelihood Restoration Plan
MCTA	Ministry of Culture, Tourism and environment
mg/l	Milligram per litre
MIGA	Multilateral Investment Guarantee Agency
MINTAB	Ministry of the Environment
MINTRANS	Ministry of Transports of Angola
MPW	Ministry of Public Works
MR	Monitoring Report
NAIL	New Luanda International Airport
NASA	National Aeronautics and Space Administration
NGOs	Non-Governmental Organisations
NIA	Noise Impact Assessment
NO ₂	Nitrogen Dioxide
NSR	Noise Sensitive Receiver
NSRs	Noise sensitive receptors
NTS	Non-Technical Summary
O ₃	Ozone
OECD	Organisation for Economic Cooperation and Development
OSM	OpenStreetMap
Pa	Pascals
PAP	Project Affected People
PAHs	Polyaromatic hydrocarbons
PDGML	General Master Plan of Luanda
PDN	National Development Plan
PDNSTIR	National Master Plan for The Transport and Road Infrastructure Sector
PM10	Particulate Matter with a diameter of 10 microns or less
PM2.5	Particulate Matter with a diameter of 2.5 microns or less
PPE	Personal protective equipment
Ppm	Parts per million
PSEP	Preliminary Stakeholder Engagement Plan
PSs	Performance Standards
RAP	Resettlement Action Plan
RCIA	Rapid Cumulative Impact Assessment
RCM	Regional Climate Model
RCP	Representative Concentration Pathway
RoW	Right of Way
RPF	Resettlement Policy Framework

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM TOC HEADING DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Name	Description
SAE	Simplified Environmental Study
SATCC	Southern Africa Transport and Communications Commission
SDGs	Sustainable Development Goals
SEP	Stakeholder Engagement Plan
SLM	Sound Level Meter
SLP	Sound Pressure Levels
SO ₂	Sulfur dioxide
SSP	Shared Socio-economic Pathway
SWL	Sound Pow er Level
т	Period
TCFD	Task Force on Climate-related Financial Disclosures
ToR	Terms of Reference
TRL	Transport Research Laboratory
TSP	Total Suspended Particulates
UNGPs	United Nations Guiding Principles on Business and Human Rights
UNTA-CS	União Nacional dos Trabalhadores de Angola
US EPA	United States Environmental Protection Agency
VEC	Valued Environmental and Social Component
VPSHR	Voluntary Principles on Security and Human Rights
W	Watts
WHO	World Health Organization
WRI	World Resource Institute
WSDI	Warm Spell Duration Index
µg/m³	Micrograms per cubic metre of air
°C	Degree Celsius

1. INTRODUCTION

1.1 **Overview and Background**

This document presents the **Environmental and Social Impact Assessment Report** for the construction of five overpasses over the Luanda railway, Angola (the "Project"). The five overpasses (SME, Viana, Estalagem, Mulenvos and 5th Avenida) are located in the province of Luanda. Environmental Resources Management Southern Africa (Pty) Ltd ERM and BDM Engenharia e Tecnologia LDA (BDM) developed this assessment, to support the contractor of the project INZAG Germany GmbH (INZAG). BDM is partnering with INZAG on this Project and is responsible for the engineering design and the HSE component.

This document summarizes the characteristics of the project, the environmental and social baseline, assessed during desktop studies and field visits and the applicable legal framework. The ESIA builds upon the outcomes of the previously conducted Environmental Pre-Feasibility Study and Scoping Report (*Estudo Preliminar de Definicao de Ambito - EPDA*), dated 21 December, 2022. The main objective of the Environmental and Social Impact Assessment Study is to fill in the information gaps identified during the Scoping Study, assess the environmental and social impacts that may arise during all Project phases, and to prepare an Environmental and Social Management Plan to mitigate identified impacts.

The ESIA has been developed according to the environmental and social (E&S) licencing processing in Angola and specifically to the Presidential Decree No.117/20 of 22 April and the Environmental Framework Law (Articles 14-16)¹, that specifies the activities, required during the ESIA process, as well as its contents. Once completed, the project proponent must submit the ESIA and supporting documents to the MINAMB (Ministry of Environment), who in turn must forward the documents to the relevant line ministry - the Ministry of Transports (MINTRANS).

The current assessment was built based on desktop information, data provided by INZAG and specific field visits conducted by ERM and BDM.

1.2 Need for the Project

The aim of the Project is to build five overpasses for the Luanda railway - LR (managed by the Caminho de Ferro de Luanda - CFL) in order to ease, organise and improve the vehicle traffic circulation of the area.

As per the "Luanda 2030 - Defined Vision and Preferred Development Strategy" dated February 2021, Luanda is going through a modernization of its transport infrastructure. The most relevant transportation improvements are the NAIL (New International Airport of Luanda) and the Luanda Railway (LR), among others. The LR construction is nearly completed, new modern locomotives were acquired in order to allow efficient mobility between the NAIL and the city centre. However, in order for this to happen, it will be necessary to improve overall circulation, mainly to better manage the daily high volumes of traffic, not only on the main roads but also on the crossing points with secondary roads and the railway. Also, the current low operating speeds on the Luanda-Malanje route are a result of the numerous interferences that exist in the urban network of the LR.

Five locations that are objects of the current assessment were identified as bottlenecks in terms of the railway crossing. The conflicts between traffic, commerce and community health and safety are evident, and the Project aims to reduce such conflicts.

If these overpasses are not built, the current safety concerns will continue. Once NAIL becomes operational (expected at the end of 2023) these risks will certainly increase due not only to the higher volumes of vehicle traffic (on the main arteries and secondary roads) but also to the higher frequency of trains (circulating at a higher speed than currently). In view of this, the construction of overpasses

¹ Presidential Decree No.117/20 of 22.04.2020

can bring a decrease in fatal accidents in the areas of SME, Viana, Estalagem, Mulenvos and 5^{th} Avenue.

1.3 Relevant Standards of the EIA

ERM based its assessment of the Project in terms of its alignment with a defined reference framework of international standards. The combined Applicable national and international requirements for the ESIA are listed below:

- Angola's laws, regulations, and permits (including regional/local directives) that pertain to environmental and social issues (including expropriation/compensation);
- International Finance Corporation (IFC) Performance Standards (PSs) (2012);
- IFC General Environmental Health and Safety Guidelines (IFC General EHS Guidelines);
- IFC EHS Guidelines for Toll Roads (2007);
- Equator Principles version IV (EP);
- OECD Common Approaches;
- Good International Industry Practices;
- World Bank Group and IFC Environmental, Health, and Safety General Guidelines (2007);

The IFC PSs form the "backbone" of the international portion of the above-listed Relevant Standards that apply to the EIA.

- As per good international industry practice, ERM will also consider the following:
- Workers' Accommodation: Processes and Standards: A Guidance Note by IFC and the EBRD' (2009);
- The Voluntary Principles on Security and Human Rights (2000);
- Projects and People: A Handbook for Addressing Project Induced In-Migration (IFC, 2009); and UN
 Guiding Principles for Business and Human Rights (UNGPs);
- Relevant UN and ILO standards applicable to Angola (as ratified and in force);
- OECD Guidelines for Multinational Enterprises and Responsible Supply Chains.

In terms of the national legal framework, the following are applicable:

General
Judgment of the Constitutional Court n.º 111/2010 (30/01/2010) - Constitution of the Republic of Angola
Environmental Management
Law n.º 5/98 (19/06/1998) – Environmental Framew ork Law
Decree n.º 1/10 (13/01/2010) – Environmental Auditing
Executive Decree n.º 92/12 (01/03/2012) – Terms of Reference for the Development of Environmental Impact Studies
Presidential Decree No. 117/20 (22/04/2022) - Environmental Impact Assessment Regulation and Environmental Licensing Procedure
Presidential Decree No. 83/22 (12/04/2020) - Taxes for Emission and Renew al of Environmental Licenses:
Environmental Pollution
Presidential Decree n.º 194/11 (07/07/2011) – Liability for Environmental Damage
Health and Safety
Decree n.º 31/94 (05/08/94) – Occupational Hygiene and Safety System
Executive Decree No. 128/04 (23/11/2004) - General Regulation of Safety and Health at Work Signalling:
Labour
Law n.º 7/15 (15/06/15) – General Labour Law
Waste Management
Presidential Deenes # 9,400/42 (42/08/2042) Celid Meste Meneroment
Presidential Decree n.º 190/12 (12/08/2012) - Solid Waste Management
Executive Decree No. 17/13 (22/01/2013) - Construction and Demolition Waste Management

Law n.º 6/02 (21/06/2002) – Water Law
Presidential Decree n.º 82/14 (12/04/2014) - Regulation on General Rules of Use of Water Resources
Presidential Decree n.º 261/11 (6/10/2011) – Regulation on Water Quality
Presidential Decree n.º 126/17 (13/06/2017) – National Water Plan
Presidential Decree n.º 83/14 (22/04/2014) - Regulation on Public Water Supply and Wastew ater Sanitation
Land Use and Resettlement
Law n.º 9/04 (09/11/2004) – Land Law
Law n.º 3/04 (25/07/2004) –Law on Territorial and Urban Planning
Decree n.º 58/07 (13/07/2007) - General Regulation Land Concession
Law n.º 2.030 (22/06/1948) - Expropriation Law
Presidential Decree n.º 117/16 (30/05/2016) - Regulation for Resettlement Operations
Decree n.º 43.894 (13/07/2007)- Regulation for the Occupation and Concession of Land
Decree n.º 41/04 (02/07/2004) - Regulation for the Licensing and Security of Electric Facilities
Decree n.º 46.847 (27/01/1996) - Regulation of the Protection of High Voltage Transmission Lines
Law No. 1/21 (07/01/2021) - Public Expropriation Law
Presidential Decree No. 171/18 (23/07/2018) - Forest Regulation
Cultural Heritage
Law n. º 53/13 06/06x)– Regulation on immobile cultural heritage
Law n. º 42 (22/01/2004) - Code of the Cultural and Heritage Landscape
Law n.º 14/05 (07/10/2005) – Cultural Heritage Law

1.4 Structure of the Report

The ESIA Report structure is aligned with the Angolan requirements as per the Presidential Decree No.117/20 and includes the following (Table 1.1):

Section	Chapters	Content
1	Introduction	Introduces the EIA, providing the Project background information about the team that prepared the assessment.
2	Project Description and Evaluation of Alternatives	Briefly outlines the Project and various components of it including specifications on land requirements, temporary construction facilities, operations and maintenance. Overall project location and project alternatives (for the different phases of the project), including the hypothetical non-execution of the Project
3	Regulatory Framework	Outlines the regulatory and administrative framework for impact assessment applicable to the Project
4	Description of the Baseline Environment	Presents the existing baseline conditions of the Project's physical/biological environment and social component. Includes identification of sensitivities that may be potentially affected by the Project
5	Stakeholder Engagement Plan	Update of the SEP developed during the Scoping phase and planning of the stakeholder meetings.
6	Environmental and Social Assessment	Describes the Project's identified environmental and social impacts, as well as outlines respective mitigation actions to be undertaken. Presents the methodology applied in conducting the Project's impact assessment.
7	Environmental and Social Management Plan	Presents mitigation measures required to mitigate the likely negative impacts on the biophysical and social environment, as well as their monitoring measures.
8	Limitations	Lists the limitations of the current assessment
9	References	Contains a list of references to the resources used for the current assessment

Table 1.1 Structure of the Report

1.5 **Project Parties**

The project promoter is the Ministry of Transports (MINTRANS) and the executing contractor is INZAG Germany GmbH (INZAG) The Overpass project was first awarded through a public tender process in 2013 to INZAG's affiliated company Andrade Gutierrez (AG). The contract had in scope four overpasses and was signed in 2014. In 2017 an addendum was signed in order to incorporate a new technical solution. In 2022, the Project was introduced in the Angolan national budget and INZAG signed a new addendum with MINTRANS.

The entities responsible for preparing the present Environmental and Social Impact Assessment (ESIA) are ERM and BDM. ERM is a global environmental consulting firm with expertise in the preparation of E&S assessments. BDM also holds consulting expertise in E&S assessments, certified as a consultant in the Ministry of Environment in Angola.

The following table (Table 1.2) presents key data of the Project and its relevant entities:

Representative Promoter Entity Data		
Entity	MINISTRY OF TRANSPORT	
Full Address	Avenida 4 de Fevereiro № 42, 5º Andar, em Luanda, Angola	
Representative of the Promoting Entity	Eugénio Mauro de Lima Fernandes (National Director for Concessions Economics)	
Full address	Avenida 4 de Fevereiro № 42, 5º Andar, em Luanda, Angola	
Contact person	Eugénio Mauro de Lima Fernandes (National Director for Concessions Economics)	
Contact	+244 937288333	
E-mail	eugenio.fernandes@mintrans.gov.ao	
Identification of the Executing		
Social Denomination	INZAG GERMANY, GmbH	
Full address	Taunusstraße 5, 65183 Wiesbaden	
Contact person	Guilherme Sá	
Contact	+244 949415040	
E-mail	guilherme.desa@inzag.de	
Identification of the local Consult	ling	
Social Denomination	BDM Engenharia e Tecnologia LDA	
Full address	Av. Pedro de Castro Van-Dúnem Loy, S/N, Talatona, Luanda – Angola.	
Contact person	Noélia Costa	
Contact	+244 926605786	
E-mail	noelia.costa@bdm.co.ao	
Identification of the International		
Social Denomination	Environmental Resources Management Southern Africa (Pty) Ltd	
Full address	Building 27, The Woodlands Office Park Woodlands Drive, Woodmead, Sandton, Johannesburg	
	Gauterig, South Africa	
Contact person	Nigel Seed	
Contact person Contact	Nigel Seed M +27 83 636 1768	
Contact person Contact E-mail	Nigel Seed M +27 83 636 1768 Nigel.Seed@erm.com	
Contact person Contact E-mail Project details	Nigel Seed M +27 83 636 1768 Nigel.Seed@erm.com	

Table 1.2 Contact Information of the Relevant Entities of the Project

Investment value	99 750 004,87 USD
Location of the contract	Luanda
Geographical coordinates of start	 SME (8°58'46.63"S / 13°29'37.55"E) Viana (8°54'5.07"S / 13°22'8.69"E) Estalagem (8°53'7.74"S / 13°20'37.44"E) Mulenvos (8°52'2.24"S / 13°18'53.52"E) 5th Avenue (8°51'22.31"S / 13°17'50.26"E)
Number of collaborators estimated for the project	365 People (peak)

1.5.1 INZAG Project Team

INZAG Germany GmbH is a construction company headquartered in Wiesbaden, Germany, and founded in 2011 by one of the largest Latin American private corporate groups, Andrade Gutierrez (AG).

INZAG's main purpose is to contribute to the economic and social development of African countries through the development of projects in the fields of logistics, water infrastructure, energy, mining and industrial plants.

The INZAG professionals who participated in the preparation of this study are located in the INZAG headquarters in Germany, in the INZAG Branch in Angola, as well as in Lisbon at the headquarters of ZAGOPE, also a company of the AG Group. Their names and qualifications are listed in the Table 1.3 below:

INZAG Wiesbaden		
Name	Academic qualification/ Position	
Achim Becker	Dipl. Ing. Civil Engineering / Managing Director	
INZAG Angola		
Name	Academic qualification/ Position	
Guilherme de Sá	BSc in Mechanical Engineering / Country Director Angola	
Éder Cruz	BSc Mechanical En / Project Director	
Agostinho Tchilala	Civil Engineer	
Pedro Santos	MSc Civil Engineering / Senior Engineer	
ZAGOPE		
Name	Academic qualification/ Position	
Paulo Estrela	QMSS Manager	
Ines Magalhães	MSc Environmental Engineer/Support	

Table 1.3 INZAG team

1.5.2 BDM

The BDM technical team assigned to the project, responsible for contributing to the preparation of the Environmental and Social Impact Assessment for the implementation of the Luanda Railway Overpasses, is composed of a multidisciplinary team, which gives the study in question greater value in terms of the level of information provided.

The BDM professionals who participated in the preparation of this study are listed in Table 1.4 below :

Table 1.4 BDM team

Directorate General

Name	Academic qualification	
Noélia Costa	Civil Engineer / Unit Director	
Manuel Valadas	Agronomist, MSc in Hydraulic and Water Resources / Unit Director	
General Coordination		
Name	Academic qualification	
Leonardo Lessa	Civil Engineer / Project Manager	
Adriana Penha de Souza	Architect – Urban Planner, MSc in Urban Development / Project Manager	
Technical Team		
Name	Academic qualification	
Ana Clara Oliveira	Environmental Engineer, Specialist in risk management and environmental emergencies	
Raphael Farage Freitas	Biologist, MBA in Expertise, Auditing and Environmental Management	

1.5.3 ERM

The ERM group is a leading global provider of environmental, health, safety, risk, and social and sustainability related consulting services. ERM employs more than 7,000 people in 134 offices in 38 countries and territories.

ERM has a solid know-how and experience in infrastructure related projects in Africa, particularly in Angola. Additionally, it is globally renowned for its 'fit for finance' services through which it advises developers on how to manage E&S risks to enable projects to meet international E&S requirements and has in-house expertise in the pertinent technical disciplines for E&S impact assessments and reporting.

The ERM professionals who participated in the preparation of this study are listed in the Table 1.5.

Directorate General		
Name	Academic qualification/ Position	
Nigel Seed	BSC. Environmental Management/ Project Director	
General Coordination		
Name	Academic qualification/ Position	
Aida Al Awar	PhD in Environmental Science / Project Manager	
Technical Team – Physical and Biological		
Name	Academic qualification/ Position	
Veronika Michl	MSc in Geography/ ESIA Generalist	
Martiens Prinsloo	MSc in Hydrology / Water Quality Lead	
George Chatzigiannidis	MSc. Acoustical Engineering/ Noise Assessment Lead	
Chris Hazell Marshall	Ph.D. in Air Pollution and Cardiovascular Health Effects/Air Quality Assessment Lead	
Roxana Molnar	MSc in Environmental Science and Engineering/ Waste Assessment	

Table 1.5 ERM team

Louis Magnani	MSc in Climate Change/ Climate Change Assessment	
Clive Abel	MSc in Chemical and Environmental Engineering/GHG Assessment Lead	
Ben Sussman	MSc in City and Regional Planning/Traffic Lead	
Aleksandr Moiseev	MSc in Geography/ ESIA Generalist and GIS Support	
Technical Team – Social		
Victoria Griffiths	PhD in Social and Environmental Fields/ Lead of the Social Team	
Julia Korshunova	MSc in Organizational Sociology/ Resettlement Framework Lead	
Olivia Cirne	MSc in Human Geography, Economic Geography, Indigenous Peoples, Conflicts, Renew ables/ Human Rights Lead	
Jessica Mc Iver	MSc in Archeology/ Cultural Heritage Lead	

2. PROJECT DESCRIPTION

2.1 **Project Area**

2.2 Location

Luanda is the capital and the largest city in Angola. The city is an important hub of economic activity for the country and the efficient movement of people and goods is essential to its vitality. The Luanda Railway - (LR)covers a network of approximately 500 km, with two final destinations, one in the city of Malanje in Malanje Province and the other in the city of Dondo in Cuanza Norte Province.

The present project is located in the section of the LR inside the Greater Luanda Area, in the main line leading from the city centre to the new international airport (NAIL), and thereafter to the hinterland.

The studies considered different aspects of the overpasses to reflect a harmonious and efficient framework for mobility, while considering technical and economic feasibility and prioritizing the current functioning of the organic local traffic.

2.3 **Project Facilities**

The Project will include the following facilities:

- Five overpasses across the Luanda Railway;
- Temporal construction yards at the five construction sites;
- Deviation roads (existing streets) that will be improved for the construction works.

2.3.1 Overpasses

The 5 locations where the overpasses are planned: SME, Viana, Estalagem, Mulenvos and 5th Avenue. The first four are situated in the municipality of Viana and the last one is in the municipality of Kilamba Kiaxi. The alignment of the overpasses is presented in the section 2.7.1. The geographical coordinates of each one are found below, and a general overview is presented in Figure 2.1:

- SME (8°58'46.63"S / 13°29'37.55"E);
- Viana (8°54'5.07"S / 13°22'8.69"E);
- Estalagem (8°53'7.74"S / 13°20'37.44"E);
- Mulenvos (8°52'2.24"S / 13°18'53.52"E); and
- 5th Avenue (8°51'22.31"S / 13°17'50.26"E).

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Figure 2.1 Location of the Overpasses Sites (above), Project Overpasses Infrastructure Outline Details (below)

Source: BDM, 2022

2.3.2 Front yards

INZAG has a central yard used for all projects in Angola. This yard is not financed as part of the Project and information about it is presented in section 2.5.1.

For the Project INZAG will organize small front yards supporting the construction of each of the overpasses. The front yards, located at the five construction sites, will include in each of them: small office, tool shop, waste area, warehouses, WCs (septic tanks), managed by qualified mobile teams from specialized companies. The offices will be supplied exclusively by small generators (Figure 2.2):



Figure 2.2 INZAG Front Yard

Source: INZAG, 2023

2.3.3 Access and Deviation Roads

No new access roads are planned to be constructed for the Project. It is planned to improve roads that will be used to deviate traffic during construction (Table 2.1). The preliminary plan has been prepared based on the conditions of the local roads. Improvements concern mainly road widths so these can assure good traffic flow during works.

Table 2.1 Deviation Routes for the Period of Construction

Overpass	Deviation Roads
SME	Four unnamed roads (Figure 2.3)
Mulenvos	5 th Avenue, Rua das Condutas, Estrada do Mulenvos and three unnamed streets (Figure 2.4)
Estalagem	Five unnamed roads (Figure 2.5)
Viana	Four unnamed roads (Figure 2.6)
5 th Avenue	Rua dos Comandos and three unnamed streets (Figure 2.7)

The deviation roads for the construction period are shown in the images below (Figure 2.3, Figure 2.4, Figure 2.5, Figure 2.6, Figure 2.7).



Figure 2.3 Deviation Roads at the 5th Avenue Overpass

Source: BDM, 2023



Figure 2.4 Deviation Roads at the Mulenvos Overpass

Source: BDM, 2023



Figure 2.5 Deviation Roads at the Estalagem Overpass

Source: BDM, 2023



Figure 2.6 Deviation Roads at the Viana Overpass

Source: BDM, 2023



Figure 2.7 Deviation Roads at the SME Overpass

Source: BDM, 2023

2.3.4 Railway Crossings to be used for deviation

The following existing crossings are planned to be used for traffic deviation:

- East from SME Overpass (Figure 2.10).
- East from Viana (Figure 2.6);
- East from Mulenvos (Figure 2.4).

2.4 Associated Facilities

As defined by IFC Performance Standard 1, the associated facilities are the (often third-party) facilities which 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.

As the associated facilities are dependent on the Project, and vice versa, the Project owner is expected to have a high level of control over the environmental and social performances of the associated facilities.

At this point, INZAG is planning to use the existing facilities and there are no facilities that would not have been constructed or expanded if the Project did not exist, except **two temporal railway crossings.** These crossings will be built for the time of construction for traffic deviation. Other facilities

which are viable for the Project but that are out of the Project's scope are presented in the section 2.4.1.

2.4.1 Railway Crossings to be used for deviation

For the construction time, two temporary railway crossings will be constructed by INZAG for the traffic deviation:

- East from the 5th Avenue overpass (Figure 2.3);
- West from Estalagem overpass (Figure 2.5);

At the time of this report preparation, no details on the exact activities that will be performed for the construction of the temporary crossings are available.

2.5 Facilities and operations beyond the Project's scope

In this section are presented the facilities that do not belong to the Project or associated facilities but are indirectly connected with the Project activity. These facilities can exist without the Project, but the Project would not be possible without them.

2.5.1 Existing Construction Yard

The existing central yard is part of the facilities of INZAG in Luanda and is used for all works in the Luanda region. It is located in the vicinity of the 5th Avenue overpass (Figure 2.8), the driving distance of the future construction sites is as follows:

- 4.8 km from the 5th Avenue overpass;
- 7.1 km from the Mulenvos overpass;
- 10.9 km from the Estalagem overpass;
- 14.2 km from the Viana overpass;
- 30.8 km from the SME overpass.



Figure 2.8 Location of INZAG's main construction yard

The central yard has such facilities as offices, workshops, a maintenance shop, a warehouse, dressing rooms, storage areas, a waste management area and an area of special wastes (e.g., paints) and a canteen (Figure 2.6, Figure 2.10). The workers will be accommodated in Luanda outside of the yard.

As the central yard is a permanent facility of INZAG, it is supplied by water distribution and sewage collection networks and connected to the public network available in the area. The central yard is also connected to the public electricity distribution network and has a back-up generator for any periods of failure.



Figure 2.9 Permanent INZAG Yard
View from the top (left; Storage area and offices (right).

Construction and Operation of 5 Overpasses - Luanda Railway Track, Angola





Figure 2.10 INZAG Central Camp

Source: INZAG, 2023

2.5.2 Other facilities

- **Borrow pits**: the Project will not have any quarries or borrow pits, the construction materials will be provided by the third parties (see section 2.10.1), that will be using the existing borrow pits.
- Asphalt plant: the existent plant of the third party, FFB (section 2.10.1)
- Traffic deviation routes: The existent roads and crossings will be used for traffic deviation (section 2.3.3);
- Dump site: INZAG will be using an existing dump site for waste deposition (section 0).

2.6 Project Area of Influence

The Area of Influence (AoI) of the Project is the area which is the subject of direct or indirect impacts of the Project. The AoI can vary depending on the type of impact being considered and the attributes of the potentially affected receptors. In each case, the AoI includes all areas within which significant impacts are likely to occur, taking into account the:

- Physical extent of the proposed works, defined by the limits of land to be acquired or used (temporarily or permanently) by the Project; and
- Nature of the baseline environment and manner in which impacts are likely to be propagated beyond the Project boundary,

The area of influence typically includes:

- The primary Project site and related facilities;
- Associated facilities, which viability and existence depend exclusively on the Project (when applicable);
- Areas potentially impacted by extraction of raw materials (e.g. borrow pits) or work areas where concrete products and bitumen or asphalt may be produced;
- Areas potentially impacted by cumulative impacts from further planned development of the Project; and
- Areas potentially affected by impacts from unplanned but predictable developments caused by the Project.

Construction materials will be sourced from local suppliers. As such, areas potentially impacted by extraction of raw materials (e.g., borrow pits) or work areas where concrete products and bitumen or asphalt may be produced have not been included in the Direct Aol.

For the proposed Project, the areas of influence of the five overpasses are categorised in two groups:

- Direct Aol; and
- Indirect Aol.

These are described further in the sections below.

2.6.1 Direct Area of Influence

The direct Aol can be described as the place subject to direct effects arising from the construction and operation of the five overpasses. It includes the Road Footprint and Construction Width, as well as the extent of direct impacts of the project on the physical, biological, social or cultural environment. These impacts may occur during the construction and operation of the project and in several environmental descriptors.

2.6.1.1 Project Footprint and Expropriated Areas

The overpasses themselves will have no road footprint, the road footprint will be thus limited to the side roads and the expansion of the access roads in some cases. The Project Footprint includes the following areas:

- Construction areas;
- Widening of the existing roads;
- Road Footprint of the side roads (marked in the figures in blue as they have ground-cement pavement): including pavement areas, sidewalks, earthworks areas, the drainages and embarkments.

The planned overpasses are not categorised as highways nor typical roads as such. However, there are affected commercial and residential areas (Figure 2.11-Figure 2.15) that will be expropriated. The Project will need to comply with the regulations of the existing infrastructure utilities (section 2.8.1.1), and their respective norms and standards.

After completion of the detailed design, an offset will be defined from the road centrelines, to consider sensitive areas for the safe construction of the Project. This offset should vary depending on the type of roads considered, for example between surface level roads or in areas with ramps or elevated structures.

The Draft study base project (INZAG, BDM, 2023) provided the maps with marked affected commercial and residential properties, that are also included into the Direct Aol of the Project.

Overpass – SME

The overpass access roads will be overlapping the existing roads currently leading to the existing SME crossing, and the overpass itself will have no footprint, despite the pillars. The two service roads on both sides of the overpass (Figure 2.27) will have a road footprint of 7.5 m each (including pavement and sidewalks). The construction works will affect the residential area on the eastern side of the overpass. The Figure 2.11 displays the affected property.



Figure 2.11 SME Overpass Footprint

Source: BDM, 2023

The affected land area with residential type of use is estimated as $4,055.52 \text{ m}^2$ (on the eastern side of the overpass), there will be two affected residential units.

Overpass – Viana

The two overpasses will be connected with the existing Deolinda Rodrigues Avenue and Viana street, they will partly overlap the existing roads, the Viana street will be widened to 17 m, including the pavement and sidewalks (see cross-sections in Figure 2.30) and the overpasses themselves will have no footprint, despite the pillars. The two service roads on both sides of the overpass (Figure 2.30) will have a road footprint of 7.5 m each (including pavement and sidewalks). The street Brasileira will be reconstructed with a width of minimum of 8m (including pavement and sidewalks). The construction works will affect the residential area. The Figure 2.12 displays the affected property.



Figure 2.12 Viana Overpass Footprint

Source: BDM, 2023

The affected land area with residential type of use is estimated as $5,127.95 \text{ m}^2$ (on both sides of the overpass), there will be three affected residential units.

Overpass – Estalagem

The two overpasses will be connected with the existing roads and streets, they will partly overlap the existing roads, which will be widened (see cross-sections C-C, D-D in Figure 2.34) and the overpasses themselves will have almost no footprint, despite the pillars. The Estalagem access next to the roundabout will be 17 m wide (four lanes and two sidewalks), parts of the roads will be widened and reconstructed (Figure 2.13). The two side roads will have a direct footprint, 7.5 m wide (pavement and sidewalks on both sides). The construction works will affect the commercially used land and residential area east of the roundabout. The Figure 2.13 displays the affected areas:



Figure 2.13 Estalagem Overpass Footprint

Source: BDM, 2023

The affected land area with commercial type of use is estimated as 786 m² (on both sides of the overpass), and there will be three affected residential units to the east from the roundabout with a total area of 167.50 m².

Overpass – Mulenvos

The overpasses will be connected with the existing Deolinda Rodrigues Avenue and Mulenvos street, they will partly overlap the existing roads, which will be reconstructed (see cross-sections A-A, B-B, E-E, D-D in Figure 2.39) and the overpasses themselves will have almost no footprint, despite the pillars. The construction works will affect the residential area. The Figure 2.14 displays the affected residential property in the south-western part of the overpass.



Figure 2.14 Mulenvos Overpass Footprint

Source: BDM, 2023

As estimated, there will be 18 affected residential units, with a total area of 1,544.87 m².

Overpass – 5th Avenue

The overpasses will be connected with the existing Deolinda Rodrigues Avenue and 5th Avenue they will partly overlap the existing roads (see cross-sections A-A, C-C and D-D in Figure 2.43) and the overpasses themselves will have almost no footprint, despite the pillars. For the service lanes to the east and west from the overpass the existing road will be widened. The service lanes are 7.5 m in width (4.5 the road itself and 1.5 m sidewalks on each side). The alignment of the service lane to the west from the overpass will affect the residential and commercial areas. The Figure 2.15 displays the affected commercial and residential property.



Figure 2.15 5th Avenue Overpass Footprint

Source: BDM, 2023

The affected commercial area is $1,342.33 \text{ m}^2$ and comprises 27 units. The affected residential area is $1,224.23 \text{ m}^2$ and comprises 20 units.

2.6.1.2 Direct Area of Influence

The maps representing the AoI for each of the overpass sites are shown below (Figure 2.16 - Figure 2.20).

Physical Environment

Thus, it was defined that the Area of Direct Influence of the physical and biotic environment will cover a buffer of 500 meters around the Project footprint, and 250 meters around the deviation routes, since this area may be under direct impacts during various phases of the Project, especially those related to increased noise levels, increased flow of vehicles / machinery in the area in question, among others.

Socioeconomic Environment

The Direct Aol of the socio-economic environment includes the Project footprint and adjacent areas subject to direct socioeconomic effects arising from the construction and operation of the five overpasses. Effects could include those related to increased noise levels and increased flow of vehicles/ machinery in the area in question, among others. The Direct Aol also includes the sensitive social receptors and critical infrastructure (e.g. schools, hospitals, markets, churches, etc.) within the Aol, the impact area of potential emergency scenarios, and the population affected by the direct impacts of Project implementation and associated resettlement process (physically and economically displaced).

It was defined that the Area of Direct Influence of the socioeconomic environment will cover a buffer of 500 m around the Project footprint, and 250 m around the deviation routes. This will allow households and businesses within the direct project footprint (and therefore likely to be displaced) to be captured in the AoI as well as those directly adjacent to the Project footprint and deviation routes who will experience impacts during the construction and operation phases (e.g. through disruption to local networks, increased traffic, noise and dust impacts, among others).



Figure 2.16 Direct Area of Influence at the SME site

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Figure 2.17 Direct Area of Influence at the Viana site

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Figure 2.18 Direct Area of Influence at the Estalagem site

Source: BDM, 2022



Figure 2.19 Direct Area of Influence at the Mulenvos site

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Source: BDM, 2022



Figure 2.20 Direct Area of Influence at the 5th Avenue site

2.6.2 Indirect Area of Influence

The area of indirect influence can be characterised as a more distant area, which physical, biological, and socio-economic environment may be influenced by the Project. For the Indirect AoI, the effects are perceived secondarily, arising from the most diverse activities related to the project. Therefore, for the **physical and biological environments**, the indirect AoI is defined as the municipalities of the project sites and adjacent municipalities (Figure 2.21).

The area of indirect influence of the **socio-economic environment** can be characterised as a more distant area, where indirect socioeconomic impacts may occur/ be felt. For the socio-economic environment, the Indirect AoI extends across the province of Luanda, focusing on the municipalities of Cazenga, Viana and Icolo e Bengo and the communes of Viana, Cazenga and Tala Hady (Table 2.2 below, Figure 2.22).

Province	Municipality	Commune	Project Site	
Luanda	Viana & Icolo e Bengo	Viana	SME	
	Viana		Viana	
			Estalagem	
	Viana & Cazenga	Cazenga	Mulenvos	
	Cazenga	Tala Hady	5 th Avenue	

Table 2.2 Administrative Regions where the Five Project Sites are Located

Source: ERM, 2023

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Figure 2.21 Indirect Area of Influence (Physical, Biological) of the Project drill

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Source: BDM, 2022



Figure 2.22 Indirect Area of Influence (Social) of the Project

Source: ERM, 2023

2.7 Project Design and Land Restrictions

2.7.1 Overall Overpasses Alignment

2.7.1.1 Topography

Topographic surveys were carried out within the Scoping Assessment using aerophotogrammetry, performed with the use of drones to get information about the project geometry. Geodetic support points were used to increase the accuracy of the altimetric quotas. The result was a georeferenced image of each site area and contour lines with sufficient precision to allow an accurate analysis of expropriations, interferences, and necessary heights for the lifts to guarantee the standard gauge for the passage of trains (Figure 2.23).



Figure 2.23 Example of an Orthophoto

Source: BDM, 2022

The main topographic findings for each of the overpasses are summarised in Table 2.3

Overpass	Topographic Characteristics
Quinta Avenida	The area is flat. A height variation is from 91.7 m to 96.0 m. The street on Fifth Avenue has a slight slope to the main road, Deolinda Rodrigues Avenue. The tracks of the LR are on average 1 meter above the level of the main road.
Mulenvos	The area is flat. A height variation is from 100.0 m to 102.7 m. The tracks of the CFL are practically on the same level as the main road. In case of high rainfall, water tends to accumulate next to the LR and in front of the Mulenvos power substation.
Estalagem	The area is rather flat. A variation in height is from 106.2 m to 115.0 m. The Estalagem Road has a slight slope to the main road, Deolinda Rodrigues Avenue. At the end of the pavement, in the section that borders the wall of the Millenium Tourist Centre, the road has a slight slope in the dirt section up to Primary School No. 5023. Level of the main road, Deolinda Rodrigues Avenue.

Table 2.3 Main topographic characteristics of the 5 Overpasses

Overpass	Topographic Characteristics
Viana	The area is rather flat. A variation in height is from 128.5 m to 140.5 m, tow ards the area close to Brasileira Road. The road next to the Canaã Cathedral Church, slopes tow ards the main road, Deolinda Rodrigues Avenue. As this stretch has no connection betw een the tracks, in case of high rainfall, w ater tends to accumulate in this area, since the trail has a small elevation in relation to the tracks.
SME	The area is rather flat. There is a variation in height from 163.4 m to 173.6 m, the terrain has a water runoff slope tow ards the main road, Catete Road. The section of the Luanda Railway is currently under construction, due to the construction of the connection to the New Luanda International Airport.

Source: BDM, 2022

2.7.1.2 Geometric Design of the Overpasses

To enable a better understanding of the planned activities, some 3D models of the study area were developed. This provides a clear perception of the structural models and the interaction of the implantation and the surroundings. Some images are presented below (Figure 2.24).





Figure 2.24 3D Images of the Overpasses

Source: INZAG, 2022

SME

The SME overpass is strategically located as it is the only existing level crossing within a 5 km radius (Figure 2.25). The SME Overpass will connect the northern and southern sides of the LR, between the NAIL access elevated (under construction) and the Nosso Super elevated (Figure 2.26).

The SME overpass consists of the two-way railway overpasses with a total width of 7.0 m plus 1.5 m of sidewalk on each side, and service roads for the connection of existing dwellings and businesses in the vicinity on both sides of the overpass, 4.5 m wide with 1.5 m sidewalks on both sides.

The northern access (SME) will have four lanes (two in each direction, 3.5 m each lane) with sidewalks of 1.5 m on both sides (Transect C-C, Figure 2.26, Figure 2.27). The southern access will be narrower: two lanes with 9 m in total with sidewalks of 1.5 m on both sides (Transect A-A) The works proposed at SME will consist of the construction of 1 flyover, 182 m in length, supported at 7 points, and with a maximum span of 28 m between the furthest support systems, as presented in Figure 2.28.





Figure 2.25 Future SME Overpass Area



Figure 2.26 SME Overpass Alignment

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Figure 2.27 SME Overpass Cross sections

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Figure 2.28 Sections of overpass support spans at SME

Viana

Located near the junction of the Estrada de Viana and the Avenida Deolinda Rodrigues, the current level crossing is one of the most used by the local inhabitants (Figure 2.29). The proposed overpass does not coincide with the current level crossing. This small displacement aims to minimize the number of expropriations required for its implementation (Figure 2.30)

The Viana overpass will consist of two flyovers, 7.0 m wide each plus 1,5m sidewalk on each side, making a direct connection between the municipality of Viana and the Avenida Deolinda Rodrigues (Figure 2.30). The main purpose of the overpass is to provide new access to the Viana community and to improve mobility.

The two service lanes next to overpasses (one in each direction) will be 4.5 m wide with a 1.5 sidewalk on each side (Figure 2.31). The access roads (Transects A-A, B-B) will be 7 m wide (two lanes) with 1.5 m sidewalk on one side. The access from Viana street (Transect D-D) will have four 3.5 m wide lanes (two lanes in each direction) with a 1.5 m sidewalk on each side and the access from Ria Brasileira will be 6 m wide, the width of sidewalks is not yet defined.





Figure 2.29 Area of the future Viana Overpass

Source: BDM, 2022

The works proposed at Viana will include the construction of 2 flyovers, 191 m and 247 m in length, supported at 7 and 9 points respectively and with a maximum span of 28 m between the furthest support systems, as presented in Figure 2.32.



Figure 2.30 Viana Overpass Alignment

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Source: BDM, 2023







Figure 2.31 Viana Overpass Cross sections

		28.00 #	* 28.0	0 m 0	18.00 m	15.00 m	21.00 m	15.00 m	28.00 m	28 00 m			
-	Encontro	5x VS 18	00 3 4x VS 800	/ 1800	0 4x VS 80	1 4k VS 750	GABARIT	ro 41 vs 750	5 x VS 1800 4x VS 800 4x VS 800	5 x VS 1800	Encontro		
+000	0+100	0+120	0+140	0+160	2. 80	0+200	0+220	0+240	0+260	0+280	0+300	0+320	-
			1	1					S				
	H	28 00 m	25.00 m	28.90 m	15.00 m		15.00 M		-28.00 m			-	
	Encontrol	-28 00 m 6 x VS 1900	25.00 m	-28.00 m 5 x VS 1800	15:00 == 6 xVS 1100	-21.00 m 6 x VS 1400 8 x VS 710	15:00 m 6 x VS 1100 4 x VS 250	28.00 m 5 x V\$ 1800 1x V\$ 800	28.00 m	28.00 m	28.00 m		
	Encorma	-28 00 m \$ x VS #900	25.00 m 5.x VS 1800 #4x VS 800	28 00 m 5 x V5 1800	-15:00 m 6 x VS 1900	21:00 m 6 x VS 1400 6 x VS 750 CARSARTO DO TREM	15:00 m 6 x VS 1100 4 x VS 750	26.00 m 5 x V\$ 1800 1x V\$ 800	28 00 m 5 x VS 1800 4 x VS 800 4 x VS 800	28.00 m 5 x VS 1800 4x VS 8007	28.00 m 5 VS 1800	/d Encontro	

Figure 2.32 Sections of overpass support spans at Viana

Estalagem

The Estalagem overpass is located at a site with similar use characteristics as the other overpasses, as well as being of importance for access to the Hospital do Estalagem (Figure 2.33).

The Estalagem overpass will consist of 2 overpasses in one direction, each 7.0 m wide plus 1.5 m sidewalk on each side, connecting the municipality of Cazenga with Deolinda Rodrigues Avenue (Figure 2.34). An access road was also designed for residents of the area close to the railroad, thus improving their mobility.

The two service lanes next to overpasses (one in each direction) will be 4.5 m wide with a 1.5 sidewalk on each side (Figure 2.35). The access roads (Transects A-A) will be 7 m wide (two lanes) with 1.5 m sidewalk on one side. The access from Estalagem street (Transect D-D) will have four 3.5 m wide lanes (two lanes in each direction) with a 1.5 m sidewalk on each side.





Figure 2.33 Area of the future Estalagem Overpass

Source: BDM, 2022

The works proposed at Estalagem will include the construction of 2 flyovers, 230 m and 278 m long, supported at 10 and 11 locations respectively, and with a maximum span of 28 m between the furthest support systems, as presented in Figure 2.36

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Figure 2.34 Estalagem Overpass Alignment

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Figure 2.35 Estalagem Overpass Cross sections

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Figure 2.36 Sections of overpass support spans at Estalagem

Mulenvos

This overpass was named after the neighbourhood that it provides access to. It connects to Estrada do Catete. A detailed analysis of risks is required given the presence of a high-voltage electricity grid in its vicinity (Figure 2.37).

The Mulenvos Overpass consists of 2 one-way flyovers, each 7.0 m wide plus a 1.5 m sidewalk on each side, connecting the Avenida do Mulenvos with Deolinda Rodrigues Avenue. An access road (Transect B-B, Figure 2.38) was also designed for residents of the area close to the railroad, thus improving their mobility: with a 3.5 m lane for transport and 1.5 m of sidewalk on one side.

The two service lanes underneath the overpasses (one in each direction) will be 6.5 m wide (two lanes) with 1.5 of sidewalk on each side (Figure 2.39). The access road (Transect D-D) will be 6 m wide (two lanes) with a 1.5 m sidewalk on each side and another access road from Mulenvos street (Transect E-E) will be 11 m wide with a 1.5 m sidewalk on each side. The access from Av, Deolinda Rodrigues will be 7 m wide with a 1.5 m sidewalk on one side.





Figure 2.37 Mulenvos overpass area

Source: BDM, 2022

The works proposed at Mulenvos will include the construction of 2 overpasses 269 m and 224 m in length, supported at 10 points each and with a maximum span of 28 m between the furthest support systems as presented in Figure 2.40.


Figure 2.38 Mulenvos Overpass Alignment

Source: BDM, 2023

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Source: BDM, 2023

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Figure 2.40 Sections of overpass support spans at Mulenvos

Source: INZAG, 2022.

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5th Avenue

The 5th Avenue crossing is an important level crossing connecting Cazenga to Deolinda Rodrigues Avenue. Due to the large amount of trade and dense housing, the implementation of an overpass is of great importance (Figure 2.41). The main objective of the overpass is to provide new access to the Cazenga community, to improve mobility.

The 5th Avenue Overpass includes two flyovers: one in each direction, 7.0 m wide each plus 1.5m of sidewalk on each side, making a direct connection between the 5th Avenue and Deolinda Rodrigues Avenue (Figure 2.42). The two service lanes underneath the overpasses (one in each direction) will be 4.5 m wide with a 1.5 sidewalk on each side (Figure 2.43).





Figure 2.41 Overpass area of 5th Avenue

Source: BDM, 2022.

The works proposed at 5th Avenue will include construction of 2 overpasses extending over 220 m and 222 m, supported at 7 and 9 points respectively, and with a maximum span of 28 m between the furthest support systems, as exposed in Figure 2.44.

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Figure 2.42 5th Avenue Overpass Alignment

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Figure 2.43 Cross-sections at 5[™] Avenue

Source: BDM, 2023

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Figure 2.44 Sections of overpass support spans at 5th Avenue

Source: INZAG, 2022

2.7.1.3 Geometric Analysis

The geometric analysis used the topographic study, for the preparation of plans and profiles in accordance with the standards and characteristics of the surroundings. The geometric designs of the overpasses were based on the Southern Africa Transport and Communications Commission (SATCC) regulations in force, to incorporate all relevant constraints to the specificity of the proposed works.

The road traffic-speed considered in the analysis was 60km/h and a maximum standardised gradient of 8% was adopted. In this context, the proposed geometry considered the trinomial components of comfort, accessibility and area of intervention, so that the planned ramps allow easy access for users (drivers and pedestrians) and minimize the works' footprint. The overpasses will have side walkways in both directions, which will function as a ramp allowing full accessibility. The overpasses will not have any stairs. Other considerations include the minimum width for the vehicle carriageway of 3.50m and the priority width of 1.50m for the pedestrian pavements. Almost all of the planned roads, including the raised crossings and the other component roads (local access roads, acceleration and deceleration lanes, etc.) are provided with two lanes per direction of flow, offering better traffic flows and greater efficiency for the desired mobility.

As noted in the previous paragraph, the concept of the project is not restricted to the overpasses, but encompasses all its surroundings, including access to local roads, pedestrian crossings and promotes a high degree of accessibility to all users involved in the proposed intervention.

Finally, in order to promote fluidity during construction while minimising negative impacts on the social environment, expropriation of land was reduced as much as possible, notably regarding the required land for the implantation of elevated areas.

2.7.1.4 Earthworks

The scope of the earthworks is presented in Table 2.4.

Material Excavation/filling	Volume, m ³
Excavation for foundations, including removal of remaining materials	10,290
Excavation for opening the floor box, including removal of remaining materials	11,820
Landfill in foundations, with soils coming from excavations	3,822
Technical landfill, with selected soils on loan	8,748
Execution of sub-base in red earth, with 20 cm thickness	7,600

Table 2.4 Earthworks

Source: BDM, 2023

Where foundations are located, excavations to the desired depths will be carried out and the surplus material will be displaced in designated areas within INZAG's yard. This material is expected to be of minor quantities and will be used for construction of abutments/ramps The volume of earthworks in 8 months is estimated as 18,000 m³.

The landfill material will be transported from the quarry to INZAG's yard for temporary stockpiling.

2.7.1.5 Structural Component

The pre-dimensioning of the structures was based on the SATCC and Eurocode standards. It was established as a premise for the standardization of designated loads in accordance with the SATCC, plus the loads arising from the designed pavement layers.

For the foundations, the available Geotechnical Studies carried out for other projects along Deolinda Rodrigues Avenue were used as a reference. Thus, the standard pile is designed with a diameter of 1.0 m and a depth of 15.0 m. These dimensions should be validated after a specific drilling campaign,

which started in July but the complete report is not available to the date of this assessment, therefore, the described design might be changed based on the results of the campaign.

A mixed solution was selected as the best option for the Project's structural components, consisting of a superstructure in reinforced concrete and a mesostructure and infrastructure in metallic elements. The columns, sleepers and decks, are all designed in concrete.

The constituent elements of the superstructure of the overpasses include a set of stringers, H-steel beams, supported at both ends by metallic cantilevers (Figure 2.45). These cockpits are in turn supported by metal pillars. The set of stringers is stopped by a series of laminated profiles, in order to reduce the lengths of instability phenomena, which are distributed along the entire length of the spans, and which provide greater rigidity of the deck as a whole.



Figure 2.45 Typical Overpass Structural Section

Source: INZAG, 2022

The concrete pillars are designed to work in a portico system, ensuring the locking of the structure to control perpendicular stress to the deck. The length of the pillars is variable in the various overpasses, ranging between 8 and 9 meters. Double supports are designed at the connection of these elements to the concrete footings. During the detailed design, an analysis will be carried out to assess the option of changing the pillars from steel elements to concrete elements.

The steel elements were designed to account for deviated and compound bending. To this purpose, welded profiles and laminated profiles were used, as seen in Figure 2.46, to avoid the need for temporary shoring or counter-arrows to control long-term deformations.

Two main types of connections were considered for the structure, notably continuity connections, with top plates and labelled connections with fin plates.

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Figure 2.46 Proposed Steel Element Component Connections

Source: INZAG, 2022

2.7.1.6 Pavement

For the surface pavement, a flexible structure is proposed, for the overpasses and for the road ramp as detailed below. The asphalt design will consider all the requirements based on the SATCC (Southern Africa Transport and Communications Commission) Norm.

Overpasses pavement

The pavement structure was designed to adapt to the local traffic, which is lower than the limit used for the Project Design. Thus, the pavement structure would include the listed components:

- <u>Wearing course</u>: bituminous concrete 5.0 cm thick;
- Binder course: bituminous concrete 5.0 cm thick;

These two layers will be applied on the concrete layer table of the overpasses.

Road ramps pavement

The road ramp pavement is proposed to consist of a base and sub-base of granulometrically stabilised soil and an asphalt concrete wearing course.

In the absence of a specific geotechnical campaign, the pavement structure was designed to be compatible with the existing pavement of the Avenida Deolinda Rodrigues. It was also designed to adapt to the local traffic, which is lower than the limit used for the Project Design. Thus, the pavement structure would include the listed components:

- <u>Wearing Course</u>: bituminous concrete 5.0 cm thick;
- Binder Course: bituminous concrete 5.0 cm thick;
- Stabilised base: 20.0 cm thick granulometrically stabilised base (Tout Venant);
- Sub-surface: 20.0 cm thick red earth sub-base.

The pavement component materials are to comply with the following specifications (Table 2.5, Figure 2.47):

Layer	Material	Minimum resistance
Base in Tout Venant	Granular	BR saturated > 80% at 98% of modified AASHTO density
Sub-Base in red earth	Granular	Saturated CBR > 30% at 95% of the modified AASHTO density

Table 2.5 Pavement specifications

Source: BDM, 2022



Figure 2.47 Pavement Components

Source: BDM, 2022.

2.7.1.7 Drainage

Heavy precipitation occurs during the Angolan summer months; therefore, it is essential that the rainwater drainage system is made with attention and caution.

ERM has made field observations of the existing drainage structures in the vicinity of the five proposed locations (see section Existing Surface Water Drainage regime). The proposed infrastructure is planned to drain rainwater onto the side of the road. This is reflected in the design with the lean angles of the road (3°). The drainage system will include the water collection elements on the flyovers, the drainage of the road system will include curb and gutter devices, drains and collector sewers.

The control and management of rainwater will be handled by a set of urban drainage structures and installations, with the main objective of directing the flow of water to gutters, culverts, galleries, among others. The main elements of the drainage system include:

- Curb;
- Fiberglass reinforced plastic pipes;
- Gutter;
- Drainage galleries (concrete);
- Trenches and ditches;
- Manholes.

The details and dimensions of these elements will be defined in the detailed Project design. The basic plan of the drainage system for the five overpasses is presented in subsections below (according to the Drainage Report, ver.00, June 2023, provided by BDM and INZAG).

SME

The water collected at the overpass will be led to two discharge points. The solution aims to avoid the transmission of a new drainage system through the Overpass (Figure 2.48):

- South Side of Overpass (EN230): Drainage will be directed to the existing drainage system on Catete Road. The existing network should be relocated and requalified;
- North Side of Overpass: Drainage will be directed through the side street with the existing drainage system to collection ponds located 350 m downstream



Figure 2.48 Proposed Drainage Network at the Viana Overpass

Source: BDM, 2023

Viana

The water collected at the overpass will be led to two discharge points. The solution aims to avoid the transmission of a new drainage system through the Overpass (Figure 2.49):

- South Side of Overpass (EN230): Drainage will be directed to the existing drainage system on Avenida Deolinda Rodrigues. The existing network should be relocated and requalified;
- North Side of Overpass: Drainage will be directed to the existing network through a side street, 1,300 m away from the lowest part of the overpass. The existing network should be relocated and requalified.



Figure 2.49 Proposed Drainage Network at the Viana Overpass

Source: BDM, 2023

Estalagem

The water collected at the overpass will be led to two discharge points. The solution aims to avoid the transmission of a new drainage system through the Overpass (Figure 2.50):

- South Side of Overpass (EN230): Drainage will be directed to the existing drainage system on Avenida Deolinda Rodrigues in two network segments. The existing network should be relocated and requalified;
- North Side of Overpass: Drainage will be directed to the existing network. The existing network should be relocated and requalified.



Figure 2.50 Proposed Drainage Network at the Estalagem Overpass

Source: BDM, 2023

Mulenvos

The water collected at the overpass will be led to two discharge points. The solution aims to avoid the transmission of a new drainage system through the Overpass (Figure 2.51):

- South Side of Overpass (EN230): Drainage will be directed to the existing drainage system on Avenida Deolinda Rodrigues in two network segments. The existing network should be relocated and requalified;
- North Side of Overpass (Mulenvos Road): Drainage will be directed through the side street to the existing network, 660 m away from the lowest part of the Overpass. The existing network should be relocated and requalified

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 2.51 Proposed Drainage Network at the Mulenvos Overpass

Source: BDM, 2023

5th Avenue

The water collected at the overpass will be led to two discharge points. The solution aims to avoid the transmission of a new drainage system through the Overpass (Figure 2.52):

- South Side of Overpass (EN230): Drainage will be directed to the existing drainage system on Avenida Deolinda Rodrigues in two network segments. The existing network should be relocated and requalified;
- North Side of Overpass (5th Avenue): Existing drainage system on the 5th Avenue. The existing network should be relocated and requalified.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 2.52 Proposed Drainage Network at 5th Avenue Overpass

Source: BDM, 2023

2.7.2 Overpass Road Safety Design

The available preliminary design of the Project does not contain any information related to the road safety design of the overpasses themselves. This information has to be completed once the detailed design of the Project is available. However, the maps provided for deviation roads visualise the signs that are planned to be installed at these roads: traffic deviation arrows, speed limits (30 km/h) at some of the roads, stop signals and warning signs before the railway crossings.

2.7.3 Right of Way

The planned overpasses are not categorised as highways nor typical roads as such; therefore, no allocated ROW has been identified as applicable to the new structures per legislation. The Project will need to comply with the regulations of the existing infrastructure utilities, and their respective norms and standards.

After completion of the detailed design, an offset will be defined from the road centrelines, to consider areas necessary for the safe construction of the Project. This offset should vary depending on the type of roads considered, for example between surface level roads or in areas with ramps or elevated structures.

2.8 Project Activities and Sequencing

2.8.1 Preconstruction Activities

Prior to construction, the planned preliminary activities are categorised into the main tasks:

- Mobilization;
- Geotechnical Survey;
- Pedestrian Crossings Relocations;
- Traffic deviation;
- Detailed Design;
- Site cleaning;
- Resettlement;
- Front yards installations;
- Work area provisional fencing and other safety measures to start the works;
- Communication policy implementation; and
- Manpower integration and context/project training (Direct and Indirect Manpower).

2.8.1.1 Existing Public Infrastructure

Utility and service lines along the construction area will be affected as a result of the Project activities. The main utilities to be affected include:

- Water lines;
- Electric lines;
- Telecommunication services;
- Transformers; and
- Street lights;

In general, road construction activities have a high potential to damage pipeline electrical infrastructure, and any interruptions may be very significant to consumers, especially industrial users. Service interruptions can take a long time to reconnect, especially if entire systems have to be shut down and restarted.

The available information on existing utilities is included in the following subsection 2.8.1.1. The relocation of these structures shall be considered in the Project design, with details and engagements in the Project design phase.

Utilities relocation

Construction will require relocation (at times temporary and at times permanent) of existing utilities. Key existing infrastructures and services where displacement will be needed will include the following:

- Drainage infrastructures (existing drainage network is described in Section 4.1.6.1);
- Water supply infrastructures;
- Electricity supply infrastructures (high and low voltage power lines);
- Telecommunication infrastructures,
- Gas supply pipes;

The infrastructures and services identified based on the stakeholder feedback and concerns raised during the stakeholder engagements.

For the relocation of the utilities INZAG will interact with their owners, who must approve the new solution for diverting their infrastructure and also identify the companies to carry out the relocation works. (e.g. water network, electricity network, telecommunications). A summary of the planned works for the relocation of the overhead lines is presented in Table 2.6 (the plan is not final as of 30.09.2023, options of keeping some of the overhead lines or their relocation/replacement by underground lines are still considered):

Location	Works planned
SME (see existing utilities Figure 2.53 and Figure 2.54)	 Removal of supports, accessories and the respective line; Installation of supports; Supply and installation of medium voltage (MV) 30kV overhead line – relocation of the poles and line itself; Supply and installation of medium voltage 30kV underground line; Commissioning. If it is possible to bypass the existing infrastructure, no intervention may be
	necessary.
Viana (see existing utilities in Figure 2.55, Figure 2.56)	 Removal of supports, accessories and the respective MV line; Removal of supports, accessories and the respective low voltage (LO) line; Removal of supports, accessories and the respective Fibre-Optic (FO) line; Installation of MV supports; Supply and installation of MV 30kV line; Supply and installation of LV underground line; Supply and installation of underground FO line; Commissioning.
Estalagem – Access to the hospital (Figure 2.57, Figure 2.58)	 Removal of supports, accessories and the respective HV line; Removal of accessories and the respective MV line; Removal of supports, accessories and the respective FO line; Installation of HV supports; Installation of MV and LV supports; Supply and installation of 220kV HV line; Supply and installation of MV 30kV underground line; Supply and installation of underground FO line; Commissioning.
Mulenvos (Figure 2.59, Figure 2.60)	 Removal of supports, accessories respective HV 220 and 60 kV line; Removal of supports, accessories and respective MV 15kV line; Removal of supports, accessories and the respective FO line; Installation of HV supports; Installation of MV; Supply and installation of 220kV HV line; Supply and replacement of the 220kV HV overhead line (after construction of the overpass); Supply and installation of MV 15kV underground line; Supply and installation of underground FO line; Commissioning. Option of replacing the MV lines with an underground cable is still under consideration. One of the suggestions is to temporarily replace the 220kV line with an underground cable and at the end of the construction of the overpass, reinstall the 220 kV overhead support. Part of the arrival section of the 60kV line to SE GAMEK km 9 must be by underground cable

Table 2.6 Overhead Lines Relocation

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Location	Works planned
5 th Avenue (Figure 2.61, Figure 2.62)	 Removal of supports, accessories and the respective FO line; Supply and installation of underground FO line; Commissioning



Figure 2.53 Plan of the existing utilities at the SME overpass

Black line – MV line to be substituted by an underground cable, red line – MV line to be relocated Source: INZAG, 2023



Figure 2.54 View of the existing MV line at the SME overpass

Source: INZAG, 2023





White line – MV 15 kV line; Red line – proposed relocation of the MV line; Yellow line – Low-Voltage and FO overhead lines that will be relocated underground.

Source: INZAG, 2023



Figure 2.56 View of the existing overhead lines at the Viana overpass

Source: INZAG, 2023



Figure 2.57 Plan of the existing utilities at the Estalagem overpass

Green line – HV line Yellow line – LV and FO overhead lines that will be relocated underground; Blue line – proposed relocation layout of HV and MV; Yellow Pins P1, P2 and P3 – existing supports; Red Pins P1' and P2' are the suggested tying supports.

Source: INZAG, 2023



Figure 2.58 View of the existing overhead lines at the Estalagem overpass

Source: INZAG, 2023



Figure 2.59 Plan of the existing utilities at the Mulenvos overpass

Yellow line – LV and FO overhead lines that will be replaced by underground lines; White line – 60 kV line to be replaced; Red line – new double-tie layout of the vertical track for the 60 kV line; Black line – new 60 kV line track; Yellow Pins P1, P5 and P6 – existing supports of the 220 kV line; Red Pins P1' and P1'' are suggested new higher supports.; Blue Pins P2, P3 and P4– existing MV supports; Green Pin P7 – LV support.

Source: INZAG, 2023



Figure 2.60 View of the existing overhead lines at the Mulenvos overpass

Source: INZAG, 2023



Figure 2.61 Plan of the existing utilities at the 5th Avenue overpass

Yellow line –FO overhead line that will be relocated underground; Red Line – existing HV Line, P1 – HV Support. Source: INZAG, 2023



Figure 2.62 View of the existing overhead lines at the 5th Avenue overpass

Source: INZAG, 2023

2.8.2 Construction Activities

For each of the main Project sites, specific activities shall be carried out that entail the following tasks:

- Resettlement actions (provided in the RPF designed by ERM)
- Relocation of utilities;
- Overpasses' Works:
 - Preparation of the area for the piles, with excavation or filling of the area;

- Bored cast for concrete piles (bored, preparing heads and temporary steel casing), for the foundations of piers and abutments;
- Blinding and reinforced concrete for bases, footings, pile caps, and ground slabs;
- Installation of the face panels for Walls;
- Mechanical Stabilization of the ground;
- Assembly of the main parts of Metallic Structures for overpasses;
- Assembly of the precast planks;
- Assembly of the bearing bridges;
- Deck rebar installation;
- Deck concreting;
- Sprayed waterproofing membrane to the deck, bituminous protection;
- Subbase and base of the ramps;
- Application of the layers of subgrade and asphalt on the deck and ramps; and
- Street lightening installation
- Provisional Roads for the traffic deviation:
 - Surface preparation for provisional roads improvement;
 - Earth cut and fill to recover the provisional roads;
 - Laying of a base of crushed stones or adequate soil.
- Road Works:
 - Remove if needed the existent asphalt pavement;
 - Surface preparation for new road construction: debris, large rocks, vegetation and topsoil will be removed from the areas to be paved;
 - Earthworks Excavation and/or filling;
 - Surface preparation laying of a sub-base;
 - Kerbs' installation;
 - Laying of a base of crushed stones;
 - Walkways preparation;
 - Prime coating;
 - Laying of the asphalt binder, tack coat and asphalt wearing course;
 - Road and Deck drainage;
 - Deck Lightning
- Assembly of the traffic signs and road marking

2.8.3 Construction Traffic

The construction traffic will be managed through a bespoke management plan developed to avoid the impacts of road dualization. The Project shall implement safety measures for the internal road network, traffic signals, site access control, personnel working on-site, internal traffic management, off-site traffic management, implementation of regular training, road and vehicle maintenance.

The works shall be planned in a fashion of freeing portions of the roads as the progress of the works, identifying, based on the final detailed design the detours and alternative roads.

The estimated vehicle movements are presented in Table 2.7. The table below does not include traffic from the INZAG main camp to the construction site (section 2.3.2) and waste transportation to the dump site (section 0).

Type of vehicle movement	Destination	Type of transport and its capacity	Length of the way	Period of transportation	Trips a month	Estimated number of trips, total;	Total km
Earthw ork material transportation	From the quarry to INZAG's yards for temporary stockpiling	Tipper trucks, 14 m ³	40 km	8 months	160	1,300	104,000
Concrete transportation	From Prefangol facilities to construction sites	Mixer truck, 7 m ³	24.5 km	8 months	220	1,700	83,300
Base course material transportation	From the FFB quarry to INZAG's yard for temporary stockpiling	Tipper trucks, 14 m ³	180 km	10 months	72	720	259,200
Asphalt transportation	from the asphalt plant to the construction sites	Tipper trucks, 16 m ³	24.5 km	10 months	30	300	14,700
Steel structures transportation	From the port to the construction sites	Truck with flatbed trailer	15 km	-	-	200	6,000

Table 2.7 Estimated vehicle movements

Source: INZAG, 2023

2.8.4 **Project Schedule and Workforce**

The Project plans foresee a total of 365 workers throughout the construction phase, more than 97% of which will be locals (Table 2.8). Expatriate workers will come from different countries including for the following roles: Project Manager, Department Managers and Specialized Engineers and supervisors (whose skills are not easily available in-country). No project specific accommodations are expected to be required, given the high percentage of locals and the urban environment of the project. Expatriate workers will be accommodated at existing accommodations in the area (e.g. hotels/apartments). The hiring process will be in line with international standards.

Categories	Foreign	Local
Administrative	2	22
Semi-Skilled		148
Skilled	7	32
Unskilled		154
Subtotal	9	356
TOTAL		365

Table 2.8 Planned Project workforce

Source: INZAG, 2023.

At peak capacity the project will be running 365 workers (328 direct labour and 37 indirect labour) – the number of workers present is shown in Figure 2.63. The scheduled duration of construction activities is planned to be 24 months (Figure 2.65).

The duration of the different Project construction activities is provided in the Table 2.9.

Main Constructions	Approximate Time Schedules
SME overpass	February 2024 – September 2024
Viana	March 2024 – February 2025
Estalagem	August 2024 – July 2025
Mulenvos	October 2024 – September 2025
5 th Avenue	March 2024 – February 2025

Table 2.9 Main Construction Activities

Source: INZAG, 2022

The normal working hours are from Monday to Friday between 07.00 and 17.00, and twice a month on Saturdays. Night activities are planned for special tasks, mainly to avoid impacts on road and rail traffic: transportation from the yard to the construction fronts and assembly of overpass structures over the railroad (pre-assembly of the structures will be performed during the daytime). This considers that there is no circulation of trains at night.

The Project has started with a pre-construction phase that is expected to last a total of 15 months (Figure 2.64). The following construction schedule for the Project execution is 24 months including mobilisation and construction phase.

	IVIT	IVIZ	IVIS	1014	IVID	IVIO	1417	IVIO	IVIS	IVIT	IVITT	IVITZ	INIT2	1114	CTIAI	IVITO	IVIT/	IVITO	INITA	IVIZ	IVIZI	IVIZZ	IVIZO	IVIZ4
DIRECT MANPOWER	4	4	46	69	97	107	167	160	194	262	273	263	259	220	200	153	154	128	122	122	84	24	24	24
INDIRECT MANPOWER	0	12	51	80	87	91	91	92	92	92	92	92	89	89	89	85	81	80	79	73	69	69	69	69
TOTAL	4	16	97	149	184	198	258	252	286	354	365	355	348	309	289	238	235	208	201	195	153	93	93	93

M1 M2 M3 M4 M5 M6 M7 M8 M9 M1 M11 M12 M13 M14 M15 M16 M17 M18 M19 M2 M21 M22 M23 M24

Figure 2.63 Workforce Planner

Source: INZAG, 2022

	2022 2023																	
ACTIVITIES - Pre Construction	Set	22	Out 22	No	v 22	Dez 22	Jan 23	Fev 23	Mar 23	Abr 23	Mai 23	Jun 23	Jul 23	Ago 23	Sep 23	Out 23	Nov 23	Dez 23
MILESTONES																		
Notice to Proceed																		
ENVIRONMENTAL STUDIES																		
Scoping Report																		
ESIA - MATERIAL DRAFT REPORT										زهد								
ESIA - FINAL REPORT														ري العار				
RAP FRAMEWORK																		
FUNDING																		
Financing Agreement																		
Precedent Conditions																		
Financial Close																		
ENGINEERING																		
TOPOGRAPHIC DETAIL SURVEY																		
GEOMETRIC DESIGN CONSOLIDATION																		
GEOTECHNICAL SURVEY														1 I I				
BASIC DESIGN																		
DETAILED DESIGN																		
PRE MOBILIZATION																		
CENTRAL YARD PREPARATION																		
Duration of the Contract and start of Construction Activities																		

Figure 2.64 Pre-Construction Work Plan

Source: INZAG, 2023



Figure 2.65 Construction Work Plan

Source: INZAG, 2023

2.9 Vehicles and Machinery

Construction activities will employ a wide array of heavy equipment and vehicles, Table 2.10 outlines the preliminarily identified basic requirements in typology and the number of equipment/vehicles needed for the construction. The information on the construction traffic is presented in the Table 2.7.

Equipment Type	Amount
Asphalt Paving Machine	2
Asphalt Plant	1
Backhoes	3
Bitumen Sprayer	1
Bulldozers	2
Concrete Pump Truck	1
Compactor Roller	4
Concrete Batching Plant	1
Concrete Mixer Truck	6
Excavator	6
Farm Tractor	1
Generators (040 Kva)	4
Generators (075 Kva)	1
Light 4x4 Vehicles	8
Loader Cranes / Truck-Mounted Crane (15tm)	3
Manitou Telescopic	2
Mobile Crane	3
Mobile elevated platforms	4
Motor Graders	2
Pneumatic Tyre Roller	2
Tipper Trucks to Transport Raw Materials and Asphalt	15
Tractor Units/Truck Unit	2
Water Trucks	2
Wheel Loaders/Front End Loaders	1

Table 2.10 Equipment List Required During Construction

Source: INZAG, 2023

2.10 Resources and Waste

2.10.1 Raw Materials and Suppliers

Raw materials will be purchased (Bitumen, Steel structures, concrete, formworks, rebars, guard rails, etc.) and imported from external suppliers (metallic structure, guardrails, bitumen, expansion joints, bridge bearings, street lightings, etc). The main list of raw materials expected to be used is outlined in Table 2.11.

Table 2.11 List of raw materials	required during construction
----------------------------------	------------------------------

Material Type	Prospective Quantity
Bitumen/ asphalt cement	11,500 ton

Material Type	Prospective Quantity
Steel structures	3,000 ton
Concrete	12,000 m ³
Base course material	20,000 m ³
Formw orks	34,000 m ²
Rebars	1,120 ton
Drainage ditches	3,200 m
Guard rails	11,800 m
Impermeabilization	5,200 m ²

Source: INZAG, 2022

INZAG will not have its own borrow pits and will acquire the construction materials from third parties:

- FFB (certified Angolan company) laterite from licensed borrow pits: material for the earthworks and asphalt;
- Prefangol (certified Angolan producer of cement, plaster and concrete, Industrial license SILAI/156/3681/DNI/2021 from 12.03.2021 valid until 12.03.2026; Environmental License 3571404202 from17.11.2021, valid until 16.11.2024) – concrete, commercial quarry;
- Cobeton (certified Angolan company) concrete;
- German suppliers (not yet defined) steel.
- FFB borrow pits (9°50'51.74"S, 14°34'29.85"E) are located along the EN120 road in Bengo province, 183 km from the closest overpass (SME) and 206 km from the furthest overpass (5th avenue). It is an area used for borrowing for over 10 years (Figure 2.66).



Figure 2.66 Location of the FFB borrow pits

An FFB-owned installation in Panguila, 24.4 km from the INZAG permanent construction yard to the north) will supply the Project with earthwork material and asphalt.

The location of the quarry used by Prefangol for the supply of the Project is yet unclear but, according to the company's website, there are three quarries in Angola in Zenze, Moxico e Cahama, and Burgaleira em Bom Jesus.

2.10.2 Water Use and Treatment

The foreseen water consumption during the construction phase is related primarily to the watering of the construction sites to reduce dust emissions due to earthmoving activities, at the batch plant and for civilian uses. Table 2.12 below summarizes the planned needs of the whole Project.

Table 2.12 Water consumption for Overpasses Project

Туроlоду	Quantity
Potable water	1,800 m ³
Water for industrial use	6,868 m ³

Source: INZAG, 2023

The water for water dispensers used at the Camp Site will be supplied by a local third party. For other uses, including industrial, INZAG will store water in tanks, that will be distributed to the construction sites.

The main activities that will require water during construction are:

- Scarification of the subgrade
- Piling;
- Landfilling;
- Construction of ditches;
- Soil cement;
- Pavement;
- General cleaning.

The records of used water amount will be kept in a specific form, presented in the annex to INZAG's Water and Wastewater MP (MP PASUL HSE SGI 007 0). The expected wastewater types during construction are presented in Table 2.13.

Туроlоду	Quantity	Collection and Treatment
Domestic effluents from the camp site	560,160 kg	Collected into septic tanks with primary treatment (decantation and filtration) and biological treatment (anaerobic fermentation) and subsequent aspiration and transport directly to its final destination, by a company duly accredited.
Industrial effluents from maintenance areas and w ashing of construction site equipment	No quantities provided	Collected into hydrocarbon separators, the generated sludge will be removed by a pump truck and transported to the final destination by a company duly accredited

Table 2.13 Wastewater generated by Overpasses Project

Source: INZAG, 2023

The company that will be managing the septic tanks and hydrocarbon separators will be selected from the list of units licensed by the Ministry of Environment of the WNA¹.

¹ ANR | Agência Nacional de Resíduos (gov.ao)

2.10.3 Fuel and Energy Consumption

Fuel will be used in the project by all construction vehicles as well as by generators to supply electricity to the construction camp.

For that purpose, fuel will be stored in specific tanks including secondary containment located at the contractor camp, where they will be used to refuel vehicles. Total fuel consumption is estimated to be 2 million litres of diesel for the whole length of construction (24 months), diesel consumption per month is shown in Table 2.14. Fuel will be required for the operation of the camp as well as all construction and logistics that involve the use of generators to produce electricity.

Mont hs	M1	M2	M 3	M4	M5	M 6	Μ7	M 8	M9	M10	M11	M12
	93.3	99.5	99.5	100.5	104.0	121.4	123.9	125.7	125. 0	125.1	129.9	130.4
	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24
	120.9	99.5	88.2	85.4	60.6	35.9	19.3	35.9	30.3	5.4	35.9	11.0

Table 2.14 Dieser Consumption during Construction (thousands of fittes	Table 2.14 Diesel Consum	ption during	Construction	(thousands	of litres
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Source: INZAG, 2023

The main campsite will be connected to the public electric grid and have a secondary generator. The construction yards will be powered exclusively by generators.

2.10.4 Project Emissions, Discharges and Wastes

2.10.4.1 Air Emissions

Emissions from the project are derived from the use of fuel. In addition, dust will also be generated as a result of earthworks and the movement of vehicles, mainly on unpaved roads/substrates. In both cases, INZAG will apply best practices (see Section 2.12).

2.10.4.2 Light Emissions

Some of the construction activities are planned to be performed at night that may impact the locals. No embedded controls are included into the preliminary Project design.

2.10.4.3 Noise Emissions

Construction will generate noise mainly as a result of the use of heavy machinery and vehicles. The best practice applicable to the project is presented in Section 2.12.

2.10.4.4 Waste

Since the end of its brutal civil war in 2002 and the relative political stability that followed, Angola has taken concrete steps to address national waste management priorities. In this view, waste management in Angola is organized through 'Waste Management Plans' (WMP), to respect the good environmental practices and the legislation in force.

This section provides a description of the waste generation and treatment for the construction phase of the Project, as analyzed through the WMP dated January 2023.

The main objectives of this section are to:

Identify the types and (where possible) estimated quantities of waste produced and generated by the Project;

- Identify the measures to be taken for waste handling and treatment by prioritizing valorization, recycling, and reuse before elimination, all by ensuring the protection of the environment, as well as employees' and communities' health; and
- Contribute to the global goal of environmental management, in particular waste management.

Waste Categories

The main Project activities generating waste are listed below:

- General handiworks, including activities like Stakes preparation, with excavation or cementing; Concrete stakes installation with drilling and provisory tubing, for pillars and abutments fundaments; Leveling concrete and reinforced concrete casting for fundaments, sabots, stakes blocs and floor slabs; Walls front panels installation; Assembly of the principal elements from the viaducts metallics structures; Prefabricated panels assemblage; Application of the waterproof bituminous protection; Under-fundament and ramps base; Fundament layer and asphalt application on the ramps and the bridge deck; and Public lighting implementation.
- Implementation of temporary roads for traffic deviation, including activities like Surface preparation with vegetation and vegetal dirt removal; Road backfill; Laying a gravel base or appropriate floor.
- Roads handiworks, including activities like Preexisting asphalt road removal; Surface preparation: debris, big rocks, vegetation and dirt removal; Earthwork, excavation and embankment; Underlayer installation for surface preparation; Road verges and footbridges installation; Gravel base installation; Asphalt layer application; Bituminous bound, bituminous layers for road construction.

INZAG will use a preexisting worksite next to the Project workplace, which contains the necessary installations for the project, e.g., offices, workshops, warehouses, a special waste storage area, waste management zones, sanitary installations, and a cafeteria.

Tentative estimates of waste types and quantities during the construction phase of the project include the following (Table 2.15). No chemical waste is foreseen. There will be no canteen at the construction sites, the food will be delivered from the canteen at INZAG permanent yard. Concrete mixer wash water and concrete laitance will be the responsibility of a contractor. Washing of the machinery and equipment will also be performed by a subcontractor within his premises.

Waste Category (source)	Typical Constituents	Generation Rate, kg/year	Storage type	Expected amount, kg/year
Equipment maintenance	Waste synthetic oils for engines, gears, and greases	7,500	Watertight 200 litre metal drums	15,000
	Absorbents, filter materials (including oil filters not otherw ise specified), w iping rags and protective clothing contaminated with hazardous substances	2,000	Watertight 1,000 litre plastic drums	4,000
	Used tires	8,825	In a place delimited and	17,650

Table 2.15	Waste	streams	for Over	pass Project

Waste Category	Typical	Generation Rate,	Storage type	Expected
(source)	Constituents	kg/year		am ount,
				kg/year
			identified for the purpose	
	Oil filters	2,200	Watertight 1,000 litre plastic drums	4,400
	Metals	10,000		20,000
	Metals	24,000	Hydrocarbon Separator	48,000
Warehouse	Paper and cardboard packaging	5,000	Bays built in concrete	10,000
Warehouse and administrative works	Paper and cardboard	5,000	Bays built in concrete	10,000
Warehouse and canteen	Plastic packaging	1,500	Bays built in concrete	3,000
	Plastic from domestic uses	1,500		3,000
	Glass packaging	500	Bays built in concrete	1,000
Equipment maintenance	Glass	500	Bays built in concrete	1,000
	Lead-Acid Accumulators	1,000	Watertight box, stored in the Waste Yard	2,000
Work execution	Concrete	5,000	Work front	10,000
	Plastic	5.500	Bays built in concrete	11,000
	Timber	500	Bays built in concrete	1,000
	Steel and iron	10,000	Bays built in concrete	20,000
	Soil and stone	500,000	Dumping site	100,000
Ambulation	Waste collection and disposal are subject to special requirements for the prevention of infections	1,300	Watertight plastic containers with lids and alcohol inside	2,300
Canteen	Biodegradable waste from kitchens and canteens	50,000	Plastic containers, w ith lids, 200 litres	100,000
Work execution	Chemical Wastes	Not foreseen	-	-
Liquid effluent waste				
Washing waterfor machinery and equipment	Oily water with high suspended solids	-	-	w ill be performed by a subcontractor
Sanitaria	Impervious sceptic pits effluents	280,080	Sceptic pits	560,160

Note: red colour marks the hazardous waste streams

Source: INZAG, 2023

Waste Management

For the different types of waste listed in the table above, and which require transport and treatment, all the operators selected to transport, process, recover and ensure the destination of the various types of waste must be included, as far as possible, in the lists of units approved by the Ministry of the Environment. Any transport will be accompanied by the consignment note for the transport and disposal of hazardous waste provided by **Presidential Decree No. 190/12 of August 24 - Annex VII.**

All types of waste are firstly gathered in adequate storage areas on site prior to being transported for treatment, following the guidance per type of waste (LAR methodology). When the stored quantity is close to the temporary storage capacity, the dispatch process for processing or revalorization is triggered.

The surplus material will be transported by the certified company FFB to Aterro Sanitário de Mulenvos, a dumpsite located at the following driving distance from the projected overpasses (Figure 2.67):

- 9 km from the 5th Avenue overpass;
- 6.6 km from Mulenvos overpass;
- 7.1 km from Estalagem overpass;
- 12.5 km from Viana overpass;
- 29 km from SME overpass.



Figure 2.67 Location of the dumpsite Aterro Sanitario de Mulenvos

1. Used Oils (LAR 13 03 06)

Most of the used oils are classified as hazardous wastes. They mainly come from the maintenance and use of heavy machines, excavation material and construction equipment (i.e., in the preparation and execution work phase). It also concerns any substances contaminated by oils.

2. Industrial packaging, including municipal packaging waste (LAR 15 01) and absorbents, filter materials, wiping clothes and protective clothing (LAR 02)

Packaging waste comes mainly from the packaging of building materials and maintenance aids. Packaging, absorbent, and filtering materials will be separated from other waste with urban characteristics, depending on the use and nature of the packaged products, in order to avoid contamination of other fractions.

3. Batteries & Accumulators (LAR 16 06)

Used batteries and accumulators, classified as hazardous waste, pose serious risks to the environment as they contain ionic lead and sulfuric acid, which increases the risk of leaching and groundwater contamination in the event of an accidental spill.

4. Chemical Waste

According to the list of wastes, associated with the project, there will be some hazardous waste associated with equipment maintenance (mainly oil wastes, see Table 2.15), that will be stored in watertight 1,000 litre plastic drums. Their management will be the responsibility of the subcontractor, which to this point was not specified.

5. Liquid Effluents

The effluents likely to be produced as part of the Project are as follows:

- Domestic wastewater from sanitary facilities and canteens that will be in service during the works; and
- Industrial wastewater (oily water) from maintenance and washing areas of site equipment.

Domestic effluents will be produced more regularly and in larger quantities in the social facilities, hence a domestic effluent disposal network will be installed in this area of the site, as well as a system for treating these effluents before their discharge.

As specified in Section 2.10.2, domestic effluents will be collected into septic tanks with primary treatment (decantation and filtration) and biological treatment (anaerobic fermentation) and subsequent aspiration and transport directly to its final destination, by a company duly accredited.

Oily industrial effluents (high in hydrocarbons) are mainly produced in the equipment maintenance area that will be managed by subcontractors.

6. Construction and demolition waste (LAR 17 01, 17 02, 17 04 and 17 05)

Construction and demolition waste (CDW) has a very heterogeneous composition and an inhomogeneous constitution, with fractions of different sizes, which can be classified into hazardous, non-hazardous and inert waste.

This category includes waste land volumes, consisting of soil and rock, vegetation, and volumes of the asphalt removed from the construction site. Uncontaminated excavation material is considered inert waste.

7. Municipal waste, including fractions collected separately (LAR 20 01)

In accordance with the definition of urban waste composition established by the legislation, on field produced wastes are similar to urban solid waste (MSW/USW). Part of the waste produced may be recyclable, and the separation according to the different fractions will therefore be ensured as far as possible.

2.11 **Operations and Maintenance**

The construction contract and engineering design make no reference to the operational lifetime of the structures. For these type of structures, it is usually at least 50 years. After the end of construction, MINTRANS will be responsible for the overpasses' maintenance.
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The Financing Agreement, as it stands, does not contain provisions outlining the Buyer's responsibilities toward E&S obligations after the construction phase. Instead, these responsibilities are governed by external guidelines, specifically the Equator Principles. According to the principles, the Buyer is obliged to provide monitoring reports to the Lenders/ECA (Export Credit Agency) after the construction phase, demonstrating the impacts of the Resettlement Action Plan on the affected population.

It's essential to note that these provisions are beyond INZAG's scope as the project operation and maintenance would fall entirely under the responsibility of the Buyer. MINTRANS is obligated to continue creating and submitting monitoring reports to the Lenders in accordance with the Equator Principles.

2.12 **Project's Implementation of the Mitigation Hierarchy**

2.12.1 Embedded Controls

Embedded controls include procedures or technical/design aspects that will be employed to avoid or minimise potential environmental or social impacts of the Project; these controls are considered an integral part of the Project design. The impact assessments on individual topics in the ESIA shall assume that these controls are already implemented and that any supplemental mitigation measures would therefore be 'above and beyond' any existing / planned embedded controls to address specific risks that are not sufficiently mitigated by these controls.

Generally, embedded controls that have already been applied or will be integrated into the next phase of the Project's design should comply with the following:

- Angolan Environmental and Social Laws/Regulations;
- IFC EHS Guidelines for Toll Roads;
- IFC EHS Guidelines for Construction Materials Extraction;
- IFC General EHS Guidelines;
- INZAG Smart Design Solutions; and
- Design Action Readiness Tool DART (ERM tool based on the international best practices and IFC EHS Guidelines presented in Appendix D).

If some of the measures already included into the Project design are not sufficient from the perspective of the impact assessment or the legal requirements, additional mitigation measures will be identified.

It is noted that infrastructure works such as foreseen for this Project are well-established activities, and as such many of the measures necessary to protect the environment and people are already included in the design. A key function of the ESIA will be to describe such measures and how they avoid, minimise, or reduce impacts, while acknowledging that they are embedded into the Project. The focus of the ESIA's ESMP section will be to identify any additional mitigation that is needed, for example, measures necessary to comply with specific local requirements or to mitigate/ monitor impacts that derive from site-specific baseline characteristics.

2.12.2 INZAG's Smart Design Solution

The Smart Design Solution tool is developed by INZAG in order to identify the most challenging areas along the flyover areas and find optimum solutions. Through this tool, INZAG takes a proactive approach to assessing and mitigating key Environmental & Social risks by conducting micro alignments of the flyover footprint and associated access roads.

Initially, 12 overpasses' locations were assessed and five of them were selected for the Project development. For the optimal positioning of the overpasses a Smart Design Solution was used.

During the preliminary study, it was possible to identify that in most situations the implementation of the flyover would cause important constraints related to the residents adjacent to its implementation, as well as traffic circulation within the neighbourhood. Therefore, new side service and return roads were included to allow access to the flyover, as well as access to any emergency vehicles. As the reason for this project is to eliminate the railway level crossing and the risks and constraints that it causes, naturally this intervention has to aim at harmony with the circulation in the surroundings.

Therefore, in comparison with the geometric design of the previous phase (Scoping Report), the current design includes service and access routes that now guarantee adequate road circulation in the surroundings.

2.12.3 DART Mitigation Measures

DART is a tool prepared by ERM to identify the general mitigation measures applicable to the design, construction and operation phases of highway projects. It includes international best practices and requirements of IFC EHS Guidelines for each topic. The DART tool has been tailored to the Project's scope and is presented in Appendix D.

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2.13 Evaluation of Alternatives

In alignment with all relevant stakeholders and the relevant national strategies as well as with a thorough analysis of the sources of the traffic congestion problems and safety hazards on the Luanda railway tracks, the following main options were considered:

- No Project Alternative;
- Project option: To construct overpasses over 5 selected locations;

2.13.1 Context for Alternative Considerations

Firstly, it is important to note that the considerations of Project alternatives need to align with the National strategies (the National Development Plan (PDN); Long-Term Strategy (PLA) 2025; the National Master Plan for The Transport and Road Infrastructure Sector (PDNSTIR) 2038 and; the General Master Plan of Luanda (PDGML) to ensure that the Province of Luanda objectives to improve travel conditions for urban and daily city connections are met.

Below are listed some key requirements for the alternatives considered:

- Consolidate the Integrated Systems for the various modes of transport. Indeed, Luanda, as the capital of the country, concentrates a large part of the country's economic resources and consequently has strategic objectives that eventually influence the other provinces. In view of the guidelines presented in these documents, the need to implement Integrated Systems for the various modes of transport is evident, since urban congestion is identified as one of the main obstacles to the development of economic and social activities in the city.
- Promote of high density of public transport services, which is one of the primary objectives of the PDGML. It foresees an integrated system with high-capacity primary corridors, several secondary urban routes and a capillary supply network with maximum reach and a high number of passengers. Over the years, the need for mobility and transport services will increase and for this reason, it is necessary to focus on strong mobility, in order to meet the estimated future demand for transport in the province of Luanda in 2030.
- Ensure efficient access for passengers and goods with the construction of urban land transport infrastructure (road and rail). Completion of the New Luanda International Airport (NAIL) is a priority, to create a "hub" between Latin America and Asia and distribute traffic from Europe to neighbouring countries, namely in Southern Africa, as well as a set of actions justified by the overall objective of developing transport infrastructure.
- **Priority of the LR**, as it is identified as the system that can handle a high movement capacity, results in the need to build overpasses to prevent interference, especially where there is a strong component of congestion and greater population density. At the points of convergence between the road system and the railway separate level junctions with bridges/overpasses will stop the disturbance of the traffic flow and allow for greater speed. The destinations of most trips through the Province of Luanda during the morning rush hour are the denser urban areas, especially Luanda, Cazenga and Viana, along the Deolinda-Catete Corridor.
- Prioritize the improvement of the Deolinda Rodrigues-Estrada de Catete corridor, as it continues to be the city's main access axis, intersecting with the metropolitan ring road system. It is the main access road to the New International Airport of Luanda, Cazenga and Viana; it also plays an important role as the main national road to Catete and Malanje; its improvement will relieve the pressure of adjacent secondary and tertiary roads. The improved road will also be used for regional public transport lines and will grant high accessibility to the special economic zone and dry port area in Viana.
- Prepare for the railway expansion Parallel to Estrada de Catete, the existing railway line will be doubled and serve as a tilting train between Luanda, Cazenga and Viana, improving

the overall capacity of the city's railway system. In addition, a train line is proposed that offers fast connections from various destinations to the new Airport.

2.13.2 No Project Alternative

Should the *No Project Option* be considered, the existing conflicts between traffic, commerce and community health and safety will continue. Additionally, once NAIL becomes operational (expected in 2023) these risks are expected to increase due:

- the higher volumes of traffic (on the main arteries and secondary roads)
- the higher frequency of trains (circulating at a higher speed than currently).

The *No Project alternative* would therefore likely cause a potential increase in fatal accidents, notably in the highly used crossings of the five proposed Project locations: SME, Viana, Estalagem, Mulenvos and 5th Avenue.

The *No Project Option* would also be contradictory to the strategies aimed at improving travel conditions for urban and daily city connections in Luanda.

In conclusion, the "do nothing" scenario is not considered a socially and economically viable option.

2.13.3 Project Options Assessed

The scope of the current Project was defined considering a total of 14 crossing locations on the railway, of which the 5 that had significant bottlenecks in terms of railway crossing were selected. This selection aimed to identify the locations that could best reduce the conflicts between traffic, commerce and community health and safety. The construction of these overpasses was selected based on the level of improvement provided to the current safety concerns at the crossing locations.

Additionally, the Project would help to avoid certain risks that would otherwise be problematic to be eliminated, once NAIL becomes operational (expected in November 2023) as higher volumes of traffic (on the main arteries and secondary roads) and also a higher frequency of trains (circulating at higher speed than currently) are expected. In view of this, the construction of overpasses can bring a decrease in the number of current and projected future fatal accidents in the regions of SME, Viana, Estalagem, Mulenvos and 5th Avenue.

The design solution proposed in this Project recommends the construction of overpasses over the Luanda Railway. In this sense, there are no alternatives for the location of the Project given that the roads that cross the railway line of the Luanda Railway already exist and the only viable alternative identified would therefore require a continuous network to cross the railway. In this sense, the construction of overpasses to address the current situation was deemed the only reasonable option to respond to the existing site conditions.

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3. **REGULATORY FRAMEWORK**

This section provides the legal background and legislative process in Angola with respect to environmental and social aspects, as well as applicable international requirements, and Good International Industry Practice to be considered. The international standards include International Finance Corporation (IFC) Environmental and Social Performance Standards (PSs), as well as International Agreements and Conventions to which Angola is a signatory.

3.1 Applicable Angolan Legislation

In a national context, the **Constitutional Court judgement n.** ° **111/2010** provides guiding principles for environmental protection and management in Angola, covering sustainable development and environmental rights in articles 21 and 39, as described below:

- Article 21: Identifies as a fundamental task of the State to:
 - Promote harmonious and sustained development throughout the national territory, protecting the environment, natural resources, and historic, cultural and artistic national heritage.
- Article 39: Environmental rights, enforces that:
 - Every citizen has the right to live in a healthy and unpolluted environment, as well as the duty of defending and preserving it.
 - The State must adopt the necessary actions to protect the environment and the flora and fauna species throughout the entire national territory, to maintain the ecological equilibrium, to define the right localization of the economic activities, and to guarantee the rational utilization and exploration of every natural resource, ensuring the sustainable development and respecting the future generations.
 - The Law punishes acts that endanger or harm the preservation of the environment.

3.1.1 Environmental Management and Protection

- The decree n. ° 117/20 (22/04/2020) establishes requirements to perform any environmental activity, rules and procedures that regulate the environmental impact assessment of public and private projects and the environmental licensing procedure for activities that, by their nature, location or size, are likely to cause significant environmental and social impact, as well as relative fees and fines for illegal activities. Licenses that authorise the operation of undertakings must include:
 - Reference documents on the best methods and techniques applicable to the licensed activity, including all measures necessary to comply with the protection of the environment;
 - Emission limits for polluting substances that may be emitted during the activity;
 - Measures that guarantee the adequate protection of the soil and groundwater, the control of noise and the management of the waste;
 - Emissions monitoring procedures, including applicable methodology, frequencies and measurement plans.
- The Environment Framework Law (Lei de Bases do Ambiente) n. 5/98 (19.06.1998) provides the framework for all environmental legislation of Angola. According to this law, ESIA is mandatory for projects that may cause a significant negative impact on the natural or social environment (Articles 15-16). Article 16 specifies the contents of the national ESIA. Article 17 on Environmental Licensing states that licensing is the registration of activities that, due to their nature, location or size, are likely to cause significant environmental and social impact, and are subject to the Governmental review and control. The issuance of the environmental license is

based on the result of the Environmental Impact Assessment of the proposed activity and proceeds with the issuance of any other licenses legally required for each case.

- The Environment Basic Law, n. ° 5/98 (19/06/1998), approved by the National Assembly on 19 June 1998, defines the concepts and the basic principles of environmental preservation and conservation and of the rational use of natural resources, establishing the need for the elaboration and implementation of the NEMP in order to achieve the objectives of the country's environmental policy.
 - Under the terms of the Basic Law, the main environmental management instruments are the creation of environmental protection areas, environmental impact assessment, environmental licensing and environmental auditing.
 - To facilitate implementation, the Basic Law emphasizes the need to establish environmental quality and pollution control standards, as well as the creation of a monitoring system to ensure compliance with the legislation. The incentive to the use of clean technologies for productive processes and the use of natural resources, in accordance with the principles of sustainable development, the right to information and to participate in actions to protect the environment.
- Decree n.º 1/10 (13/01/2010) describes environmental auditing law in Angola.
- Presidential Decree n.º 194/11 (07/07/2011) establishes Liability for Environmental Damage
 - Article 5: All those who, with intent or mere negligence, have caused damage to the environment are obliged to repair the damages and/or indemnify the State and individuals for the losses and damages to which they have caused in the form of indemnity compensation measures and environmental recovery.
 - **Article 6**: Anyone who, by virtue of the exercise of any activity, offends the rights or interests of others through damage to any environmental component is obliged to repair and prevent damage resulting from that offence, under the terms of the legislation applicable law and the fundamental principles of environmental law, regardless of the existence of fault or intent.
 - **Article 9**: When environmental damage has not yet occurred, but there is an imminent threat of such damage, the operator shall take the necessary preventive measures without delay.
 - Article 11: Whenever environmental damage occurs, the operator must immediately inform the Competent Authority of all relevant aspects of the situation and take the following measures:
 - practicable steps to immediately control, contain, eliminate or otherwise manage relevant contaminants and any other harmful factors in order to limit or prevent further environmental damage and adverse effects
 - The necessary reparation measures, in accordance with article 13.
 - **Article 13**: Operators must identify potential remedial measures and submit them to the Competent Authority for approval unless the latter has acted directly in place of the operator.
 - **Article 14**: The operator bears the costs of actions to prevent and repair the damage caused.

3.1.2 Land Use and Resettlement

During the colonial era, Luanda was under Portuguese rule, and land ownership was concentrated in the hands of Portuguese colonisers. Indigenous populations often faced displacement and were subject to forced labour on plantations owned by the colonial elite. Land rights for local communities were minimal. Angola gained independence from Portugal in 1975, but shortly after, a devastating civil war erupted. Land rights during this period were often linked to military power, and many rural communities faced displacement and insecurity due to the conflict. The civil war in Angola created

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many problems that further complicated the land challenges faced by the country. The war disrupted and changed customary land use and allocation (for both cropping and grazing), and such customary rights are now threatened by encroaching land users and competitive claims (both formal and informal). Earlier assessments of the land situation in Angola indicate that the Land Law (August 2004) is vague, ambiguous, and potentially threatening to customary, informal, and formal land users and rights holders. The law requires that land occupiers make an application for formalised land rights within three years of the date of occupation (or forever lose those occupation rights), The law also reasserts the government's right to grant land concessions subject to unclear and non-transparent criteria and processes (US Aid (2005)).

The infrastructure needed for formal dispute resolution and promoting the rule of law is weak. Informal dispute resolution does occur within communities with village elders and other leaders adjudicating and mediating many conflicts. However, there is no connection between formal and informal mechanisms and laws. Unfortunately, there appears to be no regulatory rulemaking process in place in Angola, which will lead to a lack of notice, opportunity to be heard, and right of appeal. Few citizens are aware of their rights and obligations, and a lack of legal literacy could hamper equitable and productive land relations for years to come (US Aid (2005)).

The concept of customary tenure was reintroduced as part of the 2004 Land Law (Law 9/04).

Article 15 (Land) of the Angolan Constitution 2010 states that land, which is by origin the property of the state, may be transferred to individuals or corporate bodies, with a view to its rational and full use, under the terms of the Constitution and the law.

- Land Law, n. º 9/04 (09/11/2004) (revoked Law 21/92 as well as Decree 32/95 which defined laws on land) guides involuntary resettlement and considers land, rural or urban, as property of the State, according to the constitution, and proposes the following uses:
 - Provide shelter and homes for the inhabitants of Angola, which implies the existence of urban development plans;
 - A source of natural resources that can be used for agriculture, forestry, mining and others in accordance with rural or urban planning;
 - A basis for economic, agricultural and industrial activities;
 - Environmental protection and combating soil erosion.

• The new Land Law establishes that natural resources are the property of the State and that the State's rights over land are not transferable. The State will manage and grant land in accordance with several principles such as the protection of the landscape, flora and fauna, the preservation of the ecological balance and the use of the soil without compromising the land's regeneration capacity and its production capacity.

- Article 12:
- The law allows the State to expropriate land for public purposes
- Article 16:
- The occupation, or use must be exercised in such a way as not to compromise the ability to regenerate arable land and the maintenance of the respective productive capacity.
- Article 34:
 - The state can grant, inter alia, (a) private property rights to urban land and (b) useful customary domain to rural communities. These are important steps towards assisting poor people to secure tenure, and in relation to this case, in urban areas. The 2004 Land Law stipulates that concessions of urban land up to 1,000 m² may be authorised by the Municipal Administration, while the Provincial Governor must approve concessions of land areas of up

to 50,000 m². Concessions of areas larger than 50,000 m² may only be authorised by the Minister of Urbanism and Construction (Urban LandMark, 2013).

- Decree n.º 58/07 (13/07/2017) General Regulation Land Concession establishes the legal framework for the concession of free lands within Angola and does not apply to private property lands. It also indicates that where there is expropriation for public use or for temporary requisition of lands, fair and adequate indemnity to the owner and affected holders of other property rights is always owed (Article 21). Also important to note that, as per this diploma, private parties affected by expropriations for public use or by the establishment of administrative authorities have the opting for the corresponding fair indemnity, or participation, as stockholders, in any mixed economy associations that may be established for the utilization of activities related to the respective reserve (Article 30). This Decree also establishes the regime for public expropriation for public use including compensation for improvements that the concession holder has made on the expropriated property, including conceding a parcel of land in the same judicial situation, susceptible to similar use (Article 132). The concessionaire must be notified of the expropriation of the land granted at least six months before the expropriation.
- The Angolan Expropriation Law n.º 1/21 (07/01/2021) states that expropriations may occur only if there is public interest (the grounds are listed in the law) and that they are subject to payment or prompt compensation. The entities that benefit from expropriations include the State, Municipalities and any public or legal entities. Before the issuance of a Public Utility Declaration, the expropriating authority should reach a private agreement with the interested parties. Where no agreement can be reached, or in case of urgent expropriations, the Public Utility Declaration may be issued, whereby the entity beneficiary of the expropriation is granted powers to acquire the relevant asset (right) by expropriation. The compensation should consider the existing market value of the assets that are expropriated, including the land and existing buildings and improvements.
- Law n.º 1/21 for the Expropriation of Public Utility (07/01/2021) acknowledges that the Angolan Constitution recognizes the right to private property and establishes that expropriations are permitted only when based on reasons of public interest and by paying just and prompt compensation, the National Assembly approved Law n.º 1/21, 7 January, which approves the Expropriation Law and revokes the diplomas still from the time before independence that regulated this matter
- The Law on Spatial Planning and Urbanism, Law n. ° 3/04 (25/06/2004), is governed by concepts of sustainable development when it establishes that provincial and municipal spatial planning plans are required and should be prepared by the State and other legal entities in order to ensure economic and social development and environmental protection, namely, the recovery of degraded areas, the preservation of soil for agriculture, cattle breeding and forestry, the protection of water resources and the coastline, as well as the protection and enhancement of the landscape.
- Presidential Decree n. ° 117/16 Regulation for Resettlement Operations, (30/05/2016): Regulates and approves resettlement operations in the process of relocation of a group of people living in a given territory, households, residing in areas of requalification and urban reconversion, in accordance with the principles governing the Public Administration, ensuring the continuation of the public interest and the protection of the rights and interests of citizens.
 - Article 3:
 - Resettlement is the responsibility of the Provincial Governments (or other designated entities). When resettlement results from an expropriation order, the management of the resettlement process is the responsibility of the entity responsible for the expropriation.
- Law n.º 3/04 for the Organisation of the Territory and Urbanism (25/07/2004) Establishes the instruments for urban and rural territorial space management, as well as a system for urban and territorial planning and related policies. Also regulates the territorial planning system's general

framework in coordination with other instruments such as the general regime of defence, occupation and use of land, and establishes that the land use must comply with municipal and special territorial plans.

Decree n.º 43.894 Regulation for the Occupation and Concession of Land (06/09/1961) This decree indicates that in case of expropriation, the land owner should be informed six months in advance. It also establishes that compensation should be given for necessary improvements that the concession holder has made on the expropriated property including conceding a parcel of land of similar use, if there is available land.

According to the U.S. Department of State's 2022 Investment Climate Statements, in Angola property rights enforcement remains difficult since its Land Law has not been revised since its approval in December 2004. Property rights are protected from unilateral requisition and nationalization, except for public interest reasons, in accordance with the law and the principle of non-discrimination, subject to prompt, full, and fair compensation.

3.1.3 Water

- The Water Law, Law n. ° 6/02, (21/06/2002) defines the country's water resources, establishing that they belong to the public domain and setting out the general principles for their exploitation and priorities for their use.
 - The decree-law under analysis establishes the new policy for the administration of the water sector, contemplating the creation of a decentralised system for controlling the use and protection of water resources. Its objectives include the access of citizens and collective entities to the use and rational use, the adequate sanitation of residual waters and the regulation of effluent discharge.
 - **Article 25** of the Water Law specifies that a company that intends to use water should obtain a license or concession for the use of the water resource, the location of the hydraulic works to be built, the volume of water granted and the purposes and activity for which it is intended
 - The Water Law establishes that the areas adjacent to water sources and wells, the places and respective adjacent areas where water is collected for consumption, the banks of artificial lakes and the respective adjacent areas are subject to the protection areas defined in the legislation on land and are therefore subject to licensing or concession.
- Presidential Decree N. ° 82/14 (12/04/2014) Regulation on General Rules of Use of Water Resources defines the regime for public water supply and wastewater sanitation, establishing rules on assets and means associated with the systems.
 - Article 110 defines Water Resources Protection Areas (which includes the river margins) as areas adjacent to watercourses up to a 200 m distance (which may be extended depending on the characteristics of the resource and the technical conditions of the intended use) and the restrictions are stated in Article 111. As there are no watercourses in the Project's Aol, this limit doesn't apply to the current Project.
 - Article 83 lists the information, required to obtain the water use licence
- Presidential Decree N. ° 261/11 (6/10/2011) Regulation on Water Quality establishes the roles within the Angolan governmental administration for overseeing water quality issues and addresses water quality standards relating to human consumption and wastewater. It also indicates the role of water quality monitoring and establishes the standard parameters for both drinking and surface water, and emissions limits for wastewater discharge. It also regulates the control standards of wastewater discharge to waterbodies and soil, in order to preserve the quality of the aquatic environment and protect public health.
- Presidential Decree N. ° 83/14 (22/04/2014) Regulation on Public Water Supply and Wastewater Sanitation defines the regime of public water supply and wastewater sanitation

activities. According to **Article 5**, the public water supply and wastewater sanitation systems aim essentially to contribute to the promotion of the quality of life of the population and reduce poverty; to the promotion of the socio-economic and industrial development, and the preservation of the environment; and to provide comfort and well-being to the population and facilitate cleanliness and public hygiene.

 Presidential Decree n.º 126/17 (13/06/2017) – National Water Plan – defines the guidelines and strategies related to water resources management, planning scenarios and measures (short-term, medium, long-term), related to the water management in Angola.

3.1.4 Labour

- The Constitution establishes citizens' rights and duties, including workers' rights, freedoms and safeguards which include the right to social security, holidays, employment security, equal pay for equal jobs for women and men, freedom of association, right to collective bargaining and right to strike. It prohibits the use of forced labour.
- The General Labour Law rules on the minimum wage, regular pay, overtime compensation, night-work compensation, rest days/compensatory holidays, weekend/public holiday work compensation, paid vacation, weekly rest days, employment security (fixed-term contracts, probation period, notice requirement and severance pay), maternity leave, medical care due to worker sickness (excludes medical care for pregnant women), employers' responsibility for worker health and safety, benefits for sick leave, pension contributions and rights, equal pay without discrimination, sexual harassment, non-discrimination, the minimum age for employment, minimum age for hazardous work, prohibition on forced and compulsory labour, freedom to change jobs and right to quit, freedom to establish, operate and join trade union, freedom of collective bargaining, and the right to strike. Although the Labour Law guarantees female workers access to any job or profession, women are prohibited from occupying dangerous work as well as work underground or in mines. Labour Law makes no provisions about flexible work options for parents or about unemployment benefits.

• **General Labour Law, Law n.** ° **7/15 (15/06/15)** applies to all workers who, in Angolan territory, provide remunerated activity on behalf of an employer. The law establishes procedures and guidelines for the labour legal relationship. According to **Articles 41 and 81**, the employer's duties are:

- Treat and respect the worker as a collaborator and contribute to raising his material and cultural level and to his human and social promotion;
- Contribute to the level of productivity and quality of goods and services, providing good working conditions;
- Punctually pay the worker a fair and adequate wage for the work performed, practising wage systems that meet the complexity of the job, the level of qualification, knowledge and capacity of the worker, how he is inserted in the organization of work and the results in the developed work;
- Promote good working relationships within the company and contribute to the creation and maintenance of conditions of harmony and motivation at work;
- Promoting and facilitating the participation of workers in professional training programs or actions;
- Adopt and rigorously apply measures on safety, health and hygiene in the workplace;
- Comply with the legal provisions on trade union organization and activity;
- Not to enter into or adhere to agreements with other employers in the sense of reciprocally limiting the admission of workers who have provided services to them and not to hire, under

penalty of civil liability, workers still belonging to the staff of another employer, when this hiring may result in unfair competition;

- Comply with all other legal obligations related to the organization and performance of the work
- Take the necessary measures in the field of safety, health and hygiene at work
- Article 62 prescribes an employer to implement the following internal regulations:
 - The employer must draw up and approve internal regulations to work organization and labour discipline, directives, instructions, work order and work standards in which standards of technical work organization, work performance and labour discipline, delegation competencies, definition of workers' tasks, safety, health and hygiene at work, work performance indicators, remuneration system, hours of operation of the various sectors of the company or work centre, control of entrances and exits and circulation in the company, supervision and control of production and other matters that do not directly concern the content of the legal-employment relationship
 - Take out individual or group insurance for all workers, apprentices and trainees, against the risk of accidents at work and occupational diseases, safeguarding small and micro-companies
 - Organize and provide appropriate practical training in matters of safety, health and hygiene at work to all workers it hires, who change jobs, or work techniques and processes, who use new substances whose handling involves risks or who return to work after an absence of more than six (6) months;
 - Guarantee workers with clothing, footwear and personal protective equipment, when necessary to prevent, as far as is reasonable, the risk of accidents or harmful effects on health, preventing workers from accessing the workplace who show up without personal protective equipment
 - Take due note of the complaints and suggestions made by workers about the working environment and conditions and adopt appropriate measures;
 - Collaborate with health authorities to eradicate epidemics and local endemic situations;
 - Apply appropriate disciplinary measures to workers who violate the rules and instructions on safety, health and hygiene at work;
 - Comply with all other legal provisions on safety, health and hygiene at work that apply to it.

3.1.5 Stakeholder Engagement

The **Presidential Decree 117/20, Article N° 04** states that the licensing of all "agricultural, forestry, industrial, commercial, housing, tourism or infrastructure processes which, by their nature, size or location, have implications for environmental and social equilibrium and harmony are subject to a prior Environmental Impact Assessment (EIA) process that involves the preparation of an Environmental Impact Study (EIS) to be submitted for approval by the competent entity responsible for the environment".

Within Presidential Decree 117/20, it is indicated that all projects subjected to the EIA process require public consultation. As prescribed in **Article N. 16**, All projects classified in the A or B categories or listed in Annexes I and II of the Decree must be subject to public consultation after the project's Environmental Impact Study report has been submitted. The public consultation process is to be undertaken by the environmental ministry in collaboration with project-specific ministries (i.e. Ministry of Transport). Public consultation is to include the following prescribed steps:

 Dissemination of the non-technical summary of the EIS report to all interested and affected parties (as defined in Article N
^o 16 of the Decree);

- Consideration and assessment of all public comments relating to the project;
- Within 8 days of the completion of the consultation period a brief report must be submitted detailing steps to be taken, the level of public participation, and any conclusions drawn.

The Decree states that the period of public consultation must take place over 5-10 days with the costs being borne by the Project developer.

Further to the Presidential Decree there is **Executive Decree 87/12** of 24 February 2012 (Regulamento de Consulta Publica) which gives further details on the public consultation process. For instance, the process and public consultation hearing must be chaired by the National Director of the DNPAIA on behalf of the ministry. The National Director must be part of a board which also includes a President, a Secretary, and a Rapporteur.

The Executive Decree **Article N° 07** stipulates that the consultation must be disclosed in a daily newspaper and other relevant social media to ensure that all stakeholders are aware of the process and able to participate.

The public consultation process always begins with the disclosure of the non-technical summary of the EIS. This summary must include the project description, the main significant effects of the project on the environment. Stakeholders are then given an opportunity to provide comments and intervene in the project. The questions and opinions raised by the stakeholders during this process must be taken into consideration by the DNPAIA when finalising consent for the project.

3.1.6 Health and Safety

- Decree on Occupational Hygiene and Safety System n.º 31/94 (05/08/94) introduces the main concepts related to the H&S aspects at the workplace. It obliges (Article 9) an employer to take necessary measures to ensure that the work is carried out in a safe environment and conditions that allow a worker to be in a normal physical, mental and social state:
 - Design the work processes without risks;
 - Integrate the Occupational Safety, Hygiene and Health activities into the company's management;
 - Comply with occupational H&S rules, legislation and regulations;
 - Create Occupational Safety and Hygiene Services or Occupational Medicine, as a support body for the Company Commission for the Prevention of Occupational Accidents (a joint advisory body)
- Article 11 also requires an employer:
 - To ensure that each worker receives information and instructions on safety, hygiene and health at work, on the occasion of:
 - Their hiring
 - Change of job or work technique and process;
 - Use of hazardous substances;
 - Return to work after an absence of more than six months;
 - Employers must organize and provide training in safety, hygiene and health at work to selected workers and promote their participation in overcoming and professional and technical training courses on the matter, organized by the competent bodies.
- Executive Decree No. 128/04 (23/11/2004) General Regulation of Safety and Health at Work Signalling establishes the minimum placement requirements for signalling at work.

- General Labour Law, Law n. ° 7/15 (15/06/15). In case of accidents at work or occupational diseases, according to Article 85, the employer is obliged to:
 - Provide the injured or sick employee with first aid and provide adequate transport to the medical centre or hospital unit where he can be treated;
 - Report the accident or illness to the competent authorities, provided that it causes impossibility for work, within the period and according to the procedure provided for in the specific legislation
 - Arrange for the investigation of the causes of the accident or illness, in order to adopt appropriate preventive measures
- Article 86 also obliges the employer to:
 - Install in the work centres sanitary and hygienic facilities appropriate to a healthy working environment;
 - Ensuring that hazardous substances are stored in safe conditions and that waste does not accumulate in the work areas;
 - Ensure that in work areas where there is no health post, there is a first-aid kit with the equipment required by the applicable regulation;
 - Prevent the introduction or distribution of alcoholic beverages and drugs in the places where the work is executed

3.1.7 Traffic and Vehicles

Angola's regulations for traffic and vehicles are provided by Presidential Decrees and the **Road Traffic Law of 2008 (TTTFP, 2017)**. The Road Traffic Law of 2008 addresses rules of the road and enforcement. Presidential Decrees address inspection and roadworthiness of vehicles and vehicle licenses, motor vehicle specifications and registration, transportation of abnormal or dangerous goods, and driver training and driving licenses.

The Angola National Road Institute (INEA) manages about 43,500 km of roads classified as Fundamental or Complementary Roads. The remainder of the nation's roads are local roads maintained by the provinces. INEA is an autonomous para-state agency overseen by the Ministry of Public Works (MPW) and is responsible for managing and developing the Fundamental and Complementary road networks. INEA also supports and advises the provinces and municipalities in their management of unclassified roads.

3.1.8 Waste Management

Presidential Decree nº 190/12 (24/08/2012) - Waste Management Regulation; This Presidential Decree affects all waste generators, and all transport companies, and waste treatment, and disposal companies. The regulation describes the waste management system, from its source to its disposal, mainly focusing on the treatment, storage, and disposal of wastes, and carriers. It also includes requirements for the storage and handling of wastes by those responsible for generating them. Presidential Decree N. 190/12 sets forth detailed requirements for the segregation, storage, and containment of the different types of solid wastes, to define, and classify the wastes as hazardous and non-hazardous. These specific waste requirements will be incorporated into the standardized process of operational procedures for waste generation. The transportation of wastes should be performed by authorized service providers, using vessels/vehicles that are appropriately adapted to ensure the safe transportation of wastes. The carrier vessels and drivers must have the appropriate licenses, and authorizations issued by the regulatory authorities. The pilots/drivers of these vessels/vehicles must have attended training in safe driving, basic emergency response, labelling and warning signage requirements, for ships that carry hazardous wastes. The vehicles must have a Waste Manifest Form that has been completed with information related to the nature of the material being transported. The **Article 7** of the Decree obliges all public and private entities that produce waste:

- to develop a Waste Management Plan (WMP), that is required in order to obtain an environmental licence, prior to the start of their activities, that will contain the information provided in Annex I and Annex II of the Decree.
- This WMP must be submitted to the Ministry of Environment for approval. This WMP is valid for four years, counted from the date of the approval.
- The Decree obliges the waste producers to (Article 9):
 - Minimize the production and danger of waste of any category;
 - Guarantee the treatment of waste before its deposition;
 - Ensure the protection of all workers who directly handle the waste, against accidents and diseases resulting from exposure;
 - Ensure that all waste to be transported involves a minimum risk of contamination, for workers as well as the general public and the environment;
 - Train its workers in matters of health, safety and the environment;
 - Ensure that the disposal of waste inside and outside the production site does not have a negative impact on the environment or public health;
 - Carry out a meticulous record on an annual basis of the origins, quantities and types of waste handled, transported, treated, recovered or disposed of and keep them during the 5 (five) years following the respective registration.
- Executive Decree No. 17/13 (22/01/2013) Construction and Demolition Waste Management It establishes work residues pollution control measures, including prevention and re-utilization, collection, transport, storage, treatment, valorisation and elimination of solid wastes. Residue management will be carried out according to self-sufficiency, prevention and reduction waste disposal principles. It states that the management of construction and demolition waste is the responsibility of the parties involved into the waste's lifecycle. The waste should be handled by a licensed waste management operator (Article 3). The construction waste that cannot be used on site should be screened and fragmented, in order to be sent to recycling or any other form of recovery. Landfilling of the construction waste is permitted only following screening of waste and if alternative use of waste is not possible. The transportation of the construction waste should be performed according to the guide that is defined by this decree.

3.1.9 Cultural Heritage

The following national legislation for the protection of cultural heritage in Angola is set out for this report:

- Law n. ° 53/13 (06/06/2013) Regulation on immobile cultural heritage
- Law n. º 42 (22/01/2004) Code of the Cultural and Heritage Landscape
- Law n ° 14/05 (07/10/2005) defines cultural heritage as the material and immaterial assets that, given its value, must be the object of protection of the right. Presents a set of activities that are considered violations against the cultural heritage.
- The Environmental Impact Assessment Law (51/04 of 23 July) states, that sites and archaeological, cultural and historical monuments are part of the assessment of the sociocultural component.

No national guidance currently exists on methodology for the assessment of impacts on Cultural Heritage within Angola.

3.1.10 Human Rights

The **Constitution of the Republic of Angola**, the supreme and fundamental law of the State, establishes its supremacy over the laws and other normative acts of the State, including treaties and international agreements. **Article 13** of the Constitution states that general international law or common law is an integral part of Angola's legal system.

Duly approved or ratified international treaties and agreements are in force in perpetuity within the legal system and place Angola under an international obligation as soon as they have been officially published in the country and have entered into force in the international legal system. By the same token, legal decisions of the competent bodies of supranational organizations of which Angola is a member are of direct application under domestic law, provided that this is established in their constituent instruments.

Following their entry into force in the international and domestic legal systems, duly approved or ratified standards and principles of general international law or common law and of international treaty law take precedence over sub-constitutional domestic laws and regulations.

With respect to individual rights, the Constitution tasks the Angolan state with promoting equal rights and opportunities for citizens and also enshrines the equality of all citizens before the law, regardless of origin, race, sex, ethnicity, colour, disability, language, place of birth, religion, political, philosophical, or ideological beliefs, level of education, economic or social status or profession, ensuring that all citizens enjoy the full exercise of fundamental freedoms (**Article 23**).

The national legal framework includes the following instruments for the promotion and protection of human rights:

- The Constitution, which contains a fairly thorough list of "rights, freedoms and guarantees" and "civil, political, economic, social and cultural rights and duties", preserving them as enshrined in the international human rights treaties and conventions;
- Sub-constitutional legislation, including the Penal Code, the Code of Criminal Procedure, the Code of Civil Procedure, the Civil Registry Code, the Commercial Code, the General Labour Law of 2015, the Electoral Code, and the tax laws.

Angola's **Legislative Decree No. 9/04** defines the principles and rules related to land use of both public and private bodies. The Decree rules on public and private domain and provides land classification, land sale, rent and concession. In addition, the Legislative Decree provides for land registration.

At the regional level, Angola, as a member State of the African Union and the Economic Community of Central African States is a party to the primary human rights instruments:

- The African Charter of Human and Peoples' Rights (1990);
- The African Charter on the Rights and Welfare of the Child (1992);
- The African Youth Charter (2009); (d) The Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (2007).

3.1.11 Environmental and Social Licencing Process under Angolan Regulation

The **presidential decree nº 117/20**, of 22 April (update to the former Decree nº 51/04 on Environmental Impact Assessment and Decree nº 59/07 on Environmental Licensing) has for objective to establish the rules and procedures that public and private projects must obey considering their nature, dimension or location and whether these are subject to cause a significant environmental and social impact.

It states that the licensing of all "agricultural, forestry, industrial, commercial, housing, tourism or infrastructure processes which, by their nature, size or location, have implications for environmental

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and social equilibrium and harmony are subject to a prior Environmental Impact Assessment process that involves the preparation of an Environmental Impact Study (EIS) to be submitted for approval by the competent entity responsible for the environment". The main national state bodies that will be involved in the environmental and social licensing process for the Project are presented below in Table 3.1.

Table 3.1 Main National State bodies involved in environmental and social governance in Angola

Name of Acts/Ministries	Brief Description of Contents
Ministry of Transports	The Government of Angola, acting through the Ministry of Transports (MINTRANS), represented by its implementing agency, the National Agency of Terrestrial Transports (ANTT) is leading this project.
Ministry of Environment	The Ministry of Environment (MINAMB) was restructured by Presidential Decree N. ° 85/14 of April 24, and it is the government body responsible for the development, management, implementation, and control of the Government's environmental policies, regarding the protection, preservation, and conservation of the environmental quality, pollution control, conservation areas, and appreciation for the natural heritage, as well as the preservation and rational use of the natural resources

The licensing process in Angola can be broken down into three consequent stages:

- Project Categorisation, that is performed by MINAMB after the developer has registered it in the platform (SIA).;
- Environmental Pre-feasibility Study (EPDA) and Terms of Reference (ToR). The EPDA is a high-level study focusing on the description of the project and baseline conditions, as well as a preliminary assessment of potential impacts and red flags and must propose the Terms of Reference (ToRs) for the full ESIA. This step can be required if a Project is classified as Category A by the MINAMB (see the previous stage).
- Environmental and Social Impact Assessment Study The Presidential Decree No. 117/20 of 22 April and the Environment Framework Law (Article 14) specify the activities that are required during the ESIA process, as well as the contents. The EIA is governed by the ToR, approved at the previous stage. The EIA should include:
 - Project Description; _
 - Environmental impact study report; _
 - Technological and locational alternatives of the Project, including the hypothetical non-_ existence of the Project;
 - Non-Technical Summary with the main topics addressed, conclusions and proposals; _
 - The legal framework of the activity and its inclusion in existing Land Management Plans for the direct Aol of the Project;
 - Project description and description of the activities during the phases: pre-construction, construction, exploitation and, if the Project is temporary, decommissioning;
 - Delimitation and geographical description, environmental baseline;
 - Impact Assessment with and without mitigation measures; _
 - Environmental Management Plan, including monitoring of impacts, the Environmental education Programme and the Accident Management Plan;
 - Description of the team, that worked on the study
 - Public consultation report.

• The compulsory **Public consultations**, as described in **Article 16** of the Environment Framework Law, should begin with a disclosure of the NTS of the EIA, and during these consultations, the feedback of the stakeholders is considered and evaluated. Public consultations must take at least five days and not more than ten days. At the end of the public consultations, in eight days a brief report should be prepared, that should include the taken steps, recorded participation and conclusions. The costs of the public consultations should be covered by the project owner.

Once completed, the project proponent must submit the ESIA and any supporting documents to the MINAMB, who in turn must forward the documents to the relevant line ministry (Ministry of Transports – in this case) within five days of receipt from the proponent. Within five days of receiving these documents, the line ministry must forward a binding opinion to the MINAMB. Within thirty days from the date of receipt of the documents, the MINAMB must evaluate the ESIA report (Article 17 of Presidential Decree No. 117/20). If a favourable opinion is received, the MINAMB (for Category A and B projects) shall issue an Environmental Installation Licence within eight days following the receipt of the required fee from the proponent. The final decision must be made public.

At this point, the Project has passed two first stages and was categorised as Category A Project. The **contents of ESIA**, according to the Angolan legislation, are specified in the Environment Framework Law n. 5/98 (19.06.1998), **Article 16**:

- Non-technical summary of the Project;
- Description of the activities to be carried out;
- General description of the environmental conditions of the Project Aol;
- Summary of the opinions resulting from the public consultations;
- Description of possible environmental and social impacts of the Project;
- Environmental and social impacts' mitigation measures;
- Measures of control and monitoring.

The application for environmental licensing must contain (Decree 59/07 of 13 July, Article 6; Decree 5/98, Article 23) the following:

- Description of the facility, the nature and extent of its activities;
- Certificate from the Provincial Government, declaring that the site and the installation or activity comply with the legislation on land use (documents on land acquisition);
- Non-technical summary of the environmental impact assessment study;
- Binding opinion of the entity that supervises the respective activity.
- Also, the applicant must attach the environmental impact report to the license application.

Despite the ESIA, there are several other requirements that have to be fulfilled in order to obtain the Environmental license:

Resettlement Process: Involuntary resettlement in Angola is guided by the Land Law (No. 9/04 of 9 November) and the Regulation on Resettlement. Under Article 12 of the Land Law, the state is allowed to expropriate land for public purposes. In order to obtain an Environmental Licence, the proponent or developer must attach written agreements pertaining to land acquisition and resettlement to the final draft ESIA. In addition, Presidential Decree No. 117/16 of 30 May 2016 establishes the rules for resettlement and rehousing for public projects but can be applicable to other projects. This Regulation aims to define the rules, procedures and criteria that should govern the action of the organs of public administration and autonomous state in the resettlement and rehousing process for a group of people living in a given territory, households, residents

affected by redevelopment and conversion of urban areas, in accordance with the principles governing public administration, without prejudice to the pursuit of public interest and the protection of rights and interests of citizens

 Waste Management: A Waste Management Plan (WMP) is required in order to obtain an environmental licence, prior to the start of the Project activities. It should contain the information provided in Annex I and Annex II of the Decree, according to the Presidential Decree nº 190/12 (24/08/2012).

3.2 Applicable International Legislation

3.2.1 General

In addition to Angolan standards, the Project will be subject to the following international E&S standards and good practice guidance documents as required by lenders:

- IFC Performance Standards on Environmental and Social Sustainability (2012);
- IFC Environmental, Health and Safety (EHS) Guidelines (2007);
- Equator Principles IV EP4 (2020);
- OECD Common Approaches (2016);
- IFC Stakeholder Engagement Handbook (2007); and
- IFC/EBRD Worker's Accommodation Processes and Standards (2009).

Where different standards are prescribed by the different organizations/entities, the most stringent between the national laws or the international Standards will be considered. Sustainable Development Goals.

The Sustainable Development Goals (SDG's), UN Resolution 70/1, are a set of 17 universal goals designed to be a guideline to national governments and public and private sectors to achieve a "better and more sustainable future for all" by the year 2030. The SDG's were set in 2015 and replaced the Millennium Development Goals.

The Project will seek to integrate strategies, planning and management measures into construction and operation activities that assist in Angola's commitment to achieving the SDG's. More specifically, the contractor is engaged to:

- Determine the contribution to the Sustainable Development Goals (SDGs) of the Project;
- Integrate innovative sustainable engineering solutions in the Project design and construction stages; and,
- Implement a stringent greenhouse gas emissions reduction strategy.

Considering the SDGs, the Project will have a positive impact on SDG9, SDG8, SDG11 and SDG17, as described in the following Table 3.2.

Positive Impact on SDGs	Description of SDG	Justification of positive Impact
SDG8: Decent Work and Economic Grow th	8: 'Promote sustained, inclusive and sustainable economic grow th, full and productive employment and decent w ork for all'	By cutting transport times and providing additional access around the city, more businesses relying on such transportation may thrive, low ering w orkers' stress levels and all in all contributing to higher economic grow th.
SDG9: Industry, Innovation and Infrastructure	9.1: 'Develop quality, reliable, sustainable and resilient infrastructure, including regional and	The Project consists of quality, reliable, sustainable and resilient infrastructure by improving the road and rail associated

Table 3.2 Project Positive Impact on SDGs

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Positive Impact on SDGs	Description of SDG	Justification of positive Impact
	transborder infrastructure, to support economic development and human w ell-being, w ith a focus on affordable and equitable access for all'	infrastructure to permit industry to function more efficiently through ease in transportation to the city centre and less congestion for all in the Project area.
	9.A: 'Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States'	The Contractor is supporting the development of the Project, working with international finance institutions for the timely completion of the Project.
SDG11: Sustainable Cities and Communities	11.A: 'Support positive economic, social and environmental links betw een urban, peri-urban and rural areas by strengthening national and regional development planning'	The Project will enhance sustainable urbanisation by rendering Luanda more accessible.
	11.C: 'Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials'	The Project will, as far as possible, adopt local materials.
SDG17: Partnerships for The Goals	17.3: 'Mobilize additional financial resources for developing countries from multiple sources'	The Contractor's prospective lenders include Export Credit agencies.

3.2.2 International Finance Corporation and World Bank Policies and Safeguards

In addition to the Angolan legal requirements, the Environmental Impact Study will consider the requirements defined by the International Finance Corporation (IFC) of the World Bank Group applicable to the project.

The International Finance Corporation (IFC) is a member institution of the World Bank group, which promotes development directed at the private sector with a greater focus on developing countries, with a focus on combating inequality between countries and extreme poverty. IFC defines eight Performance Standards that establish standards to be met during the period of an investment granted by IFC.

The Performance Standards defined by the IFC are:

- Performance Standard 01: Evaluation and Management of Risks and Socio-environmental Impacts;
- Performance Standard 02: Employment and Working Conditions;
- Performance Standard 03: Resource Efficiency and Pollution Prevention;
- Performance Standard 04: Community Health and Safety;
- Performance Standard 05: Land Acquisition and Involuntary Resettlement;
- Performance Standard 06: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 07: Indigenous Peoples;
- Performance Standard 08: Cultural Heritage

The alignment to IFC Performance Standards is presented in Appendix A.

The Performance Standards defined by IFC are in accordance with the Operational Policies for Environmental and Social Safeguards defined by the World Bank. The following Table 3.3 presents the Operational Policies for Environmental and Social Safeguards defined by the World Bank and their applicability to the project in question:

World Bank Operational Safeguard Policies	Project Applicability
Environmental Assessment (OP 4.01)	Yes
Environmental Action Plans (OP 4.02)	No
Natural Habitats (OP 4.04)	No
Pest Management (OP 4.09)	No
Indigenous Peoples (OP 4.10)	No
Cultural and Physical Resources (OP 4.11)	Yes
Involuntary Resettlement (OP 4.12)	Yes
Forests (OP 4.36)	No
Safety of Dams (OP 4.37)	No
International Waters Project (OP 7.50)	No
Controversial Areas Project (OP 7.60)	No

Table 3.3 WB Operational Policies for Environmental and Social Safeguards

Source: World Bank, 2022

3.2.3 OP 4.01 – Environmental Assessment

This safeguard policy provides for the prior analysis of the potential impacts of the Project's interventions (including direct, indirect and cumulative impacts), comparing them with the alternatives "with and without" intervention. It also foresees the definition of mitigating measures to prevent, mitigate, minimise or compensate for negative effects, assessing the most appropriate instruments for this activity. It includes the need for the preparation of Environmental Management Plans, assessing the institutional capacity of the executors for the management of the set of measures proposed in the EMP programmes. In addition, the environmental safeguards of PO 4.01 establish the need for public consultation (in this case, for projects in categories A and B).

The EIA assesses the potential environmental risks of the typologies to be supported by the project and establishes procedures for project design considering the analysis of alternatives in each project; the selection, location, planning, design and implementation of the project, the design of measures to avoid, minimise, mitigate or compensate adverse environmental effects; emphasis on its positive impacts; and the inclusion of a process to mitigate and manage adverse environmental impacts during project implementation.

3.2.4 Equator Principles IV

The Equator Principles IV are a set of social and environmental criteria voluntarily adopted by financial institutions worldwide, referenced in the International Finance Corporation (IFC) Performance Standards on Social and Environmental Sustainability and the World Bank's Environment, Health and Safety Guidelines. Together, they are a best practice when providing finance for major projects, enabling better management of environmental and social risks.

The application of the Equator Principles is based on the establishment of a socio-environmental rating, with projects being categorised as A (high environmental and social risk), B (medium environmental and social risk) or C (low social and environmental risk). All projects classified with categories A and B require an environmental impact assessment.

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3.2.5 Environmental Health and Safety Guidelines

The Environmental, Health and Safety Guidelines (EHS Guidelines) are tools to implement practical aspects of environmental protection and safety at work, with the main objective of preventing and reducing accidents, emergencies and health problems at work.

The EHS Guidelines are technical reference documents with general and sector-specific examples of International Good Industry Practice in its various segments. They contain the levels and performance measures that are typically acceptable to the World Bank Group and that are generally considered achievable in new facilities at reasonable costs by existing technology. They are used by the World Bank, IFC, and MIGA.

3.2.6 OECD Common Approaches

Common Approaches are a guidebook of recommendations adopted by the Organisation for Economic Co-operation and Development (OECD) in July 2012, which set out common approaches to address environmental and social issues related to exports of capital, goods and/or services in their intended locations.

Its main objectives are to promote coherence between Members' policies, develop common procedures and processes related to environmental and social issues, promote good practices and consistent review and evaluation processes for projects and operations benefiting from export credits, increase the efficiency of official support procedures and promote a global level playing field for officially supported export credits.

For coherent consideration of cultural heritage in the current scoping assessment, relevant international standards are summarized in the Box 3.1.

Box 3.1 Cultural Heritage International Standards Synopsis

There are currently a number of international standards relating to the protection of Cultural Heritage in use around the world. Among the most widely applied is IFC Performance Standard 8 which sets out minimum requirements for the protection of Cultural Heritage resources in development projects supported by the IFC. The stated purposes of this standard are to i) protect Cultural Heritage from the adverse impacts of project activities and support its preservation; and ii) promote the equitable sharing of benefits from the use of Cultural Heritage.

In paragraph 6 it calls for the implementation of international treaties and national laws relating to heritage protection, stating that clients 'will identify and protect Cultural Heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of Cultural Heritage are implemented'.

In paragraph 7 it adds that 'where the risk and identification process determines that there is a chance of impacts on Cultural Heritage, the client will retain competent professionals to assist in the identification and protection of Cultural Heritage'.

In paragraph 9 it is also stated that 'The client is responsible for siting and designing a project to avoid significant adverse impacts on Cultural Heritage. The environmental and social risks and impacts identification process should determine whether the proposed location of a project is in areas where Cultural Heritage is expected to be found, either during construction or operations.'

The standard goes on to specify that Affected Communities and relevant national regulatory agencies should be consulted. It favours the retention of Cultural Heritage in situ (paragraph 12), only permitting exceptions where there is no feasible alternative and the removal of the resource is carried out 'using the best available technique'.

In paragraphs 13-15, the standard addresses impacts on 'critical Cultural Heritage' defined as: (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.

It states that critical heritage should not be removed unless in exceptional circumstances where impacts are unavoidable. In such cases, external experts should be retained to assist

in its protection and assessment. Where there are legally protected sites, the client is required to comply with legal requirements related to their protection, consult stakeholders and implement additional programmes to promote and enhance their conservation.

3.2.7 Topic / Sector Specific Guidance and Standards

3.2.7.1 Traffic and Vehicles

IFC EHS Guidelines for Toll Roads

The IFC EHS Guidelines for Toll Roads include information relevant to construction, operation and maintenance of large road projects including associated bridges and overpasses (IFC 2007b). Transportation-related guidelines within this document include the provision of safe corridors for pedestrians during construction and operation; speed control and traffic calming devices at pedestrian crossings; use of signs, signals, markings, and other devices to regulate traffic; roadway design to accommodate traffic volume; appropriate speed limits; and ongoing road maintenance.

IFC EHS guidelines for toll roads address major road construction projects and include the following practices related to road transportation, pedestrian safety, and traffic safety:

- Development of a transportation management plan for road repairs that includes measures to ensure work zone safety for construction workers and the travelling public;
- Establishment of work zones to separate workers on foot from traffic and equipment by:
 - Routing of traffic to alternative roads when possible;
 - Closure of lanes and diversion of traffic to the remaining lanes if the road is wide enough (e.g. rerouting of all traffic to one side of a multi-lane highway);
 - Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channelling devices (e.g. traffic cones and barrels) to delineate the work zone; and
 - Reduction of maximum vehicle speeds in work zones.
- Provision of safe corridors along the road alignment and construction areas, including tunnels and bridges (e.g., paths separated from the roadway), and safe crossings (preferably over or under the roadway) for pedestrians and bicyclists during construction and operation. Crossing locations should take into account community preferences, including those related to convenience or personal safety (e.g., the prevalence of crime at potential crossing point locations);
- Installation of barriers (e.g., fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points;
- Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas;
- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways;
- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions;
- Setting speed limits appropriate to the road and traffic conditions;
- Design of roadways to accommodate anticipated traffic volume and flow;
- Maintenance of the road to prevent mechanical failure of vehicles due to road conditions;
- Construction of roadside rest areas at strategic locations to minimize driver fatigue;
- Targeting elimination of at-grade rail crossings; and

Targeting the use of a real-time warning system with signage to warn drivers of congestion, accidents, adverse weather or road conditions, and other potential hazards ahead.

IFC Environmental, Health and Safety Guidelines, 2007

Section 3.4 of the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) General Guidelines addresses traffic safety, emphasizing the "adoption of safety measures that are protective of project workers and road users, including those who are most vulnerable to road traffic accidents" (IFC 2007a). Such safety measures include driver training, fatigue management, regular maintenance of vehicles, and collaborating with local communities on education about traffic and pedestrian safety (e.g., school education campaigns).

Section 3.0 of the IFC General EHS Guidelines includes the following measures (IFC 2007):

- Adoption of best transport safety practices across all aspects of project operations to prevent traffic accidents and minimize injuries suffered by project personnel and the public. Measures should include:
 - Emphasizing safety aspects among drivers;
 - Improving driving skills and requiring licensing of drivers;
 - Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
 - Avoiding dangerous routes and times of day to reduce the risk of accidents;
 - Use of speed control devices (governors) on trucks, and remote monitoring of driver actions;
 - Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure;
 - Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:
 - Minimizing pedestrian interaction with construction vehicles;
 - Collaboration with local communities and responsible authorities to improve signage, visibility, and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns);
 - Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents;
 - Using locally sourced materials, whenever possible, to minimize transport distances;
 - Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimize external traffic; and

Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.

IFC Performance Standards on Environmental and Social Sustainability, 2012

The IFC Performance Standards on Environmental and Social Sustainability address traffic safety in Standard 4, Community Health, Safety, and Security. Performance Standard 4, Section 6 (Infrastructure and Equipment Design and Safety) specifically requires projects "that operate moving equipment on public roads and other forms of infrastructure [to] avoid the occurrence of incidents and injuries to members of the public associated with the operation of such equipment" (IFC 2012).

World Bank Group Environmental and Social Standards, 2017

The World Bank Group's Environmental and Social Standards for Community Health and Safety (ESS4) address traffic and road safety through the following requirements (WBG 2017):

- 10. The Borrower will identify, evaluate and monitor the potential traffic and road safety risks to workers, affected communities and road users throughout the project life-cycle and, where appropriate, will develop measures and plans to address them. The Borrower will incorporate technically and financially feasible road safety measures into the project design to prevent and mitigate potential road safety risks to road users and affected communities.
- 11. Where appropriate, the Borrower will undertake a road safety assessment for each phase of the project and will monitor incidents and accidents, and prepare regular reports of such monitoring. The Borrower will use the reports to identify negative safety issues, and establish and implement measures to resolve them.
- 12. For vehicles or fleets of vehicles for the purposes of the project (owned or leased), the Borrower will put in place appropriate processes, including driver training, to improve driver and vehicle safety, as well as systems for monitoring and enforcement. The Borrower will consider the safety record or rating of vehicles in purchase or leasing decisions and require regular maintenance of all project vehicles.
- 13. For projects that operate construction and other equipment on public roads or where the use of project equipment could have an impact on public roads or other public infrastructure, the Borrower will take appropriate safety measures to avoid the occurrence of incidents and injuries to members of the public associated with the operation of such equipment.

3.2.7.2 Air Quality

IFC General EHS Guidelines for Air Emissions and Ambient Air Quality

The IFC General Environmental Health and Safety Guidelines include air emissions and ambient air quality guidelines, which are an internationally recognized guideline document containing information for the assessment and management of air quality. The guidelines include air quality standards, these being derived from the World Health Organisation's (2000) Air Quality Guidelines for Europe. Of note is that the WHO updated the air quality guidelines in 2021, but specifically noted that the 2000 guidelines remained relevant in emerging economies. They are presented below Table 3.4.

Pollutant	Averaging Period	Value (µg/m ³)
NO ₂	Annual mean	40 (guideline)
PM ₁₀	Annual mean	35 (interim target-1)
PM _{2.5}	Annual mean	70 (interim target-1)

Table 3.4 IFC Air Quality Guidelines

Source: IFC General EHS Guidelines Air Emissions and Ambient Air Quality

In addition, the IFC stipulate that the impacts of a project should not exceed more than 25% of the air quality standard to allow sustainable growth in the same airshed. The IFC are not prescriptive with regard to air quality for road schemes, and therefore the general principles of the IFC's general guidelines are adopted.

3.2.7.3 Noise

IFC General EHS (Noise) Guidelines

The IFC General Environmental Health and Safety Guidelines include (in its Section 1.7) noise guidelines, which is an internationally recognized guideline document containing information for the

assessment and management of noise. The guidelines include general level criterion values based on an interpretation of the relevant section of the WHO 1999 guidance concerning the effect of noise on people and implied potential health effects. They are presented below in Table 3.5.

The IFC noise standards relate to noise from permanent industrial developments and as such do not apply to noise from road traffic noise nor to noise from construction activities. IFC general noise guidelines include noise standards which are not intended to be used to assess noise from roads. However, they are preferred noise levels, above which, in general terms, noise is likely to cause some disturbance.

Table 3.5 IFC Noise Level Guidelines

Receptor	Noise Level Guidelines L _{eq,1h} dB(A)	
	Day (7am to 10pm)	Night (10pm to 7am)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Noise impacts should not exceed the levels presented or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Guidelines values are for noise levels measured outdoors.

Source: IFC General EHS (Noise) Guidelines

In addition, the fixed values described above, IFC 1.7 Noise states that "impacts should not exceed the levels presented or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site".

The 1.7 Noise Guideline comprises two assessment requirements – that is, to meet the allowable fixed (Disturbance) noise thresholds at noise receptors or to not increase background noise levels by more than 3 dB at the nearest receptor location off-site. This second requirement is relevant where background noise levels are above the thresholds.

The sections of the IFC Noise Guidance for Toll Roads that are relevant to noise are presented below in Table 3.6. Although not directly applicable to the project, this guideline is used as a reference for mitigation measures.

Table 3.6 IFC Noise Guidance for Toll Roads, April 2007

Traffic noise is generated by vehicle engines, emission of exhaust, aerodynamic sources, and tire / pavement interaction. For vehicle speeds over 90 kilometres per hour (km/h), the noise from the tire / pavement interaction predominates.²¹ Traffic noise can be a significant nuisance and may be loud enough to interfere with normal conversation²² and can cause stress in children and raise blood pressure, heart rates, and levels of stress hormones.²³ Traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacles. Management practices to prevent, minimize, and control noise include:

Consideration of noise impacts during road design to prevent adverse impacts at nearby properties through the placement of the road right-of-way and / or through the design and implementation of noise control measures discussed below.^{24, 25}

Design and implementation of noise control measures may include the following:

- Construction of the road below the level of the surrounding land
- Noise barriers along the border of the right-of-way (e.g. earthen mounds, walls, and vegetation)²⁶
- Insulation of nearby building structures (typically consisting of window replacements)
- Use of road surfaces that generate less pavement / tire noise such as stone-matrix asphalt 27

²¹ The noise level is influenced by the type, volume, and speed of traffic (e.g. one five-axel truck sounds about as loud as 28 cars when travelling at 90 km/hr). US Department of Transportation, Federal Highway Administration. Highway Traffic Noise. http://www.fhwa.dot.gov/environment/htnoise.htm .

²² At a distance of 50 ft, traffic noise ranges from about 70 dBA for cars to 90 dBA for heavy trucks.
 ²³ Evans, Gary W. et al. (2001)

²⁴ For example, the U.S. Federal Highway Administration has established noise impact criteria, such as L10 (sound level exceeded 10 per cent of the time) = 70 dBA for residential land use. A new road project should not cause a significant increase in existing noise levels at nearby properties.

²⁵ Traffic noise is generally not perceived as a nuisance for people who live more than 150 meters from heavily travelled highways or more than 30 to 60 meters from lightly travelled roads.

²⁶ The most effective noise abatement measures include noise barriers and mounds, which can reduce noise by 5 dBA or more. The cost of noise walls in the US has been estimated at \$1.3 million per mile (NCHRP Project 25-25 (04))

²⁷ Stone-matrix asphalt (SMA) is one of several alternative surfaces that can be used in new roads or as a surface treatment in existing roads to provide a quieter surface. A double-layered porous asphalt construction results in a further reduction of traffic noise, from 3 to 4 dBA at 50 km/h up to 5.5 dBA at 100 km/h compared with regular asphalt and 7 to 12 dBA quieter than concrete pavements (NSW Roads and Traffic Authority (RTA), 2005).

Source: IFC EHS Guidance for Toll Roads

3.2.7.4 British Standard BS 5228

To evaluate the impact of temporary activities it is necessary to establish criteria above which some significant adverse effect may be experienced. Since construction noise is usually well above baseline noise levels, construction noise impact magnitude is often judged by the exceedance of absolute noise thresholds. IFC noise guidelines give no guidance on construction noise. International best practice has been followed and thresholds above which a significant construction noise impact is considered to occur have been based on British Standards 5228 Code of Practice for noise and vibration control on construction and open sites. BS 5228 would allow higher noise levels in areas where background noise levels are higher, and using the lowest criteria is therefore a stringent approach. Whilst these criteria are for residential buildings, they provide a reasonable indication of potential for noise impacts at noise-sensitive non-residential buildings. This assessment has adopted façade noise criteria of 65 dB(A) during the day for residential receptors. According to the Project Description, construction activities will not be carried out during nighttime periods.

These criteria apply at 1 meter from the facades of noise-sensitive properties and take into account reflection effects. It is generally accepted that reflections from the surface will increase the measured noise levels by around 3 dB compared to free-field levels, i.e., free-field levels = façade levels – 3 dB

3.2.7.5 Stakeholder Engagement

Equator Principles

The Equator Principles (EPs) are intended to serve as a common baseline and risk management framework for financial institutions to identify, assess and manage environmental and social risks when financing Projects. They are updated periodically to build upon implementation expertise and ongoing learning, as well as to reflect changes in the evolving operating environment and emerging good practices. EP4 is the latest iteration of the EPs and came into effect in 2020. Of the ten Equator Principles, two pertain to stakeholder engagement and grievance management (Principle 5 and Principle 6 respectively).

Principle 5: Stakeholder Engagement states that all Category A and Category B Projects³ are required to demonstrate effective stakeholder engagement as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities,

³ When a Project is proposed for financing, the Equator Principle Financial Institution (EPFI) will, aspart of its internal environmental and social review and due diligence, categorise the Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity. Such categorisation is based on the IFC environmental and social categorisation process. A project is categorised as a Category A, B or C Project (EP4, 2020).

Principle 5 states that the client (i.e. INZAG) will conduct an Informed Consultation and Participation process by tailoring its consultation process to:

- The risks and impacts of the Project;
- The Project's phase of development;
- The language preferences of the Affected Communities;
- Their decision-making processes; and
- The needs of disadvantaged and vulnerable groups.

The Principle specifies that this process should be free from external manipulation, interference, coercion and intimidation. Furthermore, it specifies that in order to facilitate stakeholder engagement, the client will, commensurate with the Project's risks and impacts, make the appropriate assessment documentation readily available to the Affected Communities, and where relevant Other Stakeholders, in the local language and a culturally appropriate manner. The client will also take account of, and document, the results of the stakeholder engagement process, including any actions agreed resulting from such process.

Principle 6: Grievance Mechanism, specifies that for all Category A and, as appropriate, Category B Projects, the client (i.e. INZAG) is required to establish an effective grievance mechanism which is designed for use by Affected Communities in order to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.

The Principle states that the grievance mechanism is to be scaled to the risks and impacts of the Project, and must seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. Grievance mechanisms should not impede access to judicial or administrative remedies and the client must inform Affected Communities about the grievance mechanisms during the stakeholder engagement process.

The IFC Performance Standards

The IFC PSs are considered a benchmark for good practice for environmental and social risk management in private sector developments. The IFC PSs require that clients engage affected communities through disclosure of information, consultation, and informed participation, in a manner proportional to the risks to and impacts of the project on the affected communities. The IFC PSs include specific guidance on conducting stakeholder engagement both during the planning phase and throughout the project lifecycle.

IFC Performance Standard 1 (PS 1: Assessment and Management of Environmental and Social Risks and Impacts) provides the framework for the integrated assessment to identify environmental and social impacts, risks, and opportunities of projects. PS 1 also provides guidance for effective stakeholder engagement through disclosure of project-related information, consultation with local communities on matters that directly affect them, and a Grievance Redress Mechanism (GRM) to formalise a process of resolution of stakeholder concerns.

IFC PS 1 requirements for stakeholder engagement include the following:

- Stakeholder engagement to facilitate informed and consultative participation with Affected Communities, leading to the client's (i.e. INZAG) incorporating into their decision-making process the views of the affected communities on matters that affect them directly, such as the proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues (PS1 30, 31);
- The extent and degree of stakeholder engagement required should be commensurate with the project's risks and adverse impacts as well as with the concerns of the Affected Communities (PS 1 30);

- The client should tailor its consultation process to the language preferences of the Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups (PS 1 30);
- Client to develop and implement a SEP that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities (PS1 27);
- Where applicable, the SEP will include differentiated measures to allow the effective participation of those identified as disadvantaged or vulnerable (PS1 27);
- When the stakeholder engagement process depends substantially on community representatives, the client will make every reasonable effort to verify that such persons do in fact represent the views of Affected Communities (PS1 27);
- Client to disclose relevant project information to Affected Communities on:
 - The purpose, nature and scale of the project;
 - The duration of the proposed project activities;
 - Any risks and potential impacts on such communities and relevant mitigation measures;
 - The envisaged stakeholder engagement process; and
 - The Grievance Redress Mechanism (PS 1 29).
- Client to provide periodic reports to the Affected Communities that describe the progress on issues that involve ongoing risk to or impacts on affected communities and on issues that the consultation process or grievance mechanism has identified as a concern to those communities. (PS1 34, 36); and
- Any changes to mitigation measures or actions to be communicated to affected communities. The frequency of these reports will be proportionate to the concerns of affected communities but not less than annually (PS1 36).

IFC PS 1 requirements for grievance management include the following:

- Client (i.e. INZAG) to establish a Grievance Redress Mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the client's environmental and social performance (PS 1 35);
- The client will inform the Affected Communities about the mechanism in the course of the stakeholder engagement process (PS 1 35);
- As part of the consultation process, affected communities should be informed of the process for registering grievances, should have access to this Grievance Redress Mechanism, and know the possibilities of legal recourse available (PS1: 35);
- The Grievance Redress Mechanism should be readily accessible to all and provide for fair, transparent and timely redress of grievances and special assistance for women and vulnerable/ marginalised groups to voice their concerns or to make complaints (PS1: 35);
- The Grievance Redress Mechanism should address concerns promptly, using an understandable and transparent process that is culturally appropriate and readily accessible to affected communities, and at no cost and without retribution (PS1: 35);
- The Client should make every effort to resolve grievances at the community level without impeding access to any judicial or administrative remedies that may be available (PS1: 35); and
- The Client should ensure that designated staff are trained and available to receive grievances and coordinate efforts to redress those grievances through the appropriate channels (PS1: 35).

The key requirements for consultation and disclosure through the life of the Project are summarised in Box 3.2 below.

Consultation with Vulnerable Groups

Vulnerable people include those who, by virtue of their gender, ethnicity, age, physical or mental disability, economic disadvantage or social status may be more adversely affected by a Project than others, and who may be limited in their ability to take advantage of a Project's development benefits. According to the IFC, vulnerable stakeholders require special attention, as a Project may have additional impacts on vulnerable / marginalised or sensitive groups.

As part of this, it is important to identify vulnerable individuals and groups who may find it more difficult to participate in or who may be differentially or disproportionately affected by the Project because of their marginalised or vulnerable status.

The IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (IFC 2007) provides recommendations on the use of written and oral communication in local languages, accessibility to information, the use of oral and visual methods, respect for local traditions, care that vulnerable groups are included in the process, and mechanisms to respond to peoples' needs, fears and expectations. The handbook was used to guide the development of this SEP.

Box 3.2 Requirements for Stakeholder Engagement in IFC PS 1

Aims:

To ensure that Affected Communities are appropriately engaged on issues that could potentially affect them; to build and maintain a constructive relationship with communities; and to establish a grievance redress mechanism.

Who to Consult:

Consultations should be held with:

- Directly and indirectly affected communities;
- Positively and negatively affected communities / individuals;
- Those with influence due to local know ledge or political influence;
- Elected representatives;
- Non-elected community officials and leaders;
- Informal / traditional community institutions and/or elders;
- Indigenous Peoples, where the Project is identified to have adverse impacts on them;
- Non-Governmental Organisations (NGOs) and Community-Based Organisations (CBOs);
- Key interest groups; and
- Communities in the wider Area of Influence (Aol).

When to Consult:

As early as possible, or at the latest consultation should begin prior to construction. Consultation should be an on-going process throughout the life of the Project, i.e., iterative. Consultation should also allow for a feedback mechanism where affected people are able to present their concerns and grievances for consideration and redress.

What to Consult on:

Disclosure of Project information (purpose, nature, scale):

- Disclosure on the Environmental and Social Action Plan as a result of consultation, with periodic reports to demonstrate implementation;
- Risks and impacts of the Project; and
- Updates actions and proposed mitigation measures to address negative impacts and areas of concern for affected communities.

How to Consult:

Consultation should:

- 1) Be inclusive and culturally appropriate;
- 2) Allow for free, prior and informed participation of affected communities;
- 3) Be in the language preferred by the Affected Communities;
- 4) Consider the needs of disadvantaged and vulnerable groups;
- 5) Be fed into the decision-making process including proposed mitigation, sharing of benefits and opportunities;
- 6) Be iterative;
- 7) Be documented;
- 8) Be responsive to community concerns and grievances;
- 9) Be easily understood and transparent; and
- 10) Allow for differentiated means of engagement, particularly for disadvantaged or vulnerable groups.

NOTE: Where engagement relies substantially upon a community representative the client will aim to ensure that the views of affected communities are communicated and that the results of consultation are communicated back to the community.

Source: IFC Performance Standard 1 (paragraphs 25-35).

3.2.7.6 Human Rights

This section provides an overview of the international regulatory framework, looking particularly at the ratification of international instruments for the protection of human rights by Angola.

It is important to note that, according to the Constitution (article 13), Angola follows the monist system and gives primacy to international law. International law forms an integral part of Angola's legal system and duly approved or ratified international conventions come into force after being officially published in the country without the need of a transposition law. By the same token, legal decisions of the competent bodies of supranational organizations of which Angola is a member are of direct application under domestic law, provided that this is established in their constituent instruments.

Angola has signed, ratified or acceded to various international and regional treaties, covenants and conventions, which cover an important part of fundamental rights relevant to the project (see Table 3.7).

UN Treaties	Angolan Status
The Convention against Torture and Other Cruel Inhuman or Degrading	Ratified in 2019
Treatment or Punishment	
The International Covenant on Civil and Political Rights	Accession in 1992
The Convention on the Elimination of All Forms of Discrimination against Women	Accession in 1986
The International Convention on the Elimination of All Forms of Racial	Ratified in 2019
Discrimination	
The International Covenant on Economic, Social and Cultural Rights	Accession in 1992
The International Convention on the Protection of the Rights of All Migrant	Not Ratified
Workers and Members of Their Families	
The Convention on the Rights of the Child	Ratified in 1990
The Convention on the Rights of Persons with Disabilities	Accession in 2014
The Convention for the Protection of All Persons from Enforced Disappearance	Signed in 2014

Table 3.7 UN Treaties on Human Rights and Angolan Status

In addition to the aforementioned covenants and conventions, Angola has signed, ratified and/or acceded to the following optional protocols (Table 3.8).

Table 3.8 International Protocols on Human Rights and Angolan Status

UN Protocols	Angolan Status
Optional Protocol of the Convention against Torture	Signed in 2013
The Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty	Ratified in 2019
The First Optional Protocol to the International Covenant on Civil and Political Rights	Accepted in 1992
The Optional Protocol to the Convention on the Rights of Persons with Disabilities	Accepted in 2013
The Optional Protocol on the Convention on the Rights of the Child	Not ratified
The Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict	Accession in 2007
The Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography	Accession in 2005
The Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women.	Accepted in 2007

Angola has ratified eight out of ten ILO Fundamental Conventions as shown in Table 3.9.

Table 3.9 International Labour Standards and Angolan Status

Convention	Angolan Status
C029 - Forced Labour Convention, 1930 (No. 29)	Ratified in 1976
C087 - Freedom of Association and Protection of the Right to Organise	Ratified in 2001
Convention, 1948 (No. 87)	
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	Ratified in 1976
C100 - Equal Remuneration Convention, 1951 (No. 100)	Ratified in 1976

Convention	Angolan Status
C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	Ratified in 1976
C111 - Discrimination (Employment and Occupation) Convention, 1958	Ratified in 1976
(No. 111)	
C138 - Minimum Age Convention, 1973 (No. 138) (minimum age specified is 14	Ratified in 2001
years)	
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	Ratified in 2001
C155 - Occupational Safety and Health Convention, 1981 (No. 155)	Not ratified
C187 - Promotional Framework for Occupational Safety and Health Convention,	Not ratified
2006 (No. 187)	

In addition, Angola has ratified several relevant technical Conventions as shown in Table 3.10.

Table 3.10 International Labour Standards and Angolan Status

Technical Convention	Angolan Status
C001 – Hours of Work (Industry) Convention, 1919	Ratified in 1976
C006 – Night Work of Young Persons (Industry) Convention, 1919	Ratified in 1976
C014 – Weekly Rest (Industry) Convention, 1921	Ratified in 1976
C017 – Workmen's Compensation (Accidents) Convention, 1925	Ratified in 1976
C018 – Workmen's Compensation (Occupational Diseases) Convention, 1925	Ratified in 1976
C019 – Equality Treatment (Accident Compensation) Convention, 1925	Ratified in 1976
C089 – Night Work (Women) Convention, 1948	Ratified in 1976
C107 – Indigenous and Tribal Populations Convention, 1989	Ratified in 1976

The Gap Assessment between Angolan Legislation and International Standards is presented in Appendix W.

3.2.7.7 Cultural Heritage

The following international standards were used for the current report:

- the draft guidance on Heritage Impact Assessments for Cultural World Heritage Sites (ICOMOS, 2022) and
- international guidance (ICOMOS and IFC PS8).

3.2.8 International Conventions

Angola is a signatory to a number of international conventions and agreements relating to industry, development and environmental management. In certain cases, conventions and agreements have influenced policy, guidelines and regulations and therefore are relevant to planning, construction and operation of the Project.

Table 3.11 International Treaties Applicable to the Project lists the relevant international conventions and protocols to which Angola is a signatory. Many of these are incorporated into the various World Bank Operational Procedures and the International Finance Corporation (IFC) Performance Standards (PSs).

Name of the Convention	Ratification Year	Aspects Related to the Project
Abolition of Forced Labour Convention, 1957 (No. 105)	1976	Ensure that forced labour is prohibited and that human resource (HR) policies and procedures are developed and implemented to ensure this.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	1976	Discrimination in the field of employment and occupation should be expressly forbidden.

Name of the Convention	Ratification Year	Aspects Related to the Project
Convention on the Elimination of All Forms of Discrimination against Women: 1981 (CEDAW)	1986	Ensure that non-discrimination against women is enshrined in HR policies and practices for the proposed Project.
Convention on the Rights of the Child (1990)	1990	Ensure that employment policies include prohibitions on the employment of children.
Convention concerning the Protection of the World Cultural and Natural Heritage (1972)	1991	By applying international standards (such as IFC Performance Standard 8) to any identification and management of cultural heritage aspects during project development, the developer will comply with the objectives of the convention.
UNESCO Convention concerning the protection of the world cultural and natural heritage (1975)	1991	Integration of the UNESCO Convention concerning the protection of the world cultural and natural heritage identified within the project study area during the construction and operation phase.
International Covenant on Civil and Political Rights 1976	1992	Ensure civil and political rights are observed in the proposed Project.
The International Covenant on Economic, Social and Cultural Rights	Accession in 1992	Ensures the enjoyment of economic, cultural and social rights, including the right to become education
SADC Protocol on Wildlife Conservation and Law Enforcement (1999)	1999	The principles and guidelines of the SADC Protocol should be considered when developing plans and programmes for the management of wildlife.
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1998)	Signed 1999	The objectives of the Rotterdam Convention should be considered when developing plans and programmes for the management of relevant hazardous chemicals and pesticides.
Framew ork Convention on Climate Change (1992)	2000	Implement measures to reduce greenhouse gas emissions.
Montreal Protocol on Climate Change (1987)	2000	Implement measures to reduce emissions of substances that deplete the ozone layer.
Vienna Convention for the Protection of the Ozone Layer (1985)	2000	Implement appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which are likely to modify the Ozone Layer.
SADC Revised Protocol on Shared Watercourses	2000	The Protocol stresses the importance of taking a basin-wide approach to water management rather than emphasising the principle of territory sovereignty. It outlines specific objectives including improving cooperation to promote sustainable and coordinated management, protection, and utilisation of transboundary watercourses. The Protocol should be considered when developing Project activities.
SADC Protocol on Forestry	2000	The Protocol promote the development, conservation, sustainable management and utilisation of all types of forest and trees; trade in forest products and achieve effective protection of the environment, and safeguard the interests of both the present and future

Name of the Convention	Ratification Year	Aspects Related to the Project	
		generations. The Protocol should be considered when developing Project activities.	
Minimum Age Convention, 1973 (No. 138)	2001	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.	
Worst Forms of Child Labour Convention, 1999 (No. 182)	2001	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.	
Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	2001	Ensure that the Project recognise workers' freedom of association and protection of the right to organise.	
SADC Protocol on Trade (1996)	2003	The Protocol intends to further liberalise intra-regional trade by creating mutually beneficial trade arrangements, thereby improving investment and productivity in the region. It advocates that Member States eliminate barriers to trade, ease customs procedures, harmonise trade policies based on international standards, and prohibit unfair business practices. The Protocol should be considered when developing Project activities.	
United Nations Convention on Biological Diversity (CBD) (1992)	2006	The objectives of the CBD must be considered in the ESIA.	
International Covenant on Economic, Social and Cultural Rights 1976	Signed 2013	Ensure that economic. Social and cultural rights are respected in the proposed Project.	
The Convention on the Rights of Persons with Disabilities	Accession in 2014	The convention aims to promote, protect and ensure that persons with disabilities enjoy human rights.	
The Convention for the Protection of All Persons from Enforced Disappearance	Signed in 2014	Enforced disappearances must be prevented	
Basel Convention on Hazardous Waste (1989)	2017	If applicable, obtain consent from the receiving country before the transboundary movement of hazardous waste.	
Bamako Convention (1991)	2016	Consider the content of the Bamako Convention (as well as the Basel Convention, above) if any hazardous wastes (broadly defined) are to be moved across national boundaries.	
International Convention on the Elimination of All Forms of Racial Discrimination (1969)	2019	All workplace racial discrimination should be expressly forbidden.	
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 1987	2019	Torture in all workplaces should be expressly forbidden.	
UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (2003)	2020	Integration of the UNESCO Convention for the Safeguarding of intangible cultural heritage identified within the project study area during the construction and operation phase.	

Source: ERM, 2022

At the regional level, Angola, as a member State of the African Union and the Economic Community of Central African States (ECCAS), is a party to the primary human rights instruments:

- The African Charter of Human and Peoples' Rights (1990);
- The African Charter on the Rights and Welfare of the Child (1992);
- The African Youth Charter (2009);
- The Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (2007).

Angola has signed, ratified or acceded to various international and regional treaties, covenants and conventions, and developed internal frameworks to guarantee its commitments. However, Angola is not a party to the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families. Additionally, the International Convention for the Protection of All Persons from Enforced Disappearance has been signed but not ratified.

In addition to the aforementioned covenants and conventions, Angola has ratified and/or acceded to the following optional protocols (Table 3.12).

Table 3.12 International Protocols on Human Rights and Angolan Status

Convention	Angolan Status
The Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty	Ratified in 2019
The First Optional Protocol to the International Covenant on Civil and Political Rights;	Ratified in 1992
The Optional Protocol to the Convention on the Rights of Persons with Disabilities	Accession in 2014
The Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict	Accession in 2007
The Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography	Accession in 2005
The Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women.	Accession in 2007

Angola has ratified eight out of ten ILO Fundamental Conventions as shown in Table 3.13.

Table 3.13 International Labour Standards and Angolan Status

Convention	Angolan Status
C029 - Forced Labour Convention, 1930 (No. 29)	Ratified in 1976
C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	Ratified in 2001
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	Ratified in 1976
C100 - Equal Remuneration Convention, 1951 (No. 100)	Ratified in 1976
C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	Ratified in 1976
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Ratified in 1976
C138 - Minimum Age Convention, 1973 (No. 138) (minimum age specified is 14 years)	Ratified in 2001
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	Ratified in 2001
C155 - Occupational Safety and Health Convention, 1981 (No. 155)	Not ratified

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Convention	Angolan Status
C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	Not ratified

3.3 Norms and legislation used for the Project Design

- Geotechnical Studies / Pavement and Earthwork:
 - Recommendations on road design standards Pavement design guide, SATCC (Southern Africa Transport and Communications Commission), 1992;
 - Standard Specifications for Road and Bridge Works, SATCC, 1994;
 - Guide for Design of Pavement Structures, AASHTO (American Association of State Highway and Transportation Officials), 1993;
- Geometry:
 - Angolan Presidential Decree N°20/21 Approving the National Road Plan of Anola;
 - ET-N-022-Ed.2 Design of HV and HV Overhead Lines;
 - Code of Practice for the Geometric Design of Trunk Roads, SATCC, 1998;
- Structural Design
 - Code of Practice for the Design of Road Bridges and Culverts, SATCC, 2001;
 - EN 1990, Basis of Structural Design;
 - ENV 13670, Execution of concrete structures;
 - EN 1090, Execution of steel structures;
 - EN 1994-1-1:2004, Eurocode 4: Design of composite steel and concrete structures Part 1-1: General rules and rules for buildings;
 - EN 1994-1-2:2005, Eurocode 4: Design of composite steel and concrete structures Part 1-2: General rules - Structural fire design;
 - EN 1994-2:2005, Eurocode 4: Design of composite steel and concrete structures Part 2: General rules and rules for bridges;
 - Eurocode 2: Design of concrete structures Part 3: Liquid retaining and containment structures;
 - Eurocode 3;
 - EN 1997-1:2004, Eurocode 7: Geotechnical design Part 1: General rules;
 - EN 1997-2:2007, Eurocode 7: Geotechnical design Part 2: Ground investigation and testing
- Drainage Project
 - Code of Practice for the Design of Road Bridges and Culverts, SATCC, 2001;
- Signalling Project
 - Presidential Decree #166 September/17
 - Angolan Regulation On Traffic Signalling, 2017.
4. DESCRIPTION OF THE BASELINE ENVIRONMENT

4.1 Physical Baseline

4.1.1 Climate

The diverse climatic conditions present in Angola are the result of the combination of atmospheric, oceanic and topographic conditions. Angola extends from the equatorial area to the Tropic of Capricorn along 14 degrees of latitude, which explains the general decrease in received solar radiation and as such the average annual temperatures recorded from north to south (Huntley et al, 2019).

Both temperature and precipitation are influenced by altitude, as well as by the atmospheric systems that dominate central and southern Africa. Around the globe and near the equator, a band of low pressure where trade winds from the northern and southern hemispheres converge creates strong convective activity that generates strong storms that characterise the Intertropical Convergence Zone (ITCZ). This band moves south over Angola during the summer and then returns north towards the equator as winter approaches. The rainy season is triggered by the ITCZ, which travels through northern Angola from early summer, reaching the south at the end of this season. The climate is strongly seasonal, with hot and humid summers (October to May) and mild and cold winters (June to September) (Huntley et al, 2019).

4.1.1.1 Koppen-Geiger Classification

The Köppen's climatic classification, makes it possible to classify the climate in quantitative terms by considering the geographic landscape, the aspects of vegetation covering the surface of the globe, to perform numerical and graphic modelling that considers field records from climatological stations.

According to the Köppen Climate Classification, the province of Luanda is characterised by a hot semi-arid climate (BSh), meaning that all the air crossings are located in this climate type (see Figure 4.1). Warm semi-arid ("BSh" type) climates tend to be located in the 20 and 30° latitudes (tropics and subtropics), typically in the vicinity of tropical savanna or humid subtropical climate regions. These climates tend to have hot summers, sometimes extremely hot, and winters that range from hot to cold, but with minimal precipitation. Warm semi-arid climates are most commonly found around subtropical deserts.

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Source: BDM, 2022, Kotek, 2006

4.1.1.2 Temperature and Precipitation

September to April is the austral summer, known locally as the Cacimbo (Sawe, 2019) during which the highest temperatures occur. June to September are the country's cooler months where temperatures usually can reach their lowest in July and August. This is also the period where the Botswana Anticyclone creates strong winds that blow from east to west bringing with them dust storms and can have significant impacts on grasslands and crops (Huntley, 2019) (Lenssen et al. 2020), (Carvalho et al., 2017).

In Luanda, the average temperature is 25 °C, with March being the hottest month with average temperatures of 28 °C and July is considered the coldest with a temperature of 21 °C (Figure 4.2).



Figure 4.2 Average Annual Temperatures Recorded in the Province of Luanda

Source: INAMET, 2022

Precipitation patterns of Angola are strongly seasonal. Generally, the rainy season runs from September to April, where precipitation often falls in heavy rain events. The length of this season depends on the region, however. In the north and central plateau, the rainy season can last eight months, from September to April, while in the south, the rainy season begins in November and ends in March. The rainy season is shortest on the northern coast where it is only from February to April. Additionally, variability in the rainy season is very high from one year to the next.

In Luanda the rainiest months are March and April but precipitation during these months can considerably vary between 0 and 400 mm. The winter and dry season runs from June to September during which the average precipitation is very low, and in many parts of the country, almost zero. For example, between 1961 and 2000, only 4.5% of precipitation in Luanda fell between May and October, and 0% in June and July, see Figure 4.3 and Figure 4.4.



Figure 4.3 Climate and Precipitation Graph for Luanda

Source: (Climatemps.com, 2022)





Source: Huntley, 2019

Considering information on the maximum rainfall in a 24-hour period (between 1943 and 1972), it is noted that in 50% of years there is a day on which more than 70 mm of rainfall occurs, and in 20% of years there is a day on which more than 120 mm of rain falls, mostly occurring in March or April. Luanda has a Köppen climate classification of BSh, which is a hot semiarid climate in the low latitudes (Sebastião and Prado E Castro, 2019), The African intertropical convergence zone significantly affects rainfall which leads to the wet and dry seasons of the tropics rather than the cold and warm seasons of higher latitudes (de Azevedo *et al.*, 2006). Luanda experiences a dry season from May to October and a wet season from November to April, illustrated in Figure 4.5.

Luanda experiences high interannual rainfall variability. Figure 4.5 shows the wide range of monthly rainfall for Luanda (Harris *et al.*, 2020). The box and whisker chart (Figure 4.6) shows the distribution of monthly rainfall information into quartiles, highlighting the mean (x) and outliers (o). The lines extending vertically from the boxes indicate variability outside the upper and lower quartiles, and any point outside those lines or whiskers is considered an outlier.

Rainfall intensity is a key factor in designing hydraulic structures. Intensity-Duration-Frequency (IDF) rainfall curves are used to design stormwater infrastructure, culverts, and bridges. IDF curves for Luanda were developed by Azevedo in 1952. A literature search found no update on these curves.



However, Costa (2017) has developed a methodology to produce Intensity-Duration-Frequency (IDF) curves for any location in Angola based on satellite rainfall information.

Figure 4.5 Mean monthly rainfall for Luanda as a percentage 1950-2014

Source: Rainfall information from Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset, Harris et al., 2020



Figure 4.6 Monthly rainfall variability for Luanda 1950-2014

Source: Rainfall information from Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset, Harris et al., 2020

4.1.1.3 Historical Climate

The historical climate trends since 1960 indicate the following identified changes:

- An increase in average temperature of 0.33°C per decade; more rapid increases June–August;
- Increased frequency of hot days in all seasons and increase in hot nights except June–August; decrease in annual frequency of cold nights; and
- Decrease in average annual rainfall of around 2.4 % per month per decade, largely due to decreases from March to May (US Aid, 2018).

4.1.2 Air Quality

Baseline air quality typically varies across the study area. In essence, the baseline can be considered in the following components:

- Natural Baseline this represents the pollution concentrations that are ubiquitous in the region due to sources other than human activity. This primarily influences PM₁₀/PM₂₅ concentrations. Naturally occurring NO_x and NO₂ are typically minimal.
- Regional Sources this represents the pollution concentrations that arise from large point or nonpoint sources that will affect substantial areas.
- Local Sources this represents pollutant concentrations that vary on a small spatial scale but may be substantially elevated on a local level. An example of such sources includes road traffic and in the middle of towns where there are vehicles, industry, and multiple small-scale sources. These sources can lead to elevated pollutant concentrations on a localised scale for the pollutants of interest.

INZAG have undertaken baseline air quality measurements in Luanda over the course of one month, running from 27/06/2023 to 26/07/2023. These measurements were for nitrogen dioxide (at each flyover) and particulate matter (as PM₁₀ and PM_{2.5}, in one location), the principal pollutants associated with road traffic.

The airshed is considered to be 'degraded' where the baseline is in excess of the air quality standards.

An example of the diffusion tubes used on site is shown in Figure 4.7.



Figure 4.7 Diffusion Tube sited near SME junction

4.1.2.1 Monitoring Techniques

A two-element monitoring program was used to monitor NO₂, PM_{2.5} and PM₁₀.

- Passive diffusion tubes were used to measure NO₂;
- Active Monitoring was used from PM₁₀ and PM_{2.5} using a Dust Track monitor. Of note is that only one week of data (27/06/2023 05/07/2023) was obtained for PM. This was due to the failure of the monitor due to the excessive dust loading and frequent power outages experienced whilst onsite. However, the monitoring data and anecdotal data were sufficient to determine the condition of the airshed.

4.1.2.2 Monitoring Locations

There were 40 monitoring locations for the NO_2 diffusion tubes with 8 locations at each of the flyovers. The Dust Trak PM monitor was located near the SME junction for the duration of its monitoring period. Locations are shown in Section 6 and Figure 4.8.

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Figure 4.8 Baseline Monitoring Locations

4.1.2.3 Results

The short results of the baseline study are shown in Table 4.1. The detailed results for the monitoring are given in Appendix U. Based on these averages it is noted that the airshed is considered degraded for NO₂, PM₁₀ and PM_{2.5}, noting that for PM₁₀ and PM_{2.5}, anecdotal evidence is that there is considerable airborne dust around the project locations as would be expected in an African megacity.

Pollutants	AQS (µg/m3)	Average (µg/m3)	Methodology	Period
Monitored				
NO ₂	40	50.2	Diffusion Tubes	27/06/2023 -
				26/07/2023
PM ₁₀	75	37.9	Automatic	27/06/2023 -
			Monitoring	05/07/2023
PM _{2.5}	35	26.7	Automatic	27/06/2023 -
			Monitoring	05/07/2023

Table 4.1	Baseline	Air	Quality
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Source: ERM, 2023

4.1.3 Green House Gases (GHG)

The development of the Project, particularly during construction, will increase the amount of global greenhouse gas (GHG) emissions contributing to climate change. Regarding operation, the GHG emissions should be demonstrated based on future traffic scenarios.

There is available information to calculate the Scope 1 and Scope 2 GHG emissions during construction (e.g. assumed average fuel consumption for construction equipment, etc.) and operation phase (*e.g.* assumed average power consumption for operating equipment, fuel combustion for maintenance equipment, etc.) of the Project.

According to IFC Performance Standard 3, quantification of GHG emissions for the construction phase in accordance with internationally recognized methodologies and good practice will be required in case the annual GHG emissions for Scope 1 and 2 exceed 25,000 t of CO₂ equivalent.

4.1.3.1 Introduction and Approach

A greenhouse gas (GHG) assessment of Project emissions in line with applicable International Standards is conducted and described in this section. A GHG inventory provides a high-level perspective of a Project's total GHG emissions.

This section describes the methodology of GHG emission assessment. The following Figure 4.9 shows the four main steps of the assessment. The details are explained in the following sub-sections.



Figure 4.9 GHG Assessment Methodology Overview

Source: ERM, 2023

4.1.3.2 Organisational Boundaries

All emissions by entities and activities controlled by the organisation are included, as well as from all construction activities over which the developer INZAG has direct control.

4.1.3.3 Operational Boundaries

The construction phase and the operation of the roadway will result in direct "Scope 1" GHG emissions primarily associated with

- the combustion of fossil fuels due to the transportation of materials to the site, transportation of excavated materials and the use of construction equipment, as well as
- combustion of fossil fuels due to maintenance of the flyovers.

Indirect GHG emissions in "Scope 2" include indirect emissions from the use of electricity generated elsewhere.

"Scope 3" includes indirect GHG emissions resulting from value chain activities. For such a roadway project, the most relevant Scope 3 emissions stem from the carbon emissions of purchased materials vehicles that are using the roadway during operations.

The next step is to identify the emissions associated with the operation, their categorisation into direct and indirect emissions and the choice of the scope of accounting and reporting for indirect emissions.

In accordance with the ISO 14064-1 standard and the GHG protocol, direct and indirect emissions are categorised into three broad scopes (see Figure 4.10):

- Scope 1: Direct GHG emissions;
- Scope 2: Indirect GHG emissions from the use of purchased electricity, heat or steam; and

Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc.

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Figure 4.10 Overview of GHG Emission Scopes

(WRI & WBCSD, 2011)

In line with IFC and EP4 requirements, the operational boundary of this study includes all Scope 1 and Scope 2 emissions released due to activities over which INZAG has direct control. Also included, though not required, are considerations of readily quantifiable Scope 3 emissions during the construction phase such as emissions from operation of construction vehicles where data is available. Calculations of embedded emissions of materials of construction are not included.

4.1.3.4 Calculation Methodology

GHG emissions for the Project are calculated via the application of documented emission conversion factors. These factors are calculated ratios relating GHG emissions to a proxy measure of activity at an emissions source. The IPCC guidelines (IPCC, 1996) refer to a hierarchy of calculation approaches and techniques ranging from the application of generic factors to direct monitoring.

The GHG emissions will be calculated using the following references:

- 1. Greenhouse Gas (GHG) Protocol: Corporate Accounting & Reporting Standard (World Resources Institute/World Business Council for Sustainable Development);
- 2. Intergovernmental Panel on Climate Change (IPCC) 2014 GHG Inventory guidelines;
- 3. EBRD Methodology for Assessment of Greenhouse Gas Emissions (2010).

4.1.4 Noise

An essential part of the noise assessment is the comprehension of the existing acoustic environment that prevails in the absence of the project. The quantification of the baseline noise levels at Noise Sensitive Receptors (NSRs) serves as the foundation for evaluating the potential noise impacts resulting from the Construction of 5 overpasses – over the Luanda Railway Track (referred to as "the Project") located in Luanda City, Angola.

ERM has prepared this Noise Baseline Report that provides an overview of the characteristics of the existing ambient noise levels in the Area of Influence (Aol). The baseline was determined through a noise survey conducted during May 2023 at 5 locations. Baseline noise levels are compared to applicable noise standards for relative comparison.

4.1.4.1 Methodology

The noise baseline survey was undertaken according to the International Finance Corporation (IFC) noise standards (IFC, 2007).

Equipment and Setup

A noise monitoring campaign was carried out in May 2023, in order to characterize the current conditions of the acoustic climate in the Aol. To evaluate the existing conditions, long-term noise measurements were performed at a selected number of identified receptors. The monitoring locations were selected in order to provide a broad understanding of the existing background noise levels across the Aol.

The noise monitoring procedure was undertaken in accordance with ISO 1996 -1:2003, which specifies that noise monitoring should be carried out using Type 1 (Rion's NL-52) sound level meter (SLM) as per IFC standards. The equipment was mounted so that the microphone was installed at approximately 1.5 m above the ground. The systems were in free-field conditions (i.e., at least 3.5 m from the nearest hard reflective surface). The sound level meters were calibrated before and after each measurement. The calibration level was checked, and no significant drift (i.e., > 0.5 dB) was noted.

Measurements were undertaken during dry conditions and with wind speeds up to 5 m/s.

Noise Measurement Locations

Noise baseline measurements were proposed to be conducted at five locations. These locations were considered to be representative of the acoustic environment around the vicinity of the Project. The coordinates of each measurement location are provided in Table 4.2. Figure 4.11 shows the location of the measured sites and Figure 4.12 shows photographs of the measurement locations.

Station ID	Location	Date of Survey	Coo WGS 1984	rdinates UTM Zone 33S
			X (m)	Y (m)
L1	5th Av.	17/05/2023 13/05/2023	312541	9020876
L2	Mulenvos	16/05/2023 13/05/2023	314520	9019439
L3	Estalagem	14/05/2023 15/05/2023	317919	9017408
L4	Viana	12/05/2023 13/05/2023	320684	9015667
L5	SME	3/05/2023 14/05/2023	334202	9006817

Table 4.2 Noise	Measurements	Locations
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Source: ERM, May 2023



Figure 4.11 Noise Measurement Locations

Source: ERM, May 2023

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Noise Measurement at 5th Av (L1)



Noise Measurement at Mulenvos (L2)



Noise Measurement at Estalagem (L3)



Noise Measurement at Viana (L4)



Noise Measurement at SME (L5)

Figure 4.12 Field Photos Noise Measurement Locations

Source: ERM, May 2023

Data Recording

Long-term noise measurements over a period of 24 hours were undertaken. The noise measurement results for each location were divided into day (0700–2200 hours) and night (2200–0700 hours) periods to understand the variation between the daytime and night-time periods. Noise measurements recorded different metrics, including the L_{Aeq}, L_{A90}, L_{Amax}, L_{Amin}, and L_{A10}, and 15-minute intervals noise levels were logged continuously for each metric throughout the survey periods. A brief description of all such noise metrics is provided below:

- The L_{Aeq} metric is the steady, continuous equivalent sound level, which has the same acoustic energy as the actual varying sound levels over the same time. The letter "A" denotes that "A"-weighting has been used. The "eq" in L_{Aeq} indicates that an equivalent level has been calculated. Therefore, L_{Aeq (T)} is the A-weighted continuous sound level, measured over the period "T."
- The L_{A90} metric is a percentile noise level, which represents the noise level exceeded for 90 per cent of the monitoring period (T) being considered. It represents the quiet lulls between noise events, such as cars or locomotives going by or planes flying overhead. The L_{A90} metric is the near-minimum baseline level that only occurs, by definition, 10 per cent of the time. The L_{A90} level is often referred to as the "background" noise level and is commonly used as a basis for determining noise criteria for assessment purposes. For this monitoring assessment, the L_{A90} metric would be used to represent background noise levels.
- Aside from the L_{Aeq} and L_{A90}, other sound metrics typically collected during sound surveys are L_{Amax}, L_{Amin}, and L_{A10}. The L_{Amax} and L_{Amin} metrics are the maximum and minimum noise levels in a noise sample, respectively. The L_{A10} metric is also a percentile representing the noise level exceeded 10 per cent of the monitoring period (T).

The noise meter automatically logs these environmental noise measurement parameters. For the purposes of this study, the L_{Aeq} is the noise parameter of most interest, as it is this parameter that needs to be directly compared to the applicable noise standards of the IFC.

4.1.4.2 Noise Measurement Results

The results of measurements recorded at the long-term noise-monitoring locations are summarized in Table 4.3. The daytime and night-time periods are defined according to IFC Guidelines.

For this noise assessment, the L_{Aeq} is the metric that is used to assess Project noise impacts since L_{Aeq} is referred to in the IFC's Guidelines.

	Deadead (T)	Me	asureme	nt Param	eters, dB	(A)	Description
IID	Period (1)	LAeq	LA10	LA90	LAmax	LAmin	Description
	Daytime	61	63	53	85	49	A Busy urban area with high commercial and traffic activity. Main noise sources came from traffic in the
L1	Night-time	54	56	44	81	38	Deolinda Rodrigues (including motorbikes and heavy vehicles), Regional Railway, and general urban activities.
	Daytime	72	73	66	104	58	A Busy urban area with high commercial and traffic activity. Main noise sources came from traffic in the
L2	Night-time	70	73	62	98	39	Deolinda Rodrigues (including motorbikes and heavy vehicles), Regional Railw ay, and general urban activities.
13	Daytime	63	65	60	93	55	A Busy urban area with high commercial and traffic activity. Main noise sources came from traffic in the Declinda Podrigues (including
LJ	Night-time	65	61	56	104	40	motorbikes and heavy vehicles), Regional Railway, and general urban activities.
	Daytime	67	64	59	102	52	A Busy urban area with high commercial and traffic activity. Main noise sources came from traffic in the
L4	Night-time	59	61	54	86	40	motorbikes and heavy vehicles), Regional Railway, and general urban activities
15	Daytime	69	73	57	91	49	An Industrial Area on the outskirts of the city. Main noise sources came from traffic in Estrada de Catete, traffic
	Night-time	59	62	41	80	37	entering the servicestation (including motorbikes and heavy vehicles) and the Regional Railway.
Perio	d T = 15 hours	for Daytime	e (07:00-	22:00) an	d 9 hours	for night-t	ime (22:00–07:00) as per IFC Guidelines

Table 4.3 Ambient Noise Levels (long-term measurements) L

Source: ERM, May 2023

Table 4.4 compares the existing ambient noise levels recorded during the noise monitoring campaign with the IFC Performance Standards limits for residential areas. Based on the monitoring results, the current local acoustic climate is already affected by noise sources (mainly road traffic) that results in an exceedance of the general IFC guidelines for residential areas at all monitoring locations. It is noted that exceedances of the IFC General EHS Guidelines are not uncommon as residential receptors in urban areas are located close to existing roads.

Table 4.4 Comparison	of Noise Measurements with	International Noise
-	Standards	

Monitoring Site	Period	LAeq, dB(A)	Applicable Noise	Guidelines*, dB(A)
			Day	Night
L1	Daytime	61	55	-
	Night-time	54	-	45
L2	Daytime	72	55	-
	Night-time	70	-	45
L3	Daytime	63	55	-
	Night-time	65	-	45
L4	Daytime	67	55	-
	Night-time	59	-	45
L5	Daytime	69	55	-
	Night-time	59	-	45
*Applicable noise quide	ines for sensitive rece	ptors: IFC guidelines 5	55 dB(A) davtime. 45 d	B(A) night time.

(Average values over periods are shown for ease of comparison)

Source: ERM, May 2023

According to the noise measurements presented in the table above (Table 4.4), the existing noise levels exceed the IFC criteria at all monitoring locations, both day and night periods. Daytime noise levels are higher than nighttime levels due to reduced urban activity and traffic during the night, except the measurement location L3. At measurement location L3, nighttime noise levels were slightly higher than the daytime due to railway noise from nearby railway lines. Eight cargo trains were observed during the night when the measurement was made.

4.1.5 Geology, Soils and Contaminated land

4.1.5.1 Geology

In terms of geology, the Angolan territory presents a great variety of geological formations. In this context, Angola's geology is represented by three major geological groups: the Basin Complex, the Meso-Cenozoic Kalahari Basin and the Meso-Cenozoic Atlantic Basins or Littoral Group, which are subdivided into the Lower Congo Basin, Cuanza Basin and Benguela/Namibe Basin.

The region around the province of Luanda has two large units, one comprising the rocky and crystalline formations of the old massif and the other corresponding to the sedimentary complex.

The crystalline rock formations of the ancient massif extend from the extreme north to Cuanza, firstly to near Ambriz, following closely the maritime coast until reaching the sea near Mussera, and then gradually bending south-eastwards until near Dondo. The majority of the rock formations are characterized by a high degree of metamorphism, characteristic of rock materials forming the base complex, and are composed predominantly of the gneisses, the paragneisses, the migmatites, the meca-xysts and the granite-gneisses. All these materials are in general very rich in phyllitic guartz. However, in crystalline plains, there is an occurrence of rocky outcrops of granitoid facies with little metamorphism of which the most imposing ones occur to the north in the area of Ambrizete and in the Southeast salient, where they become easily distinguishable by the majestic residual relief formations (DINIZ, 1973).

The sedimentary cover formations outcrop firstly in a narrow margin from the northern system in Ambriz and then considerably widen to become part of the Cuanza Sedimentary Basin. The Kwanza sedimentary basin presents deposits of marly rocks or ochre and reddish gypsum marl with intercalations of limestone (DINIZ, 1973).

In the city of Luanda, there is a Pleistocene sandy cover, that has a local name "musseque". These Pleistocene deposits contain layers of rolled pebbles varying in thickness from centimetres to about one metre (DINIZ, 1973). The results of the geotechnical survey conducted in July-August 2023, provided by BDM, confirmed that the surface deposits (up to one meter depth) at all five locations are comprised of sandy clay and silty clay (Figure 4.13).



Figure 4.13 Pits of 1 m depth made during the geotechnical survey

Source: BDM, 2023

The five flyovers are situated in two geological formations. SME, Viana, Estalagem and Mulenvos lay in the Quifangondo formation and the 5th Avenue lays in the Cacuaco formation (Figure 4.14).

The Cacuaco formation (Miocene) is composed of limestones with remains of algae, echinides and bivalves and calcarenites, and is generally rich in shell and foraminifera remains. The limestone rocks that constitute this formation lay as a platform over clayey and marly formations that are at the base of the Luanda formation. The Quifangondo formation, on the other hand, is made up of black clays and marls or black, greenish-black and brownish marly clays that lay on top of clays and silty marls interspersed with limestones and greso limestones (Pina, 2017).



Figure 4.14 Geological map of the Project Area

Source: BDM, 2022, Diniz, 1973

4.1.5.2 Seismicity

Although Angola is located in one of the most seismically stable regions in the world, the study on the country's seismicity (Pereira Neto, Sand Franca, et al., 2018) shows that Luanda municipality is in the seismogenic zone with a historical estimated magnitude of 4.4 (Figure 4.15). The records of the seismic events in the country are available since 1914, and until 2020 the number of recorded events has been 129, and the recordings have a gap (1970-2000) due to the Angolan war.





The latest recorded earthquake close to Luanda was registered in 2018. It was located offshore 226 km SSW from the city and had a magnitude of 4.3 (Earthquakelist, 2023) (Figure 4.16).



Figure 4.16 Epicentre of the latest earthquake (red circle)

Source: earthquakelist.org

4.1.5.3 Geomorphology and soils

Angola has very diverse geomorphology, including mountain ranges, plateaus, hydrographic basins, desert regions and coastal plains.

The general topography of Angola consists of coastal lowlands lying below 200 m altitude, that occupy 5% of the country's land surface area, that rise into a stepped and mountainous escarpment up to 1,000 m (23%), and an extensive interior plateau of 1,000–1,500 m (65%). Seven percent of the country lies above 1,500 m and its highest point reaches 2,620 m on Mount Moco (Figure 4.17).



Figure 4.17 Topography of Angola

Source: Huntley, 2019 / Red circle - approx. Project location.

According to Diniz (1973), Angolan territory consists of geomorphological units that are functions of seven main criteria, which are relief forms, lithology, tectonics, hydrography, climate, soils and particular vegetation.

The main geomorphologic units correspond to the Coastal Strip, Escarpment Zone, Marginal Mountain Range, Plateaus, Lower Cunene, Zambezi-Cubango Plain, Upper Cuanza, Lower Kashanje, Congo Plain, Upper Zambezi Massif and Malanje Plateau. The five overpasses are located within the Coastal Strip that has an elevation of 10-200 m above sea level The coastal strip is mainly composed of fossiliferous marine sediments from the geological basins of Cabinda, Cuanza, Benguela and Namibe. Under the sands lay Cretaceous to Miocene clays, gypsiferous marls, dolomitic limestones and sandstones (Table 4.13)

Generally, the coastal strip plain tends to gradually gain elevation inland, so the western overpass (5th Avenue) has the lowest elevation of 92-96 m above sea level, and the eastern overpass (SME) is located at an elevation of 163-173 m,

The area in the vicinity of the planned construction works is generally flat and mostly sealed, with little to no vegetation. As there are almost no slopes, despite the bare surface, the erosion processes are local and can be seen only at artificial slopes along the fences and other linear structures (Figure 4.18).

The type of soil is not relevant for the current project, as the area is mostly sealed or the soil is compacted by foot traffic. The scarcity of vegetation creates conditions for dust generation.

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Figure 4.18 Erosion processes in Viana

Source: BDM, 2023

4.1.5.4 Contamination

Potential sources of soil and water pollution are:

- Traffic and parking lots;
- Waste, accumulated in the vicinity of the railway crossings;
- Wastewater spills.

• Examples of the abovementioned pollution sources in the vicinity of the crossings are shown below in Figure 4.19 and Figure 4.20.

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Figure 4.19 Waste accumulation and wastewater (?) spill in Viana Source: BDM, 2023



Figure 4.20 Parking lot and accumulated waste in Mulenvos

Source: BDM, 2023

4.1.6 Surface Water

Angola has a very dense hydrographic network, with predominating fast-flowing rivers, often with waterfalls. Most of Angola's rivers originate in the country's central mountains and are distributed over four main drainage slopes: the Atlantic side slope, the Zaire slope, the Zambezi slope, and the Kalahari slope.

The rivers that spring from the Angolan plateau divide it into hydrographic basins and are perhaps the most important factor that defines the pattern of human occupation of Angolan lands. In general, these rivers are of small volume and have a gentle slope in their upper course. However, they gain volume and slope after crossing the mountains, creating narrow valleys before reaching the coast; rapids are common before reaching their downstream portion.

On the coastal plains, where the waters gather in larger quantities, the rivers generally spread over low ground and flow into an estuary.

4.1.6.1 River basins in the study area

The Project sites are situated at the border of two river basin districts (RBD), the Cuanza RBD to the southwest and the Bengo RBD to the northeast.

Cuanza River Basin District

The Cuanza River begins in Mumbué, municipality of Chitembo, Bié, in the Central Plateau. Its course of 960 km draws a large curve to the north and west, before flowing into the Atlantic Ocean, in the Cuanza bar, south of Luanda. The Cuanza RBD covers 152,570 km², with the only fully navigable river being the Cuanza itself, for some 258 km, from its mouth to Dondo/Cambambe Velho. The biggest tributary of the Cuanza River is the Lucala River, where the great Calandula Falls are located, while the river mouth is in the National Park of Quiçama.

Bengo River Basin District

• The hydrographic RBD of the Bengo River covers a total area of 10,930 km² and is distributed over the territory of three of the eighteen provinces of Angola: Bengo, Cuanza Norte and Luanda. The Bengo River, with a length of 404 km, starts in the municipality of Samba Caju, in the province of Cuanza Norte, where it is called the Zenza river. The Bengo River drains in a south-westerly and then north-westerly direction from its source in the Crystal Mountains towards the Atlantic Ocean, with its mouth located approximately 20 km north of Luanda city centre.

The following proposed overpasses, 5th Avenue, Mulenvos, and SME are located within the Bengo RBD. The proposed overpasses at Estalagem and Viana are located within the Cuanza RBD. Both RBDs are illustrated in Figure 4.21 below, in relation to the proposed overpass locations.

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Figure 4.21 River Basins of the Project Area: Cuanza River Basin and Bengo River Basin

Source: BDM, 2022; Diniz, 1973

Hydrological Network

The closest large rivers to the Project sites are the Cuanza River to the south and the Bengo River to the north, laying approximately 20 km and 15 km away from the Project sites, respectively.

Within both RBD there are several smaller watercourses which drain through Luanda and towards the Atlantic Ocean. Many of these watercourses are classified as urban streams, made of a concrete channel with vertical walled banks, which drain behind buildings and act as an open sewer. Most natural watercourses have been heavily modified, culverted, or built over. There are clear signs of water erosion from Google Satellite imagery which demonstrates overground flow routes towards local watercourses.

The waterways known and recorded by the Humanitarian OpenStreetMap team (HOTOSM, 2023) in proximity to the Project sites are shown in Figure 4.22 below.



Figure 4.22 Waterways recorded by the Humanitarian OSM Team within Luanda

The watercourses which are believed to be hydrologically connected to the five Project sites are summarised in Table 4.5 and illustrated in Figure 4.23 below.

Watercourse Name	RBD	Area	Overview
Rio Cambamba	Cuanza	37,600 ha	The Cambamba River originates approximately 1.3km to the north of the proposed crossing at 5 th Avenida. At this point the river is an artificial drainage channel draining between houses and roads in a westerly direction, passing under Rua dos Comandos [Road] and the Caminho de Ferro de Luanda railway line. The Cambamba River then drains in a southerly direction under Av. Deolinda Rodrigues before continuing in an overall south-westerly direction as an artificially meandering drain between houses. From Google Satellite imagery it is clear large sections of this river are heavily obstructed with debris and there are several road crossings over the river channel. There are multiple unnamed tributaries of the Cambamba River, which drain the urban municipality of Belas to the south of the Project sites.
Rio Mulvenos (Rio Seco Cacuaco)	Bengo	34,500 ha	The Mulenvos River (also known as the Seco Cacuaco River) drains the urban municipalities of Viana, Cacuaco, and Cazenga to the north of the Project sites. It is unclear where the source of the main channel is, how ever, there are numerous overland flow routes, tributaries, and artificial drains which outfall into the Rio Mulenvos. Overall, the Mulenvos River drains in a north-westerly direction between houses and fields, to its mouth at Cacuaco Cove. The Mulenvos River is less spatially constricted than the Cambamba River and more natural, featuring a meandering course with vegetated land present along much of its length. Again, there are several road crossings over the river channel.





Figure 4.23 Hydrologically Connected Watercourses⁴

⁴ Watersheds and courses are best approximations using Global Watershed software verified by OS Open Street Map and Google Earth.

No other water streams were identified during the site visit carried out by ERM in June 2023.

Hydrology

Luanda is prone to heavy rains, during which intermittent rivers may form. Similarly, these rainfalls can lead to the formation of ponds of standing, stagnant water that occur in some of its flatter areas where clay soils predominate, such as in the municipalities of Cazenga, Viana and Kilamba Kiaxi (Figure 4.24). These depressions and ponds are often not connected to a drainage system and allow water to remain stagnant on the surface for extended periods of time following a flood (Ana and Quirimba, 2013).



Figure 4.24 Areas of risk associated with flooding, slope and standing water in Luanda.

The Project Area is marked in red

Source: Mendelsohn et al., 2010

Existing Surface Water Drainage regime

The city of Luanda is located on relatively low-lying coastal lands, characterised by high variability of rainfall. Large volumes of rainfall can fall over a short period of time, characterised by large raindrops. These raindrops are conducive to erosion, with their impact closing the pores on the soil surface and moving soil particles downslope (Cain, 2017). As such, most of the rainfall in Luanda becomes surface water runoff, especially given the growing urban areas within Luanda.

Artificial drains have been built to convey surface water runoff away from urban settlements, and towards existing watercourses and/or the Atlantic Ocean. Many of these drainage channels are open sewers which drain between houses and roads, with multiple informal crossings along their length, and at multiple locations are culverted under roads. Figure 4.25 shows an open drainage channel which drains from 5th Avenida, approximately 1.3km to the north of the 5th Avenida Project site, in a general south-westerly direction towards the Cambamba River.



Figure 4.25 Satellite Imagery of drainage channel to the south of Av. Deolinda Rodrigues

Source: Google Earth

The upstream reach of this drainage channel is very artificial, comprising vertical concrete banks. The downstream reach is less artificial, but is still constricted by roads and buildings, with both formal and informal crossings across the channel. Photographs of the upstream (A) and downstream (B) reaches of this drainage channel are shown below in Figure 4.26. These images demonstrate the lack of maintenance these channels are subject to, with Figure 4.26B demonstrating an accumulation of rubbish within the channel.

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Figure 4.26 Upstream (A) and downstream (B) reach of the drainage channel

Source: Ana and Quirimba, 2013

During the Site visit carried out by ERM in June 2023, surface water drainage infrastructure was identified and recorded at each Project site. The main road beside the railway, Av. Deolinda Rodrigues/Estr.de Catete, was found to have a surface water drainage network in place at all five Project sites. Rectangular-shaped side gutters were present, approximately every 20m – 50m, along both the edges and centre of the carriageway. The size and type of gullies varied at each Project site. Most of the gutters comprised a ground level opening, however, some of the gutters had grills across them.

Photographs of the existing stormwater drainage infrastructure taken during the ERM Site visit in June 2023 are shown in below in Figure 4.27.



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Figure 4.27 Drainage infrastructure during ERM Site visit

At the 5th Avenida Project site, an open manhole allowed visibility to the underground drainage network. The gullies could be seen to drain into a culverted drainage channel, shown in Figure 4.28. It was unclear during the Site visit where the outfall of the culverted channel was nor the exact course it took.



Figure 4.28 Culverted Drainage Channel at 5th Avenida from ERM Site visit

5th Avenida was also the only location where the side roads off the main carriageway had a drainage system. The other four Project sites did not appear to have any formal drainage along the side roads, with some locations comprising only a dirt track. For example, Figure 4.29 shows the side road off Av. Deolinda Rodrigues/Estr.de Catete at the Viana Project site. Within this image you can see that surface water collects along the low points of the dirt track, running overground, demonstrating the lack of a surface water drainage system along this side road.

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Figure 4.29 Drone footage of the side road at the Viana Project Site

At the SME Project site, the junction of the side road with the main road had a perforated surface, as shown in Figure 4.30. It is assumed the holes in the road would allow rainwater to drop into a drainage channel culverted beneath the road. However, this was not visible during the Site visit.



Figure 4.30 Junction between the side road and main carriageway at the SME site during the ERM Site visit

Drone footage collected by Passagens Superiores in July 2022, suggests that the railway line at the SME Project site is newer than at the other Project sites. As shown in Figure 4.31, a drainage channel has been dug adjacent to the railway line. No other drainage features were visible in the drone footage at any of the Project sites.

Drainage Channel			A Section -		
	CARE SANDAND	1	KC CAN GOOD	La Calles	V-to C-to

Figure 4.31 Drone footage of new railway drainage ditch.

Source: BDM, 2023

It is assumed that the identified gullies drain via culverted drainage channels to nearby watercourses, however, their downstream connectivity is not proven nor documented.

The Global Watersheds web-based application (Heberger, 2022) has been used to delineate the upstream watershed and downstream flow path for each Project site, with the outputs of the downstream flow path trace illustrated in Figure 4.32. The downstream flow path is based on a digital map of the earth's elevation and assumes that surface water will follow the steepest slope.

Surface water runoff from 5th Avenida, Mulenvos, and SME is shown to drain in a north/north-westerly direction towards Mulenvos River. Surface water runoff from Estalagem and Viana is shown to drain in a south-westerly direction, towards the Cambamba river.



Figure 4.32 Assumed Surface Water Flow Paths

Source: Heberger, 2022

The indicated downstream flow routes from the five Project sites are summarised below.

- 5th Avenida: surface water drains through the municipality of Cazenga as overground flows, before reaching an open stream which drains through Cazenga between houses and then as a more established channel which is a tributary of the Mulenvos River.
- Mulenvos: surface water drains through the municipalities of Cazenga (briefly) and Viana as
 overground flows, continuing through the municipality of Cacuaco, before reaching an established
 stream which is a tributary of the Mulenvos River. Evidence of overground surface water flows is
 visible from satellite imagery.
- Estalagem: surface water drains through the municipality of Viana, for a short distance, towards a series of rainwater retention basins (Figure 4.33). From here, water drains in a south-westerly direction towards the Cambamba River, where the river continues through the municipality of Luanda City. It is unclear from satellite imagery how water drains between the basins and the

Cambamba River, however, there is limited evidence of overground flows suggesting a culverted watercourse may be present.

- Viana: surface water runoff drains almost immediately to two separate rainwater retention basins (Figure 4.34). It is unclear from satellite imagery if these basins have an outfall. However, the downstream flow route is shown to continue across the municipality of Viana, towards the downstream flow route from the Estalagem Project site, continuing through Viana to the Cambamba River which drains through Luanda City.
- **SME**: surface water drains to a rainwater retention basin (Figure 4.35) immediately northwest of the Project site. From here surface water drains through a series of connected artificial ponds, before discharging to an existing drainage channel that is a tributary of the Mulenvos River.



Figure 4.33 Satellite Imagery of downstream surface water flow route from the Estalagem site


Figure 4.34 Satellite Imagery of downstream surface water flow route from the Viana site



Figure 4.35 Satellite Imagery of downstream surface water flow route from the SME site

The downstream flow paths delineated using Global Watersheds provide an estimate of the catchment base. The flow path of surface water runoff is altered by curbs, sewers and drains.

The surface water runoff from the immediate side roads at the Project sites could be captured by the drainage gullies along the main carriageway. It is assumed that the culverted drainage channel under Av. Deolinda Rodrigues/Estr.de Catete follows the road, draining northwest, before discharging into the open drainage channel which is a tributary of the River Cambamba, as indicated by the orange line in Figure 4.32.

Whilst the available surface water drainage network and location of key assets is not well documented, it is widely reported that several water lines throughout Luanda have been obstructed by solid waste carried by floods (Kendra, 2021) and rubbish dumped in gullies (Cain, 2015) which has led to exacerbated flooding incidents. Therefore, it is clear these drainage networks do exist.

Flood Risk

Luanda's precipitation is highly variable from one year to the next, and most rainfall occurs in short, heavy storms. Occasional heavy rainfall leads to flooding and fast flows of water down river courses and steep slopes. A large amount of rain at one time means that rainfall rapidly exceeds the absorption capacity of the soil. Surface water runoff is thus common and the water from such storms flows as sheets and then concentrates in rills and gullies. The quantity and velocity of water have a significant erosive power that scours the earth and deepens the gullies into ravines (Mendelsohn et al., 2010).

Although Luanda is a rapidly growing city, due to its geographical location, climate, and land occupation, it is particularly susceptible to several natural hazards, including flooding. 17% of Luanda comprises urban land, of which 49% consists of informal settlements, known as Musseques. These Musseques house 80% of Luanda's population and are mainly located in low-lying flood-prone zones (Amado, 2020). Whilst higher regions see flood water draining away as sheet runoff, low-lying areas often see standing water for a long time after a flood event (Cain, 2015). The areas of risk associated with flooding, slope failure, and standing water in Luanda are illustrated in Figure 4.24.

Twenty per cent of households in Luanda say they have been affected by flooding and erosion, with increased flooding experienced in recent years. This increase in flooding is attributable to several causes, including climate change variability, settlement in vulnerable zones, removal of vegetation in upstream river basins, and the poor maintenance of existing drainage channels and associated infrastructure.

Refuse is often dumped in gullies and drainage channels, and there is often sediment from previous erosion in watercourses and drainage channels causing erosive flows which have damaged bridges, caused drainage channels to collapse, and damaged buildings and infrastructure near the channel (Cain, 2017).

During the ERM Site visit in June 2023, photographic evidence was collected which illustrates the poor maintenance of the existing drainage system. Figure 4.36 shows refuse that has collected at a road gully along the main carriageway by 5th Avenida and Figure 4.37 shows vegetation growing out of a road gully which has caused the gully to collapse. In both instances, this blockage will prevent surface water from reaching the existing drainage network and has the potential to exacerbate surface water flooding.

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Figure 4.36 Refuse collecting at a road gully near 5th Avenida

Source: ERM, 2023



Figure 4.37 Vegetation growth causing collapsed gully near SME.

Source: ERM, 2023

After heavy rainfalls, some roads are typically badly flooded and completely impassable. In Viana and Kilamba Kiaxi (areas that have mainly been occupied since the early 2000s), the pressure on land is not yet so great, so housing has not yet occupied most of these patches of land subject to flooding. However informal housing does appear to be gradually moving into these areas.

During the field visit carried out by ERM in June 2023, no heavy rainfall was experienced nor were signs of past flooding events identified. However, this is likely attributable to the fact the Site visit occurred during the dry season.

Past events are useful indications of risks of future occurrence. In case of Luanda, a significant flooding event took place in 2007 which allowed the production of a flood map that highlights the locations where flood damage occurred early in 2007 (Figure 4.38), and where flooding is likely to be most hazardous (Figure 4.39).

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Figure 4.38 Flood damage (2007) and most hazardous flooding locations Source: Amado et al., 2020



Figure 4.39 Risk Areas

Note: The Project area is marked in red

Source: Amado et al., 2020

The assessment that followed the flooding indicates that few homes had been built (and were thus flooded) in the broader river valleys in Luanda. Most damage from flooding along the many rivers and streams in the eastern and south-western areas of the city was likely to be structural as a result of erosion of the banks of the drainage lines. Therefore impacts of flooding were exacerbated by poor urban planning and poor maintenance. Indeed, it could be argued that it is really the effects of bad planning and maintenance, rather than flooding, that caused much of the damage (Mendelsohn et al., 2010).

Bibliographic Record of Flooding

FloodList (2023) is a Copernicus-funded resource which reports on all major flood events around the world since 2015. This resource provides a good insight into the frequency of flood events at a particular location and the damaging impacts these events had.

Table 4.6 summarises all recorded flood events which have affected Luanda since 2015. In all cases, flash flooding has occurred because of heavy rains. In some instances, multiple storms have occurred in close succession, worsening the flooding impacts. In many instances, garbage blocking drainage channels has worsened flooding. Blocked drainage channels and gutters have also prevented flood water from receding, causing standing water to remain on streets, increasing the risk of water-and-vector-borne diseases.

Fatalities have occurred because of these flood events, some directly by fast-moving flood waters, others as a result of being trapped in collapsed homes or electrocution by fallen power lines.

Figure 4.40 and Figure 4.41 provide a visual understanding of the impact these flood events can have. Figure 4.42 highlights the ongoing problems associated with lack of sanitation, dumped garbage, and flooding in Luanda.

Date	Area Affected	Impacts
18 th April 2023	Luanda City, Viana, Belas, Cazenga.	5 fatalities, all children. 1,700 homes flooded.
12 th April 2023	Luanda City, Viana, Belas, Cazenga.	15 fatalities, many of w hich w ere children. 1,200 homes flooded, hundreds of families left homeless.
25 th November 2022	Cazenga, Viana, Cacuaco.	2 fatalities and 1 serious injury. 238 houses and buildings flooded, 5 destroyed. 245 families displaced.
19 th – 21 st April 2021	Luanda City, Talatona.	5 fatalities. 1,617 homes flooded, 16 collapsed. 8,165 people displaced. Roads in the south of Luanda were closed after a bridge over the Camorteiro River was partially destroyed.
16 th March 2021	Viana, Cacuaco, Talatona, Belas.	4 fatalities, 3 missing. 554 homes destroyed. 1,770 people affected. Luanda City recorded 100mm of rain in 24 hours, with most of the rain falling in 3 hours.
18 th April 2020	Talatona., Kilamba Kiaxi.	11 fatalities, 13 missing. 113 families displaced after homes damaged. Cambamba River broke its banks.
4 th January 2020	Talatona, Viana, Cazenga.	1 fatality. 208 homes flooded. 250 families displaced. Bridge in the Cacuaco region was in danger of collapse.

Table 4.6 Record of flood events affecting Luanda

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Date	Area Affected	Impacts		
		Heavy rainfall lasted for 12 hours.		
19 th March 2019	Viana	3 fatalities. Homes and public buildings damaged.		
21 st February 2019	Kilamba Kiaxi, Ingombota.	4 fatalities. Hundreds of homes destroyed. Bridge caused to collapse.		
28 th February 2018	Viana, Cacuaco, Cazenga.	8 fatalities. 90 homes destroyed. 545 families displaced. 30 schools, a hospital, and commercial premises damaged.		
21 st March 2017	Sambizanga, Cauaco, Cazenga, Belas, Kilamba-Kiaxi	11 fatalities. 5,773 homes damaged, 700 destroyed. 79.3mm of rainfall in 24 hours.		
5 th January 2017	Viana.	No reports of fatalities or injuries. 1,800 homes destroyed. Roads blocked.		
20 th April 2016	Cacuaco, Viana, Belas, Cazenga, Imgombota, Kilamba Kiaxi, Rangel, Mianga.	19 fatalities, 4 missing, 50 injuries.800 families homeless.20 homes destroyed.Coincided with World Health Organisation (WHO) major outbreak of yellow fever.		
16 th – 19 th April 2016	Cacuaco.	9 fatalities, 7 injured. Homes destroyed, and schools and religious buildings damaged. 70mm of rainfall over 3 days.		
6 th January 2016	Viana, Cazenga, Belas, Cacuaco.	Flooding not life threatening but making life difficult. 1,700 homes flooded. 1,000 displaced.		
9 th March 2015	Viana, Cacuaco, Belas.	1,770 homes damaged, 800 families displaced. Streets blocked by flooding. Pumps set up to help remove flood water.		

Source: FloodList, 2023



Figure 4.40 Widespread flooding in Luanda, April 2023

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Source: FloodList, 2023



Figure 4.41 River in flood state in Luanda, April 2021

Source: FloodList, 2023



Figure 4.42 Flooding in Luanda Capital, February 2018

Source: FloodList, 2023

Significant flooding is recorded to have occurred every year since FloodList records began in 2015. In some years Luanda has seen up to three severe flood events. As expected, all recorded flood events occur during the wet season, with 10 out of 16 flood events listed in Table 4.6 occurring during March or April.

From the above bibliographic record, the areas of Luanda most affected by flooding are Viana, Cazenga and Cacuaco, with significant flooding experienced 11, 8 and 8 times out of the 16 flood events recorded, respectively. As previously detailed, surface water runoff from each Project site is expected to drain through at least one of these municipalities, if not multiple, with all Project sites except 5th Avenida indicated to drain through Viana.

Surface Water Quality

Major concerns exist regarding wastewater discharge control and stormwater treatment, as well as inoperative drainage ditches (Second National Communication, 2021), with water pollution in Luanda reported to be high (Numbeo, 2022). Within Luanda, accelerated and poorly managed urbanisation has resulted in water pollution (Hove and Ngwerume, 2013), with environmental pollution caused by heavy metals a major problem.

Stormwater is known to cause major contamination of surface water and subsurface water in both urban and rural areas (Meja et al., 2022), with road-deposited sediment regarded as a significant source of urban diffuse pollution (Zhang et al., 2017). Roads are a major sink of urban diffuse pollution, even though they comprise a small percentage of urban land uses. Road dust can enter

waterbodies through surface water runoff during the rainy season. Road dust pollution in developing countries, such as Luanda, was found to be significantly high due to unplanned urbanisation, road surface pattern and poor maintenance practice, vehicle fitness, road-traffic management, and surrounding land use (Newaz et al., 2021).

Urban road dust can contain high levels of trace metals, such as copper, lead, and zinc, amongst others. Concentrations of these trace metals can increase due to urban sprawl and the subsequent number and travel distance of vehicles. Stormwater runoff from densely populated urban areas can carry concentrations of these pollutants from roads to waterbodies, impairing the health of aquatic organisms (Hwang et al., 2016).

A study of street dust in Luanda, based on 92 samples, found that whilst the concentration of trace elements was generally lower than in most industrialised cities in the Northern Hemisphere, lead was a significant exception, whereby levels were similar, if not higher (Ferreira-Baptista and De Miguel, 2005). The results of this study are displayed below in Table 4.7.

City	Cd	Cr	Cu	Ni	Pb	Zn	RDS Size (µm)
Chittagong	1.6	412	74	31	84	975	< 75
Delhi	2.65	148.8	191.7	36.4	120.7	284.5	< 75
Birmingham	1.62		466.9	41.1	48	534	< 63
Ottawa	0.37	43.3	65.84	15.2	39.05	112.5	100-250
Luanda		26	42	10	351	317	< 100
Oslo			123	41	180	412	< 100
Madrid		61	188	44	1927	467	< 100
Dhaka		104	46	26	74	154	< 1,000
Kuala Lumpur	2.9		35.5		2466	344	< 63
Indian soil background	0.9	114	56.5	27.7	13.1	22.1	
China soil guideline	0.3	200	100	50	300	250	
Canadian soil guideline	10	64	63	50	140	200	827

Table 4.7 Heavy Metal Concentrations (mg/kg) in Road Dust across the world.

Source: Ferreira-Baptista and De Miguel, 2005

Highway drainage presents a high-risk source for heavy metals, suspended solids and hydrocarbons, compared to other urban land use areas (Robertson et al., 2019). Given the rudimentary nature of the surface water drainage network within Luanda, it is assumed that high concentrations of pollutants from roads enter urban drainage channels, watercourses and groundwaters. Where surface water runoff drains to a rainwater retention basin, there is a potential improvement to surface water runoff quality, as sediments can settle; however, this will depend on the capacity of these basins, compared to incoming flows during the rainy season, and the subsequent retention time of water.

The Angolan Water Law (Law No.6/02 of June 2021) applies to surface water and groundwater and established a number of general principles including the unity of the hydrological cycle, which presupposes the establishment of a single legal regime for its management, unity and coherence in the management of the country's river basins and integrated management of water resources. Currently, only the Water Sector Development Programme has been published, which establishes the obligation of environmental impact assessment for all water works and prohibits any activities that involve the danger of water pollution or degradation or any change in the water regime that may jeopardise health, natural resources, the environment or national security and sovereignty. This allows the integration of climate change considerations into EIA and environmental audits (Second National Communication, 2021).

4.1.7 Groundwater

4.1.7.1 Geological setting

Groundwater flow characteristics and patterns are largely controlled by the geological conditions and features on site. Understanding the host geology and preferential groundwater flow and contaminant migration pathways formed by weathering, fracturing and dissolution in case of limestone assist in forming an accurate conceptual groundwater flow model. A brief description of the geological conditions on site is taken from the ERM scoping report (dated 21 December 2022):

- In the city of Luanda, there was a Pleistocene sandy cover, the musseque in the regional designation, in which there was a voluminous deposition of quartzose material. This Pleistocene extract presents a layer of rolled pebbles varying in thickness from centimetres to about one metre.
- The locations of the 5 flyovers are situated in 2 geological formations. SME, Viana, Estalagem and Mulenvos lay in the Quifangondo formation and 5th Avenue lays in the Cacuaco formation.
- The Cacuaco formation (Miocene) is composed of limestones with remains of algae, echinids and bivalves and calcarenites rich in shell and foraminifera remains. The limestone rocks that constitute this formation lay as a platform over clayey and marly formations that are at the base of the Luanda formation. The Quifangondo formation, on the other hand, is made up of black clays and marls or black, greenish-black and brownish marly clays that lay on top of clays and silty marls interspersed with limestones and greso limestones.

4.1.7.2 Aquifers present on site

No groundwater boreholes were drilled on site, and the geotechnical survey did not breach the groundwater table. Therefore, there is no site-specific information available on the aquifers present and reference is made to literature, as well as experience gained from previous groundwater studies done within Luanda and surrounds.

It is expected that two aquifers occur in the area. The two aquifers are associated with: a) the upper weathered material, and b) the underlying competent and fractured rock material. This is based on a general understanding of hydrogeological principles where rainfall recharge infiltrates the soil and migrates vertically to contact with the competent / unweathered rock material. The recharging water will accumulate on top of this contact and form an aquifer associated with the weathered material.

A percentage of the water within the weathered zone will continue to migrate vertically into the competent where it is allowed by open fractures and faults. This water then forms the fractured rock aquifer.

Weathered material aquifer

The upper aquifer forms due to the vertical infiltration of recharging rainfall through the weathered material being retarded by the lower permeability of the underlying competent rock material. Groundwater collecting above the weathered / unweathered material contact migrates down a gradient along the contact to lower lying areas where it can daylight in streams in the form of baseflow contribution.

The borehole yields in this aquifer are seasonally variable due to the strong dependence on rainfall recharge. Generally, it can be said that the yields of a weathered material aquifer during the rainy season can be around 0.5 to 2 L/s while sustainable yields can decrease markedly during the dry season. In some areas, this aquifer can be laid completely dry during the dry season.

As a general comment, it can be said that the groundwater quality in undisturbed areas is expected to be good due to the dynamic recharge from rainfall. This aquifer is, however, more likely to be affected by contaminant sources situated on the surface. Additional groundwater quality information will be needed to confirm this.

Fractured rock aquifer

Although the lower permeability, fresh rock material will retard vertical infiltration of groundwater, a percentage of the water in the upper aquifer will recharge the lower aquifers. Direct recharge from rainfall can occur along the banks of rivers that drain the area where fractured rock is exposed. In areas where the stream base is located directly on top of the competent rock, the aquifer can be directly recharged from the surface water bodies.

Groundwater flows in the lower aquifer are associated with secondary fracturing in the competent rock and as such will be along discrete pathways associated with the fractures.

4.1.7.3 Aquifer transmissivity

No aquifer tests were done as part of the groundwater study. Therefore, reference is made to literature sources to obtain an indication of the aquifer hydraulic conductivity. The expected conductivities are (Domenico, 1990):

- Fine sand: 0.02 2 m/day;
- Weathered marl: 1E-4 2 m/day;
- Deeper competent sediments: 3E-5 0.52 m/day

4.1.7.4 Depth to groundwater level and groundwater flow patterns

As mentioned previously, no groundwater boreholes were drilled on site, and the geotechnical survey did not breach the groundwater table. Therefore, there is no site-specific information available on the depth to groundwater level. Reference is made to literature, as well as experience gained from previous groundwater studies done within Luanda and surrounds.

The depth to groundwater level within the study area is expected to range between 5 and 15 m below ground level (mbgl). In areas where there are no large-scale external impacts on the groundwater environment, such as the lowering of groundwater level through dewatering, and where the geology and aquifer interactions are not excessively complex it is expected that the groundwater level contours will reflect topographical contours, although at a lower gradient.

4.1.7.5 Groundwater quality

The availability of data on groundwater quality in Angola is limited. Salinity is a recognised groundwater-quality problem in some coastal areas. Potential problems also include contamination of groundwater with metals and metalloids due to mineralisation and mining; and vulnerability of shallow groundwater to contamination from anthropogenic sources including pit latrines and urban wastes.

Shallow groundwater in fractured aquifers including basement and limestones is potentially vulnerable to contamination from surface pollutants and concentrations of nitrogen species such as nitrate may be high.

Saline groundwater has been reported in the sedimentary aquifers of the coastal strip in association with evaporites in the sediments (Bee Pee and SRK, 2002). Increasing salinity has also been reported in the coastal portion of Namibe Province, likely due to saline intrusion (Bee Pee and SRK, 2002), although problems with saline intrusion appear not to be significant elsewhere.

Groundwater vulnerable to fluoride contamination also includes that at the coast affected by saline intrusion and any groundwater in sedimentary aquifers affected by ion exchange. Occurrences exceeding the WHO guideline value for fluoride in drinking water (1.5 mg/L) are likely.

Groundwater from Mesozoic deposits in the coastal sedimentary basins could also contain high concentrations of arsenic if conditions are reducing.

Higher iodine concentrations can be expected in groundwaters from the coastal sedimentary basins and possibly from the aquifers of the Kalahari Group. Iodine deficiency disorders have been reported among Angolan populations (Zimmerman et al., 2008).

4.1.7.6 Groundwater availability and use

Regional conditions

Over most of Angola, aside from the semi-arid south and south-west, Angola is richly endowed with both surface water and groundwater. The abundance of surface water has resulted in a lack of tradition in groundwater use, with the majority of the development being in the coastal cities, some rural areas and in the semi-arid parts of the country. Groundwater sources include boreholes, wells and spring catchments.

A borehole inventory dating back to the 1970s catalogued some 2,000 boreholes nationally, of which the majority were in the southwest, around 40% being in Kunene, 30% in Huile and 15% in Namibe provinces.

More recent groundwater development has occurred in peri-urban areas along the coastal strip. Over 3000 boreholes had been catalogued nationally in the early 2000s (Bee Pee and SRK, 2002).

The sedimentary rocks, particularly those in the coastal belt, represent the best aquifers. Of these, alluvial clayey sandstones have the greatest potential. In the crystalline basement rocks, primary porosity is low and the greatest yields are found along fractures, quartz veins, in contact zones between differing rock types and weathered overburden (UN, 1989). Depth to groundwater is in the range of 5–30 m below ground level at the coast, 10–30 m in the central highlands (Huambo Province) and more than 200 m in the semi-arid areas of Cunene in the south (RAK, 2013).

Borehole yields are low to moderate and typically in the range of 1-10 L/s (UN, 1989; RAK, 2013). The probability of success in obtaining usable yields decreases southwards. Yields generally less than 5 L/s typify the crystalline Precambrian rocks.

Site-specific conditions

Less than half of Luanda's residents receive piped water on a regular basis to their homes. An informal water-supply system is based on tanker truckers that sell river water or water drawn from the piped system through supply depots at various points in the system (Cain, A.; 2017).

Since groundwater is brackish, drinking water in Luanda is sourced through two formal piped and treated river-water systems at Kifangondo and Kikuxi, as well as from an informal trucked private market fed from river-water pumping stations. At some points along the formal piped system, water is siphoned off and enters the informal trucked system (Cain, A., 2017).

It is poorer families who are most vulnerable (Development Workshop 2011a). In Luanda, they have settled in the more environmentally risky parts of the city. The new settlement areas occupied by the poor are almost always without piped water services. The lack of formal sanitation means that raw sewage pollutes the groundwater and uncollected refuse is usually dumped in valleys or drainage channels.

4.2 Biological Environment and Ecosystem Services

4.2.1 Methodology

In order to scope biodiversity-related risks within the assessment of risks and impacts, an analysis was performed using secondary data collected from relevant technical bibliography and analysis and complemented with a site walkover.

The site walkover was planned and performed in the fourth week of November 2022. It covered the entire stretch of the Project footprint to confirm the desktop information as well as to identify any other

sensitive sites. Also, during the site visit and in order to gather local information regarding biodiversityrelated values, engagements were held with the Ministry of Environment.

The outcomes of the biodiversity baseline study are summarized in the next sub-sections.

4.2.2 Flora and Vegetation

The African continent has nine biomes from the three main biogeographic divisions of Africa (Palaearctic, Afrotropical and Cape). The concept of biome used was defined as a type of vegetation with similar characteristics grouped as habitats. Of the nine recognised biomes, seven are represented in Angola, namely: Tropical and subtropical moist forests, Mountain grasslands and shrublands, Tropical and subtropical grasslands, savannas, shrub savannas and woodlands, Tropical and subtropical dry and deciduous forests, Deserts and xeric shrub savannas, Mangroves and Flooded grasslands and savannas (Huntley *et al*, 2019). It is the African state that embraces the highest number of biomes per country which reflects the country's unusual diversity of landscapes, climates and ecoregions.

Angola's forest occupies approximately 53 million hectares, which corresponds to 43.3% of the country's land area. The forest formations are quite differentiated and include, among others, the dense humid forest of high productivity, corresponding to about 2% of the forest area. These formations are located in the provinces of Cabinda, Zaire, Bengo and Kwanza-Norte.

Occupying more than 80% of the forest area are open forest or miombo woodland formations, dry forest mosaics and savannahs of medium productivity and high social value in terms of woody fuel, construction materials, pasture, food and medicinal plants. The remaining forest formations are of low productivity and consist, among others, of grasslands, herbaceous formations of floodable surfaces, steppes of the subdesert and desert bands, desert herbaceous formations and mangroves.

The seven biomes found in Angola can be broken into 15 ecoregions. These areas are defined as large units of land or water that contain a distinct set of species, habitats and processes; their boundaries attempt to portray the original extent of natural communities before major changes in land use.

Thus, the 15 ecoregions are listed here: Coastal Equatorial Atlantic Forest, Zambezian Dry Cryptosepalum Forest, Coastal Equatorial Atlantic Forest, Zambezian Dry Cryptosepalum Forest, Southern Congolese Savannah Forest, Western Congolese Savannah Forest, Angolan Miombo Woodland, Central Zambezian Miombo Woodland, Baikiaea Zambezian Forest, Angolan Mopane Woodland, Western Zambezian Grassland, Flooded Zambezian Grassland, Savannah and Angolan Steppe Woodland, Woodland-Mountain Meadow of Angola, Kaokoveld Desert, Namibian Steppe Woodlands, Central African Mangroves.

According to the Ecoregion Map (Huntley, 2019), the Project is located in the area of Savannah and Woodland of the Angolan Escarpment, which consists of various plant communities, with three distinct vegetation zones: the first, north of the Kwanza River, is a mosaic of tall gallery forest, tropical forest, tall grass and swamp communities along the rivers. The second is a discontinuous series of semi-deciduous rainforest located along the steepest slopes of the escarpment. The third, south of the Kwanza River, includes arid and semi-arid woodlands and wooded lawns in the coastal strip and along the lower slopes of the escarpment (Santos, 2015).

Although Angola is considered to have a significant biome diversity, the Project site does not lie inside any biodiversity hotspot defined by the Critical Ecosystem Partnership Fund (CEPF) nor the Global 200 Priority ecoregions for global conservation defined by the WWF.

The Project districts (Cazenga, Kilmba Kiaxi and Viana) can be more specifically characterized as a Savannah and Woodland ecological zone. The Project area does not feature the original vegetation that was present in such locations and has undergone a dense urbanisation and significant anthropic pressure results in almost absence of vegetation. The land cover of the Project's Aol is predominantly urban with buildings, roads, and other man-made structures. The dense anthropic presence does not

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permit vegetation to develop and to the contrary, it finds less and less available areas to recolonize (Figure 4.43).

The study of detailed satellite images and land cover data showed that there are only individual trees near the bridge crossings that do not form tree massifs and cannot be a habitat for a significant number of terrestrial animals and birds.



Site: 5ª Avenida – Urban environment



Site: 5ª Avenida – Occasional trees



Site: Mulenvos - Occasional trees



Site: Viana – Fenced fruit or ornamental trees



Site: Estalagem - Occasional trees



Site: SME – Occasional tree and fenced orchard

Figure 4.43 Examples of the Landscape in the Project's Aol

Source: ERM, 2022

4.2.3 Fauna

The variety of Angola's ecosystems results in a great diversity of wild fauna, and the most relevant species that inhabit some of the country's conservation areas can be classified into two major zoo-geographic units, and a transition zone, namely:

- The Zambezi Plateau unit, which includes the Bicuar and Mupa national parks and the nature reserves located in the south-west of the country (Kuando-Kubango);
- The South-West African unit: the Iona National Park, the Namibe Reserve and the Chimalavera Regional Park;
- The transition zone comprises the fauna of the Quiçama National Park and, to a certain extent, the Cangandala National Park and the Luando Integral Reserve, characterised by the presence of species, on the one hand, indigenous to the West African sub-region of the equatorial humid forests of the Congo basin and, on the other, species from the eastern and southern African sub-region.

It is believed that there is an overall reduction of animals mainly in the conservation areas due to the high rate of poaching. Due to this, information is scarce on the quantity, distribution and composition of the populations of species of wild fauna in Angola.

A secondary data survey of the groups of mammals, birds and herpetofauna was carried out to identify the endangered fauna of Angola.

Mammals

Since there is no study on regional mammals, secondary data was compiled (Kingdon, 2013) – Appendix S, which includes data on the 108 species potentially occurring in the area. From the data, the endangered species of Angola (MCTA, 2018) were verified, as well as the endangered species of the International Union for Conservation of Nature (IUCN, 2022). Thus, there are 19 and 14 threatened species listed by the MTCA and by the IUCN respectively. None of the listed species is known to be present in the Project area also according to the available literature. Indeed, the Project is located in an urban area of the city of Luanda in which the species, both native and exotic, are not expected to occur.

Avifauna

A survey of secondary data on the avifauna of Angola was conducted by Mills & Melo (2013). There are 32 threatened avifauna species in Angola according to MCTA (2018) and 28 - to IUCN. As above, the current land use of the five locations makes occurrence of such species unlikely.

Herpetofauna

The survey of the secondary data on herpetofauna was conducted by Huntley et al (2019), and there are 112 species of amphibians and 269 species of reptiles of possible occurrence. There are two endangered reptile species in Angola (MCTA, 2018), or five, according to the International Union for Conservation of Nature (IUCN, 2022). As above, the current land use of the five locations does not provide suitable habitat for these species.

4.2.4 Key Biodiversity Areas, Nationally Protected Areas

4.2.4.1 Key Biodiversity Areas

Key Biodiversity Areas (KBA) are sites contributing significantly to the global biodiversity. The Global Standard for the Identification of Key Biodiversity Areas, developed by the IUCN (2016) sets out globally agreed criteria for the identification of KBAs worldwide.

Angola has several KBAs (23 sites), contributing to a total land area of 79, 184 km². The closest KBAs Mussulo and Quicama are located at 13 km and 25 km, respectively, of the Project's Aol (Figure 2.21).

The closest KBAs include:

Mussulo: Designated in 2001, this KBA covers an area of 22.218 ha, and supports both terrestrial and marine ecosystems. It is a sand spit, 35 km in length, lying parallel to the coast, with the northern tip about 10 km southwest of Luanda. The area includes several small islands, one of which (the Ilha dos Passaros) lies between Mussulo and the mainland. The vegetation is dominated by mangroves (Rhizophora mangle, Laguncularia racemosa and Avicenna germinans), with low-growing saltmarshes (Sesuvium portulacastrum, S. mesembritemoides and Salicornia sp.) and intertidal flats (Loutchanski 199).

Ilha dos Passaros has been proposed as a protected area (Huntley 1974b). One of the reasons for protection of the Ilha dos Passaros island is that the mangrove ecosystem of Mussulo is not represented in mangrove communities elsewhere on the Angolan coast, and their botanical value alone justifies conservation (Huntley 1974b, and see Airy Shaw 1947). Mangrove forests on Mussulo are currently being felled for housing timber (K. Loutchanski, pers. comm.) and are likely to be totally destroyed within a relatively short time.

Quicama: Designated in 2001, this KBA covers an area of 863, 183 ha, and supports both terrestrial and marine ecosystems. The Quiçama National Park extends along 110 km of the Angolan coast, with the estuary of the Cuanza River forming the north-western boundary of the park. It holds a diversity of bird habitats, including the most southern patch of extensive mangrove forest in the country (in the Cuanza estuary), the extensive Cuanza flood-plain, dense communities of raffia palm on permanently waterlogged islands in the river, lowland riverine forests, rank flooded grassy patches, reedbeds, swamps and extensive sandbars along the Cuanza river, extensive grasslands on the plateau, dry baobab-acacia (Adansonia-Acacia) woodland in the east of the park, and patches of broadleaved woodland. Dense thickets of Chrysobalanus, Drepanocarpus, Dalbergia, Leguncularia and Hibiscus occur along the river upstream from the mouth (Huntley and Matos 1994). The floodplain of the lower Cuanza River has extensive communities of Papyrus Cyperus, with Typha, Echinochloa and Phragmites on the margins.

The Park has a long history of illegal hunting within its borders. There was also a private cattle-ranching with over 25,000 head of cattle, thousands of hectares of cotton fields, two active oil companies, diamond-prospecting, a military detention barracks and a resident indigenous population of more than 5,000 people (Huntley 1974a). It is likely that these disturbances are still present and may even have intensified with the movement of displaced people to Luanda Province.

4.2.4.2 Important Bird Areas

The Important Bird Areas (IBA) are areas identified using an internationally agreed set of criteria as being globally important for the conservation of bird populations. Similar to the Key Biodiversity Areas the the IBAs closest to the Project are the Mussulo and the Quicama National Park (Figure 4.44).

Mussulo is important for aquatic birds, with 61 congregatory waterbird species (42% of the Angolan list) recorded, some of which occur in numbers which are at least nationally significant. Morus capensis and Sterna balaenarum are frequent to common non-breeding visitors to inshore waters. The lagoon and intertidal flats are important foraging areas for waders from the Palearctic moving south in the austral spring and returning in the late summer. All the Palearctic wader species that have been recorded in Angola have also (or have only) been recorded at Mussulo. This is one of the few sites on the Angolan coast where Phoenicopterus ruber frequently forages. There are nesting colonies of a number of species of herons and egrets and Thresk iornis aethiopica on Ilha dos Passaros (Birdlife, 2022).

Quiçama: The avifauna has not been well-studied and the total number of species occurring at the site is likely to be higher than the 186 species that have been observed and collected. However, the park is relatively rich in globally threatened and restricted-range species. *Phoenicopterus minor, Morus capensis* and *Sterna balaenarum* are non-breeding visitors, the latter two in winter to inshore coastal waters. *Francolinus griseostriatus, Platysteira albifrons* and *Euplectes aureus* are frequently encountered residents, and probably breed. The avifauna of the eastern forest and lowland riverine forest in Quiçama is poorly known, but it is thought that some restricted-range species of forest may occur there, e.g. the globally threatened *Laniarius brauni*, which is a rare resident at Dondo, just outside the park boundary (Birdlife, 2022).



Figure 4.44 Closest KBAs and IBAs

Source: ERM, 2022, Birdlife website accessed in November 2022

4.2.4.3 Nationally Protected Areas

Protected areas are parts of the national territory that, due to their environmental characteristics, are granted special status with the aim of their protection and preservation of flora and fauna species. Through specific legislation, protected areas occupy an area equivalent to 13% of the country. These are National Parks, Partial Reserves, Integral Natural Reserves and Regional Natural Parks.

Among the protected areas currently existing in Angola, it can be seen that the project is located 25 km away from the Quiçama National Park (Figure 4.45).

4.2.5 Note on Critical Habitats (IFC PS6)

The term "Critical Habitat" is defined by the IFC Performance Standards (IFC, 2012) as an area with a high biodiversity value. This includes areas that meet one or more of the following criteria:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species.
- Criterion 2: Endemic and/or restricted-range species.
- Criterion 3: Migratory and/or congregatory species.
- Criterion 4: Highly threatened and/or unique ecosystems.

Criterion 5: Key evolutionary processes.

Criteria 1, 2 and 3 are focused on species occurrence, whilst Criteria 4 and 5 focus on ecosystem and landscape characteristics⁵.

The IFC Performance Standards describe "Tiers" of Critical Habitat, based on relative vulnerability (degree of threat) and irreplaceability (rarity or uniqueness). For Criteria 1 to 3, both qualitative and quantitative thresholds are provided to assign critical habitat into either Tier 1 or Tier 2.

The scale at which a critical habitat determination takes place depends on underlying ecological processes for the habitat in question and is not limited to the footprint of the Project.

Criterion 4 is triggered by ecosystems that are threatened, support unique assemblages of biomerestricted species, or are recognized for high conservation value, including protected areas. No quantitative thresholds are indicated by the PS6 Guidance Notes; nonetheless, quantitative categories and criteria may be applied to evaluate ecosystem status if data allows it (*e.g.* Rodriguez *et al*, 2011).

Lastly, Criterion 5 applies to landscape-level features that can influence key evolutionary processes. Key landscape features such as unique topography that creates unique habitats and areas important for climate change adaptations should be identified using a literature review and through expert consultation.

This preliminary biodiversity screening was focused on a general assessment of Criterion 1: Critically Endangered (CR) and/or endangered (EN) species and Criterion 2: Endemic and/or restricted-range species.

As per the previous sections, there are no triggers for Critical (and Natural) Habitat as per IFC PS6.

⁵ The determination of critical habitat can also include other recognised high biodiversity values evaluated on a case-by-case basis. This is specified by paragraph GN56 of Guidance Note 6, which provides the following seven examples: i) Areas required for the reintroduction of CR and EN species and refuge sites for these species (habitat used during periods of stress (e.g. flood, drought or fire); ii) Ecosystems of known special significance to EN or CR species for climate adaptation purposes; iii) Concentrations of Vulnerable (VU) species in cases where there is uncertainty regarding the listing, and the actual status of the species may be EN or CR; iv) Areas of primary/old-growth/pristine forests and/or other areas with especially high levels of species diversity; and v) Landscape and ecological processes (e.g. water catchments, areas critical to erosion control, disturbance regimes, e.g. fire, flood) required for maintaining critical habitat.



Figure 4.45 Map of Protected Areas

Source: BDM, 2022

4.3 Socioeconomic Baseline

4.3.1 Introduction

This chapter describes the socioeconomic environment of the Project area along with more general information at the national, provincial and municipality levels to provide additional context. The socioeconomic conditions of the five overpass sites that will be affected by the proposed Project are described in order to support the identification of key socioeconomic sensitivities and to inform the assessment of social impacts related to the Project.

The information presented in this chapter is based on both primary and secondary data. Secondary data from specialised Angolan institutions such as INE (National Institute of Statistics) was used, as well as ERM and BDM's available information and experience in Angola.

This information is supplemented by primary socioeconomic data collected from Key Informant Interviews (KIIs) held with representatives of the Ministry of Transport (MINTRANS), the railway operator (CFL), Cazenga Municipality, Viana Municipality, Viana Commune, Kalawenda Commune, and Tala Hady Commune on 31 May and 01 June 2023. Additionally, three field surveys were conducted at the five overpass sites from 8 - 20 June 2023. Further details of primary data collection are given in Section 4.3.2 below.

The description of the Direct AoI and Indirect AoI for the socio-economic environment is presented in the Section 2.6.1.2 and Section 2.6.2 respectively.

4.3.2 Approach for Baseline Description and Data Collection Methodology

4.3.2.1 Desktop Data Collection

A desktop study of the five overpass sites commenced with a site characterisation exercise. Each site was examined using Google Earth, photographs and drone imagery to determine key characteristics of the Direct Aol that would later be verified during primary data collection. Key characteristics investigated included land use, livelihood activities, number of households, identification of sensitive receptors (schools, healthcare centres) and cultural heritage sites.

A baseline of the Indirect AoI was also developed through desktop data collection and review. The General Census of Population and Housing, conducted by the Republic of Angola from 16 – 31 May 2014 served as the main source of secondary information. This census was a key national project for the development of public and private policies aimed at improving the population's quality of life and providing information on the geographic structure of the population (INE, 2014). The National Census from 2014 provided key demographic information regarding population size, education, health, living standards, and economy and employment for the National and Provincial scales. Other INE documents used to develop this chapter were the Statistical Yearbook of Social Action, Family and Women's promotion (2021), the Directory of Social Statistics (2021), Features of Young People in Angola (2020), and a Thematic Report about Gender (2020).

During the KIIs, further secondary information was requested that would reflect municipal and commune level statistics. Data provided included statistics on health, education, transportation, and social infrastructure.

The data collected during the desktop study provided the baseline information for the Indirect Aol which was further supplemented by primary data collection in the Direct Aol as described in the following section.

4.3.2.2 Primary Data Collection

Primary data was collected through Klls, a site visit and surveys within the Direct Aol.

KIIs were held with representatives of the Ministry of Transport (MINTRANS), the railway operator (CFL), Cazenga Municipality, Viana Municipality, Viana Commune, Kalawenda Commune, and Tala

Hady Commune on 31 May and 01 June 2023 and were attended by representatives from ERM, BDM and INZAG. A member of the Ministry of Transport accompanied the team during the meetings with the Municipalities and Communes. At each meeting, a brief presentation was given that introduced the project as well as the objectives of the meeting. This was followed by a question-and-answer session where ERM asked the participants a set of general questions about the project area, followed by questions about the project and data requests. The results of the KIIs can be found in Appendix J of the Stakeholder Engagement Plan (SEP). The five overpass sites were visited by representatives from ERM, BDM and INZAG between 30 May and 1 June 2023. During the site visits, the desk-based site characterisation exercise described above was ground-truthed and expanded on.

Three surveys were designed and deployed at the five overpass sites from 8 – 20 June 2023 for the establishment of the socioeconomic baseline. These included a household survey, a small and medium-sized business survey, and a mobile/ informal traders survey. The full surveys used for primary data collection are included in Appendix C. All three surveys made use of both closed (yes/no and multiple choice) and open-ended questions in order to collect a combination of qualitative and quantitative data.

Owing to the urban nature of the five Project sites and the high density of households and businesses, it was not possible to collect a statistically representative sample for each of the three surveys in the Direct Aol. Instead, the data collection was restricted to a 100 m buffer around the project footprint, within the Direct Aol, and household and small and medium-sized business surveys Household surveys were administered to a random selection of households within this 100 m buffer. This allowed households and businesses within the direct project footprint (and therefore likely to be economically and/or physically displaced) to be captured by the surveys as well as those directly adjacent to the project footprint who will experience impacts the most during the construction and operation phases. The traders survey was administered to a random sample of individuals located near the intersection with the railway, where the flyovers will be located.

The density of households, small and medium-sized businesses and informal traders differed depending on the overpass site (e.g. SME is less urban in nature than the other four and therefore has fewer households, businesses and traders). This meant that it was not possible to survey the same number of households, businesses and traders at each site. As such, the estimated target number for each survey to be administered at each site was scaled to the nature and characteristics of the site. The number of respondents to each survey at the five overpass sites is detailed in Table 4.8 below. The survey locations within the 100 m buffer for each site are shown in Figure 4.47 to Figure 4.50 below.

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SME - Survey locations
 Project footprint
 SME - 100 meter buffer



Figure 4.46 Survey Locations SME

Source: ERM, 2023





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Source: ERM, 2023



Figure 4.48 Survey Locations Estalagem

Source: ERM, 2023



Figure 4.49 Survey Locations Mulenvos

Source: ERM, 2023



Figure 4.50 Survey Locations 5th Avenue

Source: ERM, 2023

Each of the three surveys had questions tailored to their target audience (i.e. households/ residents, businesses and informal traders) as well as questions used to inform the Human Rights Risk Assessment and Resettlement Policy Framework (RPF).

The household survey was administered at all five sites and collected data on topics such as general demographics, income and livelihoods, land tenure, standard of living, health, infrastructure and services, and subjective welfare.

On the other hand, the informal traders survey covered various topics relating to trading activities including basic demographics. their reasons for trading in the area, income and livelihood, challenges, and alternative income options. This survey was also administered at all five sites.

The business survey was conducted with owners and employees of these small and medium-sized businesses at four of the sites. The peri-urban nature of the SME site meant that there were no small and medium-sized businesses located in the 100 m buffer within the Direct AoI. As such, no business surveys were conducted at SME. The business survey covered various topics including basic demographics, structure/ primary activities of the business, tenure, income, customers, and infrastructure and services.

Site	Males	Females	Total	
Household Survey				
SME	0	3	3	
Viana	48	24	72	
Estalagem	23	18	41	

Table 4.8 Survey Respondents

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Site	Males	Females	Total			
Mulenvos	9	8	17			
5 th Avenue	20	29	49			
Small and Medium-sized E	Business Survey	•				
SME	0	0	0			
Viana	24	13	37			
Estalagem	34	15	49			
Mulenvos	23	12	35			
5 th Avenue	38	14	52			
Informal Traders and Vendors Survey						
SME	25	8	33			
Viana	31	44	75			
Estalagem	34	31	65			
Mulenvos	42	42	84			
5 th Avenue	52	32	84			

Source: ERM, 2023

4.3.3 Baseline Structure

The Social Baseline that was completed to inform the impact assessment is presented below and includes the following sections:

- Governance and administration;
- Human rights;
- Demographics;
- Land tenure, use and ownership;
- Economy and livelihoods;
- Vulnerable groups;
- Education;
- Health; and
- Utilities, infrastructure and services.

4.3.4 Governance and Administration

Angola is divided into 18 provinces (Figure 4.51 below) and 164 municipalities. The Project falls within the province of Luanda which includes the country's capital city of Luanda. Within the province, there are 7 municipalities, and the project falls within three of them, namely Cazenga, Viana and Icolo e Bengo (Table 4.9). Municipalities are further subdivided into Communes, and the Project falls into three Communes, Viana, Kalawenda and Tala Hady (Table 4.9).



Figure 4.51 Angola's 18 Provinces

Source: <u>https://www.mappr.co/counties/angola-provinces/</u>

Table 4.9 Province.	Municipalit	ies and Com	munes that the	Project Falls	Within
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Province	Municipality	Communes		
Luanda	Viana*	Viana*, Calumbo, Zango, Mbaia		
	Cazenga*	Cazenga *, Tala Hady *, Hoji Ya Henda, Cazenga Popular, Distrito Industrial		
	lcolo e Bengo*	Catete*, Bom Jesus do Cuanza, Cabiri, Caculo Cahango, Calomboloca		
	Belas	Barra do Cuanza, Quilamba, Benfica e Massulo, Ramiros		
	Luanda	Angola Quiluanje, Ingombota, Maianga, Rangel, Samba, Sambizanga		
	Cacuaco	Cacuaco, Funda, Quicolo		
	Quiçama	Cabo Ledo, Demba Chio, Mumbondo, Muxima, Quixinje		
	Talatona	Benfica, Talatona, Camama, Futungo de Belas, Quificas		
	Kilamba-Kiaxi	Quilamba-Quiaxi, Golfe, Palanca, Sapu, Vila Estoril		

*Indicates the municipalities and communes that the Project falls into

Source: ERM, 2023

4.3.5 Human Rights

This section provides an overview of the human rights situation in Angola. This includes aspects such as the human rights performance in the country, the existing legal frameworks that are in place, including international commitments, and the State's performance in the protection of human rights.

Understanding the broader human rights context is of relevance to the Project as this can provide insights into potential human rights risk factors at the country level (for instance, where domestic law is not on par with international standards or where certain cultural practices could end up creating situations of discrimination).

4.3.5.1 National Socio-economic Context

This section provides an overview of the human rights context in Angola relevant to this Project. The assessment was based on a desk review of publicly available information on the situation in Angola. References to the human rights context in the Project area were made, albeit limited, where available.

Human Development

In the 2021 Human Development Index (HDI), Angola was ranked 148 out of 191 countries with an overall score of 0,586 out of 1. Therefore, the country has been classified as having a medium level of human development. Measuring the human development of a country is an important indicator of the level of enjoyment of economic, social, cultural, and political rights. The HDI is a summary measure of average achievements in key human rights dimensions such as education, income, and life expectancy. Between 1999 and 2021, the country's HDI value increased from 0.364 to 0.586 which represents a change of 61 per cent, noting a slight decrease since 2017. Angola is above the average score of 0.55 for the sub-Saharan Africa.

Political Participation

The Constitution of the Republic of Angola recognises the right to participate in political affairs. including voting. All citizens who have reached the age of 18 have the right to vote and stand for election for any state or local authority body and to serve their terms of office or mandates (article 54.1). No laws limit the participation of women or members of minority groups in the political process (U.S. Department of State 2023a).

While there is a multiparty system in place, competition is limited. The process of creating new political parties is fraught with bureaucratic hurdles and assimilation efforts, which significantly undermine public confidence in these fledgling parties. The opposition parties already in place continue to face challenges due to biased pro-governmental media and the use of public sources to fund the MPLA's campaign.

The MPLA controls the government and state institutions. The first municipal elections in order to appoint officials at subnational levels have been planned but postponed several times. According to political experts, the government is concerned that such elections would give the opposition an opportunity to win office and demonstrate an ability to govern (Freedom House, 2023).

Rule of Law

In 2023, Freedom House, which assesses the political rights and civil liberties in 210 countries and territories, gave Angola a score of 28 out of 100 (with 100 representing the top score) and therefore classified the country as 'not free.'

For human rights to be respected and upheld in society and business, they must be supported by a strong judicial and legal system. In regard to the rule of law, Angola ranked 113th out of 140 countries globally and 21st out of 34 countries regionally in 2022 according to the World Justice Project's Rule of Law Index. The Rule of Law Index measures the rule of Iaw, including fundamental rights, in 140 countries (World Justice Project 2022). The rule of law is an important indicator of a country's promotion and protection of fundamental human rights.

The right to a fair and public trial is established in the constitution and legal framework, and the judiciary generally upholds and enforces this right. Compensation for human rights violations can be pursued through provincial courts, appeals courts, and the Supreme Court. The legal framework permits individuals who have suffered human rights abuses to claim reparations from the state (U.S. Department of State, 2023). The independence of the judicial system from the executive branch is guaranteed by the Constitution of 2010. However, in its 2022 report, Freedom House considered the judicial system to have a limited degree of independence, receiving a score of 1 out of 4. According to

the organisation, the judiciary's overall ineffectiveness and independence are undermined by corruption and political influence exerted by the presidential party. President Lourenço's proposal for a constitutional review, introduced in March 2021 and initiated in August, includes provisions for amendments that would elevate the Supreme Court above the Constitutional Court which could further undermine the independence of the judiciary. Moreover, beyond political interference, the judiciary system also suffers from inefficient functioning due to inadequate resources and training (U.S. Department of State 2023b).

Concerning working conditions, the Labor Inspectorate is in charge of carrying out examinations, inspections, investigations, inquiries and other necessary steps to ensure that labour legal provisions are being strictly observed. However, the implementation of labour legislation has been reported to be challenging, in particular due to the lack of human resources. In 2022, Angola had only 257 labour inspectors for the country as a whole (compared to 277 in 2020) (CEACR 2023c). The number of labour inspectors does not meet the International Labor Organization's technical advice for the size of Angola's workforce (U.S. Department of Labor 2022).

Corruption

According to the 2022 report of Freedom House, corruption is common in the country and has become entrenched in nearly all aspects of public and private life. Concerning corruption, Transparency International ranked Angola 116th out of 180 countries, with a score of 33/100, ⁶ which is slightly above the regional average of 32/100. In 2019, the UN Human Rights Committee outlined that corruption in the State Party was widespread and that preventive measures and protection of whistle-blowers were not sufficient, with a low number of prosecution cases and convictions (UN Human Rights Committee, 2019). There have been a few high-profile officials from the preceding government convicted of corruption, including the former president's son; the former president's daughter has been accused of siphoning funds from the state oil firm, Sonagol, and an international arbitration court ordered her to return \$500 million in shares to the company in July 2022. However, prosecution of high-profile individuals not directly connected to the family of the former president has rarely led to trial.

Human Rights Institutions and Organizations

The 10th Commission on Human Rights within the National Assembly is responsible for investigating citizen complaints related to alleged human rights violations and offering recommendations to the assembly. In 2022, the government introduced and trained local human rights committees at provincial, municipal, and communal levels. These committees comprised government officials, civil society members, journalists, religious representatives, and traditional leaders. Their role encompassed gathering information and delivering monthly reports on human rights issues within their jurisdiction (U.S. Department of State, 2023a).

The government allows local NGOs, lawfully registered, to carry out human rights-related work. However, numerous NGOs reported they were forced to limit the scope of their work because they faced problems registering, were subjected to subtle forms of intimidation, and risked more serious forms of harassment and closure (U.S. Department of State, 2023a).

Freedom of expression and press

According to the Freedom House, the fear of facing consequences for criticizing the government or sharing controversial views is still present, leading to widespread self-censorship. Civil society groups, journalists, and academics are under surveillance, which deters citizens from openly expressing their opinions. The government also monitors online activities. Allegations have emerged regarding the potential use of spyware to track their locations and phone discussions (U.S. Department of State, 2023a). Youth organizations linked to opposition parties state that political dissent is being repressed more intensely in recent times, including through arrests, intimidation, and harassment by state security forces (Freedom House, 2023).

⁶ Transparency International's Corruption Perception Index ranks countries by their perceived levels of public sector corruption. The results are given on a scale from 0 (highly corrupt) to 100 (very clean).

The majority of media within Angola are owned by the state, leading to these outlets offering positive portrayals of the government. The government actively vets news stories in the state-controlled print, television, and radio media. Reporters employed by government-affiliated media outlets reported being subjected to job insecurity threats unless they adhered to the editorial stance of the MPLA party (U.S Department of State, 2023a). Even ostensibly independent private media sources often serve as platforms for the government's perspectives. Engaging in investigative journalism regarding governance and the judicial system frequently results in legal actions and occasionally severe penalties. Journalists complained that the government used libel laws to limit their ability to report on corruption and nepotistic practices (U.S Department of State, 2023a). Government officials frequently submit both criminal complaints and civil lawsuits against members of the press (Freedom House, 2023).

Journalists faced attacks primarily due to their coverage of corruption, inadequate governance, and human rights violations. These assaults often went unpunished. Instances of violence, harassment, and intimidation against journalists were more frequently reported compared to the previous year. In April 2023, police surrounded reporters who were covering evictions and home demolitions in Luanda, taking their equipment and allegedly shoving and hitting them with a baton (U.S Department of State, 2023a).

Poverty

The World Bank estimates that 31.1 per cent of the Angolan population lived under the national poverty line in 2018. According to the 2022 estimates published by the ILO, Angola is among the countries with the highest working poverty rate, with 51 per cent of workers living on less than \$1.90 a day. Poverty is an important indicator to take into consideration as it increases the vulnerability to exploitation.

Extreme poverty and the economic decline in the country during recent years have led to an increase in the number of children living on the street, especially in Luanda. These children, estimated to number from hundreds to several thousands, do not have access to health care or education, and live in conditions placing them at great risk for exploitation (U.S./ Department of State, 2023a).

Discrimination

According to the UN Human Rights Committee, individuals belonging to certain groups continue to face stigmatization and discrimination, in particular indigenous people, foreign nationals, persons living with AIDs, persons with disabilities or persons from the LGBTQI+ community (UN Human Rights Committee, 2019). LGBTQI+ NGOs argue that societal prejudices against LGBTQI+ identities lead to discriminatory practices with regard to family life, education, healthcare, and employment (U.S. Department of State, 2023a).

The U.S/ Department of State reported the difficulties faced by persons with disabilities in accessing public or private facilities, hampering their ability to participate in the education system and thus find (U.S. Department of State, 2023a).

While the constitution ensures religious freedom, the government places stringent requirements on religious groups to attain official recognition, which is a prerequisite for legally establishing places of worship. Numerous Pentecostal churches remain unregistered. In particular, no Muslim groups have obtained official registration, despite Muslim communities advocating for acknowledgement and the unrestricted practice of their faith (Freedom House, 2023).

Gender equality and gender-based violence

With regard to gender aspects, Angola has ratified the main international and regional instruments and is committed to the United Nations Sustainable Goal 5 which aims to achieve gender equality and promote the empowerment of women and girls.

In 2019 the employment rate for men in Angola was 64.2 per cent and 59.3 per cent for women⁷. Women's economic activity rate is economic activity rate of 85.5 per cent⁸. Approximately 62 per cent of women above 15 years old are literate in Angola, compared to 80,9 per cent of men (World Bank 2022b), and women's mean years of schooling was 4 in 2021 which is less than the regional average of 4.8 (Georgetown Institute for Women Peace and Security (GIWPS) 2022).

The country has developed a legal and regulatory framework that guarantees the principle of equality between men and women. The National Development Plan 2023-2027 and Vision 2050's aim to integrate gender equality and equal opportunities in all areas and policies of national planning, sectors and governance, both at central and local level (United Nations 2023). The 2022 Women, Business and the Law Index gave the country a score of 73.8 out of 100, which is above the regional and world average (World Bank 2022a). Discrimination based on gender is prohibited by the Constitution and the labour legislation. The Family Code also establishes equality between men and women within the family, in particular with regard to general spouses' rights and duties, parental authority as well as inheritance rights. The main areas of improvement for legal equality relate to laws affecting women's pay, women's work after having children, or the size of women's pensions. Moreover, in practice, women continue to face challenges linked to traditional stereotypes and practice under customary law, which can have adverse impacts on the enjoyment of their civil and political rights (UN Human Rights Committee, 2019). With regard to access to land for instance, the Committee on the Elimination of Discrimination against Women (CEDAW) recommended Angola to guarantee equality in land acquisition and retention, including through inheritance and under both traditional and statutory law, and to facilitate women's access to the judiciary system to challenge instances of uneven land distribution (CEDAW, 2019). In the same report, the Committee highlighted the multiple and intersecting forms of discrimination that rural women, women and girls with disabilities, with albinism, living with HIV/AIDS and in prostitution, lesbian, bisexual and transgender could face. These intersecting discriminations have resulted in structural restrictions, in particular with regard to access to health services, employment, education, housing and justice, but also participation in public and political life (CEDAW, 2019).

In 2022, Angola experienced a slight improvement in its gender gap index score and achieved a score of 0.64. This score indicates that women in the country were still 36 per cent less likely to have equal opportunities as men. The greatest disparities were observed in the area of Political Empowerment. In terms of regional performance, Angola ranked 28th out of 36 nations in Sub-Saharan Africa, indicating one of the lower rankings in the region (World Economic Forum 2022). Throughout the country, 79.7 per cent of women ages 25 and older were employed in 2021 which allows the country to receive a good score in labour-force participation. Yet, Angola ranks 99th out of 146 in the 'economic participation and opportunity' category, due to unequal wages for similar work and unbalanced representation of women among professional and technical workers, legislators, senior officials and managing positions. In 2018, the CEDAW raised concern about the existing occupational segregation characterized by the concentration of women in the informal labour market and low-paying jobs, and its effect on access to food subsidies, maternity allowances and credits as it is conditional to employment in the formal sector (CEDAW, 2019).

According to the Women Peace & Security Index for 2021/2022 (GIWPS 2022), Angola is ranked 144th out of 170 countries with regard to women's inclusion, justice, and security. Angola is placed at the bottom quintile and received a lower score (0.609) than the average score for Sub-Saharan Africa (0.658).

Angola issued a law criminalizing domestic violence in 2011 and adopted a National Policy on Equality and Gender Equity seeking to protect women against violence. The law criminalizes domestic violence and penalizes offenders with prison sentences of up to eight (8) years and monetary fines. Rape, including spousal rape and intimate partner rape, is now illegal and punishable by up to 12 years' imprisonment. The law was not enforced effectively due to limited investigative resources, poor

⁷ The employment rate as an indicator evaluates the ratio between the employed population and the total population

⁸ The economic activity rate allows for evaluation the ratio of the economically active population (employed & unemployed) to the total population of age 15+

forensic capabilities, and an ineffective judicial system prevented prosecution of most cases (U.S. Department of State, 2023). Gender-based violence is still perceived as one of the most important issues faced by women. In 2018, 25 per cent of Angolan women reported that, within the previous year, they had suffered physical and/or sexual violence perpetrated by a current or former romantic partner (UN Women 2023). In 2021, the UN Women adviser stated that domestic violence and sexual harassment constituted two prominent barriers for women to access and retain the formal labour market (Afrobarometer 2023). The 2022 Afrobarometer reveals that a significant majority of 62 per cent of individuals perceive violence against women as a 'very common' phenomenon (Verangola 2023).

4.3.5.2 Human Rights Issues in Angola

Generalities at the country level

According to the U.S. Department of State's 2022 Angola Human Rights Report, the main human rights problems present in the country relate to unlawful or arbitrary killings, including extrajudicial killings, cases of cruel, inhuman, or degrading treatment or punishment by government security forces; harsh and life-threatening prison conditions; arbitrary detention; political prisoners or detainees; serious restrictions on free expression and the press, including violence, threats of violence or unjustified arrests against journalists, censorship, and enforcement or threat to enforce criminal libel laws; interference with the freedom of peaceful assembly; serious government corruption; lack of investigation of and accountability for gender-based violence; and crimes involving violence or threats of violence targeting lesbian, gay, bisexual, transgender, queer, and intersex persons. Accountability for human rights violations remains restricted due to inadequate oversight mechanisms, insufficient institutional capabilities, a prevailing sense of impunity, and pervasive governmental corruption.

Workers' rights

The government reportedly respects and protects the rights of workers to form or join unions of their choice, to engage in collective bargaining, to conduct legal strikes, and to assemble peacefully. However, there have been allegations of retribution against strikers, including suspension of salaries and threats of dismissal. In 2023, the ITUC reported that striking workers had been replaced by new hires at Angola-Telecom and at the Caculu Cabaça hydropower plant construction site, two publicly owned companies (ITUC 2023b). In addition, responses to striking workers by security forces have been violent. It was reported that on May 26, 2022, several unidentified members of a security force (composed of both public and private security forces) fired on unarmed striking workers, killing three and injuring eight of them. In 2022, a complaint was filed to the ILO highlighting efforts to marginalize the União Nacional dos Trabalhadores de Angola – Confederação Sindical, including suppressing freedom of expression, government interference in UNTA-CS matters, and threats of deregistration. The complaint outlines an overall environment of heightened violence against trade unionists and workers (ILO 2022b).

Security forces

More generally, Angola's state security forces have been consistently reported to be implicated in grave human rights violations, such as extrajudicial killings, violent dispersal and disproportionate use of force against peaceful demonstrators, arbitrary arrests and detentions (Human Rights Watch 2023a). In this regard, the pre- and post- 2022 presidential election periods were particularly mired with human rights abuses (Amnesty International 2023). In 2019, the UN Human Rights Committee denounced the use of excessive force, including the use of dogs, intimidation and arbitrary detention against peaceful protestors. In the same report, the Committee also raised its concern about allegations of torture and ill-treatment by the police and other public security forces during arrests, interrogations and at detention facilities (UN Human Rights Committee, 2019).

The Movement EU SOU TRANS Angola reported 10 cases of discrimination against transgender women sex workers in Luanda between 2020 and the end of 2022, including cases of arbitrary

detention due to intolerance and transphobia and an incident of sexual violence by a police officer (U.S Department of State, 2023a).

Freedom of press

While an improvement had been noticed after President João Lourenco's election in 2017, journalists have reportedly faced attacks on several occasions in 2022, primarily due to their coverage of corruption, inadequate governance, and human rights violations, including related to land topics. Compared to the previous year, journalists reported a higher number of incidents involving violence. verbal and physical attacks, harassment, and intimidation. In parallel, several domestic and international human rights groups investigating government corruption and human rights abuses alleged government interference in their activities with the aim of discouraging from engaging in certain activities deemed politically sensitive.

Land issues

According to the U.S. Department of State's 2022 Investment Climate Statements, in Angola property rights enforcement remains difficult. In particular, international human rights organizations have been denouncing the expropriations of communal grazing land for commercial ranching in southern Angola as it exacerbates food shortages for the communities due to limited access to alternative grazing land.

In Luanda, the forced eviction of formal and informal settlers in urban and peri-urban areas by the government has heightened tensions. Protests have arisen, arguing that proper legal procedures were not followed and neither relocation nor adequate compensation was not given (Human Rights Watch 2023b).

In urban/peri-urban areas, access to land is less dependent on inheritance and distribution by the soba and more dependent on the land market. Consequently, land is more valuable in urban and periurban areas and the pressure on space is greater, resulting in challenges in accessing land (Foley, 2007).

Child and forced labour

According to the 2015–2016 Survey on Multiple Health Indicators, approximately 23 per cent of children aged 5 to 17 were involved in child labour. The prevalence of child labour is higher in rural regions in comparison to urban areas, and mainly occurs in agriculture, industry and services. Forced labour of adults occurred in several economic sectors including fishing, agriculture, construction, domestic service, and artisanal diamond-mining sectors, particularly in Lunda Norte and Lunda Sul Provinces. Migrant workers faced passport confiscation, threats, lack of food, and confinement. Undocumented Congolese migrants, both adults and children, entered Angola seeking employment in regions known for diamond mining. Some of these migrants, particularly those working in mining camps, fell victim to exploitation by traffickers who forced them into labour or engaged them in sex trafficking. In 2019, the UN Human Rights Committee raised its concern about reports of complicity of law enforcement officials in trafficking (UN Human Rights Trafficking, 2019). Congolese migrants are also reported to be exploited in construction activities. Furthermore, there are allegations that girls as young as age 12 were subjected to human trafficking from Kasai Occidental in the Democratic Republic of the Congo to Angola for forced labour and commercial sexual exploitation.

Refugees

The 2015 asylum law, which was intended to grant refugees and asylum seekers access to essential services, has not been fully implemented by the government. According to reports from the UN High Commissioner on Refugees, NGOs, and testimonies from refugees themselves, urban refugees encountered challenges in accessing public services like healthcare and education. Expired documentation has been an important issue, preventing refugees from various benefits such as land ownership, vehicle ownership, acquiring business licenses, obtaining birth certificates for children born in the country, and accessing education beyond primary school (U.S. Department of State, 2023a).

Treatment of undocumented migrant workers

The United Nations recently reported that 12,000 Congolese migrants, mostly undocumented, entered Angola for work through the border near the town of Kamako. Angola has reportedly deported thousands of these illegal migrants, including vulnerable children and women. Angolan security forces are being accused of serious human rights abuses, including rapes of women and children, during the large-scale expulsion process of these migrant workers (Human Rights Watch 2023a).

Discrimination

The UN Human Rights Committee raised its concern about reported discrimination in access to food, water, health and education experienced by ethnic minorities (UN Human Rights Committee, 2019).

According to the U.S. Department of State, local and international health NGOs have reported discrimination against persons with HIV as a common practice, including concerning employment. Although discrimination based on HIV status is illegal in Angola, the lack of enforcement by authorities allowed employers (U.S. Department of State, 2023a).

4.3.6 Demographics

4.3.6.1 Population

According to the 2014 Census, the population of Angola is approximately 25,789,024 inhabitants, 52% of which are women and 48% are men. In that same year, 63% of the population resided in urban areas, with the remaining 37% residing in rural areas, with a national population density of 21 inhabitants per km². In Angola, life expectancy is 60.2 years, and the average age of the population is 20.6 years.

Of the 18 provinces in the country, Luanda is the most populous with an approximate population of 6,945,386 inhabitants, about 27% of the country's population (Figure 4.52). Holding an area of 18,835 km², the province of Luanda has the highest population density in Angola (369 people/ km²) (Census 2014). Within the province, 97% of inhabitants live in urban areas and 3% in rural areas.



Figure 4.52 Population Density by Province in Angola

Source: Census, 2014

Of the seven municipalities that make up the Luanda Province at the time of the last census, the municipality of Luanda is the most populous with nearly 2.2 million inhabitants (Figure 4.53, Figure 4.54 below). According to the 2014 Census, the population in the Viana municipality is approximately 1.6 million people. Of this population, 98% of inhabitants live in urban areas and 2% in rural areas. The Viana municipality covers an area of approximately 693 km² the majority of which falls within the boundaries of Luanda City, hence the significant urbanised population. The population density is approximately 3,000 people per km².

According to the 2014 Census, the population in the Icolo e Bengo municipality is approximately 81,144 people, considerably less than the Viana Municipality. Of this population, 75% of inhabitants live in urban areas and 25% in rural areas. This municipality falls on the outskirts of the city of Luanda. As a result of urban sprawl, the majority of the population is urbanised, however, there is still a significant rural population. The municipality covers an area of approximately 3,000 km² and the population density is estimated at 47,000 people per km².

According to the 2014 Census, the population in the Cazenga municipality is approximately 892,401 people. The population density is estimated to be approximately 24,435 people per km². This municipality is close to the centre of Luanda City, and as such the population is entirely urbanised.



Figure 4.53 Distribution of the Resident Population per Municipality in the Province of Luanda

Source: Census, 2014



Figure 4.54 Population per Municipality in Luanda

Source: Census, 2014

4.3.6.2 Age and Gender Distribution

According to the 2014 Census, the majority of the population in Angola (52%) are women and 48% are male. The masculinity index expresses the ratio between men and women and at a national level is 94, meaning that in Angola, there are on average 94 men for every 100 women. Figure 4.55 compares the masculinity index across all provinces in Angola.



Figure 4.55 Age and Gender Distribution Chart of Luanda

Source: Census, 2014

The masculinity index expresses the ratio between men and women. In the province of Luanda 3,401,996 of the resident population are men, accounting for 49% of the province's population, while there are 3,543,390 women, representing the remaining 51% (Census, 2014). The masculinity index is 96, marginally higher than the national level, meaning there are an average of 96 men for every 100 women.

The masculinity index per municipality in Luanda is shown in Figure 4.56 below. In the municipalities of Icolo e Bengo (107) and Quissama (115), the masculinity index is higher than 100, indicating more men in these provinces than women.


Figure 4.56 Masculinity Index per Municipality in Luanda

Source: Census, 2014

Luanda's population is relatively young, with 43% being 0-14 years old (Figure 4.57), and 62% being 0-24 years old. There is a huge gap between young and old people in Luanda, and only about 2% of the population us above 65. Roughly 55% of the province's population is of working age, between 15 and 64 (Census, 2014).



Figure 4.57 Population % aged 0-14 years old

Source: Census, 2014

The aging index corresponds to the ratio between the population aged 65+ and the population aged 0-14 years. In 2014, the aging index in Luanda was around 3.4, which means that for every 100 people aged 0-14, there were only 3 people aged 65+. In all municipalities, the population aged 0-14 is greater than the population aged 65+. The municipalities of Viana, Belas and Cacuaco have the lowest aging rate of the province, below 4. The municipality of Icolo e Bengo has the highest index, about 10. The graph below presents the percentage of the population aged between 0-14 per municipality (Figure 4.58).





Source: Census, 2014

In Angola, the population of 0-14 years old is 12,196,496 people which represents 47% of the total resident population. The three provinces that hold more than half of the total population aged 0-14 are Huambo, Bié and Moxico; Luanda holds the fewest.

The working-age population (population aged 15-64 years) in Angola is 12,980,098 people, representing 50% of the country's population, while the population aged 65 and over is only 612,430 people (2% of the country's population). The proportion of the population aged 65+ is lowest in the Luanda province.

The longevity index represents the relation between the population aged 75+ and the total population of 65+. In 2014 this index was 35. At the municipal level, Quissama has the lowest index (29.4), with loolo and Bengo being the municipality with the highest index (36.6), which means that about 37% of its elderly population are older than 75 years (Figure 4.59).





Source: Census, 2014

The rejuvenation index represents the relation of the population aged 20-29 to the population aged 55-64. In Luanda province, the rejuvenation index was recorded at 684.8 during the 2014 Census. As such, for every 100 people who leave the labour market, around 685 enter. This is a significant rejuvenation rate and much higher than the national average.

The rejuvenation index is highest in Belas municipality at 813,9, followed closely by Viana. Icolo e Bengo has the lowest rejuvenation index of all the municipalities in Luanda at 334.8 which is also lower than the national average. Cazenga municipality had a rejuvenation index of 633.1. The rejuvenation indices for all municipalities in Luanda are shown in Figure 4.60.





Source: Census, 2014

The index of sustainability potential presents the relationship between the number of individuals that fall within the working-age group (15-64) by each individual above 65. The municipalities of Belas, Viane and Cacuaco have the highest sustainability indexes of 48, 43, and 42 respectively, which are all above the provincial average of 37.3. The municipalities of Quissama (18,5) and Icolo e Bengo (13,0) have the lowest indexes (Figure 4.61).





Source: Census, 2014

4.3.6.3 Ethnicity, Language and Religion

Portuguese is spoken by more than half of the population (71%) in Angola, with a greater predominance in urban areas, where 85% of the population speaks Portuguese, while only 49% speak Portuguese in rural areas. Umbundu is the second most spoken language (23%), followed by Kimbundu (7.8%), Kikongo (8.2%) and Cokwe (6.5%).

Portuguese is also the dominant language in Luanda province. The prevalence of languages in Luanda province is detailed in Figure 4.62.



Figure 4.62 Languages Spoken in Luanda Province (%)

Source: Census, 2014

Based on the field survey results, the primary language spoken across all 5 sites within the Direct Aol was Portuguese (Figure 4.63). However, the local languages spoken at each site varied considerably. At SME, Kikongo was the second most prominent language. Kikongo was also seen at Mulenvos. At Viana, Umbundu and Cokwe were common. At the Estalagem site, Kimbundu and Umbundu were common. Kimbundu was the most common local language at the 5th Avenue site.

Protestantism is the predominant religion in Luanda province, practised by 39% of the population, followed by Catholicism with 31%, 12% non-religious, 0.8% Islamic, and 17% other. Results from the field surveys in the Direct AoI found that Catholicism was the most widely reported religion amongst households surveyed at Viana, Estalagem and 5th Avenue. At SME, evangelical Christianity was more widespread whilst at Mulenvos, the Pentecostal form of Christianity was the most common. None of the sites reflected the provincial trend of the dominance of Protestantism.

The Ovimbundu are the largest ethnic group in Angola, making up 37% of the population of Angola as of 2021. The Ambundu constitute 25% of the Angolan population, while the Bakongo account for 13%.

Within the Direct Aol, survey results found that there were numerous ethnic groups represented. Atat SME, Kimbundu and Bakongo were the only ethnic groups represented, the latter being the most common.



Figure 4.63 Ethnicities at Four of the Overpass Sites

Source: ERM and BDM Social Survey, 2023

In 2014, 176,765 (2.5%) of Angola's residents were foreign nationals. Of these, the highest concentration lives in Luanda municipality (39%), followed by 19% in Viana municipality. Together these represent 58% of the foreign population. The percentage distribution of the foreign population by municipalities shows that the municipality of Luanda has the highest concentration of foreign populations (39%), Viana municipality follows with 19%. These two municipalities together represent 58% of the foreign population of the province of Luanda (Figure 4.64)



Figure 4.64 Concentration of Foreign Population by Municipality in the Luanda Province (%)

Source: Census, 2014

4.3.6.4 Migration Patterns

Within Angola, rural-urban flow, driven usually by inadequate infrastructural development, unemployment, and lack of provision of basic social services in rural areas is the prominent form of internal migration. Poverty at the national level stands at 41%, and the incidence of poverty rate is almost three times higher in rural areas (57%) than in urban places (17.8%). People are, therefore, leaving rural areas and moving into cities, such as Luanda, in search of employment opportunities. The rate of urbanisation in Angola stands at 4.04%³.

According to the United Nations High Commissioner for Refugees (UNHCR), Angola has 56,114 refugees as of July 2023, migrating from the Democratic Republic of the Congo (DRC) (23,255), Guinea (9,272), Ivory Coast (6,357), and Mauritania (5,725). Other countries represented in the population of concern include Somalia, Sudan, Eritrea, Chad, and Rwanda). The majority of these refugees are from the DRC (43.6%) many of whom entered Angola from the Kasai following a period of conflict in 2017. A total of 67% of refugees in Angola are located in Luanda Province (UNHCR, 2023). Recently, natural disasters, like floods and droughts, have been the main drivers of internal displacement in Angola. According to the Internal Displacement Monitoring Centre (IDMC), as of December 2020, there were a total of 790 Internally Displaced People (IDPs) in Angola as a result of environmental disasters.

Figure 4.65 below presents an overview of the statistics of registered entries and exits of nationals and foreigners residing in Angola between 2015 and 2019.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Designação	Total	2015	2016	2017	2018	2019
Entries	6 999 595	1 709 550	1 387 795	1 179 874	1 214 078	1 508 298
Nationals	3 086 267	694 590	567 675	539 239	572 401	712 362
Foreigners	3 913 328	1 014 960	820 120	640 635	641 677	795 936
Exits	7 204 932	1 697 258	1 414 650	1 213 816	1 267 186	1 612 022
Foreigners	3 369 998	758 352	624 282	608 884	597 961	780 519
Types of Visa & Others	3 834 934	938 906	790 368	604 932	669 225	831 503
Long Stay Visa's	2 053 213	380 659	289 994	382 298	556 110	444 152
Chart Stay Visa's	274 517	69 136	54 269	67 884	35 731	47 497
Short Stay visa s	175 013	53 204	20 244	26 307	18 620	56 638
Passports Issued	754 848	172 636	115 628	206 024	67 717	192 843
Administrative Expulsions	326 594	40 546	80 278	37 451	59 810	108 509
Judicial Evictions	20 759	234	1 626	4 167	10 660	4 072
Voluntary Departures	425 626	34 841	5 251	24 257	331 937	29 340
Abandonment Invitations	2 217	421	367	322	674	433
National Exit Impediments	4 346	484	618	1 017	993	1 234
Impediments to Foreign Exits	391	46	115	42	114	74
Refusals of Entry into the county	33 301	1 936	2 341	2 277	26 229	518
Fines	23 133	6 641	8 979	2 061	2 925	2 527
Detained	12 468	534	278	10 489	700	467

Figure 4.65 Entry and Exit of Nationals and Foreigners Residing in Angola, 2015-2019

Source: Directory of Social Statistics (2021)

4.3.7 Land Tenure, Use and Ownership

Legislation related to land tenure, use and ownership is presented in the Section 3.1.

4.3.7.1 Informal Settlements and Urbanisation

Luanda, like other urban areas in Angola, experienced rapid urbanisation, leading to the growth of informal settlements. Land tenure in these areas is often insecure, with many residents lacking formal property rights. In 2012, Luanda was home to about six million people, and its population continues to grow. In the years of conflict during the civil war, millions of people sought refuge in the safety of the capital region and settled in the musseques (informal slum settlements) on the periphery of the city. Estimates stipulate that three-quarters of Luanda's population lives in peri-urban areas or informal settlements.

4.3.7.2 Major Land Management Issues

Upon gaining independence, the departure of many colonial civil servants resulted in the abandonment of the formal colonial land registry, which ceased to be effectively managed and updated. This has created a significant challenge for urban land management in Angola. Specifically, the absence of current municipal land registries and a comprehensive database for housing and real estate poses various issues. One of the primary consequences is the restriction of access to land, hindering the smooth transfer of land rights and pushing people toward informal land arrangements. Additionally, it serves as a barrier to obtaining credit for housing and the development of a mortgage market, limiting opportunities for urban development.

Another significant obstacle to effective urban land management in Angola is the inadequate administration of land resources, accompanied by weak tenure rights for a majority of urban residents. Despite the enactment of numerous laws and regulations concerning land, urban development, and housing since the 2004 Land Law, these regulations often face inconsistent implementation in practice.

Compounding these issues are distortions in the land market due to deficient land development and management policies. This includes slow provision of infrastructure and services, deficient land information systems, and cumbersome, protracted, and convoluted land transaction procedures.

Consequently, an extensive and active 'parallel' land management system has emerged, particularly prevalent in many areas of Luanda, where it has become the dominant force in the land market.

4.3.7.3 Parallel Land System

The parallel land system is the informal, often unregulated, and unofficial land market and land management system that operates alongside the formal, legal land tenure system. People buy, sell, or lease land without proper documentation or adherence to formal land laws and regulations. Traditional or customary land tenure practices sometimes play a significant role in the parallel land system. Communities may have their own rules and norms for land allocation and use, which may not align with formal legal requirements. The rapid urbanisation of Luanda has led to increased demand for land, often outstripping the capacity of the formal system to allocate and manage land efficiently. This has driven many residents to turn to informal channels to secure land for housing and other purposes. Another factor of people turning to the informal land system are land scarcity and high prices for land in urban settings. The parallel market offers many people more affordable options in comparison to the official system. A case study (Urban LandMark, 2013) commissioned by the World Bank based on research undertaken by Development Workshop Angola with technical support from Urban LandMark found the following characteristics of land markets in peri-urban areas/ musseques in Luanda:

- The majority (61%) of sales are in cash.
- They are generally well recorded because of the dominance of documented evidence that buyers use to back up their claims (60%) but remain 'off-register'.
- They are perceived as secure by an overwhelming majority (85%) of buyers.
- They enjoy a strong local legitimacy due to this perception as well as the widely used documented evidence.
- They are based on rights that are legally uncertain, as only 6.8% of transfers can be backed up by legally defensible documents to secure people's tenure.
- They rarely represent spontaneous occupations or attempts to legitimise squatting on vacant land (6% of cases).
- A total of 61.3% of the sample surveyed bought their land on the informal market and can demonstrate declaration of purchase or sale contracts.
- Only 14.4% of householders surveyed had no documentary proof of occupation and could conceivably be regarded as squatters.
- 85% of the population surveyed considers their tenure secure and their occupation legitimate, even though these claims are not currently defensible in law.
- Only 6.8% of the households studied had documents that the state considers to be proof of legal occupation.

4.3.7.4 Transactions and Financing

The informal nature of Luanda's real estate market is evident in how land transactions are conducted. An overwhelming 90% of these transactions occur directly between the buyer and the previous landowner, with only 2% involving the use of agents or intermediaries. Additionally, just 8% of land deals are formalised through local government offices or recognised neighbourhood commission coordinators, typically with the issuance of official legal documents or titles by municipal or provincial authorities. This means that even when transactions may be socially accepted, supported by documentation and witnesses, the legal status of land ownership is often technically unauthorised and remains so in most cases. This situation underscores that, within the informal land sector, land holds commercial value, and transactions occur at market rates, despite the state's official ownership of the land. Consequently, both formal and informal land markets coexist in Luanda, with formal markets operating on legally titled land or government-designated housing reserves, while informal markets dominate the remaining untitled land.

The formal banking sector has shown hesitance in venturing into the informal real estate market. A substantial majority of the funding for land acquisition and home construction primarily comes from family (59%) and friends (25%). Interestingly, most applications for housing mortgage loans within the informal sector are declined by banks, with an 86% rejection rate observed in their assessments. The banks' rationale for their reluctance to finance land for housing can be attributed to several factors. These include the absence of clear land-related legislation, notably the absence of a land registry in these areas, which restricts the use of property as collateral. Additionally, extended repayment periods, the absence of a government credit policy, the lack of ownership documents among borrowers, and a prevailing lack of borrower adherence to timely loan repayment practices are cited as justifications by the banks (Urban LandMark, 2013).

4.3.7.5 Land Tenure in the Direct Aol

Various property types and structures are found in the Direct Aol for the five overpass sites, ranging from commercial, residential, non-residential structures (e.g. animal shelters, schools, churches, etc.) and industrial properties. The ownership of these structures and associated land is governed by Angolan legislation which often does not ensure security of tenure.

SME

Of the three household surveys conducted at the SME site, two of the respondents reported that they were in the process of acquiring legal ownership of the land. As such they currently do not have security of tenure. The last respondent reported that they were an occupant of the land but had no formal title deed and did not pay rent. This equates to no security of tenure and little opportunity for this status to improve in the future. The situation can be further explained as the respondent was unaware of who owned the property.

Viana

During the household surveys conducted in Viana, one-third of respondents refused to clarify their tenure status or did not know their status. A notable 27% were registered owners who had already paid off their loans/ mortgages linked to the property while 17% were in the process of acquiring legal ownership and 20% were rent-paying tenants. Only 1 respondent was an occupant of a property without a formal title deed and paying no rent. Of those who were a tenant, the majority (50%) rented privately, while 25% rented from a family member. Although not a common occurrence, 4 of the respondents reported that they rented from a landlord that also lived within the same property (8% of total survey respondents).

Of the businesses that were surveyed in Viana, the majority occupied the space without a formal title or rental agreement (34%). Similarly, 26% did not know the tenure status of their business premises and 16% were in the process of acquiring legal ownership. Only a limited number were the registered owners of the property in which their business was located (11%), had the business within their family home (1 respondent), or were a rent-paying tenant (1 respondent). Three respondents did not disclose the tenure status of their business.

Estalagem

In Estalagem, the majority of household survey respondents were rent-paying tenants (34%). This was closely followed by 26% of respondents who were registered owners with paid-off loans/ mortgages. Similarly, 24% were in the process of acquiring legal ownership. Only 1 respondent out of the 41 total was an occupant without a title deed and not paying rent. Of those who rented their properties, 71% rented privately with the remainder not disclosing their rental agreement status.

Mulenvos

In Mulenvos the majority of survey respondents (41%) were registered owners of their property with a paid off loans/ mortgage. There were also 29% in the process of acquiring legal ownership and 24% were tenants. Only one respondent was an occupant of a property without any legal title or rental agreement. There was a relatively even split among the renters who had agreements with private landlords or family members.

5th Avenue

In 5th Avenue, the most prominent land tenure status was individuals in the process of acquiring legal ownership of their properties (43%). There were also a significant number of respondents who were registered owners who had paid off their property loans/ mortgage (33%). The remainder of respondents were largely rent-paying tenants (20%) with only 4% having no legal title or rental agreement.

4.3.8 Economy and Livelihoods

4.3.8.1 Employment and Unemployment

The employment rate is a calculation of what percentage of the working-age population (aged 15 and over) are economically active in some form of employment. In 2019, the employment rate for men in Angola was 64.2% and for women was 59.3% (Relatório Tématico Sobre o Genéro report, 2020). Women are at a disadvantage in entering the labour market as they often have attained lower levels of education and have limited access to technical or vocational training opportunities. As of 2019, at least 30.6% of women in Angola are unemployed, male unemployment is 27.4% (Figure 4.66).



Figure 4.66 Unemployment rate in Angola in 2019

Source: Relatório Tématico Sobre o Genéro report, 2020

Unemployment must be analysed from a gender perspective since women are subject to patriarchal practices that limit their autonomy and freedom. This impacts not only their decision-making power but also the organisation of their time, which is always in favour of family and child-rearing. When looking at activity rates (the relationship between the economically active population and the total working-age population (aged 15 or over)), it is evident that women have an economic activity rate of 85.5% showing that despite barriers to formal education and employment, women still find some form of economic activity that suits their lifestyle (Relatório Tématico Sobre o Genéro report, 2020). This is often within the informal economy such as roadside trading. Women in rural areas are also engaged in agricultural activities.

In 2014, the number of unemployed in Luanda Province was 672,649 individuals, which corresponds to a rate of 33% unemployment at the provincial level, which gives the province of Luanda one of the highest unemployment rates in the country, as can be seen in the following Figure 4.67.



Figure 4.67 Unemployment Rate per Province, 2014

Source: Census, 2014

The highest unemployment rates were found in the municipalities of Cacuaco and Viana with 43% and 34%, respectively. On the other hand, the municipalities of Icolo e Bengo and Quissama present unemployment rates of 24% and 23%, respectively Figure 4.68.



Figure 4.68 Unemployment Rate per Municipality in Luanda

Source: Census, 2014

The graph below (Figure 4.69) shows that unemployment is a challenge in Luanda province as the economic activity rate remains low and unemployment within all age groups is significant.



Figure 4.69 Economic Activity Rate by Age and Sex in Luanda Province

Source: Census, 2014

4.3.8.2 Economic Activities – Primary, Secondary, Tertiary

The economically active population is considered to be the population aged 15 years or more (INE, Census, 2014). Most of the activities related to the labour market are concentrated in the primary sector of the economy. Overall, 40% of the population aged 15 years and over are in the labour market and of these, 44.2% are allocated to the primary sector, 6.2% to the secondary sector and 26.2% to the tertiary sector.

In Angola, the main form of occupation for both men and women is within the agriculture, forestry and fisheries sectors (42.6%). Other common sectors include security services and sales (25%), unskilled workers (7%), skilled industrial, construction and craft workers (6.4%). Women dominate the agricultural and sales sectors while men dominate the construction sector and other technical sectors. The majority of employment in Angola is within sectors that require little or no technical training. In any sector where technical training is required men dominate, indicative of the gender disparities in education.

Throughout Angola, 46% of households practised some kind of agricultural activity, such as the cultivation of cereal crops. The province of Luanda had a low rate, compared to the national average, of households practising agricultural activities, represented by a rate of 12% illustrated in the Figure 4.70 below. The municipality of Icolo e Bengo, with 53%, has the highest proportion of households practising agricultural activities, while Cazenga has the lowest proportion with only 8% of such households. This is indicative of the largely urban nature of the province and in particular municipalities close to or inclusive of Luanda City.



Figure 4.70 Households Engaged in Agricultural Activities by Province, 2014

Source: Census, 2014.

In Luanda Province, there are 3,945,102 people within the working-age population. Of these 52% are economically active, 35% are employed and 17% are unemployed. The employment rate as an indicator evaluates the ratio between the employed population and the total population. Overall, the employment rate of the population aged 15 years and over in the Luanda Province was 35.3% at the time of the census in 2014.

The economic activity rate allows for the evaluation of the ratio of the economically active population (employed & unemployed) to the total population of age 15+ (Figure 4.71). In 2014, the rate of economic activity was 52.4% In Luanda Province, being 63.2% male and 42% female. The municipality of Quissama has the highest economic activity rate, with 62.3%, followed by the municipality of Icolo e Bengo with 56%. The municipalities of Cacuaco and Viana have the lowest rates with 48% and 51% respectively. The economic activity rate accounts for those who are employed through the informal sector and would not be accounted for in traditional employment rates.





Source: Census (2014)

In Luanda Province, wholesale trade and retail are the most represented economic activities in the province, as visualised below (Figure 4.72).



Figure 4.72: Percentage of the Population in Luanda Province Involved in Economic Activities, 2014

Source: Census, 2014.

4.3.8.3 Overview of Economic Activities in the Direct Aol

Economic activity in the Direct Aol comprises primarily trading in small established shops or roadside informal trading in the form of mobile stands or mobile services, such as taxis and motorbike taxis. Mobile trading is the temporary trading activity from a location which is typically vacated once trading has ended for the day. Examples are roadside stalls, e.g., selling fruit, rice, small goods etc. There are several roadside traders in the Project Aol that engage in a form of commerce that often operates outside of established regulatory frameworks. Roadside trading often provides marginalised individuals access to economic opportunities in the absence of formal employment options.

SME

As the SME site is located on the outskirts of Luanda City and close to the border of Icolo e Bengo, it has very few residential areas and commercial activities taking place. This area is largely more rural than the other overpass sites. There is a large business located adjacent to the project footprint which produces plastics products (Soruty Comercio E Industria (SU)) as well as a government services department for immigration. There are a small number of mobile informal traders and no small or medium-sized businesses.

Mobile Traders

The mobile traders sell food and other goods at stalls at the roadside. There are also motorcycle taxi traders that collect customers from the main road and transport them on the smaller roads into the residential areas. In total 33 mobile traders were surveyed at SME with the majority being motorcycle taxi drivers (22) and the remainder were street vendors (9) and goods drivers (2). The street vendors were all engaged in selling food items (mainly drinks and fruit).

Transport appears to be the main sector of employment at the intersection at SME. Within Luanda, various forms of transport are used depending on the informality of the area. Commuters often use public buses or private minibus taxis to travel along the main roads through the city which are paved. Once they reach a more informal area of the city without paved roads, they will transfer to a private motorcycle taxi or small vehicle which will be better suited to navigating the narrow dirt roads that are common in the informal residential areas (Figure 4.73).



Figure 4.73 Motorcycle Taxi Driver at SME

Source: ERM, 2023

Those engaged in these informal economic activities are predominantly youthful, indicative of the barriers many young people experience entering the formal economy in Angola (Figure 4.74).



Figure 4.74 Age of Surveyed Traders at SME

Source: ERM and BDM Social Survey, 2023

Many of the traders surveyed were reliant on SME to support their economic activities as they used the income generated to support their families and benefited from the intersection being busy and having a lot of foot traffic. Seven of the traders also stated that they lived nearby, making SME a convenient place to trade, while a further 7 stated that they had few alternatives to trading at SME to support themselves and their families. Only 2 survey respondents felt that trading at SME had no benefits.

For many of the survey respondents, SME was still a good option for trading despite a number of hardships. For instance, 15 respondents reported that the road conditions in the area were poor, making the use of motorcycle taxis difficult and dangerous. Additionally, 15 respondents reported that crime was an issue in the area. Despite these difficulties, 30% of traders travel into the area to specifically trade at SME due to the guaranteed customer base.

There is a relatively even split in the type of customers which the traders at SME reported. A small majority were men who lived within 1km. This was closely followed by women who lived within 1km and youth who lived within 1km. People passing through the area were also common. The types of customers at SME are detailed in Figure 4.75 below.



Figure 4.75 Types of Customers at SME

Source: ERM and BDM Social Survey, 2023

Many of the traders at SME are relatively new to the area and have not been trading at the intersection for a long time as shown in Figure 4.76. For the vast majority (70%) trading at SME is their only source of income. These traders are particularly vulnerable as although they are heavily reliant on this economic activity it is still not enough to pay for all their bills every month (73%) and many of the traders have no savings or access to credit owing to their informality (64%). At least 76% of the traders surveyed said that they would be capable of moving to a different area to trade if they were not able to operate at SME, while 12% stated that they would not be able to trade elsewhere.



Figure 4.76 Time Trading at SME

Source: ERM and BDM Social Survey, 2023

Viana

The Viana site is within an area of urban sprawl on the outskirts of Luanda. As such it is more periurban and has a greater presence of residential properties, small and medium-sized businesses and informal traders than SME.

Mobile Traders

At Viana, 75 mobile traders were surveyed, the majority of which (44) were female. The age structure of these traders was similar to SME and largely youthful as shown in Figure 4.77.



Figure 4.77 Age of Traders at Viana

Source: ERM and BDM Social Survey, 2023

The Viana site appears to be a popular intersection for foot traffic from the main road to residential areas. As a response to this the area is frequented by a large number of street vendors. Of the respondents to the survey, 26 were street vendors, 24 were motorcycle taxi drivers, 1 was a minibus taxi driver. Four respondents were engaged in other economic activities such as shoe making and construction. There was a wide range of goods and services for sale at Viana within the informal sector as shown in Figure 4.78. The market was dominated by motorcycle taxis and food and drink vendors.



Figure 4.78 Informal Traders at Viana

Source: ERM, 2023



Figure 4.79 Goods and Services for Sale at Viana

Source: ERM and BDM Social Survey, 2023

For many of the traders at Viana, the intersection is a preferred location through necessity and a lack of other options for employment (51%). For others, it is a favoured place, often due to the number of customers from the foot traffic (36%) and the proximity to home (11%). Other respondents stated that there were no other spaces to trade at the formal marketplaces in the city (6%). Viana is a preferred location for many despite issues with crime (27%) and a strong police presence (51%).

Police often remove traders from roadsides in Luanda as they are illegal and seen as a nuisance. At Viana, the traders operate on the active railway line and move their stalls aside when the train passes through. This poses a significant danger to themselves and their customers, something which was noted by 11% of survey respondents as a problem with the area. More than half of the traders surveyed (56%) travel into the area to specifically trade at the Viana site due to the volume of customers.

As with SME, there was a close split between the types of customers that purchased goods and services from the mobile traders at Viana. This is illustrated in Figure 4.80.



Figure 4.80 Types of Customers at Viana

Source: ERM and BDM Social Survey, 2023

A portion of the traders at Viana have been established in the area for a considerable amount of time as shown in Figure 4.81. However, the majority have not been in the area longer than 5 years. For 84% of those surveyed, trading at Viana was their only source of income and 83% still do not have enough money to pay for all their bills every month. It is, therefore, unsurprising that 73% of the traders surveyed do not have any savings and 61% do not have access to any credit for their business. And the majority of those who have been able to take a loan borrowed the money from a family member.



Figure 4.81 Time Trading at Viana

Source: ERM and BDM Social Survey, 2023

Despite the economic vulnerability of the traders, 83% stated that they would be able to trade elsewhere if they were prevented from trading at Viana while 13% stated that they would not be able to trade at s different site.

Small and Medium-sized Businesses

There are numerous micro, small and medium-sized businesses in Viana that operate out of permanent premises as opposed to the mobile traders. In total 38 respondents were surveyed from these businesses. This included the business owners and employees. The majority of those surveyed were men (63%), indicating that this type of economic activity is less common for women. Those surveyed were also largely youthful as with the mobile traders. This is illustrated in Figure 4.82.



Figure 4.82 Age of Small and Medium-sized Business Owners and Employees

Source: ERM and BDM Social Survey, 2023

Of those surveyed, 17 were employees and 19 were the owners of the businesses. A significant number (39%) had been employed by or owned the business for longer than 5 years. A total of 74% of the respondents also lived in close proximity to the business. For the vast majority of respondents (79%) the small business was their only source of income.

The types of businesses present in the area varied as shown in Figure 4.83. However, food and drink sales were the most common. Many of these businesses are relatively new with 29% being established less than 1 year ago. However, 34% have been in the area for between 2-5 years. Only 11% had been present in the area for more than 6 years. For many of the business owners this area of Viana was chosen to establish their business due to the affordability and high levels of foot traffic. The majority of the businesses (63%) have only 1 employee, 24% have 2-3 employees and 11% have 4-5 employees. Of the businesses that employed people in Viana, 37% offered permanent employment.



Figure 4.83 Types of Small and Medium-sized Businesses in Viana

Source: ERM and BDM Social Survey, 2023

The businesses in Viana are largely private with some being entirely informal and not registered with the government. This is shown in Figure 4.84.



Figure 4.84 Legal Status of Businesses in Viana

Source: ERM and BDM Social Survey, 2023

The established businesses in Viana sell to the same passing trade as the street vendors. As such there is a relatively even split between customers that live close by (men, women, and youth) as well as passers-by as seen in Figure 4.85. The goods sold to these customers are purchased in local markets and then sold on through the small businesses.



Figure 4.85 Types of Customers for Viana Businesses

Source: ERM and BDM Social Survey, 2023

The financial security of those involved with the small businesses in Viana is marginally improved compared to the street vendors. However, many of the survey respondents still struggle to earn enough money to pay their bills (42%) while only 34% were able to meet their financial needs. Despite the fact that 61% of respondents reported that the business did not have access to credit, 34% were still able to generate some savings. In total 47% of the businesses still had no savings.

Estalagem

The Estalagem site is located in a highly urbanised area with a strong presence of both informal traders and small businesses.

Mobile Traders

A survey was conducted with 67 informal traders at Estalagem. The majority (36) were street vendors while 10 were motorcycle taxi drivers, 1 was a minibus taxi driver. There were also 20 respondents who had other occupations. Other services offered in this area included key cutting and shoe shining. Those selling alongside the roads offered various goods including, food, drink, clothing and school supplies.

Estalagem is a preferred location for informal traders as it is a busy area with significant foot traffic and many of the traders live in the local area making Estalagem convenient and affordable. Crime does not appear to be as problematic at this site (9%) compared to SME and Viana. However, the presence of police (28%), dust and noise (19%), and poor road conditions (19%) were noted as issues by traders.

The majority of traders reported that passers-by were their main source of customers. As well as females that lived in the area. Youth were not a dominant source of customers in Estalagem. This is illustrated in Figure 4.86.



Figure 4.86 Types of Customers at Estalagem

Source: ERM and BDM Social Survey, 2023

The majority of traders that operate at Estalagem live in the neighbouring areas (52) as opposed to travelling from other areas (15). As such, it appears that Estalagem is not a desirable location for trading for people from other parts of the city and is mostly frequented by people who value the convenience of working in close proximity to their place of residence.

Many of the traders working at the Estalagem site have not been operating in the area for an extended amount of time as shown in Figure 4.87 below.



Figure 4.87 Time Trading at Estalagem

Source: ERM and BDM Social Survey, 2023

For a significant proportion of traders, the work they do at Estalagem is their only source of income (87%) with many still not having enough money to cover all their bills every month (73%). However, more traders reported having savings at Estalagem compared to the other sites (37%). Importantly, there were still 63% that had no savings and 91% reported having no access to credit.

Noise pollution and dust were reported as key issues for traders as well as poor road conditions.

Small and Medium-sized Businesses

At the Estalagem site, 49 surveys were conducted with either owners (21) or employees (28) of small businesses. For many the business was their only source of income (80%). The remaining 20% had additional employment in various sectors including electrical trades, sales and beauty services. The primary activities of the businesses surveyed at Estalagem were highly varied as shown in Figure 4.88.



Figure 4.88 Types of Small and Medium-sized Businesses at Estalagem

Source: ERM and BDM Social Survey, 2023

Many of these small businesses are relatively well established. However, a notable proportion have been operating at Estalagem for less than a year. This is shown in Figure 4.89 below.



Figure 4.89 Time Business has Been Open at Estalagem

Source: ERM and BDM Social Survey, 2023

For the most part, these businesses have only one employee (47%), followed by 39% with 2-3 employees, 12% with 4-5 employees and only one business with more than 5 employees. Most people are employed on a permanent basis (49%) and many use the help of family members to run the business (20%).

The businesses in Estalagem are largely private with some being entirely informal and not registered with the government. This is shown in Figure 4.90.



Figure 4.90 Legal Status of Businesses at Estalagem

Source: ERM and BDM Social Survey, 2023

The established businesses in Estalagem sell to the same passing trade as the street vendors. As such there is a relatively even split between customers that live close by (men, women, and youth) as well as passers-by as seen in Figure 4.91. The goods sold to these customers are purchased in local markets and then sold on through the small businesses.



Figure 4.91 Types of Customers at Estalagem Businesses

Source: ERM and BDM Social Survey, 2023

The financial security of those involved with the small businesses in Estalagem is poor, although, marginally improved compared to the street vendors. Many of the survey respondents still struggle to earn enough money to pay their bills (51%) while only 31% were able to meet their financial needs. Despite the fact that 67% of respondents reported that the business did not have access to credit, 31% were still able to generate some savings. In total 55% of the businesses still had no savings.

Mulenvos

Mulenvos is a highly urbanised area with significant vehicular and foot traffic. There is a large minibus taxi rank in the area showing that this is an important transport hub within the city of Luanda. As a result, the area has many informal traders and small businesses operating in amongst residential areas.

Mobile Traders

There were 84 surveys conducted with mobile informal traders in Mulenvos, half of them were street vendors (50%) followed by motorcycle taxi drivers (40%). Other economic activities were reported by the remaining 10% of respondents, including minibus taxi drivers. The primary activities of these traders varied but the majority of street vendors sold food and drink items. This accounted for 32% of all traders surveyed. There were also some traders surveyed that were involved in additional activities linked to the motorcycle taxis with some traders responsible for refuelling the motorcycles or guiding passengers to the drivers. This is unsurprising given the number of motorcycle taxi operators in the area.

The reasons given for choosing to work in Mulenvos are detailed in Figure 4.92 below.



Figure 4.92 Reasons for Trading at Mulenvos

Source: ERM and BDM Social Survey, 2023

Small and Medium-sized Businesses

During surveys conducted with small businesses in Mulenvos, there were 35 respondents the majority of them were employees (22) as well as business owners (11). Two respondents did not clarify their association with the business. Many of those surveyed were relatively new to the business having worked there for less than 1 year (46%). This can be attributed to the fact that many of the businesses involved in the survey had been open for less than a year as shown in Figure 4.93.



Figure 4.93 Time Business has been Open at Mulenvos

Source: ERM and BDM Social Survey, 2023

The types of businesses located at Mulenvos are predominantly goods stores selling items such as food and clothing (57%). Another common business is beauty salons and barber shops (17%). Other small businesses surveyed included a printing shop, laundrette and restaurant. Businesses selling goods buy their goods from various local markets to sell them at Mulenvos.



Figure 4.94 Small and Medium-sized Businesses at Mulenvos

Source: ERM, 2023

The businesses at Mulenvos are for the most part micro and small enterprises with less than 3 employees as shown in Figure 4.95. For the most part, these employees have permanent contracts (54%).



Figure 4.95 Number of Employees in Businesses at Mulenvos

Source: ERM and BDM Social Survey, 2023

The businesses surveyed were predominantly public enterprises with only 1 reporting that the business was not registered with the government as shown in Figure 4.96.



Figure 4.96 Legal Status of the Businesses at Mulenvos

Source: ERM and BDM Social Survey, 2023

As with most businesses surveyed, those at Mulenvos have a local target market as shown in Figure 4.97. As was noted at Viana and Estalagem, most customers are male.



Figure 4.97 Types of Customers at Mulenvos Businesses

Source: ERM and BDM Social Survey, 2023

The financial security of business owners and employees at Mulenvos can be considered poor as 57% reported that they do not have enough money to pay their bills every month and 86% had not accessed credit. Those who were able to get loans were mostly borrowing from family members. Surprisingly, however, 54% reported that the business did have some savings. For 83% of those surveyed at Mulenvos, the business was their only source of income.

5th Avenue

5th Avenue is close to the centre of Luanda City and is a densely populated area with many informal traders and small businesses. The area is also characterised by high levels of vehicular traffic.

Mobile Traders

In total, there were 84 respondents to the trader's survey at 5th Avenue. These traders had a wide age range as shown in Figure 4.98. Some of the traders surveyed were children.



Figure 4.98 Age of Traders at 5th Avenue

Source: ERM and BDM Social Survey, 2023

Most of those surveyed were street vendors (68%), followed by motorcycle taxi drivers (13%). Other traders included shoe shiners, locksmiths and betting agents. Street vendors in the area sell various products such as cold drinks, fruit, clothes and school supplies. Many of the traders choose to work at 5th Avenue as it is a busy intersection with a lot of foot traffic (36%) and informal trading is the only way that they can sustain themselves or support a family (12%). A further 15% stated that informal trading was their only option as there were no other jobs available.

There were numerous challenges reported for traders that operate at 5th Avenue. Pollution, dust and noise were reported as an issue for traders working in the area (15%). 5th Avenue is a densely populated area with substantial vehicular traffic that would contribute to poor air quality and noise pollution. Crime was also reported as an issue for traders (19%) as well as police or inspectors arresting traders and removing them from the area (21%).

The traders have a highly localised clientele with men and women who live in the local area and passers-by being the primary customer base as shown in Figure 4.99. The traders often buy their goods from nearby markets and warehouses to sell them at 5th Avenue.



Figure 4.99 Types of Customers at 5th Avenue

Source: ERM and BDM Social Survey, 2023

For the most part, the informal traders that operate at 5th Avenue live in the area or within neighbouring areas (83%) while only 15% specifically travel to 5th Avenue from further away to trade. The traders surveyed had been working at 5th Avenue for a significant period. However, the majority had been trading there for less than 5 years as shown in Figure 4.100.



Figure 4.100 Time Trading at 5th Avenue

Source: ERM and BDM Social Survey, 2023

By and large, informal trading was the only source of income for respondents at 5th Avenue (93%) and 73% still do not have enough money to pay their bills every month. Furthermore, 79% of traders had no savings and 85% had not accessed credit. The financial security of traders at 5th Avenue is poor owing to the informality of their work. Of those surveyed, 61% stated that they would be able to trade somewhere else if they were prevented from working at their current site.

Small and Medium-sized Businesses

At 5th Avenue, 52 respondents were surveyed at small businesses including 16 owners and 33 employees. The primary activities of the businesses at 5th Avenue were largely general goods sales (18%) as well as food and drink sales (10%) and grooming and beauty services (7%). The remainder of businesses included in the survey were highly varied and ranged from electronic repairs, clothing sales, lubricants and liquor sales. Many of these businesses were relatively well established as shown in Figure 4.101.



Figure 4.101 Time Business has been Open at 5th Avenue

Source: ERM and BDM Social Survey, 2023

These businesses mostly have less than 3 employees and, therefore, fall into the micro category. This is illustrated in Figure 4.102 and Figure 4.103 below. Most of these employees are hired on a permanent basis (44%).



Figure 4.102 Small and Medium-sized Businesses at 5th Avenue

Source: ERM, 2023



Figure 4.103 Number of Employees at 5th Avenue Businesses

Source: ERM and BDM Social Survey, 2023

The businesses were also largely public (30%) and private enterprises (19%). Three of the businesses surveyed were not registered with the government.

A small majority of those working or owning the businesses still did not have enough money to cover their bills every month (25%) while 23% were able to meet their financial needs and obligations. A small majority of the businesses have some savings (26%) but most did not have access to credit (35%) For 77% of those surveyed the business was their only source of income.

4.3.9 Income and Expenditure

Luanda is the capital and the largest city in Angola. It is Angola's primary port, and its major industrial, cultural and urban centre. Industries present in Luanda include the processing of agricultural products, beverage production, textile, cement, new car assembly plants, construction materials, plastics, metallurgy, cigarettes and shoes. The city is also notable as an economic centre for oil, and a refinery is located in the city. Luanda has been considered one of the most expensive cities in the world for expatriates (Woima, 2021).

4.3.9.1 Income and Livelihoods in the Direct Aol

SME

At SME, 3 households were surveyed, two of which stated that they did not have enough money every month to pay bills with one respondent reporting the household's income at less than 50,000 Angolan Kwanza per month. Food appears to be the primary expenditure for households, followed by healthcare. Two of the households were also reported to have no savings and no access to credit.

For the members of the households surveyed at SME their primary occupations were highly varied. Many of the households' members were children and either too young to go to school or were full-time students. The remainder worked in various sectors including, food processing, mining, sales, and housekeeping.

Viana

Of the 48 households surveyed in Viana, 67% reported that they were not able to afford their bills every month. For many food, clothing and healthcare were primary areas of expenditure. During the

survey, 54% of respondents reported that their household had no savings compared to 38% that did. Furthermore, 77% of the households had not accessed any credit or borrowed money in the previous 12 months. For those who were willing to disclose, households largely had an income of less than 100,000 Angolan Kwanza per month.

The primary occupations of all the members of the households surveyed at Viana were diverse. As with SME, many of the household members were young children or full-time students. Most of the primary occupations fell within artisanal (carpentry, joinery, sewing, tailoring etc.) and commerce (retail and informal trading) sectors. Other common forms of employment at Viana included restaurant workers and taxi drivers.

Estalagem

In the surveys conducted with households near the Estalagem site 68% of households reported that they did not have enough money to cover their monthly bills. Food, utilities, transport, healthcare and education were primary areas of expenditure. In total, 63% of households did not have any savings while only 29% reported having some savings. A significant majority of 83% of households surveyed had not accessed credit or taken a loan in the previous 12 months. Of those willing to disclose, most households earned less than 150,00 Angolan Kwanza per month.

Primary occupations for the members of households surveyed at Estalagem were dominated by the commerce and trade as well as public sectors. A large proportion of the household's members were young children or full-time students and, therefore, did not have an occupation.

Mulenvos

The households surveyed at Mulenvos appear to have a slightly higher level of financial security than households surveyed at other sites such as Viana and Estalagem. For instance, 53% of those surveyed reported that their household had enough money to cover all monthly bills. However, 41% still were not able to meet their financial needs. Food and transport were key areas of expenditure for households at Mulenvos. Despite most households being able to cover monthly expenses, 71% had no savings and 88% had not accessed credit or taken out loans in the previous 12 months. Some of the households in the area had a monthly income of less than 50,000 Angolan Kwanza. One household reported an income up to 200,000 and one household had an income higher than 200,000.

Of the households surveyed at Mulenvos, the members had numerous primary occupations. The most common occupations reported were commerce and trade, agriculture and food processing, healthcare and the public sector.

5th Avenue

Overall financial security of households around 5th Avenue appears to be poor. For instance, 81% of survey respondents reported that their households were not able to meet financial obligations monthly. For many the primary expenditures were food, healthcare and education. Of those willing to disclose, most households had a combined monthly income of less than 150,000 Angolan Kwanza. In total, 69% of households surveyed had no savings and 85% had no accessed credit or taken a loan in the previous 12 months.

Primary occupations amongst household members surveyed at 5th Avenue were dominated by commerce and the public sector. The majority of household members were very young children or full-time students and, therefore, not in the labour force.

4.3.9.2 Access to Credit and Technology

In 2019, less than 0.5% of households in Angola resorted to bank credit (Relatório Tématico Sobre o Genéro report, 2020). Of that percentage, 57.2% are households headed by men and 42.8% by women. Access to financial services is a challenge. The financial exclusion rate has not yet been measured, but it is clear that a large number of citizens remain outside the banking system, whose services operate in such a way as to prevent most of those who need them from benefiting from them.

The main complaints have been document requirements, interest rates, service fees, quality of service, poor compliance and others (Relatório Tématico Sobre o Genéro report, 2020). The lack of access to credit in Angola is supported by the fact that respondents to the Business and Trader's surveys at all sites had, on the whole, not been able to access credit or loans within the previous 12 months. The same was seen in the households' survey. For those who were able to borrow money, this rarely came from a bank or other financial institution. Instead, money is predominantly borrowed from family members and friends.

4.3.10 Vulnerable Groups

Vulnerable people or groups are those who may be more adversely affected by Project impacts than others by virtue of characteristics such as their gender, gender identity, sexual orientation, religion, ethnicity, Indigenous status, age (including children, youths and the elderly), physical or mental disability, literacy, political views, or social status. Vulnerable individuals and/or groups may include, but are not limited to, people living below the poverty line, the landless, single-headed households, natural resource-dependent communities, migrant workers, refugees, internally displaced people, or other displaced persons who may not be protected through national legislation and/or public international law.

4.3.10.1 Women

Concerning the empowerment of women in political offices/State Bodies, it is evident that they occupy the positions of 4 Governors, 11 Deputy Governors, 47 Municipal Administrators, 58 Deputy Municipal Administrators, 68 Communal Administrators, 53 Deputy Communal Administrators, a total of 285 women across the country. There are also women in management and leadership positions, placed in the Ministry of Interior, concerning the National Police 778, Criminal Investigation Services 341, Migration Services and Foreigners 140, Prison Services 159, Civil Protection Services and Firefighters 170 and Instrumental Support Body 372 (INE, 2020)

A total of 5,436 domestic violence cases were reported in Angola in 2020. Of those, 77% of cases had female victims. Types of violence include physical, emotional, economic, child abandonment, deprivation etc. Luanda has the highest incidence of domestic violence cases with a total of 3,752 reported in 2020. This is not surprising given the size of the population in the province. In 2020 none of these cases were resolved in Luanda (INE, 2020).

In Angola, gender studies are at an early but encouraging stage. This dynamic is fundamental to understanding the situation of women and men. This report cannot be conclusive, as most of the data does not allow for a conclusive view of the subject. However, information indicates that women have more limited access to education, resources, and work. Negative living conditions were manifested by a greater proportion of households headed by women, which had an impact on the women themselves, but also on the other members of the household. The role of women is challenged in this context of difficulties and their assertion, protection and appreciation are completely asleep. Thus, equality, which is nothing more than equitable access to personal, social, economic, political and cultural conditions and opportunities, remains a goal to be achieved.

4.3.10.2 Youth

According to the African Youth Charter, the youth population constitutes all those aged between 15-35 years old. For the United Nations, youth are defined as all those aged between 15-24. Youth in Angola are particularly vulnerable in relation to their access to and entry into the labour market. The population of Angola is regarded as young (wide-based population pyramid). There is a particular concentration of population in the 15-19 and 20-24 age groups.

As such the vulnerabilities of the youth are vital to address in order to ensure continued development of the country. The lack of job opportunities and a lack of job security seriously hamper the youth in Angola. A possible cause of these issues may be the quality of education in the country. Other key issues identified include:

- Overall high unemployment rate;
- Gender disparities in multiple social dimensions;
- Low qualification levels in the economically active population (mainly technical professions);
- High illiteracy rates in rural areas;
- Shortage of academically and professionally trained staff;
- Insufficient supply of technical/ vocational training facilities; and
- Insufficient economic funds to support continued growth.

Youth in Angola has been a priority and concern of the State in recent years, this fact is justified by Decree No. 273/19 of September 2nd with the creation of the National Youth Policy. At the time of IDREA 2018-2019, the young population in Angola corresponded to 9,785,069 individuals, representing around 32.4% of the total resident population (INE, 2020).

The province of Luanda is the one with the highest representation of the young population, with 2,876,582 inhabitants, which corresponds to 29.4%, with the province of Bengo having the lowest number in the same period, with 142,240 inhabitants, which represents 1.5% of the total youth population in the country. The youth masculinity index shows that there are more women than men nationally, approximately 94 men for every 100 women, the same is true for the area of residence.

The marital status that most predominates among young people is de facto union with 65.6%. The most sought-after type of professional training is IT with 33.9%, while welding and sheet metal / painting and carpentry / handicrafts, with less than 1% are among the least sought after training courses. The activity rate in Angola in the reference period was 86.9%, 88.4% for men and 85.5% for women. Regarding the area of residence, the activity rate in the rural area is higher than in the urban one, with a difference of 6.1% percentage points. The employability rate in Angola in the reference period was 61.7%, with the rural area with 75.2% having a higher rate than the urban area with 53.8%. As for distribution by gender, 64.2% of the employed population were men while 59.3% were women. The unemployment rate in the IDREA period was more predominant in the urban area with 36.5%, compared to the rural area with 17.1%. Agriculture, animal production, hunting, forestry and fishing were the main economic activities for both the 15-34 age group and the 24-35 age group.

With regard to road accidents in the last 12 months, among the young population, collisions with motorcycles/motorcycles and collisions between two vehicles were the most frequent types of accidents, with 27.7% and 20.4% respectively. With regard to sports (physical, sporting or recreational activity), young people in the 15-24 age group practice more than young people in the 25-34 age group.

About 40% of young people in the 25-34 age group and 36.8% of young people in the 15-24 age group consider their areas of residence unsafe or dangerous.

Figure 4.104 below presents the number of registered cases of child victims of violence by province in 2020.
Drovíncia	Total	Total		
Provincia	Geral	М	F	
Bengo	180	86	94	
Benguela	606	348	258	
Bié	749	365	384	
Cabinda	47	22	25	
Cuando Cubango	103	67	36	
Cuanza Norte	247	125	122	
Cuanza Sul	103	64	39	
Cunene	31	16	15	
Huambo	26	12	14	
Huíla	159	98	61	
Luanda	80	52	28	
Lunda Norte	183	126	57	
Lunda Sul	1.000	518	482	
Malanje	377	199	178	
Moxico	31	16	15	
Namibe	34	21	13	
Uíge	247	137	110	
Zaire	572	331	241	
Central (INAC)	1.035	498	537	
Total	5.810	3.101	2.709	

Figure 4.105: Number of Registered Cases of Child Victims of Violence by Province, 2020

Source: Statistical Yearbook of Social Action, INE, 2020.

According to the United Nations Convention, a person is considered to have a disability if he has impairments of a physical, intellectual or sensory nature, which, in interaction with various barriers, can obstruct their full and effective participation in society compared to other people. In 2014, the prevalence of disability in Angola was 2.5%, corresponding to 656,258 people with disabilities, of which 365,858 are (56%) males and 290,400 (44%) females. Among people with a disability, 14% reported having mental problems, 13% are paralysed and 11% have their lower limbs amputated, while 8% have their upper limbs amputated, 9% are blind, 5% are mute and 5% deaf. 35% fall in the 'other' category.

During the 2014 census, 2.2% of the population of Luanda province was recorded as having a disability. This corresponded to a total of 154,727 individuals. The majority of people with disabilities were male (56%) accounting for 86,718 people while 68,010 were female (44%).

Of the people of Luanda province who have a disability, 16% had a mental disability, 16% were paralysed, 11% had lower limb amputations, 8% were blind, 8% had upper limb amputations, 4% were deaf, and 4% were mute. A large proportion (34.1%) fall into the 'other' category with an undefined disability. The municipality of Quissama had the highest disability rate in the province at 4%. The lowest disability rates (less than 2.2%) were seen in Luanda, Belas, and Cacuaco municipalities.

4.3.10.3 Orphaned

Orphanhood is defined by the loss by death of one parent or both. In 2014, among the 13,791,482 children aged 0-17 years in Angola, 1,391,573 were orphans, which corresponds to a proportion of 10%. Among orphans, 65% are due to the loss of a father. The provinces of Bengo, Benguela and Cuanza Sul have the highest orphanage rates (about 12%). The provinces of Uíge and Moxico have the lowest, 6% and 8% respectively.

In 2014 in Luanda province, there were 3 450 745 children aged between 0-17. Of these, 346 005 were orphaned which corresponds to 10% children. Among the orphans in Luanda, 61% were due to the loss of a father. The municipalities of Cazenga, Luanda and Icolo e Bengo have the highest orphan rates at 11%, 10%, and 10% respectively (Figure 4.106). The municipality of Quissama has the lowest rate of orphans (9%).



Figure 4.106: Orphanhood Rate per Municipality in Luanda Province, 2014

Source: Census, 2014.

4.3.10.4 Vulnerable Groups in the Direct Aol

Table 4.10 below provides an overview of the groups that may be considered vulnerable in the Social Aol.

Table 4.10 Potentially Vulnerable or Marginalised Groups in the Social Aol

Vulnerable Group	Description and Relationship to the Project
Women and particularly female-headed households, widows, and divorcees	Owing to the nature of traditional and domestic relations, women may be reliant on the male members of the family for financial support and participation in public decision-making. Women have few er employment opportunities and mostly work in low -income, part-time or informal jobs. Women heads of household are more often vulnerable due to reduced access to financial resources and reduced voice in public decision-making. Women / female heads of household have been identified as being vulnerable within the Aol. They are less able to access employment and economic benefits of the Project and may be susceptible to changes in the security context.
Female traders / informal businesses	As with female-headed households, female traders may be more vulnerable due to reduced access to financial resources and reduced voice in public decision-making. Female traders are likely to be more vulnerable to changes in trading conditions associated with the Project.
Children	To access assets / resources, children are often reliant on older members of the household or community. When a child is not adequately represented by an adult, from a low-income family, or an ethnic minority, they may be vulnerable to exploitation within the community or workplace. Children are present throughout the Aol. Considering the local context and labour market regulations, they are unlikely to be directly affected by employment aspects of the Project but may be more vulnerable to health impacts of environmental changes (e.g., air emissions) generated by the construction phase of the Project. They may also be vulnerable to changes in the security context, associated with opposition.

Vulnerable Group	Description and Relationship to the Project
Youth (18–24), as defined by the United Nations	Youth may be vulnerable in terms of access to assets, education, or employment opportunities. Youth are present throughout the Aol. Impacts are likely to be limited to employment and expectations of economic benefits from the Project.
Elderly (men and women)and retired	Retired and/or elderly members of the community may have minimal / fixed income and are more likely to have reduced capacity to cope with changes to their environment. Elderly / retired persons are present in the Aol. Potential impacts may occur through environmental changes (e.g., air emissions) generated by the Project. The elderly may also be affected by changes (real or perceived) in the security context, associated with opposition.
Low-income Households	Low-income households have few er resources on which to rely and are less likely to have savings and/or access to credit, which makes them vulnerable to shocks and change. Low-income households are present in the Aol, and are likely to be directly affected by the Project's employment opportunities, including negatively due to unequal opportunity (or positively if they can access it) and by localised price inflation caused by the Project.
Physical / mental health and disability	Those who lack physical mobility or who have mental health issues may be vulnerable to changes and unable to participate in decision-making, or those with underlying health issues may be more sensitive to environmental changes. A small number of persons with disabilities may be present within the Aol but are unlikely to be directly impacted by the Project.
Foreigners	Individuals from different countries may be less able to access social and economic resources and may also be at risk of xenophobic action.

Source: ERM, 2023

4.3.10.5 Disability in the Direct Aol

There were varying levels of disability reported in the household surveys conducted in the Project Aol. For instance, one household at SME reported that one person had a congenital disability. At Viana, considering that there were significantly more households to survey, there were more diverse disabilities reported. At Viana, there were 15 individuals with visual impairments, 3 with mental illnesses, 5 with partial physical disabilities and one person with total physical impairment. The majority of those with a disability had become disabled as a result of an illness. The second and third most common causes were workplace accidents, congenital abnormalities, and domestic accidents. One person was disabled following a traffic accident.

At Estalagem, 14 people had visual impairments, 3 were deaf, mute or hard of hearing, 2 had mental illnesses and 1 person had a partial physical disability. As with Viana, the majority of disabilities are linked with a previous illness. At Mulenvos only 2 people had visual impairments, 1 had a mental disability and 1 had a physical disability. One of these was as a result of a traffic accident, the remainder were linked to illnesses. At 5th Avenue, the main form of disability reported was a visual impairment (5) followed by deaf, mute or hard of hearing (4), partial physical disability (3) and one person had a mental illness. The causes of these disabilities were primarily illnesses.

4.3.11 Education

4.3.11.1 Literacy Levels

A national literacy programme was launched in Angola in the 1980s. As reported in the Relatório Tématico Sobre o Genéro report from 2020, this programme has achieved an overall literacy rate of 69% in the country for those over the age of 15. The majority of the literate population are men accounting for 82.6% while women account for 57.2%.

Gender disparity in education becomes more apparent as higher levels of educational attainment. At the primary school level, there is a similar rate of enrolment for both boys and girls aged between 6-11 years old. Primary education is compulsory in Angola, however, financial constraints prevent some households from sending children to school. Additionally, a lack of sufficient public school places also hampers education. Overall, 71.8% of boys and 70.5% of girls aged 6-11 years old attended primary school in Angola during the 2018 academic year. Rates of attendance were significantly better in urban areas (80.8%) compared to rural areas where attendance was as low as 57.3% for both sexes combined. Overall, it is estimated that 11% of the total urban population of Angola has not attended any school. For the rural population as many as 34.9% have never attended school.

Secondary education attendance is much less common in Angola. Secondary education comprises grades 7 to 13. Within Angola, 58.8% of children aged over 12 years attend secondary school. In urban areas, the rate is higher at 77% whereas in rural areas as little as 26.3% of children attended secondary school in 2018. In both rural and urban areas over 37% of students have to travel more than 30 minutes to school. This is another contributing factor to poor attendance rates.

Within Luanda Province, 86% of the population aged 15 years or more knows how to read and write, which is above the national average. However, the urban and rural areas present a slight disparity in literacy rate, in the rural region of Luanda it is 63.2% and in the urban, it is 86%. Disparities in literacy rates are linked to the accessibility and quality of education available.

Figure 4.107 below shows that the literacy rate in the municipalities of Luanda Province is relatively consistent and close to or slightly above the provincial average as is the case with Luanda (89.2%) and Cazenga (88.9%) municipalities. Quissama (68.1%) and Icole e Bengo (60.3%) municipalities have the lowest literacy rates, well below the provincial average.



Figure 4.107: Literacy Rate per Municipality in the Province of Luanda, 2014 Source: Census, 2014

4.3.11.2 Quality of Education

In 2014, only 23% of the population of Angola aged 18 or over had completed secondary school, while only 24% of the population aged over 18 years have completed primary school. The analysis by age groups shows that only 25% of the population aged 18-24 completed the second cycle of secondary education (the final two years), and for the population aged 25-64 it is 23% and for the population of 65 or more years at 7%. Roughly 13% of 5–18-year-olds never attended school.

The majority of the population who declared they were studying attend public school (Relatório Tématico Sobre o Genéro report, 2020). Private education is an alternative that families find to guarantee the right to education, however, it is an education with financial costs, demanding that the household has resources to maintain its members in these schools.

According to the local administration, Viana municipality has a total of 147 public schools, 467 partially subsidised schools, and 662 private schools. Within the public sector there were 152,017 students and 5,706 teachers (Viana Municipality, 2022).

4.3.11.3 Access to Secondary Education

In 2014 (according to the national census), the proportion of the Angolan population aged 18 or over who completed the second cycle of secondary education who 13% of the population, i.e. completed the 12th or 13th grade. On the other hand, the proportion of the population aged 18 or over who did not complete the 6th class is 21.2%. This proportion increases in the age groups of 25-64 years and 65 years or more in relation to the current system. The proportion of the population aged 18-24 who have completed the second cycle of secondary education is only 13%. The proportion of the population aged 18 years or older by age group, according to the level of education completed is depicted in Figure 4.108 below.

In secondary education, the percentage of people aged between 12 and 18 attending school is 61.9% among boys and 56.0% among girls (Relatório Tématico Sobre o Genéro report, 2020). The inequality index is set at 0.90 which expresses a high disadvantage for women and consequently higher advantage for boys. Some factors may be related to family conditions, patriarchal culture, educational policy and the accessibility of schools at this level.



Figure 4.108 Proportion of the Angolan population aged 18 years or older by age groups, according to the level of education completed, 2014

Source: Census, 2014

4.3.11.4 Access to Higher Education

Access to higher education is limited in Angola, especially vocational training which is dominated by the private sector and therefore excludes the majority of Angolans through financial constraints. In 2018, 7.9% of 20–24 year-olds attained a tertiary education in Angola, 11.9% of 25-29 year olds and 12% of 30-34 year olds. In total 5.8% of men and 3.9% of women in Angola achieved a higher education certificate (INE, 2020a).

Vocational training is not commonplace in Angola with only 4.6% of people attending some form of training, the majority of which is attained through the private sector. Vocational training is disproportionately attended by men with the majority attending courses relating to IT and electrical trades. Courses in the culinary arts are predominantly attended by women (INE, 2020b).

In 2014, only 5% of adults above 24 years of age in Luanda Province have completed a higher education (Figure 4.109).

Within Viana Municipality there is one public higher education institution that forms part of the Agostinho Neto University. Additionally, there are 6 private higher education institutions (Viana Municipality, 2022).

In Cazenga Municipality there are a total of 117 educational institutions with a total of 154,362 enrolled students and 1,648 classrooms (Cazenga Municipality, 2022). Cazenga Municipality has a significant shortfall in the number of schools/ classrooms available compared to the number of students enrolled. The ratio is notably worse than for Viana.



Figure 4.109 Percentage of Adults >24 Years with Higher Education per Municipality in the Province of Luanda

Source: Census, 2014

4.3.11.5 Education in the Aol

SME

Across the three households surveyed at SME, there was a total of 19 household members. It was reported that 21% of household members were illiterate and two individuals had no reported education whatsoever. This may include some young children. Two individuals had achieved a kindergarten level of education, two had a secondary education, one had a tertiary education, and five had a post-secondary vocation level of education. When looking at subjective welfare, two of the three households surveyed were dissatisfied with the education available in the area.

Viana

Amongst the households surveyed at Viana, there were 282 members, the majority of whom were literate (67%). The literacy status of a significant proportion of individuals was not disclosed (16%). Of the remainder, 7% were partially literate and 10% were completely illiterate. At Viana, it was reported in the survey that 9 children in the households were not attending school because it was too expensive. Furthermore, two of the traders surveyed stated that their children did not attend school and instead helped them with their informal business. In total 6% of households surveyed at Viana were very satisfied with the available education services, while 28% were satisfied and 19% were somewhat satisfied. Subjective welfare in relation to education was highly mixed at Viana as a further 14% were somewhat dissatisfied, 28% were dissatisfied and 3% were very dissatisfied.

The numbers of individuals who had attained various levels of education amongst the Viana households surveyed are illustrated in Figure 4.110 below. Vocational training is significant amongst these households which is in contrast to national figures.

Estalagem

The households surveyed at Estalagem had a total of 240 members. Of those, the vast majority were literate (80%). Only 12% were illiterate and 6% were partially literate. The highest level of educational attainment was varied as shown in Figure 4.110. A secondary level of education attainment is the most common in the area with very few individuals having no education at all. Amongst the households surveyed at Estalagem, it was reported that 8 children were not attending school as it was too expensive, one other child was prevented from attending school as it was too far away, and one child was not receiving any education as a result of having a disability. Additionally, 10 of the traders surveyed stated that their children did not attend school and assisted with trading activities instead. Overall, those surveyed in households at Estalagem were dissatisfied with the education services available to them (37%) with 3% very dissatisfied and 17% somewhat dissatisfied. On the other end of the spectrum, 26% were satisfied and 9% were somewhat satisfied.

Mulenvos

In Mulenvos there were a total of 85 individuals across all the surveyed households. Of those 80% were literate, 11% were illiterate and 8% were partially literate. Secondary education was the most common level of attainment for these individuals. Levels of education for households in Mulenvos are shown in Figure 4.110 below. The majority of households surveyed at Mulenvos were dissatisfied with the educational services available (42%).

5th Avenue

Amongst the households surveyed at 5th Avenue, there were a total of 278 individuals. Of these people 73% were literate, 17% were illiterate and 7% were partially literate. The majority of these individuals have reached a secondary level of education as shown in Figure 4.110. In the surveys conducted at 5th Avenue, it was reported that 8 children were not attending school as it was too expensive. Moreover, six of the informal traders surveyed at the site reported that their children did not go to school and instead assisted with trading activities. Unlike households surveyed at other sites in the AoI, those at 5th Avenue were predominantly very satisfied with education available in the area (66%) with only 3% being dissatisfied.



Figure 4.110 Educational Attainment at Four of the Overpass Sites

Source: ERM and BDM Social Survey, 2023

4.3.12 Health

4.3.12.1 Healthcare Facilities and Personnel

Angolan healthcare infrastructure is outdated and in a state of severe decay. The best hospitals and clinics are in Luanda, and most public and private healthcare assistance is delivered there. Other provinces and cities outside of Luanda lack acceptable facilities. In rural areas, citizens travel significant distances to receive even basic healthcare (International Trade Administration, 2022).

In Angola, access to public sector healthcare facilities can be limited. This is especially true in rural contexts where facilities are low in number and often a considerable distance from villages. At the time of the National Institute of Statistics survey in 2019, 33% of women and 28.4% of men reported being ill or having an accident in the previous 30 days. Of those who were injured or fell ill, 71.9% of men and 71.4% of women consulted with a healthcare professional. Over 95% of those who consulted a healthcare

professional were not hospitalised. It is presumed that those who did not consult with a doctor or other professional when ill or injured may not have had adequate access to healthcare. The main reasons given for not consulting a doctor when ill, according to INE, 2020b were:

- Could not afford it (35.7%);
- Did not require medical attention (35.4%); and
- Medical facility was too far away (10.1%).

These reasonings highlight key issues with the Angolan public healthcare system in relation to accessibility, affordability and the resultant culture of self-diagnosis and treatment. Of the survey respondents, 13.7% also noted that they prefer to use private healthcare services. The main reasons given for this preference were a lack of medicines available in the public sector, overcrowding of public sector facilities, and a total lack of services in a particular area.

The Angolan healthcare system predominantly relies on local health centres and health posts which may not have the same capabilities as hospitals and in some cases may be severely under resourced – highlighted in the preference for private sector health services. The diagram below (Figure 4.111) shows that Luanda Province has a total of 185 public healthcare facilities.

Province	Hospitals	Centres of Health	Health Service Stations	Centres Maternal Children	Provincial Hospitals	Municipal Hospitals	Other	TOTAL	Unit (000 inhab)
Angola	12	455	1 963	85	33	178	46	2 772	0,09
Cabinda	0	17	81	2	1	9	0	110	0,13
Zaire	0	20	56	4	1	6	0	87	0,12
Uige	0	42	222	8	2	11	0	285	0,17
Luanda	12	37	90	22	4	12	8	185	0,02
Cuanza Norte	0	50	182	13	1	13	0	259	0,51
Cuanza Sul	0	64	199	5	5	10	1	284	0,13
Malange	0	12	106	3	1	15	3	140	0,12
Lunda Norte	0	11	61	0	2	7	1	82	0,08
Benguela	0	64	166	7	3	15	5	260	0,10
Huambo	0	16	86	1	1	8	3	115	0,05
Bié	0	36	128	6	4	14	0	188	0,11
Moxico	0	6	89	3	1	10	6	115	0,19
Cuando Cubango	0	16	69	0	1	6	0	92	0,10
Namibe	0	11	58	0	2	6	0	77	0,13
Huila	0	22	184	7	1	14	16	244	0,08
Cunene	0	6	62	0	1	10	0	75	0,06
Lunda-Sul	0	13	64	3	1	5	0	86	0,14
Bengo	0	12	60	1	1	7	3	84	0,19

Figure 4.111: Health Units by Province, 2015-2019

Source: Directory of Social Statistics, INE (2021).

Luanda province also has the largest private health sector in the country. In 2019 there were a total of 1,843 private healthcare facilities in the province, the majority of which were private medical centres (836). There were also significant numbers of private medical/doctors' practices (331) and nurses posts (364).

The majority of healthcare professionals are also located in the Luanda province, as is expected given the population density. In total there were 26,995 healthcare professionals recorded in the province in 2019 with 4,255 hospital beds available within the public sector. The majority of healthcare professionals are nurses (9,423) and auxiliary staff (7,195). In 2016 a total of 2,863,508 health consultations were carried out in the province. The number of healthcare professionals per province is detailed in Figure 4.112 below.

	2019								
Province	Doctor	Doctor /000	Nurse	Nurse/000	T.D.T	Administrative	Auxiliary	Total	
Angola	4 165	0,14	33 043	1,10	7 650	11 679	21 094	77 634	
Cabinda	116	0,14	1 155	1,40	350	298	655	2 578	
Zaire	60	0,09	755	1,08	97	457	563	1 934	
Uige	124	0.07	1 068	0,62	148	505	616	2 463	
Luanda	2 136	0,28	9 423	1,14	3.532	4 704	7 195	28 995	
Kwanza Norte	77	0,15	811	1,59	108	297	605	1 902	
Kwanza Sul	148	0,07	1 500	0,69	297	338	876	3 161	
Malange	89	80,0	566	0,50	98	183	552	1 489	
Lunda Norte	137	0,14	1 147	1,15	66	478	653	2 484	
Benguela	262	0,10	3 863	1,52	561	775	1 875	7 339	
Huambo	258	0,11	3 543	1,48	480	589	1 621	6 474	
Bié	108	0.06	2 308	1,35	376	473	1 089	4 354	
Moxico	73	0.08	793	0,90	98	256	296	1 518	
Cuando Cubango	59	0,10	738	1,19	142	252	546	1 740	
Namibe	67	0,11	867	1,47	284	364	587	2 173	
Huila	247	0,08	1 793	0,62	511	614	1 773	4 940	
Cunene	73	0.06	1 043	0,90	219	218	697	2 252	
Lunda-Sul	50	80,0	841	1,34	75	417	321	1 706	
Bengo	83	0,19	829	1,86	208	481	574	2 175	

Figure 4.112 Healthcare Professionals per Province, 2019

Source: Anuario de Estastisticas Sociais (2020)

In Viana Municipality there are a total of 23 public healthcare facilities and 56 private units. Cazenga Municipality has a total of 15 public healthcare facilities. The majority of healthcare facilities in both municipalities are health centres.

4.3.12.2 Main Health Concerns

A significant health concern in Angola is Malaria which accounted for 66.5% of all reported communicable diseases with a total of over 7 million cases in 2019 (INE, Directory of Social Statistics, 2021). Acute respiratory diseases and influenza were also notable but not as significant as malaria and accounted for 472,473 (4.5%) and 871,958 (8.2%) cases respectively. Another notable communicable disease reported in 2019 was Typhoid Fever with 437,764 (4.1%) cases. Table 4.11 below lists the most commonly reported communicable diseases in Angola in 2019.

Disease	Number of people	Percentage
Malaria	7,051,349	66.5%
Influenza	871,958	8.2%
Sever Acute Respiratory Infarction	624,397	5.9%
Acute Respiratory Disease	472,473	4.5%
Typhoid Fever	437,764	4.1%
Diarrhoea with Dehydration	320,624	3.0%
Hypertension	262,302	2.5%
Dysentery	230,324	2.2%
Tuberculosis	71,574	0.7%
Schistosomiasis	37,816	0.4%
Severe Malnutrition	43,709	0.4%
HIV	15,003	0.1%
Diabetes	13,097	0.1%
Traffic Accidents	11,768	0.1%

Table 4.11 Most Commonly Reported Illnesses in Angola in 2019

Disease	Number of people	Percentage
Measles	5 592	0.1%

Source: INE, Directory of Social Statistics (2021)

The greatest cause of death between 2015 and 2019 in Angola was malaria (53,8%), with diabetes (11%), HIV/AIDS (7,1%), acute malnutrition (5,8%), tuberculosis (5,2%), and acute respiratory diseases (4,3%) the following most common (Figure 4.113).

Province -	2015		2016	6	2017		2018	El.	2015	3
Doenças	N	5	N	%	N	%	N	%	N	%
Totai	21 191	100,0	27 782	100,0	24 402	100,0	21 947	100,0	17 199	100,0
Malaria	8 141	38,4	15 997	57,6	13 979	57,3	11 814	53,8	7 923	46,1
Acute Respiratory Diseases	1 787	8,4	1 613	5,8	1 483	6,1	936	4,3	783	4,6
Acute Diarrheal Diseases	331	1,6	285	1,0	348	1,4	444	2,0	419	2,4
Tuberculosis	1 219	5,8	1 106	4,0	1 317	5,4	1 152	5,2	2 376	13,8
Acute Malnutrition	900	4,2	994	3,6	784	3,2	1 282	5,8	1 058	6,2
Meningitis	91	0,4	83	0,3	111	0,5	188	0,9	150	0,9
Typhoid	236	1,1	326	1,2	234	1,0	227	1.0	261	1,5
Tetanus	105	0,5	79	0,3	133	0,5	156	0,7	131	0,8
Dysentery	207	1,0	106	0,4	165	0,7	187	0,9	135	0,8
bysentery	230	1,1	271	1,0	249	1,0	216	1,0	157	0,9
Anger	11	0,1	5	0,0	1	0,0	1	0,0	93	0,5
Measles	3 027	14,3	3 338	12,0	1 684	6,9	1 561	7,1	852	5,0
HIV/AIDS	nd	0.0	nd	0.0	0	0.0	0	0.0	0	0.0
Iteric syndrome	nd	0.0	2	0.0	35	0.1	18	0,1	0	0.0
Cholera	540	2,5	411	1,5	718	2,9	828	3,8	339	2.0
Hypertension	348	1,6	281	1,0	470	1,9	517	2,4	295	1,7
Diabetes	3 802	17,9	2 845	10,2	2 600	10,7	2 4 2 0	11,0	2 227	12,9
Trauma by road accident	179	0,8	8	0,0	9	0,0	0	0,0	,0	0,0
Sexual Transmission Infections	37	0,2	32	0,1	82	0,3	0	0,0	,0	0,0

Figure 4.113: Most Common Causes of Death in Angola, 2015-2019

Source: Directory of Social Statistics, INE (2021)

4.3.12.3 Traffic Accidents

The data shows that in 2017 there were 1,886 traffic accidents in the province of Luanda, 721 of these being fatal (38%). The accidents in the province of Luanda account for 20% of all traffic accidents in Angola (Figure 4.114).

Desuinale	2015		2016		2017	
Provincia	Acidentes	Mortos	Acidentes	Mortos	Acidentes	Mortos
Angola	14 004	3 671	10 740	2 7 50	9 937	2 569
Cabinda	539	136	322	69	376	74
Zaire	315	59	224	64	250	88
Uíge	540	145	364	133	275	125
Luanda	2 011	904	1 833	711	1 886	721
Cuanza Norte	631	119	641	82	400	94
Cuanza Sul	619	277	406	169	370	116
Malange	667	160	505	124	493	117
Lunda Norte	176	176	641	164	566	165
Benguela	1 446	396	1 119	346	919	271
Huambo	1 016	282	731	214	774	194
Bié	1 161	251	785	114	736	100
Moxico	684	99	314	47	340	46
Cuando Cubango	593	88	443	50	387	41
Namibe	378	63	273	47	219	39
Huila	1 513	228	951	201	847	177
Cunene	428	79	256	61	264	39
Lunda Sul	681	91	428	62	371	67
Bengo	606	118	504	92	464	95

Fonte: Ministério do Interior, Dados Estatísticos, 2015 - 2017

Figure 4.114:Traffic Accidents per Province in Angola, 2015-2017

Source: Directory of Social Statistics, INE (2021)

Of the households surveyed in 2019, 93.9% reported that one member of the households had been involved in a traffic accident in the previous 12 months. The most common type of traffic accident reported was collisions involving motorcycles (29.9%). Collisions involving vehicles were 22.8% of all traffic accidents reported. Pedestrian accidents accounted for 17%. In rural areas motorcycle accidents were the most common while in urban areas a collision between two vehicles was the most widely reported, closely followed by pedestrian accidents. Of the accidents reported in Angola in the previous 12 months to the survey, 66.5% resulted in treatment or consultation with a healthcare professional and 26.4% resulted in hospitalisation (INE, 2020a).

Within the household surveys conducted in the Project Aol traffic accidents were noted as problematic by is significant number of respondents. For instance, of those surveyed at Estalagem 52% stated that traffic accidents were a problem in the area. The same was noted at 5th Avenue where 55% of respondents considered the number of traffic accidents as problematic. The intersection of the Luanda Railway with public roads in the Aol without appropriate crossing infrastructure increases the risk of accidents.

4.3.12.4 Health in the Direct Aol

SME

All of the households surveyed at SME reported that someone in the household had been sick in the previous month. One household reported that three people had been sick in that month. The most common illnesses experienced by these households included malaria, diarrhoea, coughing, and influenza/coronavirus. One household reported an individual contracting typhoid fever in the preceding year.

These households primarily rely on hospitals for healthcare. This is followed by healthcare centres and pharmacies. These households have to use public transport to reach the aforementioned healthcare facilities as they are not within walking distance. This journey can take more than 30 minutes. The survey respondents reported that waiting times and the poor quality of healthcare provided limits their options

when it comes to seeking treatment. These households also have to rely on public transport in the case of a medical emergency as ambulances are not always available.

In terms of subjective welfare, all those surveyed at SME were dissatisfied with the condition of their health. Two households were also dissatisfied with their access to healthcare while the last was somewhat dissatisfied.

Viana

Households in Viana reported that 79% of household members had been unwell in the past month. One household reported that 9 people had been sick in the same month. Most households had one or two members falling ill during that period.

The most common illnesses experienced in the preceding years were malaria, diarrhoea, coughing, influenza/coronavirus. All reported illnesses in the survey are detailed in Figure 4.115 below.



Figure 4.115 Most Common Illnesses in Viana Households

Source: ERM and BDM Social Survey, 2023

The households surveyed at Viana rely mostly on hospitals for healthcare (49%), as well as healthcare centres (25%) and pharmacies (9%). Some households reported relying on at home remedies or community health workers. To access these healthcare services 54% used public transport, 29% walked, and 14% used private transport. These services are not always quickly accessible with transport time illustrated in Figure 4.116.



Figure 4.116 Transport Times to Health Facilities – Viana

Source: ERM and BDM Social Survey, 2023

Of the households surveyed at Viana, 78% believe that they face barriers with accessing health services including long wait times and poor quality of healthcare delivered. The cost of healthcare was also noted by some as a limiting factor.

In the event of a medical emergency, ambulances are not readily available. The majority of the households stated that they cannot access ambulance services as there are not enough and they do not arrive when called. As such, 37% of households rely on motorcycle taxis for transport to hospital in an emergency. Minibus taxis and public transport (buses) are also used in an emergency.

Other issues noted by some households in relation to healthcare provision include medicine shortages, lack of healthcare staff, inadequate number of health centres, and increasing HIV transmission in the community.

In relation to subjective welfare, the majority of those surveyed were somewhat (11%) or totally dissatisfied (39%) with their health. Only 19% were satisfied and 28% were somewhat satisfied with their health condition. In terms of health care accessibility and quality, 43% were dissatisfied with a further 5% very dissatisfied and 19% somewhat dissatisfied. Only 8% were satisfied with their healthcare and 14% were somewhat satisfied.

Estalagem

In total, 76% of households had reported that a member of the home had been unwell in the previous month. From most households (66%) there were between 1-3 sick individuals.

In the preceding year, the most common illnesses experienced by household members at Estalagem were malaria and coughing. Diarrhoea was also seen in some households. The common illnesses are detailed in Figure 4.117 below.



Figure 4.117 Most Common Illnesses in Estalagem Households

Source: ERM and BDM Social Survey, 2023

For the most part households in Estalagem receive healthcare from hospitals (54%) and health centres (36%). These facilities are, however, not always in close proximity to their homes. Travel times to these facilities are detailed in Figure 4.118. For many households, the closest health facility is more than 30 minutes from their home. As such a significant proportion (53%) use public and private transport to reach these facilities with the remainder walking.



Figure 4.118 Transport Times to Health Facilities – Estalagem

Source: ERM and BDM Social Survey, 2023

As with households at other sites, those at Estalagem noted that there were some barriers to accessing healthcare (81%) in relation to long wait times and the poor quality of the healthcare provided.

Additionally, it was noted that none of the households can make use of ambulances during medical emergencies as there are none available in the area. As such people rely heavily on minibus taxis and motorcycle taxis to transport them to the hospital when they face a medical emergency.

When looking at subjective welfare, 39% of those surveyed in households at Estalagem were dissatisfied with their health while a further 11% were somewhat dissatisfied. In total 22% were satisfied and 17% were somewhat satisfied. A further 37% were dissatisfied with the healthcare available to them, 17% were somewhat dissatisfied and 6% were very dissatisfied. Only 17% were satisfied with the availability and guality of healthcare and 11% were somewhat satisfied.

Mulenvos

At Mulenvos 76% of households reported that a member had been unwell in the preceding month. Two households reported that 5 members had been sick in the same month. Most households reported 1 member being unwell. The most common illness reported in the previous 12 months was malaria and coughing. This data is detailed in Figure 4.119 below. Other illnesses noted included vomiting and urinary infections.



Figure 4.119 Most Common Illnesses in Households at Mulenvos

Source: ERM and BDM Social Survey, 2023

Households at Mulenvos rely predominantly on hospitals for healthcare services (56%) followed by health centres (28%). It must be noted that three households reported using private clinics which is not a widespread phenomenon in Angola.

Long wait times were noted as a barrier to accessing healthcare. In the event of medical emergencies, the majority of households reported using minibus taxis to travel to healthcare facilities for treatment (48%). Motorcycle taxis were also used by 34% of respondents. Ambulances were not used by any respondents as they were reportedly not available or did not arrive when called.

Overall subjective welfare in relation to individual health and healthcare access/ quality was marginally improved at Mulenvos compared to SME, Viana and Estalagem. Interestingly, 15% of those surveyed were very satisfied with their health and a further 38% were somewhat satisfied. On the other end of the spectrum, 15% were somewhat dissatisfied and 31% were dissatisfied with their health. One household surveyed was very satisfied with the available healthcare in the area. However, the majority were still dissatisfied.

5th Avenue

At 5th Avenue, 71% of households reported that a member had been unwell in the preceding month with 69% stating that this was 1-2 individuals. However, 9% of households did report that 6 members had been unwell in the same month. The most common illness in the previous 12 months was malaria as

seen at the other sites. The most common illnesses reported are detailed in Figure 4.120. Urinary infections, hypertension and sexually transmitted infections were also noted by some households.



Figure 4.120 Most Common Illnesses in Households at 5th Avenue

Source: ERM and BDM Social Survey, 2023

In total, 75% of households sought treatment at a hospital while 25% used health centres. One household reported using home remedies instead of relying on conventional medicine.

It appears that many of the healthcare facilities are at a considerable distance from 5th Avenue with most households reporting that a journey takes longer than 30 minutes (74%). Some households reported long wait times and poor-quality services as limitations to accessing healthcare. Ambulances are also not available to people living in the area. The informality of the areas within the AoI and the poor quality of the roads appear to limit the services which residents can access, including ambulances. As such, minibus taxis, motorcycle taxis, and public transport are used as an alternative during medical emergencies as these forms of transport are readily available throughout the informal urban areas.

 5^{Th} Avenue households had improved subjective welfare compared to households at SME, Viana and Estalagem. For instance, 50% were very satisfied with their health while 17% were somewhat satisfied. Only 8% were somewhat dissatisfied with their health. This may be attributed to the fact that many of those surveyed were also satisfied with the accessibility and quality of healthcare in the area (72%) compared to 13% who were either somewhat dissatisfied or dissatisfied.

4.3.12.5 Food Security in the Direct Aol

SME

Within the Aol there are issues with food security. At SME two of the households surveyed stated that they did not have enough food to eat in the last year. This was attributed to a lack of employment, low family income and high food prices. For these households there are few coping mechanisms available with eating reduced or smaller meals noted as the primary response to poor food security.

Viana

At Viana, of those who answered to question, 58% claimed that their household did not have enough to eat in the last year. For the most part this was attributed to not having enough money to buy food (41%) as well as a lack of employment (27%) and high food prices (25%). Four of the households surveyed

explained that their food security had worsened due to illnesses within the household that limited economic activities. Most of the households (61%) reduced their meals to cope with this food shortage while 27% were able to rely on remittances from relatives. Five households stated that neighbours were able to provide meals when they did not have enough food.

Estalagem

Of the households that answered the question at Estalagem, 60% claimed that their household did not have enough food in the last year. Primarily this was linked to a low income and the high costs of food. As with the other sites, reducing food intake was the only option for many households struggling with food security (68%).

Mulenvos

The households surveyed at Mulenvos appear to be more financially secure than those at the other sites. Therefore, in contrast to the trend seen thus far 73% of households surveyed stated that they did have enough food to eat in the last year. Those who did struggle with food security equally attributed this to a lack of employment and the associated lack of income.

5th Avenue

5th Avenue shows a return to the trend of poor food security where 73% of those who answered the question claimed their households did not have enough food to eat in the last year. Most of these households stated that they did not have enough money to buy food (40%), lacked proper employment (29%) and found food to be too expensive (28%) all of which contributes to their poor food security. Furthermore, 68% claimed their only coping mechanism is to reduce their food intake. None of those surveyed at any of the sites were able to rely on local governments in times when they have struggled to afford food.

4.3.13 Infrastructure and Public Services

4.3.13.1 Housing

In 2019, it was reported that around 77% of households in Angola lived in conventional homes (i.e. a dwelling independent of others) (Relatório Tématico Sobre o Genéro report, 2020). However, this does not mean that these homes are of adequate build quality. In fact, around 62% of households reported that their homes were self-built. The types of material used for these self-builds vary. As such, it was reported that 61.9% of female-headed and 54.4% of male-headed households had walls made of inappropriate materials. Figure 4.121 below highlights the common types of wall material used for dwellings.



Figure 4.121 Type of wall material of the household dwelling, 2019

Source: Relatório Tématico Sobre o Genéro report (2020)

The same was seen with material used for roofing, with 90.2% of female-headed and 89.1% of maleheaded households having inappropriate roofing. In both female and male headed households, zinc is the most commonly used material for roofing (Relatório Tématico Sobre o Genéro report, 2020). Figure 4.122 below highlights the common types of wall material used for dwelling roofs.



Figure 4.122 Type of roofing material of the household dwelling, 2019

Source: Relatório Tématico Sobre o Genéro report (2020)

Close to half of all households in Angola also have flooring that is made from an unsuitable material or is not paved at all. Figure 4.123 below highlights the common types of wall material used for dwelling roofs.



Figure 4.123 Type of floor material of the household dwelling, 2019

Source: Relatório Tématico Sobre o Genéro report (2020)

More than 14% of households reported that their homes were more informal such as a tent or a traditional rural home known as a cubata Cubata are common in rural areas and consist of clay walls and zinc tile or grass roofs.

In Luanda province 89.2% of households in 2014 were reported as having conventional homes with 3.8% living in cubata, 3.3% in apartments, and 2.7% in tents. Since many homes are constructed from inappropriate materials the high percentage of households reporting to have conventional housing is not indicative of overall good housing quality in Luanda.

4.3.13.2 Housing in the Direct Aol

SME

The households that were surveyed at SME had conventional homes (detached and semi-detached) built from concrete blocks and with corrugated sheet roofs. These homes had between 2-3 bedrooms and inside sanitation facilities. Two of the homes also had outside toilets.

Viana

At Viana, the households surveyed were a mix of detached and semi-detached homes. All the homes were constructed of either brick or concrete blocks, some of which were plastered. The vast majority of homes had corrugated sheet roofs while one house had plastic sheet roofing and one had a tiled roof. Some of the homes had as many as three bedrooms. All the households surveyed had at least one toilet inside the home with many also having additional outside sanitation facilities.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 5.124 Housing at Viana

Source: BDM, 2023

Estalagem

As with SME and Viana, the households surveyed at Estalagem were predominantly detached and semidetached houses. Most of the homes were constructed from brick and concrete blocks. In some cases, these were plastered. Two of the households surveyed lived in homes where the walls were constructed from corrugated iron sheets. Almost all the houses had corrugated metal sheet roofs. One home had a plastic sheet roof and two homes had tile roofs. The majority of the homes had 1-2 bedrooms. Of those who were willing to answer, all had inside sanitation facilities. I significant number of the homes also had outside toilets (26).

Mulenvos

At Mulenvos all of the households surveyed had homes that were either detached or semi-detached houses. All the homes had plastered concrete block walls and corrugated sheet roofing. Most houses had 1-3 bedrooms and indoor sanitation facilities. For the most part these homes did not have outside toilets.

5th Avenue

The households surveyed at 5th Avenue also lived in detached and semi-detached houses that were constructed from brick or concrete blocks. A large proportion of these were plastered. All the homes had corrugated sheet roofs and 1-3 bedrooms. Every household surveyed had one indoor toilet. Only two of the homes had outdoor sanitation facilities.

The small businesses located at Viana, Estalagem, Mulenvos and 5th Avenue are adjoined to the houses in most cases. As such the business premises are constructed in much the same way featuring cement block or brick walls with corrugated metal roofing. These buildings for both housing and businesses are considered conventional. However, many are informally or self-built and may not always be to a high standard.

4.3.13.3 Water Sources

Access to piped water is challenging in Angola with a safe drinking water resource not easily accessible to at least 40% of all households (Relatório Tématico Sobre o Genéro report, 2020). As of 2020, it was estimated that only 13.9% of households in Angola have a tap in their home. The majority of households rely on shared water sources in the community. A tap connected to public mains within a neighbouring home is relied on by 12.6% of households, while 13.1% use protected wells, and 6.8% use public fountains.

Of those who do not have an appropriate source of safe drinking water within their communities (personal or shared), 23.6% use rivers, lakes, irrigation channels, 14.3% use water trucks, 7.6% use unprotected wells, 1.4% use unprotected springs, and 0.6% use rainwater (Relatório Tématico Sobre o Genéro report, 2020). The quality of this water is poor and requires treatment before use (filtration, boiling, disinfection with chlorine/bleach). Despite this, the majority of households did not adequately treat their water before use. In 2020, approximately 67% of all households did not treat their drinking water at all. Of those who do treat the water, the most common form of treatment is disinfection using chlorine or bleach. Around 30% of households in Angola need to travel between 30-60 minutes to fetch water (Relatório Tématico Sobre o Sobre o Sobre o Sobre o Sobre o Genéro report, 2020).

Access to appropriate drinking water (i.e. tap connected to mains, protected well, protected spring, bottled water/mineral water and hole with bamba) differs considerably between provinces as shown in Figure 4.124 below. The provinces of Cunene Lunda Norte, Lunda Sul and Moxico have the lowest values, where only 23%, 26.7%, 28% and 28.2% of the population respectively have access to appropriate water for drinking (Census 2014).



Figure 4.124 Proportion of the Angolan population using appropriate drinking water by province, 2014

Source: INE, Census (2014)

Luanda is slightly above the national average, with a rate of 46.9% in relation to the proportion of the population that uses appropriate water for human consumption, as seen in the figures below (Figure 4.125, Figure 4.126).



Figure 4.125 Access to water suitable for human consumption by province, 2014

Source: Census, 2014.



Figure 4.126 Households that use appropriate drinking water sources per municipality, 2014

Source: Census, 2014.

It is notable that while Luanda performs better than most provinces on water access suitable for human consumption, there are significant differences between municipalities within Luanda regarding households that use appropriate drinking water sources, as 78,5% of households in Cazenga use appropriate sources and only 34,2% do so in Viana (Figure 4.127).



Figure 4.127 Proportion of population, by province, using water suitable for human consumption, 2014

Source: Census, 2014

A portion of the households in Luanda, located close to the centre of the city, obtain water through their own piped connections to the central water supply network. These households often pay very low or flat rate fees to the water company even though they have better access than people who have to buy water through the informal sector (IDRC, 2011).

Public water taps or standpipes in Luanda are built by the public water company EPAL, EPHAS or NGOs within neighbourhoods that have an available connection to the water pipeline. Access to standpipes tends to be in pockets as standpipe projects usually cover only very limited geographical areas (IDRC, 2011).

The informal peri-urban water market in Luanda is estimated to provide almost 20 litres of water per person per day to almost 4 million people at a price of about US\$0.01 per litre. The water for the informal water supply system comes from girafas (supply points where cistern trucks fill up), from illegal connections to the pipeline and from the re-sale of water by households with domestic connections (Development Workshop,2009).

The community management of fountains in the Cazenga Community and consolidation of the Tala-Hady Commune – Development Cooperation – Angola project promotes access to basic social services through enhanced efficiency and effectiveness in the delivery of water supply services rendered by residents' associations in the urban (and peri-urban) areas. It does so by creating/strengthening residents' associations that manage fountains (AMOGECs) at the Cazenga Popular Commune and sustained support to 8 AMOGECs of the Tala Hady Commune. The project will enhance the monitoring quality of the service, namely access to water through public fountains, services rendered to the communities through a partnership between residents' associations (AMOGECs/ Civil Society Organisations), Commune Boards and the Municipality (Local Authorities) and also the supplier of that public good (a public company) contributing to an accountability process (IMVF).

4.3.13.4 Water Access in the Direct Aol

SME

All the households in SME reported that water is not always readily and reliably available in the area. One of the households in SME sources their water from the borehole, one from piped water and one uses other water sources. None of the population uses roof catchment, dams, ponds or spring water as a source.

Viana

In Viana, boreholes and piped water are common water sources. Of the respondents that answered the question 35% used a borehole and a further 35% of the households had access to piped water as illustrated in Figure 4.128. About 26% of the households source their water from other sources including buying water from tanker trucks or motorcycles, reservoirs, storage or collection tanks and some source their water from other houses. Only 4% of households use a dam, pond or spring as a water source.

Water availability is a challenge in Viana. Of those who answered the question, 69% stated the household did not always have water available for domestic purposes. Only 31% of the households have access to water all the time.

Estalagem

As shown in Figure 4.128, in Estalagem, a large number of the households source their water from other resources which include buying water from tanker trucks or motorcycles, reservoirs, storage or collection from tanks and buying from other residents. Boreholes are also a common source, with 33% of households sourcing their water from boreholes. This was followed by piped water at 19%. Roof catchments and natural sources such as ponds or springs are both used by 5% of households surveyed.

From the survey results, it is apparent that water availability in Estalagem is a challenge. Of those who answered to question 74% stated that water is not always available in the area. The remaining 26% stated that they always had access to water.

Mulenvos

Amongst the households surveyed at Mulenvos, only 1 had access to piped water. The majority of households buy water from other sources including water tankers (35%), motorcycles (6%) and reservoirs (24%) (Figure 4.128). Boreholes are also in use by a significant number of households (29%). At Mulenvos all the households reported that water is not always available.

5th Avenue

At 5th Avenue, the sources of water used by households vary considerably (Figure 4.128). Boreholes are the most common with 36% of surveyed households reporting their use. Other key sources of water include tanker trucks (19%) and storage tanks/collection points (17%). Water availability is a challenge in 5th Avenue with 87% of the households surveyed stating that they do not always have water available. Only 13% have water available all the time.





Figure 4.128 Water Sources at Four of the Overpass Sites

Source: ERM and BDM Social Survey, 2023

4.3.13.5 Wastewater and Sanitation

Adequate sanitation is necessary to ensure the health and wellbeing of communities. In 2019 it was reported that 70.2% of male-headed and 64.9% of female-headed households in Angola have access to appropriate sanitation facilities (toilet connected to a public sewerage system or septic tank) (Relatório Tématico Sobre o Genéro report, 2020). The remainder of households perform sanitation activities outdoors or in other poor conditions. As such they are at an increased risk of contracting certain diseases such as Cholera. As is to be expected, the percentage of households in urban areas with access to appropriate sanitation facilities far exceeds those in rural areas.

There are also significant differences between the provinces with the province of Luanda having the highest number of households using adequate sanitation facilities (91%) and the province of Cunene being below the national average, with only 12% of households using adequate toilets (Census, 2014). Luanda has significantly better sanitation access than other provinces in Angola (Figure 4.129). However rural areas of the province do not perform as well where only 33.4% of households have adequate sanitation.



Figure 4.129 Households using appropriate sanitation facilities

Source: 2014 Census, Angola

4.3.13.6 Electricity

According to (Internal Labour Organization, 2021) 44% of Angolans have access to electricity. Most of the population without access to electricity live in the western part of the country. As part of the National Development Plan 2018–2022, the government developed an energy sector plan aimed at increasing the electrification rate from 36% to 60% of the population and increasing electricity generation capacity by 125%. The availability of domestic natural gas presents a significant opportunity for the generation of efficient, reliable electricity and could underpin a domestic industrial base that would provide the additional benefit of diversifying the economy beyond oil exports (Woima, 2021).

Access to electricity is an important indicator of development and vital for communities to meet their personal needs. Across Angola, around 35% of households have access to electricity through the public network (Figure 4.130). Lanterns remain the primary lighting source for over 36% of households in the country. This is not surprising given that over 60% of households do not have access to the electricity grid. Other sources of lighting used include gas lamps, candles, generators and firewood (Relatório Tématico Sobre o Genéro report, 2020).



Figure 4.130 Access to grid electricity by province, 2014

Source: INE, Census (2014)

Within the Luanda Province around 67% of households have access to electricity from the public network. Access is marginally higher in urban areas at 68.6% whereas rural areas have limited access with only 12.9% of households connected to the public network. Those who do not have access to electricity rely on generators, candles and lanterns as their primary sources of lighting. This is illustrated in Figure 4.131 below.



Figure 4.131 Primary Sources of Lighting Luanda Province, 2014

Source: INE, Census (2014)

4.3.13.7 Electricity in the Aol

SME

In SME, three residents were interviewed and all three reported that they obtained their power from the grid. They claimed that residents have access to power and use the power for household purposes. Out of the three households, two of them reported that they always have power available and one claimed that power is intermittently available.

Viana

As illustrated in Figure 4.132, the vast majority of households surveyed at Viana use grid electricity as their main source of electricity (90%). Only 4% source their electricity from gas while around 2% charcoal and candles for lighting respectively.



Figure 4.132 Electricity Sources at Viana

Source: ERM and BDM Social Survey, 2023

Of the respondents that answered to question the majority stated that their household always had electricity available (83%). Only 18% of the households do not have access to electricity continuously.

Estalagem

In Estalagem, the vast majority of households surveyed have access to electricity from the public grid (89%). A further 7% use candles as a source of light while only 4% use gas (Figure 4.133).



Figure 4.133 Electricity Sources at Estalagem

Source: ERM and BDM Social Survey, 2023

Of those who answered the question in the household survey conducted in Viana, 69% stated that they always have power available. The remaining 31% of the households stated that electricity access was intermittent.

Mulenvos

Electricity access in the Mulenvos area appears to be extensive. All of the households surveyed at Mulenvos stated that they have access to electricity from the public grid. Additionally, 93% of the households surveyed stated that they always have power available while only 7% stated that electricity access was not constant.

5th Avenue

As with Mulenvos grid electricity access at 5th Avenue is widespread. In total 96% of households surveyed in the area source their power from the grid while only 4% use candles as a source of light. However, electricity grid stability is marginally poorer at 5th Avenue compared to Mulenvos with 82% of the households always have power available and 18% having intermittent power.

4.3.13.8 Waste Disposal

Since the end of its brutal civil war in 2002 and the relative political stability that followed, Angola has taken concrete steps to address national waste management priorities. However, the continued effects of the country's 27-year conflict mean that these efforts still have not achieved the desired results. Angola's institutions do not have adequate capacity or coordination mechanisms, while partnerships with the private sector remain very weak. This is a problem for Angola's management of municipal waste: the capital Luanda alone produces 6,000 tons of solid waste every day, which the city has struggled to manage. Meanwhile, storm runoffs and sewer overflows, mean that a lot of waste ends up in the ocean. At the same time, waste from the oil and gas sector and other industrial activities may pose a serious environmental concern (Woima, 2021).

Adequate waste disposal services are not widespread in Angola. This is particularly true for femaleheaded households where 56% dispose of waste in the open, on streets and in public spaces (Relatório Tématico Sobre o Genéro report, 2020). In male-headed households 49.9% dispose of household waste in an inappropriate manner. This poor waste management exposes households to unsatisfactory living environments that carry additional health risks. There are some households that dispose of waste in public dumpsters which shows an awareness of the importance of proper waste management. However, with rates of around 23% it is still not sufficient. Around 4.5% of households in Angola burn their waste and 7% bury it (Relatório Tématico Sobre o Genéro report, 2020).

Today, more than 2 million tons per year of unsorted is sent to Mulenvos Landfill in Luanda. Five large waste collector companies transport daily 70% of collected wastes to landfills. Mulenvos Landfill is the largest landfill in Angola. It is located in the Municipality of Viana in the western part of Luanda and has been in operation since December 2007. Thousands of children are either living on the landfill property or relying on it as a source of income. The informal sector (waste pickers) is responsible for much of the waste management activities and waste recycling in the city, but without any job security and with little recognition (Woima, 2021).

Despite the presence of the landfill in the city only 43% of the people of Luanda province disposed of their waste in an appropriate manner. This is marginally higher in urban areas (44%) but extremely low in rural areas (9.8%). In the rural areas, the majority of people (82.5%) dispose of their waste outdoors. This form of waste disposal is less common but still dominates in urban areas (53.4%) where the remainder of people dispose of their waste in some form of container (42.9%). The primary forms of waste disposal used in Luanda province are detailed in Figure 4.134.



Figure 4.134 Primary Waste Disposal Methods Luanda Province, 2014

Source: INE, Census (2014)

4.3.13.9 Waste Disposal in the Aol

SME

Of the three households surveyed at SME, two deposit their household waste in the street and one burns their waste.

Viana

Similarly, in Viana, most of the population dispose of their waste on the streets. Of those surveyed 71% dispose of their household waste in the street outside their home (Figure 4.135). Additionally, only 10% of the households surveyed had municipal waste collection. The same percentage of households (10%) burn their waste. A further 6% of the households bury their waste in a hole and only 2% take the waste to deposit in a nearby ditch.



Figure 4.135 Waste Disposal at Viana



Figure 4.136 Waste at Viana

Source: ERM, 2023

Estalagem

As with SME and Viana, the majority of households at Estalagem dispose of their waste on the streets (67%). However, 31% have their waste collected by the municipality which is a higher percentage than Viana. A further 2% burn their waste (Figure 4137).



Figure 4.137 Waste Disposal at Estalagem

Source: ERM and BDM Social Survey, 2023

Mulenvos

A small majority of households surveyed at Mulenvos have access to municipal waste collection (44%). Those who do not have access to these municipal services predominantly dispose of their waste on thestreet outside their home (39%). A further 11% of those surveyed bury their waste 6% burn their waste (Figure 5.138).



Figure 4.138 Waste Disposal at Mulenvos

Source: ERM and BDM Social Survey, 2023

5th Avenue

In 5th Avenue, most of the households surveyed dispose of their waste on the street (44%). As with Mulenvos, a higher percentage of households have access to municipal waste collection than seen at other sites such as Viana. In total 31% of households surveyed at 5th Avenue have their waste collected by the municipality. Additionally, 11% burn and 9% bury their waste. Three households surveyed used other forms of waste management including dumping waste in a nearby lagoon or within an abandoned property in the neighbourhood. (Figure 5.139).



Figure 4.139 Waste Disposal at 5th Avenue

Source: ERM and BDM Social Survey, 2023

It is apparent that waste disposal on streets is a common practice in the development area. Waste collection by the municipality is more common at sites closer to the centre of Luanda City. Sites such as SME and Viana lack municipal waste services.

Environmental Contamination in the Aol

Despite the lack of widespread municipal waste collection and other services, most households surveyed did not see environmental contamination in relation to litter as a key issue. However, within the busier sites such as Mulenvos and 5th Avenue, noise pollution has been noted as an issue.

4.3.13.10 Telecommunications

Angola has invested strategically to become an alternative hub for the southern and central regions of Africa building data centres, satellite construction, and optic fibres projects to connect the country internally, to the continent and the world. The government liberalized the telecommunication market that contributed to the people's access to phones and internet.

World Bank data suggests that 36% of the population of Angola has access to the internet. This number was 3% in 2010, 21% in 2014, and 32% in 2019. The data suggests that the number of internet users in Angola will continue to significantly increase (World Bank, 2022).

Although only 36% of the population are internet users through mostly mobile networks, Angola's digital transformation has been accelerating rapidly. The impact of the COVID-19 pandemic led companies and users to accelerate the adoption of online platforms and remain sustainable throughout the pandemic by establishing remote working systems. And the government mitigated the impact by ensuring the provision of public services, virtually.

There is a major connectivity discrepancy between urban and rural areas. Although Luanda is Angola's largest and best-connected city, infrastructure, market, and affordability challenges cripple connectivity throughout the country. The objective is to tackle this discrepancy by establishing more infrastructures and players in the market. With 29 satellite earth stations, SAT-3/WASC fibre optic submarine cable providing connectivity to Europe and Asia, AngoSat 1 (Angola's first communication satellite) built by Russia and failed during launch to launch in 2017, it will be replaced by AngoSat 2 to be launched by end of 2022 (International Trade Administration, 2022).

In the 12 months leading up to the national census in 2014, 54% of people aged over 5 years, in Luanda province, reported using cell phones for communication and accessing the internet. Only 16% of the population over 5 years in the province reported using a computer or other internet connection.

4.3.14 Traffic Baseline

4.3.14.1 Introduction

This chapter presents the baseline for transportation resources, including road, rail and air travel, within Angola and in particular within the direct Aol of the Project. The following information and sources were consulted for the transportation baseline:

- Published, publicly available reports from regional, national, and international organizations;
- A 2019 report on road transportation in Luanda Province; and
- Publicly available remote sensing data including satellite imagery.

• Stakeholder interviews were held in November and December 2022 and May 2023 as part of the social survey with the aim to gather information on the following transportation-related concerns. Notable concerns related to the need for more complete pedestrian walkways, the need for a strategic approach to mobility in and around Luanda, and suggestions for different flyover locations.

 National legislation related to traffic and vehicles is presented in the Section 3.1 and international – in Section 3.2.7.

4.3.14.2 Road Transportation

Road Network

Angola has a road network of around 76,000 km, of which about 18 per cent is paved (World Bank 2020). The road network is concentrated along the Atlantic coastal region of the country, connecting the port cities of Luanda, Lobito, and Namibe. Angola's road network includes approximately 26,000 km classified as Fundamental Roads, of which about 52 per cent is paved; 17,500 km classified as complementary roads, primarily unpaved; and 32,350 km of local roads managed by the provinces (CBRTA, 2021).

Although major roads between Luanda and the provincial capitals have improved in recent years due to road maintenance programmes, Angola's road network is generally in need of improvement (CBRTA 2021). Hazards include potholes and lack of traffic signals. Many of the unpaved roads become unpassable except by four-wheel drive vehicles during the country's long rainy season. The road links in the western half of the country are denser and include more paved roads, while roads in eastern Angola are sparser and more dilapidated.

The Estrada de Catete extends east from central Luanda and connects with other roads to form a major east-west road corridor across northern Angola. From the intersection in central Luanda with the Av. Ho

Chi Minh to the boundary of Luanda Province, a distance of approximately 33 km, the Estrade de Catete is a 6-lane, median-divided road. The paved road section varies from 30 to 45 meters depending on the presence of turn lanes, shoulders, and the varying width of the center median. This road segment has 25 pedestrian overpasses and two grade-separated interchanges (at the intersections with the Via Expresso and the R. 1° De Agosto). There are periodic at-grade intersections with roads and access drives to adjacent properties. Most intersections allow right turns but not left turns due to the raised centre median. Median breaks are provided at intervals to allow for U-turns.

The project flyovers would replace portions of the roads described below that provide access from communities north of the railroad tracks to the Estrada de Catete. The Estrada de Catete is generally not conducive to pedestrian travel, but roads that would have overpasses across the railroad tracks are extensively used for pedestrian as well as vehicular travel. The existing roads would be replaced by service roads that provide local access but do not cross the railroad tracks or provide access to the Estrada de Catete, as described in Section 2.7.1.2, Geometric Design of the Overpasses.

- SME Flyover: The proposed overpass and associated at-grade road segment would replace a segment of an unpaved road with a road width of about 15 meters. No other roads would be affected by construction or operation of the overpass.
- Viana Flyover: The proposed overpass and associated at-grade road segment would replace a segment of an unmarked road with a width of approximately 8 meters that provides access from the Estrada de Catete into the community of Viana. The replaced road segment would be approximately 0.3 km long through a primarily residential neighbourhood and would include a new (assumed at-grade) intersection with the first intersecting street.
- Estalagem Flyover: The proposed overpass and associated at-grade road segment would replace a segment of an unmarked, 8-meter wide road providing access from the Estrada de Catete into a mixed business and residential area. The existing road is paved at the intersection with the Estrada de Catete. The replaced road segment would be approximately 0.4 km long and include a segment of a new access road into a site under development for a new hospital.
- Mulenvos Flyover: The proposed overpass and associated at-grade road segment would replace a segment of the Estrade Dos Mulenvos, a paved road with pavement width of about 8 meters. The replaced road segment would be approximately 0.4 km long.
- 5th Avenida Flyover: The proposed overpass and associated at-grade road segment would replace a segment of 5th Avenue, a paved road with pavement width of about 8 meters, curbs and sidewalks. The replaced road segment would be approximately 0.4 km long and includes intersections with three existing roads.

Traffic

Traffic surveys of the Luanda area were conducted in September 2018 and July/August 2019 by BDM Engineering and Technology. Four of the traffic count locations were on the Estrada de Catete close to one of the five Project flyovers. No traffic counts were performed on the roads that would be crossed by the flyovers, and no traffic volume data has been found for those roads. Figure 4.136 shows the flyover locations and the traffic count points referred to in the tables below.


Figure 4.136 Location of Traffic Data Surveys in Relation to Flyover Locations (crossings are marked in red)

Source: ERM, 2023

Table 4.12 and Table 4.13 summarise morning and evening hourly traffic volumes. The morning peak hours were from 6:00 AM until 10:00 PM and the afternoon peak hours were from 4:00 PM until 8:00 PM at most locations but may have been from 3:00 PM until 7:00 PM at certain locations where those were the busiest hours. The full traffic report is in Appendix D.

The Estrada de Catete carried between 4,000 and 13,000 vehicles per hour during the morning rush hours and between 2,400 and 8,100 vehicles during the evening rush hours (BDM, 2019).⁹ At some locations, traffic counts were higher in the westbound direction (towards central Luanda) in the morning and in the eastbound direction in the evening, but this is not consistent for all of the count locations. Most vehicles counted on the Estrada de Catete (60 to 80 per cent) were personal vehicles, 8 to 20 percent were collective taxis, and 2 to 17 per cent were trucks (Table 4.13). Minibuses and buses constituted from 1 to 4% of traffic.

Traffic counts were only collected for the two 4-hour peak daytime periods. For analysis purposes, it was assumed that 24-hour traffic volumes were approximately twice as large as the combined 8-hour peak period. Furthermore, it was assumed that approximately 10 % of traffic measured at the count locations in Table 4.12 turned onto or off of Estrada de Catete at major intersections. Section Air Quality (Section 4.1.2) uses these assumptions to quantify estimated 24-hour traffic at the flyover locations.

Table 4.12 Average Hourly Traffic on Estrada de Catete: Morning and AfternoonPeak Hours

⁹ The AM traffic count at location T10 seems disproportionately high in relation to the nearby count at Location T107 and may be in error; therefore, the 13,000 vehicle estimate may be high

Location	Time Period		Average Hourly Traffic	
		Westbound	Eastbound	Total
T03 (west of 5th Avenida Flyover)	AM	4,330	2,759	7,089
	PM	3,224	4,233	7,457
T107 (at approximate location of	AM	2,622	3,269	5,891
Estalagem Flyover)	PM	3,120	1,583	4,703
T10 (betw een Estalagem and Viana	AM	10,127	2,925	13,052
Flyovers)	PM	3,047	5,066	8,113
T13 (west of SME Flyover)	AM	3,141	907	4,048
	PM	1,454	980	2,434

Source: BDM 2019

Table 4.13 Vehicle Types on Estrada de Catete during Morning and AfternoonPeak Hours

Location	Time		Perc	entage of Vehicle	es	
	Period	Personal Vehicles	Collective Taxis	Minibuses	Buses	Cargo Vehicles (Trucks)
Т03	AM	81%	12%	1%	2%	4%
	PM	84%	11%	1%	2%	2%
T107	AM	69%	17%	2%	3%	9%
	PM	66%	20%	2%	4%	9%
T10	AM	86%	8%	1%	1%	4%
	PM	71%	15%	1%	2%	10%
T13	AM	70%	15%	1%	4%	11%
	PM	59%	19%	1%	4%	17%

Source: BDM 2019

Based on time and distance travelled measured with GPS devices, travel speeds for private vehicles on Estrada de Catete averaged about 30 to 40 km per hour on at locations closest to the flyover locations (Table 4.14; Appendix T). These are relatively low speeds for the road and reflect the substantial number of turning movements and congestion at intersections planned for flyover upgrades (Table 4.14). On road segments between intersections, and on the Estrada de Catete east of the R. 11 de Novembro, travel speeds increase to 60 km per hour or greater.

Due to their frequent stops for passengers, collective taxis had much lower average speeds. The traffic report notes several points along the Estrada de Catete as major passenger boarding and disembarkation points for collective taxis and buses. One of the locations with the heaviest passenger volume was at the Estação da Filda near the 5th Avenue Flyover point. Based upon vehicle counts and observations of collective taxi or bus occupancy levels, the traffic report notes that portions of the Estrada de Catete have the highest volume of public transportation passenger travel of all of the roads studied in Luanda, carrying about 23,000 passengers hourly during rush hours (BDM 2019).

Origin and destination surveys indicated that travellers on Luanda roads during the morning and afternoon peak hours are primarily travelling from home to workplaces (59%) or colleges and universities (15%), as well as to appointments, family/friends, and other destinations.

Table 4.14 Average Travel Speeds on Estrada de Catete

Location	Time Period	Average Travel	Speed
		Personal Vehicles	Collective Taxis
Near 5th Avenida Flyover	AM	40-50 km/hr	10-20 km/hr
	PM	40-50 km/hr	10-20 km/hr
Near Mulenvos Flyover	AM	20-40 km/hr	10-20 km/hr
	PM	10-20 km/hr	0-10 km/hr
Near Estalagem Flyover	AM	30-40 km/hr	10-20 km/hr
	PM	40-50 km/hr	10-20 km/hr
Near Viana Flyover	AM	30-40 km/hr	0-10 km/hr
-	PM	40-50 km/hr	10-20 km/hr
Approximately 2 km west of SME Flyover	AM	60-80 km/hr	40-80 k/hr
	PM	60-80 km/hr	40-80 km/hr

Source: BDM 2019

Road Safety

The World Health Organization (WHO) estimated that Angola experienced 23.6 fatalities per 100,000 population in 2016 (nearly 6,800 traffic fatalities per year), a rate lower than the Africa-wide estimate of 27.6 fatalities per 100,000 population (World Bank, 2019). The rate of traffic fatalities has been trending downwards since 2013 (WHO, 2018). The WHO also estimated that 41 per cent of traffic fatalities in 2016 were pedestrians, 33 per cent were vehicle passengers, and 27 per cent were vehicle drivers. Angola has established regulations to increased road safety that include seat belt and motorcycle helmet requirements, a ban on hand-held mobile phone use, blood alcohol limits, and speed limits. The WHO ranks Nigeria's traffic regulation enforcement at 5 on a scale of 1 to 10 (with 10 representing the most rigorous enforcement).

4.3.14.3 Railway Network

Rail transport in Angola is provided by three main rail lines—Luanda, Benguela, and Moçamedes, as described below—each with its own Administrator reporting to the Ministry of Transportation. The Angola National Institute of Railroad (INCFA) establishes the regulations and standards for railroad operations and holds enforcement authority (ITA, 2022).

- Luanda Railways is a 425 km route from the port of Luanda to Malange, in northern Angola (ITA 2022). In addition to passenger service, this rail line began transporting rail freight from the port of Luanda in March 2013. Luanda Railways provides service to Catete and points further east of Luanda.
- Benguela Railways, located in the central part of Angola, is a 1,344 km line from the Lobito port east to Luau on the Democratic Republic of Congo border, where a dry port and logistics centre are planned.
- Moçamedes Railways, in southern Angola, is 857 km long and connects the port of Namibe to Menongue and the border of Namibia.

Planned and implemented upgrades to the Luanda Railway include constructing parallel tracks and increasing the weight capacity of the rails so that the railway can carry more trains and support the weight of new locomotives and commercial cargo (ITA, 2022; IRJ, 2015). Within the past few years, the Luanda Railway has received four new diesel multiple unit passenger trains that have a capacity to carry 700 passengers (ITA, 2022).

The segment of the Luanda Railway from 5th Avenida to the border of Luanda Province has 13 pedestrian overpasses and approximately 12 at-grade road crossings that connect areas north of the railroad line to the Estrada de Catete. Railway stations along this segment of the Luanda Railway include the Viana, Capalanca, and Baia Stations. Other local roads have been informally extended by pedestrians crossing the railroad tracks but are not accessible to vehicular traffic.

In addition to the traditional railways, a surface metro system is planned for Luanda. The first phase, from the Port of Luanda to the Kilamba area, is in construction contract negotiations as of 2023 (IRJ 2023).

4.3.14.4 Air Travel

Air travel to Luanda currently uses the 4 de Fevereiro Airport, a regional and international airport near the coast in central Luanda. This existing airport has 5 terminals and 2 runways (ITA, 2022). Domestic and regional international flights are also offered by secondary airports in Catumbela (Benguela) and Lubango. There are a total of 30 airports throughout Angola for local air travel.

A new major airport, the Luanda International Airport (NAIR), is being developed approximately 40km east of the centre of Luanda. The Estrada de Catete is currently the only public road providing access to the new airport, although other road links are planned (Airport Technology, 2018). A railway spur from the Luanda Railway will also serve the airport site. The airport is designed to handle 15 million passengers and more than 50,000 tons of cargo annually.

4.3.15 Cultural Heritage

4.3.15.1 Baseline Methodology and Approach

This baseline report is prepared using the draft guidance on Heritage Impact Assessments for Cultural World Heritage Sites (ICOMOS, 2022) and international guidance (ICOMOS and IFC PS8). No national guidance currently exists on methodology for assessment of impacts on Cultural Heritage within Angola.

Cultural Heritage resources were identified through the following:

- Desk-based research.
- Stakeholder Engagement (intangible Cultural Heritage); and
- Field Survey for tangible and.

Desk-based Research

The following information and sources were consulted during desk-based research of the Cultural Heritage for the Project AoI:

- Published and available academic research of the region;
- Publicly available remote sensing data including satellite imagery and historic mapping.

Stakeholder Engagement

• Stakeholder interviews were held in May 2023 as part of the social survey with the aim to gather information on the following intangible Cultural Heritage:

- Places that might be of historical or archaeological importance, or important to a sense of identity or belonging;
- Active or formal burial sites or cemeteries;
- Places that might be of spiritual importance, for example shrines, places of worship, ancestral places etc.
- Traditions, crafts, festivals or rituals in the area that may be impacted;
- Land farmed or managed in a particular way or tradition that is unique to a specific location.

Field survey for Tangible Cultural Heritage

A tangible cultural heritage field survey was carried out by ERM in May 2023. This comprised a visual site inspection with the aim to ground-truth the cultural heritage resources identified through the desk-based study including remote sensing, and to identify additional cultural heritage resources.

4.3.15.2 Archaeological and Historic Background

The earliest known reference to Angolan archaeology was made by J. C Tuckey in 1816 when a rock shelter containing engravings in Pedra do Feitico was sighted near a riverbed. Following this discovery, a Portuguese engineer Ricardo Severo discovered the first prehistoric stone artefacts in the form of a collection of polished stone tools in 1890. Archaeological investigation has historically been linked to colonial rule, and when Angola gained independence in 1975 after 14 years of war against Portugal, research institutes declined in Angola, with those surviving through the National Museum of Archaeology of Angola. Research struggled to continue through the decades of civil war, with scientific studies being undermined by social and political instability.

The majority of Angola's tangible heritage was lost during the period of internal conflict through pillaging of museum collections, illegal trade of antiquities and the destruction of archaeological sites. Lastly researchers were restricted from carrying out field surveys due to the proliferation of land mines. Recently research in archaeology has seen effort to re-launch in a challenging environment and lack of coherent research agendas and knowledge dispersed across several libraries in Angola.

Complex agricultural communities are known to have taken root in the northernmost parts of Angola, near Luanda approximately 3,000 years ago. The consolidation of Portuguese colonialism in the 18th and 19th Centuries paved the way for a long-term cultural and linguistic connection between Angola and Portugal. During the rush for Angolan natural resources in the late 19th Century, explorer Roberto Ivens led an expedition from Luanda to the Congo Basin. Many of the first reports on cultural heritage, ethnography and archaeology of the Luanda-Congo Basin were recorded during this expedition.



Figure 4.137 Archaeological sites identified in the Congo Zone of Angola

Source: de Matos D., et al., 2021

Within Angola's northern region, known as the Congo Zone, which extends from the Atlantic coast in the west to the Cassai river in the east on the border of Zambia, the relief is characterized by a series of river terraces draining towards the ocean. More than 80 archaeological sites have been identified in this region, localized to the extensive interior plateau crossing a network of subsidiary rivers running south to north (Figure 4.137).

These archaeological sites contain mostly stone tools from a pebble-based industry of core- axes, Acheulean hand axes, and picks found in abundance in the lower river terraces of the Late Pleistocene. Evidence suggests that the Middle Stone Age and Late Stone Age appear to be frequent and widespread within the Congo Zone and considered to be in permanent use by human occupation, though Angola's Stone Age is still considered relatively limited due inconsistencies in field survey (de Matos D., et al., 2021).

The scoping study also contains industrial heritage in the form of the Luanda Railway which opened in 1889. Initially the Luanda Railway connected Luanda to Lucala and was extended by the Portuguese government to include Malanje in 1909. Following Angolan Independence in 1975, a civil war broke out and by 2001 the Luanda Railway was one of the last functioning railways in Angola as most of the rail infrastructure was destroyed during the conflict (Railway Gazette, 2022).

4.3.15.3 Key Baseline Findings

The baseline study identified a total of three Cultural Heritage resources, comprising no Designated Resources and three Non-Designated Resources within flyover Project Aol.

Each resource is assigned a unique identifier (for example INZ_CH_001) and is presented below by Governate. Further details on each Cultural Heritage resource can be found in Appendix Q and related maps are in Figure 4.139.

Designated Cultural Heritage Resources

No Designated Cultural Heritage resources were identified within the Project Aol.

Non-Designated Cultural Heritage Resources

A total of three Non-Designated Cultural Heritage resources were identified within the flyover Project Aol (Figure 4.139). The Cultural Heritage resources are presented per site below (Figure 4.138):

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.





SME (INZ_CH_001): A baobab tree which may hold spiritual and religious value to the surrounding community

Mulenvos (INZ_CH_002): The historic railway crossing at Mulenvos



5th Avenue (INZ_CH_003): The historic railway crossing at 5th Avenue



Source: ERM, 2023



Figure 4.139 Non-Designated Cultural Heritage sites

Source: ERM, 2023

5. STAKEHOLDER ENGAGEMENT PLAN

5.1 Stakeholder Identification and Analysis

To develop an effective SEP, it is necessary to identify stakeholders that may be directly or indirectly affected by the Project (positively and negatively), understand their interest, priorities and objectives in relation to the Project and understand how they may have an influence on the Project outcomes or implementation. For the purposes of this SEP, a stakeholder is defined as *any individual or group who is potentially affected by the Project, or who has an interest in the Project and its potential impacts* (both positive and negative).

Stakeholders closer to the project site will be directly affected by the project activities (both positive and negative) and should be engaged more frequently to mitigate adverse impacts and seek to ensure that they benefit from opportunities associated with the Project, such as employment. However, project stakeholders are not necessarily limited to people who have a physical presence around the project site, they can also include local government, NGO's, and local media, among others.

By classifying and analysing the influence and support of various stakeholders, it is possible to develop an Engagement Plan that is tailored to the needs of different stakeholder groups. It is also important to understand how each stakeholder may be affected by the Project (or perceives they may be affected by the Project) so that engagement can be tailored to address their views and concerns in an appropriate manner.

As this SEP is a living document, stakeholder identification and analysis will continue through the life of the Project.

5.1.1 Stakeholder Identification

According to IFC PS 1, stakeholder engagement planning requires the project proponent to "identify the range of stakeholders that may be interested in their actions". Furthermore, stakeholder engagement is to "begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise".

Stakeholders were identified through:

- The working experience of the consultants (ERM and BDM) and INZAG, including knowledge and understanding of the local context;
- Satellite imagery and drone footage;
- The ESIA Scoping Phase;
- A site visit carried out by ERM during the socio-economic baseline data collection (29th May 2nd June 2023);
- Workshop between ERM, BDM and INZAG (held on 12th July 2023); and
- Recommendations from other stakeholders.

A stakeholder database has been created in accordance with the European Union General Data Protection Regulation (GDPR) and the IFC PSs (Appendix I). This template will be populated and maintained by INZAG throughout the life of the Project and will be stored in a secure database in line with GDPR requirements.

The supplementary Guidance Note to IFC PS 1 states that all personal data and information should be treated as confidential except where disclosure is required by law. In those instances where disclosure of data on affected stakeholders is required (e.g. as part of the ESIA Report chapters), such data will be disclosed in a manner that cannot be attributed to particular individuals.

5.1.2 Key Project Stakeholders

The main Project stakeholders identified to date are listed in Table 5.1 below. Stakeholders have been grouped according to the following categories based on their levels of participation, interest, and influence in the Project:

1) Legally Required / Linked

- Environmental and Permitting Authorities;
- Project Proponent;
- Other National Government;
- Local Government (Provincial, Municipal and Commune); and
- Parastatals.

2) Potentially Impacted Private Citizens

- Privately owned land and infrastructure in the Project footprint;
- Direct Aol, north of Catete Street;
- Direct Aol, south of Catete Street;
- Traders; and
- Vulnerable Groups.

3) Civil Interest / Influence

- Workers Unions / Business Associations;
- Civil Society Groups / NGOs; and
- Local media.

Traditional authorities / soba's are more common in rural areas than urban areas and as such are relatively rare in Luanda. This stakeholder category has therefore been removed from the stakeholder list.

Consultation methodologies will need to consider these stakeholder categories, and tools developed specifically for each group to get relevant information.

Table 5.1 Key Project Stakeholders¹⁰

Stakeholder Category	Stakeholders	Connection to the Project
Legally Required / L	inked	
Environmental and Permitting Authorities	 Ministry of Environment (MINAMB) National Directorate for Prevention and Environmental Impact (Direção Nacional de Prevenção e Avaliação de Impactes Ambientais - DNPAIA) National Institute of Roads (INEA) 	Responsible for the environmental licenses in Angola. The Ministry of Environment (MINAMB) is the government body responsible for the development, management, implementation and control of the Government's environmental policies. It is also responsible for the review and regulation of Environmental Impact Assessments (EIAs). Responsibility for EIA's falls under the National Directorate for the Prevention and Assessment of Environmental Impacts (Direcção Nacional de Prevenção e Avaliação de Impactes Ambientais (DNPAIA)), w hich, among other things, is responsible for review ing and commenting on EIA processes. All reports review ed by DNPAIA are forw arded to MINAMB w ith recommendations on w hether an environmental licence should be granted or not.
Project Proponent	 Ministry of Transports (MINTRANS) National Agency of Terrestrial Transports (ANTT) CFL - Luanda Railw ay 	The Government of Angola, acting through the Ministry of Transports (MINTRANS), represented by its implementing agency, the National Agency of Terrestrial Transports (ANTT) is leading the Project. The concept for the Project was created by CFL and they will be a key beneficiary of the Project.
Other National Government	 Ministry of Energy and Water Ministry of Economy and Planning Ministry of Telecommunications National Director for the Economy of Concessions (DNEC) Ministry of Construction (Ministério das Obras Públicas, Urbanismo e Habitação) 	National Government is of primary importance in terms of establishing policy, granting permits and/or other approvals for the Project, and monitoring and enforcing compliance with Angolan law throughout all stages of the Project life cycle. The National Director for the Economy of Concessions (DNEC) will be responsible for funding the Project.
Local Government	 Luanda Province Municipal Administration Viana Municipality Icolo e Bengo Municipality Cazenga Municipality Commune Administration Viana Commune Kalaw enda Commune Tala Hady Commune 	Local Government is responsible for the implementation of legislation, development plans and policies at the local level. Local Government may also have a role in issuing permits and processing applications associated with the project. They may also have a role in monitoring the implementation of Project commitments included in the Environmental and Social Management Plan (ESMP). The Provincial Administration are responsible for the promotion and orientation of socio- economic development, provincial planning, social support, education (alphabetisation, primary education), healthcare, environment protection, etc. They also play a role in the execution of decisions made by central authorities regarding regional / local matters, and supervise public institutes and companies of provincial/local importance.

¹⁰ A full database of all Project stakeholders should be maintained separately from the SEP and should be updated as new stakeholders are identified, or at least on an annual basis.

Stakeholder Category	Stakeholders	Connection to the Project
		The Municipal Administration is responsible, in general, for: promoting the economic and social development of the Municipality, the quality of life of citizens, basic public services such as education, health, culture, sports, recreation and tourism, water and energy supply, basic sanitation and waste management, as well as the road network, the energy network and public lighting, building maintenance and wastewater management, civic and community education of citizens, social welfare services, parking, traffic and public transport. The Communal Administration is responsible for developing a budget proposal and submitting it to the Municipal Administration as well as supervising the collection of financial revenues coming from taxes and other revenues, among other activities.
Parastatals	 Empresa Pública de Águas de Luanda (EPAL) (Public Enterprise for Luanda's Water) Empresa Nacional de Distribuição de Electricidade. (Electricity providers) Instituto de Estradas de Angola (INEA) (National Roads Institute) Direcção Nacional de Insfraestruturas Urbanas (DNIU) 	Parastatals (companies or organisations ow ned by the Angolan government) may have public land or other assets (e.g. electricity poles) that could be affected by the Project.
Potentially Impacted Pr	ivate Citizens	
Privately owned land and infrastructure in the Project footprint	 Residential households Small and medium-sized businesses Private landow ners with fruit trees (SME site) Visao Crista Church (Viana site) Hotel Viana (Estalagem site) 	This category includes households, small and medium-sized businesses, privately ow ned land and social support services (e.g. places of worship) north of Catete Street and which fall inside the project footprint. As a result, they may be physically and economically displaced through land acquisition.
Direct Aol, north of Catete Street	 Residential households Small, medium and large businesses. Examples include, but are not limited to: SME site: Plastics factory (Soruty Comercio E Industria (SU)) Government complex (SME Complex) Posto de Abastecimento Sonangalp (petrol station) Viana site: Used auto parts store (Novipeças) Tw ins Grafica Lda – Wedding Venue Facilita Padaria (restaurant) 	This category includes households, small, medium and large businesses, and support services (e.g. schools, healthcare facilities and places of worship) located north of Catete Street in the direct Aol of the overhead and deviation roads, but outside of the project footprint. As a result, they will not be physically displaced. They may, how ever, experience disruptions in the form of access restrictions ow ing to the construction activities blocking roads and drivew ays. This could potentially negatively affect income, livelihood activities, community cohesion, wellbeing and general way of life. Those near the diversion routes and new diversion route crossings may also experience negative impacts from road upgrades and increased traffic.

Stakeholder Category	Stakeholders	Connection to the Project
	 Pacafil Lda (restaurant) Bolos & Salgados sw eet shop FS4LIFE Shop O Estalagem site: Millenium Centro Turístico Hostel 5th Avenue site: NSP Commercial AC, Finicar El Valopes Comerce OE Gandara Angola Lda Grupa Morena Fn Lda Mulenvos site: Power station 	
	 Social support services. Examples include, but are not limited to: Viana site: 	
	 Kerval School Estalagem site: 	
	 Vungery School 	
	- Mulenvos site:	
	 Salao de Assembleia das Testemunhas Church 	
	 Iaxi rank 	
Direct Aol, south of Catete Street	 Residential households Small, medium and large businesses. Examples include, but are not limited to: Viana site: Marques Bolos Bakery Agencia de Viagens A.C Camuty & Filhos, Lda (Travel agent) 	This category includes households, businesses and social support services located south of Catete Street in the direct AoI of the overhead and deviation roads, but outside of the project footprint. As a result, they will not be physically displaced. They will, how ever, be affected by the project due to their proximity to the construction area. As the majority of the construction activities will occur north of the street, the negative impacts to these areas are likely to be small. These areas will likely benefit from increased traffic flow and increased accessibility during the operational phase.

Stakeholder Category	Stakeholders	Connection to the Project
Stakeholder Category	 Stakeholders Anny LinkSoft Comercio e Prestacao de Servicos Lda (IT support and services) AR – Advohados (Law yer) Café Francis 2 Ferreirinhas Restaurante E Bar Novipecas, SARL (Used vehicle parts shop) Koopleste Comercio Geral, LSA (Corporate office) Sonangol pump (Fuel station) Bomba da Sanangol "dos Mutilados" (Petrol station) Bomba da Sanangol "dos Mutilados" (Petrol station) Estalagem site: Koorri Auto parts DHL Angola Ocean Freight LCL Terminal Trenze de Viana LDA (Supermarket) Kikovo (Egg supplier) Gude (Second hand furniture shop) Marcelo Blaine (Art gallery) PEP Angola Luanda Viana Alimenta (Clothing shop) Heetch Angola Viana (Corporate office) Alimenta Angola 	Connection to the Project
	 Alimenta Angola (Supermarket) Igreja Universal Estalagem 	
	(Supermarket) ■ Feliciana R.I.O.F LDA (Discount Store)	
	 5th Avenue site: House of the Alberta Cabriel 	
	 Jota Auriculares INFOR 	
	Padaria123	
	 Praca da BCA (Shopping Centre) 	

Stakeholder Category	Stakeholders	Connection to the Project
	 Social support services. Examples include, but are not limited to: Viana site: School Ana Coxe Carvalho Escola Nacional de Bombeiros - National Fire School Estalagem site: Universal Church of Kingdom of God Mulenvos site: Escola Nova 	
Traders	 Informal street traders / vendors (both on the side of the road and on the railw ay line) Taxi and bus drivers Motorbike taxi drivers 	Informal traders use the road and railw ay intersection points to sell goods and services. This is also a point where taxi's and motorbike taxi's pick up/ drop off passengers. The project may affect some of the informal business mostly at roads intersections where the construction will take place. Traders at the five sites as well as those at the new diversion route crossings will be asked to move for safety reasons during construction phase and their access will continue to be restricted during the operational phase. This may negatively impact the livelihoods of traders in the area, leading to economic displacement.
Vulnerable Groups	 Women Youth Children Elderly and retired Female and child headed households Low -income households Physical / mental health and persons with disabilities 	Vulnerable or disadvantaged groups may be affected by the project through their physical disability, social or economic standing, limited education and/or lack of employment. See details in Table 4-2 below.
Civil Interest/Influence)	
Workers Unions / Business Associations	 Central Geral de Sindicatos Independentes e Livres de Angola (CGSILA) União Nacional dos Trabalhadores de Angola (UNTA- CS) Associação Nova Aliança dos Taxistas de Angola (ANATA) Associação dos Motoqueiros e Transportadores de Angola (AMOTRANG) 	Workers Unions / Business Associations are organisations that engage in and are supportive of business interest for both formal and informal businesses ensuring that rights of w orkers are protected. These will make sure that the Project takes into consideration peoples' jobs or livelihoods and protect their rights.
Civil Society Groups / NGOs	 AAIDA NGO – Humanitarian Help Mosaiko – Human Rights (Estalagem) 	Interested in potential environmental and social issues related to the Project and its activities. NGOs and Civil Society can influence the Project directly or through public opinion. Such

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

Stakeholder Category	Stakeholders	Connection to the Project
	 Viana Capalanga – Women's Shelter Vila de Viana – Housing society Centro de Formação Perseverante – Social Services organisation 	organisations may also have detailed insight into the local area / context. NGOs and Civil Society can also offer the potential to form partnerships with the proponent (i.e. INZAG) to collaborate on stakeholder and project outcomes.
Local media	 Radio Rádio Nacional de Angola Rádio Luanda Rádio Mais Rádio Escola New spapers Jornal de Angola Jornal Expansão Novo Jornal Jornal "O País" Jornal Economia & Finanças Television TPA – Televisão Pública de Angola TV Zimbo 	Communication of Project-related information. Print and electronic media has the potential to raise positive or negative aw areness about the project. Radio stations are widely listened to by the general population and have a wider reach than printed new spapers or TV new s programmes. As far as the printed new spapers are concerned, Jornal de Angola (daily circulation) is the most widely publicised and is generally the first to report on the activities of the Angolan government. TPA is the public broadcaster of all Angolan information. The new s agenda accompanies practically all government actions.

Source: ERM, 2023

5.1.3 Vulnerable Groups

Vulnerable people or groups are those who may be more adversely affected by Project impacts than others by virtue of characteristics such as their gender, gender identity, sexual orientation, religion, ethnicity, Indigenous status, age (including children, youths and the elderly), physical or mental disability, literacy, political views, or social status. Vulnerable individuals and/or groups may include, but are not limited to, people living below the poverty line, the landless, single-headed households, natural resource dependent communities, migrant workers, refugees, internally displaced people, or other displaced persons who may not be protected through national legislation and/or public international law.

To create an inclusive engagement process, it is important to identify individuals and groups who may find it more difficult to participate and those who may be directly and differentially or disproportionately affected by the Project because of their disadvantaged or vulnerable status.

Table 5.2 below provides an overview of the groups that may be considered vulnerable in the Social Aol. The Project will take special steps to facilitate access for such groups and provide them with the opportunity to engage in informed discussion about the Project and their interactions with it. This identification will be refined through implementing the SEP.

Vulnerable Group	Description and Relationship to the Project
Women and particularly female-headed households, widows, and divorcees	Ow ing to the nature of traditional and domestic relations, women may be reliant on the male members of the family for financial support and participation in public decision-making. Women have few er employment opportunities and mostly work in low -income, part-time or informal jobs. Women heads of household are more often vulnerable due to reduced access to financial resources and reduced voice in public decision-making. Women / female heads of household have been identified as being vulnerable within the Aol. They are less able to access employment and economic benefits of the Project and may be susceptible to changes in the security context.
Female traders / informal businesses	As with female-headed households, female traders may be more vulnerable due to reduced access to financial resources and reduced voice in public decision-making. Female traders are likely to be more vulnerable to changes in trading conditions associated with the Project.
Children	To access assets / resources, children are often reliant on older members of the household or community. When a child is not adequately represented by an adult, from a low-income family, or an ethnic minority, they may be vulnerable to exploitation within the community or workplace. Children are present throughout the Aol. Considering the local context and labour market regulations, they are unlikely to be directly affected by employment aspects of the Project but may be more vulnerable to health impacts of environmental changes (e.g., air emissions) generated by the construction phase of the Project. They may also be vulnerable to changes in the security context, associated with opposition.
Youth (18–24), as defined by the United Nations	Youth may be vulnerable in terms of access to assets, education, or employment opportunities. Youth are present throughout the AoI. Impacts are likely to be limited to employment and expectations of economic benefits from the Project.
Elderly (men and women) and retired	Retired and/or elderly members of the community may have minimal / fixed income and are more likely to have reduced capacity to cope with changes to their environment. Elderly / retired persons are present in the Aol. Potential impacts may occur through environmental changes (e.g., air emissions) generated by the Project. The elderly may also be affected by changes (real or perceived) in the security context, associated with opposition.
Low-income Households	Low -income households have few er resources on w hich to rely and are less likely to have savings and/or access to credit, w hich makes them vulnerable

Table 5.2 Potentially Vulnerable or Marginalised Groups in the Social Aol

Vulnerable Group	Description and Relationship to the Project
	to shocks and change. Low -income households are present in the Aol, and are likely to be directly affected by the Project's employment opportunities, including negatively due to unequal opportunity (or positively if they can access it) and by localised price inflation caused by the Project.
Physical / mental health and disability	Those who lack physical mobility or who have mental health issues may be vulnerable to changes and unable to participate in decision-making, or those with underlying health issues that may be more sensitive to environmental changes. A small number of persons with disabilities may be present within the AoI but are unlikely to be directly impacted by the Project.
Foreigners	Individuals from different countries may be less able to access social and economic resources and may also be at risk of xenophobic action.

Source: ERM, 2023

5.2 Stakeholder Analysis and Prioritisation

It is not practical, and not necessary, to engage with all stakeholder groups with the same level of intensity all the time. Analysing and prioritising stakeholders is important to determine appropriate engagement methods for different stakeholders. It also helps identify which stakeholders need to be prioritised during the ESIA process. It is important to keep in mind that the project development situation is dynamic and that both stakeholders and their interests might change over time, in terms of level of relevance to the Project and the need to actively engage at various stages. Stakeholder analysis should, therefore, be revisited throughout the Project lifecycle.

For each stakeholder category identified in Section 5.1 above, the following needs to be considered:

- 1. Level of **influence** that they may exert over the project:
 - a. High Stakeholder is highly influential and has significant ability to stop or disrupt the Project or cause extensive damage to its reputation.
 - b. Medium Stakeholder has a moderate influence and considerable capacity to stop or disrupt the project and cause damage to its reputation.
 - c. Low Stakeholder is considered to have limited influence and little capacity to stop or disrupt the Project or cause damage to its reputation.
- 2. Level of **interest** that they may have in the project:
 - a. High Project is of high interest to stakeholder.
 - b. Medium Project is of moderate interest to the stakeholder.
 - c. Low Project is of little or negligible interest to the stakeholder.
- 3. Level of **impact** that they may experience as a result of the project:
 - a. High Stakeholder is considered to be highly sensitive to potential project impacts and may experience significant changes in their health, wellbeing and livelihoods as a result of the project.
 - b. Medium Stakeholder is considered to be moderately sensitive to potential project impacts and may experience some changes in their health, wellbeing and livelihoods as a result of the project.
 - c. Low Stakeholder is not considered to be sensitive to the potential project impacts and is unlikely to experience any changes in their health, wellbeing and livelihood as a result of the project.

Once the above criteria have been decided for each stakeholder category, the matrix below (Figure 5.1) can be used to determine the engagement approach to be adopted. Varying engagement approaches are necessary, depending on the level of importance and influence that each stakeholder

has in regard to the Project. Further detail on the different engagement approaches is provided in Table 5.3. The analysis also needs to consider which stakeholder categories may find it more difficult to participate in consultation activities owing to their marginalised or vulnerable status (such as disabled or elderly people).

As the level of influence and importance in the project may change over time, there is a need to review and, where necessary, update this information on a regular basis.



Level of interest of stakeholders

Figure 5.1 Stakeholder Analysis Matrix

Source: ERM, 2023

Table 5.3 Approach and Frequency of Engagement Activitie
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Approach to Engagement	Frequency and Type of Engagement Activities
Engage closely	Stakeholders are directly engaged with during the ESIA process. Communication is two-way and is likely to revolve around the conduct of direct, in-person or virtual meetings to discuss the Project, facilitate dialogue and ensure that relevant information and feedback from stakeholders is considered in the ESIA process.
Keep satisfied	Stakeholders are engaged with indirectly during the ESIA process. Communication is predominantly one-way and revolves around the distribution of written information (e.g. information leaflets) via email, post or by hand. Stakeholders are encouraged to respond with written or verbal feedback and comments. Where appropriate, and at the stakeholder's request, there may be more direct contact.
Keep informed	Stakeholders are engaged with indirectly during the ESIA process. Communication is one-way and revolves around the distribution of written information (e.g. information leaflets) via email, post or by hand. Stakeholders are free to respond with written or verbal feedback or comments if they so wish.
Monitor	There are no deliberate plans to engage with these stakeholders during the ESIA process. How ever, their interest in and opinions of the Project are monitored (e.g. through the receipt of correspondence and online, including social media, activities) to identify any change in perceptions and the potential need for engagement, as appropriate.

Source: ERM, 2023

Using the approach and frequency of engagement activities set out in Table 5.3 together with the outcomes of the stakeholder analysis, recommended levels of engagement have been assigned to Project stakeholder groups (Table 5.4). This approach recognises that stakeholder engagement is multi-faceted, and that the approach to engagement is not uniform across stakeholders.

Priority should be given to stakeholders that are highly influential including those who are both supportive and unsupportive of the Project.

Stakeholder Cluster	Level of Impact	Influence Level	Interest Level	Engagement Approach
Environmental and Permitting Authorities	Low	High	High	Engage closely
Project Proponent	Low	High	High	Engage closely
Other National Government	Low	Medium	Medium	Keep satisfied
Local Government (Provincial, Municipal, Commune)	Low	Medium	High	Engage closely
Parastatals	Low	Medium	High	Engage closely
Privately ow ned land and infrastructure in the Project footprint	High	Medium	High	Engage closely
Direct Aol, north of Catete Street	High	Medium	High	Engage closely
Direct Aol, south of Catete Street	Medium	Medium	High	Engage closely
Traders	High	Medium	High	Engage closely
Vulnerable Groups	High	Medium	High	Engage closely
Workers Unions / Business Associations	Low	Low	High	Keep informed
Civil Society Groups / NGOs	Low	Low	Low	Monitor
Local Media	Low	Low	Low	Monitor

I able 5.4 Results of the Stakeholder Analysi

Source: ERM, 2023

Engaging stakeholders who are unsupportive and influential, or those with deep-rooted challenges, requires engagement with a pro-active and hands on approach. Effective engagement typically combines approaches - from informing to activities such as consultation or collaboration. In analysing these stakeholders and developing an approach to engagement, consideration has also been given to:

- Level of interest in the Project/operation;
- Anticipated impact of the Project on the stakeholder;
- Vulnerability status of the stakeholder; and
- Relationships with high-influence stakeholders, including their ability to influence these stakeholders.

Stakeholders that have low influence but that are unsupportive should be monitored closely, with a particular focus on their ability to influence, and their relationships with, other stakeholders. Less intensive forms of engagement such as monitoring or disseminating information will be adequate for engaging less influential, supportive stakeholders. That been said, it is important to remember that individual stakeholders can share a collective voice and access to legal guidance and resources thereby becoming more influential.

The summary of Stakeholder Engagement Activities undertaken is presented in Appendix E.

5.3 Stakeholder Engagement Plan

This SEP covers stakeholder engagement activities for the ESIA process as well as a framework for post-ESIA engagement (i.e., pre-construction, construction and operational phases) of the Project. The intensity and frequency of INZAG's stakeholder engagement will be commensurate to the Project's development phase as well as activity type and risk associated with that activity.

Broadly, the programme of engagement over the life of the Project consists of the following activities:

- Continuous identification, mapping and prioritisation of stakeholders;
- Refinement of engagement and information dissemination tools;
- Development of culturally appropriate strategies to guide the engagement process;
- Build trust and establish relationships with community representatives;
- Ongoing formal and informal engagement of stakeholders throughout the Project execution;
- Recording raised issues and commitments;
- Recording engagement activities;
- Communication of the Grievance Redress Mechanism (Section 7.9.7);
- Logging and responding to grievances; and
- Iterative update of the stakeholder database and stakeholder engagement log.

5.3.1 Principles of Engagement

The key principles guiding the Project's approach to stakeholder engagement are as follows:

- Transparency: to be open and transparent with stakeholders;
- Accountability: to be willing to accept responsibility as a corporate citizen and to account for impacts associated with the Project activities;
- Trust: to have a relationship with stakeholders that is based on mutual commitment to acting in good faith;
- Mutual Respect: to respect stakeholders' interests, opinions and aspirations;
- Collaboration: to work cooperatively with stakeholders to find solutions that meet common interests;
- Responsiveness: to coherently respond in good time to stakeholders;
- Proactiveness: to act in anticipation of the need for information or potential issues;
- Fairness: to engage with stakeholders such that they feel they are treated fairly, and their issues and concerns are afforded fair consideration;
- Accessibility: to be within reach of stakeholders so that they feel heard and to provide meaningful information as needed; and
- Inclusivity: to proactively anticipate, identify and include all stakeholders.

5.4 Engagement Phases

The engagement phases outlined in this SEP are associated with specific phases of the Project (i.e. ESIA engagement and disclosure phase, pre-construction phase, construction phase and operational phase). The specific engagement activities to be implemented in each phase are summarised in the sub-sections below.

Such stakeholder engagement approaches will be carefully planned to be in line with the level of Project activity and stakeholder relations, considering social tensions and engagement priorities. Engagement mechanisms will also be 'culturally appropriate,' including local languages and communication processes towards the different stakeholder groups. Best strategies to reach specific stakeholder representatives (e.g., the President of women's groups, youth groups, etc.) will also be carefully designed through the support of INZAG's Community Liaison Officers (CLOs) prior to the onset of such activities.

Dedicated approaches and increased resources will be used for engagement with vulnerable groups so that these groups have the opportunity to fully understand the issues that are potentially affecting them and are provided with specific opportunities to ask questions and express concerns.

As the SEP is a working document, this Plan will be updated should the need arise for more intensive engagement with certain stakeholder groups or should there be a substantial change to the Project plan and activities.

5.4.1 Current ESIA Phase Engagement

This phase of engagement has already commenced and includes scoping meetings and baseline data collection meetings (see in Appendix E on engagement carried out to date).

5.4.1.1 Planned ESIA Disclosure

In compliance with **Presidential Decree 117/20, Article Nº 16** and international good practice standards, the next step in the ESIA Phase engagement will be to disclose the findings of the ESIA to stakeholders as per the stakeholder engagement programme set out in **Appendix L**.

Public disclosure is to include the following prescribed steps:

- Dissemination of the non-technical summary (NTS) of the ESIA report (in English and Portuguese) to all stakeholders. The NTS will be made available:
 - Online, via INZAG's website;
 - Hard copies placed at the INZAG Office in Luanda, District Assembly offices, Regional DNPAIA offices, and public libraries.
- Dissemination of the full ESIA document (in English and Portuguese) for stakeholder review.
 Document will be made available:
 - Online, via INZAG's website;
 - Hard copies placed at INZAG offices in Luanda, District Assembly offices, Regional DNPAIA offices, and public libraries.
- Notifying stakeholders of the availability of the NTS and ESIA report and encouraging them to review and submit comments. This will be done through:
 - Invitation letters (e.g. to national and local government);
 - Radio broadcasts;
 - Newspaper adverts;
 - Flyers; and

- Notice boards.
- Receipt, consideration and assessment of all public comments relating to the project. Public comments can be submitted:
 - Online, via INZAG's website;
 - Submitting hard copies of comments via mail or through a responsible institution;
 - Placing hard copies of comments in a comment submission box which will be placed alongside the publicly disclosed ESIA in all the venues; and
 - Telephonically.
- The public consultation period should last for at least 21 days.
- Within eight days of the completion of the consultation period, a brief report must be submitted to the Angolan Ministry of Environment (MINAMB) detailing steps to be taken, the level of public participation, and any conclusions drawn.

During the public consultation period, public consultation meetings will be undertaken with various stakeholder groups by the environmental ministry in collaboration with project specific ministries (i.e. Ministry of Transport). These meetings will be attended by ANTT with support from INZAG. As per the Decree, public consultation costs must be borne by INZAG. All engagements will be conducted in a culturally appropriate manner, through involvement of community representatives in the preparation of the meetings.

Stakeholders must be notified of the consultation activities in a daily newspaper, via radio broadcasts, invitation letters (e.g. to national and local government), and other relevant social media to ensure that all stakeholders are aware of the process and how to participate.

The following are some of the important messages that will need to be communicated to stakeholders when the non-technical summary is publicly disclosed:

- Background of the project;
- Project description and location;
- Project activities;
- Potential benefits and negative impacts posed by the project;
- Proposed measures to manage and mitigate negative impacts and to enhance positive ones;
- Process that will be followed to engage with stakeholders;
- Recording issues and concerns related to the Project;
- Grievance Redress Mechanism; and
- Planning engagement activities related to the resettlement, compensation and livelihoods restoration processes.

Once the public consultation period is over, comments from stakeholders are analysed and incorporated into the updated and Final ESIA report which will be submitted to MINAMB.

5.4.2 Pre-Construction Phase Engagement

Following the ESIA approval, the Project will move into the pre-construction phase, during which planning for construction will continue. Keeping stakeholders updated on Project activities, managing stakeholder expectations and ongoing engagement around resettlement and livelihood restoration will take place during this Phase. Activities include:

- Provide regular Project updates to stakeholders (through Community Liaison Officers (CLOs));
- Plan resettlement and livelihood restoration engagement;

- Receive, respond to and monitor grievances received;
- Maintain stakeholder database, stakeholder engagement log and grievance log;
- Revise stakeholder mapping to accommodate changes in the Project and social dynamics; and
- Review and assess stakeholder participation in order to revise, if necessary, the frequency, means and format of engagement to meet accessibility and participation requirements of all stakeholders.

5.4.2.1 Provide Six-Monthly Project Updates

It is important that stakeholders continue to have a good understanding of the Project activities. Engagement meetings will, therefore, be undertaken during the pre-construction phase. All planned formal and informal engagements should be used as an opportunity to identify and register any new stakeholders and to gather their feedback and concerns.

INZAG will therefore continue to provide feedback and updates to stakeholders regarding the progression of planning for construction commencement, as well as any other pertinent information to be disclosed. This feedback will be provided primarily through the CLOs. Depending on the stakeholder group, these meetings will be held either quarterly or six monthly.

The meetings will play an important role in continually communicating relevant Project information with communities and other stakeholders as well as disseminate information on employment, local content and grievance management, etc.

5.4.2.2 Resettlement and Livelihood Restoration Plan (LRP)

Regular focused stakeholder engagement and negotiations with affected land users will occur as part of the LRP. This engagement will run in parallel to the overall engagement activities outlined in this SEP.

5.4.3 Construction Phase Engagement

Keeping stakeholders updated on Project construction activities, employment / procurement opportunities, managing stakeholder expectations and responding to grievances will take place during this Phase. Activities include:

- Provide regular Project updates to stakeholders (through CLOs);
- Monitor contractors' social performance;
- Receive, respond to and monitor grievances received;
- Maintain stakeholder database, stakeholder engagement log and grievance log;
- Revise stakeholder mapping to accommodate changes in the Project and social dynamics; and
- Review and assess stakeholder participation in order to revise, if necessary, the frequency, means and format of engagement to meet accessibility and participation requirements of all stakeholders.

5.4.3.1 Provide Quarterly Project Updates

The CLOs will be responsible for designing and implementing regular proactive and structured engagement with affected stakeholders. Engagement should take place frequently (preferably on a bimonthly basis, depending on the stakeholder group), however, there may be times during the construction phase when more frequent and targeted engagement is required.

Engagement will be focused on informing and updating community members and stakeholders about the Project construction activities and schedule, including anticipated delays or changes, and

procurement and employment opportunities, as well as the potential impacts that can be expected to occur along with the measures planned to mitigate these.

These engagements may include:

- Targeted face to face information disclosure meetings with environmental permitting authorities and other key regulatory authorities such as local government, if required;
- Community meetings for updates and information sharing on topics of concern such as community health and safety; and
- Focus Group Discussions (FGDs) for special interest groups with particular concerns.

Information dissemination tools will continue to be used to support the above activities. For example, notice boards are an accessible way for communicating changes to stakeholders concerning Project design, progress on meeting social and environmental management commitments, details of upcoming construction activities and or changes to schedule. The project website will also be updated on a regular basis.

5.4.3.2 Engage with Key Stakeholders through CLOs

In order to ensure the CLOs are visible and accessible to the affected stakeholders, the Project will maintain a permanent space for the CLOs at the Ministry of Transport. The location of the Information Office will be publicised to affected communities as a location where information about the Project construction activities and schedule is available to them and where their issues / grievances can be registered. In addition to this, it is recommended that a schedule of visits at a regular pre agreed time / location by CLOs to the affected communities will be made available to stakeholders.

5.4.3.3 Monitor Contractors

Unmanaged or poorly handled engagement with communities by contractors can present a risk to the Project. It may result in inconsistent or contradictory messages or conflicting commitments from the contractor and Project representatives, which can give rise to unmet expectations.

The CLOs will liaise with and monitor contractors to ensure that any interaction-taking place between contractor workforce and stakeholders is consistent with the standards, core principles and procedures for undertaking, recording and documenting stakeholder engagements, as is outlined in this SEP.

5.4.3.4 Maintain Stakeholder Database and Engagement Log

In order to ensure all stakeholders affected by project construction are identified and engaged, the CLOs will be responsible for ensuring the stakeholder database, stakeholder engagement log and SEP are regularly updated, and risks associated with stakeholders are assessed and re-evaluated, as necessary, based on information revealed through interactions and grievance management.

Any new stakeholders that may have arrived in the Project area or developed an interest in the Project should be monitored, and strategies developed for engaging them. The CLOs will be responsible for feeding back to the lenders information on new stakeholders or changing stakeholder issues / risks, which arise through their stakeholder interactions.

Templates for the stakeholder database and stakeholder engagement log can be found in Appendix I and Appendix P respectively.

5.4.3.5 Review and Respond to Grievances

Unresolved stakeholder grievances can quickly escalate and lead to unforeseen work stoppages and delays. It will, therefore, be important during the construction phase to respond quickly and effectively to raised grievances, and regularly engage with stakeholders to anticipate where stakeholder issues or concerns may arise before they do.

The CLOs will be responsible for logging and responding to all grievances and resolving locally those that can be managed in the immediate term or reporting and escalating more complex issues to the Project management, as appropriate.

The template for a grievance register can be found in Appendix M.

5.4.3.6 Resettlement and Livelihood Planning

Regular focused stakeholder engagement around livelihood restoration will continue during the construction phase and will run in parallel to overall engagement activities outlined in the SEP.

5.4.4 Operational Phase Engagement

On completion of the construction phase, the flyovers will be commissioned and the Project will move into the operation phase. Given the nature of the Project, stakeholder engagement during the operation phase will be scaled back and target stakeholders likely to be impacted during operations. The programme will be further refined near to the start of Project operation. Activities include:

- Stakeholder engagements related to transition to operations;
- Continue community outreach and engagement efforts;
- Provide Project updates if there is a change or any maintenance activities occurring;
- Receive, respond to and monitor grievances received;
- Maintain stakeholder database, stakeholder engagement log and grievance log;
- Revise stakeholder mapping to accommodate changes in the Project and social dynamics; and
- Revise stakeholder mapping to accommodate changes in the Project and social dynamics.

It is also important that the following information is communicated to the project stakeholders on an as-needed basis:

- Any interruptions of service utilities; and
- Any changes in the planning/ design of the Project.

5.4.4.1 Stakeholder Engagement Related to Transition to Operations

Operation phase engagement activities will be designed to clearly communicate anticipated changes brought by the transition from construction to operations, and to manage community expectations around the associated impacts, for example a reduction in employment and other economic opportunities.

The Project will need to ensure adequate resources for stakeholder engagement during operations. This could come in the form of continued presence of a CLO or handover to other management functions. Any transition will need to be managed. The loss of familiar Project staff can impact on established stakeholder relationships and cause a loss of institutional knowledge and often a breakdown in trust. If the CLO role is passed onto a new CLO or to other management staff, then this needs to be clearly communicated to affected stakeholders.

5.4.4.2 Resettlement and Livelihood Restoration Plan

Regular focused stakeholder engagement around livelihood restoration will continue during the operation phase to monitor livelihood restoration efforts.

5.4.4.3 Continue Community Outreach Related Engagement

Regular, direct engagement in the form of update meetings and focus group discussions around specific issues or concerns will continue between the CLOs and key Project stakeholders.

Engagement will be aimed primarily at maintaining continuity of relationships, monitoring the effects of Project impacts on stakeholders and particularly on vulnerable groups, and demonstrating long-term organisational commitment to delivering on social and environmental mitigations or to resolving outstanding issues and grievances.

5.4.4.4 Maintain Stakeholder Database and Stakeholder Engagement Log

In order to ensure all stakeholders affected by operations are identified and engaged, the CLOs will be responsible for ensuring the stakeholder database and SEP are regularly updated, and risks associated with stakeholders are assessed and re-evaluated, as necessary, based on information revealed through interactions and the grievance mechanism. Any new stakeholders that may have arrived in the Project area or developed an interest in the Project should be monitored and strategies developed for engaging them. The CLOs will be responsible for feeding back information on new stakeholders or changing stakeholder issues / risks within the Action PIan which arise through their stakeholder interactions.

The stakeholder database will be updated on an ongoing basis and the SEP will be updated annually during Project operations.

5.4.4.5 Monitoring of Grievances

At the commencement of construction, the Project will actively monitor grievances raised against INZAG or sub-contractor staff, as per the process outlined in Section 7.9.7 (Grievance Redress Mechanism). Where recurring grievances are identified, INZAG will actively engage with stakeholders and aggrieved parties to address the cause of such recurring grievances.

5.5 Engagement Schedule

As described in the sections above, engagement is required at key points in the Project life cycle, both in anticipation of and in response to changes in Project activities and their associated positive and negative impacts.

The Project timeline can be divided into four phases, namely:

- ESIA engagement and disclosure phase;
- Pre-construction phase;
- Construction phase; and
- Operation phase.

The recommended approach to developing and scheduling an action plan for engagement is detailed in Appendix L, which indicates the preferred approach for ESIA Disclosure, Pre-construction and Construction. This action plan will need to be adapted to specific needs arising from engagement activities, such as stakeholder requests for specific consultation activities or change / deterioration in the overall social climate. The operational phase engagement action plan should build on the schedule provided and the engagements that occurred in the previous phases.

5.6 Engagement Tools and Resources

This section describes the information dissemination tools that can be used during the implementation of the SEP.

Communicating information and engaging with stakeholders in a manner that is accessible is key to the success of an engagement programme. Various communication methods will be used to facilitate engagement during the Project phases (pre-construction, construction and operation). The level and purpose of engagement will determine the methods and channels.

Project stakeholders' literacy levels and education levels vary, and careful consideration must be given to the target audience when preparing engagement materials. Table 5.5 below outlines tools and methods for engagement and information dissemination and guidelines for preparing engagement materials.

Communication Channel	Objective	Target Stakeholders	Additional Guidance
One on one formal meetings	To disseminate Project information, respect cultural protocol, build stakeholder relationships, understand concerns, and reinforce tw o-way dialogue.	Government ministries, regional and district commissioner / authorities, potentially directly affected stakeholders w ho w ill be displaced	Prior to community meetings or focus group discussions, the CLOs should engage with the appropriate local authorities to inform them of the proposed meeting and the meeting objectives. They can play a key part in relaying the details of upcoming meetings their constituents (how ever, this should not be the only method used to communicate upcoming meetings, as it is not w holly reliable).
Community meetings	To disseminate Project information to large groups at one time, build stakeholder relationships, and understand high-level concerns.	Project affected communities, traders and businesses	Prior to holding community meetings, the CLOs should engage with the appropriate District Commissioner for Luanda and other local government authorities to discuss the proposed meeting and meeting objectives. At least one weeks' notice should be given to stakeholders ahead of a community meeting. Refreshments should be provided at community meetings. Consideration should be given to accessibility of the meeting venues and it may be necessary to arrange transportation for individuals and groups, such as elderly or disabled people. Community meetings are useful as a starting point for engagement, but may exclude the expression of certain view points, particularly those held by vulnerable groups or others w ho might be unw illing to express their perspectives in such a formal setting. Therefore, depending on the objective of the meeting, smaller follow -up Focus Group Discussions (FGDs) may be required.
Open house meeting	To disseminate Project information to stakeholders at one time, build stakeholder relationships, and understand concerns and reinforce tw o-way dialogue.	All stakeholders	Considerations should be given in terms of the accessibility of meeting venue and invitations to the meeting must be distributed at least one week prior to the meeting date. Display posters for an open house must be developed using simple language and as much visual representation as possible.
Focus Group Discussions (FGDs)	To disseminate Project information to small stakeholder groups, often with a common interest, build stakeholder relationships, understand concerns, and develop management measures / livelihood restoration measures.	Project affected communities, traders and businesses, special interest groups	Focus group discussions can also be an effective mechanism through which to engage vulnerable groups. Prior to holding focus group discussions, consideration should be given to language requirements, whether a representative from the technical team is required to provide input and answer questions, whether a female representative is required to engage women groups. At least one week's notice should be given to stakeholders ahead of a focus group discussion.

Table 5.5 Tools and Methods for Engagement and Information Dissemination

Communication Channel	Objective	Target Stakeholders	Additional Guidance
Letters	To disseminate Project information, make announcements, provide Project updates, the engagement programme and schedule, construction schedule, contact	All stakeholders	Letters must be prepared using simple, non-technical language, and include maps where appropriate. Letters must include the contact details for the Project CLOs and information on the grievance mechanism.
Email	details for the Project CLOs and information on the grievance mechanism.	Government ministries, provincial and district authorities, parastatals, w orkers unions / business associations, large businesses, civil society / NGOs, local media	Emails must be prepared using simple, non-technical language, and include maps where appropriate. Emails will typically be in Portuguese. Letters must include the contact details for the Project CLOs and information on the grievance mechanism.
SMS	To make announcements and inform stakeholders of meetings.	Project affected communities, traders and businesses	The CLOs will use SMSs to make announcements, inform communities of scheduled Project meetings, and provide Project updates. The announcements should be prepared in in English, and Portuguese. This medium has the benefit of reaching a wide audience as majority of the registered stakeholders have access to mobile phones.
INZAG website	To disseminate Project information, make announcements, provide Project updates, the engagement programme and schedule, construction schedule, contact details for the Project CLOs and information on the grievance mechanism.	Government ministries, provincial and district authorities, parastatals, w orkers unions / business associations, large businesses, civil society / NGOs, local media	The INZAG website will be updated and maintained to provide the general public, including national and international stakeholders, with information about the Project on a regular basis.
Non-technical summaries / project update flyers	To disseminate Project information, make announcements, provide Project updates, the engagement programme and schedule, construction schedule, contact details for the Project CLOs and information on the grievance mechanism	All stakeholders	Summary documents and information flyers should be prepared in Portuguese to be distributed as needed. Such material should be prepared using simple, non-technical language, and include maps and graphical representations. Summaries / flyers should always include the contact details for the Project CLOs and information on the grievance mechanism.
Media (new spaper)	To make Project announcements and inform stakeholders of upcoming meetings.	All stakeholders	The Public Relations and Communications Team within INZAG Germany will be responsible for press releases.
Posters	To make announcements, inform stakeholders of meetings and disseminate Project information.	Project affected communities, traders and businesses	Posters must contain simple language and as much visual representation as possible. When posters are placed in Project-affected communities, language should be taken into account and consideration should be given to translating posters.

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Communication Channel	Objective	Target Stakeholders	Additional Guidance
Notice boards	To disseminate Project information such as the engagement programme and schedule, construction schedule, contact details for the Project CLO.	Project affected communities, traders and businesses	INZAG will establish Project notice boards at selected locations in the Project Area. Notice boards will allow INZAG to provide regular updates with information and key announcements and should be updated on a monthly basis or follow ing the CLOs visit as necessary. The notice boards will serve as an information dissemination tool where the Project or the CLOs are able to post information pertinent to the Project, for example, construction updates, heavy traffic movement information, and recruitment updates. Project information should be available in English and Portuguese. Wherever possible, maps or visual aids must be used to increase accessibility of the notices.
Radio broadcast	To disseminate Project information such as the engagement programme and schedule, construction schedule, contact details for the Project CLO.	All stakeholders	Radio broadcasts will be used to provide updates or live question and answer sessions and information related to the Project. This medium has the benefit of reaching a wide audience and is not constrained by literacy levels. The INZAG communications team will work with local community radio stations to schedule time slots for information sharing and important Project announcements.

Source: ERM, 2023

5.7 Additional Resources

5.7.1.1 Local Office

INZAG will open and maintain an Information Office in Luanda. The mandate of this office will be to provide stakeholders with information, including answers to frequently asked questions and to enable them to log grievances either formally or informally. The office will be a meeting area for engagements with certain local stakeholders, where appropriate. All historical public information about the Project (e.g., including records of engagements, the ESIA, the commitments' register) will be available for stakeholders at the office.

5.7.1.2 Social Media Monitoring

Social media is a powerful research tool that can enable INZAG to monitor information relevant to the Project. There are a wide variety of social media monitoring tools that can be used to track and manage online conversations relevant to the Project, ensuring that INZAG has information regarding its stakeholders rather than seeking the information. These tools can help the Project understand people's perceptions and manage stakeholders' expectations.

6.1 Impact Assessment Methodology

6.1.1 Overview

The overall ESIA process for the Project has followed the obligatory stages required by the Angolan requirements and as is customary in international practice.

The Scoping Study was undertaken in accordance with the Angolan requirements and per good international practice. The Scoping Report was submitted on 21 December 2022.

6.1.2 Overall ESIA Approach

Consideration of the environmental and social factors throughout the entire lifecycle of the Project (preparatory works, construction operations, production operations, and decommissioning) is an essential prerequisite to Project implementation in accordance with the sustainable development concept. The environmental and social impact assessment (ESIA) is recognized as the most effective way to ensure such consideration.

ERM's methodological approach to conducting the ESIA has been developed in accordance with the requirements of the International Finance Corporation (IFC). In 2007, IFC published its Environmental and Social Performance Standards (PS) (the new edition came into force in January 2012). These requirements were used to define the scope and content of this ESIA.

The overall ESIA approach is illustrated in. The ESIA procedure includes several stages aimed at forecasting and evaluating the significance of the potential impacts of the Project on the components of the natural environment and socio-economic sphere. The key objective of the ESIA is to assess the sufficiency of the measures and technical solutions provided by the Project to prevent and reduce the significance of these impacts, and to develop, if necessary, additional measures to prevent, minimize or compensate for adverse impacts and enhance the positive impact.

It should be noted that the ESIA is not linear, but a consistent cyclical process. The ESIA findings are detailed, revised and adjusted as the Project's technical aspects are developed and the ESIA is carried out.

6.1.2.1 Spatial Categories of Impacts

The spatial categories used in the context of the ESIA are described below and summarized in Table 6.1.

The **Project site** is determined by the Project's direct footprint, which is a sum of areas occupied by the Project's objects.

The **Project Area of Influence** (AoI, the Project area of direct and indirect impacts) – is defined by the Project facilities, associated and other facilities together and their summarized influence and impact. The size of the Project Area of influence is different for the environmental, social and health impacts, and depends on the type of the impact.

The size of the Project AoI also depends on the type of affected receptors / resources. For some issues, such as air, noise, partially water and soil, the evaluation of predicted consequences can be quantitative based on special standards and requirements for assessment. Also, in some cases the areas of land plots allocated for Project implementation in percentage of total land areas can be used for assessment.

Table 6.1 Spatial categories used in the context of the ESIA

	Spatial category	Environmental Receptors / Socio-Economic and Heal		
	Project site	The territory of the site where the Project facilities will be located		
ı of Influence	Project area of direct impact	The territory of land allotment during the construction and operation stage	The territory where impact on socio-economic receptors is possible as a result of activities, directly initiated by the Project (e.g. as a result of vehicle movement, impact on human health from air pollution, impact on the resources used by local population etc.)	
Project Area	Project area of indirect impact	The territory where changes in the population structure and habitats of plants and animals, as well as transformation and changes in ecosystem components due to atmospheric pollution take place in relation to the Project. The area is defined in the impact assessment.	The territory where impact on socio-economic receptors is possible as a result of activities, indirectly initiated by the Project (e.g., increase of employment and grow th of income, interaction with w orking personnel of the Company, migration of labour resources associated with the Project)	
Aread	of Cumulative Impacts The area in which Project impacts and impacts from other projects/activities may overlap. In certain cases, the area of cumu impacts coincides with the area of indirect impact.		d impacts from other rtain cases, the area of cumulative direct impact.	

Source: ERM, 2023

6.1.2.2 Prediction of Impacts

Prediction of impacts is the determination of what is likely to happen with the environmental and socio-economic Receptors / Resources (R/R) as a consequence of the Project and its associated activities.

At the stage of impact prediction, the following characteristics/ parameters are identified:

- Project-related activities;
- Impacts' R/R;
- All potentially possible impacts;
- Embedded controls measures envisaged by the Project to prevent / reduce impacts.

Project-related activities or **factors of impacts** (earthworks, traffic associated with the project needs, wastewater discharges, etc.) are determined to further identify the potential adverse and positive impacts.

The environmental and socio-economic components altered as a consequence of Project-related activities are **Receptors / Resources** (R/R) exposed to impacts.

The same factor can affect different R/Rs. For instance, the "traffic" impact factor influences several components and their condition, such as ambient air quality, vegetation and soil quality and population/company's personnel safety and, in some cases, public health.

As a rule, the identification of impact factors and R/Rs is performed at the scoping or pre-ESHIA stage in the form of the Leopold matrix. Then at the full ESIA stage, a list of all potential impacts of the Project is formed on its base.

In addition, at the stage of impact prediction, the embedded controls (planned mitigation measures provided in the design documentation) are considered. Assessment of expected impacts is carried out taking into account the embedded controls. Potential impacts prevented at a source by the Project embedded controls are excluded from the impact assessment.

Environmental, social, and health impacts of the Project activities can be direct, indirect and cumulative.

Direct impacts result from a direct interaction between the Project and a resource/receptor (e.g., between the occupation of a plot of land and the habitats which are affected).

Indirect impacts follow as a result of subsequent interactions between the Project and the environment (e.g., viability of a species population resulting from the loss of part of a habitat as a result of the Project activities). Indirect impacts may be of different orders and may also occur in remote areas.

Cumulative impacts need to be addressed specifically in the assessment process. These are additional impacts and effects that arise as a result of an impact from the Project interacting with an impact from other activities, not related to the Project. Cumulative effects may be sudden, for example, as a result of a combination of ongoing or historical impacts (accumulated pollution, etc.), or intensification of impacts and effects of the Project throughout its lifecycle. The methodology of the cumulative impacts assessment (CIA) is presented in Section 6.1.5.

6.1.2.3 Evaluation of Impact Significance

Once the prediction of impacts is complete, each Impact and Receptor / Resource are described in terms of its various relevant characteristics and finally impact significance is assessed.

The significance of the impact is assessed in three steps:

- **Step 1.** Assessment of the *Impact Magnitude* that is a combined characteristics of scale, duration, frequency and extent:
- **Step 2.** Assessment of the *Responsivity of Resource/Receptor* that is a combined characteristics of vulnerability/ importance/ value and sensitivity of RRs.
- Step 3. Determination of Impact Significance is the final step, conducted qualitatively in a matrix based on the previously assessed Impact Magnitude (Step 1) and R/R Responsivity (Step 2), with the results expressed as Negligible, Minor, Moderate or Major. A detailed description of the impact significance evaluation steps is provided below.

Step 1. Impact Magnitude Evaluation

Magnitude of impact is evaluated with consideration of the following characteristics/parameters of an impact: *Scale*, *Duration*, *Frequency*, *Extent*.

The Magnitude of impacts results from a combination of the basic characteristics (extent, frequency and duration) and the scale of impact (Table 6.2). Out of extent, frequency and duration of impacts, the basic characteristic is selected, i.e. the most unfavourable (for example, if an impact is characterised as long-term instantaneous and local, the "long-term" will be used as the basis for evaluation).

	Basic Characteris	tic		Sc	ale	
Duration	Frequency	Extent	Negligible	Small	Medium	Large
Temporary	One-off	Site		Neg	ligible	
Short-term	Rare	Local			Small	
Medium-term	Occasional	Regional		[Med	lium
Long-term	Often	National				
Permanent	Constant	International				Large

Table 6.2 Impact Magnitude

Frequency of Impact

Frequency describes the occurrence of impacts and their consequences. Frequency is ranged as: one-off, rare, occasional, often and continuous.

Criteria identifying the Frequency of impact are detailed in Table 6.3.

Frequency	Criteria
One-off (unlikely)	Impact might occur once during Project implementation
Rare	Impact is caused by the features of the construction or production cycle and might occur
Occasional	Impact occurs with a regular frequency (a high probability of occurrence)
Often	Impact occurs with a frequency of once a month or more (predetermined)
Continuous	Means static impact without discontinuity points over a certain period

Table 6.3 Impact Frequency

Duration of Impact

Duration describes the temporal length of the Project's impact. Duration is ranged as: temporary, short-term, medium-term, long-term and permanent.

Criteria identifying the Duration of impact are detailed in the Table 6.4.

Table 6.4 Impact Duration

Duration	Criteria		
	Environmental part of IA	Social part of IA	
Temporary	Temporary, short impact on ecosystems, not affecting the seasonal background processes	Impact lasting several months	
Short-term	Temporary, lasts from one season up to one year, predicted usually for the construction phase	Impact that lasts up to one year	
Medium-term	Temporary, lasts for one to five years, usually in case of long-term construction and commissioning period, in the early stages of operation	Impacts during certain stages of Project implementation (first and second stages of construction operations, etc.) - several years	
Long-term	Temporary, lasts for five or more years, until the Project ends and the baseline conditions are restored	Impact during the Project lifetime (several decades)	
Permanent	Persistent (permanent) change in the baseline conditions during the Project that are not restored after the closure	Permanent change in the characteristics of objects	
Extent of Impact

Extent describes the spatial distribution of the impact and is ranged as site, local, regional, national and international.

Criteria identifying the Extent of impact are detailed in Table 6.5.

Table 6.5	Impact Extent
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Extent	Criteria		
	Environmental part of IA	Social part of IA	
Site	Impact that does not go beyond the limits of impacts on primary natural complexes (local populations of species, geological and soil ranges, etc.)	Impact on a separate small settlement, a group of settlements or within rural and urban settlements (or similar objects by area)	
Local	Impact affects baseline properties of particular landscapes and locations, not usually associated with an impact on long watercourses	Impacts within a district or a tow n	
Regional	Impacts related to a change in the baseline conditions of natural regions, usually associated with the impact on long w atercourses and significant air pollution	Impact within the region of the Project	
National	Affects national significant natural resources, territories and sustainable development of nations		
International	Affects environmental components, territories and processes of international importance		

Scale of Impact

Scale means intensity of the impacts, which is determined depending on the quantity, level and other characteristics of the impact factor. The scale of impacts can be classified into negligible, small, medium and large categories.

Scale, where possible, is a quantitative evaluation of predicted consequences (for instance, elevated concentrations of pollutants in the air, water and soils; areas of land plots allocated for Project implementation in percentage of land areas used for economic activities prior to Project implementation; a reduction in number of affected species, etc.). At that, the multivariable and diverse range of impacts does not always allow the use of quantitative methodologies of evaluation, in such cases it is admitted the use of semi-quantitative and qualitative approaches.

The scale of impact on each environmental and social components are defined individually.

Likelihood of Unplanned Events

This ESIA considers the impacts that are expected to result from planned activities on the physical, biological and the socioeconomic environment. It also considers cumulative impacts and impacts from unplanned events such as accidents.

These are different to impacts that would reasonably be predicted to occur in the normal course of activities (including the application of in-built control measures) during construction and operations.

Unplanned and accidental events have the potential to occur during Project activities and therefore the evaluation of impacts on unplanned and accidental events takes into account the likelihood of an event occurring and the impact magnitude.

For unplanned events (e.g., accidental release of hazardous materials) the likelihood of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the

attributes described in Table 6.6. The likelihood is factored into the magnitude designation process for unplanned events based on professional judgement, possibly assisted by quantitative data.

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Table 6.6 Likelihood Designation for Unplanned Events

Step 2. Receptors / Resources Responsivity Evaluation

The following step of the impact Significance evaluation is the determination of the Responsivity of the affected Receptors / Resources, which may be of a physical, biological, cultural, and anthropological nature.

The category of Responsivity is identified based on the combinations of R/R Vulnerability/Importance/ Value (own characteristics of the impacted R/R) and Sensitivity to the specific impact in accordance with the matrix in Table 6.7.

Table 6.7 Responsivity of Receptors / Resources

			Sensitivity	
Vulnerability/Importance/Value	L	_ow	Medium	High
Low	L	.OW		
Medium			Medium	
High				High

Vulnerability/ Importance/ Value of Receptors / Resources

The evaluation of Vulnerability/ Importance/ Value of the affected R/Rs is based on the following properties:

- International / national standards and regulations;
- Protected status;
- Expert opinion of specialists involved in the ESIA development;
- Policy of the regional government;
- Economic value;
- Views of stakeholders; etc.

Sensitivity of Receptors / Resources

The Responsivity of RRs is identified based on their adaptation/recovery abilities (Table 6.8).

Sensitivity	Environmental part of IA	Social part of IA
Low	High ability to recover the initial properties and functions, minor changes of spatial and dynamic indicators	High ability to adapt to changing conditions under the impact of the Project and associated activities

Table 6.8 Sensitivity of Receptors / Resources

Sensitivity	Environmental part of IA	Social part of IA	
Medium	Limited / low ability to recover the initial properties and functions. Measures to minimize disturbance of ecosystems are required.	Limited ability to adapt to changing conditions under the impact of the Project and associated activities	
High	Lack of ability to recover the initial properties and functions. Irreversible disturbances may be caused by minor impacts.	Adaptation to changing conditions under the impact of the Project and associated activities is extremely difficult / impossible	

Step 3. Impact Significance Evaluation

The overall Significance of impacts is now finally determined by a combination of **Magnitude of impact** and **Responsivity of Resources / Receptors** using the matrix as shown in Table 6.9. The Significance of a given impact falls within the categories of Negligible, Minor, Moderate or Major.

	Responsivity of Receptors / Resources		
Magnitude of Impact	Low	Medium	High
Negligible	Negligible		
Small	Minor		
Medium		Moderate	
Large		Major	

The significance of positive impacts is not evaluated.

Assessment of expected impacts is carried out taking into account the embedded controls. Potential impacts prevented at source by the Project embedded controls are excluded from the impact assessment.

A description of categories of environmental and social impacts' significance is presented in Table 6.10.

Table 6.10 Impact Significance

Impact Significance	Verbal Description
Positive	There will be a beneficial impact to a resource/receptor, that will provide an opportunity for improvements of the baseline conditions. When possible, measures to enhance the positive impact can be recommended.
Negligible	An impact of negligible significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is indistinguishable from natural background variations, i. e. practically does not change the environmental baseline conditions or conditions of livelihoods, culture or quality of life.
Minor	An impact of minor significance is one where a resource/receptor will experience a noticeable effect, but the predicted effect is not accompanied by long-term degradation of sensitive resources and long-term reductions in livelihood or quality of life. Effects are usually reversible and minor (with or without mitigation). In either case, the magnitude should be well within applicable standards. Receptors either easily adapt to changes brought by the Project or their livelihood remains unchanged.
Moderate	An impact of moderate significance is one where a resource/receptor will experience a notable effect and the predicted effect is accompanied by long-term degradation of sensitive resources, long-term reductions in livelihood or quality of life, and irreversible loss of species and habitats (with law and medium Responsivity). Changes can mainly be reversible. Impact magnitude is within the accepted limit or standard, but close to the threshold. Clearly, designing an activity so that its effects only just avoid exceeding allow ed thresholds and/or a major impact is not best practice. The aim of the approach to the

Impact Significance	Verbal Description
	moderate impacts is therefore to demonstrate that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor but that moderate impacts are being managed effectively and efficiently. Adaptation of the receptors might be challenging and they will be able to return to their former livelihood under condition of some support.
Major	An impact of major significance is one where the predicted effect is irreversible: long- term degradation of baseline conditions or long-term impoverishment or societal breakdow n; exceedance of the national environmental standards, transnational environmental issues; effects of toxic substances on receptors and potential emergencies affecting critical resources and sensitive receptors. Affected receptors are not able to adapt to changes or proceed with their previous livelihood. Mitigation measures are required to reduce impact significance to at least a moderate degree. IA aims to avoid any major residual impacts of the Project, especially the ones that w ould be long-term or extend over a large area.

6.1.2.4 Impact Mitigation Strategy

Once the potential impact of the Project and its significance has been identified, the mitigation measures and solutions to prevent and/or reduce the significance of this impact are developed. Measures to enhance the positive impact can be recommended at this stage as well.

The key objective is to mitigate adverse impacts to a level that is 'as low as reasonably practicable' (ALARP) using a tool known as the 'mitigation hierarchy'.

A hierarchy of mitigation options is considered, with avoidance at the source of the impact as a priority and compensatory measures or offsets to reduce the impact significance as a last resort.



Figure 6.1 Impact Mitigation Strategy

Source: ERM, 2012

In practice, after a negative effect has been identified and its significance assessed, the following questions are asked successively: "Can the impact be avoided?", "Can the impact be reduced (given the ALARP principle)?", "Can the affected RR be restored?", "Can potential damage be compensated?"

If the impact can be possibly prevented, the required activities are included in the "Commitments Register" and the impact is excluded from the assessment.

In case implementation of any additional (not assumed under the Project design documentation embedded controls) mitigation, restoration and offset measures are possible, the relevant actions will be included in the ESMP and any residual impacts will be assessed taking into account such measures. Residual impacts of **negligible**, **minor** and **moderate** significance are considered acceptable.

However, for some aspects there may be **major** residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in deciding on the Project.

Recommended additional measures to reduce residual impact significance are obligations undertaken by the Company based on the ESIA results. These measures are to be included in the "Commitments Register" and then into the environmental and social management plans (ESMPs) and the regular monitoring plans.

6.1.3 Results of Scoping

The centrepiece of the scoping process is the Scoping Matrix (presented in Appendix B). The Matrix allowed a comprehensive and systematic initial review of the potential interactions of the key Project activities during construction and operation stages (listed in the first main column) against the relevant environmental and social receptors (listed in the first main row across the top).

For each potential interaction (i.e. square/box) in the Matrix, an indication is given as to the potential severity of the impact and the potential need for supplemental data and/or mitigation measures:

- Blank/white means no interaction is reasonably expected (and this interaction is no longer considered in the report);
- White with "O" means the potential impacts are expected to be avoided via compliance with the normal Ghana legal requirements and the embedded measures in the Project design;
- Yellow with "I" means interaction is likely, but these are expected to be insignificant (usually no specific mitigation measures are warranted, but corresponding commitments may be made in the respective management plans of the ESIA);
- Orange with "S" means interaction is likely and some of these may be significant (specific mitigation measures will be warranted, and possibly additional baseline information may be needed);
- Green means that the likely interaction will have a positive impact on the receptor (mitigation measures may be warranted to further enhance the positive impact).

The Scoping Matrix remains a dynamic tool throughout the ESIA process, as any key concerns raised by stakeholders will be added to the receptors/topic list of the scoping, if not already included.

6.1.4 Climate Change Risk Assessment Methodology

This physical Climate Change Risk Assessment (CCRA) is conducted through four key steps as outlined in Figure 6.2:

- Steps 1-3 involve the high-level screening of the construction and operational phases of the Project through the collection and analysis of climate data and climate trends.
- Step 4 involves the review of any hazards which are identified as posing potentially material inherent risks to the construction and/or operational phases of the Project.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 6.2 A summary of the four key steps of this physical risks CCRA

Source: ERM, 2023

6.1.4.1 Approach to the Physical Climate Hazard and Risk Review

Step 4 involves conducting a review of the climate data, which has been collected for each hazard included within this assessment. This includes the analysis of baseline and future projected trends for each climate hazard, including a review of the potential materiality of any risk identified as being present under baseline conditions, and how this risk could potentially change in the future according to any key trends identified within the climate data. Each climate hazard will be assessed in relation to the Project using a mixture of climate data (see Section 6.2.7.3) and qualitative research, which is sourced from industry-leading academic and governmental sources.

A series of data variables is collected for each climate hazard included in this assessment. This climate data is collected primarily using the Climate Impact Platform (CIP) by ERM and the Global Climate Database (GCD).

Once the climate data is collected, the trends associated with each variable are assessed for each climate hazard. Following this, a review is undertaken of the potential risks posed to the Project in relation to each climate hazard (within the 'Risk Review' section). This section provides an overview of any impacts (associated with specific hazards), which are identified as being potentially material to specific risk areas associated with the Project (see Table 6.11 for the range of risk areas considered).

Risk area	Definition and extent of the risk area
Site personnel	Any person working on-site during the construction and/or operational phase of the Project.
Overpasses	A structure that crosses over a railway (in the case of this Project) to facilitate the flow of motor vehicle traffic and pedestrians. This includes foundations and bridge supports.
Construction activity (including construction equipment/machinery)	Any activity which is expected to take place during the construction phase of the Project. This includes the use of construction equipment, or machinery.
Public/overpass users	Any person expected to use the overpass during the operational phase of the Project.
Supporting infrastructure	Infrastructure expected to be used to support the construction and/or operational phase of the Project. This includes electricity and water supply.

Table 6.11 Definitions of the potential risk areas for the Project

Risk area	Definition and extent of the risk area
Access routes	Access routes which are expected to be used during the construction and/or operational phase of the Project.
Cement, concrete and asphalt production and laying	The processes required for the production of cement, concrete and asphalt, and its laying.

Source: ERM, 2023

Although climate data is collected and discussed in relation to three periods (baseline, 2030 and 2050) - 'Risk Materiality Categories' (Table 6.12) are only assigned to two of these periods, representing the start (baseline) and mid-late operational phase (2050). These two periods have been selected with an aim to identify the potential change in the level of risk posed to the Project by the mid-late operations, in comparison to the baseline level of risk. It should be noted that each risk materiality category that is assigned represents the inherent level of risk posed to the Project (as limited information has been provided regarding any mitigation/management measures that have been put in place to reduce the materiality of specific climate-related risks in relation to the Project).

Note: See Table 6.39 *in* Section Time Horizons for a more detailed explanation of the rationale behind the selection of each of the periods selected for inclusion within this assessment.

Fable 6.12 Risk materiality	categories and	associated	definitions
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Inhere Materiality	ent risk v Category	Definition
Unlikely material		Impacts with this category (such as those related to operational, financial or other types of impacts) are unlikely to be material. This means that, for example, (a) operational impacts could be expected to be short-term, impacting a limited proportion of the overall asset and its operations, or (b) financial impacts would be expected to be minimal relative to the Project's overall revenue and/or costs.
Low to moderate Likely		Impacts with this category (such as those related to operational, financial or other types of impacts) are likely to be of low-moderate materiality. This means that, for example, (a) operational impacts could be expected to be short to medium-term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be small to moderate relative to the Project's overall revenue and/or costs.
material	High	Impacts associated with this category (such as those related to operational, financial or other types of impacts) are likely to be of high materiality. This means that, for example, (a) operational impacts could be expected to be medium to long-term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be moderate to high relative to the Project's overall revenue and/or costs.

Source: ERM, 2023

Within the 'Next Steps' section high-level recommendations will be provided to the Client for any risk areas that are identified as being potentially material in relation to the Project (i.e. any risk area assigned the 'Likely Material' categorisation). Such recommendations could identify:

- the potential value in undertaking further assessment of specific climate hazards/risks (which exceed the scope of this assessment), or
- no further assessment is required (e.g. if information supplied by the Client suggests that risks are already being managed effectively).

These recommended next steps are outlined and explained in greater detail in Table 6.13 below.

Table 6.13 Next step categories and their associated definitions

No further action required	No further action has been identified as required by the Client.
Potential value in assessing the risk further	Further assessment of a specific climate hazard/risk item could provide additional value to the Project team. This is typically recommended for risk items that are classified as 'Likely Material – Low to Moderate'.
High value in assessing the risk further	Further, a detailed assessment of a specific climate hazard/risk item could provide significant additional value to the Project team. This is typically recommended for risk items classified as 'Likely Material – High'.

Source: ERM, 2023

6.1.5 Cumulative Impact Assessment Methodology

The international lender requirements of IFC PS1 specify that risks and impacts of a Project shall be analyzed in such a Cumulative Impact Assessment (CIA), *inter alia*, with respect to cumulative impacts from:

- Other existing projects or conditions gathered from baseline surveys, review of available published information and stakeholder engagement activities;
- Other future developments (including future stages of the project itself) that are realistically defined at the time the ESIA is undertaken and for which the sphere of influence of the various projects or developments may overlap.

Cumulative impacts are defined for this ESIA as impacts which result from the incremental changes caused by the Project together with other presently ongoing, or reasonably foreseeable future planned actions/projects within the Project Area¹¹.

Depending on the type/characteristics of other identified projects and their specific impacts, the main issues of concern with respect to the CIA can thus include any type of impact that is considered in the ESIA.

Objectives

The objectives of the CIA are the following:

- To determine if the combined impacts of the Project, other projects and activities, and natural environmental and social drivers will result in a Valued Environmental and Social Component (VEC) condition (or "receptors and resources") that may put the sustainability of a VEC at risk (i.e., exceed a threshold for VEC condition which is an unacceptable outcome);
- To determine which management measures could be implemented to prevent an unacceptable VEC condition; this may include additional mitigation of the Project being assessed, additional mitigation of other existing or predictable future projects, or other regional management strategies that could maintain VEC condition within acceptable limits.

The overall aim of the CIA is to avoid/minimize any of the identified cumulative impacts.

¹¹ The definition is also based on that given in the EC Document "Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions", May 1999; in addition, the IFC Good Practice Handbook "Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013, was used to inform the assessment process

Assessment Methodology

The evaluation of potential cumulative impacts is highly dependent on the particular locations/activities under review, and therefore each situation should be assessed qualitatively on a case-by-case basis.

The IFC Performance Standard 1 references the need for the ESIA process to consider the cumulative impacts of the project in combination with impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the Project.

As above, the approach to the CIA has been undertaken in line with the *IFC Good Practice Handbook: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Mark ets (August, 2013).* In line with the Handbook's proposed approach, a Rapid Cumulative Impact Assessment (RCIA) approach is considered to be appropriate for the Project as it considers the challenges to conducting a CIA in an emerging market, which apply in this case, namely:

- Lack of baseline data related to the other project developments;
- Uncertainties associated with anticipated developments; and
- Limited and emergent, strategic regional, sectoral, or integrated resource planning schemes.

In line with IFC PS 1 guidance notes (GN41) that the assessment should be "commensurate with the incremental contribution, source, extent, and severity of cumulative impacts anticipated", this assessment attempts to focus only on the potentially significant cumulative impacts, and where the Project's contribution to the cumulative impact is considered to be significant. In line with guidance provided in Sections 2 and 3 of the IFC handbook, potential mitigation measures are designed to focus on cooperation and information-sharing, in recognition of the limited control and direct influence/ decision-making ability of this private sector sponsor.

In general, this cumulative impact assessment follows the recommended approach to a CRIA as described by the IFC Handbook and is undertaken through the following six-step methodology (Figure 6.3):

- Step 1: Definition of the relevant spatial and temporal boundaries;
- Step 2: Identification of key VECs and screening/Identification of potentially relevant other projects in the region;
- **Step 3:** Determine the present conditions of the VECs; and
- Step 4, 5 & 6: Assessment of potential cumulative impacts and identification of appropriate mitigation measures¹².

The outcomes of these steps are carried out in the following sections.

¹² Note that Steps4, 5 and 6 are included as one elementhere within the approach as the results of the assessment and proposed mitigation are presented (in one table) for each of the projects where there are considered to be overlapping VECs.



Source: IFC, 2013

Figure 6.3 Cumulative Impact Assessment Process

Information Sources

The technical background information presented in this Section is drawn from the baseline information gathered through the ESIA process. This baseline information gathering included primary data collection, a review of relevant existing scientific sources as well as a review of regional planning documentation.

The key potential cumulative impacts are screened also considering the outcomes of the impacts assessment process.

The CIA also cross-references the stakeholder engagement process and outcomes from discussions and inputs from public and statutory stakeholders are considered. The scoping engagement discussions have provided inputs with regard to the identification of key issues, as applicable to the VEC confirmation. Although the specific exercise of identifying VECs for the RCIA was carried out with local stakeholders, through the engagement and contributions during the scoping engagement and baseline studies, the stakeholders have identified key issues important to the relevant stakeholder groups, which is reflected in the impact assessment, a key input to the CIA (Step 2).

Additional specific information is included as necessary for the description or assessment on a caseby-case basis. Information on potential other projects has frequently been obtained from publicly available sources.

6.2 Physical Impacts

6.2.1 Air Quality IA

Baseline is provided in Section 4.1.2 of the Report.

6.2.1.1 Assessment Methodology

Construction Dust

The construction of the Project will result in emissions of dust and PM₁₀. However, these impacts, if correctly mitigated can be rendered negligible, or at worst minor in limited circumstances. The methodology set out in Figure 7.4 directs towards the risk of significant impacts arising, and the level of applicable mitigation needed to achieve negligible impacts. This is then supported through the

execution of the Construction Environmental Management Plan to ensure that mitigation is applied and impacts are monitored and addressed throughout the construction program.



Figure 6.4 Air Quality Assessment for Dust – Infographic

Operational Traffic

The project will result in changes to road layout, traffic speed and traffic flow. Two scenarios are considered:

- Do Nothing (DN): this is the layout and predicted traffic on the existing road network in 2017; and
- Do Something (DS): this is the proposed future layout with future predicted traffic in 2017.

The traffic assessments for the operational phase have been undertaken utilising detailed road modelling. The IFC are not prescriptive as to the methodologies used for assessing road traffic impacts. Instead, the methodology for the modelling is based on mature UK guidance. Due to the absence of Information on the Angolan traffic fleet, emissions and the lack of detailed traffic flows, the necessary assumptions have been made based on UK practice. This is noted to induce an unknown degree of error in the model and results.

The assessment methodology followed two pieces of UK guidance which are considered relevant for IFC compliant projects:

- IAQM (2017) Guidance on land-use planning and development control: Planning for air quality v1.2; and
- Defra (2022) Local Air Quality Management Guidance TG (22).

Modelling of traffic emissions has been undertaken utilising the detailed dispersion modelling package ADMS-Roads. ADMS uses information on the traffic flows, traffic speeds, road characteristics, surrounding area and local meteorology. This information is used to model the impacts of road traffic emissions on air quality.

A limited amount of traffic monitoring was completed for this Project along the main thoroughfare Estrada de Catete with no monitoring completed at or near the flyovers (described in the Traffic Baseline Section 4.3.14 of this ESIA). As such a number of key assumptions were made for the model data which were agreed with the client. These and the Traffic numbers used in the modelling are set out in Appendix V.

The key elements of the methodology used for carrying out the air dispersion modelling are set out in Table 6.14 and Appendix U.

Parameter	Approach	Notes
Dispersion model	ADMS-Roads Air Quality Management System v5.0	ADMS-Roads is specifically designed for modelling road sources, and has previously been used on IFC and EBRD compliant projects
Roads Modelled	 Road 1a Road 1b Road 1c Road 1d Road 1d Road 2a Road 2a Road 2b Road 3a Road 3b Road 4a Road 4b Road 5a Road 5b Road 6a 	The geometry of each road has been included in the model to provide spatially accurate concentrations at sensitive receptors close to the proposed route. Roads consist of Estrada de Catete (road 1) and modelled flyovers (roads 2 to 6).

Table 6.14 Road Traffic Modelling Inputs

	Road 6b	
Years modelled	Opening year – Do Nothing (no change to the scheme) Opening year – Do Something (new scheme)	Traffic emissions data built into the ADMS was used, in lieu of Luanda specific data. The earliest year available (2017) was utilised to capture the higher emissions from the older Luanda fleet
Model domain	South East to North West on Estr. De Catete, incorporating Avenida, Mulenvos, Cazenga, Viana and SME flyovers.	The Project has a total length of ~26.5km
Receptor grid	Custom receptor grid (17km x 25km)	A custom receptor grid has been created to assess the impacts
Specified receptors	Human receptors in the vicinity of the road development	Human receptors were selected based on their potential sensitivity to air quality impacts.
Surface characteristics	Surface Roughness: 0.5 Albedo: 0.23 Monin-Obukhov Length: 30 Priestly –Tailor Parameter: 1	-
Meteorological data	Luanda 2022	Hour-sequential data, only 1 year of meteorological data is required for traffic modelling.
Street Canyons	None	The roads are not confined by urban/street canyons.
Emissions data	Road traffic emissions were based on UK Emission Factor Toolkit (ETF) v9.0 (2 VC), Emission year: 2017, Scotland Rural, Road Type: Various	The worst-case traffic profile and emissions available from the ADMS database was used. As noted, no Luanda specific data is available and no means of assessing the actual level of difference betw een Luanda emissions and the actual emissions profile used is possible.
NO _x to NO ₂	Conversion factor of 0.08	For human health, NO ₂ is the pollutant of interest. How ever, the conversion of NO _x to NO ₂ is limited by various atmospheric factors with a low er conversion rate in more polluted areas. No data w ere identified to estimate the ratio of NO _x to NO ₂ in Luanda, and therefore data from the UK for a heavily trafficked section of the M25 motorw ay w as used.

Source: ERM, 2023

As noted in section 3.2.7.2, the IFC states that in an undegraded airshed no project should take up more than 25% of any air quality standard; the IFC is not prescriptive with regards to the threshold in a degraded airshed but 10% is a reasonable proxy for significant impacts. Therefore, correlating with Table 6.9, the thresholds in Table 6.15 of significance are used for air quality, noting that in the general population all sensitive receptors are defined as 'medium' sensitivity.

Significance criteria	Degraded	Undegraded
Negligible	<5% of AQS	<10% of AQS
Minor	5% to 10% of AQS	10% to 25% of AQS
Moderate	10% to 25% of AQS	25% to 75% of AQS
Major	>25% of AQS	>75% of AQS

Table 6.15 Air Quality Significance Criteria

6.2.1.2 Potential Impacts

The proposed road development will result in impacts on air quality which may be positive or negative. These arise from the changes in the road layout, changes in speeds and changes in the traffic growth profile.

Wider Impacts of Traffic and Unpaved Roads

Currently, there is considerable congestion around the five junctions, and one is currently closed to traffic. As a result of the project, traffic is expected to re-route within Luanda to make use of the flyovers and reduced congestion and journey time. This leads to an anticipated net increase in traffic using the junctions. Therefore, where negative impacts arise these are primarily due to the increase in road traffic using the junction. However, this is not new traffic, but rather traffic diverting from elsewhere in Luanda. As such, where there are negative impacts close to the junctions associated with increases in traffic there will also be positive impacts elsewhere as traffic numbers reduce and congestion is reduced. However, these wider positive impacts on overall traffic flows, and therefore air quality have not been quantified, primarily due to the absence of robust macro-scale traffic data and the complexity of assessing these impacts over a larger area. Nevertheless, these unquantified wider positive impacts need to be considered when assessing the overall merits of the scheme. There are also the potential benefits of improved running times, and by association passenger use of the railway which, if realised, will also benefit air quality in Luanda by promoting a modal shift away from road traffic.

Some of the roads are currently unpaved. The emissions of dust, PM_{10} and $PM_{2.5}$ from these are considerable. Within the footprint of the project will be to pave these roads and therefore remove a considerable source of emissions from receptors adjacent to these roads. The improvements to air quality arising from paving have not been quantified, due to the excessive errors associated with estimating such sources, but typically emissions would be reduced by >90% compared to an unpaved road.

This Air Quality Impact Assessment (AQIA) assesses these impacts and identifies, where appropriate, mitigation measures may be required during the construction and operational phases of the project. The key aspect considered in the AQIA will be changes in concentrations of nitrogen dioxide (NO₂) and particulate matter (such as PM_{10} and $PM_{2.5}$) at sensitive receptors.

6.2.1.3 Baseline Conditions

The air quality in the airshed is deemed compromised for NO₂, PM₁₀, and PM_{2.5}. It's worth highlighting that, as anticipated in an African megacity, there is a significant presence of airborne dust in the project locations, particularly around PM₁₀ and PM_{2.5}. The Baseline is presented in the **Section 4.1.2** of the Report.

6.2.1.4 Embedded Controls

- Develop and implement the Project Stakeholder Engagement Plan (SEP) and Grievance Mechanism (GM) for the Project. This would include community engagement before work commences onsite and a mechanism to record and respond to complaints.
- As noted, the project has committed to paving some roads that are currently unpaved. Whilst not a mitigation measure as such, this is highlighted due to the considerable reduction in emissions and therefore impacts, of dust, PM₁₀ and PM_{2.5} that will arise as a result of this paving. Emissions are typically reduced by considerably more than 90% when the road is paved.

6.2.1.5 Impact Assessment

Sensitive Receptors

There are a number of sensitive receptors in the vicinity of the Project. These include residential properties, commercial premises, and other locations where people are present. These are shown in Figure 6.5 and listed in Table 6.16.



Figure 6.5 Sensitive Receptors

Source: ERM, 2023

	Table	6.16	Sensitive	Receptors
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Receptor ID	x	Y	Туре
1	312961.96	9020774.5	lgreja Pentecostal
2	312718.44	9021014.6	Templo Sede Cazenga
3	312988.24	9020768.8	Escola Quangula
4	313018.15	9020783.7	Creche
5	312911.28	9020765.7	lgreja Pentecostal

-			
6	334384.2	9007016.4	Fabrica de plastico
7	334342.74	9006915	Imbondeiro
8	335053.79	9007948.1	lgreja Pentecostal
9	335153.13	9007889.4	Escola Comparticipada
10	320708.95	9015672.1	lareia
11	320763 79	9015825 5	Creche
10	332450.26	000020.0	Mercada da 30
12	222547 45	9000270.3	Contro Modico lungo
13	332547.15	9000101.2	Centro Medico Jurigo
14	332661.38	9008017.2	Escola de formao
15	332627.78	9007965.7	Escola Primria 5010
16	311976.59	9022570	Escola Grande do Cazenga
17	312463.78	9023752.7	Escola Angola e Cuba
18	313747.55	9026258.8	Escola 1 de Junho
19	312679.05	9022913.4	Cazenga Professional Training Center
20	313966.96	9022842.4	Higher Polytechnic Institute of Cazenga
21	311741.65	9025555.4	Esquadra da Policia
22	311217 03	9025555.8	13 Esquadra
22	310090 60	0024084 0	Hospital dos Caluairos
23	310980.09	9024004.9	Lloopital UUS CajuellUS
24	312103.22	9027443.2	Hospital Municipal do Sambizanga
25	311115.94	9020326.3	Hospital of Sampizanga
26	311712.07	9020537.2	Instituto Superior Dom Bosco
27	311393.09	9018684.3	Centro de Forma Profissional
28	305253.97	9014263	Universidade Tecnica de Angola
29	304960.7	9015542	Colegio Emirais
30	305025.19	9015607.3	Colegio Imperio de Aprendizagem
31	304855.24	9015772.9	Colegio Pitabel Nova Vida
32	304794 23	9015515.8	Colegio Emirais
33	309/35/	0020003	Escola Sabiente
34	311066 92	0020333	
35	311592	001020471.2	Universidado. Catolica, do Angola
30	211026 41	0010020.7	Cologia Itamar
30	311030.41	9010300.3	Colegio Italian
37	310423.5	9017835	Colegio Arco Iris
38	307991.69	9017501	Biblioteca Kilamba Kiaxi
39	307947.05	9017474.8	Quartel Bombeiros Kilamba Kiaxi
40	311609.65	9019909.6	Bombeiros voluntario da Vila Estoril
41	311122.88	9018486.6	Brigada Canina e Cavalaria
42	310825.63	9015391.1	Esquadra da Policia
43	306615.49	9014972.5	Esquadra da Policia
44	305782.58	9015711.4	Destacamento da Policia
45	305304.8	9015016	Esquadra da Policia - Nova Vida
46	304975 64	9014527 2	Destacamento da Policia
47	304280.81	9014865.4	Esquadra da Policia
48	305034.97	0016172	Posto de destacamento da policia
40	207064.26	0017404 1	Fosto de destacamento da policia
49 50	200/20 26	0019561 6	Esquadra da Policia Esquadra da Policia - Calfa
50	305433.30 205462.35	0.10001.0	Esquadra da Folicia - Golle Delicio
51	000400.20	9014004.9	Fullud Llagritat a Mataunidada, da Deterra
52	510739.01	9019716.2	nospital e iviaternidade do Palanca
53	311246.64	9020096.6	Sanatorio
54	308811.86	9019853.5	Hospital Materno Infantil do Golf
55	308594.44	9016031.2	Hospital Geral de Luanda
56	305017.74	9014405	Clinica Caridade
57	309550.49	9018361.4	Clinica Caridade
58	317277.47	9011204	Escola do Canbomdo
59	324175.29	9015009.1	Universidade Jean Piaget de Angola
60	326913.35	9016251.3	Instituto Politicnico Privado Industrial
61	315167.79	9008532.6	Complexo Escolar Privado Ana Idalina
62	314718 04	9008460 2	Colegio Alvaro
63	313903 35	9008410.4	Colegio Manuel Hipy
64	314444 71	900928/ 7	Complexo da Escola Mission
65	3157/0 01	0016301 0	Cologio Maria Luisa
66	3720/2 92	80081057	Escola de Formalo. Delta PIP
67	320523 25	0015569	Listola de Formalo Della FIIX Unidade de Rombeiros, de Viana
60	314504 00	0010446.2	Unicade de Dollipie de Crefenil
00	314304.90	9019440.3	Esquaura da Policia do Grafanil Fermadae de Delicia
09	32/330.45	9016785.4	Esquadra da Policia
70	327836.32	9013487	Esquadra da Policia
71	321324.73	9007303.7	Destacamento da Policia de Viana

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72	317385.75	9007662.4	Posto de destacamento da Policia
73	319308.29	9012173.5	Esquadra da Policia
74	322035.95	8997834.5	Policia de Intervencao Rapida
75	316332.88	9018399.5	Esquadra da Estalagem
76	321013.89	9015340.4	Policia Nacional - Divisio de Viana
77	319792.38	9013346.8	Servico de Investigacao Criminal
78	315297.05	9018929.4	Clinica ôrbital Visual
79	321358.52	9013900.6	Centro Materno Infantil Ana Paula
80	321349.3	9011445.5	Hospital das 500 Casas
81	325722.33	9015132	Hospital Geral de Viana
82	320478.12	9014350.4	Centro Ortopedico de Viana
83	335040.68	8999209.3	Novo Aeroporto Internacional de Luanda - NAIL
84	320700.17	9015680	lgreja
85	318220	9017331	Hotel Viana
86	317236	9017943	lgreja Catolia MamaMuxima
87	317082	9017956	Centro de Saude Boa Nova (Hospital)
88	314400.35	9019934.8	lgreja Baptista Grafani
89	315087	9019390	Residential (Casa Almeida)
90	314611	9019340	Hotel (J Marcos Soto)
91	318062	9017106	Hindu temple
92	317803	9018012	Hotel

Source: ERM, 2023

Impact Assessment - Construction Dust

Based on the risk assessment set out in Figure 7.4, the risk of significant dust impacts from the four key types of activities has been reviewed to identify if there are activities that are at medium or high risk of causing dust impacts, and therefore require additional mitigation. In summary:

- Unpaved roads large magnitude of risk;
- Demolition large magnitude of risk;
- Earthworks large magnitude of risk;
- Dusty material handling large magnitude of risk.

The construction works will be undertaken with a degree of embedded mitigation suitable for managing emissions from this Project and ensuring a low risk of dust impacts (see Section 8.3). With these mitigation measures correctly implemented and supported by site boundary monitoring, the risk of dust nuisance is negligible or, at worst minor during limited periods, for example during particularly hot, dry and windy weather.

Impact Assessment - Operational Traffic

As noted, two scenarios were modelled 'Do Nothing' and 'Do Something'. The 'Do Something' was subtracted from the 'Do Nothing' to calculate the 'delta', this being the increase or decrease in air pollution associated with the implementation of the scheme at receptors. Due to the length of the scheme, and a large number of receptors the easiest way to illustrate the results is graphically. The 'deltas' are shown in Figure 6.6, Figure 6.7 and Figure 6.8. The key findings are below.

As noted, negative impacts are offset to some extent by the positive impacts that will arise elsewhere as traffic diverts onto the flyovers due to the enhanced traffic flows and reduced congestion

- NO₂ annual mean:
- The Project impacts on sensitive receptors are predicted to be, at worst, Moderate.
- Highest impacts were noted around the Viana and Estalagem/Cazenga flyovers.
- PM₁₀ annual mean
- The Project impacts on sensitive receptors are predicted to be, at worst, Minor.

- PM_{2.5} annual mean
- The Project impacts on sensitive receptors are predicted to be, at worst, Minor.



Figure 6.6 Operational Traffic Impacts NO₂

Source: ERM, 2023

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 6.7 Operational Traffic Impacts PM₁₀

Source: ERM, 2023

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.



Figure 6.8 Operational Traffic Impacts PM_{2.5}

Source: ERM, 2023

Based on the results set out above, the Project is predicted to have a negligible to moderate effect on air quality.

The moderate effect on air quality resulting from the installation of the flyovers on Estr. De Catete is likely due to the almost 20% increase in traffic numbers between the Do Nothing and Do Something scenarios. Whilst there is the possibility that a positive impact occurs from the installation of the flyovers through smoothing out the traffic flows this is offset by the increase in traffic numbers. The increase in traffic flowing through this part of Luanda would lead to a decrease in traffic in other parts of Luanda and a possible improvement in air quality around those roads.

6.2.1.6 Mitigation measures

Construction Dust

Following the risk assessment which outlines parts of the Project as having a large magnitude of risk, the following mitigation measures for construction dust are recommended in accordance with Institute of Air Quality (IAQM) guidance for high-risk sites (IAQM, 2023) and IFC best practice (2007). Unmitigated, the Project would result in major impacts, but in practice no scheme would be undertaken with no mitigation.

A dust management plan (DMP) should be developed and implemented as a basic mitigation measure. Part of the implementation of the DMP will be to highlight the moderate to high-risk sites across the Project construction area.

On these sites where additional mitigation measures are required the mitigation set out below is deemed sufficient to render residual impacts as negligible, or at worst minor. However, this requires careful monitoring of implementation and monitoring of dust on a regular basis.

Communications

- Display the name and contact details of the person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Site Management

- Record all dust and air quality complaints in the GM, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. Make complaints log available to the local authority where asked.
- Where possible, hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are coordinated and dust and PM emissions are minimised. It is important to understand the interactions of off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the inspection log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary
- Carry out regular site inspections to monitor compliance with the DMP and record inspection results. Make the inspection log available to the relevant local authority if asked.
- Increase the frequency of site inspections by the person(s) accountable for air quality and dust issues onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding (if applicable) clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles/Machinery

Impose and signpost a maximum speed limit of 25 km/h on surfaced and 15 km/hh on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- If possible, ensure an adequate water supply on the site effective dust/PM suppression/mitigation. Where possible and appropriate use non-potable water.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Measures Specific to Demolitions

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations. Hand-held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials, ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Track Out

- Use water/binding agent-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper to be continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport.

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes (where possible), which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- If using a wheel washing system, ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

Operation Traffic

The operation of the project is predicted to lead to Moderate impacts, and as such mitigation should be considered. However, this needs to be considered in the context of the wider Luanda situation where congested traffic is commonplace and the project will be reducing traffic flow and congestion on other roads in the city centre. Furthermore, there is also the aim of improving the functionality of the rail line, potentially enhancing modal shift and also improving air quality.

- At receptor locations that are closest to the flyovers, measures to reduce air pollution at these
 properties should be considered. This includes:
 - Microplanning of road layouts to maximise separation distance, noting that at this scale even a few metres can improve air quality.
 - where crossings and/or traffic lights are to be used, adjust these to minimise queuing traffic on the roads closest to receptors.
 - Provision of ventilation into buildings the from non-roadside of a building, and sealing windows roadside.
 - Regular maintenance of roads to minimise potholes and maintain a clean road surface.

Conclusions

This AQIA assessed the potential impacts of construction dust emissions and operational impacts of road vehicle emissions on air quality for the Project.

Construction impacts are, at worst, minor, with the implementation of suitable mitigation that will be applied throughout the construction programme. This is managed through the Construction Environmental Management Plan (CEMP) and supported by site boundary monitoring.

The impacts of the operation of the project are, at worst, moderate. However, as noted, there are wider benefits of the project with anticipated reductions in congestion on other roads in Luanda, resulting in improvements elsewhere. There is also the potential for enhancing the rail line and enabling a modal shift away from road transport. At those specific locations where moderate impacts have been identified, there are mitigation measures that may be appropriate to minimise these impacts.

Furthermore, as noted, the paving of currently unpaved roads will also considerably reduce emissions of dust, PM_{10} and $PM_{2.5}$ and lead to improvements in air quality at receptors close to approach roads that are paved as part of the project.

6.2.1.7 Summary Impact Tables

Predicted Impacts are summarised in Table 6.17 and Table 6.18.

Project Phase: Construction Dust					
Type of Impa	ct: Direct Negati	ve Impact			
Rating of Imp	acts:				
	Pre-mitigation	1	Post-mitigation (Res	sidual) – including embedded measures	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Extent	Local	within 350m of	Local	within 350m of construction activity	
		construction activity			
Duration	Medium-term	Construction is expected	Medium-term to	Construction is expected to last from 1	
	to long-term	to last from 1 – 5 years	long-term	– 5 years.	
Scale	Major	Not applicable – project	Negligible to Minor	Construction expected to last from 1 to	
	(without	will not be undertaken		5 years and section by section however	
	embedded	without mitigation. Pre-		with embedded mitigation only expect	
	mitigation)	mitigation doesn't apply		scale to be minor at any one time.	
		as required mitigation will			
actively managed through					
the Construction					
Environment					
ManagementPlan		ManagementPlan			
(CEMP)					
Frequency	Regular	Impactsexpected	Regular	Impactsexpected throughout the	
		throughout the		construction.	
		construction.			
Likelihood	Likely	During construction	Likely.	During construction phase	
		phase			
Magnitude:					
Pre-mitigation			Post-mitigation (Residual)		
Not applicable			to Small Magnitude		
Sensitivity / Vulnerability / Importance of the Resource / Receptor:					
High Sensitivity					
Significant R	lating:				
Pre-mitigatio	on		Post-mitigation		
Majo	or (without emb	edded mitigation)	Negligible to Minor Impact		

Table 6.17 Construction Dust Impacts

Source: ERM, 2023

Project Phase	: Operational	l Traffic				
Type of Impac	t: Direct Neg	ative Impact				
Rating of Impa	acts:					
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures			
	Designat ion	Summary of Reasoning	Designation	Summary of Reasoning		
Extent	Regional	Large project, covers many areas of sensitive receptors	Regional	Large project, covers many areas of sensitive receptors		
Duration	Long-term	During operational phase	Long-term	During operational phase		
Frequency	Major	During operational phase	Moderate/Major	During operational phase (Expected that baseline and emissions from road traffic in future will be lower than the opening year but mitigation measures have been outlined above in any case)		
Scale	Regular	Impacts expected throughout the duration of operation.	Regular	Impacts expected throughout the duration of operation.		
Likelihood	Likely	During operational phase	Likely.	During operational phase		
Magnitude:						
	Pre-miti	gation	Post-mitigation (Residual)			
Λ	Medium/Large	e Magnitude	Low/Medium Magnitude			
Sensitivity / V	Sensitivity / Vulnerability / Importance of the Resource / Receptor:					
		High	Sensitivity			
Significance:						
Pre-mitigatio	on		Post-mitigation			
Ne	gligible to Mo	derate Impact	Negligible Impact			

Table 6.18 Operational Traffic Impacts

Source: ERM, 2023

6.2.2 Noise IA

6.2.2.1 Modelling Methodology

This section presents a brief overview of the calculation code adopted for this study, a detailed description of the modelling setup, the modelling tool, methodologies, and input data.

For the noise modelling study, the Predictor Version 2023 modelling software, developed by SoftNoise GmbH, was utilized to calculate construction and operational noise levels. This software applies the calculation methods set out in BS 5228 for the calculation of construction noise, and the Calculation of Road Traffic Noise - Transport Research Laboratory (CRTN-TRL) method was used for the operational noise assessment.

The Predictor software package allows topographic details to be combined with ground regions such as water, grass, etc., significant building structures and Project-specific assessment locations to create a detailed and accurate representation of the Project layout and surrounding area. In this case, a simplified model has been created which reflects the flat ground conditions in the area and the screening due to buildings has not been included in the model. It is noted that this is a worst-case assessment.

The construction noise model allowed for the quantification of noise levels from multiple sources (i.e., various construction plant items), based on sound power levels emitted from each. The model computed the noise propagation at the nearest noise sensitive receptors that are likely to be affected by noise from the Project.

All noise levels were predicted at a height of 1.5m, are presented in decibels, dB(A) and rounded to the nearest whole integer or decimal place where necessary.

All Sound Pressure Levels (SLP) values are expressed as dB(A) re: 2 x 10-5 Pascals (Pa) and all Sound Power Level (SWL) values are expressed as dB(A) re: 10 -12 Watts (W).

6.2.2.2 Potential Impacts

Construction Phase

Noise impacts can be caused by noise emissions from construction equipment (earthmovers, etc.), and construction vehicles carrying materials and spoil to and from the locations where work is taking place along the Project. Construction materials will be delivered from borrow pits and stockyards sites where asphalt and concrete batching facilities will be located.

Construction of the Overpass will progress along the route and will result in a noise impact on a shortterm basis (as discussed below). With due warning and the appropriate mitigation measures noise impacts from such works are of insufficient duration to cause significant effects.

Noise impact from construction activities will arise principally from the following activities:

- Earthworks and Site Clearance;
- Roadworks; and
- Overpasses work.

The scheduled duration of construction activities is planned to be 24 months. The normal working hours are from Monday to Friday between 07.00 and 17.00, and twice a month on Saturdays.

Methodology

Based on the specifications of construction equipment supplied by the client, an overall sound power level (SWL) has been determined for each construction activity for noise modelling purposes.

Modelling of noise impact from construction of the overpass was calculated based on a typical construction scenario where a construction team is working on a site on flat terrain without any noise shielding effects and from a topography which results in a worst-case (conservative) assessment of noise impacts. This scenario is sufficient to calculate noise levels at various distances from the project, and to calculate noise impacts at receptors from the construction activity.

The determination of the source noise level is based on the type and maximum number of items, and the SWL have been derived from the BS 5228 database. Table 6.19, Table 6.20 and Table 6.21 show the input assumed for each construction activity.

Constructio n Activity	Equipment	Quantity	Activity on-time (% of hour)	SWL, dB(A)	Total SWL, dB(A)	BS 5228 Reference
	Excavator	1	75%	96	96	D.8.15
	Backhoe	1	50%	95	95	C.2.8
	Bulldozers	2	50%	108	111	C.2.11
Earthw ork	Generators (40 Kva)	1	50%	93	93	D.7.48
	Roller	1	75%	103	103	C.5 25
	Grader	1	75%	112	112	D.3.75
	Loader	1	75%	98	98	C.4.13

Table 6.19 Earthworks Construction Plant Team

Constructio n Activity	Equipment	Quantity	Activity on-time (% of hour)	SWL, dB(A)	Total SWL, dB(A)	BS 5228 Reference
	Grinder	1	50%	103	103	C.5.35
	Heavy Vehicle (Tippers, loading lorries, etc.)	2	50%	106	109	C.2.26.28
		116				

Source: ERM 2023, based on data provided by INZAG.

Construction Activity	Equipment	Quantity	Activity on-time (% of hour)	SWL, dB(A)	Total SWL, dB(A)	BS 5228 Reference
	Excavator	2	50%	96	99	D.8.15
	Asphalt Paving Machine	2	75%	105	108	C.2.61
	Asphalt Plant	1	50%	106	106	D.6.10
	Concrete agitator truck	1	50%	108	108	C.4.20
	Water truck	1	50%	117	117	D.11.52
	Concrete pump truck	2	50%	105	108	D.6.16
Roadw ork	Generators (40 Kva)	1	75%	93	93	D.7.48
	Roller	2	75%	103	106	C.5 25
	Grader	1	75%	112	112	D.3.75
	Loader	1	50%	98	101	D.3.3
	Heavy Vehicle (Tippers, loading lorries, etc.)	2	50%	106	109	C.2.26.28
		Total	•		120	

Source: ERM 2023, based on data provided by INZAG.

Table 6.21 Overpasses-works Construction Plant Team

Construction Activity	Equipment	Quantity	Activity on-time (% of hour)	SWL, dB(A)	Total SWL, dB(A)	BS 5228 Reference
Overpasses	Bored Piling Rig	1	75%	108	108	C.12.42
Work	Generators (40 Kva)	2	50%	93	96	D.7.48

Construction Activity	Equipment	Quantity	Activity on-time (% of hour)	SWL, dB(A)	Total SWL, dB(A)	BS 5228 Reference
	Farm Tractor	1	50%	116	116	D.10.268
	Loader Cranes / Truck- Mounted Crane (15tm)	2	75%	114	117	D.4.101
	Loader	1	50%	98	98	D.3.3
	Crane (mobile)	2	50%	98	101	C.4.43
	Water truck	1	50%	117	117	D.11.52
	Mobile elevated platforms	4	75%	99	105	C.2.35
	Manitou Telescopic	2	50%	99	102	C.2.35
	Heavy Vehicle (Tippers, loading lorries, etc.)	2	50%	106	109	C.2.26.28
		122				

Source: ERM 2023, based on data provided by INZAG.

Significance Criteria

To evaluate the impact of temporary activities it is necessary to establish criteria above which significant adverse effects are likely to be experienced. International best practice has been followed and thresholds above which a significant construction noise impact is considered to occur have been based on BS 5228.

When assessing the significance of an impact for the noise assessment, its significance takes into account factors such as:

- Design details of the noise sensitive property- for instance, if the construction will take place during a very short period of time, significance of the potential impacts may be downgraded; and
- Sensitivity of the receptor- receptors sensitive to noise during the daytime only are assessed using criteria that consider the impact of noise on daytime activities, whilst those rated as sensitive during the night time are assessed using criteria that consider the impact of noise on sleep disturbance.

The significance of noise effects is set out below in Table 6.22.

Exceedance of criteria, dBA	Magnitude of predicted impact	Other relevant factors	Resulting Significance of effect
5 dB or more below the criteria (<65 dB)	Negligible	Factors which may	Insignificant
> 5 dB below , up to the criteria (65-70 dB)	Small	influence significance of effects e q	Minor
Up to 5 dB above the criteria (70-75 dB)	Medium	duration of	Moderate
> 5 above the criteria (>75 dB)	Large	construction activity	Major

Table 6.22 Magnitude and Significance of Construction Noise Effects

Source: ERM 2023

The classification of significance is referred to as: Insignificant, Minor, Moderate, and Major. Impacts rated as Moderate or Major should be mitigated where practicable, feasible and reasonable with

proportionately more emphasis on the Major items. Mitigation may not fully eliminate the impact but is expected to reduce its severity.

Operation Phase

Operation of the Project may result in increases in traffic flow, speed, and changes in the composition of traffic. Therefore, the operation of the Project has the potential to result in significant noise impacts at nearby NSRs. However, it should be noted that the Project objective is to upgrade the existing road and enhance overall traffic flow with overpass infrastructure.

Methodology

A quantitative analysis of the potential impact of the Project was conducted using the Predictor sound propagation model, in compliance with the CRTN¹-TRL² calculation method, to estimate the noise produced during the operational phase.

For this study, current traffic data and traffic estimates forecast were based on assumptions agreed with the INZAG and measured traffic data. The model considers the following parameters and assumptions:

- Traffic flow data speed limit, %HGVs, traffic volume) presented in Table 6.23 and Table 6.24,
- 20m Road Width;
- Standard Road Surface Type; and
- 10% Turning Flow (of the traffic on the main highway)
- Figure 4.11 presents the exact location of each flyover.

Table 6.23 Traffic Data Input - Current Scenario

Location	Traffic Flow Q _{24h}	Heavy Vehicles,%	Average Speed, km/h		
5th Av (L1)	32,324	17	35		
Mulenvos (L2)	48,244	18	35		
Viana- Estalagem (L3 and L4)	25,932	27	35		
SME (L5)	16,228	28	35		
*Number of vehicles considering the total of both directions					

Source: ERM 2023

Table 6.24 Traffic Data Input - Forecast Scenario (worst-case)

Location	Traffic Flow Q _{24h}	Heavy Vehicles,%	Average Speed, km/h
5th Av (L1)	41,375	17	40
Mulenvos (L2)	33,193	18	40
Viana- Estalagem (L3 and L4)	61,752	27	40

¹ Department of Transport (UK), Calculation of Road Traffic Noise (1988), Technical Memorandum, paragraph 42.2.

² Project Report PR/SE/451/02, Transport Research Laboratory.

Location	Traffic Flow Q _{24h}	Heavy Vehicles,%	Average Speed, km/h
SME (L5)	20,772	28	65
*Number of vehicles considering the total of both a	lirections		

Source: ERM, 2023

Significance Criteria

In order to evaluate the results of the modelling during operation, background levels +3dB (at the nearest receptor location off-site) have been used to derive appropriate noise assessment criteria, as per Section Significance Criteria. The criteria for establishing the significance of noise effects are set out below in Table 6.25.

Table 6.25	Magnitude and	I Significance	of Operational	Noise Effects
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Exceedance of criteria, dBA	Magnitude of predicted impact	Other relevant factors	Resulting Significance of effect
5 dB or more below the criteria	Negligible	Factors which may	Insignificant
> 5 dB below , up to the criteria	Small	influence significance of effects e.g. duration of	Minor
Up to 5 dB above the criteria	Medium	construction activity	Moderate
> 5 above the criteria	Large		Major

Source: ERM, 2023

The classification of significance is referred to as: Insignificant, Minor, Moderate, and Major. Impacts rated as Moderate or Major should be mitigated where practicable, feasible and reasonable with proportionately more emphasis on the Major items. Mitigation may not fully eliminate the impact but is expected to reduce its severity.

6.2.2.3 Baseline Conditions

The baseline is provided in Section 4.1.4 of the Report. The summary of the baseline findings is presented in this subsection.

The baseline noise survey conducted from May 12th to May 18th, 2023, shows that the acoustic environment at the proposed project site exhibits high levels of noise. The measurements taken at five representative locations indicate that the noise levels exceed the thresholds set by the IFC Performance Standards for residential areas, for both day and night-time.

IFC for both daytime and night-time periods. Baseline noise levels are as follows:

- During the daytime, the baseline noise levels at all monitoring locations ranged from 61 to 72 dB
 L_{Aeq, day}.
- During the night-time, the baseline noise levels at all monitoring locations ranged from 54 to 70 dB L_{Aeq, night}.

These levels can be attributed to the constant flow of vehicles (including motorbikes, heavy vehicles), honking horns, regional railway traffic and general urban activities.

6.2.2.4 Embedded controls

 Normal working hours are from Monday to Friday between 07.00 and 17.00, and twice a month on Saturdays;

- Construction activity (earthwork, roadworks and overpasses work) will be undertaken only during day time;
- Night activities are planned for special tasks. e.g.: transportation from the yard to the construction fronts;
- Improvement of roads widths to assure a good condition traffic during works;
- In order to promote fluidity during construction while minimizing negative impacts on the social environment, expropriation of land was reduced as much as possible, notably regarding the required land for the implantation of elevated areas; and,
- Enforcing speed limits can lower noise levels significantly. e.g. speed limit of 30 km/h on the access roads.

6.2.2.5 Impact Assessment

Construction Phase

Table 6.26 presents the estimated distances at which the relevant impact magnitude will be met for each construction activity. According to the Project Description, construction activities will not be carried out during nighttime periods. Therefore, the assessment presented below is based on the daytime criteria.

	Noise Level dBA (Impact Magnitude)					
Construction Activity	<62 (Negligible) 62-67 (Small) >6		>67-72 (Medium)	>72 (Large)		
Earthw orks	>150 m	150 – 70 m	<70 – 30 m	<30 m		
Roadw orks	>250 m	250 – 130 m	<130 – 60 m	<60 m		
Overpasses-w ork	>320 m	320 – 170 m	<170 - 80m	<80 m		

Table 6.26 Distances at which Daytime Criteria will be met.

ERM 2023

These predicted impacted zones can be applied along the entire length of each of the five construction areas of the Project where construction will take place. There are receptors within the impact zones and therefore significant impacts are anticipated. As an example, receptors located within 80 meters from the construction boundaries will have a **Major** impact due to overpasses-work, but a **Moderate** impact due to roadworks and a **Minor** impact due to earthworks. Since significant noise impacts are anticipated due to construction activities, mitigation measures are recommended as described below in Section 6.2.2.6.

Operation Phase

The modelling results for the points used during the monitoring campaign are summarized in Table 6.27.

Table 6.27 Predicted Noise Levels during Operation Phase - Project Noise Contribution

Locatio n ID	Predicte Level,	d Noise dBA	Noise Cr dB/	iteria*, A	Exceedance, dBA		Im pact Magnitude	
	Daytime	Night- time	Daytime	Night- time	Daytim e	Night- time	Daytime	Night-time
L1	60	52	64	57	-4	-5	Small	Insignificant
L2	76	67	75	73	1	-6	Medium	Insignificant

L3	67	59	66	68	1	-9	Medium	Insignificant
L4	67	59	70	62	-3	-3	Small	Small
L5	70	62	72	62	-2	0	Small	Small
Period T = 15 hours for Daytime (07:00–22:00) and 9 hours for night-time (22:00–07:00) as per IFC Guidelines. *Measured LAeq + 3dB								

Source: ERM 2023

• Comparing the predicted noise levels (Project contribution only) during the operational phase with the applicable noise standards, and assuming medium sensitivity for receptors, significance can be calculated, and the results show that **Minor** to **Moderate** impacts are likely at the closest properties near L2 and L3 during the daytime period. During the nighttime period, **Minor** impacts are predicted near L4 and L5.

• Mitigation will be considered for all locations where Minor to Moderate impacts have been identified as discussed in the following section.

6.2.2.6 Mitigation measures

Construction Phase

The Project construction will affect receptors along the route during a short period. Additionally, noise impacts from the construction phase can be effectively mitigated through good management practices and provision of well-established technical solutions and limiting of noisy works to daytime. Implementation of mitigation measures will help to decrease residual impacts as a result of Project construction. In order to minimize construction noise impacts, the following mitigation measures are recommended to be included in the management of construction noise.

- Where practicable noisy equipment will be situated as far away as possible from the receptor.
- Where practicable noisy equipment will be orientated to face away from the receptors at which Moderate or Major noise impacts are predicted.
- Construction contractors will use alternatives to audible reversing alarms, such as visual and/ or broadband noise emitting models, that provide a safe system of work; or configure the Project worksites to maximize forward movements of mobile plant.
- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electriccontrolled units, will be used, where practicable.
- Where practicable, stationary equipment will be located in an acoustically treated enclosure.
- Throttle settings will be reduced and equipment and plant turned off, when not being used.
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked. Equipment will not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of the noise identified.
- Use of compressors, generators and pumps fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use.
- Fitting of mufflers or silencers of the type recommended by manufacturers.
- For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also that the doors close properly against the seals.
- Implementation of speed limits (50 km/h) for trucks while travelling to and from construction sites (within settlements and on village roads of poor condition: 30 km/h).

- Reducing Project traffic routing through community areas wherever possible.
- Installation of (temporary) noise barriers between the construction site and any sensitive use buildings.
- Use of dedicated site access roads that avoid routing through villages.
- Monitoring will be carried out during construction to confirm the modelling results and more importantly to verify and evaluate mitigation in areas where noise may be impacting sensitive receptors (i.e. adapt management plans and construction methodology to minimize impacts).

Based on the successful implementation of the noise control mitigation and management measures described above, it is envisaged that a reduction in the overall noise from construction plant teams of 5 dBA is achievable from the noise data provided in BS 5228. For a reduction of more than 5 dBA, noise shielding is required. Besides workers containers or noise screens, earth mounds or rock piles can provide a typical reduction of up to 15 dBA.

Operation Phase

Although not directly applicable to the project, the IFC Toll Road guidance is used as a reference for mitigation measures, as listed below.

- Insulation of nearby building structures (typically consisting of window replacements); and
- Use of road surfaces that generate less pavement/tyre noise such as stone-matrix asphalt.
- Landscape screening, by adding landscape bunds;
- Noise barriers adjacent to the road;
- Reducing traffic speed.

Each of the mitigation measures listed above has implications which are set out in Table 6.28. The noise benefit and other implications require careful consideration to define mitigation in each area where the potential for significant impacts is identified.

Table 6.28 Direct Road Traffic Noise Mitigation Measures

Measure	Noise Benefit	Negative Implications
Low noise road surfaces.	2-4dB	Minor. Porous asphalt can have cost and maintenance implications. Modern 'thin surfaces' provide greater noise reductions and have minor cost or maintenance implications. How ever, the effects w ould be limited on low -speed roads.
Landscape screening, by adding landscape bunds.	Varies, generally <10dB	Bunds may take additional land or create visual impacts. Given the proximity to residential communities, this mitigation measure is unlikely to be practicable.
Noise barriers adjacent to the road.	Up to 15dB	Little land take, access issues, driver sightlines, security, adverse visual impacts (can be landscaped), maintenance.
Reducing traffic speed.	Small	Increased journey times

Source: IFC EHS Guidance for Toll Roads

The hierarchy of noise mitigation measures is thus, as follows:

- A low noise road surface will be preferred where possible as a priority mitigation measure where noise impacts are identified because it has only minor dis-benefits if it can be shown to be effective at slow speeds.
- Noise barriers (landscaped as necessary) within the road corridor will be considered to address
 significant impacts where noise-sensitive receptors are very close to the road and other mitigation

measures are not effective at reducing impacts and where it is judged the benefit can outweigh the dis-benefits in that particular location, without compromising road safety.

It is unlikely noise insulation would prove to be an effective noise control solution, however, where the above mitigation measures are not adequate, a voluntary scheme for noise insulation may be considered for major noise impacts where it is likely to be effective.

Where the above measures are not effective in reducing noise, a detailed consultation will be carried out with affected residents and a mitigation plan will be developed which is tailored to each receptor to ensure that impacts are minimized as far as practicable.

6.2.2.7 Summary Impact Tables

Construction

Predicted construction noise impacts have been summarized in Table 6.29.

Project Phase: Construction								
Type of Impact: Direct Negative Impact								
Rating of Impacts:								
	Pre-mitigation			Post-mitigation (Residual) – including embedded measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning				
Extent	Local	<320m* of construction activity	Local	<320m* of construction activity				
Duration	Medium-term	Construction expected to last 24 months.	Medium-term	Construction expected to last 24 months				
Scale	Medium to Large	Construction expected to last 24 months and section by section. Construction conditions and activities (unpaved roads, earthworks and materials handling) are likely to increase significantly the noise levels.	Small to Medium	Construction expected to last 24 months and section by section however with embedded mitigation only expect scale to be minor at any one time.				
Frequency	Regular	Impacts expected throughout the duration of construction.	Regular	Impacts expected throughout the duration of construction.				
Likelihood	Likely	During construction phase	Likely	During construction phase				
Magnitude:								
Pre-mitigation	on		Post-mitigation (Re	sidual)				
	Medium to Larç	ge Magnitude	Minor to Medium Magnitude					
Sensitivity / Vulnerability / Importance of the Resource / Receptor:								
High Sensitivity								
Significant Rating:								
Pre-mitigation Post-mitigation								
	Major Ir	npact	Moderate Impact					
*>320m Negligible impact magnitude is predicted for any Construction activity.								

Table 6.29 Noise Impacts from Construction Activities

Source: ERM 2023

Operation Phase

Predicted operation Impacts are summarized in Table 6.30.
Project Phase	e: Operational Ti	raffic					
Type of Impa	ct: Noise						
Rating of Impacts: Direct Negative Impact							
	Pre-mitigation	1	Post-mitigation (Re	sidual) – including embedded measures			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Extent	Regional	Large project coversmany areas of sensitive receptors	Regional	Large project covers many areas of sensitive receptors			
Duration	Long-term	During operational phase	Long-term	During operational phase			
Scale	Moderate to Minor	During operational phase	Minor	During operational phase with the implementation of suggested mitigation measures.			
Frequency	Regular	Impacts expected throughout the duration of operation.	Regular	Impacts expected throughout the duration of operation.			
Likelihood	Likely	During operational phase	Likely	During operational phase			
Magnitude:							
Pre-mitigation	on		Post-mitigation (Residual)				
	Medium M	lagnitude		Small Magnitude			
Sensitivity / V	/uInerability / Imp	portance of the Resource / Re	ceptor:				
High Sensitivity							
Significant Rating:							
Pre-mitigation	on		Post-mitigation				
	Moderate Impact			Minor Impact			

Table 6.30 N	Voise Impacts	from O	peration
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Source: ERM 2023

Conclusions

A noise modelling study was developed to evaluate the noise emission levels generated by the Project during the construction and operation phase at the closest receptors to the proposed overpass and the upgraded road. Predicted noise levels were compared to the applicable noise limits (international guidance levels). It should be noted that the results of the monitoring campaign showed values above the general IFC guidelines for residential areas at all monitoring points, mainly due to the traffic, the railway services and other existing noise sources in the area. Therefore, background noise levels + 3dB had been used to derive appropriate noise assessment criteria.

The construction phase is expected to have the **Major** significance impacts at the closest receptors to the road for the Overpass work and **Moderate** significance for the earthworks and roadworks. However, the effects of construction will be temporary and will reduce once the section of the road in front of each receptor has been completed. With the implementation of the right mitigation measured, construction noise impact can be reduced to **Moderate**.

Based on the modelling study results, the noise from the Project during the operation phase is expected to have **Minor** to **Moderate** impacts during the daytime period at the closest receptors in L2 and L3. During the nighttime period, **Minor** impacts are predicted near locations L4 and L5.

The noise study has been based on predicted traffic flow and current scheme design data. In order to more accurately assess the effects of the road, noise during the construction and operational phases

should be monitored and a detailed study should be undertaken to confirm the effectiveness of noise mitigation at each location where noise impacts have been predicted in order to minimize the effects during these phases.

Therefore, ERM advises that noise monitoring should be conducted on a regular basis to check compliance, and where exceedances are detected, implement corrective actions to minimize noise impacts

6.2.3 Geology and Soils IA

Baseline is provided in Section 4.1.5 of the Report.

6.2.3.1 Potential Impacts

Potential impacts during construction related to geology, soils and contaminated land can be expected as a result of:

- Earthworks (soil removal and destabilization of the land surface);
- Contamination of soils due to spillage and runoff.

6.2.3.2 Baseline Conditions

The area in the vicinity of the overpasses is generally flat (Table 2.3) and mostly the surface is sealed. The results of the desktop studies on soils, geology and geotechnical issues can be summarized as follows:

- In the vicinity of the overpasses the signs of erosion are visible on artificial bare slopes (Figure 4.18).
- Potential sources of the baseline pollution are parking lots, wastewater spills and waste dumping in the vicinity of the crossings;
- The area can be subject to earthquakes with low to minor magnitude.

6.2.3.3 Embedded measures

The following embedded measures are in place to reduce potential impacts relating to geology, soils, and contaminated land:

- During Design
 - The road design shall be optimized to limit the gradient of the access roads to reduce runoffinduced erosion (the maximum gradient of the overpasses is 8°, the lean angles of the road surface are 3°), and provide adequate road drainage based on road width, surface material, compaction and maintenance (section 2.7.1.7 Drainage).
 - During Construction
 - Hazardous Materials Management Procedure:
 - Refer to Section 6.2.6 (Waste IA)
 - Waste Management Procedure:
 - Refer to Section 6.2.6 (Waste IA)
 - Soil Management Procedure:
 - The area of soil exposure and disturbance shall be limited to the construction site only;
 - The amount of extracted soil will be kept to a minimum;
 - The extracted material will be reused for the construction of abutment/ramps;

6.2.3.4 Impact Assessment

The impact assessment for Geology, soils, and groundwater has been carried out in line with the methodology outlined in Section 6.1.

Construction Phase

The Project does not have any pits or quarries as associated objects, therefore the only foreseen impact on the geological processes will be related to the construction of the new slopes and creation of conditions for the construction-induced erosion, as the area in the vicinity of the feature flyovers has a bare surface.

The potential sources of pollutants, that might impact the soil (and groundwater) quality, that will be present during the construction works, include:

- Movement of construction vehicles;
- Fueling and washing stations;
- Temporal waste storage;
- Wastewater and waste from construction camps;
- Earthworks (use of construction material).

Operation Phase

 The only risk during the operational phase is the risk of an event related to seismicity. However, since the Project design will already consider soil conditions the potential risks are considered to be negligible.

6.2.3.5 Mitigation measures

Project Design

During the Project Design the surface stability in case of minor seismic events during the Project Design should be considered.

Construction

The following mitigation measures will be implemented to reduce potential impacts on soil and geology during construction:

- Appropriate techniques will be implemented that will incorporate risk assessment before excavation and slope stability requirements to make sure that occupational and community safety risks are avoided.
- In regions where a cut in natural soil is required, the side slopes of the cuts shall be 2 (horizontal):
 1 (vertical) or flatter.
- Inspections will be carried out to identify areas where erosion is occurring as a result of construction activities. Such monitoring will be carried out on a daily basis during the rainy seasons and on a periodically scheduled basis during the dry seasons.
- Should erosion events be identified, appropriate remedial action, including the restoration of the eroded areas, and where necessary, the relocation of the paths causing the erosion, should be undertaken.
- Surface water diversions should be installed around stockpiles so as to reduce the risk of erosion during storm events.
- Berms on the downslope side of stockpiles should be created to minimize soil loss or spread.

- Minimise duration of topsoil stockpiles through implementing ongoing rehabilitation of works areas on completion of construction in each work area.
- Land clearance should only be undertaken immediately prior to construction activities taking place there.
- Unnecessary land clearance should be avoided.
- Unless foreign material such as aggregate needs to be inserted, after the installation of features requiring the excavation of a deep trench (viz. stormwater drainage pipes, services, etc.), soil should be replaced in the trench so as to mimic the pre-construction profile, (i.e.: subsoil placed at the base of the trench and topsoil above it, and should be compacted).
- Cut and fill slopes should be shaped and trimmed to resemble natural conditions, should not be excessively steep. Moreover, where the upper slope of the cut face may erode, suitable stabilisation methods should be implemented.
- Prevent clogging of the drainage network by localised control measures (eg sediment fences, check dams), appropriate contouring to optimise slope angle and steepness;
- Prevent wind erosion via fencing, covering, etc;
- Revegetate the slopes after the end of construction to prevent the development of erosion (grass cover);
- Early construction of all drainage structures (i.e. culverts, sediment basins and catch drains).
- Grievance redress mechanism for the project to be implemented and communicated to all surrounding communities, where impacts of erosion to their livelihoods can be raised and addressed;

Operation

- Monitor and clean the drainage system to avoid clogging (once after the rain season);
- Replace the damaged drainage structures (check once a year after the rain season);
- In case the erosion processes develop, implement measures to cover the surface (e.g. install geomats, revegetate the bare slopes).

6.2.3.6 Summary Impact Table

Construction Phase

The tables below include a summary of the impact assessment for the construction phase - pre and post mitigation(s) (Table 6.31, **Fehler! Verweisquelle konnte nicht gefunden werden.**). The impact on the geological environment is assessed in Section (refer to the Groundwater contamination IA). The impact of seismicity is not assessed as the estimated magnitude of 4.5 on the Richter scale will not cause damage if the geological conditions at the site are assessed properly. The impact on topography is considered negligible.

Table 6.31 Rating of Impacts Related to Erosion during Construction

Project Phase:	Constructio	n					
Type of Impact: Direct Negative Impact							
Rating of Impacts:							
	Pre-mitiga	ation	Post-mitigation (Residual) – including embedded measures				
	Designat ion	Summary of Reasoning	Designation	Summary of Reasoning			
Extent	Site	Across the project AOI	-	No development of erosion			
Duration	Long- term	Impacts expected throughout the duration of construction and if no mitigation measures apply, erosion processes may develop further and damage existing infrastructure	-	No development of erosion			
Frequency	Constant	Impacts expected throughout the duration of construction and during operation	-	No development of erosion			
Scale	Small	Sheet erosion and gully erosion	-	No development of erosion			
Likelihood	Possible	Erosion processes are likely to happen if there are suitable conditions	-	No development of erosion			
Magnitude:							
	Pre-miti	gation	Pos	st-mitigation (Residual)			
	Medium M	lagnitude		-			
Sensitivity / Vu	ulnerability / I	mportance of the Resource	e / Receptor:				
		Low	Sensitivity				
Significance:							
Pre-mitigatio	n		Post-mitigation				
	Minor II	mpact	Negligible				

Source: ERM, 2023

Operation Phase

The impacts that may occur during the operation phase will only be related to erosion (Table 6.32)

Project Phase:	Project Phase: Operation							
Type of Impact: Direct Negative Impact								
Rating of Impacts:								
	Pre-mitiga	ation	Post-mitigation (Residual) – including embedded					
			measures					
	Designat	Sum mary of	Designation	Summary of Reasoning				
	ion	Reasoning						
Extent	Site	Across the project AOI	-	No development of erosion				
Duration	Long-	Impacts expected	-	No development of erosion				
	term	throughout the						
		existence of the						
		flyovers and if no						
		mitigation measures						
		apply, erosion						
		processes may						
		develop further and						
		damage existing						
F	Ormeterst	Infrastructure		No development of encoder				
Frequency	Constant	Impacts expected	-	No development of erosion				
		duration of						
		duration of						
		during operation						
Scale	Small	Sheet erosion and	-	No development of erosion				
	Oman	gully erosion						
Likelihood	Possible	Erosion processes are	-	No development of erosion				
		likely to happen if there						
		are suitable conditions						
Magnitude:								
Pre-mitigation			Pos	st-mitigation (Residual)				
	Medium M	lagnitude						
Sensitivity / V	ulnerability / I	mportance of the Resourc	e / Receptor:					
		Low	Sensitivity					
Significance:								
Pre-mitigatio	n		Post-mitigation					
Minor Impact			Negligible Impact					

Table 6.32 Rating of Impacts Related to Erosion during Operation

Source: ERM, 2023

6.2.4 Surface Water IA

Baseline is provided in Section 4.1.6 of the Report.

6.2.4.1 Potential Impacts

Potential impacts on the surface water resource are associated with surface water quality, surface water volumes, and flood risk. Changes in quality, volume, or flood risk will have a subsequent impact on surrounding receptors (natural environment and human).

The following planned activities can have a potentially adverse impact on surface water resources during the Project lifecycle:

Surface water quality

Impacts on surface water quality can originate from:

 Enabling earthworks, watering of construction sites to reduce dust emissions, and construction activities which result in silt laden surface water runoff.

- The use of fuels, oils, and other hazardous substances at the Project site which could be mobilised in surface water runoff should spills and leaks occur during construction.
- Increased vehicular movements due to improved infrastructure which could decrease the quality of surface water runoff due to tyre wear particles, chemicals used in oils and lubricants, and spillage of fuels.

Surface water volumes

Impacts on the surface water volumes can originate from:

 Paving of the road surface, and compaction of the soil within the road reserve, which could reduce infiltration and increase rainfall runoff.

Flood risk

Impacts on flood risk can originate from:

- Earthworks required to facilitate the Project which will alter the topography of the local area. Any depressions created could facilitate stagnant pools of water following periods of heavy rainfall.
- Paving of the road surface and elevation of overpasses above ground level, which will increase surface water runoff rates and velocities above the baseline. This has potential to negatively impact hydrologically connected downstream watercourses, and sensitive receptors immediately adjacent to the sloped approach roads to the overpasses.

6.2.4.2 Embedded Controls

As discussed in Section 2.12, there are several embedded controls that have already been applied or will be integrated into the next phases of the Project design. Embedded mitigation measures planned as part of the Project include:

- INZAG will use a preexisting worksite next to the Project workplace, which contains the necessary
 installations for the Project. Concrete mixer wash water and concrete laitance will be the
 responsibility of a contractor. Washing of the machinery and equipment will also be performed by a
 subcontractor within their premises.
- A Water and Wastewater Management Plan and a Waste Management Plan will be developed for the Project, with all on site staff trained and informed about waste sorting and handling.
 - No chemical waste is foreseen. All types of waste will be firstly gathered in an adequate storage area on site prior to being transported for treatment, following the guidance per type of waste (LAR methodology).
 - Surplus material will be transported to an offsite dumpsite operated by a certified company.
 - Used oils will be stored in marked watertight 1,000 L plastic drums, in a closed covered place, with a spill retention basin, and specific signing. Oils will be transported for the final disposal following the treatment hierarchy.
 - Batteries and accumulators will be stored in signposted, waterproofed, and covered areas, with a spill retention basin to reduce the risk of leaching and contamination from accidental spills.
 - General waste (paper, plastic, timber, steel, and iron etc.) will be stored in bays built in concrete.
 - Used tires will be stored in a designated area.
 - Hydrocarbons will be put through a hydrocarbon separator.
- Domestic effluents will be collected into septic tanks with primary treatment (decantation and filtration) and biological treatment (anaerobic fermentation) and subsequent aspiration and transport directly to its final destination, by a company duly accredited..

 The road design incorporates lean angles to drain rainwater onto the side of the road. A set of urban drainage structures and installations will control and manage rainwater, directing water flow to gutters, culverts, and stormwater drains.

6.2.4.3 Impact Assessment

The impact assessment for water resources has been carried out in line with the methodology outlined in Section 6.1. The significance of impacts throughout all phases of the Project lifecycle has been assessed on the assumption that the proposed embedded mitigation measures will be implemented.

Construction phase

- Impacts to surface water quality:
 - Potential sources of contamination to surface waters from construction activities will be managed through the embedded mitigation measures. These practices will prevent, reduce, and mitigate the Project's impact on surface water quality.
- Impacts to surface water volumes and flood risk:
 - Construction activities will result in the compaction of soils, reducing infiltration and increasing surface water runoff.

Operational phase

- Impacts to surface water quality:
 - Increased traffic movements due to improved infrastructure will decrease the quality of surface water runoff. Whilst a surface water drainage system is proposed to manage surface water flows, no treatment system is included. Surface water quality will be impacted most upon the first heavy rainfalls following periods of dry weather, during which time pollutants would have accumulated on the road surface. Most downs tream watercourses are heavily modified, poorly managed, and act as open sewers which receive flows from urban areas in Luanda. As such, the quality of these watercourses is already compromised, and the Project will have a low impact in comparison.
- Impacts to surface water volumes and flood risk:
 - Increased impermeable surfaces will result in greater volumes of surface water entering the downstream stormwater management infrastructure, and in turn hydrologically connected watercourses. Flooding is a prominent problem in Luanda during the wet season, with large volumes of water already conveyed by inadequate drainage channels.
 - The proposed overpasses will be served by a surface water drainage system which directs rainfall runoff towards gutters, culverts, and stormwater drains from where it will be absorbed into the existing stormwater management infrastructure. As the overpasses will be elevated above existing ground levels, surface water runoff will have greater velocity, resulting in more erosive power which could be damaging to downstream receptors. As the existing stormwater management infrastructure includes culverted drainage channels, there is limited potential for negative impacts across the local area.

6.2.4.4 Mitigation measures

There are already several embedded measures, as summarised in **Section 6.2.4.2**. These measures will reduce the probability, severity, extent, and magnitude of impacts. This section presents additional mitigation measures that can be implemented.

Project Planning

- Project programme should plan for construction activities to occur during the dry season, where possible.
- A stormwater management system will be designed to ensure surface water runoff rates and volumes do not substantially increase over the baseline.
- Suitable measures should be incorporated into the stormwater drainage design to dissipate energy within surface water runoff before flows reach the existing stormwater management infrastructure.
- Pollution control devices should be incorporated into the surface water drainage design for the roads and overpasses to remove mobilised pollutants.
- The additional ground paved area will be designed to be minimal compared to the existing paved area to minimise the reduction of recharge area to the underlying aquifers.
- Management and maintenance of the stormwater infrastructure will be included, and committed to, in the planning phase to reduce blockages of the water flows.
- Project elements will be located to minimize risks to important sources of groundwater and to ensure surface waters and water supplies are not impacted. Where impacts cannot be avoided, appropriate technically and financially feasible mitigation measures will be developed, such as new groundwater wells and diversions of irrigation channels to maintain the functionality of the systems during the construction period

Construction

- Surface water quality:
 - Where possible, construction activities should occur during the dry season.
 - Pollution control devices should be incorporated into the surface water drainage design for the roads and overpasses to remove mobilised pollutants. Regular maintenance of these devices should occur to ensure sustained effectiveness of their operation.
 - Drainage from excavations will be collected and settled to remove suspended materials prior to discharge in accordance with required permits. Where practicable, local perimeter drains will be constructed around working areas to collect suspended run-off and direct it to a system of settlement basins before discharge in accordance with required permits.
 - All facilities and structures will be regularly inspected and maintained to ensure proper and efficient operation at all times, and especially after heavy rainfall. Sediment deposits will be regularly removed and disposed of either by spreading on site (if uncontaminated) or at a suitably licensed facility.
 - Spoil and soil storage areas and open stores of construction materials will be designed and managed to control the loss of sediments into run-off by minimizing the length and angle of slopes.
 - The size and duration of exposure of areas of open ground will be kept to a minimum.
 - Protection measures to prevent soil erosion after the finalisation of the earthwork will be implemented where required such as:
 - Use of grass turf to cover the soil surface;
 - Use of erosion-control blankets or mats;
 - Renaturation as soon as feasible.
- Surface water volumes and flood risk:

- Pre-construction drainage should be implemented to ensure construction activities, prior to the installation of a formal drainage system, do not substantially increase surface water runoff volumes and flood risk.
- Calculation of surface water runoff rates and volumes will be undertaken to inform stormwater drainage design.
- Any earthworks should ensure localised depressions are not created, to prevent ponding of stagnant water during periods of prolonged and heavy rainfall.
- Assessment of flooding conditions after heavy rainfall events to be carried out to determine the efficiency of water conveyance systems.
- A suitable maintenance schedule should be implemented to ensure drainage structures are cleared on a regular basis to enable the free flow of surface water and prevent overland exceedance flows
- Suitable measures should be taken to dissipate energy within surface water runoff before flows reach the existing stormwater management infrastructure.
- Engagement will be conducted with the local community to verify the registered and unregistered wells (including hand dug wells) surrounding the water resources used by the Project to ensure that local wells and boreholes are not negatively affected.
- Stormwater management of construction sites will be planned in advance and implemented to separate clean and dirty water systems to avoid the transport of contaminants and sedimentation into aquatic systems.

Oily industrial effluents (high in hydrocarbons) are mainly produced in the equipment maintenance area, managed by subcontractors. An industrial effluent drainage network and a pre-discharge treatment system should therefore be installed on this area of the site.

The solutions adopted for the industrial effluent drainage network should comply with the following requirements:

- The wastewater disposal networks comply with the local legal requirements;
- The network routes all the effluents produced in the industrial facilities to the treatment system;
- The treatment system has sufficient capacity for the quantity of effluent to be treated;
- The treatment system consists of a decanter and a hydrocarbon separator which then discharges the effluents into a small tank located on the site;
- The effluents, after treatment, comply with the limit values set by the legislation in force;
- The sludge resulting from the settling of effluents is subject to a drying process, then deposited into the landfill;
- The oil resulting from the water/oil separation process is routed to an approved operator;
- A license will be obtained for the discharge of industrial wastewater within the framework of the use of the water domain and the national legislation in force.

Operation

- A suitable maintenance schedule should be implemented to ensure drainage structures are cleared on a regular basis to enable the free flow of surface water and prevent overland exceedance flows
- Assessment of flooding conditions after heavy rainfall events to be carried out to determine the efficiency of water conveyance systems.

6.2.4.5 Summary impact tables

Table 6.33 Rating of Impacts Related to Surface Water Quality due to Contaminated Surface Water Runoff

Project Phase: Construction and Operation				
Type of Impac	t: Direct Negativ	e Impact		
Rating of Impa	cts:	10	Dect mitigation (Decidual) including ambaddad
	Pre-miligation		Post-mitigation (Residual) – including embedded
	Designation	Summary of	Designation	Summary of Reasoning
		Reasoning		······································
Extent	Site	Across the project AOI	Site	Across the project AOI
Duration	Permanent	Contamination can occur throughout operational lifetime.	Permanent	Contamination can occur throughout operational lifetime.
Frequency	Occasional	Contamination can occur every w et season after rainfall events. The frequency w ill be determined by the maintenance of the stormw ater infrastructure.	Rare	Better maintenance of the stormw ater infrastructure will ensure pollution control devices operate effectively and avoid untreated overland exceedance flow s.
Scale	Medium	Occasional contamination over the long-term will lead to a build-up of contamination in surface waters, especially areas of slow flow s or stagnant ponds. The scale will increase over time.	Small	Few er occurrences of contamination will reduce the scale of the impact over the long-term.
Likelihood	Likely	Without ongoing maintenance and cleaning of the stormw ater infrastructure it is likely that there will be occurrences of contamination over the operational lifetime.	Possible	Even with regular maintenance of the infrastructure, it is possible that exceptional rainfall events will occur, from which the runoff cannot be accommodated in the infrastructure.
Magnitude:				
Pre-mitigatio	n (Post-mitigation (Residual)
Compiliation (1) (Large Magni	tude		Medium Magnitude
Sensitivity / V	unerability / Impo	brance of the Resource	e / Receptor:	
Significance	Rating:			
Pre-mitigatio	n		Post-mitigation	
Moderate Impact			Minor Impact	

Source: ERM, 2023

Table 6.34 Rating of Impacts	Related to Surface	Water Volumes	and Flood Risk
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Project Phase: Construction and Operation					
Type of Impact: Direct Negative Impact					
Rating of Impa	cts:				
	Pre-mitigatio	n	Post-mitigation(measures	Residual) – including embedded	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Extent	Site	Across the project AOI	Site	Across the project AOI	
Duration	Permanent	The changes in paved area will be permanent.	Permanent	The changes in paved area will be permanent.	
Frequency	Occasional	Increased surface water runoff and resultant flood risk will occur during every wet season.	Rare	A suitable drainage system will ensure surface water runoff rates and volumes are suitably controlled. Maintenance of drainage features will ensure effective operation.	
Scale	Medium	Whilst on a catchment scale and taking into consideration that the area is densely built up, the additional paved area will be negligible in comparison to the existing paved areas. How ever, poor w ater management will result in localised flooding.	Negligible	Not much can be done to reduce the additional paved area. A well maintained surface water drainage system will ensure surface water runoff rates and volumes do not increase flood risks locally or dow nstream.	
Likelihood	Likely	With additional paved area surface w ater runoff w ill increase, exacerbating flood risk.	Possible	Even with regular maintenance of the infrastructure, it is possible that exceptional rainfall events will occur, from which the runoff cannot be accommodated in the infrastructure.	
Magnitude:					
Pre-mitigatio	n		Post-mitigation (Residual)	
	Large Magni	tude		Medium Magnitude	
Sensitivity / V	ulnerability / Impo	ortance of the Resource	e / Receptor:		
		Low	sensitivity		
Significance	Rating:				
Pre-mitigatio	n		Post-mitigation		
Moderate Impact			Minor Impact		

Source: ERM, 2023

6.2.5 Groundwater IA

Baseline is provided in **Section 4.1.7** of the Report.

6.2.5.1 Potential impacts

Potential impacts on the groundwater resource are associated with: 1) the volume, and 2) the quality of groundwater available in the aquifers. Changes in the volume, or quality, of groundwater in the aquifers will have a subsequent impact on surrounding receptors (natural environment and human).

Impact on groundwater volumes

The available project description shows that a total of 1 800 m³ will be used for the total project. The foreseen water consumption during the construction phase is related primarily to the watering of the construction sites to reduce dust emissions due to earthmoving activities, at the batch plant and for civilian uses.

Water supply is through a 3rd party. Water supply to the Camp Site will be from dispensers, while for other uses, including industrial, INZAG will store water in tanks, that will be distributed to the construction sites. It is not known what the source of the supplied water will be (surface water / groundwater), or where the abstraction point will be.

Impacts on the groundwater volumes can originate from:

- Paving of the road surface, and compaction of the soil within the road reserve, will increase rainfall runoff, which will be channelled into stormwater management channels, and therefore reduce recharge into the aquifers.
- Installation of drainage structures in areas of shallow groundwater (wetlands / river crossings), can increase loss of groundwater. This is not expected to be a significant factor in this project as the project entails the construction of overpasses that connect to already established roadways where drainage is already embedded.

Impacts on groundwater qualities

- Potential sources of impacts on groundwater quality can include:
- Materials stored, handled, and disposed of during road construction, including, but not limited to, removal of pre-existing asphalt, application of new asphalt, bituminous bound, removal of vegetation and dirt.
- Chemicals and hydrocarbons used / consumed.
- Cementing and concrete.
- Sanitary waste.

6.2.5.2 Embedded Controls

Embedded measures include:

- Groundwater volumes:
 - Water will be supplied by a 3rd party company.
- Groundwater quality:
 - INZAG will use a preexisting worksite next to the Project workplace, which contains the necessary installations for the project, e.g., offices, workshops, warehouses, special waste storage area, waste management zones, sanitary installations, and a cafeteria.
 - No chemical waste is foreseen. There will be no canteen at the construction sites (only at the main INZAG permanent yard), the food will be delivered.
 - Concrete mixer wash water and concrete laitance will be the responsibility of a contractor.
 - Washing of the machinery and equipment will also be performed by a subcontractor within his premises.
 - Waste synthetic oils for engines, gears, and greases will be stored in watertight 200L metal drums. Used oils are transported to final disposal destination following a treatment hierarchy: regeneration, other recycling, and other revalorization forms.

- Absorbents, filter materials (including oil filters not otherwise specified), wiping rags and protective clothing contaminated with hazardous substances will be stored in watertight 1 000L plastic drums.
- Sanitary waste will be stored in impervious septic pits, which will prevent or reduce contamination of the aquifers.
- Used tires will be stored in a designated area.
- Oil filters will be stored in watertight 1 000L plastic drums.
- Hydrocarbons will be put through a hydrocarbon separator.
- General waste (paper, plastic, timber, steel and iron etc.) will be stored in bays built in concrete.
- General waste management measures:
 - For the different types of waste that require transport and treatment, all the operators selected to transport, process, recover and ensure the destination of the various types of waste must be included, as far as possible, in the lists of units approved by the Ministry of the Environment.
 - All types of waste are firstly gathered in adequate storage areas on site prior to being transported for treatment, following the guidance per type of waste (LAR methodology). When the stored quantity is close to the temporary storage capacity, the dispatch process for processing or revalorization is triggered.
 - Domestic effluents will be produced more regularly and in larger quantities in the social facilities, hence a domestic effluent disposal network will be installed in this area of the site, as well as a system for treating these effluents before their discharge. The collection of effluent from the various existing pits is done by suction from the pits, using a small pump.
 - Batteries and accumulators will be stored in a properly signposted, waterproofed and covered area, with a spill retention basin and specific signs indicating the nature of the risks.
 - The onsite staff will be trained and informed about the waste sorting and handling.
 - A responsible person for waste management operations on site will be designated.

6.2.5.3 Impact assessment

Construction phase

- Groundwater volumes:
 - The impact on groundwater volume in the aquifer due to increased surface runoff attributed to increased road and compacted soil area, and installation or upgrading of runoff management infrastructure is expected to be negligible on a catchment scale. In addition, there are no known users of the groundwater resource in the vicinity of any of the 5 proposed flyovers. Therefore, it is expected that there will be no significant impact on the groundwater volumes in the aquifers in the catchment, or water supply to surrounding inhabitants.
- Groundwater qualities:
 - Potential sources of contamination from the camp site and office will be managed through the principles listed in Section 6.2.5.2. These practices will prevent, reduce, and mitigate the various impacts of the project on the underlying aquifers.
 - Runoff from the asphalt and bituminous bound handled and installed on site can contain contaminants such as polyaromatic hydrocarbons (PAHs) and heavy metals. The runoff can accumulate on unpaved areas where it can infiltrate the soil and eventually the underlying aquifers. However, runoff will be well managed, with the proposed infrastructure being planned to drain rainwater onto the side of the road and eventually being directed towards gutters,

culverts, galleries, from where it will be absorbed into the existing stormwater management infrastructure. It is expected that the impact on the groundwater resource within the catchment will be minimal.

Operational phase

- Groundwater volumes:
 - The impact on groundwater volume in the aquifer due to increased surface runoff attributed to increased road and compacted soil area, and installation or upgrading of runoff management infrastructure is expected to be negligible on a catchment scale. In addition, there are no known users of the groundwater resource in the vicinity of any of the 5 proposed flyovers. Therefore, it is expected that there will be no significant impact on the groundwater volumes in the aquifers in the catchment, or water supply to surrounding inhabitants.
- Groundwater qualities:
 - Runoff from the asphalt and bituminous bound handled and installed on site can contain contaminants such as polyaromatic hydrocarbons (PAHs) and heavy metals. The runoff can accumulate on unpaved areas where it can infiltrate the soil and eventually the underlying aquifers. However, runoff will be well managed, with the proposed infrastructure being planned to drain rainwater onto the side of the road and eventually being directed towards gutters, culverts, galleries, from where it will be absorbed into the existing stormwater management infrastructure. It is expected that the impact on the groundwater resource within the catchment will be minimal.

6.2.5.4 Mitigation measures

There are already a number of embedded measures, as summarised in Section 6.2.5.2. These measures will reduce the probability, severity, extent, and magnitude of impacts. Additional mitigation measures that can be implemented, include:

- Groundwater volumes:
 - During the construction phase water will be supplied by a 3rd party provider. The source of that water is not known. In the light of responsible water management, it is recommended that this source be confirmed with the provider. Should the water be sourced from the groundwater resource, then proof of sustainability should be requested.
 - The impact on groundwater volume in the aquifer due to increased surface runoff attributed to increased road and compacted soil area, and installation or upgrading of runoff management infrastructure is expected to be negligible on a catchment scale. In addition, there are no known users of the groundwater resource in the vicinity of any of the 5 proposed flyovers. Therefore, it is expected that there will be no significant impact on the groundwater volumes in the aquifers in the catchment, or water supply to surrounding inhabitants.
- Groundwater qualities:
 - Surface runoff, which could contain PAHs and heavy metals will be directed towards gutters, culverts, galleries, from where it will be absorbed into the existing stormwater management infrastructure. However, over time, these exit structures could become clogged or blocked by general waste and refuse such as plastic bags and other items. It is recommended that the drainage structures be cleared on a regular basis to ensure free draining. This will prevent overspilling onto unpaved areas where the contaminated runoff can pond and enter the soil and eventually the groundwater resource.

6.2.5.5 Summary impact tables

The tables below include a summary of the impact assessment for the construction phase - pre and post mitigation(s). The impact on the groundwater is considered negligible, so it is not assessed.

Project Phase: Construction and Operational						
Type of Impac	t: Direct Negative	e Impact				
Rating of Impacts:						
	Pre-mitigation	n	Post-mitigation (Residual) – including embedded			
			measures			
	Designation	Summary of	Designation	Summary of Reasoning		
Extont	Sito	Across the project	Sito	Across the project AOI		
Extent	Sile	ACIOSS THE Project	She			
Duration	Permanent	The changes in paved area will be permanent.	Permanent	The changes in paved area will be permanent.		
Frequency	Occasional	Decreased recharge into the aquifers will occur after every rainfall event.	Occasional	Decreased recharge into the aquifers will occur after every rainfall event.		
Scale	Negligible	Measured on a catchment scale, and taking into consideration that the area is densely built up as well as that the additional paved area will be negligible in comparison to the existing paved areas, the additional paved area will have a negligible impact.	Negligible	Not much can be done to reduce the additional paved area. The scale of the impact will remain negligible.		
Likelihood	Likely	With increased paved area the runoff will increase, and the recharge will decrease.	Likely	With increased paved area the runoff will increase, and the recharge will decrease.		
Magnitude:						
Pre-mitigation			Post-mitigation (Residual)		
	Small Magnit	ude		Small Magnitude		
Sensitivity / Vu	ulnerability / Impo	ortance of the Resource	e / Receptor:			
0:		Low	sensitivity			
Significance	Rating:		De e transition e ti			
Pre-mitigatio	Negligible Im	nact	Post-mitigation			
Negligible Impact				NEQUIVIDIE III PACI		

Table 6.35 Rating of Impacts Related to Groundwater Volume

Source: ERM, 2023

Table 6.36 Rating of Impacts Related to Groundwater Quality

Project Phase:	: Construction a	nd Operational		
Type of Impac	t: Direct Negativ	e Impact		
Rating of Impa	cts:		1	
	Pre-mitigatio	n	Post-mitigation (Residual) – including embedded	
	De a lass atlass	0	measures	Querran and the second second
	Designation	Summary of	Designation	Summary of Reasoning
Extent	Sito	Across the project	Sito	A cross the project A OL
Extent	3/10		Sile	Across the project AOI
Duration	Permanent	Contamination can occur throughout life of operation. Metals contamination in the fractured rock aquifer will be impossible to mitigate fully.	Permanent	Contamination can occur throughout life of operation. Metals contamination in the fractured rock aquifer will be impossible to mitigate fully.
Frequency	Occasional	Contamination can occur every rainy season after rainfall events. The frequency will be determined by the maintenance of the stormw ater infrastructure.	Rare	Better maintenance of the stormw ater infrastructure will improve channelling of the runoff into the stormw ater system and reduce ponding on open ground.
Scale	Medium	Occasional contamination over the long-term will lead to a build-up of contamination in the soil and groundwater. The scale will increase over time.	Small	Few er occurrences of contamination will reduce the scale of the impact over the long-term.
Likelihood	Likely	Without ongoing maintenance and cleaning of the stormw ater infrastructure it is likely that there will be occurrences of contamination over the life of operation.	Possible	Even with regular maintenance of the infrastructure, it is possible that exceptional rainfall events will occur, from which the runoff cannot be accommodated in the infrastructure.
Magnitude:			Doot with set	
Pre-mitigatio	on		Post-mitigation	n (Residual)
Consitivity /) /	Large Magn	nitude	/ Decenter	Medium Magnitude
Sensitivity / V	unerability / Impo			
Significance	Rating:	LOW SE		
Pre-mitigatio	n natrig.		Post-mitigation	
Moderate Impact			Minor Impact	

Source: ERM, 2023

6.2.6 Waste IA

Baseline is provided in **Section 2.10.4.4** of the Report.

6.2.6.1 Potential Impacts

Potential impacts relating to resources and wastes are summarized as following:

The existing capacity within the Project vicinity is assumed to be adequate to cater to the aggregate requirements of the Project. INZAG decided to use an existing quarry for the earthwork material and

asphalt, which are going to be provided by Prefangol. The exact location of the quarry is not known, however, according to the company's website, there are three quarries in Angola, i.e., Zenze, Moxico e Cahama, and Burgaleira em Bom Jesus.

The quantities of materials used, and wastes generated during the construction phase will primarily relate to:

- General handiworks, including activities like: Stakes preparation, with excavation or cementing; Concrete stakes installation with drilling and provisory tubing, for pillars and abutments fundaments; Leveling concrete and reinforced concrete casting for fundaments, sabots, stakes blocs and floor slabs; Walls front panels installation; Assembly of the principal elements from the viaducts metallics structures; Prefabricated panels assemblage; Application of the waterproof bituminous protection; Under-fundament and ramps base; Fundament layer and asphalt application on the ramps and the bridge deck; and Public lighting implementation.
- Implementation of temporary roads for traffic deviation, including activities like: Surface preparation with vegetation and vegetal dirt removal; Roads backfill; Laying a gravel base or appropriate floor.
- Road's handiworks, including activities like: Preexisting asphalt road removal; Surface preparation: debris, big rocks, vegetation and dirt removal; Earthwork, excavation and embankment; Underlayer installation for surface preparation; Road verges and footbridges installation; Gravel base installation; Asphalt layer application; Bituminous bound, bituminous layers for road construction.

INZAG will use a preexisting worksite next to the Project workplace, which contains the necessary installations for the project, e.g., offices, workshops, warehouses, special waste storage area, waste management zones, sanitary installations, and cafeteria.

Solid waste generation during construction will include:

- Waste from equipment maintenance: Waste synthetic oils for engines, gears, and greases; Absorbents, filter materials (including oil filters not otherwise specified), wiping rags and protective clothing contaminated with hazardous substances; Used tires; Oil filters; Metals; Metals, Lead-Acid Accumulators.
- Waste from warehouse and administrative works: Paper and cardboard; Plastics; Glass.
- Waste from work execution: Concrete; Plastics; Timber; Steel and iron; Soil and stone.
- Liquid effluent waste: Sanitaria and cafeteria.

No chemical waste is foreseen.

Furthermore, there will be no canteen at the site (the food will be delivered), hence no canteen waste is considered.

Concrete mixer wash water and concrete laitance will be responsibility of a contractor. Washing of the machinery and equipment will also be performed by a subcontractor within his premises.

6.2.6.2 Embedded Measures

The following embedded measures relating to resources and waste are considered during the construction phase:

- Contaminated waste is stored in containers specially designed for this purpose, separating them
 according to the contaminating material.
- The project provides for the reuse of excavated materials destined for landfill and the disposal of excess materials in specific locations.
- The onsite staff will be trained and informed about the waste sorting and handling.

6.2.6.3 Impact assessment

Construction Phase

During construction phase the impact will be mostly related to the quantities of produced waste, waste storage and transportation, as well as management of the few hazardous wastestreams related that will be generated by the Project.

Operation phase

No waste will be produced during the operation phase, so no impacts are foreseen.

6.2.6.4 Mitigation measures

- A responsible person for waste management operations on site will be designated; this person will have the following responsibilities:
 - Verify the compliance of waste management operations and associated documentation (including subcontractors); and
 - Complete, classify and keep up to date the annual hazardous waste production register.
- The demarcation of spaces for the temporary storage of non-reusable waste electrical and electronic equipment will be carried out using appropriate methods.
- The means of containerization must be placed in waterproofed places, preferably covered and correctly marked.
- The fundamental principles of waste management will be the prevention of the production of this waste and its dangerousness by reducing the incorporation of hazardous substances during construction, as well as the use of sorting, if possible at source, and systems of reuse, recycling and other forms of recovery, to reduce the quantity and the dangerousness of the waste to be eliminated.
- The sorting operation is especially important in this waste stream, since its efficiency largely depends on the possibility of recovering the various resulting waste streams, such as wood, glass, plastic, ferrous metals and non-ferrous and inert waste.
- When on-site sorting is not possible, the waste is sent to the appropriate final destination.
- If waste is contaminated with hazardous substances, it will be disposed of in the same way as the contaminating material.
- As hazardous materials' management will be a responsibility of subcontractors, INZAG will ensure that subcontractors deliver the hazardous waste to especially designed areas.
- Used oils must be stored in duly marked containers, in a closed and covered place, with a retention basin for spills and specific signing indicating the nature of the risks they may pose.
- Uncontaminated packaging waste will be segregated according to the type of materials it is made of (wood, glass, paper/cardboard, metal, and plastic), so that there will be separate places for temporary storage and selective waste disposal. Uncontaminated reusable packaging will be returned to the respective suppliers.
- Contaminated packaging, filter materials and absorbents will be stored in containers specially
 designed for this purpose, in sealed, covered and properly marked places on site. Their collection
 and treatment/disposal will be ensured, as far as possible, in waste facilities duly approved for this
 purpose.
- Given the hazardous nature of batteries and accumulators, their storage in an appropriate place is essential to guarantee the protection of the environment and reduce the risk of uncontrolled discharge.

For the purpose of the Project, batteries and accumulators will be stored in a properly signposted, waterproofed and covered area, with a spill retention basin and specific signs indicating the nature of the risks.

For Construction Wastes:

- The demarcation of spaces for the temporary storage of non-reusable waste electrical and electronic equipment will be carried out using appropriate methods.
- Contaminated waste is stored in containers specially designed for this purpose, separating them
 according to the contaminating material.
- The means of containerization must be placed in waterproofed places, preferably covered and correctly marked.
- The fundamental principles of CDW management will be the prevention of the production of this waste and its dangerousness by reducing the incorporation of hazardous substances during construction, as well as the use of sorting, if possible at source, and systems of reuse, recycling and other forms of recovery, with a view to reduce the quantity and the dangerousness of the waste to be eliminated.
- The sorting operation is especially important in this waste stream, since its efficiency largely depends on the possibility of recovering the various resulting waste streams, such as wood, glass, plastic, ferrous metals and non-ferrous and inert waste.
- When on-site sorting is not possible, the waste is sent to the appropriate final destination.
- The project provides for the reuse of excavated materials destined for landfill and the disposal of excess materials in specific locations.
- If the CDW is contaminated with hazardous substances, it will be disposed of in the same way as the contaminating material.

For Municipal Waste:

- The spaces intended for the temporary storage of the organic and recyclable fractions of USW will be demarcated using appropriate methods.
- Municipal wastes are stored in recycling bins for selective deposit according to its characteristics and nature (glass, paper/cardboard, wood, metal, non-recyclable organic waste).
- The collection and final destination of municipal solid waste will be provided by the municipal system in the area where the construction site is located. The recyclable fractions (paper/cardboard, glass, metal and packaging) will be sent to recyclers.
- If municipal solid waste is contaminated with hazardous substances, it will be disposed of in the same manner as contaminating material

6.2.6.5 Summary Impact Table

Table 6.37 below includes a summary of the impact assessment for the construction phase - pre and post mitigation(s).

Table 6.37 Rating of Impacts Related to use of Resources and Waste generation

Project Phase	Project Phase: Construction				
Type of Impa	ct: Direct Negati	ve Impact			
Rating of Imp	acts:				
	Pre-mitigation	ı	Post-mitigation (Re	sidual) – including embedded	
			measures		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Extent	Regional	Across the project AOI	Regional	Across the project AOI	
Duration	Medium-term	Risk of destruction of habitats and vegetation during earthworks and resource extraction.	Medium-term	Risk of destruction of habitats and vegetation during earthworks and resource extraction.	
Scale	Moderate	Resources required throughout construction duration	Minor	Resources required throughout construction duration	
Frequency	Regular	Impactsexpected throughout the duration of construction.	Regular	Impactsexpected throughout the duration of construction.	
Likelihood	Likely	Disturbance expected throughout construction phase	Likely	Disturbance expected throughout construction phase	
Magnitude:					
Pre-mitigatio	on		Post-mitigation (Residual)		
Moderate Magnitude			Low Magnitude		
Sensitivity / Vulnerability / Importance of the Resource / Receptor:					
Medium Sensitivity					
Significant Rating:					
Pre-mitigatio	on		Post-mitigation		
	Moderate	Impact	Minor Impact		

Source: ERM, 2023

6.2.7 Climate Change Risk Assessment

6.2.7.1 Introduction

This Report includes an EP4 and IFC aligned CCRA focussing on the assessment of potential climate risks identified in relation to the Project.

EP4 Requirements for Conducting physical CCRAs

Under the Equator Principles, Projects are assigned a category depending on their potential to cause adverse environmental and social risks and/or impacts. These Project's categories are outlined in Figure 6.9.

Category A

 Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B	
 Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and 	
Category C	

[·] Projects with minimal or no adverse environmental and social risks and/or impacts.

Figure 6.9 Project categories as defined by EP4 and TCFD guidelines

According to EP4 (Equator Principles, 2020):

- a physical CCRA is required for all Category A and, as appropriate, Category B projects, and will include the consideration of relevant physical risks as defined by the TCFD;
- a transition CCRA and greenhouse gas (GHG) alternatives analysis is required for any project where Scope 1 and Scope 2 emissions exceed 100,000 tonnes of CO2 equivalent per annum across the project's construction and operational lifetime.

 Similarly, EP4 CCRA guidelines also recommend that physical CCRAs should include (Equator Principles, 2020):

- A high-level assessment of the current and anticipated physical risks present with regards to the Project and its operations; and
- A high-level assessment of the Clients' plans, processes, policies and systems in place to manage these risks (for the full list of key considerations when undertaking a physical CCRA as per EP4 guidelines - see <u>Guidance Note on Climate Change Risk Assessment</u>.

Appendix G shows key considerations and supporting questions when conducting physical CCRAs – as per EP4 Guidance.

Scope

Within the previously completed scoping report, it was confirmed that the proposed Project classification is 'Category A'. As a result, this report includes a physical CCRA in alignment with the guidance set out within EP4 and TCFD documentation. This includes the identification of the key physical risks posed to the Project under present-day and future climate conditions using climate scenarios.

The GHG emissions associated with the Project have not yet been assessed and therefore it is not yet known whether the Scope 1 and 2 GHG Project emissions will exceed the annual threshold of 100,000 tonnes of CO2 equivalent per annum to trigger the transition CCRA and GHG alternative analysis requirements. As a result, this assessment does not include a transition CCRA/GHG alternatives analysis.

Appendix H shows preconstruction/ construction activities associated with the Project.

6.2.7.2 Overview of Climate Data, Scenarios and Time Horizons

A number of data sources are used in the physical CCRA, including baseline and projections data. Baseline data is used to understand the current presence and intensity of each climate hazard within the Project's area, whilst projections data is used to suggest the potential change (if any) in intensity and frequency of each climate hazard within the Project area, under a number of specified future timeframes and climate scenarios.

Baseline and projections data

The baseline and projections climate data used in this assessment is compiled from numerous international scientific organizations, including: Intergovernmental Panel for Climate Change (IPCC), World Resource Institute (WRI), International Best Track Archive for Climate Stewardship (IBTrACS), National Aeronautics and Space Administration (NASA), European Space Agency (ESA), Fathom (for flooding) and World Bank.

The climate data used in this assessment is comprised of a variety of types of climate data including observational (baseline only), reanalysis (baseline only), and modelled data:

- Observational data (baseline only) is based upon observations recorded and collected at various weather stations located around the world.
- Reanalysis data (baseline only) describes the reanalysis of previously recorded climate data, either from observational or modelled records. This source of data aims to correct any biases, errors and aspects of physical climatic processes that were previously unidentified within older iterations of data. These corrections can be carried out via the backtesting of data against newly observed climatic trends and/or modelled climate data (ECMWF, 2021).
- Modelled data aims to identify, quantify and accurately represent complex physical processes within the climate and can be generated in a variety of formats, depending on the physical process being modelled, based on models of differing resolution (e.g. Global Climate Models or Regional Climate Models). Modelled climate data can be used to highlight trends in climatic processes under historic (past), present and projected future climatic conditions (NOAA, 2021).

Climate Scenarios

The IPCC is the UN's leading body for assessing the science related to climate change. The IPCC provides periodic Assessment Reports (AR) reviewing the available literature on climate change as well as trends in climatic hazards. With each new AR comes a new round of climate models and data which is developed by the IPCC and Coupled Model Intercomparison Project (CMIP). The newest round of climate data from the IPCCs AR6, published in 2021, is utilised and marks the most well-rounded set of published climate data (as provided in CMIP6).

The data provided by CMIP6 is seen to improve upon the data provided by CMIP5 by using a greater number of climate model runs and modelling groups. CMIP6 also sees a move away from Representative Concentration Pathways (RCPs) to Shared Socio-economic Pathways (SSPs), which aim to bridge the gaps between the physical climate and social sciences, and to explore the potential future climate response to a broader range of greenhouse gases (GHG), land uses and air pollutants, in comparison to AR5.

Each of the SSPs set out by the IPCC represents scenarios that vary on the basis of future projected greenhouse gas (GHG) emissions and resultant warming over the next century. As GHG's increase, there is the potential that climatic conditions within any given area could also change (e.g. increasing temperatures and/or changes to precipitation regimes). However, the specific changes experienced for any given area can vary, depending on the prescribed increase in GHG emissions associated with each SSP and time horizon.

Scenarios are selected based on their appropriateness for any given assessment being undertaken. The technical guidance on physical scenario analysis from the TCFD and other sources advises the inclusion of a selection of scenarios covering a variety of reasonable outcomes. This includes the inclusion of a scenario representative of keeping global average temperatures at 2°C or lower, most closely aligned with the Paris Agreement (TCFD, 2017). As a result, the inclusion of two SSPs: SSP1-2.6 and SSP5-8.5 has been selected (see Table 6.38 below for estimated temperature increases and definitions associated with each SSP):

Table 6.38 Climate Scenarios used in this physical CCRA

Scenario	Definition	Mean annual temperature increase by 2100 compared to pre-industrial averages (1850)
SSP1-2.6	A low emissions scenario that stays below 2°C warming by 2100, aligned with the current commitments under the Paris Agreement.	+1.8°C (very likely range of 1.0°C to 1.8°C)
SSP5-8.5	A high emissions scenario w hich follows a 'business as usual' trajectory, assuming no additional climate policy and seeing CO ₂ emissions triple by 2100.	+4.4°C (very likely range of 3.3°C to 5.7°C)

Source: TCFD, 2017

Time Horizons

This CCRA includes the assessment of physical climate hazards under baseline and future projected conditions. Data collected related to the baseline time period will be used to assess the potential physical climatic hazards that are currently present within the specified Project area. Whereas data for future projected time periods will be used to assess the potential change in the risk associated with these hazards – in relation to the Project and its lifetime. Justifications for the time horizons selected for inclusion are outlined in the Table 6.39 below.

Table 6.39 Time horizons selected for inclusion within this physical CCRA

Time horizon	Justification
Baseline (present-day)	The construction phase of the Project will take approximately 24 months to complete and should provide long-term transport improvement to the city of Luanda and relevant municipalities. This time horizon will be used to assess climatic hazards and risks that could potentially be present during the construction phase, and early operational phase of the Project (baseline data will be used in tandem with projections data during the operational phase).
2030	Given the expected operational lifetime (50 years) of the overpasses associated with the Project, future time horizons (2030 and 2050) have been selected for inclusion within this assessment to reflect this lifetime. These time horizons will be used to identify the level of risk
2050	w hich the Project could be exposed to during the start-middle (2030) and mid-late (2050) of the Project's expected operational lifetime (~2070). The forecast until 2070 has significant uncertainty, so ESIA settled on a forecast until 2050.

Source: ERM, 2023

CCRA limitations and assumptions

This physical CCRA provides a high-level review of the possible inherent risks posed to the Project. As a result, this physical CCRA is generated with the aim of identifying inherent risks and aspects of the Project's design that should be assessed further as the Project and its operations progress.

However, there are also a number of limitations and assumptions that accompany this type of approach, which should be recognised when interpreting the results of this assessment. The limitations are presented in Section 8

6.2.7.3 Climate Trends Analysis

Project area climate

Angola is located in Eastern Southern Africa, bordering Namibia, the Congo and the Atlantic Ocean. The Project is located within Western Angola, within the city of Luanda. According to the Köppen-Geiger Climate Classification (which is based upon the precipitation and temperature regimes of this region), Luanda has a hot semi-arid climate, with a distinct rainy and dry season. Within Angola the rainy season occurs from October to May and coincides with the warmest months of the year (with mean temperatures within Luanda ranging from 24.6°C to 27.7°C and mean precipitation ranging from 9.8mm to 153.7mm). Conversely, the dry season within Angola (also known as the "Cacimbo") occurs from June to September and coincides with the coolest months of the year (with mean temperatures in Luanda ranging from 23°C to 23.3°C and mean precipitation ranging from 0.02mm to 1mm).

Hazards carried through to risk review

Climate data is provided in the tables below for each hazard grouping. This climate data is provided under baseline and future projected climatic conditions.

Appendix F shows definitions of all climate hazards included in this assessment.

Extreme heat

Climate projections suggest daily maximum temperature values are projected to change by +/-0°C to +0.7°C by 2030, and +0.6°C to +1.2°C by 2050, under SSP1-2.6 and SSP5-8.5 respectively (Table 6.40). Considering the already high baseline daily maximum temperature of 36.6°C, this highlights the potential for material risks associated with extreme heat.

Warm Spell Duration Index (WDSI)¹⁵ values are projected to significantly increase from the baseline result of 45.8 days. Under SSP1-2.6, increases of +54.2 days by 2030, and +72.6 days by 2050, are projected. With the number of days contributing to "warm spells" more than doubling under the lowest emissions scenario (SSP1-2.6), and by the earliest time-period assessed (2030) compared to baseline, this provides further support for the potential for material risks associated with extreme heat. Under SSP5-8.5, increases of +95.4 days by 2030, and +175.3 days by 2050, are projected. This suggests that by 2050 under SSP5-8.5, approximately 60% of the year could be classified as a "warm spell".

Variable	Baseline		Proje	ctions	
		20	30	20	50
Daily maximum temperature	36.6°C	36.6°C	37.3°C	37.2°C	37.8°C
Warm Spell Duration Index (WSDI)	45.8 days	100.0 days	141.2 days	118.4 days	222.1 days

Table 6.40 Baseline and projected extreme heat climate data

Source: ERM, 2023

¹⁵ Where six or more consecutive days experience a maximum temperature of greater than the 90 th percentile of the historical averages for that time of the year.

Flooding

For both baseline and future projections there is minimal risk of river flooding, with climate data results showing a 0m inundation depth, and the closest river to Luanda, the Cuanza River, is located approximately 50km south of Luanda. Similarly, for coastal flooding, the nearest coastline to the Project is 8.5km away, and the elevation at each overpass location surpasses 80m.

For extreme rainfall flooding, the climate data suggests that the 1-in-500-year extreme rainfall flooding inundation depth is projected to fluctuate compared to the baseline level of 0.25m under future scenarios. Under most future timeframes and scenarios, flood depths are projected to decrease slightly compared to baseline conditions (by a max of 5cm by 2050 under the SSP1-2.6 scenario), with the exception of the SSP5-8.5 scenario where flood depths return to baseline levels by 2050 (Table 6.41).

Flooding type	Variable	Baseline	Projections			
			20	30	20	50
			SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
River flooding	1-in-500-year river flooding inundation depth	0 m	0 m	0 m	0 m	0 m
Extreme rainfall (pluvial) flooding	1-in-500-year extreme rainfall flooding inundation depth	0.25 m	0.23 m	0.22 m	0.20 m	0.25 m
Coastal flooding	1-in-500-year coastal flooding inundation depth	0 m	0 m	0 m	0 m	0 m

Table 6.41 Baseline and projected flooding climate data

Source: ERM, 2023

Extreme winds

The table below indicates that tropical cyclones are likely not material for this Project, with maximum tropical cyclone wind speeds at 0 knots under both baseline conditions and future projections. However, The Working Group's I contribution to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (IPCC), suggests that the region of West Southern Africa, in which Angola is situated, has the potential to experience future changes to its mean wind speeds. Using multiple lines of evidence for observed, attributed, and projected directional changes, mean wind speeds are anticipated to increase with a medium confidence level (or more) by the mid-21st century (2050). Given this additional evidence, this indicates the potential for material risks associated with extreme winds.

From additional desk-based research, sand and dust storms have not been identified as a current relevant risk to Luanda, and The Working Group's I report indicates low confidence in a direction of change for sand/dust storms. The report also suggests that tropical cyclones are broadly not relevant to the region, which further supports the above finding identified from the climate data displayed in Table 6.42. This section of the risk review will therefore focus on the potential impact of extreme winds on the Project.

Variable	Baseline	Projections			
		20	30	20	50
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Maximum tropical cyclone w indspeed	0 knots	0 knots	0 knots	0 knots	0 knots

Table 6.42 Baseline and projected tropical cyclones and extreme winds data

Source: ERM, 2023

Water stress and drought

According to climate projections in the Project area, the WRI water stress category is projected to increase from a 'High' level in the baseline year to an 'Extremely high' level by 2030 under scenarios SSP1-2.6 and SSP5-8.5. The water stress category is then projected to remain at an 'Extremely high' level by 2050 under the same scenarios. Considering the baseline 'High' level of water stress, and the projected increase to an 'Extremely high' level under each scenario and timeframe, it is anticipated that water stress and drought have the potential to cause material risks to the Project (Table 6.43).

Table 6.43 Baseline and projected water stress and drought climate data

Variable	Baseline	Projections			
		20	30	20	50
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Water stress	High (40-80%)	Extremely high (>80%)	Extremely high (>80%)	Extremely high (>80%)	Extremely high (>80%)

Source: ERM, 2023

Hazards excluded from risk review

This section includes all climate hazards which are not anticipated to cause materials risk in relation to the Project (based on analysis of the climate trends associated with each hazard).

Table 6.44 is a summary of the climate hazards which have been excluded from the risk review step of this assessment, together with the rationale for this:

Table 6.44 Table Showing the Rationale for hazard exclusion from risk review

Climate Hazard	Rationale for exclusion
Extreme Cold	 The climate data shows that the risk of extreme cold is unlikely to be material under any future timeframe/scenario. Under baseline conditions, the minimum daily temperature is recorded at 17°C, and this is projected to increase to 18°C by 2050, indicating that the risk of extreme cold is projected to decrease. The Cold Spell Duration Index (CSDI) indicator also indicates a reduction in the number of "cold spell" days from 8.4 days at baseline, to 1.5 days by 2030 under SSP1-2.6, and 0 days for all other projections. According to research from Climate Data, in Luanda the average annual temperature is 25°C, and even though July is considered the coldest month, average temperatures remain as high as 22°C (Climate Data).
Wildfires	 The climate data shows that the risk of wildfires is unlikely to be material under any future timeframe/scenario. Under baseline conditions, burned area data recorded at the locations of the five overpasses is low. Furthermore, according to ESA data, the land cover at four out of the five overpasses is recorded as urban (with only one overpass having land cover that is identified as being particularly susceptible to wildfire activity). It is not anticipated that large amounts of combustible materials (e.g., wood, coal or timber) will be used in the construction of the overpasses – reducing the Project's potential risk of wildfire activity. The Forest Fire Danger Index, a measure of vegetation dryness with air temperature, wind speed and humidity, has a baseline value of 0 fire-permitting weather days across each site. Although that is projected to increase to 0.5 days by 2030 under the SSP5-8.5, there is no projected increase across any other timeframe or scenario. Therefore under future projected conditions, wildfire risk is not anticipated to increase materially (from an already low baseline level).
Rainfall- induced landslides	 Under baseline conditions, the risk of rainfall-induced landslides is identified as being minimal (according to baseline and future projected Rainfall-Induced Landslide Index -RILI data) and therefore is not anticipated to be material to the Project. It is anticipated that the overpasses will be built on relatively flat terrain – surrounded by urban environments (further reducing the anticipated risk of landslides). Although it is noted that the Project could involve the generation of steep artificial slopes (e.g. during the excavation of soil/sediment during overpass construction) – this is not anticipated to materially increase the risk of landslide activity for the Project (due to the relative size of the Project and the relatively flat terrain of the local environment).

Source: ERM, 2023

6.2.7.4 Risk Review and Next Steps

Extreme heat

Table 6.45 Potential risk areas at the start and mid-late operations associated with the Project for the extreme heat hazard
grouping

	Extreme Heat							
	Inherent risk materiality category and time-period							
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁶)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps				
	Likely Material –	Likely Material -	Extreme heat events have the potential to pose risks to the health and safety of personnel working on-site at any of	Potential value in assessing / managing the risk further				
Site Personnel	Low to Moderate	High	the five overpasses during the construction and operational phases of the Project. Personnel could experience dehydration, heat stress, heat exhaustion and, in severe cases, heat stroke. Extreme heat events could also result in personnel requiring additional breaks, water, and access to shaded areas – which has the potential to reduce operational efficiency throughout the Project. For the construction phase of the Project, reductions in operational efficiency could cause delays to the proposed completion date of the overpasses. Although an Occupational Safety Routine document has been provided, this document does not contain specific reference to climate hazards (e.g., extreme heat).	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). It should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Analyse observational records of the seasonality and intensity of average and maximum temperatures within the Project region to inform the construction phase start date (in order to limit the exposure of site personnel to extreme heat events during the construction phase). Ensure that the impact of extreme heat conditions on site 				

¹⁶ Data for the mid-late operational phase is averaged from the period 2035-2064.

			document, an Incident/Accident Management document is referenced (how ever, ERM does not have access to this document). Therefore, no direct information has been provided regarding any mitigation measures/management plans associated with extreme heat and the Project. As a result, the risk materiality category is classified as 'Likely Material - Low to Moderate' during the construction phase. During the operational lifetime of the Project, site personnel are anticipated to be involved with maintenance or repair w ork and will, therefore, remain exposed to risks associated with extreme heat. How ever, as the impact associated with extreme heat is anticipated to rise during the operational phase of the Project (due to projected increases in the daily maximum temperature and WSDI by 2030, and even further increases by 2050), the risk materiality category has been elevated to 'Likely Material – High' for mid-late operations.	H&S (and emergency) management plans associated with the Project. These plans could provide guidance for site personnel to follow during both the construction and operational phases of the Project (for example, stop w ork procedures could be implemented for site personnel if key temperature thresholds are exceeded). If this guidance is appropriate and follow ed by site personnel, this could also act to reduce the potential materiality of the impacts posed by extreme heat to site personnel (and the Project's operations).
	Likely Material – Low to	Likely Material – Low to	Extreme heat events can impact the use of the access routes and overpasses associated with the Project. Although it has not been confirmed by the Client, it is	Potential value in assessing / managing the risk further
Access routes and overpasses	Moderate	Moderate	assumed that the Project's access routes will also be built from asphalt. In extreme heat, asphalt can soften leading to deformation such as cracking and raveling. If vehicles are unable to transport materials and equipment tow ards the construction site efficiently due to damaged road surfaces, then the Project could be delayed, impacting its completion date. These impacts could extend into the mid- late operational phase, increasing the demand for ongoing maintenance, capital expenditure (to repair roads) and causing disruption for road users (w hilst roads are being repaired).	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). How ever, it should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Assess and consider the resilience (to extreme heat conditions) of the materials that the overpasses and access routes (associated with the Project) are due to be built from.
			No information has been received by ERM regarding any mitigation measures which are planned to be put in place to manage this risk. Therefore, the risk materiality category	

			assigned during the construction and mid-late operational phase is 'Likely Material – Low to Moderate'.	
Cement, concrete and asphalt production and laying	Likely Material - High	Unlikely Material	Extreme heat events can impact the production and laying of cement, concrete and asphalt. This is due to the impact that extreme heat can have on the thermal expansion of materials used within the Project (e.g., bitumen/asphalt, cement, and concrete). During the construction phase of the Project the pouring of concrete could be impacted by high temperatures. This is because curing concrete at temperatures exceeding 32°C ⁽ Risks of Pouring Concrete at a Wrong Temperature) can reduce its durability and strength, and could result in insufficient surface finishing on the overpasses. Having to avoid high temperatures to be able to set concrete at an appropriate time could lead to delays in the Project schedule w hich could impact the Project's completion date. No information on management plans/mitigation measures associated with extreme heat has been provided to ERM. Considering the potential impacts listed above and the high baseline level of risk of extreme heat - the inherent risk materiality category assigned for the start of operations is 'Likely Material – High'. How ever, as cement, concrete/asphalt production and laying are only relevant to the construction phase, this risk has been categorized as 'Unlikely Material' by the mid-late operational phase.	 Potential value in assessing / managing the risk further Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). It should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the Client could further assess and manage this risk: Investigate daily maximum temperatures in more detail to identify if high temperatures are projected to impact the materials used in the construction and/or operational phases of the Project. Consider organising the laying and curing of concrete during cooler periods of the year (e.g., July). This could reduce the potential materiality of this risk in relation to the Project.
Construction activity and supporting infrastructure	Unlikely Material	Unlikely Material	Extreme heat events can affect the functioning of construction machinery (e.g., asphalt paving machines), and other equipment (e.g., cranes) that are required during the construction phase of the Project. For example, during extreme heat events the design specifications (relating to temperature) of construction machinery could be exceeded causing malfunctions and damage to equipment. Consequently, the operational efficiency of site personnel	No further action required No further information and no further action is required as extreme heat is not considered a material risk for construction activity and supporting infrastructure.

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	machinery/equipment is out of operation/being repaired. Similarly, the site's electricity supply is also at risk of extreme heat. It is ERM's understanding that the Project will source its energy from two on-site generators. During extreme heat events, these generators could be at risk of overheating (and therefore could require regular cooling breaks to avoid malfunction/becoming damaged). These measures could also lead to delays in the Project schedule.	
	How ever, impacts associated with this risk area are anticipated to be short-term, and the corresponding financial impacts are anticipated to be limited in comparison to the overall Project's cost. Therefore, this risk area has been categorized as 'Unlikely Material' for both the construction and mid-late operational phase.	

Source: ERM, 2023

Flooding

Table 6.46 Potential risk areas at the start and mid-late operations associated with the Project for the extreme rainfall
flooding hazard grouping

			Flooding	
	Inherent ris category and	k materiality I time-period		
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁷)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps
	Likely Material - High	Likely Material – High	Extreme rainfall flooding has the potential to create unsafe working conditions and pose risks to the health and safety of	High value in assessing / managing the risk further
Site Personnel	Tiig T		 site personnel. For example: During flooding events, heavy rainfall could cause surfaces to become slippery – increasing the risk of slips, trips and falls. Extreme instances of flooding could increase the risk of drow ning if site personnel encounter deep, or rapidly flow ing w ater. Due to the nature of the Project's operations, floodw aters could also contain contaminants. If site personnel w ere directly exposed to contaminants, or if contaminants entered the w ater supply – personnel health and safety could be put at risk. Prolonged rainfall and flooding can w eaken the stability of structures under construction. Workers may face the risk of structural collapse in temporary w orks, if the foundations of the overpasses are compromised, or if w ater accumulation/pooling adds excessive w eight to the overpasses. 	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of flooding in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Ensure that the potential impacts of flooding on site personnel is factored into any new ly developed or existing H&S (and emergency) management plans associated with the Project. These plans could provide guidance for site personnel to follow during both the construction and operational phases of the Project (for example, these plans could highlight evacuation routes, assembly points, and contact information for emergency services). If this guidance is appropriate and follow ed by site personnel, this

¹⁷ Data for the mid-late operational phase is averaged from the period 2035-2064.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Flooding							
	Inherent risk materiality category and time-period		-				
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁷)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps			
			 In addition, flooding can create an electrical hazard. Damage to electrical systems from flooding can lead to exposed wires, potentially causing electrical systems to malfunction and expose site personnel to electrical shock hazards. As a result, workers would need to avoid contact with electrified water or damaged electrical equipment, reducing operational efficiency. No direct information on mitigation/management measures associated with extreme rainfall flooding and the Project has been provided. Although an Occupational Safety Routine document has been provided, it does not contain specific reference to climate hazards (e.g., flooding). Additionally, within the Occupational Safety Routine document, an Incident/Accident Management document is referenced, how ever this has not been provided. Based on the aforementioned potential impacts, the risk materiality category assigned to the construction phase is 'Likely Material – High'. Although site personnel will still be required to undertake on- site repair/maintenance activities, flooding depths are not projected to increase in the future. As a result, the mid-late operational phase of the project is also categorized as 'Likely Material – High'. 	 could act to reduce the potential negative impacts posed by flooding to site personnel (and the Project's operations). Consideration of flood-related issues within the Project's construction plans/systems (e.g. in the event of a flood, implement temporary flood protection measures and provide personal protective equipment to site personnel). Issues to be considered within operational plans include establishing a system for the advanced w arning of potential rainfall and flood risks, and ensuring that drains, gutters and stormw ater channels are clear of obstructions. 			
Construction activity and	Likely Material –		Extreme rainfall flooding has the potential to cause damage to construction equipment and disruption to construction	Potential value in assessing / managing the risk further			

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Flooding								
	Inherent risk materiality category and time-period							
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁷)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps				
supporting infrastructure	Low to Moderate	Unlikely Material	 activities. For example, electrical components of construction equipment could become damaged if this equipment is exposed to excess w ater. Damage to electrical components could also lead to a reduction in the efficiency of equipment, or in a w orst-case scenario, cause equipment failure, both of w hich could cause delays to the Project's completion date. The electricity supply for the Project is sourced from tw o generators on site. In the event of flooding, these generators could also become damaged and cause a disruption in the Project's pow er supply. This could increase Project expenditure associated with the repair/replacement of this equipment. Although a drainage report has been provided for each overpass, no further information has been provided regarding any measures which are planned to be put in place to mitigate the risk of flooding. How ever, ERM does note that risks associated with flooding could be easily reduced (in some instances e.g. sheltering stored equipment from rainfall, storing equipment at higher elevations to the surrounding area). Therefore, for the construction phase an inherent risk materiality category of 'Likely Material – Low to Moderate' has been assigned. As extreme rainfall flooding is not projected to increase in the future, and construction will be completed, the mid-later operational phase is categorized as 'Unlikely Material'. 	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of flooding in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Consideration of flood-related issues within the Project's construction plans/systems (e.g. in the event of a flood, implement temporary flood protection measures and provide personal protective equipment to site personnel). Consideration of the most appropriate w ay to store construction equipment/generators, to reduce their exposure to damage from flooding (e.g. shelter equipment from rain/flooding and store equipment at higher elevations). Issues to be considered within operational plans/systems include ensuring that drains, gutters, and stormw ater channels are clear of obstructions to reduce the risk of flooding. 				

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Flooding							
	Inherent risk materiality category and time-period						
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁷)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps			
	Likely Material -	Likely Material –	Extreme rainfall flooding presents a risk to the access routes and overpasses associated with the Project. Most notably,	High value in assessing / managing the risk further			
Access routes and overpasses	High	High	flooding could cause damage and create potholes/uneven road surfaces. Prolonged or intense rainfall could also cause structural damage to access routes and overpasses as excess w ater could enter cracks and joints, causing the accelerated deterioration of concrete and steel components. Flooding and heavy rainfall could also cause erosion of the soil supporting the foundations of the overpasses, w hich could also undermine the stability of the structure, resulting in damage or collapse. Flooding and heavy rainfall could also disrupt the use of access roads and overpasses as roads can become submerged or w ashed out by floodw aters (as w as the case in recent floods that impacted the region - 12 th April 2023 and the 16 ^{th of} March 2021). This could make it challenging and dangerous for vehicles and pedestrians to use the roads. Flooding could also hide obstacles and debris w hich could pose a health and safety risk to overpass users. These risks could result in an increase in OpEx if measures are taken to mitigate the impacts of flooding on the overpasses. CapEx may also increase if frequent repairs are required. Although a drainage report has been provided for each overpass, no further information has been provided regarding any measures w hich are planned to be put in place to mitigate the risk of flooding. Therefore, although extreme rainfall	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of flooding in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Consideration of flood-related issues within the Project's construction plans/systems (e.g. in the event of a flood, implement temporary flood protection measures and provide personal protective equipment to site personnel). Issues to be considered within operational plans/systems include ensuring that regular maintenance of the overpasses is planned and that drains, gutters, and stormw ater channels are clear of obstructions. 			
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Construction and Operation of 5 Overpasses - Luanda Railway Track, Angola

			Flooding	
	Inherent risk materiality category and time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁷)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps
			flooding inundation depths at the site locations are not projected to increase by 2030 or 2050, the risk materiality category has been classified as 'Likely Material – High' across the construction and operational phases of the Project due to the high level of baseline risk.	

Source: ERM, 2023

Extreme winds

Table 6.47 Potential risk areas at the start and mid-late operations associated with the Project for the extreme windshazard grouping

			Extreme Winds	
	Inherent risk materiality category and time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁸)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps
		Likely Material –	Extreme wind events have the potential to cause health and safety risks to the personnel working on-site at any of	Potential value in assessing / managing the risk further

¹⁸ Data for the mid-late operational phase is averaged from the period 2035-2064.

	Extreme Winds				
	Inherent ris category and	k materiality I time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁸)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps	
Site Personnel	Unlikely Material	Low to Moderate	the five overpasses. The severity of the winds is likely to determine the level of destruction, with more severe winds increasing the potential to cause disruption to the Project. Extreme winds could increase the movement of debris, increasing the risk of injury to site personnel and reducing their operational efficiency. This could lead to operational shutdow ns, w hich in turn could impact the Project's schedule. Based upon the information listed above and the climate data, extreme winds are not anticipated as being particularly material in relation to the Project under baseline conditions and, therefore, the risk materiality category assigned to the construction phase of the Project is 'Unlikely Material'. On the other hand, mean wind speeds are projected to increase by the mid-21 st century – w hich could increase the exposure of site personnel involved in the maintenance/repair of the overpasses. This has resulted in the risk materiality category of 'Likely Material – Low to Moderate' being assigned for the mid-late operational phase (2050).	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme wind conditions in relation to the Project (and its associated assets and operations). How ever, it should be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Ensure that the impact of extreme wind conditions on site personnel is factored into any new ly developed or existing H&S (and emergency) management plans, to avoid risks to staff health and safety during the construction and operational phases of the Project. Consider if there is available shelter for site personnel to access should high winds occur w hilst on-site (during the construction and operational phases of staff health and safety. 	
Overpasses and access routes and	Unlikely Material	Likely Material – Low to	High winds could pose risks to access routes, the overpasses and their users. High winds could cause dow ned trees/pow erlines and debris to build up across the	Potential value in assessing / managing the risk further	
overpass users		Moderate	overpasses and their access routes. These impacts could in turn cause disruption as debris is cleared from the	the Project, it is recommended that the Client undertakes a more detailed assessment of extreme wind conditions in	

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	Extreme Winds				
Inherent r category a		k materiality time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁸)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps	
			overpasses/access routes. These impacts may be compounded if both the access routes and overpasses w ere impacted at the same time (particularly given that some overpasses only have access via a tertiary or secondary road). It is also possible that an increase in the time taken to restore normal operating capacity could increase dissatisfaction amongst the overpass users. Based upon the information listed above and the climate data, extreme w inds are not anticipated as being particularly material in relation to the Project under baseline conditions and, therefore, the risk materiality category assigned to the construction phase of the Project is 'Unlikely Material'. On the other hand, mean w ind speeds are projected to increase by the mid-21 st century – w hich could increase the exposure of site personnel involved in maintenance/repair of the overpasses. This has resulted in the risk materiality category of 'Likely Material – Low to Moderate' being assigned for the mid-late operational phase (2050).	 relation to the Project (and its associated assets and operations). How ever, it should be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Undertake a more detailed (and forw ard looking) assessment of the risk posed by extreme winds to the Project. The results of this assessment could be used to inform the Project's design. Ensure that the impact of extreme wind conditions is factored into any new ly developed or existing H&S (and emergency) management plans for the construction and operational phases of the Project. This could include plans and responses to enable a return to normal capacity in the most effective w ay possible follow ing disruption caused by storms. Introduce w ind breaks on the overpasses to reduce the risk of toppling for tall vehicles. 	

Source: ERM, 2023

Water stress and drought

Table 6.48 Potential risk areas at the start and mid-late operations associated with the Project for th	e water stress and
drought hazard grouping	

			Water Stress and Drought	
	Inherent risk materiality category and time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁹)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps
	Likely Material – High	Likely Material - High	Water stress and drought have the potential to cause material risks to the Project. This is primarily due to its	Potential value in assessing / managing the risk further
Site Personnel			 botential to pose a health and safety fisk to site personnel in the availability of clean and safe water is limited. Reduced water availability can pose health and safety risks to site personnel such as dehydration, heat exhaustion, and heat stroke. Productivity could also be reduced as increased breaks may be required or, in a worst-case scenario, work may be unable to continue as workers do not have access to clean freshwater. Site personnel are anticipated to be particularly at risk of water stress and drought as construction work takes place outside where personnel are exposed to the weather, including high temperatures. Water stress and drought could also pose indirect risks to site personnel. For example, hygiene and sanitation practices could be compromised due to a reduction in access to clean freshwater (e.g. reduced hand washing and 	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of water stress and drought in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Develop a water management plan to ensure the supply of clean/safe water for the Project. This would help the Client to ensure that a consistent and sufficient supply of freshwater is maintained throughout the construction phase of the Project to ensure hygiene/sanitation standards are upheld. Examples of considerations water management plans could take are listed below : Consider alternative freshwater sources to ensure that the freshwater supply is maintained throughout the Project.

¹⁹ Data for the mid-late operational phase is averaged from the period 2035-2064.

Water Stress and Drought					
	Inherent risk materiality category and time-period				
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁹)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps	
			 cleaning of on-site portable toilets) which could result in an increase in disease transmission. Although an Occupational Safety Routine document has been provided, it does not contain specific reference to climate hazards (e.g., water stress and drought). Additionally, within the Occupational Safety Routine document, an Incident/Accident Management document is referenced, how ever this has not been provided. Therefore, no direct information on mitigation measures/management plans associated with this risk has been provided. As the Project region is identified as having a high baseline exposure to water stress and drought (according to the WRI water stress categorisations), and due to the potential impacts listed above, this risk is assigned a 'Likely Material – High' categorisation (for the construction phase). Despite the fact that few er site personnel are anticipated to be exposed to risks associated with water stress and drought during the Project's operational phase, the risk categorisation for the mid-late operational phase remains 'Likely Material – High' (as the severity of water stress conditions within the region is projected to increase as a result of climate change). 	 Invest in water efficient technology, procedures, and training to reduce the Project's demand for freshwater during the construction phase of the Project. Engaging with the local municipality to understand how they manage the supply of freshwater. This could help guide the Client on instances where they might need access to alternative sources of water. 	
Construction activity and	Likely Material -		Water stress and drought have the potential to cause impacts to construction machinery and supporting	Potential value in assessing / managing the risk further	

Water Stress and Drought					
	Inherent ris category and	k materiality time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁹)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps	
supporting infrastructure	Low to Moderate	Unlikely Material	infrastructure. Heavy construction machinery requires regular cleaning and maintenance to prevent the buildup of dust, dirt and debris that can block filters, reduce engine performance, and result in corrosion. How ever, when water is scarce, it may become challenging to keep this machinery clean. This could lead to increased CapEx, through repair and maintenance costs, as the machinery could suffer from an increased rate of degradation. Damages and repair works could also result in operational dow ntime, leading to a delay in the construction/delivery of the Project. Water is also used for dust control during the use of construction machinery and water stress could limit its use for this purpose, exacerbating the potential damages described above. Construction equipment is also often w ater-cooled, and therefore a scarcity of water could result in an increase in energy consumption to cool equipment, and potentially an increase in the risk of damage, resulting in increased repair/maintenance costs. The increase in energy consumption and repair/maintenance costs could lead to increases in OpEx and CapEx. The Client has provided limited information regarding how water stress and drought has been considered within the Project's design (including any mitigation measures that are planned to be put in place). Due to the presence of water stress conditions under baseline conditions, the construction phase of the Project is assigned a risk materiality category of 'Likely Material – Low to Moderate'.	Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of water stress and drought in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. The recommendations provided for the risk in the row above (relating to the development of a water management plan) are also applicable to this risk.	

	Water Stress and Drought				
	Inherent risk materiality category and time-period				
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁹)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps	
			How ever, as construction equipment will no longer be required during the operational phase of the Project – this phase is assigned a reduced risk category of 'Unlikely Material'.		
Cement, concrete and asphalt production and laying	Likely Material - High	Unlikely Material	Water stress could have a significant impact on the construction of the overpasses due to the w ater intensive nature of construction. This is particularly relevant for cement production w here reduced w ater availability can lead to a reduction in production capacity. Insufficient w ater supply can also affect the quality of cement produced, leading to low er compressive strength and an increased setting time. These risks could result in an increase in OpEx as the reduced road and build quality of the overpasses could require more frequent repair w ork. The production and laying of asphalt is also reliant on w ater for dust control. Water stress can lead to challenges in controlling dust, leading to health impacts on w orkers and nearby communities. Water stress can also impact the quality of asphalt, leading to decreased compaction and binding of the asphalt material and thereby reducing the quality and durability of the road surface. Water stress can therefore result in an increase in OpEx as the cost of obtaining and transporting w ater trucks to the production	 Potential value in assessing / managing the risk further Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of water stress and drought in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Investigate the use of alternative overpass construction materials during the design phase of the Project which is less water-intensive as well as using low -water cement production processes. The recommendations provided for the risk in the first row of this table (regarding the development of a water management plan) are also applicable to this risk. 	

Water Stress and Drought				
	Inherent ris category and	k materiality I time-period		
Risk area Mid-late Construction operational (Baseline) phase	Potential Impacts (including existing mitigation measures)	Recommended Next Steps		
			site could also increase. In areas experiencing water stress, competition for limited water supplies could also create social tensions between construction companies and communities.	
			No information has been provided regarding: the Client's planned approach for cement, concrete and asphalt production and laying or regarding; any mitigation measures associated with water stress and drought. As a result of the potential impacts listed above and the presence of water stress and drought under baseline conditions the construction phase of the Project has been assigned a 'Likely Material – High' category. As the production and laying of road surfaces is anticipated to be focused during the construction phase, the operational phase of the Project is assigned an 'Unlikely Material' categorization.	
Overpasses and access routes	Likely Material - Low to Moderate	Likely Material - Low to Moderate	Water stress and drought could have material impacts on the Project over the course of its lifespan. This could include causing the surface of the overpasses to crack or become damaged as the road becomes dry and brittle. These issues could create a dangerous driving surface for cars, impacting the usability of the overpasses, and could increase requirements for maintenance/repairs. The risk of soil erosion and instability also increases in areas that face w ater stress as the soil becomes dry and shrinks, leading to	Potential value in assessing / managing the risk further Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of water stress and drought in relation to the Project (and its associated assets and operations). Furthermore, the Client should consider that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to

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			Water Stress and Drought	
	Inherent risk materiality category and time-period			
Risk area	Construction (Baseline)	Mid-late operational phase (2050 ¹⁹)	Potential Impacts (including existing mitigation measures)	Recommended Next Steps
			 changes in soil volume and subsidence. This could lead to settling or shifting of the roadbed, causing uneven surfaces, and reducing the structural integrity of the overpass roads. As a result, repairs and maintenance costs could rise, resulting in an increase in CapEx. Based upon the impacts listed above and the presence of water stress and drought conditions under baseline and future projected climatic conditions – this risk is assigned a risk materiality category of 'Likely Material – Low to Moderate' across the construction and operational phases of the Project. 	 the Project. Below are a series of examples of how the client could further assess and manage this risk: Monitor the overpass locations during the construction phase of the Project to gather information on any potential impacts of water stress and drought. If not done already, the Client could investigate how water stress and drought could impact the land surrounding the overpasses, and the overpasses themselves (e.g. soil subsidence and erosion). The findings of this investigation could be used to inform the Project's design (to reduce the materiality of this risk).

Source: ERM, 2023

6.2.7.5 Summary and Conclusion

There are a range of climate hazards present within proximity to the Project area, posing a range of potential inherent risks with varying degrees of materiality (ranging between 'Unlikely Material' and 'Likely Material – High'). This assessment has identified that extreme heat, extreme rainfall flooding, and water stress and drought, pose the most significant threats to the Project. Each hazard has a 'High' materiality for specific risk areas. This is driven primarily by each hazards' potential to cause material impacts to:

- The health and safety of site personnel;
- The access routes and overpasses;
- The cement, concrete and asphalt production and laying aspects of the Project.

It is important to note that this initial analysis has been limited by the lack of information currently available on the Client's climate hazard mitigation measures and plans. Therefore, the risk levels that have been identified are based upon inherent risk and, unless explicitly mentioned, do not consider how specific mitigants/controls have been factored into the Project's design. A number of potential next steps have been provided for each risk - to further manage the inherent risks identified for extreme rainfall flooding, water stress and drought, extreme heat and extreme winds (see Section 6.2.7.4 for further details).

6.3 Biodiversity and Ecosystem Services IA

The Baseline is provided in **Section 4.2** of the Report.

Given the highly urbanised area in which the Project is located, the potential for existent ecosystem services is significantly reduced. No existing ecosystem services were identified during the Scoping stage in the Project AoI. This was also confirmed at the ESIA stage.

Impact on Biodiversity within the Project footprint area is negligible, as the Project is located in an urban area. The study of detailed satellite images and land cover data showed that there are only individual trees near the bridge crossings that do not form tree massifs and cannot be a habitat for a significant number of terrestrial animals and birds. The nearest protected areas are more than 10 km away from the Project facilities and will not be affected by the Project activities (for more information see Figure 4.44, Figure 4.45).

During the scoping assessment potential impacts on biodiversity were associated with facilities beyond the Project's scope (quarries and dump site), which are not subject to assessment during this report.

6.4 Social Impacts

6.4.1 Economy and Employment IA

6.4.1.1 Potential Impacts

At the macro level, the Project is intended to result in increased circulation throughout Luanda which is expected to have positive effects on the local, and ultimately national, economy. Beyond this, the Project is expected to generate positive impacts at a local and regional level on economic and employment opportunities. Primary impacts are expected to take place during the construction phase through the creation of temporary direct and indirect employment opportunities and the creation of long-term benefits associated with capacity enhancement of local Luandan labour through on-the-job and formal training.

Opportunities for economic development and diversification may also result from the use of local goods and services during the construction phase, in particular through sourcing significant quantities of construction materials and expenditures associated with the running costs of vehicles and equipment (i.e. fuel, lubricants, and additives). This will benefit the economy and generate indirect employment opportunities.

To a far lesser extent, the operation phase will generate some limited longer-term local employment opportunities mainly for maintenance and monitoring activities. This will likely be filled by skilled workers and the benefit to the local economy is likely to be negligible.

Indirectly, and to a much smaller extent, the operation phase will generate some longer-term local economic opportunities related to improved traffic and train transport flows, which affect local businesses and commuters. The improved access and traffic management will mean that the areas north of the railway (and less developed) will be better connected with the centre of Luanda as well as the more developed areas to the south of the railway. This could also attract much needed development to the areas north of the railway line.

Impacts related to labour rights including employment contracts, working hours, child labour and forced labour are discussed separately in Section 6.4.10.

Table 6.49 summarises the potentially significant impacts on the economy and employment during the construction and operation phases of the Project.

Construction Phase	Operations Phase
Temporary direct and indirect local employment	Benefits from improvements to infrastructure
opportunities.	services including road and rail.
Temporary macro-economic impacts from taxes	
and fees, procurement, and worker spending.	
Long-term benefits from capacity enhancement of	
local Luandan labour through on-the-job and formal	
training opportunities.	

Table 6.49 Potential Impacts on Economy and Employment

6.4.1.2 Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarised as follows:

- In the province of Luanda, the employment rate (population aged 15 years and over) is approximately 35%, below the national average of 38%. The employment rate in Luanda is, therefore, slightly below the national average.
- Economic activities throughout the Study Area vary (including services, manufacturing, formal and informal); however, wholesale trade and retail dominate economic activities.

 Economic activity in the Direct Aol comprises primarily trading in small established shops or roadside informal trading (selling food, drinks and services).

6.4.1.3 Embedded Measures

INZAG intends to contribute to the development of local companies and the Angolan economy through local sourcing of supplies (e.g. construction materials, equipment, fuel, and support services).

The Human Resources Management Plan includes the following:

- To ensure that all workers are recruited in a fair, transparent, equitable way and in keeping with the Project National Content Strategy objectives, INZAG shall:
 - Not employ any workers below the legal minimum age; and
 - Recruit and employ based on the skills required regardless of culture, faith, religion, gender, political opinion, ethnicity, sexual orientation or race.
- All workers shall be recruited free from indenture or bond to the recruitment or employment agency. Bonded labour includes: The requirement to pay off a debt such as a recruitment fee or plane ticket where the debt is such that it will take a substantial portion of the worker's wage to be repaid and would cause hardship for the worker.
- For Local Workers:
 - Take special efforts to prioritise recruitment opportunities to Angolan nationals from the Project affected areas and the surrounding districts and province. Positions that cannot be filled locally may be filled by foreign workers;
 - Adopt the Local Manual Labour Recruitment Policy for non-skilled workers set out in the National Content Strategy. Where unskilled positions are filled by workers other than nationals from the project affected area INZAG will provide an explanation as to why they have not been recruited from this area;
 - Take special measures of protection or remedy to rectify instances where past discrimination has been practised; this will be deemed fair discrimination;
 - Adopt a selection criterion that is transparent, inclusive and includes information about the number of positions, selection process, start date and duration. Angolan nationals who are unsuccessful in their job applications will be notified of the reasons for this; and
 - Conduct awareness programmes informing relevant stakeholders of the job opportunities with the objective of managing expectations.

6.4.1.4 Feedback from Stakeholders

- The only feedback from stakeholders to date on employment referred to:
- The need for efficient training of national staff to create local jobs.
- Generally local communities will have an expectation around local job creation.

6.4.1.5 Impact Assessment

Construction Phase

Temporary direct and indirect employment opportunities (primarily unskilled)

There are 20 workers currently working on the project. The future workforce will reach approximately 400 at its peak (Male 90%; Female 10%). It is expected that 97% will be local workers from Luanda

Province, and the remaining 3% will be ex-pat workers (Staff 10%; Contractor: 50%; Subcontractor: 40%).

The construction activities are anticipated to include site enclosure, site clearance works, excavation and movement of soil, embankment construction, construction of the flyovers, various elements of the road (main road, access roads, viaducts, bridges, tunnels, culverts etc.) and their associated subelements (e.g. sub-base, road surface, pavements, concrete and steel works, retaining walls, drainage infrastructure and features etc.), and finish works (lighting, signs, road markings, etc.).

It is assumed that workers will be housed in existing accommodation, as the sites are within a welldeveloped urban area. No site camps or accommodation will be provided during construction.

The anticipated impacts are **positive** and local in extent due to the high number of primarily wagelabour positions available during construction, that do not necessarily require skills or technical proficiency. In addition to direct employment, the Project will result in the indirect employment of workers through the procurement of select local goods and services from local and regional businesses.

These impacts are only expected from the short to medium-term as the projected workforce will be significantly reduced as the Project moves into operations.

Temporary economic impacts from taxes and fees, procurement and worker spending

In general, construction activities associated with the Project will likely generate economic benefits from the purchase of goods and services during construction and even in the operational phase, which will generate benefits at the national, regional and where possible, local level.

Significant quantities of various types of construction materials will be needed such as concrete, prefabricated segments, aggregates, and asphalt, together with construction plant, vehicles and machinery. In accordance with international good practice, environmental and social implications need to be considered in the selection. The sourcing and transport of materials will be conducted through suppliers and does not form part of this ESIA. The main principle is to source the materials locally where possible and feasible.

Impacts are **positive** and regional in extent and are only expected in the short to medium-term as the projected workforce (and hence their contribution to taxes and spending) will be significantly reduced as the Project moves into operations.

Long-term benefits of capacity enhancement (on-the-job and formal training opportunities)

Those who are able to secure employment on the Project during construction will likely have the opportunity to improve their skills, gain experience and thereby improve their opportunities for future employment within the construction and other sectors.

In addition to on-the-job training at the level of individual workers, the Project will also represent an opportunity for Angolan (and specifically Luanda-based) companies to tender for work on different project-related components and basic services such as food supply and maintenance, which will result in a capacity enhancement and reputational benefits from working on a major international project to the highest safety and performance standards.

For those companies that meet the eligibility criteria and enter the supply chain, there will be shortterm benefits to the businesses and their employees through increased experience, capacity and training opportunities.

Impacts to individuals and businesses are anticipated to result in long-term **positive** impacts at the local, regional, and national levels.

Operations Phase

Benefits from improvements to infrastructure services including road and rail

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It is anticipated that the operational phase will see a general improvement in traffic and trains transport flows. This should promote an impairment in local and regional economic development.

Furthermore, the improved access to the areas and traffic management will mean that the areas north of the railway will be better connected with the centre of Luanda as well as the more developed areas to the south of the railway. This could attract much needed development to the areas north of the railway line.

Impacts are anticipated to result in long-term **positive** impacts at the local and regional levels.

6.4.1.6 Mitigation Measures

Construction Phase

Temporary direct and indirect employment opportunities (primarily unskilled)

INZAG has a Project Specific Human Resources Management Plan, as well as the Contractor and Subcontractor Management Plan. INZAG (or the relevant contractor or subcontractor) will:

- Work with local authorities and employment organisations to ensure that all positions are advertised in a manner that is accessible to the communities in the AoI.
- Ensure that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender.
- Develop specific measures to facilitate access to employment of women and youth.
- Provide clear information on the number and limited timescales of employment opportunities.
- Ensure information on the employment and procurement strategies is disclosed in all communities within the Aol.
- Engage with stakeholders through early, inclusive dialogue to build a shared understanding of the
 potential positive and negative impacts of workers influx, and the associated risks and
 opportunities.
- Continuing to engage local people in the employment opportunities and work with suppliers to enable capacity building, procurement, employment and contracting opportunities at a settlementlevel, as part of maximizing the positive benefits.

A Community Grievance Management Procedure (as set out in the SEP) will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project.

Furthermore, regular, transparent engagement with the local communities and other stakeholders will help with managing expectations around employment opportunities and benefits.

Temporary economic impacts from taxes and fees, procurement and worker spending

A Local Content and Procurement Plan will be developed to inform the Project's in-country value planning, specifically, with respect to the employment potential for multiple positions and the local provisioning potential through local suppliers from the area, concretely:

- As part of the tendering process, INZAG's contractors will be required to develop a purchasing strategy that stipulates how national and local purchases of goods will be optimised. The purchasing strategy will be required to adhere to all INZAG HSE policies and procedures. Agreed measures will be monitored and reported on;
- INZAG will enhance national supplier capacity through a comprehensive demand and supply analysis; phased capacity building program; targeted training agreed with local government and other organisations;

- INZAG will implement a phased capacity building programme (sector by sector) that will enable local companies to achieve qualifications and potentially certification with the relevant standards and requirements well in advance of the tendering process;
- INZAG will engage with local government, and other organisations to determine opportunities for targeted training; Any selected potential suppliers will have to meet health, safety and quality standards; and
- Following the selection of primary contractors, INZAG will carry out training of contractors on the Project HSE and socioeconomic and health policies prior to the start of construction.

Long-term benefits of capacity enhancement (on-the-job and formal training opportunities)

The Local Content and Procurement Plan will include the following:

- INZAG will carry out training of contractors on Project Health and Safety Requirements (aligned with internal INZAG HSE Management Plan) and socioeconomic policies prior to the start of construction activities and during operations when needed; and
- To maximise capacity enhancement and transfer of knowledge to local contractors and their employees, INZAG will develop formal training programs and formalise on-the-job trainings to the extent possible, including learning targets and performance monitoring.

Operation Phase

Benefits from improvements to infrastructure services including road and rail

It is recommended that MINTRANS ensure that the physical integrity of the flyover infrastructure is maintained in the long-term, and ensure that public health and safety is continued, including aspects such as monitoring mobile trader, pedestrian and vehicle use of the flyovers to prevent accidents and injury, and interruptions to traffic flow. It is also recommended that INZAG and MINTRANS develop an operational ESMP and specify these mitigation measures in any hand over agreements.

6.4.1.7 Summary Impact Tables (Pre and Post-mitigation- Residual)

Construction Phase

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s).

Project Phase: Construction							
Type of Impa	ct: Direct and Indir	ect Positive Impact					
Rating of Impacts:							
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Medium-term	Majority of employment opportunities will be during 24-months of construction.	Medium-term	Majority of employment opportunities will be during 24-months of construction.			
Extent	Local	Employment related impactsprimarily at the local level.	Local	Employment related impacts primarily at the local level.			
Frequency	Constant	Labour requirements will fluctuate during construction phase.	Constant	Labour requirements will fluctuate during construction phase.			
Scale	Small	Approximately 400 workers will be recruited of which 97% will be local. Other workers may benefit indirectly. However the material change in socio-economic environment is likely to be limited.	Small	Approximately 400 workers will be recruited of which about 97% will be local. Other workers may benefit indirectly. However the material change in socio-economic environment is likely to be limited.			
Likelihood	Likely	Direct and indirect employment opportunities are likely.	Likely	Direct and indirect employment opportunities are likely.			
Magnitude:							
Pre-mitigatio	n		Post-mitigation (Residual)				
Medium			Medium				
Sensitivity / V	/ulnerability/Impo	tance of the Resource / Re	ceptor:				
Medium	<i>"</i> , <u> </u>						
Local expect	ations around Proje	ectemployment are high wi	than emphasis on opp	portunities available for youth.			
Significant R	ating:		Deet mitigetie:				
Pre-mitigatio	on		Post-mitigation				
	Positive In	npact	Positive Impact				

Table 6.50 Rating of Impacts Related to Employment Opportunities

Table 6.51 Rating of Impacts Related to Taxes and Fees, Procurement andWorker Spending

Project Phase	Project Phase: Construction						
Type of Impa	Type of Impact: Direct Positive Impact						
Rating of Imp	Rating of Impacts:						
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Medium- Term	Contribution to regional and local economy will be short-term during the construction phase of 24 months.	Medium-Term	Contribution to regional and local economy will be short-term during the construction phase of 24 months.			
Frequency	Often	Procurement and spending will fluctuate throughout construction phase based on Project needs.	Often	Procurement and spending will fluctuate throughout construction phase based on Project needs.			
Extent	Regional	Local and regional profit generation from taxes/fees, procurement and worker spending.	Regional	Local and regional profit generation from taxes/fees, procurement and worker spending.			
Scale	Small	Medium impact on in country and local profit generation from taxes/fees, procurement and worker spending.	Small	Medium impact on in country and local profit generation from taxes/fees, procurement and worker spending.			
Likelihood	Likely	There are likely to be taxes, fees and worker spending related to the Project.	Likely	There are likely to be taxes, fees and worker spending related to the Project			
Magnitude:							
Pre-mitigation	on		Post-mitigation (Residual)				
MediumMag	nitude		MediumMagnitude				
Sensitivity/	/uInerability/Imp	portance of the Resource / Re	ceptor:				
Low Procurement opportunities are considered of high importance to local communities and regional companies; however the baseline is low and therefore loss of opportunities is unlikely to affect the baseline.							
Significant Rating:							
Pre-mitigation	on		Post-mitigation				
Positive Impact			Positive Impact				

Table 6.52 Rating of Impacts Related to Capacity Enhancement (Construction)

Project Phase: Construction							
Type of Impact: Direct and Indirect Positive Impact							
Rating of Imp	Rating of Impacts:						
	Pre-mitigation	ו	Post-mitigation (Residual) – including embedded				
	Designation						
Dunation	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Long-term	Benefits of capacity	Long-term	Benefits of capacity enhancement			
		for long-term		projected for forig-term			
Frequency	Occasional	I ong-term benefits will be	Occasional	l ong-term benefits will be capitalized			
,		capitalized on by		on by individuals / individual businesses			
		individuals/individual		may differ in frequency, and so it is			
		businesses may differ in		considered occasional in terms of			
		frequency, and so it is		impact.			
		considered occasional in					
Extent	Regional	Impact on capacity	Regional	Impact on capacity enhancement is			
LAtent	Regional	enhancement is likely to	Regional	likely to impact local to regional level at			
		impact local to regional		an individual level and to a limited			
		level at an individual level		extent on a business level.			
		and to a limited extent on					
		a business level.					
Scale	Small	I he number of individuals	Small	I he number of individuals benefiting			
		capacity development		both directly and indirectly is moderate			
		both directly and indirectly		as well as the potential to source local			
		is moderate as well as the		contracts; however the overall socio-			
		potential to source local		economic impact is likely to be limited			
		contracts; however the		within the current social environment.			
		overall socio-economic					
		Impact Islikely to be					
		social environment					
Likelihood	Likelv	Capacity enhancement	Likelv	Capacity enhancement through on the			
	,	through on the job		job training is a requirement of INZAG.			
		training is a requirement		, , ,			
		of INZAG.					
Magnitude:			Deed with we then (De	e i dece ()			
Pre-mitigatio	on do		Post-mitigation (Residual)				
Sensitivity / V	ue /ulnerability/lmr	portance of the Resource / Re	centor:				
Constantly /	aniorability / imp						
Sensitivity of	long-termcapac	ity enhancement is considere	d medium as primary b	enefits will be during the construction			
phase with lo	ong-termben efits	capitalized on by individuals	and businesses on the	er own initiative once construction is			
complete.	-						
Significant R	lating:						
Pre-mitigatio	on		Post-mitigation				
	Desitive	Impost		Popitivo Impost			
	Positive	Impact		Positive Impact			

Operation Phase

The table below includes a summary of the impact assessment on the operational phase of the Project, pre and post mitigation(s).

Table 6.53 Benefits from Improvements to Infrastructure Services includingRoad and Rail (Operations)

Project Phase	Project Phase: Operations						
Type of Impact: Direct Positive Impact							
Rating of Impacts:							
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Long-term	Benefits anticipated to be throughout operations.	Long-term	Benefits anticipated to be throughout operations.			
Frequency	Constant	Continuousthroughout operations.	Constant	Continuous throughout operations.			
Extent	Regional	Local and regional economic benefits.	Regional	Local and regional economic benefits.			
Scale	Small	Regional benefits are likely to be low.	Small	Regional benefits are likely to be low.			
Likelihood	Likely	Operational benefitsare likely.	Likely	Operational benefits are likely.			
Magnitude:							
Pre-mitigatio	on		Post-mitigation (Residual)			
MediumMag	nitude		MediumMagnitude				
Sensitivity/∖	/ulnerability/lm	portance of the Resource / Re	ceptor:				
Low							
While general economic improvements are likely to affect a range of people and sectors.							
Significant R	lating:						
Pre-mitigation	on		Post-mitigation				
Positive Impact			Positive Impact				

6.4.2 Land, Households and Livelihoods IA

6.4.2.1 Potential Impacts

This section addresses the likely physical and economic displacement impacts caused by land acquisition within and adjacent to, the footprint of the proposed development, including classifying the types and extent of displacement and livelihood impacts based on the data collection undertaken to date within the development footprint (see Section 4.3.2).

Table 6.54 summarises the potentially significant impacts on land, households and livelihoods during the construction and operation phases of the Project. The minimisation of displacement impacts is one of the main issues that will be addressed by the appropriate design of the Project.

Table 6.54 Potential Impacts on Land, Households and Livelihoods

Construction Phase	Operation Phase
 Displacement of houses and small and medium- sized businesses and associated livelihoods. 	 Permanent loss of livelihoods and household income due to permanent land use changes.
 Disruption to local businesses and social services through restricted accessibility. 	
 Displacement of mobile traders and taxis and associated livelihoods. 	

The land on which the flyovers are to be built is predominantly owned by state entities, including Caminho de Ferro de Luanda E.P. (Luanda Railway) and MINTRANS (roads). Therefore, most of the development will occur on government-owned land. There are, however, some privately owned residential and businesses properties which will be expropriated or encroached on for the development. These are small areas or portions of properties (e.g. a hotel at Estalagem and a church at Viana), and MINTRANS or the appropriate agency will engage with the landowners.

From a preliminary analysis of satellite images provided as part of the project description, it is estimated that 46 residential units and 27 commercial structures will be affected by the Project.

The land required for the Project consists of the Project footprint and a 500 m buffer zone. The Project requires a total land area of 12,120.07 m² of residential area and 2,128.33 m² commercial area, see Table 6.55.

Flyover Site	Residential Area Impacted (m ²)	Commercial Area Impacted (m ²)
SME	4,055.52	0
Viana	5,127.95	0
Estalagem	167.5	786
Mulenvos	1,544.87	0
5 th Avenue	1,224.23	1,342.33
Total	12,120.07	2,128.33

Table 6.55: Project Land Requirements at Each Flyover Site

Source: BDM, 2023

6.4.2.2 Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarised as follows:

- A total of 46 residential units and 27 commercial structures will be affected by the Project.
- The flyovers are located in areas of dense urban settlement, with the exception of SME, which is a commercial area and peri-urban in nature.
- The land ownership within the Project footprint is predominantly government owned (i.e. roads, railway line); however the residential land is privately owned, either legally or informally.
- Residential structures will be impacted at all five overpass locations. There will be two residential structures impacted at the SME overpass location, three at Viana and Estalagem, 18 at the Mulenvos overpass location and another 20 at the 5th Avenue overpass location.
- 27 commercial structures will be impacted at the 5th Avenue overpass location. The other overpass locations contain commercial areas, but no permanent commercial infrastructure.
- There are properties that have commercial uses such as small businesses but may not be officially zoned as commercial as they are amongst and, in some cases, form part of residential properties. Hence, it can be assumed that more commercial structures will be impacted than the 27 that are officially zoned as such.
- At Estalagem, land take will impact the Millenium Centro Turistico Hotel as a portion of the land will be taken by the project footprint (including for the laydown area) and the entrance will be moved further north. This land is relatively distant from the hotel buildings and no buildings will need to be moved.
- At Viana, land take will impact the Visao Crista Church as a portion of the land will be taken by the project footprint. The church buildings will not need to be moved.
- At SME, land take will impact several private land owners as a portion of their land will be taken by the project footprint. This land is currently undeveloped and as such no buildings will need to be moved, only a few fruit trees.
- In addition to residential and commercial structures, there are other structures found in the direct project AoI that will be impacted by the Project, such as cultural structures (churches and schools), and healthcare facilities.
- All five of the flyover sites (although to a lesser extent, SME) have large numbers of informal traders and motorbike taxis that operate on the railway line or at the intersection between the road and railway. These traders will be displaced during the construction phase of the project and potentially during the operational phase.

- Possible negative impacts mobile traders could face range from increased market competition at alternative trading spots, to increased vulnerability to violence when competing with other traders at different spots or a loss of income in case the alternative location does not offer the same business opportunities. Positive impacts could be an increased income or new business opportunities at new trading spots or increased customers, e.g., construction workers.
- As the sites are all urban in nature, there is low reliance on natural resources for livelihoods; however, the informal economy (vendors, home businesses) makes up a substantial part of the livelihoods of local communities. Four of the five sites have high volumes of mobile vendors (e.g. ranging from 30 100 vendors per site) located at the existing intersections and informal businesses (run out of adjacent homes or commercial premises). The displacement of houses, small businesses and mobile vendors is likely to cause disruption to the local communities and livelihoods of a large number of households.

6.4.2.3 Embedded Measures

As a first step in the process of managing displacement impacts (both physical and economic), the Project has made efforts to minimise the scope of displacement and will continue to do so as the Project footprint is solidified moving forward. Specific efforts include the following:

- Examination of alternative Project alignments;
- Examination of alternative locations for Project components;
- Avoidance, minimisation, and full mitigation of Project-related impacts and risks outside the Project footprint; and
- Minimisation of land acquisition through careful design of all Project components to reduce the need for displacement (particularly physical displacement) to the extent possible.

The scope of the current Project was defined considering a total of 14 crossing locations on the railway, of which the five that had significant bottlenecks in terms of railway crossing were selected. This selection aimed to identify the locations that could best reduce the conflicts between traffic, commerce and community health and safety. The construction of these overpasses was selected on the basis of the level of improvement provided to the current safety concerns at the crossing locations. For further information regarding the assessment of project alternatives, refer to Section 3 of the ESIA.

In addition, INZAG has commissioned the development of a Resettlement Policy Framework (RPF) for submission alongside this ESIA. The RPF will serve as a reference document to guide and align the implementation of the land acquisition process and the associated commitments linked to compensation, rehabilitation, and livelihood restoration to a series of applicable international standards. The RPF outlines the Project's commitment to mitigate adverse socioeconomic impacts from land acquisition or restrictions on affected persons' use of or access to land. The RPF will further be developed into a full project Resettlement Action Plan (RAP) by the MINSTRANS, with support from INZAG.

In line with the requirements of the Resettlement Policy Framework for Road Sector Operations ²⁰ as well as the applicable international standards of the IFC, there are several key elements to this mitigation approach including:

- Providing compensation for loss of assets at replacement cost;
- Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;

²⁰ Ministry of Roads & Highways, 2017.

- Improving or, at a minimum, restoring the livelihoods and standards of living of displaced persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status; and
- Paying particular attention to the needs of vulnerable groups.

The RPF²¹ provides the foundation for the resettlement process including an entitlement matrix that will ensure adequate compensation, resettlement and livelihood restoration options are provided to Project Affected People (PAPs):

- Resettlement options provided by the Project will ensure that households are able to continue to access the same livelihood resources or otherwise livelihood restoration measures will be provided to adequately manage economic displacement impacts;
- The Project will favour the provision of in-kind compensation over cash compensation for both land and structures used as homes, particularly for vulnerable households. It provides reduced risk (for both the Project and those affected) of entitlement mismanagement, inequitable distribution, and long-term impoverishment;
- Where possible, INZAG will seek to replace the lost residential land plots within the same settlements (in-fill resettlement);
- In general, the owner (whether formal or informal) of a particular asset (land, structures or trees/crops) will be compensated for its loss in full. Users will be compensated for the loss of their specific interest in that asset for a period of time and assisted in their re-establishment; and
- Engagement will be maintained with Affected Communities through the process of stakeholder engagement. A grievance mechanism will be established as early as possible in the Project development phase.

6.4.2.4 Feedback from Stakeholders

No feedback has been received on resettlement or displacement aspects. This aspect will be revised following the stakeholder engagement activities carried out as part of the ESIA disclosure.

6.4.2.5 Impact Assessment

Construction Phase

Displacement of houses, small and medium-sized businesses and associated livelihoods

Loss of residential structures – Shelter (Physical Displacement)

A total of 46 residential units will be affected by the Project. Households residing in these structures will be physically displaced. Approximately 46 residential units will be displaced, totalling approximately 212 people.

Permanent physical displacement, depending on the resettlement options provided by the Project, may cause inability or difficulty of households to continue to access the same livelihood resources leading to related economic displacement impacts.

The loss of shelter can lead to various adverse impacts, such as disconnection from cultural and social roots, and often, a decline in overall well-being. People may face challenges in accessing essential services such as education, healthcare, and clean water in their new locations, and they can experience increased vulnerability to poverty and social exclusion. Emotional and psychological distress is also common, as individuals grapple with the trauma of losing their homes and communities. In case the resettlement is not well planned, managed and implemented and people are not provided with replacement structures in locations of better or equal value to the ones prior to resettlement or just receive monetary compensation, they can face problems in accessing alternative

²¹ See separate RPF document prepared by ERM

houses for rent. In case monetary compensation is provided, an in-depth market study must be conducted assuring that replacement structures are available and accessible for displaced persons.

Loss of commercial and non-residential structures

As noted above, a number of potentially displaced structures are of commercial use. These include small businesses and shops. Owners and employees of these affected structures are expected to experience a loss of income and employment due to removal and relocation of these structures. The permanence of this loss is likely to depend on the resettlement options, land availability and location.

The loss of houses, small and medium-sized businesses and associated livelihoods are anticipated to have a **major negative** impact on local communities. The negative impacts are local in extent (limited to the AoI) but will be permanent (i.e. permanent relocation of structures).

Disruption to local businesses and social services through restricted accessibility

The construction phase is likely to constrain or even restrict access to some businesses and social resources. This may lead to temporary loss of income and livelihoods.

Small - Medium-sized Businesses adjacent to the site include:

- Food & Drink (groceries, catering, refreshments, alcohol);
- Merchandise sales (cell phones, household goods, clothes);
- Personal Services (hair, make up, nail salon); and
- Professional Services (canteen management and training).
- Social Services in the Aol include:
- Schools;
- Churches; and
- Healthcare Facilities.

Restricted accessibility and associated loss of income/ livelihoods is anticipated to have a **major negative** impact on local communities. The negative impacts are local in extent (limited to the AoI) and will be constant throughout the construction phase.

Displacement of mobile traders and taxis

The construction phase will include the enclosure of the construction area, which is currently used by mobile traders as informal markets. In addition, taxis (cars, buses and motorbikes) use the rail crossings as points of pickup and drop off.

5th Avenue, Viana and Estalagem have between 30 and 60 mobile traders at any given time during the day. They sell a variety of goods and services, from food and drink to clothes, mobile accessories and wage-based skilled labour (e.g., cobbler, bricklayer). These traders will be prohibited from trading at these intersections during construction. The extent of the impact is uncertain, as they could move to areas outside of the construction site and continue trading. However, if they need to move to completely new areas, this could impact their sales and livelihoods. Increased competition for customers, conflict over trading areas used by other vendors, and increased costs of transport could all impact these traders' livelihoods. The loss of access to income could be disproportionately felt by vulnerable groups such as children, women and women (mobile traders) who are in single-income households

Most of the roadside traders indicated the reason for working in the area would be many customers (17 respondents) and or no other options/ necessities (38 respondents) and that most customers would be people who live close by (within 1 km). 63 out of the 75 interviewees at Viana alone indicated that the business was their only means of income and 62 indicated that the money was not enough to pay for their bills in given months. Ten respondents said that they were unable to work

elsewhere if trading was not possible at their initial spots. On the other hand, positive impacts could be an increased income or new business opportunities at new trading spots or increased customers, e.g., construction workers.

A similar scenario is likely to apply to taxi drivers, as generally have set routes or areas they access for customers. With the closure of these intersections, they are likely to need to find alternative areas to work in or alternative means of income. Conflict over areas and competition for customers in new areas could prevent them from earning the same income as they do at present.

Displacement of mobile traders and taxis and associated loss of income/livelihoods is anticipated to have a **major negative** impact on these individuals. The negative impacts are local in extent (limited to the AoI) and will be permanent.

Operations Phase

Permanent loss of livelihoods and household income due to permanent land use changes

The operational phase will permanently affect a number of households and micro businesses, and potentially mobile vendors due to the change in nature of the sites. The construction of a road and associated facilities and restrictions (including construction of a wall underneath the flyover to prevent pedestrians from accessing the railway) will restrict the ability of local residents and mobile traders to earn a living. The restriction of pedestrians will substantially reduce the foot traffic, which is the key market for most of the businesses and traders within the immediate Aol. The relocation of these businesses and traders could alter the level of income and number of customers at least temporarily. Other areas are likely to have similar businesses and sell similar products which could lead to increased conflict over resources.

This impact is anticipated to have a **major negative** impact on local communities. The negative impacts will be permanent.

6.4.2.6 Mitigation Measures

Construction Phase

The RPF outlines the below options for the loss of land, loss and/or disruption of primary economic activity, loss of structures, host communities and potential creation or exacerbation of conditions of vulnerability.

Type of Loss	PAP/PAH Category	日igibility	Entitlements
Loss of land	Ow ner	Be the ow ner of the land.	 Option 1: Replacement land of at least equal value, size and quality, Payment of transaction costs, Access to Livelihood Restoration Program, Allow ance(s), as appropriate based on household characteristics to be further elaborated on in final RAP. Option 2: Cash payment of equivalent value (full replacement cost). Please note that cash compensation should only be considered if there is no replacement land available.
	User (without formal land title)	Being user of lands impacted by the	 Option 1: Assistance to re-establish a similar land use agreement on the replacement land²², Access to the Livelihood Restoration

Table 6.56 Proposed Preliminary Entitlement Matrix

²² To be negotiated as part of Village Land Access Agreements.

Type of Loss	PAP/PAH Category	日igibility	Entitlements
		Project without formal title.	 Program, Allow ance(s), as appropriate based on household characteristics to be further elaborated on in final RAP. Option 2: Cash payments for improvements to remaining land
	Ow ners w ho face temporary loss of land	All PAHs whose lands will be affected by the construction of Project activities	 Cash compensation at a percentage of land value to be established by final RAP. Payments for any damage to structures and / or productive assets (including crops, improvements to the land, loss of livestock) on the affected lands due to construction activities at rates constituting full replacement value. Payment for any lost w ages / income resulting from the above damage or other effects of the area of disturbance (including land-use restrictions). Access to Livelihood Restoration Program
	Ow ners and occupiers w ho face loss caused by permanent access restrictions, such as Orphan Land.	All PAHs whose lands will be permanently affected by the construction of Project activities. This also includes orphan land that cannot be accessed anymore due to the Project construction.	 Cash compensation at a percentage of land value for the permanent or temporary restrictions on land-use Allow ance(s), as appropriate based on household characteristics to be further elaborated on in final RAP.
Loss and/or disruption of primary economic activity disrupted by land acquisition and resettlement (incl. mobile traders)		Demonstrate income received from economic activities on lands to be acquired/ impacted by the Project.	 Cash payment for loss of income Compensation for loss of assets Cash payment for transfer of livestock Relocation Assistance Access to Livelihood Restoration Program Allow ance(s), as appropriate based on household characteristics to be further elaborated on in final RAP.
	PAH with informal commercial economic activity disrupted by land acquisition and resettlement (incl. mobile traders)	Demonstrate income received from economic activities on lands to be acquired/impacted by the Project.	 Access to Livelihood Restoration Program Relocation Assistance Allow ance(s), as appropriate based on household characteristics to be further elaborated on in final RAP.
Loss of structures	All PAHs who own or occupy residential structures that are permanently affected by the	Demonstrate ow nership of structure or occupation of a structure that will be permanently	Option 1 (For structure owners): Provision of replacement structures with same value, size and on land with equal value including private bathroom and toilet and provision of basic services, such as electricity connection, clean water supply, garbage collection etc.; replacement rental allow ance for a reasonable

Type of Loss	PAP/PAH Category	Eligibility	Entitlements
	Project activities.	affected by the Project.	 agreed time period in case replacement structure cannot be provided directly; Disturbance allow ance; Provision of demolition assistance of house. The ow ner can salvage building materials as they wish; Provision of special arrangements and assistance to suit people with disabilities, pregnancy, infants, and other vulnerable people's needs during the relocation as necessary. Option 2 (For structure owners): Cash compensation at full replacement value. Please note that this option should only be considered in case there should be no appropriate replacement structures available. Option 3 (For people who rent structures): Disturbance allow ance, housing security for the duration of existing contract, or at minimum, for an agreed reasonable period at a replacement house.
	All PAHs who ownoroccupy residential structures that are temporarily affected by the Project activities	Demonstrate ow nership of structure or occupation of a structure that will be temporarily affected by the Project.	 Provision of replacement structure for the time of impact, including private bathroom and toilet and provision of basic services. Provision of special arrangements and assistance to suit people with disabilities, pregnancy, infants, and other vulnerable people's needs during the relocation as necessary. Disturbance allow ance in the form of cash-compensation. Payments for any damage to structures due to construction activities at rates constituting full replacement value.
	All PAHs who own or occupy non-residential structures that are temporarily affected by the Project activities.	Demonstrate ow nership of the structure or impact by loss of structure.	 Determination of appropriate compensation will be established during the RAP. In-kind replacement structures where appropriate and feasible²³ Community compensation if appropriate and feasible²⁴
	All PAHs who own or occupy non-residential structures that are affected by the Project activities.	Demonstrate ow nership of the structure or impact by loss of structure.	 Provision of demolition assistance of house. The owner can salvage building materials as they wish. Determination of appropriate compensation will be established during the RAP. In-kind replacement structures where appropriate and feasible²⁵ Community compensation if appropriate and feasible²⁶ (e.g., for community-ow ned structures, such as churches, markets etc.)

 $^{^{\}rm 23}$ To be further specified in final RAP.

 $^{^{\}rm 24}$ To be further specified in final RAP.

 $^{^{25}}$ To be further specified in final RAP.

²⁶ To be further specified in final RAP.

FEHLER! VERWENDEN SIE DIE REGISTERKARTE 'START', UM HEADING 1 DEM TEXT ZUZUWEISEN, DER HIER ANGEZEIGT WERDEN SOLL.

Type of Loss	PAP/PAH Category	日igibility	Entitlements
Host communities	All PAHs that are member of a host community.	Demonstrate residency or economic activity in one of the selected host communities that will be impacted by the project resettlement.	Community compensation, if appropriate.
Potential creation or exacerbation of conditions of vulnerability	All categories	All PAHs subject to physical and/or economic displacement that will be considered as vulnerable prior to or because of the Project impacts. All vulnerable PAHs impacted by the resettlement (this also includes PAHs that will not be physically or economically displaced, but anyhow impacted by the Project, e.g., members of host communities).	 Provision of special arrangements and assistance to suit people with disabilities, pregnancy, infants, and other vulnerable people's needs during the resettlement process as necessary. Vulnerable Support Measures Priority involvement in livelihoods programming Allow ance(s), as appropriate based on household characteristics Community compensation, if appropriate and feasible.²⁷

Operations Phase

Impacts during the operations phase will be managed by INZAG although the operator will be MINTRANS. Mitigation measures will include the following:

- Responsibilities will include monitoring and providing the necessary follow-up to support households to restore their livelihoods throughout the operations phase; and
- The grievance mechanism established during the construction phase will be maintained during
 operations to ensure that local communities and stakeholders have an adequate channel to voice
 concerns.

6.4.2.7 Summary Impact Tables (Pre- and Post-mitigation- Residual)

Construction Phase

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s).

²⁷ To be further specified in final RAP.

Table 6.57 Rating of Displacement of Houses, Small and Medium-sized Businesses and Associated Livelihoods

Project Phase: Construction							
Type of Impa	Type of Impact: Direct Negative Impact						
Rating of Impacts:							
	Pre-mitigation	1	Post-mitigation (Re	sidual) – including embedded			
			measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Permanent	Permanent relocation of residential and	Permanent	Permanent relocation of residential and commercial structures.			
		commercial structures.					
Frequency	Once-off	One time impact occurring before start of construction activities.	Intermittent	One time impact occurring before start of construction activities.			
Extent	Local	Limited to Aol	Local	Limited to Aol.			
Scale	Large	Physical displacement of	Medium	Physically displaced structures will be			
		43 structures.		compensated prior to land acquisition therefore reducing scale to medium.			
Likelihood	Likely	Loss of residential and	Likely	Loss of residential and commercial			
		commercialstructuresis likely.		structures is likely.			
Magnitude:							
Pre-mitigation	n		Post-mitigation (Residual)				
Large Magnit	tude		Large Magnitude				
Sensitivity / V	/uInerability/Imp	portance of the Resource / Re	ceptor:				
High							
Receptors' sensitivity is high considering the risk of homelessness without proper resettlement options.							
Significant R	ating:						
Pre-mitigation	on		Post-mitigation				
	Major II	mpact	Moderate Impact				

Table 6.58 Rating of Disruption to Local Businesses and Social Services Through Restricted Accessibility (Construction)

Project Phase	Project Phase: Construction							
Type of Impa	Type of Impact: Direct Negative Impact							
Rating of Imp	Rating of Impacts:							
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded measures					
	Designation	Summary of Reasoning	Designation	Summary of Reasoning				
Duration	Medium-term	Throughout construction phase. Access will be restored during operations.	Medium-term	Throughout construction phase. Access will be restored during operations.				
Frequency	Constant	Throughout the construction phase.	Constant	Throughout the construction phase.				
Extent	Local	Limited to Aol	Local	Limited to Aol.				
Scale	Medium	Restricted access to businesses, services and customers.	Medium	Restricted access to businesses, services and customers.				
Likelihood	Likely	Likely to occur during normal operating hours.	Likely	Likely to occur during normal operating hours.				
Magnitude:								
Pre-mitigation	on		Post-mitigation (Re	esidual)				
MediumMag	nitude		MediumMagnitude					
Sensitivity/∖	/uInerability/Imp	portance of the Resource / Re	ceptor:					
High Receptors' sensitivity is high given the levels of dependence on non-residential structures to support commerce/ trade oriented activities.								
Significant R	lating:							
Pre-mitigation	on		Post-mitigation					
	Major II	mpact		Moderate Impact				

Table 6.59 Rating of Displacement of Mobile Traders and Taxis (Construction)

Project Phase: Construction								
Type of Impact: Direct Negative Impact								
Rating of Impacts:								
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures					
	Designation	Summary of Reasoning	Designation	Summary of Reasoning				
Duration	Permanent	Loss of access to trading	Permanent	Loss of access to trading and				
		and thoroughfare through		through the railway crossings will be				
		the railway crossings will		permanently lost				
		be permanently lost		politicationaly rook				
Frequency	Often	Impacts are likely to	Often	Impacts are likely to fluctuate as new				
		fluctuate as new locations		locations are identified for traders and				
		are identified for traders		taxis across the 5 sites.				
		and taxis across the 5						
Extent	10001	Siles.	10001	Impact limited to Apl				
Scalo	Modium	Modorato instanco of	Local Medium	Transitional support and reasonable				
Scale	Wedlulli	affected people relying on	Medium	time frames will be provided to restore				
		non permanent and		income earning capacity and levels of				
		informal business		productivity.				
		structures who are not						
		eligibleforcompensation						
		of non-residential						
		structures.						
Likelihood	Likely	Loss of access to	Likely	Loss of access to customers and				
		customers and trading		trading locations likely				
Magnitudo		locationstikery						
Pre-mitigatio	n		Post-mitigation (Re	sidual)				
Large Magnitude			MediumMagnitude					
Sensitivity / Vulnerability / Importance of the Resource / Receptor								
High								
Traders are all low-income, and predominantly female, and taxi drivers are predominantly low-income groups.								
Significant Rating:								
Pre-mitigatio	on		Post-mitigation					
Major Impact			Moderate Impact					

Operation Phase

The table below includes a summary of the impact assessment on the operational phase of the Project, pre and post mitigation(s).

Table 6.60 Rating of Permanent Loss of Livelihoods and Household Income Due to Permanent Land Use Changes (Operations)

Project Phase	e: Operation							
Type of Impact: Direct Negative Impact								
Rating of Impacts:								
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded					
			measures					
	Designation	Summary of Reasoning	Designation	Summary of Reasoning				
Duration	Permanent	The loss of livelihoods	Permanent	The loss of livelihoods and income				
		and income associated		associated with the change in land use				
		with the change in land		from mixed residential and mobile				
		use from mixed		laders to road and hydreists				
		traders to road and		considered to be permanent.				
		flyovers is considered to						
		be permanent.						
Frequency	Continuous	The impact will be felt	Often	The impact will be felt less often with				
. ,		continuously throughout		support and compensation in place				
		the years of operation as		throughout the years of operation.				
		the land use change is						
		permanent.						
Extent	Local	Impact limited to Aol.	Local	Impact limited to Aol.				
Scale	Medium	The scale of the impactis	Small	Following mitigation – i.e. access to				
		considered moderate as		support and relocation compensation –				
		the current intersections		the scale is likely to be reduced over				
		support a large number of		ume.				
		businesses and are the						
		only source (or significant						
		part) of household income						
		in the local area.						
Likelihood	Likely	Loss of access to	Likely	Loss of access to communal resources				
	-	important resources is		islikely				
		likely						
Magnitude:			Deed weitige tier (De					
Pre-mitigatio	on nitudo		Post-mitigation (Residual)					
	////ulperability//mr	ortance of the Resource / Rev	Sinali Maginuude					
The affected	individuals and I	nouseholds are considered hid	ably sensitivity due to th	heir in herent vulnerability (low-income low				
education and noor access to economic and social resources amongst other aspects)								
Significant Rating:								
Pre-mitigation Post-mitigation								
Major Impact			Moderate Impact					
major impaor				mean and mpan				

6.4.3 Community Health, Safety and Security IA

6.4.3.1 Potential Impacts

The presence of the Project could potentially affect the health, safety and security of the communities at the five different sites as a result of worker-community interactions, the risk of health issues and injury associated with construction activities, increased road accidents and road trespassing, and competition for access to resources (e.g. healthcare facilities).

Table 6.61 presents the potentially significant community health, safety and security impacts that may occur during the construction and operation phases.

Table 6.61 Potential Impacts on Community Health, Safety and Security

Construction Phase	Operation Phase	
Road safety and traffic accidents.	Road safety and traffic accidents.	
Unauthorised public access and injury.		

- Environmental health.
- Increased transmission of communicable diseases.
- Increased pressure on healthcare services.
- Use of security personnel.

6.4.3.2 Baseline Conditions

Relevant baseline conditions that may potentially influence impacts on community health, safety and security are summarised as follows:

- The healthcare system in Angola compromises a mix of the National Healthcare System (government funded and free of charge), and private healthcare, which is mainly accessed by wealthier residents.
- Access to healthcare in Luanda is notably better than the rest of Angola; however, the public healthcare system is severely underfunded and understaffed. There are reports of hospitals and clinics running out of prescription drugs and basic supplies, structures are dilapidated and equipment is outdated and inoperative.
- The communities within the AoI at each site comprise low- to medium-income households, with limited access to healthcare services.
- Key health issues, as documented in the baseline survey, include fever (caused by malaria or other infections), diarrhoea; coughing (or other chest ailments); colds, flu and covid; skin conditions; dental; and eye conditions.
- Key health-related issues are the lack of basic sanitation and access to clean water, as well as excessive refuse disposed of in open areas and along the railway line. During the rainy season, poor drainage results in large bodies of open standing water, which promotes malaria mosquitos and vectors.
- Over half of the respondents in the baseline survey indicated that they go to local hospitals and healthcare centres or clinics to treat conditions, and there are several facilities located within 5 km of the Aol. However, there is poor access to emergency care such as ambulances, and reliance on public or private transport to access healthcare facilities.
- Up to 400 employment opportunities (direct and indirect) are anticipated during construction. Non-local workers, both Angolan nationals and expatriates will be brought into the vicinity of Project activities through a managed process of recruitment and transportation. The presence of workers from outside the Study Area increases the risk to community health, safety and security from interactions with workers and associated influx.

6.4.3.3 Embedded Measures

- Relevant Project design elements that may potentially influence impacts are summarised as follows:
- A Workers Accommodation Management Plan has been compiled including the following specific measures:
 - Accommodation at the camp is restricted exclusively for authorised personnel and persons employed on the "Construction of the 5 Overpasses over the Luanda Railway Track – Angola" Project. The right to occupancy of accommodation will cease upon termination of employment on the Site or upon withdrawal of accommodation privileges by the Project Manager.
 - The camp is a CLOSED Camp. It is recommended to be in the camp from 18h00 to 06h00. INZAG employees and its subcontractors shall not interfere with members of the community (public), shall respect the rules and norms of the communities, and adhere to the rules of the Camp.

- Appropriate accommodation will be sourced for expatriate staff within Luanda during the construction phase if outside of on-site camp accommodation.
- The Project site will be fenced off to manage public health and safety risks during construction.
- Occupational health and safety measures will be put in place to prevent harmful or unnecessary interactions with the public. As included in the Occupational Health and Safety Management Plan:
 - INZAG will comply with National and International Standards and Good Practice regarding HIV/AIDS awareness programmes;
 - Ensure that sufficient protection equipment is used to separate public drivers from local drivers onsite;
 - Drivers shall respect public and flagman/ladies onsite while driving onsite during shift; and
 - Reporting of incidents, including any complaints, regarding Project activities from any member of the public.
- A Grievance Redress Mechanism will be in place whereby communities can report any complaints and grievances.
- Refer to Sections 6.2.1, 6.2.2 and 6.4.7 for embedded measures relating to air quality, noise and traffic respectively.

6.4.3.4 Feedback from Stakeholders

No feedback has been received on community health and safety aspects. This aspect will be revised following the stakeholder engagement activities carried out as part of the ESIA disclosure.

6.4.3.5 Impact Assessment

Construction Phase

Road safety and traffic accidents

Traffic accidents involving pedestrians during road construction, road upgrades and construction of the overpasses are likely to affect people of all ages, but children and elderly could be most affected.

During the construction phase, there is likely to be an increase in road safety risks within community areas adjoining the borders of construction sites (increased heavy vehicle movement) and diversion routes (increased traffic volumes). Potential changes in the road environment include an increase in the number of heavy vehicles, additional road hazards around the construction sites, variable speed limits on the Catete Road and unfamiliar road conditions. This could impact community health and safety through an increased risk of vehicle collisions, resulting in personal injury or death. An engagement programme with affected communities as well as appropriate signage (with consideration for illiteracy levels) will be required to minimise risks associated with increased traffic.

Road safety and traffic accidents are likely to have a **moderate negative** impact on communities in the AoI (i.e. a local extent). In terms of frequency, they may occur occasionally owing to current driving practices, the state of the roads and the increase in traffic expected during the construction phase.

Unauthorised public access and injury

Other accidents and injuries may occur from unauthorised access to / trespass onto construction sites. Examples include slips, trips and falls leading to severe injuries or in the worst case, death. Measures such as security fences and signage around construction sites will be required to minimise risks of unauthorised access. Ensuring alternative access is provided for pedestrians where existing access routes are blocked will also assist in reducing the likelihood of trespass through construction areas. Considering that the Project site will be fenced off to manage public health and safety risks

during construction and operation, this potential impact will be limited. An engagement programme with affected communities, as well as appropriate signage / information boards will be required to minimise risks associated with restricted access.

Unauthorised public access and injury are likely to have a **major negative** impact on communities in the Aol (i.e. a local extent), and without any management measures in place, are likely to occur often.

Environmental health

Noise disturbance

Noise impacts may occur during construction phase of the Project. Construction activities are likely to affect local communities, due to the close proximity of houses and business to the construction footprint. High noise emissions (and vibrations) are anticipated from activities such as demolition of structures and infrastructure, excavations, piling, use of heavy equipment and movement of heavy vehicles. While the construction noise will be temporary, localised in nature, the dense settlement of the areas (excluding the SME site) is likely to increase the noise impacts on neighbouring communities. Noise may also increase along the diversion routes, impacting local communities in the wider AoI, as a result of increased vehicular traffic on these roads.

During the construction phase, management and mitigation measures such as use of noise dampened equipment and scheduling of activities during daytime hours will be important to minimise potential impacts on the community. Ongoing Grievance Redress Mechanisms and engagement with local communities on timings of high-impact construction activities must be maintained to ensure impacts are minimised.

During the operational phase, it is possible that the increased flow of traffic over the flyovers will generate higher noise emissions than the current levels, especially as there will be faster movement of vehicles as they will not need to stop to cross the railway line. The AoI for most of the sites (excluding SME) currently experiences high volumes of traffic and noise from the trains however and as such, the flyovers are unlikely to significantly raise the noise levels above current conditions.

Refer to Sections 6.2.2 for further mitigation measures relating to noise.

Air emissions

During the construction phase of the Project, air emissions are anticipated to occur as the result of activities such as demolition of structures, excavations, piling, and movement of heavy vehicles, amongst other aspects. Of particular concern are potential dust emissions during construction, most notably during the dry season, and operation of heavy vehicles within the Aol (diesel emissions).

Unmitigated, elevated levels of air pollution can have effects on human health and has been linked to a number of health issues including the aggravation of asthma, respiratory symptoms and cardiovascular diseases, which are caused by different air pollutants. The current air quality within the AoI at all sites is generally considered poor, due to high levels of dust, poor sanitation (odour) and high volumes of motor vehicles, especially in the western areas of the project (5th Avenue, Mulenvos, and Estalagem).

Refer to Section 6.2.1, for mitigation measures relating to air quality.

Increased transmission of communicable diseases

The Project has the potential to result in an increased prevalence of vector related (air, soil and water borne) and sexually transmitted diseases. Malaria is widely cited as a leading cause of death amongst children in Luanda. Unmitigated Project construction works may increase the breeding habitat for malaria vectors (mosquitoes) through the water collecting in borrow areas or drainage channels left by construction works.

Potential influx of Project workers to the area during the construction phase may lead to increased rates of communicable diseases, including Covid, Tuberculosis (TB), and Sexually Transmitted Infections (STIs), particularly HIV, among the local community at all five sites.

Additionally, potential poor sanitation and solid waste disposal from the construction camps have the potential to introduce new pathways for diseases such as amoebic dysentery and acute diarrhoea.

The current quality of healthcare and sanitation within the Aol is considered poor and could easily be aggravated by additional pressure on infrastructure, and social and healthcare services.

Increased transmission of communicable diseases is likely to have a **moderate negative** impact on communities in the AoI (i.e. a local extent), and without any management measures in place, is likely to occur.

Increased pressure on healthcare services

Influx of workers for construction of the flyovers may place further strain on already pressurised healthcare facilities and detrimentally affect access to healthcare services and health status for communities within the AoI at all five sites. This risk is limited to the construction phase however, as no staff are required on site during the operational phase, and there will be a limited number of temporary workers during maintenance and monitoring.

Any decrease in access to health care facilities, including longer waiting times and access to basic supplies, is likely to be associated with reduced community health. This is a particular risk in the case of incidents involving multiple casualties or patients from both the workforce and community where hospital level care is required or in the case of a disease epidemic.

Increased pressure on healthcare services in the Project area is likely to have a **moderate negative** impact at a regional extent, and without any management measures in place, could possibly occur.

Use of security personnel

It is assumed security personnel will be hired by INZAG mainly during construction to prevent unauthorised access to the construction sites. The risk of security personnel is that if they are not appropriately trained, they may misuse their status and be abusive to local persons or apply excessive force in their handling / apprehension of potential trespassers or other unauthorised persons.

The presence and use of security personnel during the construction phase is likely to have a **moderate negative** impact on communities in the AoI (i.e. a local extent), and without any management measures in place, is likely to occur.

Operations Phase

Road safety and traffic accidents

The development of the flyovers (and additional pedestrian crossings/ bridges) is aimed at preventing collisions between trains and motor vehicles and pedestrians. There is likely to be an improvement in road, rail and pedestrian safety with the operation of the flyovers.

Given the local context, however, specifically the high numbers of informal and mobile traders and taxi drivers, management of these members of the public and community should be implemented during operation. For example, traders may choose to setup stalls on the flyovers to access pedestrian customers, and taxi drivers may stop near the flyovers to pick up or drop off customers. This could lead to traffic and pedestrian accidents. Management of public space is required to prevent unintended consequences.

Road safety and traffic accidents during the operational phase is likely to have a **major negative** impact on communities in the AoI (i.e. a local extent) for the long-term, and without any management measures in place, is likely to occur.

6.4.3.6 Mitigation Measures

The following mitigation measures will be implemented during the construction phase to reduce any impacts on community health and safety.

Construction Phase

Road safety and traffic accidents

- Implementation of a community Grievance Redress Mechanism, and information about this mechanism will be shared amongst local communities, specifically:
 - Contractor/s will be responsible for managing a grievance mechanism that allows communities and employees to raise complaints;
 - The grievance redress mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognisant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders; and
 - A comprehensive stakeholder engagement process will be carried out to liaise with stakeholders (relevant authorities and project affected communities) with regards to road safety issues and undertaking coordinated action regarding design solutions (e.g. pedestrian crossings).
- INZAG will develop a Traffic Management Plan that will include the following in addition to the requirements listed at Section 6.4.7:
 - Drivers of Project vehicles will be trained / briefed about safe driving with respect to other drivers, and pedestrians;
 - Advance warning will be given of proposed road diversions and closures;
 - Project vehicles to be identifiable to the Project (e.g. an easy to read / see sign or symbol on vehicles which shows that they are connected to the Project); and
 - Address how the Contractor can reduce the exposure of vehicle drivers, their passengers and other road users from the hazards of road-related accidents.
- INZAG should develop and implement an Incident/ Accident Manage Plan and procedure.

Unauthorised public access and injury

- As part of the SEP, INZAG will undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto construction sites, the meaning of signs, the dangers of playing on or near equipment or entering fenced areas. This will include:
 - Presenting site restrictions and management protocols (including the Grievance Redress Mechanism) to the local community during public meetings and at local schools (where possible) within the immediate AoI of each flyover. As part of the community meetings INZAG will present on other issues such as construction methods and skills required to work in construction to provide benefits. Records of the meeting and attendees should be kept.
- Consideration of vulnerable groups, specifically children. Children are particularly vulnerable to traffic danger and trespassing, as they are less likely to receive road safety education as they do not all attend school and are often unsupervised, particularly if they are working as street vendors and are exposed to hazardous road and construction risks. Special posters and culturally appropriate signs will be provided.
- INZAG will ensure that signs are put up around work fronts and construction sites advising people of the risks associated with trespassing.
- INZAG will provide access to health care for those injured by its activities.
- INZAG should develop and implement an Incident/ Accident Manage Plan and procedure.

Environmental health

As part of the SEP implemented by INZAG, awareness sessions will occur to explain the type of noise, dust and emissions from Project activities, their mitigation measures and a point person to contact in case of emergency.

INZAG will also implement the community Grievance Redress Mechanism.

Refer to Sections 6.2.1, 6.2.2 and 6.4.7 for additional mitigation measures relating to air quality, noise and traffic respectively.

Increased transmission of communicable diseases

- INZAG has developed a Workers Accommodation Plan and Occupational Health and Safety Management Plan that will include:
 - The Workforce Code of Conduct detailing specific living and working conditions which will contribute to reduce the risks of disease transmission into the community as well as a worker grievance mechanism. The Code of Conduct shall expressly prohibit sexual interactions of any kind with underage persons.
 - The Contractor will regularly monitor interactions between the community and workers both in public spaces in the communities.
 - Workforce, including contractors and subcontractors, will be provided with health awareness training, including a significant briefing of hygiene practices (such as hand washing), implementation of educational outreach to increase awareness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the communicable diseases of concerns (including STDs).
 - Pre-employment screening protocols will be conducted for all employees including contractors and subcontractors which will include testing for TB and other diseases appropriate to World Health Organisation (WHO) recommendations and including vaccinations.
 - Workers will be provided with primary health care and basic first aid at worksites.
 - Regular medical check-ups and centralised medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided.
- INZAG will offer all workers including contractors and subcontractors voluntary screening for STDs, which will be submitted to confidential treatment.
- INZAG will ensure all workers, including contractors and subcontractors, receive education around STDs including transmission routes and symptoms. The training will include specific content regarding STD prevalence rates in Angola and/ or the relevant Regions, expectations of local communities if a woman is made pregnant (e.g. marriage, financial implications, etc.) and law penalties for sexual assault.
- INZAG will extend the Worker Code of Conduct to include guidelines on worker community interactions.
- INZAG will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- INZAG will provide free condoms and femidoms to all workers at camps and accommodation and at entry/exit points of camps.
- INZAG will develop an STD Management Plan designed to minimise the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A typical plan would include, among others, the following measures:
 - An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs to employees, through workshops, posters and informal information sessions;
- Encouragement of employees to determine their HIV status; and
- Supply of condoms/ femidoms at the construction site(s)/ Construction Camps.
- INZAG will partner with other non-governmental organisations (NGOs) and community based organisations (CBOs) to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs. These activities should be focussed in locations where construction camps are located or where drivers rest.
- INZAG will consult with local leaders such as village elders among others. The consultations should be aimed at finding ways of ensuring social vices such as prostitution are minimised either through punitive measures for clients, in particular Project workers, or rehabilitative measures for the commercial sex works.
- INZAG will also develop and implement a Community Health and Safety Plan, which will include:
 - A full and thorough review of the community health, safety, and security risks associated with the Project activities and mitigation measures. This review will focus on community risks (rather than occupation worker risks).

Increased pressure on healthcare services

- INZAG will develop a Community Health and Safety Management Plan.
- INZAG will undertake a health facility assessment of medical infrastructure as part of the INZAG Health and Safety Management System to determine if facilities have sufficient resources and equipment.
- INZAG will ensure that there is sufficient resourcing (including emergency staff, equipment, and funds) to extend any required health and safety plans to cover the INZAG activities and any affected communities.
- INZAG will monitor the emergence of major pandemics through WHO alerts. When the WHO Pandemic Alert Scale reaches Level 4, INZAG will implement the relevant emergency response.
- An Emergency Preparedness and Response Plan (EPRP) will be developed by INZAG, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Project construction. The EPRP will include, among other topics:
 - The emergency response activities in the event of fire, accidents, earthquake, flood etc.;
 - Procedures for INZAG staff, contractors and subcontractors to report any incidents or incidents and the investigation and preventive actions taken;
 - Regular emergency response training for all INZAG, contractor and subcontractor personnel, including in the use of response equipment; and
 - Emergency Communication Procedure demonstrating how local communities and authorities will be notified of any emergencies, the procedures they need to follow and any training/ emergency drills that will be performed.

Use of security personnel

A Security Management Plan will be developed and implemented by INZAG, including the following measures:

Training will be provided to security personnel. Training and security arrangements will be based on the Voluntary Principles for Security and Human Rights which are international best practice. This involves, for example, the selection of security contractors based on a careful background screening of security forces, their training with regards to human rights and a careful monitoring of their services. INZAG will make security arrangement transparent to the local communities and consult regularly with them about the impact of arrangements on communities.

- Violation of INZAG's policies, procedures and required standards will result in corrective actions, including termination of sub-contracts with security firms. Sufficient training including clear instructions on the objectives and the permissible actions will be provided to the security personnel. The instructions will be based on the relevant Angolan law and will be communicated as terms of employment and reinforced through periodic professional training. Given regular contact with the local populations, training on Grievance Redress Mechanism, such as handling of community grievance will also be provided to the security staff as part of their periodic professional training.
- Complaints by the public (or other workers) with respect to behaviour of security personnel can be made via the Grievance Redress Mechanism.
- As part of the SEP, INZAG and contractors will have an engagement meeting with chiefs and traditional leaders informing about the safety management plan and the procedures adopted. INZAG and contractors will consider and incorporate feedback and concerns of chiefs and traditional leaders into the Security Management Plan.
- INZAG will engage with public security services on a regular basis to assess security risks, monitor, and evaluate security and human rights arrangements.
- INZAG will only call Angolan police and/or military services in a situation involving a level of threat the security provider is not able to deal with (such as armed intruders).
- INZAG will assess the risks associated with public security providers involvement and take appropriate actions to mitigate those risks, following these considerations:
 - The likely scenarios where they may be involved;
 - Their locations/postings;
 - Their reputation and capabilities;
 - Their relationship/ reputation with the local community; and
 - The risks of the Project being associated with inappropriate behaviour by the public security providers.

Operations Phase

Road safety and traffic accidents

During operations, MINTRANS will maintain the Grievance Redress Mechanism that will remain accessible to all communities. It is recommended that formal sites be developed for taxi and mobile traders using flyovers as trading areas. It is also recommended that INZAG and MINTRANS develop an operational ESMP and specify these mitigation measures in any hand over agreements.

6.4.3.7 Summary Impact Tables (Pre and Post-mitigation- Residual)

Construction Phase

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s).

Table 6.62 Rating of Impacts	Related to Road Safet	y and Traffic Accidents
------------------------------	-----------------------	-------------------------

l ype of Impa	ct: Direct Negati	ve Impact				
Rating of Imp	Rating of Impacts:					
	Pre-mitigation		Post-mitigation (Residual) – including embedded			
			measures			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Duration	Medium-term	Risk of accidents due to	Medium-term	Risk of accidents due to road safety is		
		road safety is medium-		medium-term during construction.		
_		term during construction.				
Frequency	Occasional	Current driving practices and state of the roads	Occasional	Current driving practices and state of the roads combined with increased		
		combined with increased		traffic from project construction could		
		traffic from project		lead to an increase in accidents		
		construction could lead to		(vehicles and pedestrians).		
		an increase in accidents				
		(vehiclesand				
-		pedestrians).				
Extent	Local	Limited to Aol	Local	Limited to Aol.		
Scale	High	Serioustraffic accidents	Medium	Mitigation measures such as signage,		
		could result in severe		driver training, advance warning of		
		Injuries or, in the worst		diversions, and access to grievance		
Likeliheed	Likoly	Case scenario, deatri.	Passible	Implementation of these mitigation		
Likeimoou	LIKEIY	during construction are	FUSSIBLE	more the likely to reduce but not		
		likely		completely eliminate the risk of		
		intery.		accidents and injuries		
Magnitude:		<u>.</u>				
Pre-mitigatio	on		Post-mitigation (Re	sidual)		
Large Magnit	ude		MediumMagnitude			
Sensitivity / V	/uInerability/ <u>Imr</u>	portance of the Resour <u>ce / Re</u>	ceptor:			
Sensitivity is	considered to be	high due to the lack of capac	city of health care facilit	ies to deal with trauma cases,		
communities'	unfamiliarity wit	h high traffic densities and po	or road safety awarene	ess.		
Significant R	ating:					
Pre-mitigatio	on		Post-mitigation			
	Moderate	Impact	Minor Impact			
				•		

Table 6.63 Rating of Impacts Related to Unauthorised Public Access and Injury

Project Phase: Construction						
Type of Impa	ict: Direct Negati	ve Impact				
Rating of Imp	Rating of Impacts:					
	Pre-mitigation	1	Post-mitigation (Re measures	sidual) – including embedded		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Duration	Medium-term	Limited to construction period.	Medium-term	Limited to construction period.		
Frequency	Often	Potential for accidents to occur often.	Occasional	Awareness, signage and security measures could reduce the frequency		
Extent	Local	Limited to Aol.	Local	Limited to Aol.		
Scale	Large	Serious accidents resulting from trespass onto project sites could lead to severe injuries or, in the worst case scenario, death.	Medium	Despite the mitigation the risk remains that there could be an accident resulting in injuries or fatalities. This risk will be temporary for the duration of construction.		
Likelihood	Likely	Risk of accident due to site trespass likely.	Possible	Implementation of these mitigation measures is likely to reduce, but not completely eliminate the risk of accidents and injuries.		
Magnitude:						
Pre-mitigation	on		Post-mitigation (Re	sidual)		
Large Magnit	tude		MediumMagnitude			
Sensitivity/V	/uInerability/Imp	portance of the Resource / Re	ceptor:			
Sensitivity is considered to be high due to the lack of capacity of health care facilities to deal with trauma cases, communities' unfamiliarity with safety precautions around unfenced construction sites.						
Significant R	lating:					
Pre-mitigation	on		Post-mitigation			
	Major II	npact		Moderate Impact		

Project Phase	Project Phase: Construction					
Type of Impa	ct: Direct Negati	ve Impact				
Rating of Imp	acts:					
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded measures			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Duration	Short-term	Dust, emissions and noise will be present during construction on a temporary to short-term (dry/wet season) basis and will directly affect nearby communities and businesses.	Short-term	Dust, emissions and noise will be present during construction on a temporary to short-term (dry/wet season) basis and will directly affect nearby communities and businesses.		
Frequency	Often	The impacton environmental health could result in a deterioration physical and psychological health.	Occasional	The impacton environmental health could result in a deterioration physical and psychological health.		
Extent	Local	Limited to Aol.	Local	Limited to Aol.		
Scale	Medium	Although construction will take place in a phased manner at the different sites, there is the potential for air and noise emissions to extend beyond the construction area.	Small	Mitigation developed to minimise environmental impacts will minimise impacts to health and engagement will ensure that communities are kept informed.		
Likelihood	Likely	Impactsto environmental health are likely.	Possible	Implementation of these mitigation measures is likely to reduce, but not completely eliminate the risk of accidents and injuries.		
Magnitude:						
Pre-mitigatio	on situale		Post-mitigation (Re	sidual)		
Neai um Magi	nitude (ulporobility / legr	ortance of the Resource / De	Small Magnitude			
Receptor sensitivity is considered mediumas receptors may experience disturbance and decreased well-being. Also, although structures inside the road footprint corridor will be displaced to maintain security distances to the line, houses located further away mays still experience some impacts related to noise and air quality.						
Pre-mitigatio	n		Post-mitigation			
Pre-mitigation Moderate Impact			. cot magaaon	Minor Impact		

Table 6.64 Rating of Impacts Related to Environmental Health

Table 6.65 Rating of Impacts Related to Increased Transmission of Communicable Diseases

Project Phase: Construction						
Type of Impa	ct: Direct Negati	ve Impact				
Rating of Imp	Rating of Impacts:					
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded measures			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Duration	Medium-term	The risk of exposure will occur throughout the construction phase.	Medium-term	The risk of exposure will occur throughout the construction phase.		
Frequency	Often	The influx of workers and activities associated with construction could increase the frequency of exposure for the local communities.	Occasional	Mitigation measures are unlikely to remove, but will lower, the risk of exposure for the local communities.		
Extent	Regional	Workers and member of the public are likely to move between the construction site and other areas within the city, potentially spreading the geographical risk.	Regional	Workers and member so the public are likely to move between the construction site and other areas within the city, potentially spreading the geographical risk.		
Scale	Large	Following any increase in the incidence of communicable diseases there is a risk of on-going increased prevalence as well aslong-term health consequences for those affected.	Medium	Communicable diseases remain a significant threat for both national and expatriate workforce but could be reduced through management and mitigation measures.		
Likelihood	Likely	Presence of the Project workforce combined with the baseline conditions mean that the impactis likely.	Possible	Implementation of mitigation measures is likely to reduce, but not completely eliminate the risk of transmission of communicable disease.		
Magnitude:						
Pre-mitigation	on		Post-mitigation (Re	sidual)		
Large Magnitude			MediumMagnitude			
Sensitivity / V	/ulnerability/lmp	portance of the Resource / Re	ceptor:			
High sensitiv	ity due to poor a	ccess to healthcare facilities a	and reportedly poor ser	vice of healthcare establishments (e.g.		
Iong waiting t	times, inadequat	e drug supply, etc.)				
Significant R	lating:					
Pre-mitigation	on		Post-mitigation			
Major Impact			Moderate Impact			

Table 6.66 Rating of Impacts Related to Increased Pressure on Healthcare Services

Project Phase	e: Construction			
Type of Impa	ct: Direct Negati	ve Impact		
Rating of Imp	acts:			
	Pre-mitigation	1	Post-mitigation (Remeasures	esidual) – including embedded
	Designation	Summary of Reasoning	Designation	Summary of Reasoning
Duration	Medium-term	Throughout the construction phase.	Medium-term	Throughout the construction phase.
Frequency	Often	Impact could occur regularly throughout construction period.	Rare	Management and mitigation measures could reduce the impact to healthcare services for local communities.
Extent	Regional	Increased pressure on local resources could affect regional healthcare facilities through overflow.	Local	Mitigation measures could reduce the potential impact to the AoI only, as immediate and emergency services will be localised.
Scale	Large	The current state of public healthcare is highly constrained and so any large-scale incidents could have a significant impact on the healthcare systems.	Small	INZAG will provide basic health care for its workers and put in place agreement with hospitals following a needs assessment and upgrade support ensuring no or minimal decreased access for communities.
Likelihood	Possible	Potential for accidents and emergencies requiring hospitalisation is possible.	Unlikely	Where mitigation measures are adequately implemented, including collaboration with healthcare centres, hospitals and worker and community health and safety, impact is unlikely.
Magnitude:				
Pre-mitigatio	on .		Post-mitigation (R	esiduai)
MediumMagi	nitude		Small Magnitude	
Sensitivity / V	/ulnerability / Imp	portance of the Resource / Re	ceptor:	
nign sensitiv	ily due lo poor a times in adequat	ccess to nealthcare tacilities a e drug supply etc.)	ina reportealy poor se	rvice of nealthcare establishments (e.g.
Significant R	ating:			
Pre-mitigatio	n		Post-mitigation	
Moderate Impact Minor Impact			Minor Impact	

Table 6.67 Rating of Impacts Related to Use of Security Personnel

Project Phase: Construction				
Type of Impa	ct: Direct Negati	ve Impact		
Rating of Imp	oacts:			
	Pre-mitigation	1	Post-mitigation (Re	sidual) – including embedded
			measures	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning
Duration	Medium-term	Employment of security	Medium-term	Employment of security personnel
		personnel throughout the		throughout the construction phase.
_	a	construction phase.		
Frequency	Occasional	Impact could occur	Rare	Minimised/decreased impact will lead to
		construction period		security personnel
Extent	Local	Limited to Aol	Local	Limited to Aol
Scale	Medium	Medium risk of abuse	Minor	Security management and personnel
ooule	Mearann	and/or excessive use of	Num of	training, grievance mechanism, and
		force.		engagement with local stakeholders
				reducesimpact to minor.
Likelihood	Likely	Potential for impacts from	Unlikely	Where mitigation measures are
		use of security personnel		adequately implemented, impact is
		likely.		unlikely.
Magnitude:				
Pre-mitigation	on		Post-mitigation (Re	sidual)
MediumMagi	nitude		Small Magnitude	
Sensitivity/V	/ulnerability/lmp	oortance of the Resource / Re	ceptor:	
Mediumsen	sitivity due to po	overty and vulnerability of mos	<u>t communities in the A</u>	ol
Significant R	lating:			
Pre-mitigation	on		Post-mitigation	
Moderate Impact Minor Impact			Minor Impact	

Operations Phase

The table below includes a summary of the impact assessment on the operational phase of the Project, pre and post mitigation(s).

Table 6.68 Rating of Impacts Related to Road Safety and Traffic Accidents (Operations)

Project Phase	Project Phase: Construction						
Type of Impa	ct: Direct Negati	ve Impact					
Rating of Imp	Rating of Impacts:						
	Pre-mitigation	1	Post-mitigation (Re	sidual) – including embedded			
			measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning			
Duration	Long-term	Risk of accidents due to road safety is long-term during the operational phase.	Long-term	Risk of accidents due to road safety is long-term during the operational phase.			
Frequency	Often	Current driving practices and state of the roads combined with increased traffic from project construction could lead to accidents occurring often.	Often	Even with implementation of Traffic ManagementPlan, risk of accident could occur on often throughout construction.			
Extent	Local	Limited to Aol.	Local	Limited to Aol.			
Scale	High	Serious traffic accidents could result in severe injuriesor, in the worst case scenario, death.	Medium	Mitigation measures such as signage, driver training, advance warning of diversions, and access to grievance mechanism reduces scale to medium.			
Likelihood	Likely	Road safety accidents during operation are likely.	Possible	Implementation of these mitigation measures is likely to reduce, but not completely eliminate the risk of accidents and injuries.			
Magnitude:							
Pre-mitigatio	on		Post-mitigation (Re	ost-mitigation (Residual)			
Large Magnit	ude		MediumMagnitude				
Sensitivity / V	/uInerability/Imp	portance of the Resource / Re	ceptor:				
Sensitivity is	considered to be	high due to the lack of capac	city of health care facili	ties to deal with trauma cases,			
communities'	untamiliarity wit	n nign traffic densities and po	or road safety awarene	2SS			
Significant R	aung:		Dect mitigation				
Pre-mitigatio			Post-mitigation				
	Major li	mpact	Moderate Impact				

6.4.4 Labour and Working Conditions IA

6.4.4.1 Potential Impacts

Workers' rights, including occupational health and safety, need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working or living conditions. These issues should be considered not only for those who are directly employed by INZAG but also its contractors (including sub-contractors) and within the supply chain.

The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Angolan law or international best practice.

Table 6.69 presents the potentially significant impacts associated with occupational health and safety and worker management during the construction and operation phases. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

Table 6.69 Potential Impacts on Labour and Working Conditions

Construction Phase	Operation Phase
Labour and w orking conditions / w orkers' rights.	_
Worker health and safety.	_
Child labour and forced labour in the supply chain.	

6.4.4.2 Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarised as follows:

- Women may be at risk of being discriminated against, as they are often not offered the same opportunities to get paid employment or are limited to taking on certain roles such as cooking food for workers. Furthermore, women could suffer discrimination if they are not provided with the same working conditions as men once recruited.
- The use of forced labour is illegal in Angola and is not known to be a widespread problem in most regions of the country. It is therefore unlikely that the Project or its contractors and suppliers will be utilising forced labour. In the unlikely event that forced labour is used by subcontractors, this is likely to have an impact on the physical and mental health and well-being of the persons concerned, as well as on their right not to be forced to work.

6.4.4.3 Embedded Measures

As specified in Section 7.7, INZAG has developed a Project-specific Human Resources Management Plan, Project-specific Workers Accommodation Management Plan and is currently drafting an Ethics and Code of Conduct ('the Code') which presents a set of principles, values and rules outlining the Company's expectations on how to conduct business ethically. This Code is applicable to direct employees and partners whether they are clients, subcontractors, suppliers, joint participants in consortiums or other third parties. In particular, the Code includes a section on 'Human Rights and the Workplace Environment' that prohibits any form of violation of human rights such as prejudice, discrimination or harassment. The Groups promotes equal opportunities for all throughout the selection, management and development of human resources. In the 'Social Responsibility' section, the Company only outlines its no-tolerance to the sue of child or forced labour at any level of its organization or supply chain.

INZAG has also developed a workers grievance mechanism and a whistleblowing system which allows employees to raise concerns around the application of the Code. Employees are encouraged to use the managerial channels to report any possible violation of the Code; however, additional communication channels are accessible including a website page and a hotline that ensure anonymity. The Ethics Committee is in charge of investigating any possible violation of the Code.

All temporary site offices, warehouses, workshops, dining areas and surrounding fences around respective facilities will be constructed in accordance with the specifications and regulations of INZAG's policies for occupational health and safety. Required facilities for meals, sanitation and welfare will be provided in accordance with local requirements and Standards of the IFC.

INZAG has also developed a Project-specific Occupational Health and Safety Management Plan outlining the requirements, processes and procedures to identify, address and monitor the occupational health and safety risks associated with the Project activities. This Plan encompasses risks assessments, training, incident reporting and audits and inspections, among other topics.

Furthermore, INZAG has developed a Project-specific Sub-contractor Management Plan describing the specifications and minimum requirements for management and operational control in the areas of Quality, Safety and Environment, applicable to the project works after selection and during execution phase.

6.4.4.4 Feedback from Stakeholders

No feedback has been received on labour and working conditions. This aspect will be revised following engagement with stakeholders as part of the ESIA disclosure process.

6.4.4.5 Impact Assessment

For a further assessment of labour rights and working conditions, refer to the Human Rights Risk Assessment (Section 6.4.10).

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

Construction Phase

Labour and working conditions / workers' rights

Potential impacts to the workforce may include unfair treatment, harassment or prejudice against employees/ individuals dur to union memberships, sexual orientation, gender, etc., gender-based violence and harassment of female workers in the workplace or in the workers accommodation, unfavourable living conditions affecting the health and well-being of person's residing in the workers accommodation, among others.

As a result of the above-mentioned policies and procedures, worker rights should be protected throughout the Project lifecycle. However, issues with implementation and capacity may result in some breaches of workers' rights especially within the supply chain and amongst casual labourers.

If issues arise, there is the opportunity for these to be identified and addressed through the worker grievance mechanism and whistle blowing procedure. However, individuals may be unwilling to report issues and as such breaches may go unnoticed.

On the other hand, there is also the potential for a positive legacy in terms of strengthening knowledge and practice of worker rights of contracted and supplier companies and their employees.

During construction, local employment will be subject to local labour laws and applicable international standards to which Angola is party (i.e. the ILO conventions) in particular with respect to safeguarding the health and safety of workers. In addition, contractors will need to comply with INZAG's HSE Policy standards aimed at safeguarding the health and safety of its employees and subcontractors. These include the use of appropriate equipment and facilities to allow employees to undertake their duties in a professional and safe manner ensuring rights and freedom of association as well as providing a safe and sound work environment for workers. The employer / contractor is therefore expected to develop and implement appropriate health and safety measures for its workforce including enforcing the use of appropriate Personal Protective Equipment (PPE) at all times.

All employees and contractors are required to acknowledge and adopt INZAG's environmental and social work practices and comply with all HSE policies and procedures as well as the Code of Conduct, reporting safety hazards, unsafe work practices, unacceptable conditions, and environmental and social issues.

All contractor contracts will include explicit reference to the need to abide by Angolan law, international good practice and INZAG standards and policies in relation to health and safety.

During construction, the direct interaction between the Project and the workforce if not managed properly, may result in negative impacts on the workers' working conditions and potentially permanent impacts on their health and safety. This impact is considered **moderate** as local populations may not understand their labour rights as enshrined in the law or may be willing to waive these rights in order to earn incomes.

Workers' health and safety

Activities of the site personnel will involve typical construction risks such as risks due to moving equipment and working at height. Accidents resulting in injuries or fatalities remain a possibility albeit with reduced likelihood due to the implementation of the management system and Occupational Health and Safety Management Plan. Injuries and fatalities could have long-term impacts on workers and their families.

The rate of accidents will be dependent on the consciousness and cautiousness of the personnel regarding the specific hazards of the construction work they are involved in. These risks may be managed with adequate trainings in accordance with good management approaches and international construction site practices avoiding problems with the worker-employer relations and significant occupational health and safety risks. The impact of accidents resulting in injuries or fatalities is considered **moderate**.

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Child labour and forced labour in the supply chain

The use of child labour or use of people aged 16-18 in hazardous work within the supply chain remains a possibility albeit with reduced likelihood due to the implementation of mitigation measures. If there are incidences of child labour, the magnitude of the effect to the individual affected will remain unchanged. However, there is still the potential for child labour or use of people aged 16-18 to be involved in hazardous work in the supply chain.

On the other hand, there is the potential for positive legacy in terms of strengthening knowledge and practice of avoiding and managing out child labour within contracted and supplier companies.

This impact is considered **moderate**, **however**, the likelihood of the use of forced labour will be significantly reduced as a result of the proposed mitigation such that it will become a non-routine event. However, should incidences occur the impacts on the individuals affected will remain unchanged.

Operations Phase

There are no direct employment opportunities related to the operational phase, however MINTRANS will be required to monitor and maintain the flyovers in the long-term.

6.4.4.6 Mitigation Measures

Construction Phase

The following mitigation measures will be implemented during the construction phase to reduce any impacts on workers' health and safety and labour rights.

Labour and working conditions/workers' rights

INZAG has developed a Project-specific Human Resources Management Plan, Code of Conduct, Workers Accommodation Plan, Workers Grievance Mechanism and Subcontractor Management Plan to ensure the following:

- Access to clear and understandable information regarding worker's labour and working conditions;
- Provision of reasonable working conditions and terms of employment;
- Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects;
- Implementation of a grievance mechanism for the Project workers including subcontractor workforce;
- Retrenchment preventive measures will be implemented to reduce adverse impacts as a result of termination of contacts which will consider benefits to boost workers employment opportunities post construction where possible. Notice of dismissals will be done in due time and will manage employment expectations of the construction workforce;
- No employee or job applicant will be discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation;
- All workers will, as part of their induction, receive training on worker rights in line with Angolan legislation to ensure that positive benefits around understanding labour rights are enhanced;
- All workers (including those of contractors and subcontractors) will be able to join unions of their choice and have the right to collective bargaining;
- All workers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights;

- Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights;
- As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Angolan law, international standards and INZAG policies;
- INZAG will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with Angolan law through gap analysis and capacity building;
- Contractor contracts will establish the right for INZAG monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, INZAG's policies or clauses in the contract. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers;
- INZAG and Contractors' will implement a program of socioeconomic compliance monitoring to inform internal auditing and monitoring process in the framework of an Environmental and Social Management System. As such, key performance indicators will be developed around worker rights, discrimination and management, workforce grievance mechanism and monitoring of outcomes. As part of the contractor and supplier selection process, INZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Angolan law and ILO international standards;
- As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker management and rights as outlined in Angolan law and international standards;
- INZAG and its Contractors (and subcontractors) will oversee whether suppliers comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards;
- INZAG will put in place a worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed including contractor workers;
- As part of stakeholder monitoring, INZAG will review and monitor the outcomes of community engagement, media coverage and its workforce and community grievance mechanism for additional indications of labour-related issues that may arise;
- The Project ESMS and applicable standards will be put as contractual commitments in all subcontractors and contractors' contracts; and
- During the operations phase, MINTRANS will maintain all provisions of the existing Workers Management Plan in line with Angolan regulations. MINTRANS will maintain a Worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed. Contractors and sub-contractors will be required to put in place a worker grievance mechanism. The MINTRANS worker grievance mechanism shall be open to the contractor and subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer. MINTRANS will then have the authority to act to resolve this grievance.

Refer to additional specific mitigation measures set out in the Human Rights Risk Assessment (Section 6.4.10).

Worker health and safety

INZAG has developed an Occupational Health and Safety (OHS) Management Plan, Incident/ Accident Management Procedure, Workers Grievance Mechanism and Subcontractor Management. The OHS Management Plan will be enforced throughout the Project including all Project personnel (including direct hire employees, advisors and consultants, contractors and sub-contractor personnel). It will include aspects such as regular training and monitoring, as well as inspections and audits.

Within the OHS Management Plan, INZAG will ensure the following measures are included:

- Identification and provision of personal protective equipment (PPE) to all concerned workers during activities to avoid health implications (e.g. dust masks, protective clothing for handling waste materials etc.);
- Pre-employment screening protocols for all employees including contractors and subcontractors which will include medical checks for symptoms TB and other diseases appropriate to WHO recommendations, the individual's country of origin and vaccinations;
- Workers will be provided with primary health care and basic first aid at worksites;
- All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work;
- Regular medical check-ups and centralized medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided; and
- Workforce, including contractors and subcontractors, will be provided with health awareness training, including hazardous works, a significant briefing of hygiene practices (such as hand washing), implementation of educational outreach to increase awareness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the communicable diseases of concerns (including STDs).

Contractor contracts and the Supplier Management Plan will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers. As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker health and safety as outlined in Angolan law, international standards and INZAG policies. Any appointed contractors should establish their own Emergency Response Plan and communicate key information to the Project workforce prior to work commencing on any site.

Child labour and forced labour in the supply chain

The Project-specific Human Resources Management Plan, Code of Conduct and Subcontractor Management Plan will ensure the following:

- INZAG will oversee if suppliers, contractors and subcontractors comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards;
- Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers;
- In all contractor contracts the Project will make explicit reference to the need to abide by Angolan law and international standards in relation to child labour and forced labour; and
- Contractors and subcontractors will need to monitor closely the potential existence of irregular forms of child and forced labour in the supply chain. Action measures and notice to INZAG will be carried out immediately if this is found.

Operations Phase

Worker health and safety

Operations phase will be led by the MINTRANS, following its internal management frameworks. It is recommended for MINTRANS to implement a specific Occupational Health and Safety (OHS) Plan other than an overarching policy.

6.4.4.7 Summary Impact Tables (Pre and Post-mitigation- Residual)

Construction Phase

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s). Impacts during the operation phase are not foreseen.

Table 6.70 Rating of Impacts Related to Labour and Working Conditions / Workers' Rights

Project Phase	Project Phase: Construction				
Type of Impa	ct: Direct Negati	ve Impact			
Rating of Imp	acts:				
	Pre-mitigation	1	Post-mitigation (Residual) – including embedded measures		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Duration	Permanent	Injuries and fatalities could have permanent impacts on workers and their families.	Permanent	Injuries and fatalities could have permanent impacts on workers and their families.	
Extent	Local	Limited to Aol.	Local	Limited to Aol.	
Frequency	Rare	The frequency is considered to be rare as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPE and health and safety measures.	Rare	The frequency is considered to be rare as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPE and health and safety measures.	
Scale	Medium	Medium impact on violations to labour rights as local population may not understand their labour rights as enshrined in the law or may be willing to waive these rights in order to earm incomes.	Small	Despite training and mitigation measures, individuals may be unwilling to report issues and breaches may go unnoticed.	
Likelihood	Unlikely		Unlikely		
Magnitude:					
Pre-mitigation	on		Post-mitigation (Residual)		
MediumMagi	nitude		Small Magnitude		
Sensitivity/V	/ulnerability/lmp	portance of the Resource / Re	ceptor:		
The sensitivi	ty of the receptor	rs is considered medium as so	me workers may not be	e aware of their rights.	
Significant R	ating:		Post mitigation		
-re-mugatio			Fost-mugauon		
Moderate Impact		Minor Impact			

Table 6.71 Rating of Impacts Related to Worker Health and Safety

Project Phase	Project Phase: Construction					
Type of Impa	Type of Impact: Direct Negative Impact					
Rating of Imp	acts:					
	Pre-mitigatior	1	Post-mitigation (Residual) – including embedded measures			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Duration	Permanent	Injuriesand fatalities could have permanent impactson workers and their families.	Permanent	Injuries and fatalities could have permanent impacts on workers and their families.		
Frequency	Rare	The frequency is considered to be rare as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPE and health and safety measures.	Rare	The frequency is considered to be rare as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPE and health and safety measures.		
Extent	Local	Limited to Aol.	Local	Limited to Aol.		
Scale	Medium	Medium impact on worker health and safety may not understand their labour rights as enshrined in the law or may be willing to waive these rights in order to earn incomes.	Small	Despite training and mitigation measures, individuals may be unwilling to report issues and breaches may go unnoticed.		
Likelihood	Unlikely		Unlikely			
Magnitude:						
Pre-mitigatio	n		Post-mitigation (Re	sidual)		
MediumMagr	nitude		Small Magnitude			
Sensitivity/V	ulnerability / Imp	portance of the Resource / Re	ceptor:			
The sensitivit	ty of the receptor	<u>s is considered mediumas so</u>	me workersmaynotbe	e aware of their rights.		
Significant R	ating:					
Pre-mitigatio	n		Post-mitigation			
Moderate Impact				Minor Impact		

Table 6.72 Rating of Impacts Related to Child Labour and Forced Labour in the
Supply Chain (Construction)

Project Phase: Construction				
Type of Impa	ct: Direct Negative I	Impact		
Rating of Imp	acts:			
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning
Duration	Short-term	The incidence will be temporary for the duration of the work to supply materials.	Short-term	The incidence will be temporary for the duration of the work to supply materials.
Frequency	Unknown	Child and forced labour are prevalent in Angola particularly in areas where hazardous work is involved.	Rare	The commitment to audit supply chain labour practices will result in a reduced frequency.
Extent	Regional	This will depend on the place of origin of supplies acquired by project, but it is anticipated the majority of supplies will be sourced regionally.	Regional	This will depend on the place of origin of supplies acquired by project, but it is anticipated the majority of supplies will be sourced regionally.
Scale	Extended	Use of child labour or use of people aged 16-18 to be involved in hazardous work within the supply chain remains a possibility without specific mitigation.	Extended	Use of child labour or use of people aged 16-18 to be involved in hazardous work within the supply chain remains a possibility albeit with reduced likelihood due to the implementation of mitigation.
Likelihood	Possible	The use of child and/or forced labour is possible in the supply chain	Possible	With the mitigation the likelihood should be reduced. However, the risk remains.
Magnitude:				
Pre-mitigation	n		Post-mitigation (Re	sidual)
Large Magnitude			MediumMagnitude	
Sensitivity / V	/ulnerability/Import	ance of the Resource / Recept	or:	
The sensitivi	ty of the receptor is	very high due to the age and v	uInerability of the recep	ptors.
Significant R	ating:		Deed weiting the	
Pre-mitigatio	n		Post-mitigation	
Major Impact			I	Moderate Impact

6.4.5 Access to Infrastructure and Services IA

6.4.5.1 Potential Impacts

The main potential impacts on local infrastructure and utilities as a result of these Project activities are disruption to traffic and transportation, accidents that damage property, utilities (e.g. water, telecommunications and electricity supply), increased pressure on existing local utility supplies and short-term planned and unplanned disruption to electricity, telecommunication, and water supply for irrigation, domestic, drinking, and industrial purposes.

Table 6.73 summarises the potentially significant impacts on access to infrastructure and services during the construction and operation phases of the Project.

Table 6.73 Potential Impacts on Access to Infrastructure and Services

Construction Phase	Operation Phase
Temporary loss of and/or increased pressure on	Benefits from improvements to infrastructure and
social services and utilities.	services, including road improvements.

6.4.5.2 Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarised as follows:

- According to (Internal Labour Organization, 2021), 44% of Angolans have access to electricity. Most of the population without access to electricity live in the western part of the country. Across Angola, around 35% of households have access to electricity through the public network. Lantems remain the primary lighting source for over 36% of households in the country. In SME, households obtain their power from the grid. In Viana the vast majority of households use grid electricity as their main source of electricity (90%). Only 4% source their electricity from gas while around 2% charcoal and candles for lighting respectively. Same in Estalagem, Mulenvos and 5th Avenue, the vast majority of the households source their electricity from the grid.
- The most relevant transportation improvements are the NAIL (New International Airport of Luanda) and the Luanda Railway (LR), among others. The LR construction is nearly completed, new modern locomotives were acquired in order to allow an efficient mobility between the NAIL and city centre. However, in order for this to happen, it will be necessary to improve overall circulation, mainly to better manage the daily high volumes of traffic, not only on the main roads, but also on the crossing points with secondary roads and the railway. Also, the current low operating speeds on the Luanda-Malanje route is a result of the numerous interferences that exist in the urban network of the Caminho de Ferro de Luanda (Luanda Railway).
- Some households in Luanda, located close to the centre of the city, obtain water through their own piped connections to the central water supply network. These households often pay very low or flat rate fees to the water company even though they have better access than people who have to buy water through the informal sector (IDRC, 2011). Public water taps or standpipes in Luanda are built by the public water company EPAL²⁸ or NGOs within neighbourhoods that have an available connection to the water pipeline. Access to standpipes tends to be in pockets as standpipe projects usually cover only very limited geographical areas.
- Most of the communities in the five flyover sites access their water from boreholes and piped water. There are other sources of water including roof catchment, dam, water tankers, reservoir, and storage tanks.

6.4.5.3 Embedded Measures

INZAG intends to reduce the risks and negative impact to infrastructure and utilities by adopting the following embedded measures in the project design:

- To preserve the articulation with the existing road network and minimise disturbances, it is planned to improve roads that will be used to deviate traffic during construction. The preliminary plan has been prepared based on the conditions of the local roads. Improvements concern mainly road widths so these can assure a good condition traffic during works.
- Displacement of water, electricity and telecommunication infrastructure will be minimised during detailed design. This will involve identification of public infrastructure and adjustments to the schedule and diversion of resources to avoid loss where possible.

6.4.5.4 Stakeholder Feedback

No feedback has been received on access to infrastructure and services. This aspect will be revised following the stakeholder engagement activities carried out as part of the ESIA disclosure process.

²⁸ Empresa Pública de Águas de Luanda (Luanda Public Water Company)

6.4.5.5 Impact Assessment

Construction Phase

Temporary loss of access and/or increased pressure on social services and utilities

Construction activities may lead to impacts on access to utilities and infrastructure. Construction activities such as site clearance works, excavation and movement of soil, piling, and flyover construction, may lead to accidents that damage property, utilities (e.g. water, telecommunications and electricity supply) and use more space than acquired /paid for. This is likely to generate pressure on existing local utility supplies, disturbance to traffic and transportation, and short-term planned and unplanned disruption to electricity, telecommunications, and water supply for domestic, drinking, and industrial purposes.

Furthermore, construction activities may also restrict access to public services such as schools, healthcare facilities and religious sites. The loss of access to these such public resources could also result in local households and communities needing to access alternative services or facilities in neighbouring areas, leading to additional pressure on the alternative services or facilities that tend to be under-resourced.

Finally, the establishment of a construction workforce may apply yet further pressure on remaining services or facilities. This may include the use of local schools, clinics, markets, water sources, roads by the workforce. While such a workforce often brings economic benefits, it can readily overwhelm local public services or facilities where similar services is not directly provided by INZAG.

Disruption to infrastructure and utilities could result in impacts to local livelihoods or quality of life and, if left unmanaged, could result in negative health impacts (e.g. water restrictions, inability to pass roads in an emergency etc.). With regards to road and traffic disruption specifically, INZAG plans to improve roads that will be used to deviate traffic during construction. The preliminary plan has been prepared based on the conditions of the local roads. Improvements concern mainly road widths so these can assure a good condition traffic during works. If unmanaged, disruption to services might result in community distrust and resentment towards the Project, especially in those areas where access to infrastructure and utilities is already deficient. The overall impact to disruption of road networks and access to other infrastructure and utilities is expected to be **moderately** negative in significance.

Operations Phase

Benefits from improvements to infrastructure and services including road improvements

Local communities at the five overpass sites will benefit from improved transport routes, access to services and infrastructure to the south of the railway and improved roads. Owing to the road improvements, municipal services (e.g. waste collection) may also be able to access the local communities better than they can currently.

The resulting impact is expected to be of a long-lasting **positive** significance.

6.4.5.6 Mitigation Measures

Construction Phase

Temporary loss of access and/or increased pressure on social services and utilities

The following mitigation measures will be implemented:

 A Public Utilities Enhancement Plan will be developed by INZAG that ensures that infrastructure improvements made during construction (access roads, electric and water supplies, telecommunication, etc.) contribute to the physical and economic development of local communities in the study area. This will improve the quality of life and social inclusion of the neighbouring communities.

- Infrastructure relocated by the Project (electric and telecommunication lines, water supply and irrigation pipes, etc.) will be developed in a way that allows neighbouring communities to benefit from them after construction is over. Special attention will be paid to the settlements located in semi-urban and rural areas with poor access to infrastructure and services. The Public Utilities Enhancement Plan will be developed in close coordination with local utilities companies, authorities at the regional and local level and communities to ensure the appropriateness of the relocation and improvements.
- Diversion routes have been planned as part of the construction plan (refer to Section 2.3.3), which will direct traffic onto alternative routes through parallel road and access Catete Road at different intersections. According to INZAG, upgrades to these roads will be made to ensure they can cope with the additional traffic, however, the current version of the Project design does not provide detailed information about the planned improvements of diversion roads.
- INZAG shall develop a Traffic Management Plan which will include a wide range of measures such as stakeholder engagement before temporary closure and diversion of the roads, appropriate signage, requirements in case a new access road needs to be built, etc.
- INZAG will liaise and engage with local authorities and utilities companies to ensure continuity of supply to communities. Only short-term "planned" disruption to drinking water or electricity services will be allowed.
- INZAG will work with local utilities companies to ensure coordinated and rapid response to unplanned events such as damage to electric lines and water pipes.
- CLOs will be present at work fronts to ensure that impacts from planned disruptions are minimised and that unplanned disruptions are properly managed.
- Grievance Redress Mechanism will be in place ensuring rapid response time and access to a compensation process should unplanned disruption result in loss of livelihoods that could not otherwise be avoided.

Operations Phase

Benefits from improvements to infrastructure and services including road improvements

The following enhancement measures will be considered to maximise the positive outcomes that will stem from the improvement of the infrastructure and service and road improvement quality:

The Public Utilities Enhancement Plan developed by INZAG will continue to bring access to improved telecommunication lines, water supply and irrigation pipes, etc. to neighbouring communities, specially to the settlements located in semi-urban and rural areas with poor access to infrastructure and services.

6.4.5.7 Summary Impact Tables (pre and Post-mitigation- Residual)

Construction Phase

The table below includes a summary of the impact assessment on the construction phasse of the Project, pre and post mitigation.

Table 6.74 Rating of Impacts Related to Temporary Loss of and/or Increased Pressure on Social Services and Utilities

Project Phase: Construction				
Type of Impact: Direct Negative Impact				
Rating of Imp	acts:			
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning
Duration	Short-term	Short-term as the impact is considered to last throughout the construction phase.	Short-term	Short-term as the impact is considered to last throughout the construction phase.
Frequency	Rare	Planned and unplanned disruption to infrastructure and services (planned and unplanned disruption to electricity, telecommunication, and water supply for domestic, drinking, and industrial purposes) will be short- term.	Rare	Only short-term "planned" disruption to drinking water or electricity services will be allowed. CLOswill be present at work fronts to ensure that impacts from planned disruptions are minimised and that unplanned disruptions are properly managed.
Extent	Local	Limited to Aol.	Local	Limited to Aol.
Scale	Medium	Medium disruption to infrastructure and utilities which could result in impacts to livelihood or quality of life and if unmanaged could result in health impacts (e.g. water restrictions, inability to pass roads in an emergency etc.).	Small	Public Utilities Enhancement Plan, embedded design and diversion schemes, and Traffic Management Plan as well as continued engagement reduce scale to small.
Likelihood	Likely	Short-term planned and unplanned disruption is expected during construction phase.	Likely	Short-term planned and unplanned disruption is expected during construction phase but drinking water and electricity services are expected to have only short- term and planned disruption.
Magnitude:			B ()	
Pre-mitigation		Post-mitigation	(Residual)	
MediumMagnitude		Small Magnitude	·	
Sensitivity / vulnerability / Importance of the Resource / Receptor:				
i ne sensitivity of the focal communities is high as they depend on the road network to access healthcare services.				
Bre mitigation			Post-mitigation	
Moderate Impact		1 Ost-mugauon	Minor Impact	

Operations Phase

The table below includes a summary of the impact assessment on the operational phase of the Project, pre and post mitigation.

Table 6.75 Rating of Impacts Related to Improvements to Infrastructure and Services

Project Phase: Operations				
Type of Impact: Direct Positive Impact				
Rating of Imp	acts:			
	Pre-mitigation		Post-mitigation (Residual) – including embedded	
	Decignation	Summary of Poasoning	Designation	Summary of Poasoning
Duration	Long-term	Infrastructure improvements could potentially benefit communities access to services (e.g. road network).	Long-term	Local communities will benefit from infrastructure improvements made during construction aspart of the Public Utilities Enhancement Plan, resulting in improved access to electricity, telecommunication, and water in a long- term.
Frequency	Continuous	The frequency of the impact is continuous throughout the operation phase.	Continuous	The frequency of the impact is continuous throughout the operation phase.
Extent	Local	Limited to Aol.	Local	Limited to Aol.
Scale	Medium	Improved accessto certain infrastructure and services.	Medium Improvement of the quality of live a social cohesion due to a better acc and less disruption of electricity, telecommunication and water	
Likelihood	Likely	Infrastructure benefits are likely aspart of Project enhancements.	Likely	Infrastructure benefits are likely as part of Project enhancements.
Magnitude:				
Pre-mitigatio	n		Post-mitigation (Residual)	
MediumMagr	nitude		MediumMagnitude	
Sensitivity / V	ulnerability/Imp	ortance of the Resource / Re	ceptor:	
The sensitivity of the local communities is high, especially for communities in close proximity of the road, who have deficient				
access to intrastructure and utilities: lower connection rate to th			to the grid, poor access	s to network service, temporary disruption
or water suppry for agricultural purposes etc.				
Bro mitigation			Post mitigation	
Pre-mugauon			Post-mugauon	
Positive Impact		Positive Impact		

6.4.6 Community Cohesion IA

6.4.6.1 Potential Impacts

Impacts to community stability and cohesion are of particular importance to infrastructure projects which can often raise tensions within communities (intra-community tension) and between communities (inter-community tension).

Furthermore, the establishment of the Project will likely result in the physical displacement of households. While physical displacement itself has impacts that can be mitigated though provision of replacement dwellings, the potential fragmentation of social structures, via the dispersed displacement of portions or parts of existing communities, will remain as an issue.

This is particularly a threat for those who are vulnerable and marginal and rely on social structures that have been developed as part of a community. People who rely on charitable acts for their survival are in this category of vulnerability as are those who may be aged or infirm and rely on favours from neighbours or nearby kin to survived. The impact also manifests itself in potential growth in socially unacceptable behaviours where authority structures are fragmented and the role of guidance from elders and authority figures is restricted.

Table 6.76 presents the potential impacts associated with disruptions to community cohesion during the construction and operation phases.

Table 6.76 Potential Impacts on Community Cohesion

Construction Phase	Operation Phase
Disturbance from the presence of w orkforce.Community severance.	 Loss of access to communal resources and infrastructure.
Unmet expectations regarding Project benefits.	

6.4.6.2 Baseline Conditions

Community cohesion relies on a variety of factors, including positive relationships within a community, including shared resources and economic or social and psychological support. Cohesion is enhanced through access to similar resources, common vision, or circumstances, as well as integration and acceptance levels.

Community cohesion varies between the five flyover sites, as measured by household reliance on other households in the local area for support within the local context (detailed below). The variation in cohesion is likely to be the result of several factors. These could include the household income levels, length of stay in the community, permanence of residence, and cultural or social background.

SME – Moderate cohesion

• There are a small number of residential houses in the Aol, but the area predominantly comprises industrial and commercial activities. One of the three households surveyed indicated that they relied on being connected to another household for food, money, emotional support, and security.

Viana – High cohesion

• Viana is a dense residential area north of Catete Street and the railway, with an extremely high number of mobile traders operating on the railway and at the intersection. Of the 48 households surveyed, 56% rely on other households in the local area for social support, including food, water, childcare, money, psychological support, and security.

Estalagem – Low cohesion

• Estalagem comprises a dense residential area north of Catete Street and the railway and to the west of the upgraded road, with a large area of open, undeveloped land owned by a hotel opposite. There were 41 households surveyed, and 20% indicated that they relied on other local households for financial and psychological support.

Mulenvos – Moderate cohesion

Mulenvos is a mixed residential and commercial area, with a high number of mobile traders, taxis and vehicular traffic. There were 17 households surveyed, and the majority (71%) indicated that they did not rely on other local households for financial or social support, however five (29%) of the respondents indicated that psychological support is sought through neighbours or other local connections.

5th Avenue – High cohesion

• This site is predominantly high density residential and commercial with a large amount of vehicular traffic. A total of 48 houses were surveyed and just over half (52%) indicated that they relied on other local households for social support, mainly food, childcare, money, psychological support, and security.

6.4.6.3 Embedded Measures

The following embedded measures will be considered by the Project design and planification in order to minimise and mitigate risks and negative impacts to community cohesion:

- Each stakeholder engagement phase will be carefully planned to be in line with the level of Project activity and stakeholder relations, considering social tensions and engagement priorities.
- Engagement mechanisms will also be 'culturally appropriate,' including local languages and communication processes towards the different stakeholder groups, including vulnerable groups.
- Best strategies to reach specific stakeholder representatives (e.g., the President of women's groups, youth groups, etc.) will also be carefully designed through the support of INZAG's Community Liaison Officers (CLOs) prior to the onset of such activities.
- Dedicated approaches and increased resources will be used for engagement with vulnerable groups so that these groups can fully understand the issues that are potentially affecting them and are provided with specific opportunities to ask questions and express concerns.
- A Grievance Redress Mechanism will be in place throughout the construction and operational phases to address the concerns and grievances raised by external stakeholders.
- The pre-construction phase will include:
 - Providing regular Project updates to stakeholders (through Community Liaison Officers (CLOs));
 - Planning resettlement and livelihood restoration engagement;
 - Receiving, responding to, and monitoring grievances received;
 - Maintaining a stakeholder database, stakeholder engagement log and grievance log;
 - Revising stakeholder mapping to accommodate changes in the Project and social dynamics; and
 - Reviewing and assessing stakeholder participation to revise, if necessary, the frequency, means and format of engagement to meet accessibility and participation requirements of all stakeholders.

6.4.6.4 Feedback from Stakeholders

No feedback has been received on community cohesion. This aspect will be revised following the stakeholder engagement activities undertaken as part of the ESIA disclosure.

6.4.6.5 Impact Assessment

Construction Phase

Disturbance from the presence of workforce

With large construction projects, there is always the risk of job seekers from outside of the area moving in with the hopes of receiving employment or project benefits. Furthermore, there may also be an influx of individuals/ households wanting to receive compensation from the resettlement activities. Influx will increase the pressure on already pressured social services.

To limit disturbances related to the influx of outside workers into the Project area, INZAG' employment strategy and recruitment process will need to clearly communicate to stakeholders that local candidates from the area will be prioritised to the fullest extent possible.

The Project's Community Liaison Officer (CLO) will proactively and regularly engage with local stakeholders prior to commencement of construction activities, providing updates and answering their queries. The CLO will be present on the ground during the whole construction process and available to the affected communities. The aim of this is to ensure that all working practices are transparent and any issues between local residents and non-local workers are communicated and dealt with early on.

Ongoing dialogue will be maintained between the Project and local communities to assist in information sharing regarding employment practices and the use of non-local staff. Local communities will be provided information on the number of non-locals to be brought to the area, their housing arrangements, and the measures that the Project is putting in place to ensure that all workers abide by local customary practices.

Information will also be shared on the number of local unskilled and semi-skilled positions available to local residents, along with the recruitment methods used to identify potential candidates.

A Project Grievance Redress Mechanism will be developed and implemented, and information about this mechanism will be shared amongst local communities. The Project will also be responsible for managing an internal grievance mechanism that allows employees to raise complaints. This will be a key monitoring and reporting requirement of the Project.

The Grievance Redress Mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognisant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders. Additional resources may be required to resolve concerns within a set timeframe.

The significance of the impact before mitigation is **moderate** on the potential disturbances regarding inter-community and intra-community tensions.

Community severance

The construction of the flyovers is likely to cause communities, households, and individuals to be affected due to severance of social resources.

The Project will require resettlement of houses and businesses, and possibly the fragmentation of communities during construction. Restriction of access across the railway is likely to cause local communities, households, and individuals to be restricted from accessing economic and social resources, including customers, healthcare, schools, and other communities.

Severance issues, such as households no longer having direct access to some of their land, schools, shops, other neighbourhoods, due to physical barrier posed by the project is one of the main negative effects on social cohesion within the AoI. The effects of community severance are not limited to a restriction of movement, but also to psychological consequences on individuals which, experienced collectively, could disrupt local social structures.

The significance of the impact on community severance before mitigation is **major** and is likely to be limited to the communities in the AoI.

Unmet expectations regarding Project benefits

There is a high degree of expectation that the proposed Project will bring local and municipal/ district level benefits. The main expectation for benefits is access to employment opportunities, compensation packages and economic and livelihood benefits related to the development of the flyovers. Due to the extent of these expectations, there is potential for unmet expectations especially if workers from other parts of Angola are on site.

There is a risk for some communities to have perceptions of unfair or inequitable compensation arrangements for land and the belief that those people who are being resettled are receiving additional benefits resulting in the perception that there are 'winners and losers' or that some people are missing out. This fear is exacerbated as many people do not have title deeds to the land/businesses they utilise and may be concerned that they will not be eligible for compensation.

The significance of the impact is **moderate** and the discontentment associated with unmet expectations could last for the medium-term but will be restricted to the Aol.

Operation Phase

Loss of access to communal resources and infrastructure

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The displacement of households and businesses will be permanent. This displacement will take some time to stabilise and reduce impacts to the individuals affected. There will be a period of adjustment to reestablish social networks. There may be a change in the volume of pedestrian and motor traffic within these areas due to restrictions on land use (e.g. preventing pedestrian access across the railway), and loss of mobile trader areas. Due to the informal and dynamic nature of the local context, especially 5th Avenue and Estalagem, the overall impact is unknown and will require ongoing monitoring to ensure indirect displacement of livelihoods does not occur.

6.4.6.6 Mitigation Measures

Construction Phase

Disturbance from presence of workforce

Implement a comprehensive engagement programme in the project area, building on the SEP, stating:

- Communication will be based on the principle of transparency and clarity, clearly explaining the selection process and criteria.
- Ongoing dialogue between the Project, through its Community Representatives (CR) and local communities to assist in information sharing regarding employment practices and the use of non-local staff. Local communities to be provided information on the number of non-locals to be brought to the area, their housing arrangements, and the measures that the Project is putting in place to ensure that all workers abide by local customary practices. Information will also be shared on the number of local unskilled and semi-skilled positions available to local residents, along with the recruitment methods used to identify potential candidates.
- Relevant Project information in particular those related to environmental and socioeconomic impacts, employment and project benefits will be disclosed at the local level in a manner that is accessible, understandable, and culturally appropriate for those affected. This will be facilitated by the Community Representatives (CR) employed for the duration of construction activities. The CLO will proactively and regularly engage with local stakeholders prior to commencement of construction activities, providing updates and answering their queries. The CLO will be present on the ground during the whole construction process and available to the affected communities. The aim of this is to ensure that all working practices are transparent and any issues between local residents and non-local workers are communicated and dealt with early on.
- A Project Grievance Redress Mechanism will be developed and implemented, and information about this mechanism will be shared with local communities. The Contractor will also be responsible for managing a grievance mechanism that allows communities and employees to raise complaints. This will be a key monitoring and reporting requirement of the Project. The grievance mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognisant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders. Additional resources may be required to resolve concerns within a set timeframe.

Community severance

A Severance Management Plan with a detailed assessment and measures to mitigate community severance in each of Aols should be developed by INZAG. Stakeholders should be liaised with regarding the Plan (i.e. relevant authorities and project affected communities) and informed about identifying severance issues and undertaking coordinated action regarding design solutions (e.g. alternative routes and relocation of mobile traders).

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Unmet expectations of benefits

Communities will be continuously and transparently engaged by the Project and regularly updated on Project activities Information disseminated during these meetings will emphasise the limited nature of employment and the recruitment processes. A Grievance Redress Mechanism will also be in place.

Operations Phase

Loss of access to communal resources and infrastructure

The final Project design will include access for vehicles and pedestrians to move safely over the railway. The high volumes of mobile traders using some of the sites currently could be permanently displaced or create new informal marketplaces which could have public health and safety impacts in the future.

It is recommended that INZAG and MINTRANS develop an operational ESMP and the MINTRANS continue to implement the project community Grievance Redress mechanism. It is recommended that these mitigation measures be specified in any hand over agreements.

6.4.6.7 Summary Impact Tables (Pre- and Post-mitigation – Residual)

Construction Phase

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s).

Table 6.77 Rating of Impacts Related to Disturbance from the Presence of Workforce

Project Phase: Construction					
Type of Impact: Direct and Indirect Negative Impact					
Rating of Imp	acts:		r		
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Duration	Short-term	Disturbance from the presence of workforce would be mainly during the 24 months construction period.	Short-term	Disturbance from the presence of workforce would be mainly during the 24 months construction period.	
Frequency	Intermittent	Potential disturbance would only occur during daytime in areas where workforce could interact with communities.	Intermittent	Local communities to be provided information on the number of non-locals to be brought to the area, their housing arrangements, and the measures that the Project is putting in place to ensure that all workers abide by local customary practices. This will reduce the frequency of potential disturbance.	
Extent	Local	Local Aol.	Local	Local Aol.	
Scale	High	Infrastructure projects often raise tensionswithin communities (intra- community tension) or between communities (inter-community tension).	Minor	The establishment of Community Representatives (CR) and local communities to assist in information sharing with regard to the use of non- local staff and the grievance mechanism will diminish the perceived tensions by communities.	
Likelihood	Unlikely	Delimited work fronts, interaction is not considered likely to happen.	Unlikely	Considering the implementation of the SEP and its related measures, it is unlikely to have disturbance incidents.	
Magnitude:					
Pre-mitigation			Post-mitigation (Residual)		
Large Magnitude			Minor Magnitude		
Sensitivity/Vulnerability/Importance of the Resource / Receptor:					
Significant B	nsidered of high	Importance to local communit	ies.		
Pre-mitigation			Post-mitigation		
Moderate Impact			Minor Impact		

Table 6.78 Rating of Impacts Related to Community Severance

Project Phase	Project Phase: Construction				
Type of Impact: Direct Negative Impact					
Rating of Imp	acts:				
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Duration	Short-term	Community severance would be mainly during the 24 months construction period and to varying degrees, as construction commences and ends with each flyover.	Short-term	Community severance would be mainly during the 24 months construction period and to varying degrees, as construction commences and ends with each flyover.	
Frequency	Continuous	Disruptions to movement as well psychological effects on social fabric to be a continuous impact.	Occasional	Disruptions to movement as well psychological effects on social fabric to be a continuous impact.	
Extent	Local	Local Aol.	Local	Local Aol.	
Scale	High	Scale will range from medium to high.	Medium	Detailed Severance Management Plans will be developed in each community impacted by a flyover location to address specific impacts.	
Likelihood	Likely	Severance issues are likely to occur.	Possible	Severance issues are likely to occur.	
Magnitude:					
Pre-mitigatio	n		Post-mitigation (Residual)		
Large Magnit	tude		MediumMagnitude		
Sensitivity/V	/uInerability/Imp	portance of the Resource / Re	ceptor:		
Severance and issues, such as households no longer having direct access to some of their land, schools, shops, other neighbourhoods etc, due to physical barrier posed by the project is one of the main detrimental effects to social fabrics of the communities in the Aol.			ne of their land, schools, shops, other n detrimental effects to social fabrics of		
Significant Rating:					
Pre-mitigation			Post-mitigation		
Major Impact			Moderate Impact		

Table 6.79 Rating of Impacts Related to Unmet Expectations of Benefits

Project Phase: Construction					
Type of Impact: Direct Negative Impact					
Rating of Imp	oacts:				
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Duration	Medium-term	Discontent associated with unmet expectations will fluctuate over the construction phase of the Project with varying intensity as different components are completed.	Shorī-term	Discontent associated with unmet expectations will fluctuate over the construction phase of the Project with varying intensity as different components are completed.	
Frequency	Occasional	Discontent may fluctuate over time however is likely to be strongest during high periods of land acquisition and Project employment	Rare	Discontent may fluctuate over time however is likely to be strongest during high periods of land acquisition and Project employment.	
Extent	Local	Impacts restricted to AoI.	Local	Impacts restricted to AoI.	
Scale	Medium	The location within an urban area with high unemployment could result in high expectations, especially from directly affected communities within the Aol.	Small	Proactive communication will reduce unrealistic expectations.	
Likelihood	Likely	Unmet expectations of benefits are likely to be widespread within the local context	Possible	With intervention and good engagement, there may still be some level of expectation or individuals trying to leverage the benefits for a specific group or economic purposes.	
Magnitude:					
Pre-mitigatio	on		Post-mitigation (Residual)		
MediumMag	nitude		Small Magnitude		
Sensitivity / Vulnerability / Importance of the Resource / Receptor:					
discontent will formif direct Project employment opportunities are not geared towards benefiting local populations and workers from other parts of Angola are onsite. In addition, lack of title deeds and unfair or inequitable compensation arrangements may create a perception of "winners and losers."			s and compensation benefits. It is likely that ards benefiting local populations and unfair or inequitable compensation		
Significant R	ating:		Doot mitigatie:		
Pre-mitigatio			Post-mitigation		
Moderate Impact		Minor Impact			

Operations Phase

The table below includes a summary of the impact assessment on the operational phase of the Project, pre and post mitigation(s).

Table 6.80 Rating of Impacts Related to Loss of access to communal resources and infrastructure

Project Phase: Operations					
Type of Impact: Direct Negative Impact					
Rating of Imp	acts:				
	Pre-mitigation		Post-mitigation (Res measures	sidual) – including embedded	
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Duration	Long-term	Impacts due to displacement of businesses and households, and removal of communal areas used for mobile traders, may prevail into operations phase.	Medium-term	Immediate impacts may stabilise after construction	
Frequency	Often	Impacts due to displacement of businesses and households, and removal of communal areas used for mobile traders, may be permanent.	Rare	Immediate impacts may reduce after construction.	
Extent	Local	Impact limited to Aol.	Local	Impact limited to AoI.	
Scale	Medium	Short-term reductions in community well-being from loss of access to basic services before reinstatement is considered medium scale.	Small	The implementation of livelihood restoration and grievance redress mechanisms will promote the faster reestablishment of social cohesion, however residual impact is likely to take time to dissipate.	
Likelihood	Likely	The project will displace households and businesses and is likely to change the local social cohesion following construction.	Possible	The implementation of livelihood restoration and grievance redress mechanisms should reduce the overall impact and promote social cohesion during operation.	
Magnitude:					
Pre-mitigatio	on		Post-mitigation (Res	sidual)	
MediumMagi	nitude		Small Magnitude		
Sensitivity/V	ulherability / Imp	portance of the Resource / Rec	cepetor:		
Medium Sensitivity is households a	considered medi and livelihoods.	umas local communities dep	end on existing social r	resources to support and sustain their	
Significant Rating:					
Pre-mitigatio	n		Post-mitigation		
Moderate Impact Minor Impact			Minor Impact		

6.4.7 Traffic IA

6.4.7.1 Potential Impacts

Potential impacts related to road traffic can be expected as a result of the factors listed below.

- Construction:
 - Traffic delays and congestion resulting from additional vehicle travel on roads, including vehicle travel related to delivery of materials and supplies, movement of construction vehicles and equipment, and employee travel.
 - Active worksites on and adjacent to roads.
 - Temporary lane or road closures.
 - Temporary railroad stoppages or delays.
- Operations:

- New vehicular and pedestrian travel patterns resulting from overpasses.
- Reduced conflict between moving vehicles, trains and pedestrians.
- Reduced railway travel times.
- Improved road infrastructure.

These Project activities would have impacts on traffic congestion, road safety, and the condition of road surfaces.

6.4.7.2 Baseline Conditions

The results of the transportation and traffic baseline can be summarized as following:

- The Estrada de Catete is a major east-west road corridor across northern Angola. In the Project area, the Estrade de Catete is a 6-lane road with a raised central median. This road segment has numerous pedestrian overpasses, two grade-separated interchanges, and numerous at-grade intersections. The Estrada de Catete is not conducive to pedestrian travel.
- The five roads on the north side of Estrada de Catete that are proposed for overpasses across the railroad tracks are extensively used for pedestrian as well as vehicular travel.
- In 2019, the Estrada de Catete in the Project area carried between 4,000 and 7,000 vehicles per hour during the morning rush hours and between 2,400 and 8,100 vehicles per hour during the evening rush hours. Traffic volumes were higher closer to the centre of Luanda and lower at the western traffic count locations.
- Angola's rate of traffic fatalities has been trending downwards since 2013 and was estimated at 23.6 annual fatalities per 100,000 population in 2016. The highest number of traffic fatalities (41 percent) were pedestrians.
- The Luanda Railway, which extends from Luanda to Malange, is one of three main rail lines in Angola and transports both passengers and freight. The rail line has approximately 12 at-grade, vehicular road crossings between 5th Avenida and the border of Luanda Province.
- Operation of the new Luanda International Airport (NAIR) will generate increased demand for travel on the Estrada de Catete and the Luanda Railway.

6.4.7.3 Embedded controls

The embedded measures listed below have been incorporated in the Project design or will be incorporated in Project construction or operation procedures. The road transportation impact assessment assumes that these controls will be implemented and that supplemental mitigation measures would therefore be "above and beyond" these embedded controls to address site-specific risks.

Transportation Measures for Construction:

- Schedule employee shifts and truck deliveries to minimise congestion and conflicts with local traffic, particularly vulnerable road users such as school children or school buses.
- Maintain (or initiate, where needed) relationships with local stakeholders to keep communities up to date regarding Project schedules, activities, and risks.
- Provide a grievance mechanism that is easy to access, transparent, responsive. Accept grievances related to road traffic in writing, electronically, by telephone, or verbally at community stakeholder meetings. Create written record of all grievances submitted verbally.
- Establish and enforce driver qualification and training standards:

- Use only drivers with the required driving license. Enforce driver qualifications and training for all drivers, whether employees or sub-contractors. Include requirements in applicable contracts.
- Establish driver training program specific to the vehicles, roads and risks encountered for the particular tasks.
- Require regular truck driver safety training, defensive driving training, and testing.
- Establish and enforce consistent safe driving practices:
 - Define rest and break standards that comply with industry and national standards.
 - Structure contracts with truck contractors to avoid incentives for speeding or insufficient fatigue break.
 - To the degree permissible by law, require daily or periodic drug and alcohol testing for all drivers.
 - Equip trucks with speed governors or on-board GPS, and/or monitor vehicle speed and location.
 - To the agree allowed by law, enforce driver quality through loss of jobs or contracts for individual drivers for drug or alcohol offenses, chronic or egregious speeding, or other notable or repeated unsafe behaviours.
- Require scheduled, preventative vehicle maintenance according to manufacturers' recommendations for all Project vehicles, whether owned by Project or a contractor.
- Require completion of a vehicle safety checklist daily prior to vehicle operation on public roads.
- Provide uniform in-vehicle communications systems that enable contact with truck traffic controllers and other drivers.
- Require that noise-control devices be in good operating condition.

Noise Management Measures for Construction:

- Implementation of speed limits (50 km/h) for trucks while travelling to and from construction sites (within settlements and on minor roads of poor condition: 30 km/h).
- Reducing Project traffic routing through community areas wherever possible: The majority of Project subcontractor traffic will be routed from industrial areas via the main road axis (Estrada de Catete/Avenida Deolinda Rodrigues), towards the construction sites.
- Limiting hours of operation for specific equipment or operations (e.g., trucks or machines operating in or passing through community areas)

Resources and Waste Measures for Construction:

The following mitigation measures will be applied within the Quarry Operations Procedures (to be verified with 3rd party providers):

- Contractor will consider social issues in designing the transport routes to minimize the need to
 pass through populated areas.
- The contractor will ensure that the width of the access roads is broad enough, especially in villages.

Land Use Measures for Construction

Access will be maintained to all existing land uses, buildings and facilities along the project footprint during construction. Where temporary diversions and alternative access arrangements are required, the relevant land use, businesses or residents will be informed well in advance of the alternative access arrangements and detours will be clearly signposted. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

INZAG's Smart Design Solution

During the preliminary study, INZAG identified that in most situations the implementation of the flyover would cause important constraints in traffic circulation within the neighbourhood. Therefore, new side service and return roads were included to allow access to the flyover, as well as access for any emergency vehicles. The proposed design includes service and access routes to provide adequate road circulation in the surrounding neighbourhoods.

6.4.7.4 Impact Assessment

The impact assessment for road transportation has been carried out in line with the methodology outlined in Section 6.1.

Construction Phase

The construction phase will have two types of impacts on road traffic:

- Disruption in local traffic circulation. Each road segment that is being replaced by an overpass will be closed to traffic while the new road improvements are constructed. Disruption to traffic patterns will be significant, as each of the five overpass locations is a road that provides access across the railroad tracks to Estrada de Catete. Most other roads on the north side of Estrada de Catete terminate on the north side of the railroad tracks, leaving few vehicular access points to the Estrada de Catete.
- Additional traffic due to construction activities, including heavy vehicle traffic and employee commuting.

INZAG would address the disruption in local vehicle traffic circulation by identifying detour roads for traffic to use at each overpass location (Section 2.3.3 of Project Description). INZAG plans to widen some local roads that would carry traffic along the detour routes; detailed plans for road widening have not been made available. The roads disrupted by overpass construction generally traverse densely developed areas with extensive, interconnected road networks that provide multiple routes to reach local destinations north of the railroad track. The detour route for each construction site is discussed below.

- 5th Avenue Overpass: Access to the Estrada de Catete at 5th Avenue would be cut off during a construction period of approximately 11 months. Traffic would be directed to instead use the Rua Dos Commandos, a major road that intersects the Estrada de Catete approximately 1.5 km west of 5th Avenue. Three unnamed roads are identified to provide alternative access to areas on either side of 5th Avenue.
- Mulenvos Overpass: Access to the Estrada de Catete at Estrada dos Mulenvos would be cut off during a construction period of approximately 12 months. Traffic would be directed to the Estrada de Catete via either 5th Avenue, 2.3 km to the west, or an unnamed road 2.0 km to the east, with connections between these access points provided by the Rua Das Condutas and unnamed roads. The construction plan calls for phasing such that the 5th Avenue overpass would completed and available for traffic several months into the Mulenvos Overpass construction.
- Estalagem Overpass: Access to the Estrada de Catete at the Estalagem overpass would be cut off during a construction period of approximately 11 months. Traffic would be directed to access the Estrada de Catete via an unnamed street approximately 200 m to the east which currently terminates at the railroad right-of-way and continues only as pedestrian access to the railroad right-of-way. Some surface improvements would be needed between the current road terminus and the Estrada de Catete paved surface to allow vehicular access during construction. Local traffic to the properties near the overpass construction would be directed to existing unnamed roads.
- Viana Overpass: The proposed Viana overpass would extend an existing, unnamed road that currently terminates north of the railroad track and does not provide vehicular access to the

Estrada de Catete. Access during construction would continue to be provided approximately 260 m to the east where an unnamed road intersects the Estrade de Catete. Local traffic to the neighbourhood immediately adjacent to the overpass and service road construction would be directed to two additional unnamed roads.

SME Overpass: Access to the Estrada de Catete at SME would be cut off during a construction period of approximately 10 months. Traffic would be directed to instead use an unnamed road that intersects the Estrada de Catete approximately 1.1 km east. The road network is sparser in the vicinity of the SME Overpass, and the detour required for vehicles from the Estrada de Catete to reach the properties near the overpass construction area is approximately 4.3 kilometers, further than for the other overpass detour routes. The area provides fewer alternative routes.

The additional traffic generated by construction would include worker commuting and truck deliveries (or waste removal). Construction hours would be Monday through Friday 7 am through 5 pm and two Saturdays per month. Nighttime work hours will be scheduled to avoid impacts on road and rail traffic, especially for transportation from INZAG's main construction yard to the overpass construction yards, and for assembly of overpass structures over the railroad.

Table 2.6 of the Project Description provides the construction trip estimates given below for trips from suppliers to INZAG's central construction yard or to the individual construction sites. These deliveries originate at several locations ranging in distance from Luanda Port, 15 km from the closest overpass construction site (the 5th Avenue site) to a quarry 180 km away. While the regional traffic is dispersed among different sources, this assessment focuses on the concentration of construction traffic along the Estrada de Catete and on roads local to the overpass construction sites. Table 6.81 summarizes trip data provided by INZAG regarding vehicle deliveries.

Type of Shipment	Source and Destination	Total	Duration	Monthly
		trips		trips
Earthw ork material	Quarry to INZAG central yard (temporary stockpiling)	1,300	8 months	160
Base course material	Quarry to INZAG central yard (temporary stockpiling)	720	10 months	72
Concrete	Prefangol facilities to construction sites	1,700	8 months	220
Asphalt	Asphalt plant to the construction sites	300	10 months	30
Steel structures	Luanda Port to construction sites	200	-	-

Table 6.81 Anticipated Truck Deliveries for Project Construction

The number of trips from INZAG's central yards to each overpass construction site to deliver stockpiled materials, waste disposal, and routine supply deliveries (especially fuel) have not been provided. The peak volume of truck traffic also requires understanding of the overlap for different types of shipments overlap.

Table 6.82 provides the assumptions used to estimate the peak truck traffic volumes. The estimated construction workforce would peak at 365 workers and require an average of 225 workers (see table and additional detail in Section 2.8.4 of the Project Description). More than 97 per cent of the workforce would be local residents. This analysis assumes that expatriate workers would be accommodated at local lodgings and that all workers would use existing transportation resources (collective taxis, minibuses, and buses) to access Project job sites. Therefore, Project-related worker travel is not anticipated to add substantially to the commuter traffic in the region or on the Estrada de Catete.

Based on the above, estimates daily Project-related Construction Traffic during the peak construction period.

Table 6.82 Estimated Project-related Traffic during Peak Construction

Type of travel	Estimated daily one-way trips	Basis for estimate				
Truck Traffic						
Earthw ork and base course material deliveries to INZAG central facility	21	232 deliveries monthly (464 one-way trips) divided among 22 workdays per month				
Earthw ork and base course material deliveries from INZAG center facility to overpass sites	42	Assumes INZAG will use smaller vehicles and twice as many trips to move the materials from its central facility to the worksites.				
Concrete and asphalt deliveries to overpass sites	23	250 deliveries (500 one-w ay trips) divided among 22 w orkdays per month				
Steel deliveries to overpass sites	80	Assumes that 200 deliveries (400 one-way trips) occur over a 5 month period, or one month per overpass site.				
Routine deliveries to overpass sites; w aste transport from overpass sites	20	Assumes 2 deliveries or waste removal round trips daily per site, or 10 total per day (20 one-way trips)				
Peak Estimated Daily Truck Trips	140	The sum of the estimated daily one-way truck trips is 186 trips; assume that no more than 75 per cent of these trips would overlap during the period of peak construction traffic.				
Worker Traffic						
Commuting Trips	90	Assumes ridesharing with an average of 4 workers per vehicle for a peak of 365 workers (730 one-way commutes daily)				
Total	230					

The estimated 90 commuting trips would increase the average peak hour traffic on the Estrada de Catete (averaging about 6,000 vehicles per hour in the Project vicinity) by about 1.5 per cent. No noticeable impact on the Estrada de Catete would be anticipated, but workers arriving at or departing from worksites could produce congestion on the local routes to the Project sites for brief periods. Truck traffic would be distributed throughout the day and therefore would not increase peak hour congestion. On local roads leading to the construction sites, truck traffic could increase the rate of deterioration of road surfaces and present challenges for pedestrians and motorists not accustomed to trucks within neighbourhoods. INZAG's embedded controls related to identifying, improving, and providing signage along detour routes to the Project sites would alleviate some of this impact.

Road users on the Estrada de Catete and the roads to the north of the Estrada de Catete are considered to have moderate sensitivity to increased road congestion, diversions, or changes to the physical condition of road surfaces. Increased heavy vehicle traffic, lane closures and diversions would add to the existing challenges of navigating traffic for daily travel to jobs, schools, services, and homes. Road users, including pedestrians, bicyclists, and those travelling in motor vehicles, may change their schedule or route due to Project traffic and road disruption, but would be able to adapt to changed conditions. Detour routes would be improved to accommodate traffic during construction. For impacts on road safety only, pedestrians and bicyclists are considered to have high sensitivity due to the lack of physical protection in a crash and the substantially greater risk of injury from collisions with moving vehicles.

The impact of Project construction on road congestion and road condition would be adverse, direct, regional, medium-term, and constant during construction. The scale of the impact would be large, resulting from road closures and diversions during construction as well as from the added traffic. The scale rating accounts for the disruption caused by traffic diversions, disruption to local roads, and presence of heavy construction traffic at various points along the Estrada de Catete and connecting
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local roads. The overall magnitude of impacts would be Medium and would be limited to the construction period. Road closures at each proposed overpass location would last approximately 10 to 12 months. The truck traffic and diverted traffic would result in substantial wear on specific local roads, especially detour routes and other local roads used for truck deliveries. The pre-mitigation impact significance of Project construction traffic on road congestion and road condition would be **Moderate**.

Impacts on road safety would be substantially addressed by the embedded controls. Providing safe and well-marked pedestrian crossings and construction entrances will be important to road safety, as would driver training, vehicle maintenance, signage, pedestrian safety measures, community outreach, grievance procedures and other embedded controls. As a result, the pre-mitigation impact significance would be **Moderate** with regard to pedestrian and bicyclist safety and **Minor** with regard to motor vehicle safety.

Operation Phase

Once complete, the Project would allow faster rail travel on a key segment of the Luanda Railway and would improve traffic operations from certain communities on the north side of the railroad tracks to the Estrada de Catete. Service roads adjacent to the overpasses would provide continued local circulation for traffic not seeking to turn onto the Estrada de Catete. The overpasses would provide access only to the westbound travel lane of the Estrada de Catete, consistent with current conditions on the Estrada de Catete, which has a raised central median and at most intersections allows only right-turn-in and right-turn-out movements. The increased speed for rail travel would improve regional access to the new NAIR airport.

In addition to the improved vehicle and rail operations, the Operations phase would contribute to traffic safety by eliminating five at-grade rail crossings. Although not addressed in the proposed road improvements at the current phase of planning, traffic safety would be further enhanced through the planning and provision of appropriate traffic signage and road markings (as provided for in the IFC Guidelines listed in Section 6.4.7.3). The planned pedestrian walkways along the service roads, access roads and overpasses would improve the convenience and safety of pedestrian travel.

The Project would improve the condition of the road infrastructure. The new overpasses and service roads would have paved surfaces in better condition than the roads they replace. For the four overpasses adjacent to the Estrada de Catete (all except the SME overpass), the new access road to the overpasses would improve the condition of intersections along the Estrada de Catete. Improvements made to roads that would be used as detour routes during construction would also provide improved road surface conditions.

As described for the Construction phase, road users are considered to have moderate sensitivity, except that pedestrians and bicyclists have high sensitivity to road safety impacts due to their greater vulnerability. The impacts of Project operation on traffic operations and transportation network conditions would be beneficial, regional, and permanent. The overall impact of Project operations on traffic and transportation network conditions would be **Beneficial**.

6.4.7.5 Mitigation measures

Construction Phase

In addition to the embedded controls mentioned above, it is recommended that during construction, the applicant incorporate the following mitigations:

- Plan routes and timing for unusual/ wide loads (if required) in advance with the relevant authorities and obtain the appropriate permit for the use of public roads.
- Generally, schedule truck deliveries outside of the peak traffic hours.

- Consult with relevant authorities to agree on specific routes for use by construction traffic to avoid any sensitive residential areas and unsuitable parts of the road network.
- Communicate with authorities and affected communities (including emergency services and public transport providers) about road closures, lane closures, and diversions.
- Restrict the circulation of delivery and employee vehicles to defined routes and areas, giving preference to 'one-way' circulation, where appropriate.
- Implement Design Change Management Procedure if any new access road construction will be required that is not included in Section 2, Project Description.
- Establish and enforce speed limits within construction areas and along delivery routes.
- Use signs (reflective signs and/or flashing lights for night), traffic cones and positioning of flag
 persons to indicate road work in progress and to inform and warn equipment operators and
 workers.
- Install and maintain warning and directional signage to notify road users of lane closures, road closures and diversions. Prior to the commencement of construction, establish detours and if necessary construct temporary bypass lanes for road closures.
- Maintain access to existing land uses, buildings and facilities along the project footprint during construction.
- Schedule deliveries outside of the morning and evening peak hour traffic.
- At the conclusion of construction, repair damage to roads used for construction traffic or as diversion routes.

Operation Phase

No mitigation measures are recommended for the operations phase.

6.4.7.6 Summary Impact Tables

The tables below include a summary of the impact assessment pre- and post-mitigation.

Table 6.83 Rating of Impacts Related to Road Congestion During Construction

Project Phase: Construction					
Type of Impact: Direct Negative Impact					
Rating of Impacts:					
	Pre-mitigatio	n – including embedded	Post-mitigation (Residual)		
	measures				
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Extent	Regional	Construction supplies,	Regional	No change from pre-mitigation	
		w orkers and equipment			
		w ould travel from the			
D ()		surrounding region.			
Duration	Medium-	Effects are limited to the	Medium-	Change from pre-mitigation	
	term	construction period of	term		
F	Orationary	approximately 24 months.	Orationary		
Frequency	Continuous	Construction traffic would	Continuous	Change from pre-mugation	
		workdow Diversions and long			
		aloguros would be 24 hours			
		per day			
Scale	Large	Construction would result in	Large	Diversions lane closures and	
		lane closures and diversions		construction traffic cannot be	
		at construction locations.		avoided. Scheduling	
		w hich include heavily		construction-related traffic	
		travelled roads. Truck		(except for employee	
		movements traffic may result		transportation) to avoid peak	
		in delays on local roads.		hours would reduce the scale of	
				impacts on road congestion, but	
				the impact would remain large.	
Magnitude:			-		
Pre-mitigatio	n		Post-mitigati	on (Residual)	
	Medium	Magnitude		Medium Magnitude -	
Sensitivity / \	/ulnerability/lr	nportance of the Resource / Re	eceptor:		
		Medium sensiti	vity		
Significance	Rating:				
Pre-mitigatio	n		Post-mitigati	on	
Moderate Impact			Moderate Impact		

Table 6.84 Rating of Impacts Related to Road Condition During Construction

Project Phase: Construction						
Type of Impact: Direct Negative Impact						
Rating of Impacts:						
	Pre-mitigation–including embedded measures		Post-mitigation (Residual)			
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Extent	Local	Road surface conditions w ould be affected primarily by the concentration of heavy truck traffic on roads local to the overpass construction sites. Regional truck traffic w ould be dispersed to numerous roads.	Local	No change from pre-mitigation		
Duration	Long-term	Deterioration of road surfaces w ould not resolve until road maintenance or repairs are provided	Long-term	No change from pre-mitigation		
Frequency	Continuous	Damage to road surfaces w ould occur incrementally during the construction period. Heavy truck traffic w ould be daily or periodic.	Continuous	No change from pre-mitigation		
Scale	Medium	The project truck traffic would be divided between the 5 sites, resulting in medium- scale impacts in the vicinity of each site.	Negligible	Post-construction road repairs w ould reduce long-term impacts on roads condition.		
Magnitude:			ľ			
Pre-mitigatio	on		Post-mitigati	on (Residual)		
	Medium	Magnitude	N	egligible Magnitude -		
Sensitivity / \	/ulnerability / Ir	mportance of the Resource / Re	ceptor:			
0: ::::		Medium sensitiv	ity			
Significance	Rating:		Doot mitigati			
Fre-miligatio	Modero	to Impact	Fost-miligati	Negligible Impact		
Moderate Impact Negligible Impact						

Table 6.85 Rating of Impacts Related to Road Safety During Construction

Project Phase: Construction					
Type of Impact: Direct Negative Impact					
Rating of Imp	pacts:				
	Pre-mitigation measures	– including em bedded	Post-mitigation (Residual)		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning	
Extent	Local	Road safety impacts would result primarily from the concentration of heavy truck traffic on roads local to the overpass construction sites.	Regional	No change from pre-mitigation	
Duration	Medium-term	Effects are limited to the construction period of approximately 24 months.	Medium-term	No change from pre-mitigation	
Frequency	Continuous	Construction traffic w ould occur throughout the w orkday.	Continuous	No change from pre-mitigation	
Scale	Small	Embedded measures provide extensive controls to address safety.	Small	No change from pre-mitigation	
Likelihood					
Magnitude:					
Pre-mitigatio	n		Post-mitigation (Residual)		
	Negligible N	Magnitude	Negligible Magnitude -		
Sensitivity / \	/ulnerability / Im	portance of the Resource / F	Receptor:		
Medium sei	nsitivity for road u	isers travelling in motor vehicle	es; high sensitivit	y for pedestrians and bicyclists	
Significance	Rating:				
Pre-mitigatio	n Maria (losse a st	Post-mitigatio	n	
	Moderate	Impact	Moderate Impact		

Table 6.86 Rating of Impacts Related to Road Congestion, Condition, and Safety During Operations

Project Phase	Project Phase: Operations					
Type of Impact: Direct Beneficial Impact						
Rating of Imp	pacts:					
	Pre-mitigation	i–including embedded measures	Post-mitigati	on (Residual)		
	Designation	Summary of Reasoning	Designation	Summary of Reasoning		
Extent	Regional	The road improvements would provide improved road infrastructure, safety features, and surface condition.	Regional	Same as pre-mitigation.		
Duration	Permanent	The improvements would be a permanent change in the transportation network.	Permanent	Same as pre-mitigation.		
Frequency	Continuous	The improvements would be a continuous change in the transportation network.	Continuous	Same as pre-mitigation.		
Scale	Large	The overpasses would provide a significant improvement to road facilities.	Large	Same as pre-mitigation.		
Likelihood						
Magnitude:						
Pre-mitigatio	n		Post-mitigati	on (Residual)		
	Be	neficial	Beneficial			
Sensitivity / Vulnerability / Importance of the Resource / Receptor:						
Significance	Rating:					
Pre-mitigatio	n		Post-mitigati	on		
	Posit	ive Impact	I	Positive Impact		

Source: ERM, 2023

6.4.8 Cultural Heritage IA

6.4.8.1 Summary of Baseline Key Findings

The baseline study for Cultural Heritage (Section 4.3.15 of the Report) identified **three** Cultural Heritage resources, comprising **no** Designated Resource and **three** Non-Designated Resources within the Area of Influence (AoI) of the Flyover Project.

Each resource was assigned a unique identifier (for example INZ_CH_001) and comprise the following 'type' of resource:

- Baobab tree (INZ_CH_001);
- Industrial Heritage (INZ_CH_002 and 003).

6.4.8.2 Sensitivity of Receptor

As identified in the baseline, each of the **three** Cultural Heritage resources is presented with a sensitivity in line with the ERM Impact Assessment Methodology²⁹. In the absence of more detailed information on these Cultural Heritage resources, the impact assessment takes a conservative, precautionary approach to the assessment of sensitivity and impact, in line with Good Industry International Practice.

Table 6.87 presents the 'types' and quantities of identified Cultural Heritage resources in relation to their sensitivity of receptor. The distinction of high, medium and low sensitivity is utilised in each impact assessment table. (Please refer to Appendix Q for impact assessment details on each cultural heritage resource).

²⁹ Source: Annex to The ERM ImpactAssessment Standard

Table 6.87 Quantities of high, medium and low sensitivity of receptor forCultural Heritage 'types' identified in the Baseline

'Type' of Cultural Heritage resource	High Sensitivity	Medium Sensitivity	Low Sensitivity
Baobab Tree	0	0	1
Industrial Heritage	0	0	2
Total	0	0	3

Source: ERM, 2023

6.4.8.3 Identification of potential impacts

The predicted impacts to the Cultural Heritage resources as a result of the Project are described in this section.

The impact assessment considers both tangible and intangible Cultural Heritage resources as described below:

- Tangible Cultural Heritage such as (but not limited to) archaeological sites, built heritage (historic or culturally significant buildings or structures), places of worship, historic enclosures and potential settlements; and
- Intangible Cultural Heritage such as (but not limited to) places that hold cultural, artistic, or religious values, knowledge, innovations, and practices of communities embodying traditional lifestyles, and living heritage resources (shrines, cemeteries, religious/ritual sites) etc.

6.4.8.4 Project considerations

The Project Area of Influence (AoI) and construction corridor for Cultural Heritage are outlined in Table 6.88. For the impact assessment it is assumed³⁰ that any identified Cultural Heritage Resources located within the construction corridor (defined as 250 metres either side of the Project alignment and including the limits of any associated infrastructure) will be wholly removed³¹ during the construction phase.

Project Phase	Construction Corridor	Area of Influence (Aol)
Construction	250 metres around the construction footprint and any associated infrastructure.	500 metres around the construction footprint and any associated infrastructure.
Operation	n/a – it is assumed any cultural heritage resources located within the construction corridor will have been wholly removed at construction stage	500 metres around the construction footprint and any associated infrastructure.

Table 6.88 Project Area of Influence

Source: ERM, 2023

Direct, indirect, and cumulative impacts

Three types of impacts to Cultural Heritage resources are considered in this assessment resulting from construction and operation phases of the Project:

Direct: ground disturbance due to earthworks are the most likely source of direct, physical impacts to known and unknown Cultural Heritage resources, with the potential to partially or

 $^{^{30}}$ At the time of writing, no construction limits for the project had been defined, as such assumptions needed to be applied to the study.

³¹ "Removed" here means the resource will need to be physically removed in its total ity for construction of the Project, and no trace will survive in-situ beyond the construction phase

wholly remove these resources. Direct impacts have the potential to be once off, nonreversible and permanent. Unless the principle of avoidance is adopted in the first instance, mitigation measures will not significantly reduce the predicted residual effect of this impact on the Cultural Heritage.

- Indirect: Cultural Heritage resources are susceptible to indirect impacts through the introduction of intrusive visual, auditory or dust elements to their physical environment or 'setting'. Indirect impacts also include restricted access to existing Cultural Heritage resources as a result of construction or operation phases; and
- Cumulative: impacts to Cultural Heritage resulting from incremental change caused by surrounding projects in the past, present or reasonably foreseeable future, combined with this Resettlement Project.

Impact Magnitude

Standard terminology and designations as per Table 6.89 is provided to ensure consistency when characteristics are described in an impact assessment report. An assessment of the overall magnitude of an impact is provided by considering all the dimensions of the impact described in order to determine whether an impact is of negligible, small, medium or large magnitude (ERM Impact Assessment Methodology, 2021).

Magnitude	Cultural Heritage resources
Negligible	No discernible change in the physical condition, setting or accessibility of the site
Small	Small part of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes temporary or permanent change that has limited effect on the site's perceived value to stakeholders; Stakeholder/public or scientific access to site is temporarily impeded; and/or Historic building suffers minor, reparable, structural damage.
Medium	A significant portion of the site is lost or damaged, resulting in a loss of scientific or cultural value; Setting undergoes permanent change that permanently diminishes the site's perceived value to stakeholders; Site becomes inaccessible for the life of the Project to stakeholders including traditional users or researchers; and/or Historic building suffers major structural damage that is not reparable.
Large	The entire site is damaged or lost, resulting in a nearly complete or complete loss of scientific or cultural value; Setting is sufficiently impacted to cause site to lose nearly all or all cultural value or functionality; Site becomes permanently inaccessible to stakeholders including traditional users or researchers; and/or Historic building suffers major structural failure.

Table 6.89	Impact	Magnitude	definitions	for	Cultural	Heritage
	mpaoe	magintaao			• ancar ar	nonago

Source: ERM, 2023

6.4.8.5 Construction Phase Impacts

Five Potential Impacts (PI) are considered during the construction phase:

- PI1 Physical ground disturbance through earthworks: a direct impact, ground disturbance and earthworks associated with the construction phase have the potential to partially or wholly remove Cultural Heritage resources, such as:
 - Buried archaeology, including undiscovered archaeological sites and pyramids;
 - Built heritage including historic buildings, places of worship, shrines or tombs;
 - Historic agricultural, irrigation, settlements or enclosures; and
 - Industrial heritage including historic railways, rail and road bridges.

- PI2 Restriction of access: restriction zones associated with the construction phase have the
 potential to temporarily or permanently restrict the access for traditional users or researchers
 to existing Cultural Heritage resources;
- PI3 Visual: The construction of temporary or permanent structures (bridges, fly-over, embankments etc.) has the potential indirectly impact built and living Cultural Heritage through the introduction of intrusive visual elements to the physical environment or 'setting' where the resource draws value from its surroundings.
- PI4 Auditorial: The construction phase has the potential to introduce intrusive auditorial (noise) elements through associated construction works to the physical environment or 'setting' of Cultural Heritage resources; and
- PI5 Dust: The construction phase has the potential to introduce intrusive dust elements through associated works to the physical environment or 'setting' of Cultural Heritage resources

Pre-mitigation Direct Impacts

Construction phase direct impacts are presented below in Table 6.91. For clarity, the table is presented by the Cultural Heritage sensitivity of receptor (high, medium, and low³²) and by the types of potential impacts (PI1 through to PI5).

Direct Impacts on Low Sensitivity resources

The magnitude of impact through physical ground disturbance activities (earthworks) on the following **3 (INZ_CH_001, 002 and 003) low** sensitivity Cultural Heritage resources during the construction phase is assessed as **large**, as the entire site is damaged or lost, resulting in a nearly complete or complete loss of scientific or cultural value. The resulting significance of impact (based on the sensitivity of the resources and the magnitude of impact) is **permanent moderate adverse**.

³² No high or medium sensitivity cultural heritage resources were identified in the baseline, therefore there are no direct impacts on high or medium sensitivity resources.

Pre-mitigation Indirect Impacts

There were no identified pre-mitigation indirect impacts to cultural heritage resources in this impact assessment.

Construction Phase Mitigation Measures

A comprehensive Cultural Heritage Management Plan (CHMP) will be developed for the Project to ensure all cultural heritage resources are addressed and managed adequately. The plan will be developed and agreed pre-construction, to allow appropriate mitigation measures to be applied before any impact occurs. Items to be covered in the CHMP include (but not limited to):

- Regulator engagement with the National Museum of Natural History of Angola to agree site-specific mitigation measures;
- Further field survey and assessment for potentially impacted resources. In the absence of more detailed information on Cultural Heritage resources identified in the baseline, additional field survey will be required under the CHMP to determine the full extents and significance of Project impacts to be undertaken by an appropriately qualified Cultural Heritage specialist. The CHMP will need to be updated to reflect the findings of this additional survey.
- Access management (Memorandum of Understanding with local communities regarding access and activities). Access arrangements will be made to the satisfaction of identified stakeholders through a Memorandum of Understanding agreed to by authorities and identified stakeholders, which will allow unrestricted access to Cultural Heritage resources. This memorandum should be in place before construction begins.
- Cultural Heritage input into the Community Grievance Mechanism;
- Grave Relocation Plan. This will be designed and implemented with the agreement of the local communities.
- Chance Finds Procedure. A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with international requirements and guidelines IFC PS8.
- Detailed site-specific Archaeological mitigation, such as pre-construction investigations, archaeological excavations, etc.;
- Built heritage recording; and
- Monitoring of mitigation measures and Mitigation Control.

Post Mitigation Direct Impacts

The direct impacts presented in Table 6.91 on **Low** sensitivity Cultural Heritage resources will not change with the imposition of specific mitigation measures listed within the CHMP in Section Construction Phase Mitigation Measures. Thus, direct impacts will not be reduced unless avoidance is adopted in the first instance.

The only mitigation measure that would be effective in reducing the significance of direct physical impact would be avoidance via rerouting³³. If this were to be applied, the resulting Post-Mitigation significance would be negligible.

Post Mitigation Indirect Impacts

There were no identified post-mitigation indirect impacts to cultural heritage resources in this impact assessment.

 $^{^{33}}$ For the purposes of this Impact Assessment, it is assumed rerouting the alignment to avoid impact is not possible as a mitigation measure

6.4.8.6 Operation Phase Impacts

Three types of indirect impacts are considered during the operation phase:

- PI6 Restriction of access: the potential to permanently restrict access for traditional users or researchers to existing Cultural Heritage resources;
- PI7 Visual: the potential to introduce mobile intermittent intrusive visual elements to the physical environment or 'setting' of Cultural Heritage resources; and
- PI8 Auditorial: the potential to introduce intermittent intrusive auditorial elements to the physical environment or 'setting' of Cultural Heritage resources.

Pre-mitigation direct Impacts

No direct impacts to Cultural Heritage resources have been identified at the Operation phase of the Project, as direct impacts to cultural heritage resources will happen at construction phase during earthwork activities, either partially or wholly removing the resource.

Indirect impacts to Low Sensitivity resources

There were no identified pre-mitigation indirect impacts to cultural heritage resources in this impact assessment.

Operation Phase Mitigation Measures & Residual Effect

As all predicted impacts at Operation phase are currently assessed as no impact, no further mitigation measures are proposed, and the residual effects remain the same.

No impacts

A total of **0** cultural heritage resources will experience no impact during the construction phase, and a total of **0** cultural heritage resources will experience no impacts during the operation phase.

6.4.8.7 Summary of Impacts to Cultural Heritage Resources

A summary of the potential direct and indirect impacts to Cultural Heritage at construction and operation phase is presented in Table 6.90 below.

Construction Phase (quantity of Cultural Heritage resources impacted as shown)					
Sensitivity	Direct Impacts	Indirect impacts	No Impact		
High	0	0	0		
Medium	0	0	0		
Low	3	0	0		
Total	3	0	0		
Operation Phase (quantity of Cultural Heritage resources impacted as shown)					
Operation Phase (quantity of	Cultural Heritage resources	s impacted as shown)			
Operation Phase (quantity of Sensitivity	Cultural Heritage resources Direct Impacts	s impacted as shown) Indirect impacts	No Impact ³⁴		
Operation Phase (quantity of Sensitivity High	Cultural Heritage resources Direct Impacts 0	impacted as shown) Indirect impacts	No Impact³⁴ 0		
Operation Phase (quantity of Sensitivity High Medium	Cultural Heritage resources Direct Impacts 0 0 0	s impacted as shown) Indirect impacts 0 0	No Impact³⁴ 0 0		
Operation Phase (quantity of Sensitivity High Medium Low	Cultural Heritage resources Direct Impacts 0 0 0 0 0 0 0	impacted as shown) Indirect impacts 0 0 0	No Impact³⁴ 0 0 0		

Table 6.90 Summary of potential impacts to Cultural Heritage Resources

³⁴ If a Cultural Heritage resource falls wholly within the construction corridor, it has been assumed it will be fully removed at construction phase, and therefore no impact will occur at operation phase.

Construction

The tables below include a summary of the impact assessment on the construction phase of the Project, pre and post mitigation(s). Impacts during the operation phase are not foreseen.

Project Phase: Construction							
Type of Impac	Type of Impact: Direct Negative Impact						
Rating of Impacts:							
	Pre-mitigation		Post-mitigation (Residual) – including embedded measures				
	Designat ion	Summary of Reasoning	Designation	Summary of Reasoning			
Extent	Local	Limited to the Project Aol	Local	Limited to the Project Aol			
Duration	Permane nt	Impacts expected throughout the duration of construction and if no mitigation measures apply, erosion processes may develop further and damage existing infrastructure	Permanent	Impacts expected throughout the duration of construction and if no mitigation measures apply, erosion processes may develop further and damage existing infrastructure			
Frequency	Once Off	The impact will be once off	Once Off	The impact will be once off			
Scale	Small	Sheet erosion and gully erosion	Small	Sheet erosion and gully erosion			
Likelihood	Possible	The resource is situated w holly w ithin the construction corridor and w ill be w holly removed by earthw orks, resulting in a direct impact.	Possible	The resource is situated w holly w ithin the construction corridor and w ill be w holly removed by earthw orks, resulting in a direct impact.			
Magnitude:							
	Pre-miti	gation	Po	st-mitigation (Residual)			
	Larg	ge		Large			
Sensitivity / V	ulnerability / I	mportance of the Resource	e / Receptor:				
		Low	Sensitivity				
Significance:							
Pre-mitigatio	n	· · · ·	Post-mitigation				
Moderate Impact Moderate Impact							

Table 6.91 Direct Impacts on Low Sensitivity resources

Source: ERM, 2023

6.4.9 Cumulative IA

Assessment methodology is provided in **Section 6.1.5** of the Report.

6.4.9.1 Step 1 – Defining Spatial and Temporal Boundaries

Spatial Boundaries

The relevant spatial boundaries for this CIA are essentially the same as the specific Area of Influence (AoI) defined in Section 2.6 of this ESIA Report for each relevant topic; this area typically extends (depending on the topic) from about 100m to 1,000m (e.g. for visual and landscape features) as measured from the centre-alignment of the road.

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Given the specific nature of the Project and the nature of the impact on the surrounding area, a regional approach is used for subsequent screening at Stage 2, taking into account an area of approximately 5 km from the Project. The intent here in the screening is too be inclusive of projects that might reasonable be relevant for the CIA, and if doubtful they are included. For the impact assessment in Step 4, 5 & 6, a narrower focus is then made as appropriate for the relevant assessment topics.

Temporal Boundaries

The temporal boundary of the CIA formally encompasses the entire Project life-cycle, from construction through long-term operations. Nevertheless, the CIA process is inherently constrained by the ability to reasonably predict future events and trends, including (as will be discussed in the Screening in Step 3), the planning/implementation of other relevant projects in the region. Therefore, for the purpose of this CIA, consideration is given of the construction phase and, for operations – to the extent feasible for discussion and assessment of cumulative impacts with the other projects.

6.4.9.2 Step 2 – Identification of VECs and Screening of other Projects in Region

Identifying the VECs

Per the IFCs Good Practice Handbook on Cumulative Impact Assessment and Management, the focus of the CIA should be on VECs and not traditional receptors. The Handbook states, "because it is unrealistic to think that every environmental and social aspect that can be subject to cumulative impacts can be appropriately factored into a CIA, it is good practice to focus the assessment and management strategies on Valued Environmental and Social Components (VECs)".

VECs are defined as follows per the Handbook: "VECs are environmental and social attributes that are considered to be important in assessing risks; they may be:

- physical features, habitats, wildlife populations (e.g., biodiversity);
- ecosystem services;
- natural processes (e.g., water and nutrient cycles, microclimate);
- social conditions (e.g., health, economics); or
- cultural aspects (e.g., traditional spiritual ceremonies)."

The ESIA process identified a number of VECs in the Project area that may be subject of potential impacts of the Project – and other relevant projects in a cumulative manner.

The outcomes of the impact assessments were reviewed to identify VECs that are impacted by the Project. Then the list of VECs was further narrowed by considering those where the Project would be a significant contributor to any cumulative impact realized. These significant impacts are considered to represent the development's contribution to cumulative impacts. Full details of all receptors and potential impacts are described in the respective ESIA sections.

The approach and logic used to identify the VECs is shown in the table below (Table 6.92).

Table 6.92 Key VECs	Identification
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Aspect	Impact	Receptor/Resource	VEC Identified?
Air Quality	 Disturbance due to dust and disturbance due to vehicle emissions (construction) Disturbance due to vehicle emissions (operation) 	Social sensitivity receptors in the immediate vicinity of the overpasses	Yes Social conditions (health) Air quality can be influenced by the development of other projects in the region.
Geology, Soils and Contaminated Land	 Impacts related to soil instability risk Impacts related to disturbance of contaminated land Impacts related to contamination due to runoff (construction) 	Soil in the construction area and associated infrastructures	No According to Section 4.1.5.3 the soils in the region are not particularly sensitive. Most of the land near the project is occupied by buildings and is not used for agriculture. Given the localised potential area of cumulative effects, this is not considered an important attribute in assessing risk.
Water Resources	Availability and Quality of Water Resources (construction)	Surface w ater bodies crossed by the Project (and dow nstream areas)	No According to Section 4.1.6 and 4.1.7, there are no watercourses near the proposed crossings that could be impacted during construction.
Waste Management	Resources and waste generation, disposal of excavated waste soil (construction)	Direct Area of Influence	No This does not meet the definition of any of the four categories of a VEC.
Noise	 Disturbance due to noise Vibration at linear features Vibration at fixed infrastructure Vibration due to traffic (construction) Disturbance due to noise, vibration (operation) 	Social sensitivity receptors in the immediate vicinity of the overpasses	Yes Social conditions (health) Noise can be influenced by the development of other projects in the region.
Biodiversity And Conservation	Loss of flora, loss of fauna, disturbance and displacement of fauna, spread of invasive species (construction)	Flora and Fauna	No There are no significant green areas or any valuable habitats near the project facilities. Crossings are located among dense urban areas.
Economy and Employment	Employment Opportunities, Taxes and fees, procurement and worker spending, Capacity enhancement (construction)	Direct and Indirect Areas of Influence	Yes Social conditions Economy and employment can be impacted by the development of other projects in the region.
Land and livelihoods	 Impacts on residential structures, loss of non-residential structures, infrastructure (operation) Loss of land and livelihoods (operation) 	ldentified affected households	Yes <i>Social conditions (land and livelihoods)</i> Potential cumulative impacts with other projects.

Aspect	Impact	Receptor/Resource	VEC Identified?
Community Health and Safety	 Road safety, site trespass and injury, environmental health, increased transmission of communicable diseases, transmission of STDs, Increased pressure on healthcare, Use of security personnel (construction) Road safety (operation) 	Communities in the immediate vicinity of the overpasses	Yes Social conditions (health) Traffic conditions may change when considering the development of additional projects in the region.
Labour and Working Conditions	 Effects on Workers' rights, Effects on Workers' health and safety, Child labour and forced labour in the supply chain (construction) Child labour and forced labour in the supply chain (operation) 	Contractor's w orkforce	No potential for cumulative effects on w orkforce w ill apply.
Access to Infrastructure and Services	Disruption to infrastructure and utilities, Temporary loss of water flow due to planned disruption to water pipeline (construction)	Communities in the immediate vicinity of the overpasses	No Impacts on access to infrastructure will not be affected by the flagged additional projects.
Community Cohesion	 Presence of workforce, Community severance, Unmet expectations of benefits (construction) Community severance, Business infrastructure, Loss of access to communal resources as well as infrastructure and social services (operation) 	Communities in the immediate vicinity of the overpasses	No Impacts on access to infrastructure will not be affected by the flagged additional projects.
Cultural Heritage	No Designated Cultural Heritage resources were identified within the Project Aol. A total of three Non-Designated Cultural Heritage resources were identified within the flyover Project Aol (a baobab tree and two parts of the historic railway).	Non-Designated Cultural Heritage w ithin the project Aol	No Cultural Heritage related impacts will only be applicable to the project. No cumulative impacts are expected from other projects due to their remoteness from the sites under study.
Climate Risk	 Climate risk associated impacts (construction) Climate risk associated impacts (operation) 	Direct and Indirect Areas of Influence	No Climate risk related impacts will only be applicable to the project. No cumulative impacts are expected from additional projects on the matter.
Unplanned Events	Worker health and safety; accidental spills of equipment fuel and oils; and vehicle traffic accidents (construction and operation).	Direct Area of Influence	Yes Social conditions (health) During the construction and operation phase of the project, other projects may also have negative impacts that may result in cumulative impacts.

Approach to identify CIA trigger projects in the Region

The purpose of the screening is to identify those other projects and activities in the region that could potentially have impacts that overlap spatially and temporally (per Step 1) with impacts of the Project on any the VECs identified.

As a first step, a "long-list" was prepared of known and reported larger infrastructure and other projects in some stage of planning or development in the wider region – areas crossed by ECR.

Each project in the Screening Table was then screened for relevance in the CIA via the evaluation of the project characteristics (namely type of project, proximity to the Project, and expected timing of construction and operations) compared to a set of Screening Considerations to determine the potential for likely cumulative impacts:

- **Spatial Overlap**: Are the two projects close enough to each other that the Areas of Influence are likely to affect each other?
- **Temporal Overlap**: Do the timelines of key activities (namely Construction and Operations) overlap with each other?
- **Common VECs**: Which VECs may be affected cumulatively by both projects (considering the previous special and temporal factors)?

A qualitative conclusion was then given if the specific project is either "Screened In" or "Screened Out" of further consideration in this CIA.

In addition, the current status of other projects was evaluated for this CIA as follows:

- For projects <u>already in existence and operating</u>: any existing emissions/ impacts of the project would already be reflected in the baseline studies conducted for this ESIA and hence integrated within the impact assessment and any mitigation measures foreseen; as such, they are screened out of the CIA;
- For projects <u>currently under construction or approved and about to commence construction</u>: reasonable assumptions are made about likely emissions/ impacts that may occur with the spatial and temporal boundaries of the CIA; such projects are usually screened in;
- For projects that are <u>reportedly planned</u>, but the start of construction is uncertain (and/or the project is under public dispute): unless such a project potentially has a direct and significant impact on shared VECs spatial and temporal boundaries, such projects are considered speculative and typically screened out.

This analysis is summarized in Table 6.93 and the projects are shown in Figure 6.10.

Characteristics of Other Projects			Screening Considerations			Result		
No	Nam e	Proximity to	Constructi	Operation	Spatial	Temporal Overlap	Comments	Screened in?
		Project	on Period	Period	Overlap with	with Lot 1		
			(start)	(start)	Lot 1?	Construction?		
Road Projects								
01	Luanda Light Rail	Intersection w ith 5 th Avenue and Mulenvos; 1.6 km to Cazenga; 5 km to Viana; 8.3 km to SME	December 2023	March 2027	Yes	Yes	39 km double-track line linking the Port of Luanda with Kilamba city (Siemens).	Yes
02	 Improvements of Deolinda Rodrigues avenue: New pedestrian crossings along Deolinda Rodrigues avenue; Rehabilitation of existing pedestrian crossings along the avenue; New bays for taxi drivers along Deolinda Rodrigues avenue Reinforcement of the central divider; Improvement of the road conditions. 	0 km	ongoing	October 2023	Yes	No	Once construction is completed, this project will not have impacts that could become part of a cumulative impact.	No

Table 6.93 Other Projects and Developments - Screening Step 3

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

	Characteristics of Other Projects					Screenir	ng Considerations	Result
No	Nam e	Proximity to	Constructi	Operation	Spatial	Temporal Overlap	Comments	Screened in?
		Project	on Period	Period	Overlap with	with Lot 1		
03	Bungo Rail Station (Estação Central de Luanda)	7 km NE from 5 th Avenue	June 2016	October 2023	No	No	Once construction is completed, this project will not have impacts that could become part of a cumulative impact.	No
04	Musseques Rail Station	3.6 km to 5 th Avenue	June 2016	October 2023	No	No	Once construction is completed, this project will not have impacts that could become part of a cumulative impact.	No
05	Viana Rail Station	0.8 km to Viana overpass	June 2016	October 2023	Yes	No	Once construction is completed, this project will not have impacts that could become part of a cumulative impact.	No
06	Bala Train Station	1.9 km to SME	June 2016	October 2023	No	No	Once construction is completed, this project will not have impacts that could become part of a cumulative impact.	No
Publi	c Infrastructure							
07	Luanda International Airport	7 km from SME	ongoing	November, 2023	No	Yes	The airport will be connected to the railw ay that passes under flyovers. It will be used to connect the airport with Luanda, a higher frequency of trains is expected. The construction of the airport is planned to be completed in November 2023 - before the construction of overpasses begins. During the operational phase, this project may lead to an increase in road and rail traffic.	Yes
Othe	r Projects			- 				
08	Raiz do Quimbo – housing project	15 km to Viana	ongoing	No information	No	No information	550 houses under construction in Kilamba (Rna, 2023). This project is located far from the nearest overpass, so cumulative impacts are not expected.	No

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Characteristics of Other Projects			Screening Considerations			Result		
No	Nam e	Proximity to	Constructi	Operation	Spatial	Temporal Overlap	Comments	Screened in?
		Project	on Period	Period	Overlap with	with Lot 1		
			(start)	(start)	Lot 1?	Construction?		
09	Science and Technology Park	6.7 km from 5 th Avenue in the centre of Luanda	ongoing	2025	No	Yes	This project is located far from the nearest overpass, so cumulative impacts are not expected.	No



Figure 6.10 Projects of Cumulative IA

Results of Screening

According to Table 6.93, potential adverse cumulative impacts are considered possible in relation to the following projects:

- Construction of the Luanda Light Rail (construction started in December 2023, the operation is expected to start in March 2027);
- Construction of the Luanda International Airport NAIL (the operation is expected to start in the end of 2023).

6.4.9.3 Step 3 – Determine Present Conditions of the VECs

The present conditions of the VECs identified are described in the respective baseline sections of this ESIA - refer to the relevant sections for these descriptions.

Based on the potential cumulative interaction of the two screened in projects, the main VEC's under discussion are:

- Construction of the Luanda Light Rail: Air Quality, Noise, Economy and Employment, Land and livelihoods, Community Health and Safety (road safety and traffic conditions, unplanned events);
- Construction of the Luanda International Airport NAIL: Air Quality, Noise, Economy and Employment, Land and livelihoods, Community Health and Safety (road safety and traffic conditions, unplanned events).

6.4.9.4 Steps 4, 5 & 6 – Assessment of cumulative impacts and identification of mitigation measures

Approach and Overview

For each of the short-listed projects identified in the preceding Step 2, a qualitative assessment of potential cumulative impacts on the identified VECs is undertaken per the following sequence:

- Brief description of the relevant other project and location/activity, with reference made to respective ESIA Sections for further information regarding baseline conditions and other relevant data (if applicable);
- Assessment of key potential types of cumulative impacts on the VECs identified and estimation of significance and magnitude (as compared to the impacts of the Project on its own);
- Description of potential mitigation measures and residual cumulative impacts.

Depending on the specific impact characteristics, it may or may not be feasible to assign a specific significance to the cumulative impacts. Where feasible, the significance criteria will be referred to for the corresponding types of impacts in the respective ESIA sections.

The purpose of the CIA is to identify and mitigate the Project contributions to any potential significant cumulative impacts on VECs. Because potential cumulative impacts are often the result of different projects and different operators, mitigation measures for CIAs need to be realistic, practical and focus primarily where the construction consortium/operator has full or partial control to successfully implement mitigation measures.

The overview of VEC interactions is presented in Table 6.94.

Table 6.94 Overview of VEC interactions

Valued Environmental Component	Overview of Project interactions/impacts
Air Quality	All projects screened in Table 6.93 have in common the Air Quality VEC; considering that the construction works for these other projects will require the use of vehicles/ equipment/ machinery that will generate atmospheric emissions (i.e. engine exhaust pollutants), as well as dust emissions associated to the earthwork activities.
Noise	Exceedance of noise regulations near the Project may occur during the construction phase of the Luanda Light Rail. The implementation of the Luanda International Airport Project will increase the number of trains and vehicles, which may increase noise in the vicinity of the Project.
Economy and Employment	The implementation of the considered projects can provide additional jobs to the local population, as well as improve the availability of places of economic activity.
Land and livelihoods	The implementation of the considered projects will require a small resettlement of people, as well as the withdraw al of land where the economic activities of local residents could be carried out.
Community Health and Safety (road safety and traffic conditions, unplanned events)	The implementation of the considered projects will lead to an increase in the traffic of heavy construction equipment, as well as to a redistribution of the vehicle flows due to street closures. Unplanned events may occur (accidents, leaks of combustible and hazardous materials, and so on).

Cumulative Impacts Related to Decreased Air Quality

The construction phase of the Project will produce emissions from a variety of sources; mainly:

- Dust emissions (e.g. PM10 and PM2.5) from all earthworks related activities such as blasting, vehicle transit and earth movements with machinery; and
- Pollutants (mainly NOx, SO2) from diesel consumption of vehicles/machinery/generators;
- Both sources are expected to be point within the work areas. Impacts from these emission sources can be of high magnitude in both construction as well as adjacent areas.

Local air quality impacts are anticipated to arise around the Project construction activities. It can also be reasonably assumed that the other projects that have been identified in the area will have impacts to air quality extending over different zones, which may partially overlap with that of the crossings construction:

- During the construction of the Luanda Light Rail, where the 5a Avenida 5a and Moulenvos crossings will be built, the cumulative impact on air quality will be limited to a small area near the crossings. These impacts will be temporary³⁵. Thus, cumulative impacts during the construction phase are expected to be **minor**. At the stage of operation **negligible**.
- Cumulative impact on air quality from the Luanda International Airport expected to be **negligible** as the construction of this project will be completed before the construction of the crossings.
 Increased traffic to and from the airport will increase air pollutants, but not significantly compared to the total number of vehicles in the city.

No further mitigation measures are proposed for air quality, besides the related measures already foreseen for this topic for the Project.

Cumulative Impacts Related to Increased Noise (affecting Community VEC)

Local noise impacts are anticipated to arise around the Project construction activities. It can also be reasonably assumed that the other projects that have been identified in the area will have impacts to

³⁵ The Consultant does not have a plan for the construction of the Luanda Light Rail, so we cannot determine if there will be any overlap in construction between the projects under consideration. It is likely that construction works will not cross, as this will complicate the construction of crossings and the Luanda Light Rail.

noise extending over different zones, which may partially overlap with that of the crossings construction:

- During the construction of the Luanda Light Rail, where the 5a Avenida 5a and Mulenvos crossings will be built, the cumulative impact on noise will be limited to a small area near the crossings. These impacts will be temporary³⁶. Thus, cumulative impacts during the construction phase are expected to be **minor**. At the stage of operation **negligible**.
- Cumulative impact on noise from the Luanda International Airport expected to be **negligible** as the construction of this project will be completed before the construction of the crossings. Increased traffic to and from the airport will increase noise, but not significantly compared to the total number of vehicles in the city.

No further mitigation measures are proposed for noise, besides the related measures already foreseen for this topic for the Project.

Cumulative Impacts Related to Economy and Employment

The cumulative impact from the implementation of the analysed projects can be recognized as **positive** if international requirements are met (for example, the involvement of local workers in the construction and further management of project facilities). The projects will create new jobs and improve the accessibility of different parts of the city.

Cumulative Impacts Related to Land and Livelihoods

Based on current plans, construction and operation of the Project will result in two types of displacement:

- Physical displacement, meaning the loss of people's homes; and
- Economic displacement, meaning the loss of economic-productive assets that leads to loss of or impacts to income sources and other means of livelihood.

A total of 46 residential units and 27 commercial units will be affected by the Project. Project implementation implies the development of a full project Resettlement Action Plan (RAP).

Among the analyzed projects, displacement can be observed during the implementation of the Luanda Light Rail Project. The Consultant does not have exact information about whether there will be displacement and in what quantity. The cumulative effect will show up with displacement near the 5a Avenida 5a and Moulenvos crossings. In this case, **minor to medium** cumulative impacts are expected. Joint consultation of the current Project and the Luanda Light Rail Project is necessary.

Cumulative Impacts Related to Community Health and Safety (road safety and traffic conditions, unplanned events)

During construction, taking into account the proposed mitigation measures, it is expected that the significance of the Project's construction impact on road safety and traffic function (i.e. expected delays and traffic congestion associated with the construction of crossings) is anticipated to be of minor-medium significance. Part of the crossings will be built at one time, and the other part - at another time, which will help to avoid significant problems with interruptions in traffic. In addition, local residents will be notified in advance of detour options. These impacts may result in cumulative impacts when combined with other planned projects:

 Minor to medium cumulative impacts are expected at the 5a Avenida 5a and Moulenvos crossings, where the Luanda Light Rail will be built nearby. The cumulative impact would be if

³⁶ The Consultant does not have a plan for the construction of the Luanda Light Rail, so we cannot determine if there will be any overlap in construction between the projects under consideration. It is likely that construction works will not cross, as this will complicate the construction of crossings and the Luanda Light Rail.

construction of the Luanda Light Rail sections near these two crossings occurred at similar times (worst-case scenario³⁷). During the operational phase, the cumulative impact will be positive due to reduced congestion and improved traffic safety due to the creation of safe crossings and the new light rail.

 Negligible to minor cumulative impacts are expected near all crossings once the Luanda International Airport becomes operational. This is due to the increase in traffic from and to the airport.

No further mitigation is proposed for traffic aspects beyond those related measures already foreseen for this topic for the Project; nonetheless on a strategic level, construction traffic management plans should be coordinated with the Luanda Light Rail Project and with the Ministry of Transport.

Assuming the implementation of the inherent Emergency and Preparedness Plans for considered projects, during the crossings construction and the Light Rail construction, potential residual effects on community health and safety as a result of accidental spills of equipment fuel and oils and vehicle traffic accidents were considered **negligible**. During the operation phase of both projects, the impact significance remains **negligible**.

Results of the Cumulative Impact Assessment

During the cumulative impact assessment, 5 VECs were assessed for the construction of crossings and two other projects (Construction of the Luanda Light Rail and the Luanda International Airport). Results are shown in Table 6.95.

VEC	Cumulative In	Mitigation measures	
	Construction stage	Operation stage	
Air Quality	Minor	Negligible	No additional mitigation measures required
Noise	Minor	Negligible	No additional mitigation measures required
Economy and Employment	Positive	Positive	No additional mitigation measures required
Land and livelihoods	Minor to Medium	Minor to Medium	Joint consultation of the current Project and the Luanda Light Rail Project is required
Community Health and Safety (road safety and traffic conditions, unplanned events)	Minor to Medium	Negligible	Construction traffic management plans should be coordinated with the Luanda Light Rail Project and with the Ministry of Transport

Table 6.95 Results of the Cumulative Impact Assessment

Source: ERM, 2023

6.4.9.5 Cumulative Impact Management Framework

Effective management of cumulative impacts requires a stakeholder consultation and a collaboration of all parties that contribute to these cumulative impacts. In some cases, a minor impact of a project can result in a significant cumulative impact on a VEC. Consequently, the effective management of negative cumulative impacts transcends the capacity of a single interested party and therefore, management on two fronts: i) Project level, and ii) "Inter-project" level.

 $^{^{37}}$ The Consultant does not have a precise plan for the construction of the Luanda Light Rail.

It is understood that the Project fall within the responsibility of the Ministry of Transport. Two other analyzed projects are under the control of the same ministry:

- The Luanda Light Rail project is controlled by the Ministry of Transport;
- Road and rail traffic from and to the Luanda International Airport is controlled by the Ministry of Transportation.

The aforementioned organizations involved in the implementation of the projects should take into account the following:

- Application of a hierarchical mitigation methodology (i.e. Avoid, Minimize, Compensate) of the environmental and social impacts management generated by different Projects on the key VECs discussed. Though no specific additional mitigations have been assessed as needed, in all cases, the key aspect would be of considering the present cumulative impact management framework.
- Consideration that other operators be included as stakeholders in the Project Stakeholder Engagement Plan (SEP) and vice-versa. Cumulative impacts cannot be managed at a single project level, therefore means of communication must be established between Project operators and government agencies in order to undertake collaborative approach towards implementation of collective management measures.

Cumulative impact management would be led by government entities that have direct influence on proponents, in order to identify the contributions of each actor and establish the mechanism to handle the cumulative effects.

6.4.10 Human Rights Impact Assessment

6.4.10.1 Introduction

This assessment aims to provide an understanding of the Project's potential human rights risks. This information will help in understanding what additional management measures or safeguards are required to mitigate potential human rights risks associated with the Project in order to meet the requirements of EP4 and address the gaps identified in this high-level risk assessment.

In assessing the Project's potential human rights risks, the scan focuses on the rights set out in and protected by the UN International Bill of Rights and the International Labour Organization (ILO) fundamental conventions. Consideration was also given to existing corporate policies and procedures, in particular those related to human rights, working conditions and social aspects.

The objectives of this preliminary assessment are to:

- Characterize the national human rights context;
- Identify the potential human rights risks related to the project and its context;
- Determine the extent of the Project's involvement in potential human rights risks to understand the influence and responsibilities in mitigating such risks;
- Assess the saliency of the identified human rights risks according to severity and likelihood; and
- Recommend appropriate mitigation and prevention measures.

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6.4.10.2 HRIA Methodology

To determine the Project's human rights risks, a four-step process has been employed, which is further detailed below. The development of the approach has been informed by the guidance set out in the UNGP and the Guidance Note on Implementation of Human Rights Assessments Under the Equator Principles. The identification of risks considers internationally recognized human rights described in the following instruments:

- International Bill of Rights, which comprises:
 - The Universal Declaration of Human Rights
 - The International Covenant on Civil and Political Rights
 - The International Covenant on Economic, Social and Cultural Rights
- ILO's fundamental conventions, which comprises:
 - The Forced Labour Convention, 1930 (No. 29)
 - The Abolition of Forced Labour Convention, 1957 (No. 105)
 - The Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
 - The Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
 - The Equal Remuneration Convention, 1951 (No. 100)
 - The Discrimination (Employment and Occupation) Convention, 1958 (No. 111)
 - The Minimum Age Convention, 1973 (No. 138), and
 - The Worst Forms of Child Labour Convention, 199 (No. 182)
 - The Occupational Safety and Health Convention, 1981 (No. 155)
 - The Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

Screening

The Screening phase involves developing an understanding of the human rights context and conditions, from which potential adverse human rights impacts could be assessed. The focus is on gathering data required to understand the legal and policy context in place to manage human rights risks and identifying human rights inherent risks considering country and sector risks. Information will be gathered through a desktop review, including human rights treaties, national laws, as well as publications from local and international government and non-governmental organisations (NGOs). The analysis examines the level of rights protection in Angola and identifies gaps between domestic and international standards. The screening stage also involves collecting baseline data on social, environmental, and human rights conditions at both country and local levels, including from the recently developed Environmental and Social Impact Assessment (ESIA).

Scoping – baseline

The scoping phase aims to gain an understanding of how the human rights identified in the screening stage may specifically be impacted as a result of the Project.

The rightsholders that may experience such potential impacts will be identified. This involves a desktop review of project-related information provided by INZAG to understand the Project's characteristics, activities and requirements, in light of the information gathered during the screening. The rightsholders are identified as part of an Area of Influence (AoI) which encompasses the geographical extent of the Company's potential impacts on human rights including potential impacts on the lives, livelihoods, health or well-being of the rightsholders and the natural environment. For the purpose of this assessment, the AoI is different than the Social AoI as defined in the socio-economic

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baseline and includes impacts beyond the Project area that might be related to workers and their families, including workers in the supply chain, but also communities along supply routes or users of downstream water that might be excluded from the Social Aol. Particular attention will be given to vulnerable rightsholders – individuals and groups in the Aol who are more likely to experience adverse impacts as a result of the Project than the general population. Vulnerability may be due to specific characteristics of the individuals or groups (such as age, ethnicity, or disability), or may result from a broader range of factors (such as dependence on natural resources). These factors can also combine into multidimensional vulnerability. The European Bank for Reconstruction and Development defines vulnerability as:

people or groups of people who may be more adversely affected by Project impacts than others by virtue of characteristics such as their gender, gender identity, sexual orientation, religion, ethnicity, Indigenous status, age (including children, youths, and the elderly), physical or mental disability, literacy, political views, or social status. Vulnerable individuals and/or groups may include but are not limited to people living below the poverty line, the landless, single-headed households, natural resource dependent communities, migrant workers, refugees, internally displaced people, or other displaced persons who may not be protected through national legislation and/or public international law (2019).

Some population groups are automatically considered due to their positioning within society and/or inherent characteristics that make them more sensitive to change.

The outputs of the scoping process included:

- An understanding of the potential human rights issues and risks that required further exploration as part of the baseline and risk assessment process; and
- Identification of the rightsholders that may be impacted by the Project, paying particular attention to vulnerable individuals and groups.

High-level Human Rights Risk Assessment

The Risk Assessment phase involves the analysis of the human rights risks that may result from the works planned for the five (5) overpass flyovers. The focus is on those risks that are considered to be *salient*. The most salient issues are those that pose a significant risk of causing negative impact on people through the Project's activities or business relationships. The level of saliency is determined by assessing the severity of the potential impact, considering the scale, scope and irremediability (see Table 6.96 for a definition of each of these factors) and the likelihood of the impact occurring.

Assessing saliency enables to prioritize efforts and resources in managing potential and actual human rights impacts, while still acknowledging that less salient impacts should not be ignored, as saliency of different issues may change over time. Additionally, when prioritizing actions, consideration should be given to linkage and leverage as well as focus on addressing the needs of the most vulnerable individuals.

Severity

Parameters for assessing severity				
Scale	Seriousness of actual or potential impact; including consideration of the vulnerability of affected rightsholders			
Low	Unlikely to cause body or psychological harm / change in standard of living			
Moderate	Will cause a human rights infringement by denying access to essential life necessities (such as livelihoods, education); OR			

Table 6.96 Parameters for assessing severity of human rights risks

	Will cause an impact to cultural, economic, natural and social assets that identified groups or subject matter experts have identified as highly valued; OR Will cause an impact to ecosystem services identified as priority to livelihoods, health, safety or culture
High	Will cause death or adverse health effects that could lead to significant reduction in quality of life and / or longevity.
Scope	Number of people that are (or potentially are) affected
Low	Single person or family or small number of people potentially affected
Moderate	Multiple individuals or families or medium number of people potentially affected
High	Significant number of members of one community or across multiple communities, or large number of people potentially affected
Irremediability	Degree to which the (actual or potential) harm is irreparable
Low	Remediation will return the victim to the same or equivalent position. Easy – simple technical requirements, acceptance by the identified group, implementation partner has capacity to deliver.
Moderate	Remediation may return the victim to the same or equivalent position. Simpler technical requirements, acceptance by the identified group, implementation partner can deliver with some capacity development.
High	Remediation will not return the victim to the same or equivalent position. Complex technical requirements, little acceptance of remediation by the identified group, low capacity of implementation.
Severity	A negative human rights impact that is severe by virtue of its scale, scope and / or irremediability
Low	Low /Low OR Low /Moderate/Low
Moderate	High/ Moderate/Low OR High/Low/Low/OR Moderate/ Moderate/ Moderate OR Moderate/Moderate/Low
High	High/High/Moderate OR High/Moderate/Moderate OR High/High/Low OR High/High/High

Likelihood

Table 6.97 Parameters for assessing likelihood of human rights risks

Parameters for assessing likelihood				
Likelihood	Likelihood of the impact occurring which is a combination of the degree to which there are project-inherentrisks, risks arising from the operating context, and evidence that the company has faced similar risks in the past that it has failed to properly mitigate			
Unlikely	Unlikely to happen. The impact has never been known to occur			
Possible	It is possible that the adverse human rights impact could occur. There is a 50% or greater chance it will occur.			
Certain or almost certain	The adverse human rights impact will probably / almost certainly occur, and/or it is already occurring.			

Source: ERM, 2023

Saliency classification

Table 6.98 Parameters for assessing saliency of human rights risks

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Se	ve	r	ity

Likelihood

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	Unlikely	Possible	Certain or almost certain
Low	Low	Low	Moderate
Moderate	Low	Moderate	High
High	Moderate	Moderate	High

It should be noted that when assessing the human rights risks, the precautionary principle is applied. Accordingly, where there is uncertainty in relation to the likelihood or severity of the potential impact, a higher risk ranking is assigned in order to ensure sufficient management measures are put in place. As the Project evolves, this uncertainty may change, and potential impacts should be reviewed and re-classified accordingly.

Involvement

Under the UNGPs, companies have the duty to respect human rights and to not cause harm that would compromise the enjoyment of human rights by their rightsholders. All actual or potential human rights impacts are considered as being either **caused** by the business, **contributed to** by the business, or **directly linked** to the business through contractual or non-contractual relationships. Identifying how business can be connected to actual or potential human rights impacts is important as it determines business' level of responsibility and possible actions the business might take to manage these impacts.

Table 6.99 Parameters for assessing involvement of the Project with the identified human rights risks

	Cause	Contribute	Directly Linked
Involvement	Company activity causes the impact.	Company activity contributes to the impact but is not by itself the sole cause.	Impact is caused by an entity linked to company via its operations, products or services.
Responsibilities	 Prevent or mitigate the impact. Remediate the harm of the impact. 	 Prevent or mitigate contribution to the impact. Use or increase leverage with other responsible parties to prevent or mitigate the impact. Contribute to remediating the harm of the impact. 	 Use or increase leverage with other responsible parties to prevent or mitigate the impact. Consider terminating relationship if leverage remains limited or non- existent w hile avoiding additional harm caused by the termination. No responsibility to remediate but can still choose to do so.

Source: ERM, 2023

High-level management measures

The last step involved identifying high-level management measures or additional work required to assist in mitigating potential human rights impacts identified and evaluated during the risk assessment. This involves a desktop review of documents provided by INZAG such as relevant corporate policies and procedures, taking into consideration additional recommended mitigation measures defined during the ESIA process.

In this report, the inherent human rights risks have been classified taking into consideration the existing and anticipated mitigation measures. Additional mitigation measures have been recommended and a residual risk has been assessed accordingly.

6.4.10.3 Potential Impacts

Relevant rightsholders

The term "rightsholders" refers to individuals or social groups holding distinct entitlements in relation to specific duty bearers (such as state or non-state actors that have a particular obligation or responsibility to respect, promote and realise human rights and abstain from human rights violations) and who have universal and inalienable human rights regardless of who they are, their opinions, race, sexual orientation, etc. In particular contexts, specific social groups human rights may not be fully realized, respected or protected, despite all human beings are rights-holders under the Universal Declaration of Human Rights. The following rightsholders were identified and considered during this assessment based on the information provided in the ESIA, the Project description (see Section 2) and the human rights context described in Section 4.3.5.

Workforce

Project workforce:

The information about Project workforce is presented in Section 2.8.4

At peak capacity the project will be running was a total of 356 workers (Male 90%; Female 10%), 97 per cent of which are anticipated to be locals. The Human Resources Management Plan indicates that INZAG will take special efforts to recruit Angolan nationals from the Project affected areas and surrounding district and province. Only the position that cannot be filled locally may be filled by foreign workers. In particular, expatriate workers will come from different countries for the following roles: Project Manager, Department Managers and Specialized Engineers and supervisors.

The vulnerability of the Project's workforce is presented in Table 6.100.

Material Type	Prospective Quantity		
Women	Due in part to traditional gender roles, women ca face stigmatisation and discrimination in access to employment opportunities and career advancement. They are also more prone to face harassment, including sexual harassment. According to the information received from the Company, Project workers will be 90% male and 10% female.		
Children	To access assets or resources, children are often reliant on older members of the household or community. When a child is not adequately represented by an adult or is from a low -income, they may be vulnerable to labour exploitation. Orphaned children are particularly vulnerable.		
Youth	Youth (15-24 years old) may be vulnerable to poor labour practices due to contracting practices, and lack of work experience and skills. Unemployed youth from low -income families or who have dependents and financial obligations (e.g., families, rents, and other responsibilities) are considered more vulnerable. Orphaned youth are particularly vulnerable.		
Migrant workers	Migrants are at heightened risk of exploitation and abuse in the workplace due to unfamiliarity with the local culture, language, their rights at work and national labour and migration laws or dependence on employer due to legal status or migration-related debt.		
Informal workers	Informal workers are particularly vulnerable to labour exploitation and poverty as they lack formal employment contracts. They are usually unable to access the same legal and social protection as formal workers.		
Ethnic minorities	Members of ethnic minorities may face stigmatisation and discrimination with regard to employment opportunities and resources management (including career advancement).		
Members of the LGBTQI+ community	Members of the LGBTQI+ community may face prejudice, stigmatisation and discrimination with regard to employment opportunities and human resources management (including career advancement). Individuals from the LGBTQI+ community are particularly vulnerable as the law does not include sexual orientation or gender identity as a ground to prohibit discrimination.		
People with disabilities (mental and physical)	People with disabilities may face stigmatisation and discrimination with regard to employment opportunities and resources management (including career advancement). They can also face challenges in accessing employment infrastructure and related facilities.		

Table 6.100 Vulnerability assessment for the Project Workforce

People living with	People living with HIV/AIDs might face stigmatisation and discrimination based on their bealth status. It was reported as being an issue in Angola in relation to employment
People with	People with albinism may face stigmatisation and discrimination with regard to
albinism	employment opportunities and resources management (including career advancement).
Illiterate	Illiteracy can create challenges for individuals to access employment opportunities and make workers more vulnerable to exploitation as they might not fully understand the terms and conditions of their contract.

Supply Chain workforce:

Raw materials will be purchased (Bitumen, Steel structures, concrete, formworks, rebars, guard rails, etc.) and imported from external suppliers (metallic structure, guardrails, bitumen, expansion joints, bridge bearings, street lightings, etc). The quantities of the raw materials and details about the suppliers are presented in Section 2.10.1

Vulnerability Assessment:

The vulnerability of the workers will depend on the country of sourcing. Vulnerable groups within supply chain workforce may include women, migrant workers, people from minorities, children and youth.

Local Communities

<u>General</u>

The overpasses of the project are located at five (5) different sites in the Luanda Province, along the Railway tracks. The 5 roads at where the overpasses are planned are: SME, Viana, Estalagem, Mulenvos and 5th Avenue which are located in the municipalities of Cazenga, Viana, and Icolo e Bengo. Further socio-economic information on the communities located at the overpasses can be found in the socio-economic baseline (Section 4.3).

Displaced population

The construction and operation of the Project will result in the displacement of several households from the Project footprint. These displacement impacts can be characterized in terms of the immovable assets that will be affected, including residential and commercial structures, community infrastructure, and public facilities. The loss of immoveable assets will affect the people, households, and communities that own or use these assets. Furthermore, there are several roadside traders within the area, whose assets (trading stalls, vehicles etc.) can be moved, but who will not be able to return to their initial trading places after Project construction. From a preliminary analysis of satellite images provided as part of the project description, it is estimated that 46 residential units and 27 commercial structures will be affected by the Project. Vulnerability assessment for local communities is presented in Table 6.101:

Material Type	Prospective Quantity		
Women	Due to the nature of traditional and domestic relations, women may be reliant on the male members of the family for financial support and participation in public decision-making. Women are identified as vulnerable, particularly in relation to land issues as they may face discrimination in various ways including access to land use. Women are also less likely to access economic benefits from the Project due to low participation in decision-making process. Women heads of households are particularly vulnerable. Due in part to traditional gender roles, GBV (women and girls) remains an issue in the country, including harassment and sexual violence. In Luanda Province, women represent 51 per cent of the population. It was reported that Luanda Province has the bickets insidence of demostic wielence in the country.		
Ethnic minorities	Some groups may be marginalised with reduced access to healthcare, education, freedom of speech, credit, and other services. In most cases ethnic minority groups have their ow n language, which is not the language practised by the dominant ethnic group. The Luanda Province is host of many different ethnicities.		

Table 6.101 Vulnerability assessment for local communities

Children	Children in Angola face food insecurity and poverty. 37.6 per cent of children under five (5) years old are affected by chronic malnutrition. Environmental health effects (e.g., due to air pollution) can be worse in groups know n to have compromised health, which is most typically for very young children. Orphaned are particularly vulnerable In Luanda Province, children under 14 years old represent 43 percent of the population.10 percent of the children in Luanda Province are orphaned.
Youth	Youth may be vulnerable in relation to land issues due to their lack of land ownership and limited opportunities for securing livelihoods. In the Luanda Province, youth represent 19 percent of the population.
⊟derly	Those who lack physical mobility or who have mental health issues may be vulnerable to changes and unable to participate in decision-making, or those with underlying health issues that may be more sensitive to environmental changes. The elderly are also vulnerable due to limited ability to change or increase income levels, access to additional finances. The burden of additional health care or price inflation might be particularly challenging for them. In the Luanda Province, elderly people (over 65 years old) represent 1,7 percent of the population.
People w ith disabilities	Those who lack physical mobility or who have mental health issues may be vulnerable to changes, especially when their physical and/or mental conditions might require them particular care. Moreover, people with disabilities might face challenges to participate in decision making processes. In Luanda Province, 2,2 percent of the population was recorded as having a disability (16 percent having mental disability and 84 percent having physical disability).
People with pre- existing health conditions (including HIV/AIDs)	Individuals with pre-existing health conditions refers to any health condition, such as hypertension, diabetes, cancer, or chronic respiratory disease that already affects the health of an individual. Individuals with pre-existing conditions are at greater risk for health complications and are more susceptible to becoming ill due to other diseases, including communicable diseases, and are more vulnerable to environmental changes as a result of the Project.
Low -income households	Low -income households have few er resources on w hich to rely w hich make them vulnerable to shocks and change. Low -income households are likely to be affected due to loss of livelihoods and localised price inflation caused by the Project. Single-headed households are more vulnerable as they do not have financial support resulting from another source of income.
Migrant/refugees	Migrants and refugees may be marginalised with reduced access to healthcare, education, freedom of speech, credit and other services. Migrant and refugees might not speak the language(s) of the country, which can exacerbate their vulnerability. Undocumented migrants are particularly vulnerable as they are not protected by the legislation. According to the 2014 census, approximately 40 percent of the population of Luanda Province was from foreign countries. The Luanda Province hosts 67 percent of refugees in Angola, which represent approximately 37,600 refugees
Members of the LGBTQI+ community	Members of the LGBTQH community may be marginalized hen attempting to access public services and infrastructure, in particular healthcare services.
lliterate	Illiteracy creates challenges for individuals to thrive in society, compromising their ability to participate in decision making and access appropriate healthcare and other fundamental services. Illiteracy is often linked to higher poverty. In Luanda Province, the literacy rate is of 85.9 percent.
Informal settlers	Informal land and assets ow ners and users are not protected by the national legislation with regards to land acquisition and resettlement processes, which makes them more vulnerable to issues related to land.

Host Communities

The Project is going to result in permanent physical displacement. The displaced populations will be resettled in communities elsewhere, also called host communities. There are no host communities identified yet while they may experience negative consequences because of the new settlement and should thus be recognized as a group affected by the project. Since the project takes place in an urban setting, the host communities, are likely to be urban communities. Host communities should be identified as early as possible in the project lifecycle.

Vulnerability Assessment: vulnerable groups will be identified as part of the host community assessment.

Scoping of the Human Rights Issues Related to the Project

The following table (Table 6.102), which outlines human rights subjects and specific human rights linked to Project undertakings, are divided into five sections:

- Human rights pertaining the workplace at Project Site;
- Human rights within the supply chain;
- Human rights within local communities;
- Human rights within host communities;
- Others.

Table 6.102 Identification of Human Rights Risks

Potential impact	Justification	Human rights at risk	Affected rightsholder
Human Rights at the wo	orkplace		
Various severe injuries to w orkers as a result of health and safety accidents that could have serious and potentially irreparable consequences such as permanent disability or fatality.	Given the nature of Project activities during construction, operation and decommissioning phases, workers face occupational health and safety (OHS) hazards arising from factors such as: physical stresses such as noise; the potential for injuries (like falls from heights, and machinery hazards). Additionally, working excessively long hours under strenuous conditions, and/or challenging weather conditions (in particular high temperature) could negatively affect the physical health and mental well-being of the personnel. The construction is among the sectors that concentrate more fatal work accidents according to ILO statistics.	 Right to safe and healthy w orking conditions Right to life Right to livelihood Right to remedy 	All Project workers (direct and contracted), and their families
Unfair treatment, harassment or prejudice against people or groups due to union membership gender identity, sexual orientation, or country of origin in employment matters.	There is a risk that the Project could engage in discriminatory practices concerning employment. Project workers may be subject to degrading treatment or lack of equal opportunity for recruitment and career advancement. Women, members of the LGBTQ+ community, persons with AIDs, persons with disabilities, and migrant workers are particularly vulnerable.	 Right to equal treatment in employment without discrimination Migrant workers' rights Right to work Right to remedy 	All project w orkers, direct and contracted Vulnerable groups: w omen, members of the LGBTQ+ community, people w ith AIDS/HIV, people w ith albinism, refugees
Different forms of gender-based violence and harassment of female w orkers at the w orkplace or in w orkers accommodations	There is a risk that the Project could engage in different forms of gender-based violence and harassment of women workers at Project site and in the Project accommodations. Women are under-represented in the construction industry in the country and face gender-based discrimination, sustained by an overly masculine workplace environment (the Project will employ 90% male and 10% female workers). Single sex dominated workplaces or workplace cultures that tolerate inappropriate comments, jokes, or derogatory conversations can significantly contribute to the prevalence of systematic harassment. Project workers might be provided with accommodations which creates a space where gender-based violence might occur if adequate mitigation measures are not defined and implemented.	 Right to safe and healthy w orking conditions Right to equal treatment in employment without discrimination Right to freedom from torture and other cruel or degrading treatment or punishment. Right to remedy 	Female Project workers
Workers not being able to form or join trade unions of their choice, and/or not being able to engage in collective bargaining to improve	Workers in Angola are legally able to organize unions, bargain collectively, and strike. How ever, there are legal restrictions to these rights. Violations of workers' right to bargain collectively have been recently reported in the country in particular actions against labor unions such as UNTA-CS, including suppressing freedom of expression, government interference in union matters, and threats of deregistration.	 Right to freedom of association and collective bargaining Right to strike 	All Project workers Vulnerable groups: waste management

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Potential impact	Justification	Human rights at risk	Affected rightsholder
their working conditions.	Moreover, legal restrictions to the right to strike and inappropriate response to industrial actions from public security forces are limiting the enjoyment of this right. Workers in the waste management sector are particularly vulnerable since they are not permitted to strike as they are considering working in an essential service. The implementation of the labour legislation is considered not efficient in the country, mainly due to lack of resources within the Labour Inspectorate.	 Right to freedom of movement Right to freedom of expression Right to freedom of peaceful assembly Right to remedy 	w orkers, informal w orkers
Workers facing labor exploitation due to situations of dependence of sponsor that enhance abusive relationships.	The national legislation prohibits forced labour and human trafficking for labour purposes. In particular, the Penal Code penalizes employers or labor agents who seize workers' identification documents, change contracts without the workers' approval, or withhold salary payments. In total, it is anticipated that only nine (9) workers will be expatriates. They will be filling managing or skill-specific positions. INZAG has committed to not use third party agencies for the recruitment of foreign workers and to contract directly with them. All low wage positions will be filled by local workers from the area or neighbouring provinces. It is important to note that local recruitment does not prevent from exploitative practices to occur. The U.S Department of State reported cases of Angolan adults taken by labor recruiters to work in the construction sector where they were exploited by their employers. Moreover, vulnerable groups present in the recruitment area, such as refugees, migrant workers already in the country or illiteracy put these categories of workers particularly at risk. The implementation of the labour legislation is considered not efficient in the country, mainly due to lack of resources within the Labour Inspectorate. Workers within the supply chain companies, especially those hired for tasks like catering, cleaning, and other low -w age positions, as well as suppliers of construction materials, might inadvertently involve forced labor. The risk will be higher if suppliers are located in countries where labour legislation is weak.	 Right to freedom from forced labour and servitude Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement Right to remedy 	All workers Vulnerable groups: low-income households, illiterate, refugees and migrant workers depending on their employer to maintain and renew their work permits
Negative impacts on the physical health and mental well-being of persons affected by unfavourable working conditions at Project site	The construction sector is often characterised by low margins and significant pressure on delivery times, which can affect the working conditions of workers including low wages, delayed salary payment and long working hours. Angolan legislation is generally in line with international standards regarding working conditions. How ever, employment in the construction sector is potentially intermittent which means that the 54-hour weekly limit would apply to the Project workers. Long working hours could result in fatigue, physical and mental stress of Project workers, including increased rate of work-related accidents and injuries. Workers who do not speak the working language (workers speaking local dialects, refugees or migrant workers) are particularity vulnerable as they do not necessarily	 Right to decent w orking conditions Right to safe and healthy w orking conditions Right to fair w ages Right to rest, leisure and reasonable limitation of w orking hours and periodic holidays w ith pay Right to remedy 	All project w orkers Vulnerable groups: w orkers not speaking the w orking language, migrant, refugees, informal w orkers

Angola

Human rights at risk Affected rightsholder Potential impact Justification fully understand the terms and conditions of the contract they sign and might not be aw are when they are not in compliance with national legislations. The implementation of the labour legislation is considered not efficient in the country, mainly due to lack of resources within the Labour Inspectorate. Impacts on living and Expatriates may not be covered by Angolan social security if they are already Expatriates Right to social security working conditions of covered by a social security system in their home country. Depending on the country Informal workers, in Right to adequate standards w orkers due to of origin, social security systems might be more or less protective, potentially particular security of livina inadequate access to compromising workers' access to benefits such as family allow ances. quards Right to health social protection floors unemployment, sickness and maternity benefits that exist to enhance the realization Right to remedy of basic economic, social, and cultural rights, reducing poverty and inequality. It is worth noting that very few workers will be foreign nationals and that they will not be employed in low-wade positions. Informal workers are also at risks since they are unable to receive social benefits or access health insurance through the employment relationship. The U.S Department of State identified security guards as a common type of informal work in Angola. Workers will be housed in within existing accommodation (hotels and appartements) Unfavourable living Resident of workers' Right to adequate standard of conditions affecting the and potentially in site camps The provision of inadequate, unsafe and unsanitary accommodation living health and well-being of living conditions and inappropriate leisure and health facilities could result in Right to freedom of negative impacts on the physical and mental health of accommodated workers. persons residing in Vulnerable groups: movement w orkers' women Right to freedom of accommodation In the case of campsites, the rules applicable in workers' accommodation might association overly restrict resident's rights and freedoms such as the freedom of movement, Right to freedom of thought, freedom of association, freedom of religion and beliefs, right to privacy etc. belief and religion Right to privacy Right to family life Right to remedy Abusive behaviours It is unclear whether or not campsite(s) will be developed to house workers. Residents of workers' Right to freedom of In the event of accommodation being provided, it will be secured by physical accommodations from private security movement staff tow ards residents security. Security personnel who will be posted at the main gate, patrol the areas ■ Right to freedom from torture of w orkers' perimeter fence and proceed with searches (persons and bags) might engage in and other cruel or degrading accommodations abusive behaviour tow ards the residents such as physical and sexual assault, Vulnerable groups: treatment or punishment. intimidation, discrimination, harassment or excessive use of force. women Rights to life, liberty and security of person. Right to privacy Right to equal treatment and non-discrimination

Right to remedy
Angola

Potential impact

Affected rightsholder

Human rights at risk

Right to remedy

Harm to workers due to inadequate response from public security services	There is a risk of inappropriate response to w orkers (direct and contracted) protests and opposition associated with the project activities. In case of escalation of violence and lack of cooperation from protestors, public security forces could respond aggressively including abuse of pow er, and inappropriate and disproportionate response, including arbitrary arrest and detention, excessive use of force, or threats against Project w orkers. The baseline research show ed that there has been report of excessive use of force from public security forces even in response to peaceful protests. Opposition from w orkers might arise from dissatisfying w orking conditions and disrespect for labour rights in relation to the Project.	 Right to freedom of assembly Right to freedom of movement Rights to life, liberty and security of person. Right to freedom from torture and other cruel or degrading treatment or punishment. Right to collective bargaining Right to strike Right to equal treatment Right to remedy 	All Project workers Vulnerable groups include women, members of LGBTQ+ community
Human Rights within th	e supply chain		
Negative impacts on the physical health and mental w ell-being of persons affected by unfavourable w orking conditions	The construction sector relies on the outsourcing of raw and processed materials that can be associated with human rights violations. Some materials within the construction supply chain are particularly at-risk regarding health and safety, forced labor, human trafficking and child labor. Sourcing material, in particular if materials coming from outside the country, can involve complex supply chains and multiple tiers suppliers resulting in reduced visibility. Beyond the risks associated with the economic sector, risks associated with the country of sourcing should be taken into consideration. Depending on the origin of the suppliers and sub-suppliers, labour rights- and working conditions-related risks might be exacerbated (situation of conflict, poverty, w eakrule of law, w eaklabor legislation, corruption, state-failure to protect human rights etc.). At the day of writing, only four (4) first-tier suppliers have been identified. Three (3) of them are located in Angola and might be associated with similar labour risks as those identified through this assignment. One (1) of them is located in Germany which has developed a comprehensive legal framew ork to protect w orkers' rights. Suppliers and sub-suppliers of construction materials might be involved in labour rights abuses.	 Right to safe and healthy w orking conditions Right to decent w orking conditions Right against w orst forms of child labour Right to freedom from forced labour and servitude Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement Right to remedy 	Supply chain workers Vulnerable groups: workers in the supply chain of at-risk materials, migrant workers, children, informal workers
Human rights in local	communities		
Reduced standard of living ad negative impacts on the security, health and safety of local communities associated with Project activities and associated	The Project has the potential to impact community security, health and safety in various ways, most prominent of which relate to: Noise and Vibration: construction phase could result in noise pollution and vibration due to construction activities, such as demolition of infrastructure, excavations or use of heavy equipment which will affect local communities due to the close proximity of houses and businesses to construction footprint. Increased flow of traffic during operational phase will likely generate higher noise emission than currently levels. Noise is already a concern in Mulenvos for 25% of the surveyed	 Right to an adequate standard of living Right to health Right to access to clean water and sanitation Right to a safe, clean, healthy and sustainable environment Pight to life 	Community members, particularly those living and/or working near the Project's immediate Aol and deviation roads Vulnerable groups:
infrastructures	households, in Estalagem for 10% of the surveyed households and in Viana for 5%		women, children,

Justification

of the surveyed households.

individuals with

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

Potential impact	Justification	Human rights at risk	Affected rightsholder
Construction and Operation	Decreased air quality: construction phase could result in air pollution due vegetation clearance, general earthw orks, excavation, piling, movement of heavy vehicles and Project traffic movements during construction and due to general traffic on the flyovers once operational. Degradation of air quality can have effects on human health and has been linked to a number of health issues including the aggravation of asthma, respiratory symptoms and cardiovascular diseases Coughing has been reported as a common illness in SME, Viana, Estalagem and Mulenvos. Water contamination: mobilisation of contaminants (e.g., polyaromatic hydrocarbons and heavy metals) in the soil may decrease the quality of groundw ater winci may be used by local communities for drinking or other domestic purposes. Increased road traffic: construction phase may contribute to an increase in traffic in the municipalities, in particular on the deviation roads. Local traffic patterns and activities could be affected (due to the closing of roads, increased number of vehicles due to delivery of construction materials) which could result in road accidents between vehicles but also with pedestrians affecting community members' safety. Increased traffic could also result in reduced access to emergency facilities in particular healthcare facilities for emergencies). Unauthorized access to Project site: accidents may occur from unauthorised access to construction sites leading to serious injuries and in the worst-case scenario to fatalities.		Community mombars
and community infrastructures (including cultural assets) resulting to negative impacts on the bealth and safety and	activities. Main utilities to be affected include water lines, electric lines, telecommunication services, transformers, and streetlights. In general, road construction activities can have a high potential to damage pipeline electrical infrastructure, and any interruptions may be very significant to the consumers especially the industrial users. Temporary disruption of water supply could affect households for drinking or other domestic nursoses, but also farmers for agricultural	sanitation) Right to adequate standard of living Right to health Right to food	relying on public infrastructure Vulnerable people: w omen, children, elderly, individuals

Potential impact	Justification	Human rights at risk	Affected rightsholder
livelihoods of local communities <i>Construction</i>	activities. Service interruptions can take a long time to reconnect, especially if entire systems must be shut down and restarted. In SME, 33 percent of households rely on piped w ater and 100 percent of households with access to electricity rely on grid. In Viana, 33 percent of households rely on piped w ater and 90 percent of households with access to electricity rely on grid. In Estalagem, 19 percent of households rely on grid. In Estalagem, 19 percent of households rely on grid. In Mulenvos, 6 percent of households rely on piped w ater and 100 percent of households with access to electricity rely on grid. In 5th Avenue, 5 percent rely on grid. In Mulenvos, 6 percent of households rely on piped w ater and 100 percent of households with access to electricity rely on grid. In 5th Avenue, 5 percent rely on piped w ater. It too is possible that community members temporarily lose their source of income, resources, and livelihoods – in particular businesses that rely on electricity and telecommunication. The Project could also result in impact on access to other infrastructure in local communities, in particular health care services and facilities. The households survey show that communities already face barriers in accessing health services including long w ait times, poor quality of healthcare delivered or unavailability of emergency vehicles. Injuries from w orkers at Project site or in w orkers' accommodation could increase the pressure and reduce access to health care. Additional disruption to social services such as Churches, Police services, and/or personal services such as hair care, professional services (canteen management and training), Merchandise such as household goods is possible and anticipate. The client plans to bridge the gaps by setting up a public transport system, to access key ecosystem services such as schools.	 Right to education Right to participate in cultural life Right to remedy 	w ith pre-existing health conditions
Conflicts betw een local communities and non- local w orkers impacting the safety and w ell- being of community members <i>Construction</i>	The employment of non-local workers can raison tensions within communities around the Project, in particular when the non-local workers do not share the same values and principles as local community members or have a different culture and lifestyle. This risk is reduced due to the limited number of non-local workers.	 Rights to life, liberty and security of person Right to remedy 	Local community members
Different forms of gender-based violence and harassment of female community members <i>Construction</i>	There is a risk that the Project workers could engage in different forms of gender- based violence and harassment of female community members passing close to the project site including inappropriate comments, jokes, derogatory conversations, or even sexual assault. Such behaviour might also originate from residents of workers' accommodations (if provided) during interactions with local communities.	 Rights to life, liberty and security of person. Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement Right to remedy 	Female community members
Harm/injury caused to members of the local communities due to	There is a risk of inappropriate response to community protests/unrests and opposition associated with the project activities. In case of escalation of violence and lack of cooperation from protestors, public security forces could respond	 Rights to life, liberty and security of person. 	Community members

Potential impact	Justification	Human rights at risk	Affected rightsholder
inadequate use of force by public security services <i>Construction</i>	aggressively including abuse of pow er, and inappropriate and disproportionate response, including arbitrary arrest and detention, excessive use of force, or threats against local communities. The baseline research show ed that there has been report of excessive use of force from public security forces even in response to peaceful protests. Opposition from local residents might arise if their high expectations for employment opportunities and/or investment in social and community development are unmet. Opposition could also arise from the sentiment of dissatisfaction due to displacement, nuisance or environmental impacts resulting from the Project activities.	 Right to freedom from torture and other cruel or degrading treatment or punishment. Right to freedom of movement Right to freedom of expression Right to freedom of peaceful assembly Right to remedy 	Vulnerable groups include women, members of LGBTQ+ community
Abusive behaviour from private security providers tow ards local community members <i>Construction</i>	It is still unclear whether accommodation will be provided to workers. Should accommodation be provided, it will be secured by physical security. Security personnel who will be posted at the main gate around the clock and will patrol the perimeter fence might engage in abusive behaviour tow ards local community members such as harassment, intimidation, different forms of gender-based violence or excessive use of force. This scenario could also apply to security personnel posted during construction to prevent unauthorized access to the sites with a risk of misusing their status, being abusive to local persons or applying excessive force in their handling/apprehension of potential trespassers or other unauthorised persons.	 Right to freedom of movement Rights to life, liberty and security of person. Right to freedom from torture and other cruel or degrading treatment or punishment Right to remedy 	Community members Vulnerable groups include women
Loss of shelter, threat to livelihoods and well- being of displaced population <i>Construction and</i> <i>Operation</i>	The land on which the flyovers are to be build is predominantly owned by state entities, including Caminho de Ferro de Luanda E.P. (Luanda Railway), MINTRANS (roads). Therefore most of the development will occur on government-owned land. There are, how ever, some privately owned residential and businesses properties will be expropriated or encroached on for the development. The Project is anticipated to result in partial or full loss of land. In particular, it is anticipated that the Project will result in the permanent physical displacement of 46 residential units, which could include approximately 212 people. The loss of shelter can lead to various adverse impacts, such as disconnection from cultural and social roots, and often, a decline in overall well-being. People may face challenges in accessing essential services such as education, healthcare, and clean water in their new locations, and they can experience increased vulnerability to poverty and social exclusion. The displacement might impact the employment situation, in particular if the relocation area is distant. Emotional and psychological distress is also common, as individuals grapple with the trauma of losing their homes and communities.	 Right to shelter Right to work Right to adequate standard of living Right to health (in particular mental health) Right to safe and adequate water Right to education Right to culture Right to remedy 	Displaced community members Vulnerable groups: illiterate, non- Portuguese speakers, w omen, children, individuals relying on specific public or community infrastructure
Loss of income and threat to livelihoods and resources	The construction of the five (5) flyovers is going to result in the economic displacement of 27 commercial structures as well as informal traders (between 30 and 60 informal traders at 5 th Avenue, Viana and Estalagem). Displacement of informal traders and taxi drivers: challenges could range from increased market competition at alternative trading spots, to increased vulnerability	 Right to an adequate standard of living Right to w ork Right to food 	Informal traders, businesses ow ners and their employees

Construction and Operation of 5 Overpasses – Lua Angola

Potential impact	Justification	Human rights at risk	Affected rightsholder
Construction and	to violence when competing with other traders and taxi drivers at different spots or a	Right to housing	Vulnerable groups:
Operation	loss of income in case the alternative location does not offer the same business	Right to remedy	illiterate, women,
	opportunities. Most of the roadside traders indicated the reason for working in the		employees living
	area would be many customers (17 respondents) and or no other		close to their activity
	options/necessities (38 respondents) and that most customers would be people who		location, who
	live close by (within 1 km). 63 out of the 75 interview ees indicated that the business		consider not having
	was their only means of income and 62 indicated that the money was not enough to		alternatives to their
	pay for their bills at a given month. 10 respondents said that they were unable to		activity, or who do not
	work elsewhere if trading should not be possible at their initial spots.		have other source of
	Displacement of small and medium businesses: economic displacement in an urban		Income.
	resettlement project can lead to a range of significant challenges for affected		
	limited and individuals may find themselves in low paying or informal jobs, which		
	can perpetuate a cycle of economic vulnerability. Additionally, the cost of renting		
	commercial structures in an alternative location may be higher there may be		
	increased market competition, further straining financial resources. It may also be		
	possible, that an established customer base cannot follow to a new location,		
	negatively impacting the business. At least 138 respondents reported that the		
	business was their sole source of income.		
Community Severance	Community severance, is a well-established phenomenon of transport planning in	Right to adequate standard of	Community members
	Sub-Saharan Africa, where large or busy roads that pass through settlements can	living	around and in the Aol
Construction and	have the effect of driving a wedge through the community by limiting peoples ability	Right to take part in cultural	
Operation	or desire to move through that area. This can reduce accessibility to key services or	life	
	damage local social networks and community conesion.	 Right to social society 	
		Right to remedy	
Human rights in host co	ommunities		
health acfaty and wall	Host communities, to which the Project affected households will be resettled to, can		Host community
heing of bost	resources, strain on services increase of housing prices insecurity and potential		members
communities	disparities in income and social stratification. Resettlement, can also influence	Right to adequate standard of 	Vulnerable groups will
Commentio	politics and community dynamics impacting voting patterns and representation	living	have to be
Construction and		Right to security	determined during the
Operation		Right to education	host community
,		Right to remedy	assessment.
Human rights in comm	unities – other		
Data share of	The Project will be conducting engagement activities with communities as part of	 Right to privacy 	Local and host
community individuals	impact management. The management and disclosure of personnel information if	 Right to social security 	community members
with authorities without	could lead to the identification of persons, resulting in abuse and misuse in particular	Right to participate in public	participating in
their know ledge	by government authorities.	affairs	engagement activities
		Right to participation	

Potential impact	Justification	Human rights at risk	Affected rightsholder
Construction and Operation		 Freedom from discrimination Right to remedy 	Vulnerable groups: children, elderly, women, people with existing health conditions
Discrimination of marginalized groups, minorities, vulnerable groups <i>Construction</i>	Impact through project on community with diverse demographic make-up is certain, the risk to act to the disadvantage to a marginalised group is significant. Engagement activities might favour some community members due to traditional governance. Although it is important to respect local cultural practices, Project engagement activities should not result in the neglect of community members with little political or community pow er/participation. This includes access in economic benefits as well as impacts management decision.	 Rights to life Right to liberty and security of person Minority rights Right to health Right to adequate standards of living Right of social security Freedom from discrimination Right to equality betw een men and w omen Right of children from social and economic exploitation Right to remedy 	Local and host community members Vulnerable groups: women, elderly, people with pre- existing health conditions, ethnic and religious minorities, members of the LGBTQ+ community, illiterate, migrants

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6.4.10.4 Impact Assessment

The Table 6.103 provides a complicated assessment of identified human rights risks.

Table 6.103 Assessment of Identified Human Rights Risks

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level

Labour rights and working conditions

Under the UNGPs, business responsibility - defined through the concept of company's involvement in human rights impacts (cause, contribute to or directly linked) - allows to identify and assess the potential and actual adverse impacts that INZAG will need to address. With regards to labour rights and working conditions, INZAG's responsibility will be limited to the construction phase as the monitoring and maintenance of the flyovers in the long-term will fall under the responsibility of the Ministry of Transport.

Human rights in the wo	rkplace at Project	Site						
1.1 Multiple severe injuries to w orkers as a result of occupational health and safety incidents that could have serious and potentially irreparable consequences such as permanent disability or fatality.	 Cause (own w orkers) Contribute or directly linked (contracted w orkers) 	All Project w orkers (direct and contracted) and their families	 Right to safe and healthy w orking conditions Right to life Right to livelihood Right to remedy Right to w ork Right to w ater 	 INZAG Hazard Identification and Risk Assessment Procedure (applicable to Project) Project OHS Management Plan Consideration H&S performance in subcontractor and supplier selection process Subcontractor Management Plan Emergency Response Plan Presence of health care and basic first aid at w orksites Occupational Safety Routines Training Stop w ork process Workers grievance mechanism HSE audits and inspections w hich also covers subcontractor 	Construction Scale = High Scope = Moderate Irremediability = High Severity — High/Moderate/High = Moderate Likelihood = possible — the construction sector is among the sectors that concentrate more fatal w ork accidents according to ILO statistics. How ever, the anticipated management measures enable to decrease the likelihood of the impact occurring.	Moderate	 Ensure that grievance mechanism is available and accessible to contracted workers Ensure that Project OHS workers' representatives have the right to access OHS information w hen they request it, the right to be present during interview s with workers on H&S aspects and the right to accompany inspectors during inspections. If not part of Corrective actions and follow -up visits and audits: Incidents log 	Moderat e

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
					 Corrective actions and follow -up visits and audits Provision of Work Accident Insurance and Health Insurance 				
1.2	Unfair treatment, harassment or prejudice against people or groups due to union membership, gender identity, sexual orientation, or country of origin in	Cause (ow n w orkers) Contribute or directly linked (contracted)	All Project w orkers Vulnerable groups: w omen, members of the LGBTQ+ community, people w ith AIDS/HIV, people w ith albinism, refugees	 Right to equal treatment in employment w ithout discrimination Right to equal remuneration for equal w ork Right to just and favourable 	 Code of Conduct which prohibits any form of violation of human rights such as prejudice, discrimination or harassment. Human Resources Management Plan includes specific commitment equal opportunity and non-discrimination, and the right to form and/or join a union. 	Construction Scale = Moderate/High Scope = Moderate Irremediability = Moderate Severity — High /Moderate/ Moderate = High Likelihood = Possible — Gender-based discrimination is an issue, with women underrepresented in	Moderate	 Conduct regular labour rights risk assessment to identify the risks associated with the activities to perform, including risks of discrimination Ensure that prohibition of discrimination covers all grounds including Include clause in contractual 	Low

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
	employment matters.			 conditions of work Migrant workers' rights Right to work Right to remedy 	 OHS Management Plan includes a separate section on HIV, committing to non- discrimination against workers who are positive with HIV Workers Accommodation Plan including behavioural expectations from residents prohibiting any form of discrimination and harassment Workers grievance mechanism 	the construction sector industry, facing an overly masculine environment. The Project has developed policies committing to equal treatment and non-discrimination, but implementation measures remain limited.		 agreement with first- tier subcontractors requiring commitment to equal treatment and non- discrimination Include clauses in contractual agreements with first- tier subcontractors requiring them to cascade the requirements to their ow n business partners Update Human Resources Management Plan to address the labour rights and w orking conditions risks related to Project activities, including with regards to equal treatment and non- discrimination Ensure that training on cultural aw areness is provided to employees, in particular personnel responsible for the employment process (e.g., human resources and recruiting staff) 	

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								 Amend the Subcontractor Management Plan to include requirements regarding labour rights and w orking conditions beyond OHS (including KPls) Include in the Subcontractor's contracts clauses to respect and recognise w orkers' rights including equal treatment and non- discrimination Ensure due diligence processes are put in place by subcontractors to screen and monitor recruitment and labour management practices implemented by their suppliers and subcontractors Include labour rights and w orking conditions in routine audits and inspections of Project activities Ensure that grievance mechanism is available and 	

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								accessible to contracted workers	
1.3	Different forms of gender- based violence and harassment (GBVH) of w omen at the w orkplace or in w orkers accommodatio ns	 Cause (own w orkers) Contribute or directly linked (contracted w orkers) 	Female Project w orkers (direct and contracted)	 Right to safe and healthy w orking conditions Right to fair and decent w orking conditions Right to equal treatment in employment w ithout discrimination Right to freedom from torture and other cruel or degrading treatment or punishment. Women's rights Right to remedy 	 Code of Conduct which prohibits any form of violation of human rights such as prejudice, discrimination or harassment. OHS Management Plan includes separate rooms and toilets for men and w omen Workers Accommodation Plan includes Workers Accommodation Plan includes Workers Accommodation Plan including behavioural expectations from residents prohibiting any form of discrimination, harassment and gender-based violence. Workers grievance mechanism 	Construction Scale = High Scope = Moderate Irremediability = High Severity — High /Moderate/ High = High Likelihood = Possible — Gender-based harassment is an issue, with w omen underrepresented in the sector industry, facing an overly masculine environment. Anticipated measures to address this risk remain limited.	Moderate	 Consider violence and harassment and associated psychosocial risks as part of the management of occupational health and safety risks. Provide Project workers, including subcontractor's and sub subcontractor's personnel, with specific GBVH training based on the risks identified, to raise aw areness of the GBVH prevention plan. Deploy the required resources for effective means of inspection and investigation of cases of violence and harassment, including through labour inspections and monitoring. As part of the Grievance Mechanism, include explicit measures to address grievances linked to GBVH 	Low

Construction and Operation of 5 Overpasses – Luanda Railway Trac. Angola

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								 Ensure that grievance mechanism is available and accessible to contracted workers 	
1.4	Workers not being able to form or join trade unions of their choice, and/or not being able to engage in collective bargaining to improve their w orking conditions.	Cause (ow n w orkers) Contribute to / direct link (contracted w orkers)	All project w orkers (direct and contracted) Vulnerable groups: w aste managemen t w orkers, informal w orkers	 Freedom of association and collective bargaining Right to strike Right to freedom of movement Right to freedom of expression Right to freedom of peaceful assembly Right to remedy 	 The Human Resources Management Plan includes specific commitment right to form or join a worker's organization, such as a union. INZAG also commits to not discourage workers from electing worker representatives or forming collective bargaining organizations. Protocols for dealing with industrial action such as strikes, work stoppages, sit-ins Workers grievance mechanism 	Construction Scale = Moderate Scope= high Irremediability = Low Severity — Moderate /High/Low = Moderate Likelihood = Possible — violations of w orkers' right to bargain collectively have been recently reported in the country. The anticipated preventive and mitigation measures are very limited.	Moderate	 Conduct a labour right risk assessment to identify the risks associated with the activities to perform Update Human Resources Management Plan to address the labour rights and w orking conditions risks related to Project activities, in particular related to freedom of association and collective bargaining Commit to prohibition of retribution against w orkers w ho strike Amend the Subcontractor Management Plan to include requirements regarding labour rights and w orking conditions beyond OHS (including KPIs) Include in the Subcontractor's contracts clauses to respect and 	Low

Ref	Potential	Company	Whose Rights at	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
140.	Justification	involvement	Risk		Activities			Management Measures	Level
1.5	Workers						Madarata	recognise w orkers' rights in alignment with ILO, including to freedom of association and collective bargaining. Ensure due diligence processes are put in place by subcontractors to screen and monitor recruitment and labour management practices implemented by their suppliers and subcontractors Include labour rights and w orking conditions in routine audits and inspections of Project activities, including subcontractor Provide Project contract managers with training on human rights, labour rights and decent w orking conditions Ensure that grievance mechanism is available and accessible to contracted w orkers	
1.5	vvorkers facing labor	vorkers)	All project w orkers	Right to freedom from	The Code of Conduct outlines INZAG's its no-	Construction	Moderate	Conduct a labour right risk assessment	Low

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
	exploitation due to situations of dependence of sponsor that enhance abusive relationships.	Contribute/dire ctly linked (contracted w orkers)	(direct and contracted) Vulnerable w orkers: informal w orkers, low -income households, illiterate, refugees and migrant w orkers depending on their employer to maintain and renew their w ork permits	 forced labour and servitude Right to life, liberty, and security of person Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement 	 tolerance policy to the use of child or forced labour at any level of its organization or supply chain The Human Resources Management Plan includes commitment to respect a list of w orkers' rights including the right to voluntary end the employment relationship with contractual parameters. The Human Resources Management Plan indicates that INZAG will limit the use of third-party agencies for the recruitment of foreign w orkers. INZAG commits to not use third-party agencies. Workers grievance mechanism 	Scale = Moderate Scope = moderate Irremediability= Moderate Severity Moderate = Moderate/ Moderate = Moderate Likelihood = Possible There have been recent cases in the country of forced labor including in the construction sector. The anticipated mitigation measures are limited.		 to identify the risks associated with the activities to perform Update Human Resources Management Plan to address labour rights and working conditions risks related to Project activities Conduct due diligence on Labour Agencies prior using them for the recruitment of workforce. Amend the Subcontractor Management Plan to include requirements regarding labour rights and working conditions beyond OHS (including KPIs) Include clauses in contractual agreements with first- tier subcontractors committing to a zero- tolerance policy regarding modern slavery Ensure due diligence processes are put in place by subcontractors to screen and monitor 	

Ref	Potential	Company	Whose Bights at	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
NO.	Justification	Involvement	Risk		Activities			Management Measures	Level
								 recruitment and labour management practices implemented by their suppliers and subcontractors Include labour rights and w orking conditions in routine audits and inspections of Project activities, including subcontractor Ensure that grievance mechanism is available and accessible to contracted w orkers Provide Project contract managers w ith training on human rights, labour rights and decent w orking conditions 	

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
1.6	Negative impacts on the physical health and mental w ell-being of persons affected by unfavourable w orking conditions at Project Site	Cause (ow n w orkers) Contribute/dire ctly linked (contracted w orkers)	All Project w orkers (direct and contracted) Vulnerable w orkers: illiterate, non- Portuguese speaking w orker, migrant w orkers, refugees, informal w orkers	Right to just and favourable conditions of w ork. Right to safe and healthy w orking conditions Right to fair w ages Right to rest, leisure and reasonable limitation of w orking hours and periodic holidays w ith pay Right to remedy	 In its Human Resources Management Plan, INZAG commits to fair, transparent and equitable recruitment and selection process covering local and foreign w orkers. Workers grievance mechanism 	Construction Scale = Moderate Scope= High Irremediability= Moderate Severity — Moderate /High/Moderate = Moderate Likelihood = almost certain. The Angolan legislation allows intermittent work to be performed above the w eekly maximum number of hours set by the ILO w hich is likely to be applicable to the construction sector. The anticipated mitigation measures are limited.	High	 Conduct a labour right risk assessment to identify the risks associated with the activities to perform Commit to respect internationally recognized labour standards, including with regards to w orking hours Update Human Resources Management Plan to address labour rights and w orking conditions risks related to Project activities Ensure that contracts detail all the terms and conditions of employment in a language understood by the w orker before commencement of w ork and explain verbally the content of the contract Amend the Subcontractor Management Plan to include requirements regarding labour rights and w orking conditions beyond OHS 	Low

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								 Include a clause in contractual agreement requiring subcontractors to respect internationally recognized labour standards, including with regards to w orking hours Ensure due diligence processes are put in place by subcontractors to screen and monitor recruitment and labour management practices implemented by their suppliers and subcontractors (with KPIs on w orking hours, w ages, intime payment etc.) Include labour rights and w orking conditions in routine audits and inspections of Project activities, including subcontractor Provide Project contract managers with training on human rights, labour rights and decent w orking conditions 	

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								 Provide support to subcontractors through capacity building activities (engagement, training, w orkshops, tools etc.) Ensure that grievance mechanism is available and accessible to contracted w orkers 	

Ref No.	Potential Impact and	Company involvement	Whose Rights at	Rights at Risk	Existing Management Measures and Planned	Assessment	Saliency	Additional Recommended	Residua I Risk
	Justification		Risk		Activities			Management Measures	Level
1.7	Impacts on living and w orking conditions of w orkers due to inadequate access to social protection floors	Cause (ow n w orkers) Directly linked (informal w orkers)	Expatriates Informal w orkers, in particular security guards	 Right to social security Right to adequate standards of living Right to health Right to remedy 	Provision of health insurance, w ork accident insurance and life insurance	Construction Scale = Moderate Scope= Low Irremediability = Moderate Severity — Moderate /Low /Moderate = Moderate Likelihood = unlikely. The Angolan legislation allow s the coverage of expatriates under the social security schemes if non- resident workers are not already covered by the system in their country of origin. It is anticipated that expatriates will occupy higher-paying positions and will be provided with employer insurance.	Moderate	Assess social security schemes in country of origin for expatriates and expend insurance benefits if basic social protection floor are not covered	Low

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
1.8	Unfavourable living conditions affecting the health and w ell-being of persons residing in w orkers' accommodatio n	Cause (direct management of accommodatio ns) contribute or directly linked (contracted management of accommodatio ns)	Residents and residents families Vulnerable groups: w omen	 Right to adequate standard of living Right to freedom of movement Right to freedom of association Right to freedom of thought, belief and religion Right to privacy Right to family life Right to remedy 	 Workers' accommodation management Plan Grievance mechanism 	<u>Construction</u> Scale = Moderate Irremediability = Low <u>Severity</u> — Moderate/Moderate/Lo w = Moderate <u>Likelihood</u> = possible The Workers Accommodation Plan is not sufficiently detailed to assess the appropriateness of the accommodations with regards to general living facilities, rooms/dormitories facilities, sanitary facilities, canteen and cooking facilities, food safety, medical facilities and leisure/social facilities	Moderate	 Ensure that the construction and provision of accommodations are in line with the ILO R115 Workers' Housing Recommendation, and IFC/EBRD Workers' Accommodation Guidance Note. Should worker accommodation be provided, implement an accommodation auditing programme. Ensure that restriction on w orkers' rights and freedoms, in particular freedom of movement, is limited and justified. Ensure that grievance mechanism is available and accessible to contracted workers 	Low

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
1.9	Abusive behaviors from private security providers towards residents in workers' accommodatio ns	Contribute or directly linked (contracted security staff)	Workers Vulnerable groups: w omen	 Right to equal treatment and non- discrimination Right to freedom of movement Right to freedom from torture and other cruel or degrading treatment or punishment. Rights to life, liberty and security of person. Right to privacy Right to equal treatment and non- discrimination Right to remedy 	 Security Plan which includes requirement of security providers to act in line with the VPSHR, the procedures to report, investigate, address (including remedial actions) and record the allegations of use of excessive force, as w ell as training Workers grievance mechanism 	Construction Scale = Moderate Scope = Low Irremediability = Moderate Severity — Moderate /Low / Moderate = Moderate Likelihood = Possible — Human rights violation and use of violence by security personnel is not rare; but the Company has developed some measures that allow to reduce the risk.	Moderate	 Ensure that grievance mechanism is available and accessible to contracted workers Conduct due diligence prior entering relationship with private security providers to assess their capacity to act in line with the VPSHR and their human rights record. Ensure that VPSHR are reflected in the Standard Operating Procedures Implement monitoring process to ensure that VPSHR are respected along the business relationship and that non- compliance are effectively identified and addressed. 	Low

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
1.1 0	Harm to w orkers due to inadequate response from public security services	Contribute or directly linked	All Project workers (direct and contracted) Vulnerable groups: women, members of LGBTQ+ community	 Right to freedom of assembly Right to collective bargaining Right to strike Right to strike Right to freedom of movement Rights to life, liberty and security of person Right to freedom from torture and other cruel or degrading treatment or punishment Right to equal treatment and non- discrimination Right to remedy 	 Stakeholder Engagement Plan (SEP) Workers grievance mechanism 	Construction Scale = High Scope = High Irremediability = High Severity — High /High/ High = High Likelihood = Possible — Excessive use of force from public security providers in not uncommon in Angola. Anticipated measures cover the risks related to private security providers but not public security forces.	High	 Ensure that grievance mechanism is available and accessible to contracted workers Develop and implement a memorandum of understanding with public security forces in the event of high- risk context to ensure commitment to the VPSHR. Conduct regular external checks on public security forces human rights records. Ensure that training on the VPSHR (in the context of support from public security forces) is completed. 	Moderate
Huma	n Rights within the	e supply chain	-	<u> </u>				-	
2.1	Negative impacts on the physical health	Contribute or directly linked	Workers w ithin the supply chain	 Right to decent w orking 	The Code of Conduct prohibits any form of child and forced labor	Construction Scale = Moderate	High	 Evaluate the supply chain structures w ithin the Project to 	Low

2.1	Negative	Contribute or	Workers	Right to	The Code of Conduct	Construction	High	Evaluate the supply	Low
	impacts on the	directly linked	w ithin the	decent	prohibits any form of		i iigii	chain structures	LOW
	physical health		supply chain	w orking	child and forced labor	Scale = Moderate		within the Project to	
	and mental			conditions	including along the			pinpoint suppliers	
	w ell-being of		Vulnerable	Right to safe	supply chain.	Scope= High		and subcontractor	
	persons		groups:	and healthy				posing the highest	

Ref No.	Potential Impact and	Company involvement	Whose Rights at	Rights at Risk	Existing Management Measures and Planned	Assessment	Saliency	Additional Recommended	Residua I Risk
	affected by unfavourable w orking conditions		Vulnerable groups: w orkers in the supply chain of at- risk materials, migrant w orkers, children, informal w orkers	 w orking conditions Right against w orst forms of child labour Right to freedom from forced labour and servitude Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement Right to freedom of children from social and economic exploitation Right to remedy 	Local Content Policy and commitment to fair procurement	Irremediability= Moderate Severity — Moderate/High/Moderat e = high Likelihood = possible. The construction's supply chain is know n to be associated with human rights abuses including regarding occupational health and safety, forced labor, human trafficking and child labor. The lack of visibility along the supply chain beyond first tier suppliers increases the risk of human rights abuses. The anticipated measures regarding supply chain management are very limited.		 risk of negative human rights effects Develop and implement a Supply Chain Management Plan to address the risks including measures to select suppliers, address noncompliance and monitor performance (including KPIs) Include clause in contractual agreement with first- tier suppliers requiring them to commit to respecting international labour standards (ILO Core Conventions) Ensure similar due diligence processes are put in place by suppliers to screen and monitor recruitment and labour management practices implemented by their suppliers and subcontractors, including recruitment agencies. Provide support to suppliers through capacity building activities 	

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures (engagement,	Residua I Risk Level
Huma	n riahts within loc:	al communities	Standard of Livir	and Community	Health & Safetv			 training, workshops, tools etc.) Ensure that grievance mechanism is available and accessible to supply chain workers 	
3.1. a	Environmental impact through construction of flyovers, resulting in air, w ater contamination, noise pollution and vibration as w ell as malaria infection during construction	Cause / Contribution	All community members, w ho live close to the vicinity of the Project's area Vulnerable people: elderly, Children, people w ith pre-existing health conditions, low -income households	 Right to health Right to life Right to adequate standard of living Right to w ater Right to remedy Right to clean environment 	 Stakeholder Engagement Plan (SEP) Recognizes the potential environmental impacts on communities and emphasises to engage closely with Environmental and Permitting authorities as w ell as the impacted communities. Community Grievance Mechanism The SEP also mentions the importance of Grievance Mechanisms in regard to Environmental impacts. Design of infrastructure to drain rainw ater onto the side of the road and eventually being directed tow ards gutters, culverts, galleries, from w here it w ill be absorbed into the existing stormw ater 	Construction Scale: Moderate Scope: High Irrem ediability: Moderate/High Severity: High Likelihood: Certain. The increase in noise and air pollution will impact communities w ho are living in or close to the Aol. It is to anticipate that noise and air pollution will increase during construction. Furthermore, it will need to be assessed, as to w hether both impacts low er or change once the flyovers are in operation, due to potential increase exposure to traffic noise and pollution. Without ongoing	High	 Revision evaluation of updated SEP Review of Resettlement Plan and consequent mitigation measures. SIA suggests informing community members about noise and air pollution – additionally, ways of protection specifically for vulnerable community members e.g., with respiratory illnesses should be considered. Change Management Procedure to ensure that unexpected changes in Project design address associated E&S impacts Management of Vehicle Emissions through regular 	Moderat e

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
					management infrastructure.	maintenance and cleaning of the stormw ater infrastructure it is likely that there will be occurrences of contamination over the life of operation		 services, optimisation of traffic flow s and toll systems. Management of Wildlife issues associated with construction camps. INZAG to ensure that during construction activities drainage structures are being cleared on a regular basis to ensure free draining 	
3.1. b	Increase of traffic accidents during construction period, and lack of road safety	Cause and/or Contribution	Community members, particularly those living around/or w orking near the Project's immediate Aol Vulnerable: Elderly, Children	 Right to life Right to adequate standard of living Right to health Right to safety 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions, ensuring engagements on road safety. Community Grievance Mechanism Incident and Accident Management procedures for incidents/accidents with community members Transportation measures (schedules for shifts and delivery). ESMPs provide recommendations on sign usage, traffic regulations, community safety and aw areness, communication with 	Scale: High Scope: Moderate Irremediability: Moderate Severity: High Likelihood: Almost certain. Through the direct exposure from communities close or in the Aol, it is almost certain to assume that traffic accidents during the construction period occur. Road safety and site security must have high priority.	High	 Emergency Preparedness and Response Plan ensuring effective response after road accidents, and preparedness for comprehensive road safety. Traffic & Management Plan, ensuring driver training and controls over prescribed routes. Community Health and Safety and Security Plan (CHSSP) providing a clear set of actions to control and upon impact onto community members. 	Low

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Ref No.	Potential Impact and	Company involvement	Whose Rights at	Rights at Risk	Existing Management Measures and Planned	Assessment	Saliency	Additional Recommended	Residua I Risk
					authorities and emergency response providers, w as w ell as vehicle standards and driver standards.			 Traffic Control System Training, ensuring road safety. Road Improvement and Repair programmes, as well as established vehicle and driver standards shall provide additional provision for safety. Community Safety and Aw areness training and Campaign during construction period. Collaboration with responsible communities and authorities. 	
3.1. c	Increase of traffic accidents during Operation period, and lack of road safety	Contribution	Community members, particularly those living around/or w orking near the Project's immediate Aol Vulnerable: Elderly, Children	 Right to life Right to adequate standard of living Right to health Right to safety Right to remedy 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions, ensuring engagements on road safety. Community Grievance Mechanism Project design to include service and access routes to provide adequate road circulation in the surrounding neighbourhoods 	Operation Scale: High Scope: Moderate Irremediability: High Severity: High Likelihood: Likely. The road traffic system shall provide detail as to whether the access to flyovers low er the impact on the communities surrounding the access to the flyovers. Overall, it is being confirmed,	High	 New community structures and road traffic and safety at access to flyovers will identify increased risk of road safety along flyover access Engagement with local communities on new layouts to increase familiarity with new layout Traffic & Management Plan, ensuring driver training and controls 	Moderat e

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment that the flyovers release traffic pressure, how ever, the unfamiliarity with high traffic and density as	Saliency	Additional Recommended Management Measures over prescribed routes.	Residua I Risk Level
						w ell as poor road safety aw areness, results in a high severity receptor			
3.1. d	Accidents (serious to fatal injuries) resulting from unauthorised public access on site (trespassing)	Contribute	All community members, particularly those living around/or w orking in the vicinity Project's area Vulnerable: Children	 Right to life Right to liberty and security of person Freedom of movement Right to health Right to remedy 	 Stakeholder Engagement Plan (SEP) Stakeholder Engagement Activities according to SEP: As part of the SEP, INZAG will undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, the dangers of playing on or near equipment or entering fenced areas. This will include presenting in every primary and secondary school in communities in the Aol. The programme will consider especial vulnerabilities in regard to children living under the poverty threshold. 	Construction Scale: Moderate Scope: High Irremediability: High Severity: High Likelihood: Almost Certain. It is to assume that trespassing of site property is prone to trespassing activities due to proximity of multiple communities in and around the Aol.	High	 Develop Emergency Preparedness and Response Plan to ensure effective response to incident on site. Develop Community Health and Safety and Security Plan (CHSSP) to control impacts on community members 	Moderat e

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
					forces to secure the property, and therefore protect community members from putting themselves in danger. Community Grievance Mechanism				
3.1. e	Increase of communicable diseases during construction period through construction w orkers influx in area	Contribute	All community members, w ho live close to the Project's immediate Aol Vulnerable people: elderly, Children, people w ith respiratory or relatable health conditions,	 Right to health Right to life Right to adequate standard of living 	 OHS Management Plan referring to INZAG 's HIV/AIDs Policy which encourages employees to take HIV screening tests Stakeholder Engagement Plan (SEP) Community Grievance Mechanism The Workforce Code of Conduct specifies living and w orking conditions, w hich shall contribute to reduce risks of diseases as w ell as community interactions. 	Construction Scale: Moderate Scope: Moderate Irremediability: Moderate Severity: Moderate Likelihood: Almost Certain. The proximity and exposure of workforce that is brought into the area, onto communities suggest an certain interaction, and almost certain risk of an increase of STDs in the area.	High	 Development of Community Health and Safety and Security Plan (CHSSP) to control impacts on community members, including encouraging the reporting of harassment and sexual assault through show casing safe spaces (e.g.; female-only- engagements) INZAG should offer all w orkers incl. contractors and subcontractors a voluntary screening for STD's as w ell as provide education on STDs including transmission routes and symptoms. In addition w orkers w ill be informed about law penalties for sexual assault and financial implications 	Moderat e

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								for impregnating w omen. STD Management Plan (yet to be designed) to minimize spread of STDs such as HIV/AIDS including aw areness sessions provided to Project w orkers (direct and contracted) on STDs	
3.2. a	Effect on existing public/commu nity infrastructure and facilities and reduced standard of living on local communities associated with Project construction activities (electricity, telecommunic ation, and w ater)	Cause and/or Contribution	Community members, particularly those living around/or w orking near the Project's immediate Aol Vulnerable groups: w omen, children, individuals w ith pre- existing health conditions, low -income households	 Right to an adequate standard of living Right to health Right to access to clean water and sanitation Right to a safe, clean, healthy, and sustainable environment Right to lif Right to lif Right to safety Right to privacy Right to environment and women and women 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions and programmes tailored to the project, such as engaging every 6 months at a minimum to keep the community updated. The SEP also recognizes the project impact and potential loss and/or disruption of primary economic activity and gives recommendations on how to respond to support impacted community members. Community Grievance Mechanism 	Construction Scale = High Scope = High Irremediability= High Severity — High/High/High = High Likelihood = Certain. This is likely to generate pressure on existing local utility supplies (w hich already have temporary disruption), disturbance to traffic and transportation due to road crossings, and short-term planned and unplanned disruption to electricity, telecommunication, and w ater supply for irrigation, domestic, drinking and industrial purposes.	High	 Corrective actions and follow -up visits and audits Develop Resettlement Plan tailored to the project to ensure community members are provided with equal or better living standards than before impacted to the project. Incorporating lessons learned element in project cycle, ensuring community feedback will be incorporated into project mechanisms. Engagement with respective NGO's or governmental institutions to work on solution orientated long-term plans for 	Mod erate

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
				Right to an adequate standard of living Right to w ork Right to food Right to health Right to social security				 affected community members Public Utilities Enhancement Plan (yet to be developed) to improve living standards even during the construction phase Training on Environmental Aw areness in the workplace for workers, taking care of direct environment. Traffic Control System Training, ensuring road safety. Change Management Procedure to ensure that unexpected changes have a sound technical, safety, environmental and commercial justification. Actions to avoid loss of natural habitats. Management of Wildlife issues associated with construction camps. 	
3.2. b	Effect on existing public infrastructures resulting to	Cause / Contribution	All community members, particularly	 Right to adequate standard of living 	 Incident/Accident Management Procedure, including incidents/accidents, and 	Construction Scale: Moderate Scope: High	Moderate	 If access to health facilities disrupted, aw areness raising material, training, etc 	Low

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
	negative impacts on the health and safety of local communities during construction – Clinics / Hospitals / Medical Institutions		those w ho live close to the Project's immediate Aol Vulnerable people: w omen, children, elderly, individuals strongly relying on infrastructur e	 Right to health (e.g., access to medical facilities) Right to social security Right to equality betw een men and w omen 	procedures/ claims with the community and evaluation of the effectiveness of corrective measures. The site specific OHS Management Plan provides insight on planned additional health facilities for w orkers on site property, w hich shall reduce pressure on surrounding medical institutions.	Irremediability: Moderate/High Severity: Moderate / High / Moderate-High: High Likelihood: Certain. Infrastructure within Aol will change, and probably affect infrastructure around Aol. Know n access routes to key infrastructure will most likely change – alternative routes need to be sought after. Those diversion might be overcrow ded by main transport routes, which could delay access to health services further. The Impact Assessment suggests, that INZAG plans bus stops at critical infrastructure.		 on how to access medical facilities, w ater, food shall be developed and provided and tailored to communities of all 5 flyovers. Incident/Accident Management Procedure A Community Health and Safety Management Plan (CHSMP) w ill be developed by INZAG INZAG w ill undertake a health facility assessment of medical infrastructure as part of the INZAG Health and Safety Management System to determine if facilities have sufficient resources and equipment to deal w ith emergencies. Agreements w ith medical institutions are planned to be entered. INZAG w ill monitor the emergence of major pandemics through WHO alerts. An Emergency Preparedness and 	

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								 Response Plan (EPRP) will be developed by INZAG. Change Management Procedure to ensure that unexpected changes have a sound technical, safety, environmental and commercial justification 	
3.2. c	Effect on existing public infrastructures resulting to negative impacts on the health and safety of local communities during construction – WaSH (incl. Sew age System, Water scarcity, w aste management)	Cause / Contribution	All community members, particularly those w ho live close to the Project's immediate Aol Vulnerable people: w omen, children, elderly, community members w ith pre- existing conditions	 Right to adequate standard of living Right to health (e.g., WaSH) Right to water (potable and sanitation) Right to equality betw een men and w omen Right to remedy 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions and programmes tailored to the project, such as engaging every 6 months at a minimum to keep the community updated. Community Grievance Mechanism Water and Wastew ater Management Plan, redefining preventative measures to mitigate and mange impacts to w ater sources, surface w ater and groundw ater quality. Waste Management Plan, ensuring w aste handling procedures from hazardous and non-hazardous w astes. 	Construction Scale: Moderate Scope: High Irrem ediability: Moderate/High Severity: Moderate / High / Moderate-High: High Likelihood: Almost Certain. Water companies have already raised concern that the construction will interfere with water supply (in tanks) to communities in and close to Aol. In addition, concern was aired that construction work could damage (underground) piping system. Water management risks also relate to water handling on site (sew age, water storage, wastewater management)	High	 Development of EPRP, detailing actions and reporting lines in the event of service interruption (w ater pipes, electricity, telecommunication) as w ell as specifications on community communication and disclosure. Public Utilities Enhancement Plan (yet to be developed) to improve living standards even during the construction phase A Community Health and Safety Management Plan (CHSMP) w ill be developed by INZAG to ensure w ater, sanitation and 	Moderat e

Angola

Ref No.	Potential Impact and	Company involvement	Whose Rights at	Rights at Risk	Existing Management Measures and Planned	Assessment	Saliency	Additional Recommended	Residua I Risk
	Justification		Risk		Activities			 Management Measures hygiene (including functioning sew age system) throughout the construction phase. Environmental Aw areness in the workplace for workers, taking care of direct environment. Engagement with communities to inquire about registered and unregistered wells. Earthworks to ensure local water supply and fly is not impacted. 	Level
3.2. d	Construction is impacting on community provision of education	Cause / Contribution	Community members, particularly those living around/or w orking near the Project's immediate Aol Vulnerable groups: children	 Right to education Right to remedy 	Stakeholder Engagement Plan (SEP) During construction access to infrastructure could be temporarily disrupted and community members will need to find alternative routes, on the long run, how ever, the flyovers will increase people's mobility. Stakeholder Engagement Plan shall cater to supporting community members find alternative safe routes to critical infrastructure such as	Construction Scale: Moderate Irremediability: Low Severity: Moderate Likelihood: Possible. During the site's construction phase, it is to assume that construction w orks might hinder and/or temporarily disrupt the communities access to critical infrastructure such as schools.	Moderate	SEP activities with regards to providing impacted community members safe access to critical infrastructure to be review ed and evaluated once developed.	Low

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities schools e.g., it is planned to establish bus stops at school, to navigate children around sites. Community Grievance Mechanism	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
3.2. e	Construction restricts communities' access to cultural assets / areas of importance to livelihoods	Cause / Contribution	Host community members, particularly those living around/or w orking near the Project's immediate Aol Vulnerable groups: w omen, children	 Right to life Freedom of religion or conscience Freedom of assembly Right to adequate standard of living Right to social society Right to participate in cultural life Right to health Right to safety 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions and programmes tailored to the project, ensuring infrastructural changes are communicated with the communities through a detailed SEP. Community Grievance Mechanism 	Construction Scale: Moderate Scope: Moderate Irremediability: Low Severity Moderate Likelihood: Possible. The permanence of this loss is likely to depend on the resettlement options and location. Disruption to social services such as Churches, Clinics/Healthcare Police services, personal services (hair, make up, nail salon), Professional Service (canteen management and training), Merchandise sales (cell phones, household goods, alcohol).	Moderate	 Development of Cultural Heritage Management Plan to ensure that all heritage issues are addressed and managed adequately. A Community Health and Safety Management Plan (CHSMP) will be developed by INZAG Environmental Aw areness in the w orkplace for w orkers, taking care of direct environment. Traffic Control System Training, ensuring road safety. 	Low
Huma	n rights within loc	al communities –	Security						
4.1	Abusive behaviour	Cause (ow n security staff)	Community members w ho are	 Rights to life, liberty and 	 Stakeholder Engagement Plan (SEP) Engagements 	Construction Scale: High Scope: Low	High	 Review of mitigation measures post policy 	Low

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
	from public security services tow ards local community members	Contribute/Dir ectly linked(contract ed security staff)	directly or indirectly impacted by the Project, specifically those w ho live in the vicinity of the Project area Vulnerable groups: w omen	 security of person. Right to freedom from torture and other cruel or degrading treatment or punishment. Right to freedom of movement Right to freedom of expression Right to freedom of peaceful assembly 	 aim to raise aw areness of the project, grievance mechanisms as well as role of security forces. Community Grievance Mechanism will be made available to all members of the community. The Workforce Code of Conduct specifies living and w orking conditions, w hich shall contribute to reduce conflict in exchange with community members. Security management training is planned based on Voluntary Principles for Security and Human Rights. Violation w ill result in corrective actions. Grievance Mechanisms kept live and monitored. 	Irremediability: High Severity: High Likelihood: Likely. INZAG relays mainly on private security personnel, leading to likely contact with community.		 implementation by INZAG. Conduct due diligence prior entering relationship with private security providers to assess their capacity to act in line with the VPSHR and their human rights record. Ensure that VPSHR are reflected in the Standard Operating Procedures Implement monitoring process to ensure that VPSHR are respected along the business relationship and that non- compliance are effectively identified and addressed. Community Health and Safety and Security Plan (CHSSP) Workers will be informed about law penalties for e.g., sexual assault and financial implications for impregnating w omen. 	
Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
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4.2	Harm/injury caused to members of the local communities due to inadequate use of force by public security services	Directly linked	Community members w ho are directly or indirectly impacted by the Project, specifically those w ho live in the vicinity of the Project area Vulnerable groups: elderly, w omen, children (specifically girls), marginalised groups specifically members of the LGBTQ+ community	 Right to freedom of movement Rights to life, liberty and security of person. Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement Right to freedom of expression Right to freedom of peaceful assembly 	 Stakeholder Engagement Plan (SEP) Engagements aim to raise aw areness of the project, grievance mechanisms as well as role of security forces. Community Grievance Mechanism will be made available to all members of the community. 	Construction Scale: High Scope: Low Irremediability: High Severity: High Likelihood: Possible. Exposure to public security forces are possible, how ever, INZAG plans on falling back on public security forces if threat breaches an unmanageable level for private security forces.	High	 Engagement with Public Security forces on regular basis to assess security risk and human rights arrangements. Engagement with Angolan Police and/or military service only planned in situations involving a level of threat that private security providers aren't able to deal with. Written agreement or MoU outlines extend of public security support as w ell as ensuring enactment on basic Human Rights principles. 	Moderat e
4.3	Conflicts between local communities and non-local workers impacting the safety and well-being of community members	Contribute	Community members Vulnerable groups: children, w omen, elderly	 Rights to life, liberty and security of person Right to freedom from torture and other cruel or degrading treatment or punishment 	Local Content: the Project will hire 90% of the labour force from local communities	Construction Scale: Moderate Scope: Moderate Irremediability: Moderate Severity: Moderate Likelihood: unlikely due to local content policy.	Moderate	 Provide aw areness session to w orkers not coming from local communities to ensure culturally appropriate behaviour and respect for community values 	Low

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Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
				 Right to freedom of movement 					
4.4	Different forms of gender- based violence and harassment of female community members	Contribute	Community members Vulnerable groups: w omen	 Rights to life, liberty and security of person. Right to freedom from torture and other cruel or degrading treatment or punishment Right to freedom of movement 	 Workers' Accommodation Plan which outlines expected residents' conduct including in relation to discrimination and harassment Community grievance mechanism 	Construction Scale: High Scope: Moderate Irremediability: High Severity: Moderate Likelihood: possible due to traditional gender role and prevalence of violence against w omen.	High	 w orkers w ill be informed about law penalties for e.g., sexual assault and harassment training session on harassment and GBV w ill be provided to w orkers and camp residents (if applicable) 	Moderat e
				Human Rights withi	n local communities – Resettler	ment and Livelihoods			
5.1.	Community Severance	Contribute	Community members live in and around the Aol. Vulnerable groups: Elderly, children, w omen, family	 Right to life Right to liberty and security of person. Minority rights Right to adequate standards of living Right of social security Right to equality betw een men and w omen 	 Stakeholder Engagement Plan (SEP) Engagements aim to raise aw areness of Resettlement Plans Resettlement Framew ork outlines best practice standards for Resettlement Plan and actions Community Grievance Mechanism will be made available to all members of the community. 	Construction & Operation Scope : Moderate Irrem ediability : High Severity : High Like lihood : Certain. 46 residential units and 27 commercial structures will be affected by the Project. Resettlement actions are unavoidable.	High	 ERM to review Project Specific Resettlement Plan once developed Develop a Severance Management Plan to identify severance and counteract w here possible. Project Specific Resettlement Action Plan (RAP) (yet to be developed), outlines resettlement actions, including in-fill resettlement to avoid community 	Moderat e

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
								severance w here possible	
5.2	Loss of income and threat to livelihoods and resources due to displacement of business in less commercially used area (this includes displacement of mobile traders and taxis drivers)	Contribute	All resettled community members Vulnerable groups: illiterate, w omen, employees living close to their activity location, w ho consider not having alternatives to their activity, or w ho do not have other source of income.	 Freedom of discrimination Right to life Minority rights Right to social security Right of adequate standard of living 	 Resettlement Framew ork outlining the projects commitment to mitigate adverse socioeconomic impacts from land acquisition. Mitigation Approach also includes compensation for loss of asset, improving and/or restoring livelihoods and standard of living, ensuring the inclusion of vulnerable groups (eg street venders) Stakeholder Engagement Plan (SEP) Engagements aim to raise aw areness of Resettlement Plans Community Grievance Mechanism w ill be made available to all members of the community. 	Construction & Operation Scope: Moderate Irremediability: High Severity: High Likelihood: Certain. 27 commercial structures will be affected by the Project as well as informal traders and taxi drivers. Resettlement actions are unavoidable. Most of the land is government ow ned but some privately ow ned businesses settings. Severity of receptors are high considering the level of dependence on residential structures to support trade orientated livelihood. Ow ners and employees of these affected structures are expected to experience a temporary loss of income and employment due to removal and relocation of these structures. The permanence of this loss is likely to depend	High	 Review of Resettlement Plan once developed, signed off, and implemented Project Specific Resettlement Action Plan (RAP) (yet to be developed), outlines resettlement actions, including in-fill resettlement to avoid moving/changing established community structure. 	Moderat e

Construction and Operation of 5 Overpasses – Luanda Railway Tra Angola

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk	Rights at Risk	Existing Management Measures and Planned Activities	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
						on the resettlement options and location.			
5.3	Loss of infrastructure due to resettlement in area with less advanced infrastructure (health, schools)	Contribute	Resettled community members Vulnerable people: elderly, w omen, children persons w ho strongly depend on local infrastructur e e.g., through physical disability	 Right to adequate standard of living Right to life Right to social security 	 Resettlement Framew ork outlining the projects commitment to mitigate adverse socioeconomic impacts from land acquisition. Mitigation Approach also includes Compensation for loss of asset, improving and/or restoring livelihoods and standard of living, ensuring the inclusion of vulnerable groups (e.g.; street venders) Stakeholder Engagements aim to raise aw areness of Resettlement Plans Community Grievance Mechanism will be made available to all members of the community. 	Construction & Operation Scope: Moderate Irrem ediability: High Severity: High Likelihood: Certain. 46 residential units and 27 commercial structures will be affected by the Project. Resettlement actions are unavoidable. Most of the land is government ow ned but some privately ow ned businesses and residential settings.	High	Project Specific Resettlement Action Plan (RAP) (yet to be developed), outlines resettlement actions, including in-fill resettlement to avoid moving/changing established community structure.	Moderat
5.4	Loss of residential structure and housing	Contribute	All resettled community members Vulnerable groups: illiterate,	 Right to adequate standard of living Right to life 	 Resettlement Framew ork outlining the projects commitment to mitigate adverse socioeconomic impacts from land acquisition. Mitigation Approach 	Scope: Moderate Irremediability: High Severity: High Likelihood: Certain. 46 residential units will be affected by the Project. Resettlement actions	High	 Revision of Resettlement Options upon design and implementation of a project specific resettlement plan 	Moderat e

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
			non- Portuguese speakers, w omen, children, individuals relying on specific public or community infrastructur e	 Right to social security 	 also includes Compensation for loss of asset, improving and/or restoring livelihoods and standard of living, ensuring the inclusion of vulnerable groups (eg street venders) Stakeholder Engagement Plan (SEP) Engagements aim to raise aw areness of Resettlement Plans Community Grievance Mechanism will be made available to all members of the community. 	are unavoidable, and loss of residential structure as affected community members know it, will change. Risk of homelessness without proper resettlement options results in a high severity.		Project Specific Resettlement Action Plan (RAP) (yet to be developed), outlines resettlement actions, including in-fill resettlement to avoid moving/changing established community structure.	
				Hu	iman rights within host commur	nities			-
6.1	Reduced standard of living and threat to security, health, safety and well-being of host communities (construction and operation)	Contribute	Host communities Vulnerable groups will have to be determined during the host community assessment.	 Right to health Right to housing Right to adequate standard of living Right to security Right to education 	 Stakeholder Engagement Plan (SEP) Provides recommendations on engagement actions and programmes tailored to the project, such as engaging every 6 months at a minimum to keep the community updated. The SEP also recognizes the project impact and potential loss and/or disruption of primary economic activity and gives 	Construction & Operation Scale = Moderate Scope= High Irremediability= High Severity — Moderate/High/High = High Likelihood = Certain. This is likely to generate pressure on host community services and critical infrastructure (such as hospitals, schools etc),	High	 Corrective actions and follow -up visits and audits Conduct host community assessment and develop livelihood restoration action plan Incorporating lessons learned element in project cycle, ensuring host community feedback w ill be incorporated into project mechanisms. 	Moderat e

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
					recommendations on how to respond to support impacted community members. Community Grievance Mechanism Resettlement Framew ork Provides guidelines on building a Resettlement Plan	but also jobs or and w ater supply for irrigation, domestic, drinking and industrial purposes.		 Engagement with respective NGO's or governmental institutions to work on solution orientated long-term plans for affected community members Public Utilities Enhancement Plan (yet to be developed) to improve living standards even during the construction phase Change Management Procedure to ensure that unexpected changes have a sound technical, safety, environmental and commercial justification. 	
				Huma	an Rights within Communities	- Other			
7.1	Data share of community individuals with authorities without their knowledge during Construction	Cause	All community members, w ho are directly or indirectly affected by the Project. Vulnerable people: elderly,	 Right to privacy Right to social security Right to participate in public affairs Freedom of expression 	 Stakeholder Engagement Plan (SEP) Confirms that the stakeholder database has been created in accordance with the EU GDP Regulation as well as the IFC PSs INZAG to provide the community with consent forms, in case data is required to be shared 	Construction Scale: Moderate Scope: High Irremediability: Low Likelihood: Unlikely. It is possible that data could be shared accidentally, how ever, it is unlikely that there is a 50% chance or higher that this event occurs.	Moderate		Low

Ref No.	Potential Impact and Justification	Company involvement	Whose Rights at Risk women,	Rights at Risk	Existing Management Measures and Planned Activities during the lifecycle of	Assessment	Saliency	Additional Recommended Management Measures	Residua I Risk Level
			children persons w ith mental health disabilities	from discrimination	the Project				
7.2	Discrimination of marginalized groups, minorities, vulnerable groups during Construction	Cause	Community members w ho are directly or indirectly or indirectly impacted by the Project, specifically those w ho live in the vicinity of the Project area Vulnerable groups: Vulnerable groups: Vulnerable groups: w omen, elderly, people w ith pre-existing health conditions, ethnic and religious minorities, members of the LGBTQ+ community, illiterate, migrants	 Rights to life Right to liberty and security of person. Minority rights Right to health Right to adequate standards of living Right of social security Freedom from discrimination Right to equality betw een men and w omen Right of children from social and economic exploitation 	 Stakeholder Engagement Plan (SEP) Engagements aim to cater tow ards all members of a community (incl. w omen, illiterate, elderly, migrants) Community Grievance Mechanism will be made available to all members of the community. The Workforce Code of Conduct specifies living and w orking conditions, w hich shall contribute to reduce conflict in exchange w ith community members. 	Construction Scale: Moderate Scope: Moderate Irremediability: Moderate Severity: Moderate Likelihood: Almost Certain. Impact through project on community with diverse demographic make-up is certain, the risk to act to the disadvantage to a marginalised group is significant. Engagement activities will need to be nuanced to reflect community demographic.	Moderate	 Ensure engagements cater to all groups of a community. ERM to revise engagement activities once updated SEP has been implemented. The Workers Management Plan (Yet to be developed: w orkers w ill be informed about law penalties for e.g., sexual assault and financial implications for impregnating w omen. Change Management Procedure to ensure that unexpected changes have a sound technical, safety, environmental and commercial justification 	Low

Ref	Potential	Company	Whose	Rights at Risk	Existing Management	Assessment	Saliency	Additional	Residua
No.	Impact and	involvement	Rights at		Measures and Planned			Recommended	l Risk
	Justification		Risk		Activities			Management Measures	Level
			(respective legal status)						

6.5 Summary of Impacts

The summary of Project's impacts and their residual impact is presented below in Table 6.104. Summary of the risk, associated with Climate Change is presented in Table 6.44 and Human Rights Risk Assessment is presented separately in Table 6.103. The colour coding for the impact assessment is presented in Table 6.9 :

ID	Торіс	Phase	Aspect	Pre-mitigation	Residual
				impact	Impact
				significance	significance
1.	Air Quality	Construction	Dust	Major	Negligible to Minor
		Operation	Traffic	Negligible to Moderate	Negligible
2	Noise and Vibration	Construction	-	Major	Moderate
		Operation	-	Moderate	Minor
3	Geology and Soil	Construction	Erosion	Minor	Negligible
		Operation	Erosion	Minor	Negligible
4	Surface/ Ground Water	Construction and Operation	Contaminated Water Runoff	Moderate	Minor
		Construction and Operation	Surface Water Volumes and Flood Risk	Moderate	Minor
5	Groundwate r	Construction and Operation	Groundw ater Volume	Negligible	Negligible
		Construction and Operation	Groundw ater Quality	Moderate	Minor
6	Resources and Waste	Construction	-	Moderate	Minor
7	Cumulative	Construction	Air Quality	Minor	Negligible
	Risk		Noise	Minor	Negligible
			Economy and Employment	Positive	Positive
			Land and Livelihoods	Moderate	Moderate
			Community H&S	Moderate	Negligible

Table 6.104 Summary of the Impacts and their Pre- and Post-significance

ID	Торіс	Phase	Aspect	Pre-mitigation	Residual
				im pact	Im pact
				significance	significance
8	Economy	Construction	Employment	Positive	Positive
	ano Employment			Positivo	Positivo
	Linpioyment		Procurement and	FUSILIVE	FUSILIVE
			Worker Spending		
			Capacity Enhancement	Positive	Positive
			Improvements to	Positive	Positive
0	Lond	Construction	Infrastructure Services	Malan	Madanata
9	Land, Houses and	Construction	Houses Small and	wajor	woderate
	Livelihoods		Medium Businesses		
			and Associated		
			Livelihoods		
			Disruption to Local	Major	Moderate
			Businesses and Social		
			Restricted Accessibility		
			Displacement of Mobile	Major	Moderate
			Traders and Taxis		
		Operation	Permanent Loss of	Major	Moderate
			Livelihoods and		
			due to Permanent		
			Livelihoods Changes		
10	Community	Construction	Road Safety and	Moderate	Minor
	H&S and		Traffic Accidents		
	Security		Public Access and	Major	Moderate
			Environmental Health	Moderate	Minor
			Community Diseases	Major	Moderate
			Increased Pressure on	Moderate	Minor
			Healthcare Services	moderate	
			Use of Security	Moderate	Minor
			Personnel		
11	Labour and	Construction	Labour and Working	Moderate	Minor
	Conditions		Worker H&S	Moderate	Minor
	Contaitionio		Child Labour and	Moior	Mederate
			Forced Labour	iviajoi	IVIDUEIALE
12	Access to	Construction	Temporal Loss and/or	Moderate	Minor
	Infrastructur		Increased Pressure on		
	e and		Social Services and		
	Services	Operation	Improvement of	Positive	Positive
		Operation	Infrastructure and	FOSILIVE	rosilive
			Services		
13	Community	Construction	Disturbance from the	Moderate	Minor
	Cohesion		Presence of Workforce		
			Community Severance	iviajor	Woderate
			Unmet Expectations of Benefits	Moderate	Minor
		Operation	Loss of Access to Communal Resources	Moderate	Minor
14	Traffic	Construction	Road Congestion	Moderate	Moderate
15	Cultural	Construction	-	Moderate	Moderate
	Heritage				

Source: ERM, 2023

7. ENVIRONMENTAL MANAGEMENT PLAN

7.1 Introduction

This Section presents a provisional Environmental and Social Management Plan (ESMP) for the construction and operation of the Project, with the purpose to specify framework, standards, and controls required to manage and monitor the environmental and social impacts. To achieve this the ESMP compiles the potential adverse impacts from the planned activities as identified in the ESIA and outlines mitigation measures required to reduce the likely negative impacts on the biophysical and social environment.

7.2 Overview and Scope

The ESMP is intended to cover the Project activities described in Section 3 of this ESIA report. It covers project activities during construction and operation and will be subject to thorough reviews prior to the commencement of activities to ensure completeness.

The ESMP details roles and responsibilities that will be assumed by each Agent as leader and/or supporter. INZAG has already acknowledged its commitments for the period of construction, after the end of construction period MINTRANS will be responsible for the maintenance of the overpasses during the operation phase.

INZAG will have responsibility for the implementation of some of the measures outlined in the ESMP during construction, but may delegate responsibility to its contractors, where appropriate. In cases where other individuals or organisations have responsibility for mitigation measures, this is clearly indicated within the ESMP table (Table 7.3).

Capacity building and training requirements are also described within this Section, where these relate to specific skills required to deliver the ESMP action in question. General training, which will be provided to staff (and contractors' staff as appropriate), is not specifically indicated in the plan.

7.3 Objectives

The ESMP is essential for successfully implementing the Project's environmental and social performance throughout the life of the Project. Having this ESMP in place ensures a systematic approach to bringing environmental and social considerations into decision-making and day-to-day operations. It establishes a framework for tracking, evaluating and communicating environmental and social performance and helps ensure that environmental risks and liabilities are identified, minimised and managed.

It is, however, important to approach the ESMP as a living document, which will continue to develop during the construction phase to enable continuous improvement of the Project's social and environmental performance.

The core objectives of this ESMP are as follows:

- Ensuring compliance with regulatory authority stipulations and guidelines, which include local, national and international;
- Ensuring that there is sufficient allocation of resources on the Project budget so that the scale of the ESMP related activities is consistent with the significance of Project impacts;
- Verifying environmental and social performance through information on impacts as they occur;
- Periodically updating the ESMP as the Project activities progress;
- Responding to unforeseen events; and
- Providing feedback for continual improvement in environmental performance.

7.4 **Principles**

The ESMP was developed attending three major groups of general principles: Principles of Sustainable Development, Principles of Ethics and Quality and Principles of Best Practice.

7.4.1 Principles of Sustainable Development

- Protection of public health, welfare and safety activities on site should be contained and will not impact on human health and well-being. The benefits of the port activities should be realised by the communities during all phases.
- Maintenance of ecological processes natural resources should be conserved or improved and not decreased in value. The resources are managed in such a way that will provide for present and future needs.
- Avoidance, mitigation and management of pollution existing or possible future contamination of surface, groundwater and soil and air pollution is avoided where possible and mitigated and managed within the standards set. Waste generated will be eliminated, reduced or minimised, reused or recycled and the residual finally disposed of, if no other option is available.
- Precautionary Principle in the absence of scientific data confirming a complete evaluation of the risk a cautious approach will be adopted to protect human, animal or plant health, or to protect the environment.

7.4.2 Principles of Ethics and Quality

- Consistency with legal and planning context through all phases of the development of the Project, activities will comply with local, national and international legal and regulatory requirements.
- ESMP implementation and proactive management the ESMP is implemented at the start of the activities and aims at continual improvement during all phases of the development.
- Clear and easily understood reporting the ESMP should be easily understood, clearly laid out, an accepted documentation style should be used and all tables, figures and illustrations should be appropriate and necessary.
- Cost effectiveness ensure that there is a balance between the financial constraints of achieving a maximum return on investment and the reduction of present and future risks and liabilities.

7.4.3 Principles of Best Practice

- Continuous improvement the Project Proponent should be committed to review and continually improve environmental management, with the objective of improving overall environmental and social performance.
- Broad level of commitment commitment is sought from all levels of management as well as the workforce in order for the development and implementation of the ESMP to be successful and effective.
- Participative process consultation will and has been undertaken with all Project Affected Persons (PAPs) to seek their input into the environmental and social management of the Project.

7.5 General Requirements

This ESMP has been developed in line with applicable legal and policy requirements. These include the national requirements in terms of the Environmental Assessment Regulations and the requirements of the IFC Performance Standards. The ESMP aligns to:

 The Environmental Assessment Regulation, 1999 (L. I. 1652) and Environmental Assessment (Amendment) Regulations, 2015 (LI 2228)

- IFC Performance Standard 01; and
- World Bank Group General EHS Guidelines (2007).

Where specific additional standards and guidelines are used, these are noted in the ESMP table contained within Section 7.9.9.

7.6 Plan-Do-Check-Act

The structure of this ESMP is set out according to the Plan, Do, Check, Act (PDCA) ESMP process. The PDCA is a well-known management tool which allows for a methodical and ongoing approach to managing environmental and social risks. Each of the primary sections in this Section relate to key components of the process.

Plan, Do, Check, Act is part of international frameworks for quality and environmental management systems including ISO 14 001. This process is described in Box 7.1.

Box 7.1 ESMP Process

Plan

- Define policies and objectives for environmental and social performance;
- Identify environmental and social impacts and risks of the operations;
- Develop mitigations and operational controls to address impacts and risks; and
- Develop a management plan to achieve these objectives.

Do

- Implement management plan; and
- Implement mitigations and operational controls.

Check

- Monitor performance against policies and objectives; and
- Check that mitigations and operational controls are effective.

Act

Make corrections to plans, mitigations, or controls in response to performance monitoring or out of control events.

7.7 INZAG Corporate Sustainability System, Policies and Processes

INZAG Germany GmbH is part of a Group that includes several construction companies. Within the Group, the relationship between INZAG Germany GmbH and Zagope - Construções e Engenharia S.A has been always quite solid (refer to Figure 8-1).

In terms of Environmental and Social Management System, Group's strategy includes the migration of Zagope's processes to INZAG and a transition period has been established for that purpose, in order to plan and define which responsibilities will be undertaken by both parties.

In order to better understand what will be the Project's ESMS, it is important to summarize ZAGOPE's Quality, Environment, Health and Safety at Work (QASST) Management System.

ZAGOPE started the implementation of the QASST Management System back in 1995. In 2001, certification in Quality (ISO 9001) and in 2008 the certification of Environment (ISO 14001) and Occupational Health and Safety (ISO 45001) were obtained. In 2009, the System of Quality, Environment, Health and Safety management system was expanded in accordance with the ISO 9001, ISO 14001 and OHSAS 18001 standards for the Angolan market, obtaining in 2011 the Health and Safety at Work certification and Quality and in 2014 certification in Environment. In 2015, Zagope decided to extend its certification of Quality, Environment, Health and Safety according to ISO 9001, ISO 14001 and ISO 45001 standards for Angolan branch, having been obtained in July 2015.

It should be noted that some of the subsidiaries from Zagope Group, which INZAG Germany GMBH is an example, have the Quality, Environment, Health and Safety management system in accordance with ISO 9001, ISO 14001 and ISO 45001 implemented. INZAG Germany GMBH has the intention to certify in the references of Quality (ISO 9001) and Environment (ISO 18001) and Occupational Health and Safety (ISO 45001).

In terms of Company's Policies, the following should be mentioned:

- Procedures exist to screen, identify, analyse, and access the potential risks and impacts related to its business activities/projects (PR/INZ/QSA/SGI/004 Hazard Identification and Risk Assessment and swot matrix).
- An emergency preparedness and response system has been integrated in the company's risk management system (PR/INZ/QSA/SGI/008 Emergency Management).
- Procedures exist to track and evaluate E&S performance of its operations (PR/INZ/QSA/SGI/007 QSE Performance Management) as well as to evaluate and record results of its monitoring activities. Additionally, environmental and social performance information is periodically reported internally to senior management, investors and stakeholders, during monthly meetings (as relevant).
- Although INZAG does not have any procedures to receive communication from external stakeholder at the corporate level, these communication plans are prepared for each project work in the construction phase, considering compliance obligations. There is also a grievance mechanism as a procedure for receiving, addressing, and recording/documenting complaints and communication, ensuring that the confidentiality of a person rising the complaint is protected (Community Grievance Mechanism PR PASUL HSE SGI 002_0).
- INZAG has a corporate Human Resources Management Procedure for recruitment and selection (PR INZ RHPR GRH 002 0_Recruitment and Selection) which establishes the company's steps for the recruitment and selection of collaborators. The procedure is supported by annex documents to ensure the implementation of the set requirements including templates for training needs, salary proposal, or integration plan. This Procedure is not specific to the Project and applies to all INZAG collaborators.
- INZAG has a corporate Human Resources Management Procedure (PR INZ RHOP GRH 001 0_HR Management – Operations) which provides a high-level description of the processes related to hiring, transferring and dismissing employees but also contract management. The procedure is supported by annex documents to ensure the implementation of the set requirements including templates for overtime authorization, absence report, or vacation request.
- This Procedure is not specific to the Project and applies to all collaborators in INZAG markets.
- INZAG Germany GmbH is part of a Group that includes several construction companies. Within the Group, the relationship between INZAG Germany GmbH and Zagope Construções e Engenharia S.A has been always quite solid. In terms of Environmental and Social Management System, the Group's strategy includes the migration of Zapope's processes to INZAG and a transition period has been established for that purpose, in order to plan and define which responsibilities will be undertaken by both parties. In terms of Group Policies, the following should be mentioned in relation to stakeholder engagement and management:
 - Procedures exist to track and evaluate E&S performance of its operations (PR/INZ/QSA/SGI/007) as well as to evaluate and record results of its monitoring activities (PR/INZ/QSA/SGI/007). Additionally, environmental and social performance information is periodically reported internally to senior management, investors and stakeholders, during monthly meetings (as relevant).
 - Procedures exist for a grievance mechanism as a procedure for receiving, addressing, and recording/documenting complaints and communication, ensuring that the confidentiality of a

person rising the complaint is protected (PR/PASUL/HSE/SGI/001 and PR/PASUL/HSE/SGI/002).

INZAG has an Ethics and Code of Conduct ('the Code') which presents a set of principles, values and rules outlining the Company's expectations on how to conduct business ethically. This Code is applicable to direct employees and partners whether they are clients, subcontractors, suppliers, joint participants in consortiums or other third parties. In particular, the Code includes a section on 'Human Rights and the Workplace Environment' that prohibits any form of violation of human rights such as prejudice, discrimination or harassment. The Groups promotes equal opportunities for all throughout the selection, management and development of human resources. ERM notes that the Code adopts a restricted definition of human rights as it focuses on fair employment practices without referring to any broader labour rights and working conditions. No commitment to internationally proclaimed human rights as defined in International Treaties and Conventions was made. In the 'Social Responsibility' section, the Company only outlines its no-tolerance to the use of child or forced labour at any level of its organization or supply chain.

Non-compliance with the Code can lead, upon recommendation of the Ethics Committee, to the application of penalties or disciplinary including written or verbal warning, temporary suspension of employment contract or termination of employment contract. ERM notes that these measures appear to apply to direct employees only. No information was provided with regards to consequences of non-compliance by a business partner, such as subcontractors and suppliers.

- INZAG has a Project-specific Human Resources Policy which outlines the general principles that will apply to human resources management for the Project, including provision of good working conditions, a safe and healthy work environment, and flexible employment possibilities that support a better balance of private and professional life.
- INZAG has a corporate Hazard Identification and Risk Assessment Procedure (PR INZ QSA SGI 004 0_Hazard Identification and Risk Assessment) which defines the methodology for identifying the hazards inherent to the activities, as well as the respective risk assessment and the measures to be taken to eliminate or minimize the risks.
- INZAG monitors its performance on health and safety matters as part of its integrated management system (PR INZ QSA SGI 007 0_QSE Performance Management). Goals and indicators are defined annually and measures monthly (e.g., total accident frequency rate, accident frequency rate with lost time, severity rate). The results are analysed in the Quality, Safety and Environment (QSE) panel. The Project is required to ensure that workers, including third parties, are aware of the operational goals and targets associated with their activities.
- INZAG has developed a whistleblowing system which allows employees to raise concerns around the application of the Code of Ethics. Employees are encouraged to use the managerial channels to report any possible violation of the Code; however, additional communication channels are accessible including a website page and a hotline that ensure anonymity. ERM notes that no phone number for Angola is provided in the Code. The Ethics Committee is in charge of investigating any possible violation of the Code of Ethics.

INZAG has provided the following management plans of relevance to project activities interactions with resources/receptors (Figure 7.1., Table 7.1). These plans set out how the mitigation measures will be put into practice, monitored and upheld. The present list is not exhaustive and additional plans have been suggested for the development (Section 7.8.3).

Plan Name	Includes	Plan Owner
Specific Management		
Waste Management Plan	Project-related waste handling procedures for hazardous and non-hazardous wastes.	HSE Manager/Environ mental Inspector

Table 7.1 Existing Management Plans

Plan Name	Includes	Plan Owner
Water and	Plan aims to define and describe the appropriate preventive	HSE
Wastew ater	measures to eliminate, minimize, mitigate and, in general, manage	Manager/Environ
Management Plan	any adverse impacts to water resources, surface water and	mental Inspector
	groundwater quality, arising from wastewater discharge.	
Incident/Accident	This procedure defines the guidelines and establishes the	Safety Officer or
Management	requirements for communication, investigation, registration,	Environmental
Procedure	treatment of work incidents/accidents, environmental	Officer
	incidents/accidents and accidents with the community and	
	evaluation of the effectiveness of corrective measures	
	implemented following the occurrence of accidents	
Occupational H&S	The Plan outlines the requirements, processes and procedures to	HSE Manager/
Management Plan	identify, address and monitor the occupational health & safety	Quality, Health,
	risks associated with the activities to be performed. Among other	Safety and
	elements, the OHSMP encompasses:	Environmental
	Risk assessment: INZAG will ensure that systematic risk	Inspector
	evaluation using the risk assessment matrix is performed, that	
	risk mitigation processes are implemented, and that risk ow ners	
	are able to demonstrate that risks have been reduced to as low	
	as reasonably practicable;	
	Training: INZAG will ensure that all employees including	
	subcontractors and vendors are adequately trained and	
	competent for all aspects of their work within the defined scope	
	of their contract. A Health & Safety (H&S) Training Plan has	
	been developed and will be implemented, covering all aspects	
	of the management of training, induction and ongoing education	
	that is specific to the scope of works;	
	Incidents reporting the Plan details the procedures to	
	investigate, report and record work-related accidents, incidents	
	and near misses. On a monthly basis, INZAG will report on	
	indicators such as worked hours, open incidents investigations	
	and actions, incidents that occurred and review s undertaken to	
	assess the effectiveness of the actions. Subcontractor will be	
	required to send data to INZAG for consolidation, analysis, and	
	calculation of the indicators;	
	Audit and inspections: compliance with the regulations and	
	Health, Safety and Environment (HSE) project requirements will	
	be verified through internal audits and HSE inspections (weekly	
	visits and random visits). In the event of deficiencies, corrective	
	actions will be implemented and monitored through follow -up	
	visits and audits.	
	Leadership in health & safety: INZAG will ensure	
	program The menogement and europyican levels will	
	program. The management and supervisory levels will discominate backth and sofety concerts to their workforce.	
	disseminate health and safety concepts to their workforce,	
	enable the "Health and Safety Vision" to become a way of life'	
	 Decumentation and recording: NZAC and the subcontractor 	
	will retain records and documents, related to H&S activities on	
	site at least for the duration of the Project. Shot audits and	
	Self-Verifications will be conducted by INZAG's H&S	
	department or designee to verify that records are being	
	maintained in accordance with established requirements:	
	Construction specific health and safety programs: in	
	addition to the general requirements the Plan outlines health	
	and safety programs detailing further requirements for risks	
	specific to certain activities such as electrical wiring and	
	apparatus, earthmoving and handling equipment, journey	
	management, transportation, welding and cutting, concrete	
	construction etc.;	
	Emergency Response: INZAG will implement an Emergency	
	Response Plan including actions to take, contact details, ways	
	of communication	
	Pro-active remediation: the Plan includes a 'stop w ork'	
	process which allows Project workers to stop work at any time if	
	they believe that the work is unsafe or there is a serious conflict	

		(
Plan Name	Includes	Plan Owner
	in workfronts, and the requirement to take immediate remedial	
	actions.	
	Management of change: any technical change proposed after	
	for use, will be rigorously reviewed with the owner and	
	approved prior to its implementation	
	The Plan applies to all employees subcontractors service	
	providers and visitors.	
Specific Management	t Plans - Social	
Community	INZAG has a grievance mechanism available to external	Social
Grievance	stakeholders. The procedure (PR PASUL HSE SGI 002	Responsibility
Mechanism	0_Community grievance Mechanism) describes roles and	Team
	responsibilities and process for receiving, registering,	
	acknow ledging, investigating, and resolving grievances. In the	
	event of a complaint received by the subcontractors, they will be	
	required to report it to INZAG. The effectiveness of the mechanism	
	will be monitored through feedback from members involved in the	
	mugation process. INZAG personnel and subcontractors will	
	refreshere)	
Worker Grievance	It is unclear if the grievance mechanism developed by INZAG is	HR Department
Mechanism	open to contracted workers and workers in the supply chain. The	The Department
	procedure (PR PASUL HSE SGI 001 0 Worker Grievance	
	Mechanism) provides high level guidelines for the reception,	
	handling and recording of the complaints. INZAG requires respect	
	for human dignity and confidentiality when managing complaints.	
Workers	The Plan (MP PASUL HSE SGI 004_0_ Workers Accommodation	HR Department
Accommodation	Management Plan) details the rules, requirements, and the	
Management Plan	management procedures for the residence of the Project workers	
	during the construction phase. The Plan applies to all project	
	workers residing in the camp facilities. It outlines the requirements	
	to keep a healthy, sale and secure environment for all in the	
	expectations from residents in particular regarding local	
	communities and female workers prohibiting any form of	
	discrimination, harassment and gender-based violence.	
	Upon induction, workers will be required to attend trainings	
	covering camp rules and obligations; Code of Conduct; camp	
	grievance mechanism; complaint system, community relation and	
	w hat is expected from w orkers; health, safety environment and	
	security.	
Incident/Accident	This procedure defines the guidelines and establishes the	Safety Officer or
Management	requirements for communication, investigation, registration,	Environmental
Procedure	incidents/accidents, and accidents, with the community and	Officer
	evaluation of the effectiveness of corrective measures	
	implemented following the occurrence of accidents	
Occupational Safety	The document is developed as part of INZAG's integrated H&S	Occupational
Routines	management system. These mandatory routines aim to ensure a	Safety team
	safe working environment and allow risk anticipation, elimination,	
	reduction and control. The routines will be implemented according	
	to the characteristics of the Project and contractual requirements.	
D		
Resettlement Plan	The document outlines outlining guidelines for the resettlement	Resettlement
	and invertion disclosure process, information sharing disclosure process,	ream
	engagement	
	INZAG developed a Resettlement Policy Framework (RPF) that	
	will outline the Project's commitment to mitigate adverse	
	socioeconomic impacts from land acquisition or restrictions on	
	affected persons' use of or access to land. The RFP will provide	
	the foundation for the resettlement process including an	
	entitlement matrix that will ensure adequate compensation,	
	I resettlement and livelihood restoration options are provided to	1

Plan Name	Includes	Plan Owner
	project affected people. The RPF will be supplemented by a Project Resettlement Action Plan (RAP) or multiple smaller RAPs.	
Subcontractor Management Plan	The Plan describes the specifications and minimum requirements for management and operational control in the areas of QSE, applicable to the project works after selection and during execution	QHSE Inspector and Project Director
	 phase. In particular, suppliers/subcontractor are required: one w eek before the commencement of w ork, to send specific safety procedures w hen conducting w ork activities associated w ith specific risks as w ell as a corresponding risk assessment to be approved by INZAG; during execution of contract, to submit a collective and signaling plan; to provide training on safety procedures, risk assessment and preventive measures specific to the activities to be performed; report any incidents or near-misses 2 hours using the safety alert template. In the OHS Management Plan, INZAG also included a specific section on subcontractor management w hich provides additional indications. H&S is described as one of the most important criteria during pre-rew ard screening. During the qualification process, INZAG w ill analyze information about subcontractors considering health, safety, environment aspects to identify potential risks associated with the business relationship. Subcontractors w ill be required to develop and implement a project specific H&S plan based on the content of INZAG's OHSMP w hich w ill need to be 	
	approved by INZAG. For critical activities, all subcontractors must develop Job Hazards Environment Analysis and comply with the approved Work Method Statements and respective Hazard ldentification and Risk Assessments. INZAG will monitor the HSE management performance of its suppliers/subcontractors during the course of the relationship. Periodic engagement with the subcontractor will be held to verify compliance with INZAG's OHSMP, and subcontractor will be included in the HSE audits and inspections. The processes do not cover requirements with regard to labor rights (beyond OHS) and human rights.	
Security Plan	 The Security Plan (MP PASUL HSE SGI 001 0_Security Plan) describes the site-specific management structure, roles and responsibilities, resources, procedures, and practices that will be implemented by INZAG to implement adequate security mitigating measures and guarantee the security of all stakeholders and patrimony. In order to guarantee the legal and adequate response to security risks, INZAG commits and requires the security providers to conduct actions in line with: The Universal Declaration of Human Rights; The Voluntary Principles on Security & Human Rights (VPSHR); The International Code of Conduct for Private Security Service Providers; UN Principles on the Use of Force and Firearms by Law Enforcement Officials; The Plan describes the procedures to report, investigate, address (including remedial actions) and record the allegations of use of excessive force. Security staff will be trained on how to ensure respect to the local population, the concept of human rights, the use of appropriate and proportional force as a last resort, and the VPSHR. 	Security Coordinator/ Administrative Manager
Human Resources Management Plan	This document outlines the site-specific management structure, resources, procedures, and practices that will be implemented. It includes requirements for a fair, transparent and equitable recruitment and selection process covering local and foreign workers	HR Manager

Plan Name	Includes	Plan Owner
Occupational H&S Management Plan	This Plan provides the description of the Health and Safety (H&S) processes and procedures which underpin all other plans and programs regarding health and safety during the EPC phase of the Project. All related social aspects with respect to these programs are an inherent part of this management system	HSE Manager/ Quality, Health, Safety and Environmental Coordinator
Stakeholder Engagement Plan (Section 5)	 The Stakeholder Engagement Plan (SEP) provides guidelines to manage effective, meaningful, and culturally appropriate engagement with the Project's stakeholders. The SEP seeks to ensure that adequate and timely information is provided to all stakeholders, including impacts and opportunities that may arise and proposed mitigation measures, as well as the manner in which they can participate in the process, voice their opinions and raise concerns. The SEP encompasses: Requirements for consultation and disclosure; Identification and prioritisation of stakeholders; Strategy and timetable for sharing information and consulting with stakeholders; Identification of structures and processes to deal with conflicts and grievances; Resources and responsibilities for implementing stakeholder engagement activities; and Grievance Redress Mechanism to document and resolve all stakeholder concerns. 	CLO





7.8 Planning

7.8.1 Impact Assessment

The Project has utilised the impact assessment through the ESIA process as a tool within the planning process to identify key impacts of the Project and associated mitigation and management measures (refer to Section 6 and Section 7.9.9) for the construction and operation phases.

The Project will continue to use the impact assessment process as a planning tool for any future development activities. The mitigation hierarchy applied in this ESIA will also be used.

7.8.2 Environmental and Social Commitments

Through the Project development and ESIA process, mitigation measures have been identified to address environmental and social impacts associated with Project activities. The Project has made a commitment to implement these to ensure or improve environmental and social performance.

The commitments take a number of forms as summarised in Box 7.2.

Box 7.2, with the specific actions intended to address a particular environmental or social issue. The commitments are detailed in tabular form in Section 7.7.

Box 7.2 Type of Commitments

Avoidance

During the planning phases, potential impacts to sensitive resources are identified. Where feasible, locations or processes can be changed during the planning or design phases to avoid impact to these areas.

Minimisation

Minimisation involves measures to reduce proposed impacts to a resource/receptor.

Management

Management commitments include development of plans and procedures for ensuring that measures to protect the environment actually take place and are of the desired standard of practice. Training is another commitment in this category.

Monitoring

Commitments to monitoring are primarily to ensure the above measures are working properly and delivering the desired (and anticipated) results.

Additional actions

Additional actions involve actions and contributions which are designed to provide a positive benefit. Examples may include, e.g. assisting with additional domestic water supply to surrounding towns.

7.8.3 Supporting Environmental and Social Management Plans

Following the completion of ESIA studies, the ESMP will outline the supporting management plans which will be developed for each topic. These plans will set out how the mitigation measures will be put into practice, monitored and upheld. Together with this ESMP and already existing management plans (Table 7.1), these specific plans will form the overall Environmental and Social Management System (ESMS) for the Project.

The plans have been listed in Table 7.2, alongside with how they related to Project activities and impacts, as well as the identified responsible party for each specific plan.

Plan Name	Includes	Plan Owner	
Specific Management	Specific Management Plans - Environmental		
Emergency Preparedness and Response Plan	Administration (policy, purpose, distribution, definitions, etc.), organisation of emergency areas (command centres, medical stations, etc.), roles and responsibilities, communication systems, emergency response procedures, emergency resources, training and updating, checklists (role and action list and equipment checklist) and business continuity and contingency. The Plan will also include specifications for emergency communications as well as on-going public and community communication and disclosure.	HSE Manager	
Traffic & Management Plan	Controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. Will also include specification for community aw areness and safety programmes.	Project Manager	
Specific Management Plans - Social			
Severance Management Plan	Severance Management Plan will provide a detailed assessment and measures to mitigate community severance in each of Aols.	Social Manager	

Table 7.2 Proposed Management Plans

Plan Nam e	Includes	Plan Owner
	An Informed Consultation and Participation (ICP) process will be carried out to inform the Severance Management Plan and liaise with stakeholders (relevant authorities and project affected communities) with regards to identify severance issues and undertake coordinated action regarding design solutions (e.g.	
	alternative routes and relocation of mobile traders).	
Stakeholder Engagement Plan (SEP) - update	SEP will build on engagement undertaken to date and specify interactions with community and other stakeholders, as well as finalizing the grievance procedure to be used throughout the Project. Community and Employee aw areness training and code of conduct procedures.	HSE Manager
Workers	Plan for local training and procurement for operations. Also	Human
Management Plan	 specifies requirements for INZAGs during construction. The Plan will include policies and procedures for hiring of local labour, unskilled, semi-skilled and skilled labour. No employee or job applicant will be discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation; All w orkers will, as part of their induction, receive training on w orker rights in line with Angolan legislation to ensure that positive benefits around understanding labour rights are enhanced; All w orkers (including those of contractors and subcontractors) will be able to join unions of their choice and have the right to collective bargaining; All w orkers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights; Contracts will be verbally explained to all w orkers w here this is 	Resources (HR) Manager
	 necessary to ensure that workers understand their rights; As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Angolan law, international standards and INZAG policies; INZAG will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with Angolan law through gap analysis and capacity building; Contractor contracts will establish the right for INZAG monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, INZAG's policies or clauses in the contract. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers: 	
	 INZAG and Contractors' will implement a program of socioeconomic compliance monitoring to inform internal auditing and monitoring process in the framew ork of an Environmental and Social Management System. As such, key performance indicators will be developed around w orker rights, discrimination and management, w orkforce grievance mechanism and monitoring of outcomes. As part of the contractor and supplier selection process, INZAG will take into consideration performance with regard to w orker management, w orker rights, health and safety as outlined in Angolan law and ILO international standards; As part of the contractor and supplier selection process INZAG will take into consideration performance with regard to w orker management and rights as outlined in Angolan law and international standards; 	

Plan Name	Includes	Plan Owner
	 INZAG and its Contractors (and subcontractors) will oversee whether suppliers comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards. INZAG will put in place a worker grievance mechanism that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed including contractor workers. As part of stakeholder monitoring, INZAG will review and monitor the outcomes of community engagement, media coverage and its workforce and community grievance mechanism for additional indications of labour-related issues that may arise. The Project ESMS and applicable standards will be put as contractual commitments in all subcontractors and contractors' contracts. 	
Human Resources Policy	 The Policy Will be developed to: Access to clear and understandable information regarding worker's labour and working conditions; Provision of reasonable working conditions and terms of employment; Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects; Implementation of a grievance mechanism for the Project workers including subcontractor workforce; Adoption of open attitude tow ards freedom of association and in conformance with Angola law s. Retrenchment preventive measures will be implemented to reduce adverse impacts as a result of termination of contacts which will consider benefits to boost workers employment opportunities post construction where possible. Notice of dismissals will be done in due time and will manage employment expectations of the construction workforce 	HR Manager
STD Management Plan	 An STD Management Plan designed to minimise the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A typical plan would include, among other things, the following measures: An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs to employees, through workshops, posters and informal information sessions; Encouragement of employees to determine their HIV status; and Supply of condoms/ femidoms at the construction site(s)/ Construction Camps; 	Social Manager
Community Health and Safety Plan (CHSSP)	The purpose of the CHSSP is to provide a clear set of actions and responsibilities for the control of impacts affecting the health and safety of the communities within the Project's area of influence. The plan includes measures to respond to exposure to diseases due to worker interaction, environmental change and safety (traffic, unplanned events, etc.). An Informed Consultation and Participation (ICP) will inform the development of the CHSSP by integrating feedback diagnosis on road safety and related issues	Social Manager
Cultural Heritage Management Plan	The CHMP is required to ensure all heritage issues are addressed and managed adequately. Items to be addressed in the plan	HSE Manager

Plan Name	Includes	Plan Owner
	include Regulator Engagement, Access Management, Mitigation control and management of Intangible heritage through community engagement.	
Resettlement and Livelihood Restoration Plans (LRPs)	This plan shall be developed according to RPF, that was submitted to INZAG by ERM. It defines the procedures and the actions that will be taken to mitigate adverse effects, compensate losses, and provide development benefits to persons and communities affected by the land acquisition process.	HSE Manager
Local Content and Procurement Plan	 The Plan will be developed to inform the Project's in-country value planning, specifically, with respect to the employment potential for multiple positions and the local provisioning potential through local suppliers from the area, concretely: As part of the tendering process, INZAG's contractors will be required to develop a purchasing strategy that stipulates how national and local purchase of goods will be optimised. The purchasing strategy will be required to adhere to all INZAG HSE policies and procedures. Agreed measures will be monitored and reported on; INZAG will enhance national supplier capacity through a comprehensive demand and supply analysis; phased capacity building program, targeted training agreed with local government and other organisations; INZAG will implement a phased capacity building programme (sector by sector) that will enable local companies to achieve qualifications and potentially certification with the relevant standards and requirements well in advance of the tendering process; INZAG will engage with local government, and other organisations to determine opportunities for targeted training; Any selected potential suppliers will have to meet health, safety and quality standards; and Follow ing selection of primary contractors, INZAG will carry out training of contractors on the Project HSE and socioeconomic and health policies prior to the start of construction. INZAG will carry out training of contractors on Project Health and Safety Requirements (aligned with internal INZAG HSE Management Plan) and socioeconomic policies prior to the start of construction activities and during operations when needed; and To maximise capacity enhancement and transfer of know ledge to local contractors and their employees, INZAG will develop formal training programs and formalise on-the-job trainings to the extent possible, including learning targets and performance monitoring. 	Social Manager
Public Utilities Enhancement Plan	This Plan ensures that infrastructure improvements made during construction (access roads, electric and water supplies, telecommunication, etc.) contribute to the physical and economic development of local communities in the study area. This will improve the quality of life and social inclusion of the neighbouring communities.	Social Manager

As a contractual requirement, the contractors will be required to demonstrate compliance of their activities against the ESMP. This includes providing resources to ensure compliance of next tier contractors and a process for emergency stop-work orders in response to monitoring triggers. Contractors will be responsible for performing all work:

 In compliance with relevant national and international HSE legislation and regulations, and with other requirements to which the Project subscribes;

- In conformance with the Project ESMP, and related management plans for specific aspects; and
- In accordance with contractual technical and quality specifications.

The Project's ESMP and related documentation will be the main contractual documentation to which the contractor(s) will be bound. Contractors will be required to develop their own management plans which show how they will comply with these environmental and social requirements.

In this way, the ESMP will be implemented and controlled using both INZAG and the contractor management systems. The contractor management systems will therefore:

- Provide the framework that regulates their activities;
- Define responsibilities and reporting relationships for expediting, mitigation and monitoring actions detailed in the ESMP; and
- Specify the mechanisms for inspecting and auditing to ensure that the agreed actions are implemented.

Contractors will be required to self-monitor against their plan and compliance with the plan will be routinely monitored by INZAG directly or by third-parties. Contractors will be required to submit regular reports of monitoring activities and the Project will review these on a regular basis.

Contractors will be reviewed and approved by INZAG. An external audit and assurance process will be conducted of the contractors' and tenants' HSE documentation on an annual basis, the results of which will be disclosed at completion of the process.

7.9 Implementation

INZAG is committed to providing resources and establishing the systems and components essential to the implementation and control of the ESMP. These include appropriate human resources and specialised skills, training programmes, communication procedures, documentation control and a procedure for the management of change.

INZAG will support the process and have an HSE department with competent staff on the basis of appropriate education, training and experience.

MINTRANS will be responsible for the management and supervision of implementing this ESMP and the mitigation measures after the end of construction.

7.9.1 Roles and Responsibilities

The effective implementation of the ESMP (in alignment with the Stakeholder Engagement Plan and Resettlement Policy Framework) is dependent on established and clear roles, responsibilities and reporting lines within INZAG institutional framework. The organisational structure for environmental and social management for the Project is defined below (Figure 7.2, Figure 7.3). The structure will be maintained throughout the construction and operation phases, whilst being reviewed on a regular basis to adapt the structure as necessary.

The roles and responsibilities related to resettlement are described in Resettlement Project Framework, developed by ERM.

During the preconstruction and construction phase, INZAG's Social Manager, supported by the Community Liaison Coordinator (CLC), will be responsible for the management and implementation of the SEP. The Social Manager will be supported by the Community Liaison Team (CLT) which will effectively be in charge of all relations with stakeholders. The CLT will be made of several Community Liaison Officers (CLOs). The CLT will be headed by the Community Liaison Coordinator. The number of CLOs will be determined by the number of works sites and the distance between them.







Figure 7.3 Organisational structure of INZAG team responsible for implementation of the SEP and grievance mechanism

Project Director

The Project Director (PD) is the senior representative for the Site and, as such, is the ultimate authority on all matters including environmental and social management. The objective is to actively work towards the elimination of Company and Sub-contractor environmental damage. The PD is responsible for providing the human and financial resources necessary for ensuring compliance to the ESMP.

The PD must be fully conversant with the conditions of the environmental license and ensure that all stipulations within the ESMP are communicated and adhered to by the construction team (and any subcontractors).

The PD shall be also responsible for the day-to-day operations of the Contract.

According to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006), PD's responsibilities include:

- Defines and discloses the Mission and Objectives of the Quality, Health, Safety and Environmental (QHSE) Management System of the Project Work.
- Ensures that INZAG's Top Management radiate their H&S commitment down to all levels and functions of the Project organization.
- Allocates the necessary resources for the management and implementation of the Integrated QHSE Management System.
- Approves procedures/documents of the QHSE Management System.
- Ensures the implementation of the QHSE Management System in the project's activities according to the Corporate Guidelines and the Project Owner's requirements defined in the procedures.
- Ensures, in collaboration with the HSE Manager and all Department Managers, that relevant project H&S requirements are conveyed to subcontractors and implemented.
- Ensures overall responsibility for H&S Plan implementation.
- Encourages the adoption of a positive, proactive, committed Health and Safety culture throughout the PROJECT execution phase.
- Ensures that adequate resources are made available for the Project to support the implementation of the Project QHSE System in the work site.
- Attends relevant QHSE meetings;
- Ensures that H&S matters are a regular agenda item in Site QHSE meetings

The PD reports directly to the INZAG Country Manager, oversees site work and liaises with the construction team.

In relation to SEP, the responsibilities of the Project Director should also entail:

- Ensures that this SEP and GRM is applied through all INZAG and Contractor departments and levels that are undertaking activities related to the project;
- Apply necessary controls to minimise risks that could result in stakeholder grievances; and
- Contribute to the resolution and sign off any grievances that have international repercussions.

The following resources will also need to be in place:

- An auditable system for receipt, recording, and tracking of the process (for example, a grievance log, database, etc.) shall be in place.
- Dedicated budget for resourcing management of SEP and GRM and addressing grievances through financial or in-kind compensation as and when needed.

HSE Manager

The HSE Manager is appointed by INZAG and will be responsible for day to day environmental and social management.

The HSE Manager is responsible for implementing the monitoring programmes and maintaining the monitoring databases as well as the reporting of the results. The HSE Manager as a minimum will have a degree or diploma in environmental management, nature conservation or related discipline; have knowledge of the relevant legislation and at least two years previous experience in environmental control, environmental management or environmental monitoring and previous experience in land acquisition, compensation and resettlement processes. Key responsibilities, according to the INZAG'S OHS Management Plan (MP PASUL HSE SGI 006) include:

- Represents INZAG at Project Owner's HSE Leadership forums.
- Responsible for implementing the QHSE policies and programs on the project.
- Ensures that all INZAG employees, peers and who report to him/her, and subcontractors are held accountable for their HSE performance.
- Regularly reviews the performance of the safety program with the QHSE Department at INZAG's Headquarters.
- Reviews the Monthly QHSE Performance Report for the project and forwards this report to the INZAG's project management team. This report includes the project's HSE statistics, loss prevention inspection ratings and a description of plans and programs to be implemented during the next month to correct problem areas.
- Actively participates in the HSE program and improves the program's overall effectiveness.
- Reports all incidents to the Project Owner in accordance with the Incident Notification and Investigation good practice.
- Participates in serious incidents investigations.
- Reviews and signs off Incident Investigation Reports.
- Ensures that the Traffic Management Plan has been communicated with employees in training section.
- Collaborates and assists Construction team onsite with High risk assessments onsite.
- Ensures that Traffic Control Plan is communicated and planned with construction team.
- Ensures that weekly Traffic Control Plan is revised with our HSE team and Construction Manager and Foreman onsite.
- Ensures road closures is robust for prevention of man and motor vehicle interaction while working near the road.
- According to the SEP, the responsibilities of the HSE manager should also entail:
- To ensure that all Supervisors and employees are familiar with the contents of the SEP.
- To report to the Client and Project Director on all accidents and incidents and corrective and preventative measures.
- To report to the Project Director and Client on any public grievances or concerns raised by the local communities with respect to the project.

Quality, Health, Safety and Environmental Inspector

Key responsibilities, according to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006) include:

- Ensures the setting, implementation and continuous improvement of the Quality, Health, Safety and Environmental Management System focused on INZAG's Requirements, General Requirements of Interested External Parties, Project Owner's Requirements, Regulatory, Statutory, Legal and Other requirements from other external interested parties that directly focus on the project work;
- Responsible for the administration of the QHSE programme;
- Establishes and maintains all safety and health record-keeping systems;
- Reports to the Project Management and the Contract Management, and receives support from the Corporate HSE Department;
- Provides safety information and guidance to line supervision on proper QHSE procedures, hazards and employee training requirements;
- Reports all incidents in accordance with the Incident Notification and Investigation good practice;
- Conducts investigations of all lost-time accidents, significant medical treatment / first aid cases, "near-misses" and/or damage to property or equipment. Completes an analysis of each Incident Investigation and reports any serious injury to the national authority as required;
- Follows up on all injuries to ensure proper care;
- Conducts the safety orientation program for new employees and subcontractors;
- Reviews all subcontractors safety programs for compliance with INZAG's policies/procedures and Owner safety instructions;
- Writes monthly reports highlighting HSE activities, accidents and safety findings. Safety statistics and analyses, as well as actions taken to correct safety findings, are also included in the report;
- Handles non-conformities and implements corrective, preventive and improvement actions regarding the QHSE Management System;
- Prepares, develops or adapts operational safety documents and procedures that are the responsibility of INZAG and, thereby, guarantees that INZAG follows the prevention and safety procedures stipulated for the jobsite;
- Supervises medical facilities, medical records, and sets up procedures and training for emergencies, including serious accidents, fire, evacuations, etc.
- Surveys the project and purchase orders for hazardous substances, maintains Material Safety Data Sheets, monitors employee exposure to toxic substances and establishes a training program to meet Occupational Safety and Health Administration and client requirements;
- Coordinates INZAG's QHSE recognition program and initiates activities that stimulate and maintain employee interest;
- Coordinates the project fire prevention program with the local cities fire department (when applicable) and the project Owner's program;
- Administers the project QHSE Audit and Inspection verification program;
- To assist where possible with traffic monitoring with INZAG machinery and vehicles onsite.

In relation to SEP, responsibilities of QHSE inspector should also entail:

- To ensure that Project's employees are informed and trained on the SEP.
- To ensure INZAG H&S team reports on time and with the expected and agreed points.
- To provide resources to ensure that interests of stakeholders are represented and taken into consideration.
- To manage and coordinate grievances or concerns regarding H&S or environmental issues.

Social Manager

INZAG's Social Manager will have an oversight and monitoring role with regards to resettlement planning and implementation. He/she will liaise closely with the Resettlement Team, to ensure INZAG's schedule and timelines can be maintained and adjusted where required. More specific involvement and responsibility with regards to resettlement planning and implementation is yet to be discussed between INZAG and ANTT.

More specific involvement and responsibility with regards to resettlement planning and implementation is yet to be discussed between INZAG and ANTT. The Social Manager will be responsible for overseeing social performance issues and follow up on the SEP implementation. The Social Manager will report directly to the SM and will liaise with the HSE Manager and Community Liaison Officers (CLOs).

The Social Manger's responsibilities, according to SEP, include:

- Ensures that Project employees are informed and trained on the SEP.
- Overall responsibility for all external stakeholder engagement activities;
- Ensures Community Liaison Coordinator (CLC) reports on time and with the expected and agreed points.
- Receives feedback on social performance and resettlement issues from CLOs / Community Liaison Coordinator.
- Provides resources to ensure that interests of stakeholders are represented and taken into consideration.
- Reports to the Client and Project Director on all accidents and incidents and corrective and preventative measures.
- Reports to the Project Director and Client on any public grievances or concerns raised by the local communities with respect to the project.

Health and Safety Technician

Key responsibilities, according to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006) include:

- Verifies the conformity of the equipment and material to be used based on the safety procedures and proposes preventive and corrective actions;
- Conducts safety visits to the jobsite and prepares reports while proposing corrective actions and conducting awareness actions;
- Participates in safety/jobsite meetings;
- Conducts initial verification and validation of the equipment;
- Gathers information for the Accident Rates table on a monthly basis;
- Executes training and information actions in accordance with the training program predefined in this OHSMP;
- Verifies the maintenance conditions of the firefighting equipment, the Collective Protective Equipment (CPE), Personal Protective Equipment (PPE), signalling and others;
- Verifies the existence and correct usage of the Collective Protective Equipment and PPE by workers involved in the operations; ensure hi-vis ability for all employees onsite;
- Gathers information in the event of accident in order to prepare the Accident Report and Analysis and notifies the QHSE Manager;

- Verifies the proper implementation of the measures listed in the firefighting plans and issues an immediate order to stop the works, informing management each time there is a lack of safety conditions at the affected workplaces;
- Analyses the implementation of safety measures in executing the works, thereby always minimizing risks;
- Answers to his superior whenever there is an error or anomaly in the methods for implementing the health and safety conditions at the workplaces;
- Implements the necessary procedures for assistance and controlling risks in case of accident or serious incident;
- Assists the line management team in the development of risk assessments, Work Method Statement and Job Hazard Environmental Analysis for the safe execution of the work;
- Take lead on ensuring road signage id placed correctly and is clean and closures is robust for safety requirements onsite;
- To monitor and plan flagmen/ladies' placements in safe space onsite with traffic control plan;
- Ensure that all flagmen/ladies are aware of the risk involved with the activities and have regular Toolbox talks and Risk assessment communicated to them;
- Communicate regular with medical team regarding Traffic control plans diversions.

Environmental Supervisor

- Responsible to implement the control measures related to implementation of ESMP and sitespecific management plans;
- Performs daily inspections in the work areas to ensure compliance with management procedures;
- Verification and inspection of the wastewater infrastructures together with the Foreman, according to the defined periodicity and recording the observations;
- Available to guide staff on correct management practices
- Performs training and awareness sessions related to management on site (water and wastewater, waste, dust, noise)
- Alerts to possible non-compliant situations, in order to ensure timely implementation of the environmental minimization measures listed in this ESMP and ESIA;
- Reports water consumption, wastewater and waste generation data to HSE Manager

Administrative Supervisor

According to INZAG's Security plan (MP-PASUI-HSE-SGI-001-1), Administrative Supervisor is responsible for

- ensuring the implementation of the security policy in the project,
- making decisions regarding security events that moderately or severely impact the company, its operation or its employees.

He/she may delegate his/her's responsibilities to the Security Coordinator.

Security Coordinator

According to INZAG's Security plan (MP-PASUI-HSE-SGI-001-1), Security Coordiantor is responsible for:

advising the project director on security matters and its policies.

- Ensures the implementation of the security policy in the project,
- makes decisions regarding security events that have a minor or moderate impact on the company, its operation or its employees.
- Ensures permanent contact with the Project Owner's security team and is responsible for security communications with the Project Owner.
- Responsible for coordinating the Security Service Provider, its staff and ensuring communication between the Security Service Provider and the Administrative Supervisor.
- Ensures communication of all security events to the Administrative Supervisor.

Area/Department Manager

Key responsibilities, according to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006) include:

- Responsible for the safety of all employees under their supervision;
- Ensures that appropriate Plant, Equipment and Consumables are provided to safely execute the scope of work;
- Identifies SIMOPs activities and establishes the priority of work to eliminate interface issues;
- Ensures that safety regulations are complied with and enforced within the group of employees they supervise;
- Ensures that conformity with QHSE regulations is always maintained, including safety in work plans;
- Ensures that housekeeping was conducted, and site was left clean and safe at end of the days shift;
- Ensures all excavations is barricaded neatly with necessary fencing should it be kept open for a long period;
- Ensures that required edge protection is used in any structures high than 1-meter up wards;
- Ensures to communicate with HSE if not clear on the Traffic control measures for the area of activity;
- Ensures that Flagmen assigned for activity should be aware of risk and requirements;
- Ensures that sufficient protection equipment is used to separate public drivers from local drivers onsite;
- Ensures to commit that the HI visibility requirement onsite is kept to standard;
- Enforces all QHSE rules and regulations consistently every time violations are observed;
- Disciplines all who fail to observe QHSE rules and regulations;
- Ensures Toolbox Meetings are held in accordance with project requirements and attends to participate and show support;
- Participates in accident investigations and completes reports following serious injuries or nearmiss accidents within their area;
- Ensures that all foremen, general foremen and subcontractors enforce HSE standards.

In relation to SEP, the responsibilities of the Department Manager should also entail:

 Receives and acknowledges any issue, concern, complaint, or grievance from the community, verbally or in writing. They will record the case and report it to the Social Manager in compliance with the GRM. Involvement in the investigation, depending on the grievance's nature and severity, and as directed by the Social Management team.

General Staff

Key responsibilities, according to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006) include:

- Includes line staff not listed and the staff members in charge of other project functions such as field engineering, warehousing, supply chain, cost and scheduling, etc;
- These staff members are responsible for the safe performance of the work in their areas. They will train and set an example for their fellow employees by being familiar with applicable sections of the loss prevention program and complying with those rules. This is especially important when performing functions in the field.

Foreman

Key responsibilities, according to the INZAG's OHS Management Plan (MP PASUL HSE SGI 006) include:

- Provides information, instruction and appropriate oversight of the works to ensure that they are executed in a safe manner;
- Verifies that the necessary plant, equipment and consumables are available and used for the performance of the work;
- Ensures that employees are trained and competent to perform assigned tasks;
- Attends to identified hazards or concerns raised by the workforce in a timely manner;
- Escalates the identification of hazards that cannot immediately be controlled and take such measures to isolate the hazard until such time as eliminated;
- Ensures that Flagmen assigned for activity should be aware of risk and requirements;
- Ensures that sufficient protection equipment is used to separate public drivers from local drivers onsite;
- Ensures that deviations found rectified with immediate action onsite;
- Responsible for HSE communications to their supervisors and crew. Also accountable to the craft supervisors for the safe performance of employees through orientation, training and enforcement of QHSE policies and procedures;
- Enforces established QHSE regulations and work methods. Ensures that proper tools and safe equipment are provided to perform the work safely. Applies disciplinary action necessary to ensure conformity with the rules;
- Holds toolbox meetings with crew and records meeting minutes;
- Informs QHSE Coordinator/Supervisor of topics discussed at the Toolbox Meetings and provides a record of the meeting to the QHSE Coordinator/Supervisor;
- Inspects for unsafe practices and conditions as a part of the regular tour of work areas and ensures prompt corrective action to correct the findings;
- Completes an Incident Investigation Report ensuring that each accident or near miss is investigated, and corrective action taken to prevent recurrence;
- Attends to the monthly supervisor QHSE meetings;
- Ensures that daily housekeeping is done clean as she goes action will be recommended for safe approach and neat site;

 Ensures that team under her responsibility respect PPE requirements and aspect of High Visibility and respect is mandatory while onsite.

Traffic Safety Inspector

- Ensures that the safe traffic flow is in place by securing the worksites (secured trenches, temporary bridges, traffic controls, barricades, signs and warning lights, etc.);
- Ensures that the appropriate site boundary and access controls are implemented near settlements to prevent unauthorized entry to construction or activity sites especially by children (e.g. fencing of construction section in the vicinity of settlements or communities);
- Ensures that the relevant authorities and stakeholders are informed prior to temporary road closures, diversions, assignment of new road alternatives;
- Reports and records the road related accidents, incidents to HSE Manager;
- Maintains regular inspections of all equipment and ensures proper operation;
- Ensures that INZAG Transport Management and Road Safety Plan requirements are followed;
- Has continuous contact with all drivers in trip;
- Ensures all vehicles are appropriately equipped with the required HS equipment;
- Monitors that subcontractor transport management plan complies with HS requirements;
- Monitors that Contractor vehicles are appropriately equipped with HS equipment;
- Reports daily to HSE Manager; and
- Monitors that all contractor's drivers have valid driving permits.

HR Manager

According to the SEP, the Human Resources (HR) manager will be responsible for the following:

- Planning and budgeting, recruitment, HR policy framework, organisation structure, compensation philosophy and HR processes;
- Management Industrial Relations, Employee Relations and collective bargaining process;
- Management of employee grievances and disciplinary procedure;
- Contract Labour Management, policy framework, wage structure and collective bargaining agreements;
- Supervision of community relations and community development;
- Performance management system, increments and promotions:
 - Career Planning and Development: identification of critical roles and critical talent and management of development plan;
 - Training and development: identification of critical capabilities and development, training need identification, annual training calendar, budgeting and planning; and
 - Organisational Development initiatives: change management, environmental and social governance, digitalisation of HR processes, job evaluation, employee engagement survey, diversity and inclusion programmes.
- Management of compliance with global social sustainability performance standards;
- Supervision of employee welfare and administration;
- Statutory compliance Immigration Law, Pension, Life Insurance, etc.;
- Overall responsibility for all internal stakeholder engagement activities;
- Provide sufficient and competent resources, including budget, for effective implementation of the SEP; and

Continuously update stakeholder information (contact details).

Community Liaison Coordinator

The Community Liaison Coordinator (CLC) is responsible for leading and supervising all engagement, including resettlement engagement and support. The CLC will work closely with the HSE Manager and the Social Manager as well as the Resettlement Coordinator to coordinate the work of the Community Liaison Officers (CLOs) in supporting all Project engagement.

Specific responsibilities include:

- Plan the stakeholder engagement activities and ensure it are appropriately implemented by the CLOs, deployed along the different sites.
- Plan the specific stakeholder engagement activities for resettlement implementation support and coordinate with the Livelihood Restoration Team.
- Supervise / monitor and coordinate activities with subcontractors to ensure they comply with the SEP.
- Plan the stakeholder engagement activities and ensure they are appropriately implemented by the CLOs.
- Manage the grievance mechanism and grievance resolution process.
- Report to H&S Manager and Social Manager on the stakeholder engagement activities.

Community Liaison Officers

The Community Liaison Officers (CLOs) will be the interface between the Project and communities. They will be based in the communities and will facilitate community meetings and other stakeholder engagement activities, as well as receipt of grievances.

Specifically, CLOs roles include:

- Lead day-to-day implementation of the SEP and Community Grievance Mechanism, including proactively maintaining regular contact with affected communities through regular community visits to monitor opinions and provide updates on Project activities, and ensuring communication with vulnerable groups.
- Supervise / monitor and coordinate activities with subcontractors to ensure they comply with the SEP.
- Coordinate and manage consultation with community groups affected by the project regarding environmental, health and safety, security and social issues.
- CLOs will report directly to the CLC and will also liaise with H&S Manager regarding H&S and environmental issues.

Grievance Officer

- Responsible to manage the grievance mechanism and grievance resolution process;
- Share any relevant issues or concerns regarding the RAP implementation with the Resettlement Coordinator.

Resettlement Team

A Resettlement Team will be established by ANTT and support of the relevant government agencies and INZAG. Distribution of roles and responsibilities between ANTT and INZAG is yet to be agreed on prior to the planning and implementation of the Resettlement Action Plan (RAP). RAP will be
developed based on the RPF, established by ERM. The other roles related to resettlement are provided in the RPF document.

The Resettlement Team will be led by an overall Resettlement Coordinator. The Resettlement Team will be supplemented by a number of technical leads, experts and managers, including a Livelihoods Restoration Lead, a Community Liaison Coordinator, a Field Coordinator and Data Collection Lead, a Monitoring and Evaluation Officer and further support services.

Support Services

Administrative, financial, legal, procurement, logistics and transport.

Employees

- Must follow safe procedures and participate in the safety of their fellow workers. Working safely is a condition of employment;
- Expected to report hazardous conditions, practices and behaviours to their supervisors. They are encouraged to make safety suggestions through the Unsafe Conditions/Suggestion Report;
- Must make safety a part of their job by following the project QHSE rules and regulations taught in the orientation and Toolbox Meetings;
- Co-operate with INZAG management on health and safety related measures. They are encouraged to make safety suggestions through the Unsafe Conditions/Suggestion Report;
- Immediately report all injuries to the supervisor and seek first aid or medical help immediately;
- Ensure to respect PPE issued and used correctly for activity required.

7.9.2 Training and Awareness

INZAG will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment or social conditions. INZAG recognises that it is important that employees including subcontractors and vendors at each relevant function and level are aware of the Project's environmental and social policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures. Training and awareness-raising therefore forms a key element of both HSE and the expediting of this ESMP.

INZAG shall implement an H&S Training Plan that covers all aspects of the management of training, induction and ongoing education that is specific to the scope of works. The key objective of the HSE training is to achieve INZAG's goal of zero incidents. Key staff will, therefore, be appropriately trained in key areas of HSE management and operational control with core skills and competencies being validated on an on-going basis. INZAG's training will be aimed not only for high-risk activities but also for activities that are traditionally considered low-risk. The non-exhaustive list of sessions includes:

- Project QHSE Induction;
- Waste Management;
- Spill Prevention and Response;
- Environmental Awareness in the workplace;
- Work at heights;
- Mechanical Movement of Loads;
- Manual Handling of Loads;
- Equipment and Machinery Movement;
- Emergency Response Plan;

- Site Yard Assembly;
- Welding Activities;
- Scaffolds assembly, use and disassembly
- Trenches and excavation works;
- Observation Programme;
- Traffic Control System.

All new employees will receive a Site Induction before commencement of work, short-term visitors (five days or less) will be accompanied and shall also receive a shortened version of induction, if a person visits the site more often than once a month, she will get a complete induction. Any person who is away from the Project for longer than three months must undergo a full re-induction. Specific training will be held by subcontractors. A schedule of specific training events will be prepared.

INZAG has developed a specific leadership in Health and Safety programme, that aims to transform INZAG leaders into effective "Safety Leaders",

Additionally, each INZAG employee shall attend a daily meeting, aimed at reinforcing the received training and sharing lessons learned from incidents. The identification of training and awareness requirements and expediting of the identified training/awareness events will be the responsibility of the HSE Manager.

INZAG will ensure that the employees, including subcontractors and others who are required to work on site, hold the appropriate qualifications/certifications, if applicable.

Training and awareness are not a requisite only of INZAG personnel (and subcontractors). It would be important to include an assessment of the need for training and capacity building of MINTRANS staff (before and during the construction phase) as well as at the conclusion of the construction phase and handover of the ESMP, SEP and grievance mechanism from INZAG to MINTRANS.

This will be achieved through a formal training process. Employee training will include awareness and competency with respect to:

- environmental and social impacts that could potentially arise from their activities (including, noise);
- legal requirements in relation to environmental and social performance;
- necessity of conforming to the requirements of the ESIA and ESMP, in order to avoid or reduce those impacts;
- activity-specific training on waste management practices, documentation systems and community interactions; and
- roles and responsibilities to achieve that conformity, including those in respect of change management and emergency response.

The HSE Manager is responsible for coordinating training, maintaining employee-training records, ensuring that these are monitored and reviewed on a regular basis, as well as handover of the ESMS action plans, SEP and Grievance Mechanism to MINTRANS at the end of construction, and capacity building in their use. The HSE Manager will also use information from the Observational Programmes, incident investigations, jobsite audits and requires from supervision or employees to identify areas, and/or personnel that may need additional training. He shall assist the project supervision in developing the training programme and may assist in the actual training.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be coordinated by the HSE Manager prior to commissioning of the facilities. Upon completion of training and once deemed competent by management, staff will be ready to train other people.

The contractor training program will be subject to approval by INZAG, and it will be audited to ensure that:

- training programs are adequate;
- all personnel requiring training have been trained; and
- competency is being verified.

7.9.3 Communication

INZAG will maintain a formal procedure for communications with the regulatory authorities and communities. The HSE Manager is responsible for communication of HSE issues to and from regulatory authorities whenever required. The INZAG HSE Manager is kept informed of such communications and pertinent information arising from such interactions will be communicated to contractors through the HSE Manager.

According to the QHSE Management Manual, different communication mechanisms can be used:

- For internal Communications:
 - Intranet;
 - Meetings;
 - Display cases of the project work;
 - Posters and leaflets;
 - Digital suggestion box;
 - Awareness-raising and internal training actions;
 - Paper or digital forms;
 - Letters;
 - Email;
 - Manuals, Plans, Procedures, Work Instructions
 - Workers Consultation and Participation
 - Other means deemed suitable.
- External Communication:
 - Meetings;
 - Letters;
 - Email;
 - Website;
 - Social Media;
 - Consultation of official websites/journals of public and private entities;
 - Other means as deemed appropriate by the organization and external parties;

Meetings will be held, as required, between INZAG and the appropriate regulatory agency and community representatives to review HSE performance, areas of concern and emerging issues. Dealings will be transparent, and stakeholders will have access to personnel and information to address concerns raised.

The Project will implement a grievance mechanism (Section 7.9.7) whereby community members can raise any issues of concern. Grievances may be verbal or written and are usually either specific

claims for damages/injury or complaints or suggestions about the way that the Project is being implemented. When a grievance has been brought to the attention of the Project team it will be logged and evaluated. The person or group with the grievance is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made.

Where a complaint or claim is considered to be valid, then steps are required to be undertaken to rectify the issue or agree compensation for the loss. In all cases the decision made and the reason for the decision will be communicated to the relevant stakeholders and recorded. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (e.g. government official). Local community stakeholders will be informed on how to implement the grievance procedures. The grievance mechanisms currently in use and example log sheets are provided as an appendix to the Stakeholder Engagement Plan (Section 5.3).

7.9.4 Documentation

INZAG will control HSE documentation, including management plans; associated procedures; and checklists, forms and reports, through a formal procedure. All records will be kept on site and will be backed up at several offsite locations (including secure cloud storage facilities). Records will be kept in both hard copy and soft copy formats. And all records will be archived for the life of the project.

Furthermore, the document control procedure will describe the processes that the Project will employ for official communication of both hardcopy and electronic (through the internet) document deliverables. In addition, it will describe the requirement for electronic filing and posting and for assignment of document tracking and control numbers (including revision codes).

The HSE Manager is responsible for maintaining a master list of applicable HSE documents and making sure that this list is communicated to the appropriate parties. The HSE Manager is responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately.

The contractors will be required to develop a system for maintaining and controlling its own HSE documentation and describe these systems in their respective HSE plans.

7.9.5 Operational Control Procedures

Each activity for which a potentially significant environmental or socioeconomic risk or impact is expected will have an operational control associated with it that specifies appropriate procedures, work instructions, best management practices, roles, responsibilities, authorities, monitoring, measurement and record keeping for avoiding or reducing impacts. Operational controls are monitored for compliance and effectiveness on a regular basis through a monitoring and auditing procedure described in the ESMP.

Operational control procedures will be reviewed and, where appropriate, amended to include instructions for planning and minimising impacts, or to at least reference relevant documents that address impact avoidance and mitigation.

7.9.6 Emergency Preparedness and Response Plan

According to Integrated Management System Manual Quality Safety and Environment (MG-INZ-QSA-SGI-001-0), INZAG will establish a separate EPRP for the Project to identify the potential for, and response to, environmental accidents and health and safety emergency situations and for preventing and mitigating potentially adverse environmental and social impacts that may be associated with them, during construction.

INZAG will engage with local communities, government officials and other relevant parties during development of EPRP. Draft EPRP will be shared with stakeholders for their review and channels of communication will be established and agreed. EPRP will include the following:

- The emergency response in the event of spills, fire, accidents, earthquake, flood;
- A spillage risk assessment;
- Procedure for staff and subcontractors to report any incidents and the investigation, remediation and preventive actions taken;
- Regular emergency response training including the use of spill response equipment;
- Emergency Communication Procedure for local communities and authorities

Emergency preparedness and response will be reviewed by INZAG on at least an annual basis and after the occurrence of any accidents or emergency situations to ensure that lessons learnt inform continuous improvement. Emergency exercises will be undertaken on a regular basis to confirm adequacy of response strategies. Investigations of accidents or incidents will follow formal documented procedures.

Emergency planning will include planning for onsite activities as well as notifications and planning support for local community members who would be affected by a site emergency.

The EPRP will be updated and expanded by MINTRANS as needed for implementation during the operation of the flyovers.

7.9.7 Grievance Redress Mechanism

7.9.7.1 Importance

- Grievances can be an indication of growing stakeholder concerns (real and or perceived), and therefore the management of grievances is a vital component of stakeholder management and an important aspect of risk management for the Project.
- This Grievance Redress Mechanism (GRM) outlines the principles and process for grievance management, and defines the organisational structure and processes required to implement a functional, effective and culturally appropriate grievance mechanism that is responsive to stakeholder needs.
- This GRM is solely to manage the interface with external stakeholders, and not intended to be used for addressing employee, contractor or sub-contractor employee grievances.

7.9.7.2 Purpose

The purpose of this Grievance Redress Mechanism (GRM) is to establish is a **fair**, **accessible**, **effective**, **and timely** mechanism for stakeholder concerns, complaints and grievances to be raised and resolved without risk of discrimination or retaliation.

It outlines INZAG's approach to accepting, assessing, resolving, and monitoring grievances that stakeholders may have about the Project, its subcontractors' and activities in relation to the construction of the overpasses. **Timely redress or resolution** of such grievances is vital to ensure effective stakeholder management and successful implementation of the Project.

Grievances are issues, complaints, comments, questions, concerns, suggestions or claims (perceived or actual) raised by an individual or group of stakeholders ("complainants") about the way in which a Project is being implemented or a commitment by INZAG (or its subcontractors) that has not been honoured. Grievances can encompass minor concerns as well as serious or long-term issues. They might be felt and expressed by a variety of parties including individuals, groups, communities, entities, or other parties affected or likely to be affected by the social or environmental impacts of the Project. Grievances may take the form of specific complaints for damages / injury, concerns about Project activities, perceived incidents or impacts or requests for more information / clarity about the project. It is essential to have a robust and credible mechanism to systematically handle and resolve any complaints that might arise in order that they do not escalate and present a risk to operations or the

reputation of the company (nationally or internationally). If well-handled, an effective grievance mechanism can help foster positive relationships and build trust with stakeholders.

A GRM is a free, open and accessible mechanism that provides a **formal and on-going avenue** for stakeholders to engage with the Project proponents and contractors, whilst the monitoring of grievances provides signals of any escalating conflicts or disputes.

The objectives of the GRM are to:

- Guide INZAG in addressing complaints, comments, questions, concerns and suggestions from stakeholders, related to the project and its activities in a fair, transparent and practical manner;
- **Provide a predictable, transparent, and credible process** to all parties for resolving grievances, resulting in outcomes that are seen as fair, effective, and lasting;
- Identify and manage stakeholder concerns, thereby supporting effective risk management for the project;
- Be inclusive of all stakeholders, thereby creating an enabling environment in which to operate;
- Prevent adverse consequences of failure to adequately address grie vances;
- Enable more **systematic identification of emerging issues and trends**, facilitating corrective action and pre-emptive engagement;
- Provide stakeholders fearing or suffering adverse impacts from the project with the assurance that they will be heard and assisted in a timely manner; and
- Build and maintain trust.

The GRM is applicable to all phases of the Project, including construction an operation, and will be updated regularly to ensure it remains relevant and appropriate to the scale and phase of the Project.

7.9.7.3 Principles

Key components of an effective GRM are as follows:

- Simple and Culturally Appropriate Process: The GRD should be fully accessible to all stakeholders affected by the Project and it should be convenient for them to submit grievances. There should be several appropriate channels through which stakeholders can submit grievances free of charge, and without retribution to the party that originated the issue or concern.
- **Simple Internal Procedure**: A simple and consistent procedure is required to record grievances, identify those responsible for addressing them and ensure that they are resolved.
- **Staff Arrangements**: Roles and responsibilities in the grievance management process are to be defined and agreed.
- **Training**: The launch or modification of the grievance management process should include internal induction and/or training for operational staff and a Community Representative.
- **A Set Timeframe**: The grievance process should set a timeframe within which complainants can expect acknowledgement of receipt of grievance and a response and/or resolution of grievance.
- Sign Off: Actions planned to resolve grievances considered to be of significant concern by the Grievance Officer should be signed-off by a member of the senior management, suitably qualified to assess the effectiveness of the response.
- **System of Response**: A clear system of response is required to identify who should respond to the complainant and how. Response to the complainant should be provided in a timely and transparent manner.

- **Appeal Process**: An appeal process with the involvement of third parties should be in place in case the complaint is not resolved to satisfaction of the party originating the grievance.
- **Disclosure**: The grievance mechanism should be clearly and widely disclosed to affected communities.
- Access to Legal Remedies: The mechanism should not impede access to judicial or administrative systems.
- Monitoring Effectiveness: Mechanisms should be set in place for monitoring the effectiveness with which complaints are being recorded and resolved.

INZAG will inform the stakeholders about the GRM during the course of its engagement activities, and report regularly to the public on its implementation whilst also protecting the privacy of affected individuals.

To maximise the effectiveness of the mechanism, INZAG shall uphold the following values during implementation and operation of the system:

- Commitment to fairness in both process and outcomes;
- Freedom from reprisal for all involved parties within INZAG and in the external stakeholder group;
- Clear operating rules, and accountability;
- Validity of all complaints submitted;
- Culturally accessible and applicable;
- Accessible to vulnerable groups of stakeholders; and
- Confidentiality if requested.

7.9.7.4 Eligibility

Any stakeholder can file a grievance at any time and at no financial cost, with the ability for complainants to remain **anonymous** if they choose. However, grievances must meet one or more of the following criteria to be considered <u>eligible for inclusion in the grievance process</u>:

- The grievance is made by a person (or a representative who has the consent of the person to act on their behalf) who resides in – or with a family connection to – the Project area; and/or
- The grievance identifies an impact, complaint, concern, or problem that is directly or indirectly related to one or more activities of INZAG or its subcontractors, such as those related to Project engagements, activities, impacts, responsibility, and scope.

Ineligible grievances include:

- Complaints with respect to actions that are not technically or financially supported by the Project, or about the parties that are not partners or collaborating partners in the project;
- Complaints about issues outside of the Project scope, including outside of the Project Aol; and/or
- Complaints submitted by the same complainant on matters they submitted previously that have been closed out, unless new evidence is provided or the Project has not responded to this complaint in the required timeframe.

If the grievance is considered out-of-scope or ineligible, INZAG will respond to the complainant with an explanation and will inform the complainant who they should contact to get the issue addressed (if possible). All grievances, whether eligible or ineligible will be recorded in the Grievance Register (**Appendix M**).

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7.9.7.5 Grievance Procedure

The Project's grievance mechanism presents a simple process through which stakeholders can submit their complaints free of charge and, if necessary, anonymously or via third parties. Complaints may be submitted in more than one format (e.g. in writing or verbally). The preferable channels for reporting grievances will be confirmed with communities and will be discussed with the community as part of community engagement.

The grievance resolution procedure for the Project is administered in eight steps, as follows:

- Step 1: Publicising the GRM;
- Step 2: Receiving a grievance;
- Step 3: Acknowledge receipt of grievance;
- Step 4: Documenting a grievance;
- Step 5: Assess and investigate;
- Step 6: Grievance resolution;
- Step 7: Closure of grievance; and
- Step 8: Monitoring and reporting.

This procedure aims to address stakeholder concerns promptly, effectively and transparently.

Step 1: Publicising the Grievance Redress Mechanism

To ensure that the GRM is accessible, practical and transparent, it will be translated into Portuguese, ensuring that the information is delivered in a culturally appropriate way, reaching all relevant stakeholder groups, including women and other vulnerable groups.

Various methods will be used to raise awareness about the GRM and procedures. During all meetings with external stakeholders, they will be notified of the existence of the GRM and grievance procedure. In addition, a factsheet outlining the process of registering and resolving grievances will be circulated / presented. During these meetings, INZAG will ensure that stakeholders are made aware that procedures are in place to protect complainants from any retaliatory action.

Step 2: Receiving a Grievance

Grievances can be submitted in writing, telephonically or presented verbally in any language through the following means:

- In Person: to the Community Liaison Officers (CLO's), INZAG's Social Manger or at the Information Office;
- In writing: to the CLO's or INZAG's Social Manger using a grievance form available (template provided in Appendix O). Address to be confirmed;
- Online: using the grievance form on INZAG's website;
- By phone: number to be confirmed;
- Grievance box: These will be placed at strategic locations such as at the Information Office; and
- CLO's team Email: email address to be confirmed.

Box 7.3 Tips for Receiving a Grievance

- Regardless of who receives the grievance, it needs to be forwarded to INZAG's Social Manager and CLOs for attention.
- The GRM should make it possible to lodge a grievance in any appropriate format (written, verbal, telephonic, email, post, etc.). Consideration should be given to capturing concerns raised informally or indirectly (e.g., through perception studies, media reports, social media, etc.).
- It is important that the process is easily accessible and not intimidating to stakeholders.
- Regardless of the form of the complaints, all need to be addressed with the same sincerity and seriousness.
- The CLOs will be required to be in touch with the complainant at least once per month to provide feedback on the grievance.

Source: ERM, 2023

Step 3: Acknowledging Receipt of a Grievance

INZAG shall acknowledge receipt of any grievance within <u>seven working days</u> from the date it was submitted and shall inform the complainant about the timeframe in which a response can be expected. If the grievance is not well understood or if additional information is required, clarification will be sought from the complainant.

A Grievance Receipt Form (**Appendix O**) shall be signed and a copy provided to the complainant. Refer to for tips on acknowledging grievances (see below Box 7.4).

Box 7.4 Tips for Acknowledging a Grievance

- 1. Literacy levels should be taken into consideration when providing the complainant with the acknowledgment of receipt, and verbal acknowledgement should accompany a written acknowledgement.
- 2. Where appropriate, acknowledgement should be provided through the Social Manager.

Step 4: Documenting a Grievance

All grievances received (whether eligible or ineligible) will be documented in a Grievance Register, as will be the project response and the final outcome to the grievance. This should include documentation of how the grievance has been resolved.

A Grievance Register template is provided in **Appendix M**.

INZAG will ensure that any personnel and contractors that could potentially receive claims will be knowledgeable about the grievance management process and ready to accept feedback. INZAG will stress that there will be no costs or retribution associated with lodging grievances.

INZAG's Social Manager will log, document and track all grievances received. Grievances shall be assigned a case number and records of communication / consultation shall all be securely stored within the Grievance Register. The Register shall be monitored regularly for recurring grievances so that appropriate mitigation can be developed. As a minimum, the following information shall be recorded:

Case number;

- Status of the grievance (open or closed);
- Date complaint received;
- Complainant's name and contact details;
- Type of complainant (e.g. business, community member, etc.);
- Subject of complaint (e.g. cracked house);
- Brief description of the complaint;
- Eligibility / ineligibility (if ineligible, explain why);
- Date complaint was acknowledged;
- Complaint acknowledged on time (i.e. within 7 working days);
- Name of investigating officer and department;
- Grievance significance rating (see step 5 below);
- Claim true or false;
- Corrective action proposed;
- Date investigation was completed;
- Date response was provided to complainant;
- Brief description of response;
- Resolving actions accepted by complainant (i.e. yes / no. If no, explain why);
- Grievance resolved (i.e. yes / no);
- Next steps, if no;
- Date closed (if grievance is resolved);
- Resolution time;
- Actions implemented (including dates);
- Outcome of the actions implemented;
- Signed off by; and
- Cost (if applicable).

Step 5: Assess and Investigate Grievance

The following steps shall be undertaken to investigate all grievances:

- Capture as much information as possible from the person who received the complaint, as well as from the complainant;
- Undertake a site visit, if required, to clarify the parties and issues involved. Gather the views of
 other stakeholders including INZAG employees, if necessary, and identify initial options for
 settlement that parties have considered;
- Determine whether the grievance is eligible;
- Eligible grievances include all those that are directly or indirectly related to the INZAG Project and that fall within the scope of the GRM;
- Ineligible complaints may include those that are clearly not related to the INZAG Project or its contractors' activities, whose issues fall outside the scope of the GRM or where other INZAG or community procedures would be more appropriate to address the grievance;

- If the grievance is deemed ineligible it can be rejected, however, a full explanation as to the reasons for this must be given to the complainant and recorded in the Grievance Register;
- If the grievance is eligible, determine its severity level using the significance criteria (Box 7.5). This will determine whether the grievance can be resolved immediately or requires further investigation and whether senior management will need to be informed of the grievance;
- If the grievance concerns physical damage, (e.g. crop, house, community asset, etc.) take a photograph of the damage and record the exact location as accurately as possible;
- Inform the complainant of the expected timeframe for resolution of the grievance; and
- Enter the findings of the investigation in the Grievance Register (Appendix M).

INZAG will aim to resolve any grievances within 30 days from date of receipt. This timeframe can be extended to 60 days for more complex grievances e.g., level 4 grievances, if required, and following communication and engagement with the complainant.

Significance Level	Type of Grievance	Responsibility
Level 1	A grievance that is isolated or 'one-off' and essentially local in nature and restricted to one complainant. Note: Some one-off grievances may be significant enough to be assessed as a Level 4 grievance e.g., when a national or international law is broken (see Level 4 below).	Social Manager
Level 2	A grievance that extends to the local community or region and has occurred more than once, which is judged to have the potential to cause disruption to INZAG operations or to generate negative comment from local media or other local stakeholders.	Project Director
Level 3	A grievance which is widespread and repeated or has resulted in long-term damage and/or has led to negative comment from local media, or is judged to have the potential to generate negative media and local stakeholder comments (e.g. damage to a sacred site).	Country Manager
Level 4	A one-off complaint, or one w hich is w idespread or repeated and, in addition , has resulted in a serious breach of INZAG policies, Angolan or International Law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (e.g. failure to pay compensation w here appropriate, e.g. resettlement).	Managing Director

Box 7.5 Significance Rating Criteria

Step 6: Grievance Resolution

All grievances will be dealt with on a case-by-case basis. The approach adopted will seek to facilitate dialogue with complainants and community members to jointly identify and select measures for grievance settlement. This will help to increase ownership of solutions and to mitigate perceptions that resolutions unfairly benefit Indorama.

An incident investigation team from INZAG may be tasked with seeking resolution to the grievance. This may entail a dialogue or a series of dialogues between affected parties to find a solution to the grievance. Alternatively, it may entail investigating the underlying cause of the grievance and action any changes required to internal systems to prevent a recurrence of a similar grievance.

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An Incident Investigation Report will be completed within 28 days (considered good practice). During the 28 days of dialogue or investigation, the Social Manager will co-ordinate conflict resolution activities necessary to contain and resolve any actual or potential conflicts arising from the reported grievance. If the case is complex and the stated resolution timeframe cannot be met, an interim response will be provided (oral or written) that informs the stakeholder of the delay, explains the reasons, and offers a revised date for next steps.

Where possible, grievances will be addressed directly by INZAG. The resolution proposal shall be respectful and considered, including a substantiating rationale for the decision and any data used in reaching it. If wider consultation is necessary, grievances will be forwarded to a third party. This third party should be neutral, well-respected, and agreed upon by both INZAG and the affected parties. These may include public defenders, legal advisors, local or international NGOs, or technical experts. In cases where further arbitration is necessary, appropriate government involvement will be requested.

As a last resort, aggrieved parties have a right to take legal action. This more formal rights-based approach shall only be taken if all other approaches have failed or when there are serious conflicts about facts and data. The final decision will be taken by the arbitrator or courts based on compliance with laws, policies, standards, rules, regulations, procedures, past agreements or common practice.

Box 7.6 Tips for Resolving Grievances

- 3. Grievance verification is especially important when the grievance is about another stakeholder or group of stakeholders. For example, the community may make claims against a contractor that need to be investigated before acted upon.
- 4. A regular forum to discuss grievances could be in the form of a monthly meeting where Risk Level 1 grievances are discussed. This forum can be constituted more frequently in the case of Risk Level 2 and 3 grievances. This is particularly relevant to phases of the Project that are likely to result in the highest degree of impact (e.g., construction).
- 5. It is important to be transparent about the mechanism to resolve the issue. The appropriate level of action may require further consultation. In addition, the issue may be symptomatic of a bigger issue. When this arises, both the symptom and the cause need to be addressed and resolved. For example, a complaint about job seekers setting up informal housing near the site may be raised as an issue related to informal housing but may also be symptomatic of an issue around influx of people and associated negative impacts.
- 6. There are instances where grievances cannot be resolved in 28 days. In these cases, monthly updates must be given to the stakeholders who raised the grievance to provide them a report on progress.

Step 7: Closure of Grievance

The Social Manager will communicate to the complainant(s) that the grievance has been resolved. In instances where the stakeholder is not satisfied with actions taken, the grievance will either:

- Be escalated to INZAG senior management and a decision will be taken either to implement supplementary actions or to consider initiating an appeal process; or
- The Social Manger will approach a neutral or third party to assist in mediating and resolving the grievance; or
- The Social Manager will approach the host country's judiciary to further address the grievance.

Following this process, the Social Manager will communicate that actions implemented have resolved the grievance.

The staff member who signs off on the closure of the grievance should have sufficient knowledge about the topic to provide assurance.

Once sign-off has occurred, this should be recorded in the Grievance Register (Appendix M).

Step 8: Monitoring and Reporting

INZAG's Social Manager will monitor all grievances (whether eligible or ineligible) routinely as part of the broader management of the Project in order to assess the effectiveness of the complaint's resolution process and to identify any needs for improvement. This entails good record keeping of complaints raised throughout the life of the Project (construction and operation). On receipt of grievances, electronic notification to must be distributed to the Project Director. Grievance records must be made available to management at all times.

Quarterly internal reports will be compiled by the Social Manger and distributed to the INZAG management team. These grievance reports will include:

- The number of grievances logged in the proceeding period by level and type;
- Number of grievances acknowledged on time/ not acknowledged on time, including why;
- The number of grievances unresolved after 60 days by level and type;
- The number of stakeholders that have indicated that they are not satisfied with the resolution;
- The number of grievances resolved between INZAG and complainants, without accessing legal or third-party mediators, by level and type;
- The number of grievances of the same or similar issue; and
- The measures taken to incorporate these grievance outcomes into Project design and implementation.

These reports and other records will be made available for external review if required. An appropriate grievance report should form part of INZAG's annual reporting. Annual reports will be made available to the public. A hard copy will be located at the INZAG offices, and an electronic copy will be made available online.

7.9.8 Managing Changes to Project Activities

INZAG established a Design Change Management Procedure for Environmental and Social Aspects, presented in Appendix C.

The Environmental and Social Impact Assessment (ESIA) is prepared based on the current preliminary design information provided by INZAG. The Project Final Design is at preliminary stage and will likely not be ready and approved until after the ESIA studies are completed. Therefore, the Design Change Management (DCM) Procedure (DCMP) will be an integral part of the ESIA and used by INZAG to assess and mitigate all E&S risks in the case a change in the Final Design is required as compared to the current status. For establishing the detailed designed, INZAG considers both Angolan and international standards, including the IFC EHS Guidelines for Toll Roads (2007) and implements smart design solutions to avoid / minimize the impacts as far as possible. The Final Design proposed by INZAG will then be subject to approval of National Land Transport Agency (ANTT) and further revisions may be needed at that time as well and will likely to be implemented after the ESIA approval process.

The objective of the procedure is to ensure that the impact of changes on the health and safety of personnel, the environment, plant and equipment are identified and assessed prior to changes being implemented.

The management of change procedure will ensure that:

Proposed changes have a sound technical, safety, environmental, and commercial justification;

- Changes are reviewed by competent personnel and the impact of changes is reflected in documentation, including operating procedures and drawings;
- Hazards resulting from changes that alter the conditions assessed in the ESIA have been identified and assessed and the impact(s) of changes do not adversely affect the management of health, safety or the environment;
- Changes are communicated to personnel who are provided with the necessary skills, via training, to effectively implement changes; and
- The appropriate INZAG person accepts the responsibility for the change.

As information regarding the uncertainties becomes available, the Project ESMP will be updated to include that information in subsequent revisions. Environmental and social, as well as engineering feasibility and cost, considerations will be taken into account when choosing between possible alternatives.

7.9.9 Checking and Corrective Action

Introduction

Checking includes inspections and monitoring as well as audit activities to confirm proper implementation of checking systems as well as effectiveness of mitigations. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

Inspection

According to the Occupational H&S Management Plan, HSE inspections will be conducted weekly by the HSE team, accompanied by the project management, Foreman, and frontline supervisors. The results of the inspection activities will be reported to INZAG management in a form of checklist signed by all participants of the inspections. The registered non-conformities and deviations will be recorded in the Processing of Findings form.

Monitoring

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. Monitoring parameters are included in the ESMP.

In addition, lender requirements may include other forms of external monitoring as specified by the lending institution.

Monitoring methodologies or processes must be put in place in order to ensure the efficacy of the mitigation measures identified in the ESIA. Monitoring methodologies should be established to address the following:

- alteration to the biological, chemical, physical, social and health characteristics of the recipient environment;
- alterations in the interactions between project activities and environmental sensitivities, and interactions among the various sensitivities;
- to monitor the effectiveness of the mitigation measures;
- determination of long-term and residual effects; and
- identification of Project specific cumulative environmental effects.

The SEP will be monitored and evaluated by INZAG regularly using the indicators recommended by international good practice (e.g., IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (2007)).

Suggested monitoring and evaluation activities are outlined below:

- Monitor the grievance register in terms of response times to address complaints logged as well as the recurrence of complaints over time.
- Review whether the stakeholder database is maintained and regularly updated.
- Monitor whether records of all engagement activities are recorded and stored (electronic or hard copies) and that the stakeholder engagement log is maintained and up to date.
- Review /audit the implementation of the SEP.
- Develop and assess performance in terms of Key Performance Indicators (KPIs), such as:
- Number of engagement activities facilitated by stakeholder group and engagement type;
- Number of attendees at stakeholder engagement activities (expected vs actual);
- Frequency of information disclosure;
- Number of grievances received per annum;
- Number of grievances unresolved / outstanding;
- Time taken to resolve grievances;
- Number of satisfied responses from complainants;
- Number of stakeholders with knowledge of the grievance process and whether they use it; and
- Overall perceptions of the Project and company.
- INZAG (and in particular the head of HR) should ensure that the SEP be updated annually based on outcomes of monitoring exercise.

The aim of the monitoring programme is to ensure that the negative environmental impacts identified in this ESIA are effectively mitigated in the design, construction and operations stages of the proposed Project.

Auditing

According to the Occupational H&S Management Plan, beyond the routine inspection and monitoring activities conducted, audits will be carried out internally each quarter to each site by INZAG to ensure compliance with regulatory requirements. Additionally, H&S department will carry out random visits to the site or to work locations. Audits to be conducted will also cover the contractor self-reported monitoring and inspection activities. The audit shall be performed by qualified staff and the results shall be reported to INZAG management to be addressed.

The audit will include a review of compliance with the requirements of the ESIA and ESMP and include, at a minimum, the following:

- completeness of HSE documentation, including planning documents and inspection records;
- conformance with monitoring requirements;
- efficacy of activities to address any non-conformance with monitoring requirements; and
- training activities and record keeping.

There will also be a cycle of audits into specific areas or activities of the Project. The result of the audits will be in the preparation of a report with photographs and referenced documents for each non-conformity.

Corrective Action

Impacts will be identified and associated risks addressed before an incident occurs. Investigating a "near miss" or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future. The appropriate control measures will be authorized by INZAG QHSE Manager.

The risk management activities will form part of the overall risk management process:

- Risk assessment (RA);
- Work Method Statements (WMS's);
- Safe Work Method Statements (SWMS's);
- Job Hazard Environmental Analysis (JHEA).

INZAG has a specific Hazard Identification and Risk Assessment Procedure (PR/INZ/QSA/SGI/004), that includes Risk Assessment Matrix.

INZAG will implement a formal non-compliance and corrective action tracking procedure for investigating the causes of, and identifying corrective actions to, accidents or environmental or social non-compliances. This will ensure coordinated action between INZAG and its contractors. The HSE Manager will be responsible for keeping records of corrective actions and for overseeing the modification of environmental or social protection procedures and/or training programs to avoid repetition of non-conformances and non-compliances.

Reporting

Throughout the construction period, INZAG will report all accidents, incidents and near misses to MINTRANS as soon as possible, first verbally (safety alert must be sent within 72 hours of occurrence), the final report must be completed after all the facts have been reported and measures to be taken have been identified. Any employees involved in the accident must report it to their supervisor immediately, who decides if the Emergency Response Team should be made aware of it. If an incident involves injury, it will additionally be assessed by a member of the site medical team at the earliest opportunity. All accidents and near misses must be immediately reported to the INZAG safety team, which will start an investigation of the occurrence. INZAG shall provide MINTRANS a Safety Flash prior to close of business on the day of the incident within an agreed timeframe. INZAG's HSE Manager will also disclose the information regarding accidents, incidents and near misses occurred on site through the Daily Safety Dialogues.

On a monthly basis, INZAG will report the following to MINTRANS:

- totals of all incidents that occurred;
- status of open incident investigations;
- total of incident investigations actions open;
- total of overdue investigation actions;
- total of reviews undertaken to verify the effectiveness of close out actions.

keep the regulatory authorities informed of the Project performance with respect to HSE matters by way of written status reports and face-to-face meetings. INZAG will prepare a report on environmental and social performance and submit it to MINTRANS. The frequency of this reporting will be agreed upon between INZAG and the MINTRANS.

If required, INZAG will provide appropriate documentation of HSE related activities, including internal inspection records, training records, and reports to the relevant authorities. Contractors are also required to provide HSE performance reporting to INZAG on a regular basis through weekly and monthly reports. These will be used as inputs to the above.

Subcontractors must send the data to INZAG's safety team every month, by the 6th of the following month: the number of workers, the hours worked, and the number of accidents

All engagement activities throughout the life of the Project will be documented and appropriately stored to track and refer to records when required and ensure delivery of commitments made to stakeholders.

The following stakeholder engagement records and documentation will be used:

- Meeting Template: Used to collect full meeting minutes to be captured within the stakeholder Engagement Log. It will capture the date and time of every meeting, the attendees (disaggregated by gender), topics of discussion, any photos taken and any decisions or commitments made. This information will be entered into the Stakeholder Engagement Log within 48 hours of each engagement.
- Stakeholder Database (Appendix I): A database of all Project stakeholders (individuals and groups) will be maintained throughout the life of the Project. The database should include contact information (name, contact number, email address, and affiliated stakeholder group).
- Stakeholder Engagement Log (Appendix P): All engagements with stakeholders should be recorded using information from the meeting template to provide high-level tracking of engagements taken to date. Where detailed information on a specific engagement is required, the Stakeholder Engagement Log may be cross-referenced with archived meeting templates.
- Grievance Register (Appendix M): All grievances received will be recorded in a Grievance Log / Register in order to document progress in resolving them, to identify patterns, avoid recurrent problems and improve INZAG's overall social performance. Grievances are to be addressed as per the requirements included in the Grievance Management Procedure.

The ESMP (Table 7.3) prepared in order to capture mitigation measures and management actions that have been identified in the impact assessment, and deemed to be technically feasible, financially and institutionally viable.

- ESMP includes the need for the development of a fit for purpose Environmental and social management system (ESMS), as well as for the development of the Proponent's sustainability or HR policies or of EPC requirements.
- ESMP includes a list of specific management plans that will be developed prior to construction and operation (Section 7.8.3). The requirements under the Environmental, Health, And Safety General Guidelines – Occupational Health and Safety will be observed.
- The ESMP allocates responsibilities for the implementation of environmental and social measures to Project qualified personnel that will have the knowledge, skills, and experience necessary to perform their work, including current knowledge of the host country's regulatory requirements and the applicable requirements of Performance Standards 1 through 8. The ESMP will also suggest personnel training programs on environmental and social issues to ensure the personnel will perform the actions in a competent and efficient manner.
- The ESMP also includes the need to develop an External Communications Protocol as well as a Grievance Mechanism for Affected Communities and Project workforce.
- ESMP and SEP (Section 5) describe the strategy around periodic reporting process to the Affected Communities that describe progress with implementation of the Project Action Plans on issues that involve ongoing risk to or impacts on Affected Communities and on issues that the consultation process or grievance mechanism have identified as a concern to those Communities.

ESMP will also be focused on the following elements (in full compliance with IFC PS2): Human Resources Policies and Procedures, Working Conditions and Terms of Employment, Workers' Organizations, Non-Discrimination and Equal Opportunity, Retrenchment, Grievance Mechanism, Child Labor, Forced Labor, Occupational Health and Safety, Workers Engaged by Third Parties, Supply Chain.

7.9.10 Summary of Management Measures

The summary of management measures for the Project is presented in Table 7.3

Table 7.3 ESMP Table

Aspect Activity	Management Measure	Timing	Responsibility	
Quarries, Borrow Pits and Dumpsites	 An E&S due diligence will be conducted by INZAG on the aggregate suppliers' quarries to ensure permits are valid and operations are in compliance and international guidelines. Relevant suggestions will be made to improve current standards of the quarry and quarries will be monitored frequently. In case new quarries, new borrow pits and dumpsites outside of the RoW alignment are needed, the application and approval procedures will be in line with Angola regulations and Project E&S requirements. The following actions that will be taken by INZAG within the approval process to avoid potential E&S risks: INZAG will develop an Aggregate and Surplus Material Management Plan (AgSMMP) which will include:	Prior to and Throughout construction	INZAG	
Excavation Surplus Material	Re-use of excavated soils in the Project area as far as possible and seek alternative uses of surplus spoil w here practicable (eg landscaping and earthw orks for other projects) to minimise the requirements for off-site disposal. The aim will be to achieve a balance of cut and fill material as far as possible. INZAG will consider "0" net surplus material target during the design phase to avoid the w aste generation.	Throughout construction	INZAG	

Construction Resources and Waste Management

 The demarcation of spaces for the temporary storage of non-reusable w aste electrical and electronic equipment will be carried out using appropriate methods. Contaminated w aste is stored in containers specially designed for this purpose, separating them according to the contaminating material. The means of containerization must be placed in w aterproofed places, preferably covered and correctly marked. The fundamental principles of CDW management will be the prevention of the production of this w aste and its dangerousness by reducing the incorporation of hazardous substances during construction, as well as the use of sorting, if possible at source, and systems of reuse, recycling and other forms of recovery, to reduce the quantity and the dangerousness of the w aste to be eliminated. The sorting operation is especially important in this w aste stream, since its efficiency largely depends on the possibility of recovering the various resulting w aste streams, such as wood, glass, plastic, ferrous metals and non-ferrous and inert w aste. When on-site sorting is not possible, the w aste is sent to the appropriate final destination. The project provides for the reuse of excavated materials destined for landfill and the disposal of excess materials in specific locations. 	
If the CDW is contaminated with hazardous substances, it will be disposed of in the same way as the contaminating material.	
For Municipal Waste:	
 The spaces intended for the temporary storage of the organic and recyclable fractions of USW will be demarcated using appropriate methods. Municipal wastes are stored in recycling bins for selective deposit according to its characteristics and nature (glass, paper/cardboard, wood, metal, non-recyclable organic waste). The collection and final destination of municipal solid waste will be provided by the municipal system in the area where the construction site is located. The recyclable fractions (paper/cardboard, glass, metal and packaging) will be sent to recyclers. If municipal solid waste is contaminated with hazardous substances, it will be disposed of in the same manner as contaminating material 	

Traffic Management				
Aspect Activity	Management Measure	Timing	Responsibility	
Routing, Access and Scheduling	 Plan routes and timing for unusual/ wide loads (if required) in advance with the relevant authorities and obtain the appropriate permit for the use of public roads. Generally, schedule truck deliveries outside of the peak traffic hours. Consult with relevant authorities to agree on specific routes for use by construction traffic to avoid any sensitive residential areas and unsuitable parts of the road netw ork. Communicate with authorities and affected communities (including emergency services and public transport providers) about road closures, lane closures, and diversions. Restrict the circulation of delivery and employee vehicles to defined routes and areas, giving preference to 'one-w ay' circulation, w here appropriate. Implement Design Change Management Procedure if any new access road construction will be required that is not included in Section 2, Project Description. Establish and enforce speed limits within construction areas and along delivery routes. Use signs (reflective signs and/or flashing lights for night), traffic cones and positioning of flag persons to indicate road w orkin progress and to inform and w arn equipment operators and w orkers. Install and maintain w arning and directional signage to notify road users of lane closures, road closures and diversions. Prior to the commencement of construction, establish detours and if necessary construct temporary bypass lanes for road closures. Maintain access to existing land uses, buildings and facilities along the project footprint during construction. 	Prior to and Throughout construction	INZAG	
Road Repair	At the conclusion of construction for each of the five overpasses, repair roads used for construction traffic if Project truck traffic has damaged road surfaces.	Near the end of construction period	INZAG and MINTRANS	
Vehicle Standards	 Equip trucks with speed governors or on-board GPS, and/or monitor vehicle speed and location. Require scheduled, preventative vehicle maintenance according to manufacturers' recommendations for all Project vehicles, whether ow ned by Project or a contractor. Require completion of a vehicle safety checklist daily prior to vehicle operation on public roads. Provide uniform in-vehicle communications systems that enable contact with truck traffic controllers and other drivers. 	Throughout construction	INZAG	
Driver Standards	 Use only drivers with the required driving license. Enforce driver qualifications and training for all drivers, whether employees or contractors. Include requirements in applicable contracts. Establish and enforce a driver training program specific to the vehicles, roads, and risks encountered for the particular tasks. Define rest and break standards that comply with industry and national standards. Structure contracts with truck contractors to avoid incentives for speeding or insufficient fatigue break. To the degree permissible by law, require daily or periodic drug and alcohol testing for all drivers. 	Throughout construction	INZAG	

Traffic Management			
	To the degree allow ed by law, enforce driver quality through loss of jobs or contracts for individual drivers for drug or alcohol offenses, chronic or egregious speeding, or other notable or repeated unsafe behaviours.		

Air Quality				
Aspect Activity	Management Measure	Timing	Responsibility	
Aspect Activity Construction Dust Management	Air Quality Management Measure Communications Display the name and contact details of the person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information. Site Management Record all dust and air quality complaints in the GM, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. Make complaints log available to the local authority where asked. Where possible, hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and PM emissions are minimised. It is important to understand the interactions of off-site transport/deliveries which might be using the same strategic road network routes. Monitoring Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the inspection log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary <td>Tim ing Prior to and throughout construction</td> <td>Responsibility</td>	Tim ing Prior to and throughout construction	Responsibility	
Management	 Carry out regular site inspections to monitor compliance with the DMP and record inspection results. Make the inspection log available to relevant local authority if asked. Increase the frequency of site inspections by the person(s) accountable for air quality and dust issues onsite w hen activities with a high potential to produce dust are being carried out and during prolonged dry or w indy conditions. Preparing and Maintaining the Site Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period. Avoid site runoff of w ater or mud. Keep site fencing, barriers and scaffolding (if applicable) clean using wet methods. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. 	construction		

 Cover, 	seed	or fence	stockpiles	to	prevent w ind w hipping.
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Operating Vehicles/Machinery

- Impose and signpost a maximum-speed-limit of 25 km/h on surfaced and 15 km/hh on unsurfaced haul roads and w ork areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, w here appropriate).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- If possible, ensure an adequate water supply on the site effective dust/PM suppression/mitigation. Where possible and appropriate use non-potable water.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Measures Specific to Demolitions

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allow ed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

	Ensure bulk cement and other fine pow der materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.			
	For smaller supplies of fine pow er materials, ensure bags are sealed after use and stored appropriately to prevent dust.			
	Measures Specific to Track Out			
	Use water/binding agent-assisted dust sw eeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sw eeper to be continuously in use.			
	Avoid dry sw eeping of large areas.			
	Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport.			
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.			
	Record all inspections of haul routes and any subsequent action in a site logbook.			
	Install hard surfaced haul routes (w here possible), w hich are regularly damped dow n w ith fixed or			
	mobile sprinkler systems, or mobile water bow sers and regularly cleaned.			
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)			
	If using wheel washing system, ensure there is an adequate area of hard surfaced road between the			
	w heel w ash facility and the site exit, w herever site size and layout permits.			
	Access gates to be located at least 10m from receptors where possible.			
	At receptor locations that are closest to the flyovers, measures to reduce air pollution at these properties should be considered. This includes:			
	 Microplanning of road layouts to maximise separation distance, noting that at this scale even a few metres can improve air quality. 			
Operation Traffic	 Where crossings and/or traffic lights are to be used, adjust these to minimise queuing traffic on the roads closest to receptors. 	During operation	MINTRANS	
	 Provision of ventilation into buildings the from non-roadside of a building, and sealing windows roadside. 			
	• Regular maintenance of roads to minimise potholes and maintain a clean road surface.			

Climate Change					
Aspect Activity	ManagementMeasure	Timing	Responsibility		
Site personnel	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). It should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk: Analyse observational records of the seasonality and intensity of average and maximum temperatures within the Project region to inform the construction phase start date (in order to limit the exposure of site personnel to extreme heat events during the construction phase). Ensure that the impact of extreme heat conditions on site personnel is factored into any newly developed or existing H&S (and emergency) management plans associated with the Project. These plans could provide guidance for site personnel to follow during both the construction and operational phases of the Project (for example, stop work procedures could be implemented for site personnel if key temperature thresholds are exceeded). If this guidance is appropriate and follow ed by site personnel, this could also act to reduce the potential materiality of the impacts posed by extreme heat to site personnel (and the Project). These plans associated with the Project. These plans could provide guidance for site personnel to follow during both the construction any newly developed or existing H&S (and emergency) management plans associated with the Project. These plans could provide guidance for site personnel to follow during both the construction and operational phases of the Project (for example, these plans could highlight evacuation routes, assembly points, and contact information for emergency services). If this guidance is appropriate and follow ed by site personnel, this could act to reduce the potential negative impacts	Prior to construction	INZAG		
Access routes and overpasses	Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). How ever, it should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the client could further assess and manage this risk:	Prior to construction	INZAG		

	Assess and consider the resilience (to extreme heat conditions) of the materials that the overpasses and consider results (concentrated with the Dreight) are due to be with form		
	 Undertake a more detailed (and forw ard looking) assessment of the risk posed by extreme winds to the Project. The results of this assessment could be used to inform the Project's design. Ensure that the impact of extreme wind conditions is factored into any new ly developed or existing H&S (and emergency) management plans for the construction and operational phases of the Project. This could include plans and responses to enable a return to normal capacity in the most effective w ay possible follow ing disruption caused by storms. 		
	 Introduce w ind breaks on the overpasses to reduce the risk of toppling for tall vehicles. Develop a w ater management plan to ensure the supply of clean/safe w ater for the Project. This w ould help the Client to ensure that a consistent and sufficient supply of freshw ater is maintained throughout the construction phase of the Project to ensure hygiene/sanitation standards are upheld. Examples of considerations w ater management plans could take are listed below : Consider alternative freshw ater sources to ensure that the freshw ater supply is maintained throughout the Designt 		
	 Invest in water efficient technology, procedures, and training to reduce the Project's demand for freshwater during the construction phase of the Project. 		
	- Engaging with the local municipality to understand how they manage the supply of freshwater. This could help guide the Client on instances where they might need access to alternative		
	 Monitor the overpass locations during the construction phase of the Project to gather information on any potential impacts of water stress and drought. If not done already, the Client could investigate how water stress and drought could impact the land surrounding the overpasses, and the overpasses themselves (e.g. soil subsidence and erosion). The findings of this investigation could be used to inform the Projects design (to reduce the materiality of this risk). 		
Cement, concrete and asphalt production and laying	 Based upon this risks potential to cause material impacts to the Project, it is recommended that the Client undertakes a more detailed assessment of extreme heat conditions in relation to the Project (and its associated assets and operations). It should also be noted that the implementation of mitigation measures/management plans could potentially reduce the materiality of this risk in relation to the Project. Below are a series of examples of how the Client could further assess and manage this risk: Investigate daily maximum temperatures in more detail to identify if high temperatures are projected to impact the materials used in the construction and/or operational phases of the Project. Consider organising the laying and curing of concrete during cooler periods of the year (e.g., July). This could reduce the potential materiality of this risk in relation to the Project. Investigate the use of alternative overpass construction materials during the design phase of the Project which is less w ater -ntensive as well as using low -w ater cement production processes. 	Prior to construction	INZAG

Construction activities	 Consideration of flood-related issues within the Project's construction plans/systems (e.g. in the event of a flood, implement temporary flood protection measures and provide personal protective equipment to site personnel). Consideration of the most appropriate w ay to store construction equipment/generators, to reduce their exposure to damage from flooding (e.g. shelter equipment from rain/flooding and store equipment at higher elevations). Issues to be considered within operational plans/systems include ensuring that drains, gutters, and stormw ater channels are clear of obstructions to reduce the risk of flooding. 	Construction	INZAG
Site personnel	Issues to be considered within operational plans include establishing a system for the advanced w arning of potential rainfall and flood risks, and ensuring that drains, gutters and stormw ater channels are clear of obstructions	Operation	MINTRANS

Noise Management			
Aspect Activity	Management Measure	Timing	Responsibility
Mitigation of Noise from Traffic During the Operational Phase	The road surface shall be regularly maintained to keep it in good condition.	Prior and during construction	MINTRANS
		After construction	
Construction	 Where practicable noisy equipment will be sited as far aw ay as possible from NSRs. Where practicable noisy equipment will be orientated to face aw ay from the receptors at which moderate or major noise impacts are predicted. Construction contractors will use alternatives to audible reversing alarms, such as visual and/ or broadband noise emitting models, that provide a safe system of work; or configuring the Project work sites to maximise forw ard movements of mobile plant. Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable. Where practicable, stationary equipment will be located in an acoustically treated enclosure. Throttle settings will be reduced and equipment and plant turned off, when not being used. Onsite chutes and bins will be lined with damping material. Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked. Equipment will not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified. Use of compressors, generators and pumps fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use. Fitting of mufflers or silencers of the type recommended by manufacturers. For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also that the doors close properly against the seals. Although significant vibration impacts are not expected during construction, in the unlikely event that significant sources of vibration (e.g. piling and blasting) are required, the follow ing measures will be taken: buildings located within 50 m will be identified ahead of construction works. Sensitivity of the identified building and building occup	Prior to and during construction	INZAG

Noise Management			
Aspect Activity	Management Measure	Timing	Responsibility
	 methods should be developed to avoid damage occurring. Where disturbance due to vibration is likely, the method will be review ed as far as practicable. Documentation of the current structural status/conditions for each of the identified buildings will be prepared. This will include photographs of building structures sensitive to vibration and results of the sensitivity evaluation; Monitoring of vibration on commencement of relevant activities to ensure that the Angolan requirements are met. If the standards are exceeded additional measures will be taken to reduce vibration and if necessary altering the methods of working to use equipment that creates low er levels of vibration. Instead of using secondary blast, hydraulic hammers or other mechanical methods will be preferred to improve rock fragmentation and minimize fly-rock risks. Hammers will be shielded by noise screens in order to avoid significant increase in noise impacts on villages situated in the vicinity; Delayed, micro-delayed, or electronic detonators will be used to reduce individual charge mass to safe limits where possible. Where construction noise levels are likely to result in significant effects (ie exceed the criteria set out in this ESIA for more than one month at any individual noise sensitive receptor), further mitigation measures, such as the use of 3 m noise barriers or adjusting working methods will be crosidered where practicable and likely to be effective. Training in noise control procedures and equipment operation will be provided to the relevant personnel. A summary of applicable noise criteria that relate to relevant work practices and nearby receptors will be developed. This summary will be shared in the environmental aw areness training and made available/accessible so that all site operators can quickly reference noise information. Where practical, natural topography or use of buildings / structures or temporary noise barriers (e.g. trucks or machines oper		

Noise Management			
Aspect Activity	Management Measure	Timing	Responsibility
	Where these mitigation measures are not adequate, a voluntary scheme for noise insulation will be considered for major noise impacts at the affected receptors.		
Construction Traffic	 Where practicable, Project traffic routing through community areas will be avoided and the implementation of speed limits for all construction vehicles. Slow driving rules in villages (e.g. 30km/h), particularly near identified sensitive receptors. Where feasible and reasonable, mobile plant parking near residences and other sensitive land uses will be prohibited. Moreover, exclusion zones where the offloading of Project equipment / materials from trucks is not permitted will be established. The informal use of truck honking systems will be prohibited (especially when in or passing residential areas or schools) and will only be used to prevent vehicle / pedestrian collision. Monitoring will be carried out during construction to confirm the modelling results and more importantly to verify and evaluate mitigation in areas where noise may be impacting sensitive receptors (i.e. adapt management plans and construction methodology to minimize impacts). 	Prior to and during construction	INZAG
Mitigation of Noise in Construction Accommodation Areas	 Where practical, natural topography or use of buildings / structures or temporary noise barriers will be used to form a noise barrier betw een the construction site and any noise sensitive receptors. The working time of construction yards will be during daytime hours only except such times that additional night work shifts are required. Should additional work shift be required this will be timeously communicated with nearby residences. 	Throughout construction	INZAG
Mitigation of Noise at Quarries and Borrow Pits	Since INZAG will not have direct responsibility at third party quarries, a due diligence will be undertaken to ensure that the management of these sites complies with Angola legislative requirements.	Prior to and during construction	INZAG
Operation	 Noise barriers adjacent to the road; Reducing traffic speed; Insulation of nearby building structures (typically consisting of window replacements). 	Operation	MINTRANS

Surface and Groundwater Management			
Aspect Activity	Management Measure	Timing	Responsibility
Project Planning	 Project programme should plan for construction activities to occur during the dry season, w here possible. A stormw ater management system will be designed to ensure surface w ater runoff rates and volumes do not substantially increase over the baseline. Suitable measures should be incorporated into the stormw ater drainage design to dissipate energy within surface w ater runoff before flow s reach the existing stormw ater management infrastructure. Pollution control devices should be incorporated into the surface w ater drainage design for the roads and overpasses to remove mobilised pollutants. The additional ground paved area will be designed to be minimal compared to the existing paved area to minimise the reduction of recharge area to the underlying aquifers. Management and maintenance of the stormw ater flow s. Project elements will be located to minimize risks to important sources of groundw ater and to ensure surface w aters and w ater supplies are not impacted. Where impacts cannot be avoided, appropriate technically and financially feasible mitigation measures will be developed, such as new groundw ater wells and diversions of irrigation channels to maintain the functionality of the systems during construction period. 	Prior to construction	INZAG
Water Availability and Vulnerability	 Engagement will be conducted with the local community to verify the registered and unregistered wells (including hand dug wells) surrounding the water resources used by the Project to ensure that local wells and boreholes are not negatively affected. Pre-construction drainage should be implemented to ensure construction activities, prior to the installation of a formal drainage system, do not substantially increase surface water runoff volumes and flood risk. Any earthw orks should ensure localised depressions are not created, to prevent ponding of stagnant water during periods of prolonged and heavy rainfall. Suitable measures should be taken to dissipate energy within surface water runoff before flow s reach the existing stormwater management infrastructure. A suitable maintenance schedule should be implemented to ensure drainage structures are cleared on a regular basis to enable the free flow of surface water and prevent overland exceedance flows. 	Prior to construction	INZAG
Groundw ater volumes	During the construction phase water will be supplied by a 3 rd party provider. The source of that water is not know n. In the light of responsible water management, it is recommended that this source be confirmed with the provider. Should the water be sourced from the groundwater resource, then proof of sustainability should be requested.	Construction	INZAG

Surface and Groundwater Management			
Aspect Activity	Management Measure	Timing	Responsibility
Groundw ater quality	It is recommended that the drainage structures be cleared on a regular basis to ensure free draining. This will prevent overspilling onto unpaved areas where the contaminated runoff can pond and enter the soil and eventually the groundwater resource.	Construction	INZAG
Runoff from construction site to surface w ater course	 Pre-construction drainage should be implemented to ensure construction activities, prior to the installation of a formal drainage system, do not substantially increase surface water runoff volumes and flood risk. Stormwater management of construction sites will be planned in advance and implemented to separate clean and dirty water systems to avoid the transport of contaminants and sedimentation into aquatic systems. 	Prior to construction	INZAG
	 Earthw orks should ensure localised depressions are not created, to prevent ponding of stagnant water during periods of prolonged and heavy rainfall. Drainage from excavations will be collected and settled to remove suspended materials prior to discharge in accordance with required permits. Where practicable, local perimeter drains will be constructed around working areas to collect suspended run-off and direct it to a system of settlement basins before discharge in accordance with required permits. All facilities and structures will be regularly inspected and maintained to ensure proper and efficient operation at all times, and especially after heavy rainfall. Sediment deposits will be regularly removed and disposed of either by spreading on site (if uncontaminated) or at a suitably licensed facility. Spoil and soil storage areas and open stores of construction materials will be designed and managed to control loss of sediments into run-off by minimizing the length and angle of slopes. The size and duration of exposure of areas of open ground will be kept to a minimum. Protection measures to prevent soil erosion after the finalisation of the earthw ork will be implement ed w here required such as: use of grass turf to cover the soil surface; use of erosion-control blankets or mats; renaturation as soon as feasible. 	Throughout construction	INZAG
Pollution Prevention	Personnel with responsibility for hazardous substances should receive spill prevention training. No untrained staff shall be allow ed to handle hazardous substances.	Prior to construction	INZAG
	 All reasonable measures will be taken to minimise the risk of causing adverse impacts to surface and groundwater quality in the Project's Area of Influence. These measures include: Proper storage, handling, and disposal of waste; 	Throughout construction	INZAG

Surface and Groundwater Management				
Aspect Activity	Management Measure	Timing	Responsibility	
	 Appropriate treatment of w astew ater discharged from the project activities to meet legislated discharge standards in Angola; Conformance with spill prevention, control, and containment management measures. Safe Fueling and Gasoline Handling Guidelines will be developed in the construction areas. No fueling of vehicles or equipment will take place within excavated areas. If heavy equipment cannot be moved to appropriate fueling points, an impervious surface (such as a drip-tray) will be used for refueling this equipment to prevent accidental releases to groundw ater aquifers. An Emergency Response Plan (ERP) will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS guidelines (IFC, 2007) for handling spills of hazardous materials including fuels that will be handled during construction works. All facilities and structures will be regularly inspected and maintained to ensure proper and efficient operation at all times, and especially after heavy rainfall. Sediment deposits will be regularly removed and disposed of either by spreading on site (if uncontaminated) or at a suitably licensed facility. Waste and any other product containing hazardous chemical substances (i.e. fuel) will not be stored near surface water features. Excavated materials will not be dumped into surface water features, nor will they be stored in their proximity, to avoid any increase of the turbidity levels. For industrial drainage network: The wastewater disposal networks comply with the local legal requirements; The network routes all the effluents produced in the industrial facilities to the treatment system; The treatment system has sufficient capacity for the quantity of effluent to be treated; The etfluents, after treatment, comply with the limit values set by the legislation in force; The sudge resulting from the settling of effluents is subject to a drying process, then deposited i			
Dew atering of Construction Sites	Sustainable road drainage and stormwater management practices will be implemented and maintained in accordance with international guidelines (such as the South African National Roads Agency Drainage Manual) to minimize impacts of road drainage on surrounding water resources.	Throughout construction	INZAG	

Surface and Groundwater Management				
Aspect Activity	Management Measure	Timing	Responsibility	
Flooding	 Calculation of surface w ater runoff rates and volumes will be undertaken to inform stormw ater drainage design. Pre-construction drainage should be implemented to ensure construction activities, prior to the installation of a formal drainage system, do not substantially increase surface w ater runoff volumes and flood risk. 	Prior to construction	INZAG	
	 Calculation of surface w ater runoff rates and volumes will be undertaken to inform stormw ater drainage design. Any earthw orks should ensure localised depressions are not created, to prevent ponding of stagnant w ater during periods of prolonged and heavy rainfall. Assessment of flooding conditions after heavy rainfall events to be carried out to determine efficiency of w ater conveyance systems. A suitable maintenance schedule should be implemented to ensure drainage structures are cleared on a regular basis to enable the free flow of surface w ater and prevent overland exceedance flow s Suitable measures should be taken to dissipate energy within surface w ater runoff before flow s reach the existing stormw ater management infrastructure. Engagement will be conducted with the local community to verify the registered and unregistered w ells (including hand dug w ells) surrounding the w ater resources used by the Project to ensure that local w ells and boreholes are not negatively affected. Stormw ater management of construction sites will be planned in advance and implemented to separate clean and dirty w ater systems to avoid the transport of contaminants and sedimentation into aquatic systems. 	Throughout construction	INZAG	
	 A suitable maintenance schedule should be implemented to ensure drainage structures are cleared on a regular basis to enable the free flow of surface w ater and prevent overland exceedance flow s Assessment of flooding conditions after heavy rainfall events to be carried out to determine efficiency of w ater conveyance systems. 	Operation	MINTRANS	
Economy and Employment				
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Aspect Activity	Management Measure (s)	Timing	Responsibility	
Temporary direct and indirect employment opportunities (primarily unskilled)	 INZAG has a Project Specific Human Resources Management Plan, as well as Contractor and Subcontractor Management Plan. INZAG (or the relevant contractor or subcontractor) will: Work with local authorities and employment organisations to ensure that all positions are advertised in a manner that is accessible to the communities in the Aol. Ensure that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender. Develop specific measures to facilitate access to employment of women and youth. Provide clear information on the number and limited timescales of employment opportunities. Ensure information on the employment and the procurement strategies is disclosed at all communities within the Aol. Engage with stakeholders through early, inclusive dialogue to build a shared understanding of the potential positive and negative impacts of workers influx, and the associated risks and opportunities. Continuing to engage local people in the employment opportunities and work with suppliers to enable capacity building, procurement, employment and contracting opportunities at a settlement-level, as part of maximising the positive benefits. A Community Grievance Management Procedure (as set out in the SEP) will be implemented to ensure that individuals who have concerns or complaints about the Project or wish to report their potential expectations or concerns related to local economy and employment can communicate directly with the Project. Furthermore, regular, transparent engagement with the local communities and other stakeholders will help with managing expectations around employment opportunities and benefits. 	Prior to and throughout construction	INZAG	
Temporary economic impacts from taxes and fees, procurement and w orker spending	 A Local Content and Procurement Plan will be developed to inform the Project's in-country value planning, specifically, with respect to the employment potential for multiple positions and the local provisioning potential through local suppliers from the area, concretely: As part of the tendering process, INZAG's contractors will be required to develop a purchasing strategy that stipulates how national and local purchase of goods will be optimised. The purchasing strategy will be required to adhere to all INZAG HSE policies and procedures. Agreed measures will be monitored and reported on; INZAG will enhance national supplier capacity through a comprehensive demand and supply analysis; phased capacity building program; targeted training agreed with local government and other organisations; INZAG will implement a phased capacity building programme (sector by sector) that will enable local companies to achieve qualifications and potentially certification with the relevant standards and requirements w ell in advance of the tendering process; 	Prior to and throughout construction	INZAG	

Economy and Employment				
Aspect Activity	Management Measure(s)	Timing	Responsibility	
	 INZAG will engage with local government, and other organisations to determine opportunities for targeted training; Any selected potential suppliers will have to meet health, safety and quality standards; and Follow ing selection of primary contractors, INZAG will carry out training of contractors on the Project HSE and socioeconomic and health policies prior to the start of construction. 			
Long-term benefits of capacity enhancement (on- the-job and formal training opportunities)	 The Local Content and Procurement Plan will include the following: INZAG will carry out training of contractors on Project Health and Safety Requirements (aligned with internal INZAG HSE Management Plan) and socioeconomic policies prior to the start of construction activities and during operations when needed; and To maximise capacity enhancement and transfer of know ledge to local contractors and their employees, INZAG will develop formal training programs and formalise on-the-job trainings to the extent possible, including learning targets and performance monitoring. 	Prior to and throughout construction	INZAG	
Benefits from improvements to infrastructure services including road and rail	 It is recommended that MINTRA NS ensure that the physical integrity of the flyover infrastructure is maintained in the long-term, and ensure that public health and safety is continued, including aspects such as monitoring mobile trader, pedestrian and vehicle use of the flyovers to prevent accidents and injury, and interruptions to traffic flow. It is also recommended that INZAG and MINTRA NS develop an operational ESMP and specify these mitigation measures in any hand over agreements. 	During operation	MINTRANS	

Land, Households	and Livelihoods
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Aspect Activity	Management Measure(s)	Timing	Responsibility
Displacement of houses, small and medium-sized businesses and associated livelihoods	■ Implement Resettlement Action Plan (RAP)	Prior to construction	INZAG
Displacement of mobile traders and taxi's	Implement Resettlement Action Plan (RAP)	Prior to construction	INZAG
Permanent loss of livelihoods and household income	 Impacts during the operations phase will be managed by INZAG although the operator will be MINTRANS. Mitigation measures will include the following: Responsibilities will include monitoring and providing the necessary follow -up to support households to restore their livelihoods throughout the operations phase; and 	During operation	MINTRANS

Land, Households and Livelihoods			
Aspect Activity	Management Measure(s)	Timing	Responsibility
due to permanent land use changes	The grievance mechanism established during the construction phase will be maintained during operations to ensure that local communities and stakeholders have an adequate channel to voice concerns.		

Community Health, Safety and Security			
Aspect Activity	Management Measure(s)	Timing	Responsibility
Road safety & traffic accidents (construction phase)	 Implementation of a community Grievance Redress Mechanism, and information about this mechanism will be shared amongst local communities, specifically: Contractor/s will be responsible for managing a grievance mechanism that allow s communities and employees to raise complaints; The grievance redress mechanism will be implemented prior to commencement of the construction phase, with all relevant staff fully cognisant of their roles in the grievance resolution process so that quick and effective response is provided to the concerns raised by local stakeholders; and A comprehensive stakeholder engagement process will be carried out to liaise with stakeholders (relevant authorities and project affected communities) with regards to road safety issues and undertaking coordinated action regarding design solutions (e.g. pedestrian crossings). INZAG will develop a Traffic Management Plan that will include the follow ing in addition to the requirements listed at Section 6.4.7: Drivers of Project vehicles will be trained / briefed about safe driving with respect to other drivers, and pedestrians; Advance warning will be given of proposed road diversions and closures; Project vehicles to be identifiable to the Project (e.g. an easy to read / see sign or symbol on vehicles which show s that they are connected to the Project); and Address how the Contractor can reduce the exposure of vehicle drivers, their passengers and other road users from the hazards of road-related accidents. INZAG should develop and implement an Incident/ Accident Manage Plan and procedure. 	Prior to and throughout construction	INZAG
Road safety & traffic accidents (operation phase)	 During operations, MINTRANS will maintain the Grievance Redress Mechanism that will remain accessible to all communities. It is recommended that formal sites be developed for taxi and mobile traders using flyovers as trading areas. 	During operation	MINTRANS

Community Health, Safety and Security			
Aspect Activity	Management Measure(s)	Timing	Responsibility
	It is also recommended that INZAG and MINTRANS develop an operational ESMP and specify these mitigation measures in any hand over agreements.		
Unauthorised public access and injury	 As part of the SEP, INZAG will undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto construction sites, the meaning of signs, the dangers of playing on or near equipment or entering fenced areas. This will include: Presenting site restrictions and management protocols (including the Grievance Redress Mechanism) to the local community during public meetings and at local schools (where possible) within the immediate Aol of each flyover. As part of the community meetings INZAG will present on other issues such as construction methods and skills required to work in construction to provide benefits. Records of the meeting and attendees should be kept. Consideration of vulnerable groups, specifically children. Children are particularly vulnerable to traffic danger and trespassing, as they are less likely to receive road safety education as they do not all attend school and are often unsupervised, particularly if they are working as street vendors and are exposed to hazardous road and construction risks. Special posters and culturally appropriate signs will be provided. INZAG will ensure that signs are put up around work fronts and construction sites advising people of the risks associated with trespassing. INZAG should develop and implement an Incident/ Accident Manage Plan and procedure. 	Prior to and throughout construction	INZAG
Environmental health	As part of the SEP implemented by INZAG, aw areness sessions will occur to explain the type of noise, dust and emissions from Project activities, their mitigation measures and a point person to contact in case of emergency. INZAG will also implement the community Grievance Redress Mechanism. Refer to Sections 6.2.1, 6.2.2 and 6.4.7 for additional mitigation measures relating to air quality, noise and traffic respectively.	Prior to and throughout construction	INZAG
Increased transmission of communicable diseases	 NZAG has developed a Workers Accommodation Plan and Occupational Health and Safety Management Plan that will include: The Workforce Code of Conduct detailing specific living and working conditions which will contribute to reduce the risks of disease transmission into the community as well as a worker grievance mechanism. The Code of Conduct shall expressly prohibit sexual interactions of any kind with underage persons. The Contractor will regularly monitor interactions between the community and workers both in public spaces in the communities. 	Prior to and throughout construction	INZAG

Community Health, Safety and Security			
Aspect Activity	Management Measure (s)	Timing	Responsibility
Aspect Activity	 Management Measure(s) Workforce, including contractors and subcontractors, will be provided with health aw areness training, including a significant briefing of hygiene practices (such as hand w ashing), implementation of educational outreach to increase aw areness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the communicable diseases of concerns (including STDs). Pre-employment screening protocols will be conducted for all employees including contractors and subcontractors which will include testing for TB and other diseases appropriate to World Health Organisation (WHO) recommendations and including vaccinations. Workers will be provided with primary health care and basic first aid at worksites. Regular medical check-ups and centralised medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided. NZAG will offer all workers including contractors and subcontractors, receive education around STDs including transmission routes and symptoms. The training will include specific content regarding STD prevalence rates in Angola and/ or the relevant Regions, expectations of local communities if a woman is made pregnant (e.g. marriage, financial implications, etc.) and law penalties for sexual assault. NZAG will extend the Worker Code of Conduct to include guidelines on worker – community interactions. NZAG will provide training on the worker code of conduct to all employees including contractors and subcontractors approace. 	Timing	Responsibility
	INZAG will provide free condoms and femidoms to all workers at camps and accommodation and at entry/exit points of camps.		
	 INZAG will develop an STD Management Plan designed to minimise the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A typical plan would include, among others, the following measures: An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs to employees, through workshops, posters and informal information sessions; Encouragement of employees to determine their HIV status; and Supply of condoms/ femidoms at the construction site(s)/ Construction Camps. 		
	INZAG will partner with other non-governmental organisations (NGOs) and community based organisations (CBOs) to support the provision of information, education and communication campaigns around safe		

Community Health, Safety and Security				
Aspect Activity	Management Measure(s)	Timing	Responsibility	
	sexual practices and transmission of STDs. These activities should be focussed in locations where construction camps are located or where drivers rest.			
	INZAG will consult with local leaders such as village elders among others. The consultations should be aimed at finding ways of ensuring social vices such as prostitution are minimised either through punitive measures for clients, in particular Project workers, or rehabilitative measures for the commercial sex works.			
	■ INZAG will also develop and implement a Community Health and Safety Plan, which will include:			
	A full and thorough review of the community health, safety, and security risks associated with the Project activities and mitigation measures. This review will focus on community risks (rather than occupation worker risks).			
	INZAG will develop a Community Health and Safety Management Plan.			
	INZAG will undertake a health facility assessment of medical infrastructure as part of the INZAG Health and Safety Management System to determine if facilities have sufficient resources and equipment.			
	INZAG will ensure that there is sufficient resourcing (including emergency staff, equipment, and funds) to extend any required health and safety plans to cover the INZAG activities and any affected communities.	Prior to and		
	INZAG will monitor the emergence of major pandemics through WHO alerts. When the WHO Pandemic Alert Scale reaches Level 4, INZAG will implement the relevant emergency response.			
health care	An Emergency Preparedness and Response Plan (EPRP) will be developed by INZAG, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Project construction. The EPRP will include, among other topics:	throughout construction	INZAG	
	The emergency response activities in the event of fire, accidents, earthquake, flood etc.;			
	Procedures for INZAG staff, contractors and subcontractors to report any incidents or incidents and the investigation and preventive actions taken:			
	Regular emergency response training for all INZAG, contractor and subcontractor personnel, including in the use of response equipment; and			
	 Emergency Communication Procedure demonstrating how local communities and authorities will be notified of any emergencies, the procedures they need to follow and any training/ emergency drills that will be performed. 			
	A Security Management Plan will be developed and implemented by INZAG, including the following	Prior to and		
Use of security personnel	 Training will be provided to security personnel. Training and security arrangements will be based on the Voluntary Principles for Security and Human Rights which are international best practice. This involves, 	throughout construction	INZAG	

Community Health, Safety and Security			
Aspect Activity	Management Measure(s)	Timing	Responsibility
	 for example, the selection of security contractors based on a careful background screening of security forces, their training with regards to human rights and a careful monitoring of their services. INZAG will make security arrangement transparent to the local communities and consult regularly with them about the impact of arrangements on communities. Violation of INZAG's policies, procedures and required standards will result in corrective actions, including termination of sub-contracts with security firms. Sufficient training including clear instructions on the objectives and the permissible actions will be provided to the security personnel. The instructions will be based on the relevant Angolan law and will be communicated as terms of employment and reinforced through periodic professional training. Given regular contact with the local populations, training on Grievance Redress Mechanism, such as handling of community grievance will also be provided to the security staff as part of their periodic professional training. Complaints by the public (or other workers) with respect to behaviour of security personnel can be made via the Grievance Redress Mechanism. As part of the SEP, INZAG and contractors will have an engagement meeting with chiefs and traditional leaders informing about the safety management. INZAG will engage with public security services on a regular basis to asses security risks, monitor, and evaluate security and human rights arrangements. INZAG will any call Angolan police and/or military services in a situation involving a level of threat the security provider is not able to deal with (such as armed intruders). INZAG will only call Angolan police and/or military services in a situation involvement and take appropriate actions to mitigate those risks, follow ing these considerations: The likely scenarios where they may be involved; Their locations/postings; Their locations/postings; The		
Prevention of construction traffic accidents	 Develop and implement a Traffic Management Plan including consideration of: Safe w orksite layouts; Delivery routes to and from project construction sites considering community safety as w ell as traffic impacts. Vehicle safety equipment standards (e.g. seat belts and first aid kits); Driving rules (e.g. speed limits, hours of driving, required breaks, carrying passengers and use of mobile phones/ radios); 	Prior to and throughout construction	INZAG

Community Health, Safety and Security				
Aspect Activity	Management Measure(s)	Timing	Responsibility	
	 Driver qualifications and selection (e.g. defensive driving courses, accident history and 'practical' interview s to test skills); Driver education and training (aw areness raising, information on required standards and review of incidents); Vehicle inspection and maintenance (in line with manufacture requirements for vehicle roadw orthiness and Project standards); Accident/ incident reporting and investigation; and Disciplinary procedures. Develop and implement an Emergency Prevention and Response Plan (EPR Plan) Develop and implement a Hazardous Materials Management Procedure Conduct an ongoing traffic safety aw areness campaign and training during the construction period, in communities near the five overpass construction sites. Establish and implement traffic incident reporting and investigation procedures that include identification of corrective measures to reduce the risk of similar occurrences 			

Labour and Working Conditions					
Aspect Activity	Management Measure(s)	Timing	Responsibility		
Labour and working conditions / workers' rights)	 INZAG has developed a Project-specific Human Resources Management Plan, Code of Conduct, Workers Accommodation Plan, Workers Grievance Mechanism and Subcontractor Management Plan to ensure the follow ing: Access to clear and understandable information regarding worker's labour and working conditions; Provision of reasonable working conditions and terms of employment; Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects; Implementation of a grievance mechanism for the Project workers including subcontractor workforce; Retrenchment preventive measures will be implemented to reduce adverse impacts as a result of termination of contacts which will consider benefits to boost workers employment opportunities post construction where possible. Notice of dismissals will be done in due time and will manage employment expectations of the construction workforce; 	Prior to and throughout construction	INZAG		

Labour and Working Conditions				
Aspect Activity	Management Measure (s)	Timing	Responsibility	
	 No employee or job applicant will be discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation; All workers will, as part of their induction, receive training on worker rights in line with Angolan legislation to ensure that positive benefits around understanding labour rights are enhanced; All workers (including those of contractors and subcontractors) will be able to join unions of their choice and have the right to collective bargaining; All workers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights; Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights; As part of the contractor and supplier selection process NZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Angolan law, international standards and INZAG policies; INZAG will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with Angolan law through gap analysis and capacity building; Contractor contracts will establish the right for INZAG monitoring and auditing of all contractors and subcontractors is or clauses in the contract. Contractor contracts will be entry work of an Environmental and Social Management System. As such, key performance indicators will be developed around worker rights, discrimination and management, worker rights, health and safety as outlined in Angolan law and ILO international standards; As part of the contractor and supplier selection process. NZAG will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Angolan law and ILO international standards; As part of the contractor and supplier selection process. NZ			

Labour and Working Conditions			
Aspect Activity	Management Measure (s)	Timing	Responsibility
	 The Project ESMS and applicable standards will be put as contractual commitments in all subcontractors and contractors' contracts; and During the operations phase, MINTRANS will maintain all provisions of the existing Workers Management Plan in line with Angolan regulations. MINTRANS will maintain a Worker grievance mechanism that will be accessible to all w orkers, w hether permanent or temporary, directly or indirectly employed. Contractors and sub-contractors will be required to put in place a w orker grievance mechanism. The MINTRANS w orker grievance mechanism shall be open to the contractor and subcontractor w orkforce in the event that their grievance is not adequately resolved by their direct employer. MINTRANS w ill then have the authority to act to resolve this grievance. 		
Worker Health and Safety	 INZAG has developed an Occupational Health and Safety (OHS) Management Plan, Incident/ Accident Management Procedure, Workers Grievance Mechanism and Subcontractor Management. The OHS Management Plan will be enforced throughout the Project including all Project personnel (including direct hire employees, advisors and consultants, contractors and sub-contractor personnel). It will include aspects such as regular training and monitoring, as well as inspections and audits. Within the OHS Management Plan, INZAG will ensure the following measures are included: Identification and provision of personal protective equipment (PPE) to all concerned workers during activities to avoid health implications (e.g. dust masks, protective clothing for handling waste materials etc.); Pre-employment screening protocols for all employees including contractors and subcontractors which will include medical checks for symptoms TB and other diseases appropriate to WHO recommendations, the individual's country of origin and vaccinations; Workers will be provided with primary health care and basic first aid at worksites; All work of persons under the age of 18 will be subject to an appropriate risk assessment and regular monitoring of health, working conditions, and hours of work; Regular medical check-ups and centralized medical treatment for all workers of the Project (INZAG, contractors and subcontractors) will be provided; and Workforce, including contractors and subcontractors, will be provided with health aw areness training, including hazardous works, a significant briefing of hygiene practices (such as hand washing), implementation of educational outreach to increase aw areness of major communicable disease and how to protect against infection and about transmission routes and the symptoms of the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and subcontractors and subcontractors and subcontractor	Prior to and throughout construction	INZAG

Labour and Working Conditions			
Aspect Activity	Management Measure(s)	Timing	Responsibility
	selection process INZAG will take into consideration performance with regard to worker health and safety as outlined in Angolan law, international standards and INZAG policies. Any appointed contractors should establish their ow n Emergency Response Plan and communicate key information to the Project workforce prior to work commencing on any site.		
Child labour and forced labour in the supply chain	 The Project-specific Human Resources Management Plan, Code of Conduct and Subcontractor Management Plan will ensure the follow ing: INZAG will oversee if suppliers, contractors and subcontractors comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards; Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers; In all contractor contracts the Project will make explicit reference to the need to abide by Angolan law and international standards in relation to child labour and forced labour; and Contractors and subcontractors will need to monitor closely the potential existence of irregular forms of child and forced labour in the supply chain. Action measures and notice to INZAG will be carried out immediately if this is found. 	Prior to and throughout construction	INZAG
Worker health and safety	Operations phase will be led by the MINTRANS, following its internal management frameworks. It is recommended for MINTRANS to implement a specific Occupational Health and Safety (OHS) Plan other than an overarching policy.	During operation	MINTRANS

Access to Infrastructure and Services			
Aspect Activity	Management Measure(s)	Timing	Responsibility
Temporary loss of access and/or increased pressure on social services and utilities	 A Public Utilities Enhancement Plan will be developed by INZAG that ensures that infrastructure improvements made during construction (access roads, electric and water supplies, telecommunication, etc.) contribute to the physical and economic development of local communities in the study area. This will improve the quality of life and social inclusion of the neighbouring communities. Infrastructure relocated by the Project (electric and telecommunication lines, water supply and irrigation pipes, etc.) will be developed in a way that allow s neighbouring communities to benefit from 	Prior to and throughout construction	INZAG

Access to Infrastructure and Services			
Aspect Activity	Management Measure (s)	Timing	Responsibility
	 them after construction is over. Special attention will be paid to the settlements located in semi-urban and rural areas with poor access to infrastructure and services. The Public Utilities Enhancement Plan will be developed in close coordination with local utilities companies, authorities at the regional and local level and communities to ensure the appropriateness of the relocation and improvements. Diversion routes have been planned as part of the construction plan (refer to Section 2.3.3), which will direct traffic onto alternative routes through parallel road and access Catete Road at different intersections. According to INZAG, upgrades to these roads will be made to ensure they can cope with the additional traffic, how ever, the current version of the Project design does not provide detailed information about the planned improvements of diversion roads. INZAG shall develop a Traffic Management Plan which will include a wide range of measures such as stakeholder engagement before temporary closure and diversion of the roads, appropriate signage, requirements in case a new access road needs to be built, etc. INZAG will liaise and engage with local authorities and utilities companies to ensure continuity of supply to communities. Only short term "planned" disruption to drinking water or electricity services will be allow ed. INZAG will work with local utilities companies to ensure coordinated and rapid response to unplanned events such as damage to electric lines and water pipes. CLOS will be present at workfronts to ensure that impacts from planned disruptions are minimised and that unplanned disruptions are properly managed. Grievance Redress Mechanism will be in place ensuring rapid response time and access to a compensation process should unplanned disruption result in loss of livelihoods that could not otherw ise be avoided. 		
Benefits from improvements to infrastructure and services including road improvements	 The following enhancement measures will be considered to maximize the positive outcomes that will stem from the improvement of the infrastructure and service and road improvement quality: The Public Utilities Enhancement Plan developed by INZAG will continue to bring access to improved telecommunication lines, water supply and irrigation pipes, etc. to neighbouring communities, specially to the settlements located in semi-urban and rural areas with poor access to infrastructure and services. 	During operation	INZAG & MINTRANS

Com m unity Cohesion			
Aspect Activity	Management Measure(s)	Timing	Responsibility
Disturbance from presence of w orkforce	 Implement a comprehensive engagement programme in the project area, building on the SEP, stating: Communication will be based on the principle of transparency and clarity, clearly explaining the selection process and criteria. Ongoing dialogue betw een the Project, through its Community Representatives (CR) and local communities to assist in information sharing regarding employment practices and the use of non-local staff. Local communities to be provided information on the number of non-locals to be brought to the area, their housing arrangements, and the measures that the Project is putting in place to ensure that all workers abide by local customary practices. Information will also be shared on the number of local unskilled and semi-skilled positions available to local residents, along with the recruitment methods used to identify potential candidates. Relevant Project information in particular those related to environmental and socioeconomic impacts, employment and project benefits will be disclosed at the local level in a manner that is accessible, understandable, and culturally appropriate for those affected. This will be facilitated by the Community Representatives (CR) employed for the duration of construction activities. The CLO will proactively and regularly engage with local stakeholders prior to commencement of construction activities, providing updates and answ ering their queries. The CLO will be present on the ground during the whole construction process and available to the affected communities. The aim of this is to ensure that all working practices are transparent and any issues between local residents and non-local working ractices are communicated and dealt with early on. A Project Grievance Redress Mechanism will be developed and implemented, and information about this mechanism will be shared with local communities. The Contractor will also be responsible for managing a grievance mechanism that allows communities and employees to raise complaint	Prior to and throughout construction	INZAG
Community severance	 A Severance Management Plan with a detailed assessment and measures to mitigate community severance in each of Aols should be developed by INZAG. Stakeholders should be liaised with regarding the Plan (i.e. relevant authorities and project affected communities) and informed about identifying severance issues and undertaking coordinated action regarding design solutions (e.g. alternative routes and relocation of mobile traders). 	Prior to and throughout construction	INZAG
Unmet Expectations of Benefits	 Communities will be continuously and transparently engaged by the Project and regularly updated on Project activities. Information disseminated during these meetings will emphasise the limited nature of employment and the recruitment processes. A Grievance Redress Mechanism will also be in place. 	Prior to and throughout construction	INZAG

CommunityCohesion			
Aspect Activity	Management Measure(s)	Timing	Responsibility
Loss of access to communal resources and infrastructure	 The final Project design will include access for vehicles and pedestrians to move safely over the railway. The high volumes of mobile traders using some of the sites currently could be permanently displaced or create new informal marketplaces which could have public health and safety impacts in the future. It is recommended that INZAG and MINTRANS develop an operational ESMP and the MINTRANS continue to implement the project community Grievance Redress mechanism. It is recommended that these mitigation measures be specified in any hand over agreements. 	During operation	MINTRANS

Cultural Heritage Management			
Aspect Activity	Management Measure	Timing	Responsibility
General Management	 A programme of comprehensive walk-over reconnaissance (Field Survey) by archaeological specialists of all proposed areas of ground works to support avoidance and minimisation of impacts through detailed design development and to identify any suspect areas; Operation of a Chance Find Procedure to address construction phase heritage impacts in accordance with international standards; Public involvement, access and sharing of information (with due consideration of the need for keeping certain site-specific information confidential, as per international common practice). 	Prior to and throughout construction	INZAG
Disturbance to Cultural Heritage	 Development of a Cultural Heritage Management Plan, to include: Detailed required mitigation measures for all cultural heritage sites across the scheme, tangible and intangible. Protocols for liaison with local communities where issues such as working on holy or sacred days or crossing sacred rivers without the performance of rituals may cause offence; Grievance mechanisms and access protocols for local communities in relation to heritage sites; Programme and monitor site-specific mitigation along the scheme, including those already identified; Outline stakeholder engagement with the relevant authorities will be undertaken to the present the construction activities and the authorities' sensitivity to noise and likely success of potential noise mitigation measures. Liaise with the Angolan National regulator to agree a strategy for archaeological mitigation; Detail pre-construction archaeological investigations (agreed with the GMINB), to identify, investigate and scientifically remove any archaeological deposits encountered by the development; A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with national and international requirements and guidelines. Access arrangements will be made to the satisfaction of the local communities which will allow them to use the pilgrimages unrestricted. Cultural heritage Management Plan should be in place before construction begins. 	Prior to construction	INZAG
Provision of Cultural Heritage Training	The Project will establish a Cultural Heritage Training Programme for all field staff. The objective of the Cultural Heritage Training Programme is to manage potential impacts to know n and unknow n cultural	Prior to and throughout construction	INZAG

Cultural Heritage Management			
Aspect Activity	Management Measure	Timing	Responsibility
	 heritage sites by facilitating the identification and reporting of potential Chance Finds encountered during construction works. The programme will consist of training; <i>Chance Finds</i> tool box talks/training for field staff; and the development of reference materials such as fliers, signage, and educational posters to be posted in the Construction Camps and facilities. The plan should cover: Defining Chance Finds; Identifying Chance Finds in the field; Local sensitivity to damage to cultural heritage resources; Sensitivity of cultural heritage sites to looting and legal penalties for looting or the destruction of cultural heritage sites; Chance Finds reporting procedures; and The consultation process with local and national stakeholders and regulatory agencies. 		

Cum ulative Im pacts			
Aspect Activity	Management Measure	Timing	Responsibility
Cumulative Impacts	 It is understood that the Project fall within the responsibility of the Ministry of Transport. Two other analyzed projects are under the control of the same ministry: The Luanda Light Rail project is controlled by the Ministry of Transport; Road and rail traffic from and to the Luanda International Airport is controlled by the Ministry of Transportation. The aforementioned organizations involved in the implementation of the projects should take into account the follow ing: Application of a hierarchical mitigation methodology (i.e. Avoid, Minimize, Compensate) of the environmental and social impacts management generated by different Projects on the key VECs discussed. Though no specific additional mitigations have been assessed as needed, in all cases, the key aspect would be of considering the present cumulative impact management framework. Consideration that other operators be included as stakeholders in the Project Stakeholder Engagement Plan (SEP) and vice-versa. Cumulative impacts cannot be managed at a single project level, therefore means of communication must be established betw een Project operators and 	Prior to and throughout construction and during operation	MINTRANS

Cum ulative Im pacts			
Aspect Activity	Management Measure	Timing	Responsibility
	government agencies in order to undertake collaborative approach tow ards implementation of collective management measures.		
	Cumulative impact management would be led by government entities that have direct influence on proponents, in order to identify the contributions of each actor and establish the mechanism to handle the cumulative effects.		

Spill Prevention and Contamination Management				
Aspect Activity	Management Measure	Timing	Responsibility	
General Management	 Prior to introduction to site, a hazardous material / substance will be review ed, and proper storage, handling and transportation procedures and spill risk analysis will be established. The bulk loading and unloading of hazardous materials and fuels will be confined to areas that are provided with secondary containment and in line with hazardous material handling procedures. Maintain an inventory of all dangerous and hazardous goods onsite, together with all relevant Safety Data Sheets (SDS) for all contaminants on-site. These will include human health effects of chemicals handled and will be included in the required chemical environmental and safety training for all employees handling or otherw ise exposed to the contaminants. All appropriate personal protective equipment, handling and response procedures will also be identified in the SDS or otherw ise recommended by the suppliers / manufacturers and follow ed by all Project staff. Implement the land contamination notification procedure in case unexpected encounter of contaminated soils during construction. The procedure shall include the follow ing: Photograph the construction site and take dow n the names and statements of the people w ho w ere present during the discovery of the contamination. Preserve the site as best as possible. Do not do anything to cover-up or change the physical terrain immediately surrounding the site w here contamination w as discovered. 	Prior to and throughout construction	INZAG	
Storage of Hazardous Materials	 Implementation of a Hazardous Materials Management Procedure: Procedures for handling and storage of hazardous materials in accordance with manufacturer's instructions Register of hazardous materials and identification of dangers posed by hazardous materials within the Project site; Storage of fuels, oils and hazardous materials on a suitably sized impervious and bunded base and use of drip trays for fuelling; Training of on-site personnel on the presence, handling, transport and disposal of hazardous materials and on emergency response management; Provision of personal protective equipment (PPE) to staff w ho are required to handle certain chemicals; Protect public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odours, or other emissions. 	Throughout construction	INZAG	

Spill Prevention and Contamination Management				
Aspect Activity	Management Measure	Timing	Responsibility	
Spills and Clean-up	 Areas where spillage of soil contaminants occurs will be excavated (to the depth of contamination) and suitably rehabilitated. If any other minor spillage occurs, the spillage will be cleaned immediately and the contaminated area will be rehabilitated. All contaminated material will be suitably disposed of. Clean-up procedures will need to be fully recorded. Spill kits will be provided at any fuel or chemical storage location. Spill kits must be maintained. Designated and qualified staff designated for responsibility to respond to emergencies. A maintained emergency contact list will be placed at all spill response kit locations. Development, implementation and regular training and testing of a Project wide Spill Response Plan will be implemented. 	Throughout construction	INZAG	
Soil Management and Geological Stability	 Appropriate techniques will be implemented that will incorporate risk assessment before excavation and slope stability requirements to make sure that occupational and community safety risks are avoided. In regions where cut in natural soil is required, the side slopes of the cuts shall be 2 (horizontal): 1 (vertical) or flatter. Inspections will be carried out to identify areas where erosion is occurring as a result of construction activities. Such monitoring will be carried out on a daily basis during the rain seasons and on a periodically scheduled basis during the dry seasons. Should erosion events be identified, appropriate remedial action, including the restoration of the eroded areas, and where necessary, the relocation of the paths causing the erosion, should be undertaken. Surface water diversions should be installed around stockpiles so as to reduce risk of erosion during storm events. Berms on the dow nslope side of stockpiles should be created to minimize soil loss or spread. Minimise duration of topsoil stockpiles through implementing ongoing rehabilitation of works areas on completion of construction in each work area. Land clearance should only be undertaken immediately prior to construction activities taking place there. Unnecessary land clearance should be avoided. Unless foreign material such as aggregate needs to be inserted, after the installation of features requiring the excavation of a deep trench (viz. stormwater drainage pipes, services, etc.), soil should be replaced in the trench so as to mimic the pre-construction profile, (i.e.: subsoil placed at the base of the trench and topsoil above it, and should be compacted). Cut and fill slopes should be shaped and trimmed to resemble natural conditions, should not be excessively steep. Moreover, where the upper slope of cut face may erode, suitable stabilisation methods should be implemented. Prevent clogging of the drainage netw ork b	Throughout construction	INZAG	

Spill Prevention and Contamination Management				
Aspect Activity	Management Measure	Timing	Responsibility	
	 Revegetate the slopes after the end of construction to prevent the development of erosion (grass cover); Early construction of all drainage structures (i.e. culverts, sediment basins and catch drains). Grievance redress mechanism for the project to be implemented and communicated to all surrounding communities, where impacts of erosion to their livelihoods can be raised and addressed; 			
Operation	 Monitor and clean the drainage system to avoid clogging (once after the rain season); Replace the damaged drainage structures (check once a year after the rain season); In case the erosion processes develop, implement measures to cover the surface (e.g. install geomats, revegetate the bare slopes). 	Operation	MINTRANS	

8. LIMITATIONS

The following limitations have been considered during the preparation of this report:

- The Final Project design is currently not yet finalised, and this ESIA is based largely on the Project Design available at the Scoping Stage. Hence, the Project footprint is subject to potential changes as well as the definition of restrictions within the various corridors (e.g. construction footprint, buffer zone). Therefore, a general classification of the types and extent of displacement and livelihood impacts is included based on the initial remote sensing exercise through GIS as well as the outcomes of stakeholder engagement activities undertaken to date. The identification of structures at risk of being displaced relies primarily on the areas defined by BDM in Projecto Base Estudo de Traçado-Fase 01 (May, 2023). In case the Project footprint changes, the structures at risk shall be re-identified.
- INZAG is not responsible for operations and maintenance of the Project and the process of handing over ESMP and RFP responsibilities to MINTRANS after the end of the construction phase is not clear to ERM. INZAG thus can also not guarantee implementation of identified measures during the operation phase.
- ERM is of the view that the information gaps mentioned above do not materially affect the key outcomes and recommendations of the ESIA at this stage of the Project. In the event that any new information is obtained in future that may affect the ESIA results, the Design Change Management Procedure can be implemented to assess potential impacts and apply appropriate mitigation measures. Similarly, the SEP is a "living document" and can be adapted to new/revised information.
- The development of the social baseline was limited due to the availability of recent data. The last census conducted in Angola was in 2014. As a result, the data used to inform the baseline is somewhat outdated. However, best efforts were made to ensure that the most up-to-date data available was used in all cases. Additionally, data at the municipality and commune level was not readily available. If data was available, it was not necessarily accurate or of high quality (especially demographic data).
- There is little place for installation of the noise screens or landscape screening, therefore the noise mitigation measures might be limited.
- This document has been prepared based on publicly available data, secondary data, information provided by the Project and outcomes of the ESIA. The list of documents reviewed is presented in Appendices. ERM did not conduct a site visit as part of the Human Rights Risk Assessment nor was it possible to conduct interviews with any rightsholders / stakeholders. ERM relies on information obtained from INZAG and through the ESIA. ERM's findings are accurate and complete only to the extent that information provided.

Climate Change limitations and assumptions:

- This conducted assessment was desk-based, and was not based on any on-site visits, and thus assessments of the exposure of each asset are based upon information provided by the Client.
- The accuracy of any information provided by the Client has not been verified (for example design specifications, observational data provided etc.).
- This assessment uses CMIP6 Global Climate Models (GCMs). The IPCC's Assessment Report 6 uses this data to form conclusions about the current and future state of the world's climate. The data has been used in this assessment to assess current and future levels of risk associated with 9 climate hazards, each downscaled to a varying resolution. For example, Warm Spell Duration Index has a resolution of 55x55km, while river flooding has a resolution of 90x90m.

- This high-level screening exercise and its corresponding recommendations should not be considered as sufficiently detailed in the nature of its output for use within a lender's credit risk assessment associated with the proposed financing facility, or for the design of the Project.
- It should be noted that each risk materiality category that is assigned represents the inherent level of risk posed to the Project (as limited information has been provided regarding any mitigation/management measures that have been put in place to reduce the materiality of specific climate-related risks in relation to the Project).
- This report does not include an assessment of the potential impact of seismic activity (e.g. earthquakes) on the Project and its operations as these events are associated with, and induced by, seismic activity and therefore not considered a physical climate change event/hazard.
- A review of the Project's supply or full value chain has not been undertaken, and therefore there may be impacts not covered in this CCRA relevant to the Project.
- Climate data for this CCRA has been obtained for the coordinates detailed below. However, the average result of the five overpasses is presented within the climate data tables, reducing the granularity of the data used to inform the risk materiality categories.
 - SME (8°58'46.63"S / 13°29'37.55"E)
 - Viana (8°54'5.07"S / 13°22'8.69"E)
 - Estalagem (8°53'7.74"S / 13°20'37.44"E)
 - Mulenvos (8°52'2.24"S / 13°18'53.52"E)
 - 5th Avenue (8°51'22.31"S / 13°17'50.26"E)

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APPENDIX A ALIGNMENT TO IFC PS

PS	Торіс	ESIA Section
IFC PS1 - Assessment and Management of Environmental and Social	ESMS and Policy	Section 7.7 and Section 7.8.3
	Identification of Risks and Impacts	Section 6
Risks and Impacts	Project Description & Area of Influence	Section 2 and Section 2.6
	Associated Facilities	Section 2.4
	Alternatives	Section 2.13
	Cumulative Impact	Section 6.4.9
	Environmental and Social Management Plans (ESMP)	Section 7
	Organizational Capacity, Competency, Roles and Resp.	Section 7.9.1
	Emergency Preparedness and Response	Section 7.9.6
	Monitoring and Review	Section 7.9.9
	Stakeholder Engagement, Planning Consultation	Section 5
	Indigenous Peoples (IP)	Not applicable to current Project.
	External Communications & Grievance Mechanism	Section 7.9.7, Sections 5.4.3.5 and 5.4.4.5
	Ongoing Reporting to Affected Communities	Section 6.4.6
	Applicable Standards	Section 3
IFC PS2 - Labour and Working Conditions	Working Conditions and Mgmt of Worker Relationship	Section 6.4.4
	HR Policies and Terms of Employment	
	Workers' Organization	
	Non-Discrimination and Equal Opportunity	
	Retrenchment	
	Workers' Grievance Mechanism	
	Protecting the Work Force	
	Child and Forced Labour	
	Occupational Health and Safety	
	Workers Engaged by Third Parties	
	Supply Chain	
	WBG EHS Guidelines and relevant Sector Guidelines	Section 3.2

IFC PS3 - Resource Efficiency and Pollution Prevention	Resource Efficiency	Section 2.12	
	Greenhouse Gases (GHG)	Section 4.1.3	
	Water Consumption	Section 2.10.2	
	Pollution Prevention	Section 6.2.5 and 6.2.6 lists Incident Management Procedures with Spill related procedures	
	Air and Noise	Sections 4.1.2 and 4.1.4 list the baseline related to Air and Noise, sections 6.2.1 and 6.2.2 and list the impact assessment	
	Waste	Section 2.10.4.4 describes the waste categories and quantities and Section 6.2.6 presents the waste impact assessment.	
	Hazardous Materials Management	Addressed in Section 6.2.6	
IFC PS4 - Community Health. Safety and	Community Health and Safety	Section 6.4.3	
Security	Infrastructure Design and Equipment	Section 2.7.1	
	Hazardous Materials Management and Safety	Addressed in Section 6.2.6	
	Ecosystem Services	Ecosystem services screening indicates limited interaction of Project activities with any relevant provisioning and cultural service.	
	Community Exposure to Disease	Section 6.4.3	
	Emergency Preparedness and Response	Section 7.9.6	
	Security Personnel	Section 6.4.3	
IFC PS5 - Land Acquisition and	Project Design	Section 2.7	
Involuntary Resettlement	Compensation and Benefits for Displaced Persons	Addressed by RPF prepared by ERM	
	Community Engagement	Section 5	
	Grievance Mechanism	Section 7.9.7, Sections 5.4.3.5 and 5.4.4.5	
	Resettlement and Livelihood Restoration Planning	Addressed by RPF	
	Displacement		
	Physical Displacement		
	Economic Displacement		
IFC PS6 - Biodiversity Conservation and	Appropriate Impact and Risk Assessment	Considering the urban nature of the Project area. It is expected that no sensitive flora/fauna is to be present within the Project's Aol.	
Sustainable Management	Protection and Conservation of Biodiversity		
of Living Natural Resources	Modified / Natural / Critical Habitat	Location of associated facilities (i.e. borrow pits outside of the Luanda province) are not located within or near potential critical habitat areas	
	Legally Protected and Internationally Recognized Areas		

	Invasive Alien Species Management of Ecosystem Services	Ecosystem services screening indicates limited interaction of Project activities with any relevant provisioning, cultural service.
	Sustainable Management of Living Natural Resources	
IFC PS7 – Indigenous Peoples	All topics	Not applicable to current Project.
IFC PS8 Cultural Heritage	Protection of Cultural Heritage in Project Design	Section 6.4.8
	Chance Find Procedures	Not applicable
	Consultation and Community Access	To be addressed in ESIA.
	Removal of Replicable Cultural Heritage	Not applicable
	Removal of Non-Replicable Cultural Heritage	Not applicable
	Critical Cultural Heritage	Not applicable
	Project's Use of Cultural Heritage	Not applicable

APPENDIX B SCOPING MATRIX
	Physical Environment										
	Air	Noise		Land and	i Waste		V.	ater	CC	Landseap	and Visual
	Pollutants, Particulate, Odour	Noise and Vibration	Geology and Soil Structure	Soil Contamination	Landform	Besources and Vaste	Hydrogeology	Hydrology	Climate Change Resilience	Lighting	Visual Intrusion
Construction		1							10		1
Employment of personnel	-	1							î.)		1
Physical presence of workers						5		6	e .		
Labour contracting											
Effect on current power and water supply	1								1		
Procurement of Materials and Services (exci. Aggregates)	2	(A							1		
Vegetation clearing											
Earthworks (surplus removal, grading, embankment and trenching)	\$	- 1		1		(8)	0.00				1. E
Construction works of Project related initiastructure	8	5	8	5	1	8	(i	(0)	() (C)	(P)	S
Borrow pits, quarries, orushing plants, batch plants, asphait plants, etc.	5	8	8	5	14 - C.	s		1.05			
Vaste disposal (Surplus material, hazardous vastes, domestic wastes, etc.). No incineration.	5	1		5		8		1	1		1
Construction traffic	s	3								(
Land acquisition (temp. And perm.)									\$) #)	-	2
Removal of existing intrastructure (water pipelines, electrical lines, etc.)	š	- 5	i	- T		\$			\$.		1
Retrenchment of workforce									17		
Operation				9							100 C
Workforce											
Local inhabitants									1	(P	
Road traffic	P	P							5 B	P	F
Waste disposal				P		P.	19 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	1			
Road Maintenance	1	P		· · · · · · · · · · · · · · · · · · ·					R	0	P
Presence of new Infrastructure								3	S RE L		1.81
Unplanned/ Accidental Events (Contruction)											
Generation of leaks and splits		1		S		S	9		2		
Natural Events (Rires, opciones, storm surge)	1. I.								S		
Road Accidents	8			1			2		1		
Explosion Risk (generators, industrial facilities, public infrastructures removal - water & power)	8	s			1	8.	<u> </u>	1.003	1		
Unplanned/ Accidental Events (Operation)											
Generation of leaks and spills	-			1		(条)					
Natural Events (lines, cyclones, storm surge)									6	1	
Road Accidents	i 1)	1			3	1

Table 9.1 Scoping Matrix - Physical Environment

	Biological Environment								
	Habitats			FI	ora	Fa	una		
	Relevant Habitats	Ecological Conectivity (Regional Level)	Protected Areas [Secred Forests]	Relevant <i>Tasa</i>	Invasive Sp.	Relevant Tara	Feral Pests	Supply chains & Businesses	
Construction		2				S			
Employment of personnel								P	
Physical presence of workers							i i i i i i i i i i i i i i i i i i i	P	
Labour contracting								Р	
Effect on current power and water supply									
Procurement of Materials and Services (excl. Aggregates)								P	
Vegetation clearing		<u> </u>							
Earthworks (surplus removal, grading, embankment and trenching)							Û.		
Construction works of Project related infrastructure									
Borrow pits, quarries, crushing plants, batch plants, asphalt plants, etc.	S			5		S		Р	
Waste disposal (Surplus material, hazardous wastes, domestic wastes, etc.). No incineration.	S			S		S	ti i	P.,	
Construction traffic								S	
Land acquisition (temp. And perm.)									
Removal of existing infrastructure (water pipelines, electrical lines, etc.)								1	
Retrenchment of workforce						1		s	
Operation									
Workforce		1							
Local inhabitants							P		
Road traffic									
Waste disposal	<u>(</u> 1			Û)		i i	P		
Road Maintenance					2. I			<u>_</u>	
Presence of new Infrastructure									
Unplanned/ Accidental Events (Contruction)		0							
Generation of leaks and spills									
Natural Events (fires, cyclones, storm surge)									
Road Accidents	ĺ								
Explosion Risk (generators, industrial facilities, public infrastructures removal - water & power).									
Unplanned/ Accidental Events (Operation)									
Generation of leaks and spills									
Natural Events (fires, cyclones, storm surge)									
Road Accidents									

		1				14				
		8	Economics							
	Supply chains & Businesses	Economy (Regional, National)	Primary industry Agriculture	Recreation & Tourism	Employment & income, including Gender related opportunities	Ecosystem Services				
Construction		1	S		2					
Employment of personnel	P	P			P					
Physical presence of workers	P	P			P					
Labour contracting	P				P					
Effect on current power and water supply										
Procurement of Materials and Services (excl. Aggregates)	P	P			P.					
Yegetation clearing										
Earthworks (surplus removal, grading, embankment and trenching)										
Construction works of Project related infrastructure					P					
Borrow pits, quarries, crushing plants, batch plants, asphait plants, etc.	P		1		P.					
Waste disposal (Surplus material, hazardous wastes, domestic wastes, etc.). No incineration.	Р	P			P					
Construction traffic	S	6	1							
Land acquisition (temp. And perm.)		10 J			S	6				
Removal of existing infrastructure (water pipelines, electrical lines, etc.)										
Retrenchment of workforce	S	S			s					
Operation										
Warkforce					t.					
Local inhabitants				P						
Road traffic	1	P		P						
Waste disposal						· · · · · · · · · · · · · · · · · · ·				
Road Maintenance		1			1					
Presence of new Infrastructure										
Unplanned/ Accidental Events (Contruction)	Í.	8	i j							
Generation of leaks and spills										
Natural Events (fires, cyclones, storm surge)										
Road Accidents	li		1							
$Explosion \ {\sf Risk} \ ({\sf generators}, {\sf industrial facilities}, {\sf public infrastructures removal - water} \ \& \ {\sf power})$										
Unplanned/ Accidental Events (Operation)										
Generation of leaks and spills			1							
Natural Events (fires, ojciones, storm surge)	0.									
Road Accidents										

Scoping Matrix - Social Environment (1/3)

Scoping Matrix - Social Environment (2/3)

Scoping Matrix												
	Social Environment											
	Himan Flights - To be	Severance	Physical Resettlement	Economic	Housing and	Community stability h	Education levels #	Aligratics	Increased sisk on	Diseases	Increased risk of	Vulnerable Groups &
	team			. Uniprocessorie	seconmousion	CORFEREN	annacy		Safety		flooding	analyrie ous Propas
Construction												
Employment of personnel			<u>4</u>		P	0	-		-			8
Physical presence of vorketz	10 - 10 - 11 - 11 - 11 - 11 - 11 - 11 -					100 C		10		6 1		¥
Labour contracting	(B))					1.					-	
Elect on current power and water mapping						(i) (ii)			3			
Procurement of Materials and Services (exol. Aggregates)						1 (0) ()						
Vegetation clearing												
Earthoeths (studyks removal, grading, embaritoment and trenshing)		5	8	8		1		1	8	1	5	
Construction works of Project related initiatmucture		1			1					1	1	
Borrow pits, quarries, muching plants, batch plants, asphalt plants, ato.		1.		1.					0			
Vaste disponal (Suplus material, hazardous wastes, domentic wastes, etc.) No incineration.	1			-		10 B	1		\$	1		
Construction traffic												
Land acquisition (temp. And perm.)	186			10 A								
Removal of existing initiatitucture (water pipelines, electrical lines, etc.)	1	5				. 0	-	6	1			
Petrenohment of workforce	8				1	1						8
Operation			- 100			5.						
Validarce	(I						-	· · · · ·		×		
Localithabitants	10	1				9	(······ * ···· · ·			
Boadmaillis		R				1 3			P			P
Vaste disposal	-		1						P			
Road Maintenance										_		
Prezence of new Initiastructure											2	
Unplanned/ Accidental Events (Contruction)	1			-		2 3			· · · ·			
Generation of leaks and spills									8	8		
Natural Events (Rives, cycliones, storm surge)		8.							9			
Road Accidents						S 8		2	5	5		
Explosion Risk (permators, industrial facilities, public intrastructures removal - water & power)					-			-	8	38		
Implanned/ Anxidental Events (Operation)	1					6						
Generation of lesks and spills									1	1		
Matural Events (lives, opulones, storm surge)		R:							10	1		
Road Accidents			- 2			2			. <u>1</u>	4		

Scoping Matrix - Social Environment (3/3)

Scoping Matrix							
		1	Vorkers and Labour				
	Cultual Heritage		Rights			Infrastructure	
	Tangible CH Inherited Patrimony	Intangible CH Inherited Patrimony	Child labour and forced labour in the supply chain	Capacity Building	Occupational H&S	Traffic and Transport (road)	Access to health care, power, water, severage / sanitation (teporary/permanent)
Construction		<u>, 1</u>			w.	10	
Employment of personnel			S				
Physical presence of workers			S	P			
Labour contracting			S				
Effect on current power and water supply							S
Procurement of Materials and Services (excl. Aggregates)							
Vegetation clearing							
Earthworks (surplus removal, grading, embankment and trenching)	s	S			s	S	1
Construction works of Project related infrastructure	S	S			S	S	U.
Borrow pits, quarries, crushing plants, batch plants, asphalt plants, etc.	S	S			S	1	S
Waste disposal (Surplus material, hazardous wastes, domestic wastes, etc.). No incineration.	S	ş	1		s		
Construction traffic	1				S	S	-8
Land acquisition (temp. And perm.)	S	S					1
Removal of existing infrastructure (water pipelines, electrical lines, etc.)	S	S		_	s	S	1
Retrenchment of workforce	1		S		· ·		
Operation			() 100				
Workforce			1	P	1		17
Local inhabitants		S				P	P
Road traffic		S			P	R	P
Waste disposal	s	s					-
Road Maintenance	S	S			î.		
Presence of new Infrastructure	S						
Unplanned/ Accidental Events (Contruction)							
Generation of leaks and spills					s	E.	
Natural Events (fires, cyclones, storm surge)					s	S	
Road Accidents					S	S	
Explosion Risk (generators, industrial facilities, public infrastructures removal - water & power)					s	S	
Unplanned/ Accidental Events (Operation)			ii				
Generation of leaks and spills					\$		
Natural Events (fires, cyclones, storm surge)					S	1	
Road Accidents					S	S	

APPENDIX C INZAG'S DESIGN CHANGE PROCEDURE

See PDF attached – Design Change Procedure

APPENDIX D DART TOOL

See Excel attached - DART Tool

APPENDIX E SUMMARY OF ENGAGEMENT ACTIVITIES UNDERTAKEN

Stakeholder engagement for the project is being undertaken using a staged approach in line with the various phases of its development as follows:

- Scoping phase engagement (completed);
- ESIA process engagement (still to be conducted); and
- Post ESIA engagement (i.e. during construction and operation).

Scoping Phase Engagement

Information disclosure about the Project with the involvement of government authorities took place in Luanda in the week of the 21st of November 2022. A total of seven meetings were held during scoping phase with local government stakeholders and these were attended by representatives from BDM, ERM and INZAG. The aim of the meetings was to present the proposed project concept, approach to the ESIA and provide stakeholders with an opportunity to raise any issues or concerns and ask any questions. At each meeting, a brief presentation was given by INZAG that introduced the Project.

The complete list of meetings organised is presented below in Table 9.3 below. No stakeholder engagement activities were carried out with the potentially affected communities. The minutes of the meetings can be found in **Appendix J**.

Stakeholder	Date	Location	Mode of Communication	Total No. of Participants
INEA (National Roads Institute) & DNIU	22/11/2022	Ministry of Public Works, Urbanism, and Housing	Face to face	8
Cazenga Administration & National Land Transportation Agency	23/11/2022	Municipal Administration of Cazenga	Face to face	11
Viana Administration	23/11/2022	Municipal Administration of Viana	Face to face	16
Ministry of Environment	24/11/2022	Ministry of Environment	Face to face	8
National Land Transport Agency, National Director for the Economy of Concessions, Ministry of Transport, Ministry of Environment, INEA, Viana Administration	25/11/2022	Ministry of Transport	Face to face	29
Ministry of Environment	02/12/2022	Ministry of Environment	Face to face	9
Provincial Government of Luanda (GPL)	07/12/2022	Provincial Government of Luanda	Face to face	12

Table 9.3 List of Scoping Meetings

Source: ERM, 2023

Comments Raised During the Scoping Phase

Stakeholders had a general very positive perception of the Project and most had knowledge about it. An overview of concerns and issues raised by stakeholders as part of the scoping exercise is provided in Table 9.4.

Table 9.4 Comments	Raised by	Stakeholders	During the	Scoping	Phase
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Themes	Concerns	Key Outcomes (Scoping Phase)
Project Execution time	Too long, as can cause inconvenience	We understand it might cause some inconvenience, INZAG will do the best to reduce by keeping up with the timing agreed with ANTT to conclude the project.
Training	Need for efficient training of national staff to create local jobs	Yes, it will be provided.
Below Overpasses	What will be done below the overpasses?	There will be a service road below the overpasses, that will serve as round about.
Access to Airport	 New Luanda Int'l Airport scheduled for 2023, Av. Deolinda Rodrigues is main access road to airport 	Attention to be paid to the times when the works will take place for the needs and positioning of detours to be discussed with local administrations.
Sidew alks	Pedestrian w alkw ays (to be further filled in)	There are pedestrian walkways foreseen in the design project.
Expropriation	Extremely important to several stakeholders	Close monitoring, working closely with local administrations, give enough time to carry out survey and registration of expropriations, respect Angolan national framework as well as standards of financing bank, community consultation council to be consulted.
Social Security	 Need for strategic approach highlighted during meetings by stakeholders given impacts of project 	Strategic approach will be guaranteed.
Mobility	 Need for strategic approach highlighted during meetings by stakeholders given impacts of project 	Strategic approach will be guaranteed.
KM 30 Overpass	Some stakeholders suggested that SME overpass to be initially replaced by the KM 30 Overpass. As well as in Viana, on the opposite side of the entrance to Suave.	KM 30 is considered to be the first overpass to be built in Phase 2 of the project by the Client, which is to start while Phase 1 is still ongoing.
Registration	 MINAMB: Project must be registered in SIA platform, Ministry of Transport is responsible. Deadline for analysis of registration is 5 days from registration date, EIS 30 days, analysis of licensing 38 days. 	Acknow ledged and the deadline will be considered in the timeline of the project.
Waste Management Plan	Need for WMP identified	MINAMB indicated this matter should be dealt with in a meeting with the National Waste Agency (ANR).
Criteria	Several stakeholders questioned the criteria used to define the 5 passages that comprise the first phase, as they believe they are other priority points such as Bungo station, entrance to Cazenga (along former FILDA), and entrance to São Paulo (where even in times of rain, a basin of water forms, making it difficult for locomotives to move).	Decision must come from Ministry of Transport.

Themes	Concerns	Key Outcomes (Scoping Phase)
Aw areness Program	Need for an aw areness program that could include residents 'committees, given the social impact, w as highlighted.	Aw areness programme will be prepared.
Urgency	Need to be more pragmatic in order to not lose funding	Acknow ledged.
Drainage	 Environmental concerns regarding impact of Project on drainage in surrounding neighbourhoods, as climatic events can aggravate existing situation 	BDM informed that this will be taken care in executive project, and project's drainage will be integrated into macro drainage system in the region.
Sellers on Railway	 Occupations of people selling products on the railw ay is an urgent concern 	The Local Municipality has already put into place a plan to accommodate all those sellers into a proper market with basic conditions.

Source: ERM, 2023

Key Informant Interviews During Baseline Data Collection

During the socio-economic baseline information data collection, three Key Informant Interviews (KIIs) were held with representatives of the Ministry of Transport (MINTRANS), the railwayoperator (CFL), Cazenga Municipality, Viana Municipality, Viana Commune, Kalawenda Commune, and Tala Hady Commune. These KII meetings were attended by representatives from BDM, ERM and INZAG.

The aim of these meetings was to gather municipality and commune level data. At each meeting, a brief presentation was given that introduced the project as well as the objectives of the meeting. This was followed by a question-and-answer session where ERM asked the participants a set of general questions about the project area, followed by questions about the project and data requests. The representatives from government present during the KII also took the opportunity to raise concerns and ask questions regarding the project. These comments are detailed in Table 9.5 below.

The list of KIIs is presented in Table 9.5 below. No stakeholder engagement activities were carried out with the potentially affected communities. The summary of the meetings can be found in Appendix K.

Stakeholder	Date	Location	Mode of Communication	Total No. of Participants
Ministry of Transport and CFL	31/05/2023	Ministry of Transport Offices - Luanda	Face to face meeting	14
Cazenga Municipality, Kalaw enda and Tala Hady Communes	01/06/2023	Cazenga Municipality	Face to face meeting	11
Viana Municipality and Commmune	01/06/2023	Viana Municipality	Face to face meeting	11

Table 9.5 Key Informant Interviews Held During Baseline Data Collection

Source: ERM, 2023

Comments Raised During the Key Informant Interviews

As with the Scoping Phase, stakeholders had a general very positive perception of the Project and most had knowledge about it. An overview of concerns and issues raised by stakeholders as part of the KIIs is provided in Table 9.6 below.

Stakeholder	Comments/ Questions	Responses
Cazenga Municipality, Kalawenda Commune, Tala Hady Commune	 Will there be pedestrian w alks alongside the flyovers to ensure the community can safely commute across the railways on foot? Who w ill be responsible for land expropriation? How advanced is the Social Impact Assessment? Will high voltage cables need to be relocated? Will the Municipalities and Communes be given the opportunity to review the project and impact assessments? 	The flyovers will include infrastructure for pedestrians. ANTT will be responsible for land expropriation. The social impact assessment is in the early stages with primary data collection occurring soon to inform the baseline of the assessment. Only medium voltage cables will need to be moved as well as some streetlights. The non-technical summary of the ESIA will be shared with the municipalities and communes.
Viana Municipality and Commune	It will be problematic if the flyovers do not account for pedestrians as the	The flyovers will have infrastructure for pedestrians.

 Table 9.6 Comments Raised During Key Informant Interviews

Stakeholder	Comments/ Questions	Responses
	crossing in Viana have high levels of pedestrian as well as vehicular traffic.	

APPENDIX F DEFINITIONS OF ALL CLIMATE HAZARDS INCLUDED WITHIN THIS ASSESSMENT

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
Hazard Extreme Heat Extreme Cold	Extreme heat is defined as a period of time w hen temperatures are much hotter and/or more humid than long-term averages. Because some places are hotter than others, this depends on w hat's considered average for a particular location at that time of year (WMO, 2021). Extreme cold is defined as a period of time w hen temperatures are much colder than long-term averages. Because some places are colder than others, this depends on w hat's considered average for a particular location at that time of year (WMO, 2021).	 that Climate Hazard Warm Spell Duration Index (WSDI): Baseline & Projections: The annual number of days contributing to unusually warmevents where six or more consecutive days experience a maximum temperature (TX) of greater than the 90th percentile of the historical averages for that time of year. Baseline period: 1985-2014 Unit: Days Cold Spell Duration Index (CSDI): Baseline & Projections: The annual number of days contributing to unusually cold events w here six or more consecutive days experience a minimum temperature (TN) of less than the 10th percentile of the historical averages for that time of year. Baseline period: 1985-2014
Riverine Flooding	Riverine flooding can occur over a wide range of river and catchment systems. Floods in river valleys occur mostly on flood plains or wash lands as a result of flow exceeding the capacity of the stream channels and spilling over the natural banks or artificial embankments (<u>WMO</u> , <u>2011</u>). High levels of rainfall and increased flow velocity often contribute to river flooding events.	 Unit: Days Riverine flooding inundation depth: Baseline & Projections: Baseline & Projections: The maximum inundation depth experienced within a 270mx270m area that is associated with a 1-in-500-year fluvial (riverine) flooding event. Baseline year: 2020 Unit: Metres
Extreme Rainfall Flooding	Extreme rainfall flooding occurs where high-intensity rainfall exceeds the capacity of the drainage systems. Intense rainfall over the urban area may cause flooding of streets and property in low -lying areas, in old waterways, underpasses and depressions in highways. Often such flooding is exacerbated by debris that clogs inlets to pipes and channels, or outlets of retention basins (WMO, 2011).	 Pluvial flooding inundation depth: Baseline & Projections: The maximum inundation depth experienced within a 270mx270m area that is associated with a 1- in-500-year pluvial (extreme-rainfall-induced) flooding event. Baseline period: 2020 Unit: Metres
Coastal Flooding	In coastal areas, storm surges caused by tropical cyclones, tsunamis or rivers sw ollen by exceptionally high tides can cause coastal flooding. Storm surges and high winds coinciding with high tides are the most frequent cause of this type of flooding. The surge itself is the result of the raising of sea levels due to low atmospheric pressure (WMO, 2011).	Coastal flooding inundation depth: Baseline: The maximum inundation depth associated with a 1-in-500-year coastal flooding event as a result of historical sea level rise, land subsidence, storm surges and/or high tide events. Projections: The maximum inundation depth associated with a 1-in-500-year coastal flooding event as a result of projected sea level

Climate	Definition	Climate Indicator Used to Represent
падаги		
		high tide events
		- Basoline vear: 2010
		- Unit: Metres
Tropical	The general term for a strong, cyclonic-	Maximum tropical cyclone wind speed:
Cyclones	scale disturbance that originates over	Baseline: The maximum sustained wind
	tropical oceans. Distinguished from	speed associated with being within 200 km of a
	weakersystems by exceeding a	tropical cyclone event.
	threshold wind speed. A tropical storm is	Projections: The maximum sustained wind
	a tropical cyclone w ith one-minute	speed associated with being within 200 km of a
	average surface winds between 18 and	tropical cyclone, based on cyclone basin-
	32 m s-1. Beyond 32 m s-1, a tropical	specific tropical cyclone projections generated
	cyclone is called a hurricane, typhoon or	using AR6 global mean surface temperature
	cyclone, depending on geographic	Projections.
	Simpson Hurrisono Wind Soalo is a 0	- Baseline period: 1980-2020
	(Tropical Storm) to 5 (High-Intensity	
	(Notices) categorization based on the	
	hurricane's intensity. The scale provides	
	examples of the type of damage and	
	impacts in the United States associated	
	with winds of the indicated intensity	
	(<u>NOAA, 2021</u>).	
Rainfall-	Landslides are local events and usually	Rainfall-Induced Landslide Index (RILI):
Landslides	unexpected. They occur when	Baseline & Projections: The annual number
	earthquake, heavy rain, rapid snow, ice	of days with a potential chance of a rainfall-
	melt or an overflowing crater lake loosens	induced landslide event. This index is
	vulnerable parts of the landscape on	developed using antecedent rainfall index
	of earth rock sand or mud flowing swiftly	(weighted summation of daily rainfall amounts)
	downslope Hillsides or mountain sides	faults deology forestloss and road
	that are bare or have had their vegetation	networks)
	cover degraded through clearance or by	- Baseline period : 1985-2014
	forest or brush fires may be especially at	- Unit: Number of days with a potential
	risk. They can reach speeds of over 50	chance of a landslide event
	km/h and can bury, crush or carry aw ay	
	people, objects and buildings (<u>WMO.</u>	
	2021). The Climate Impact Platform	
	focuses on assessing the risk of climate	
Wildfires	driven landslides, i.e., extreme rainfall.	
**iidiii 63	A wildfire is categorized as such by any	Maximum burned area:
	fire including management ignited	Baseline: The maximum area that has been burned by any fire type within a 20 km ² area
	vegetation fires that exceed the	- Baseline period: 1989-2018
	restrictions in the fire plan and require	- Unit: Square Kilometres (km ²)
	suppression actions (<u>UN, 2021</u>).	
	· · · · · · · · · · · · · · · · · · ·	Forest Fire Danger Index (FFDI):
		Baseline & Projections: The annual number
		of days with fire-permitting climatic conditions.
		This index is based on the McArthur Forest

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
		 Fire Danger Index (FFDI; widely used in Australia for several decades) and combines a record of dryness, based on rainfall and evaporation, with meteorological variables for wind speed, temperature and humidity. Baseline period: 1985-2014 Unit: Number of days with fire-permitting climatic conditions
Water Stress & Drought	Water stress is typically defined by water availability and use. Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use (EEA, no date). Drought is a prolonged dry period in the natural climate cycle that can occur anywhere in the world. It is a slow -onset phenomenon caused by a lack of rainfall (WMO, 2021).	 Water Stress: Baseline: Water stress measures the ratio of total w ater w ithdraw als to available renew able surface and groundw ater supplies. Water w ithdraw als include domestic, industrial, irrigation, and livestock consumptive and nonconsumptive uses. Available renew able w ater supplies include the impact of upstream consumptive w ater users and large dams on dow nstream w ater availability. Projections: Projected w ater stress estimates the future competition for w ater resources and is defined as the ratio of demand for w ater by human society divided by available w ater. Baseline period: 1960-2014 Unit: Categorical

APPENDIX G KEY CONSIDERATIONS AND SUPPORTING QUESTIONS WHEN CONDUCTING PHYSICAL CCRA'S – AS PER EP4 GUIDANCE³⁸

⁽³⁸⁾ Equator Principles Guidance Note on Climate Assessment Link

What are the current and anticipated Physical Risks of the project's operations?				
Acute Increased frequency and severity of: - Wildfires - Flooding - Storms/Cyclones - Heatwaves	 What are potential Physical Risks for the project? Based on current climate conditions and long-term climate projections (if available), are there any potential Physical Risks that are known or forecast to get worse in the project's location? Is the project highly reliant on a resource that could be impacted by climate change, like water or changes to land use? Is the project in a location more vulnerable to climate change, such as a low-lying area, coastal area or flood zone? Is this project in an industry or geographic location where climate and weather variation are already having impacts? Are such impacts likely to be exacerbated over time? 			
Chronic - Changes in precipitation patterns resulting in drought or water stress - Rising mean temperatures - Sea level rise (i.e. in coastal zones, designated flood zones, areas vulnerable to storm surge)	 How could the identified Physical Risks im pact on the project? What w ould be the impact? Damage to assets, loss of operation, delays for customers, impact on suppliers, increased operating costs, or impact on the surrounding business, environment and communities? How material w ould this be to the project's operations? Supply chain? Revenues (if know n)? Would climate vulnerabilities and risks inform the design, siting and analysis of alternatives of the project? Would physical climate impacts result in impacts on community, business or customers? e.g., greater competition over w ater resources. Would physical climate impacts be severe enough to affect the license to operate of the Project Sponsor or the project? 			

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APPENDIX H PRECONSTRUCTION/CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROJECT

Preconstruction Activities

Prior to construction, the planned preliminary activities are categorised in the main tasks:

- Mobilization;
- Surveying of the entire alignment;
- Traffic deviation;
- Detailed Design;
- Site cleaning;
- Advanced camp installations;
- Work area provisional fencing and other safety measures to start the works;
- Communication policy implementation; and
- Manpower integration and context/project training (Direct and Indirect Manpower).

Construction Activities

For each of the main Project sites, specific activities shall be carried out that entail the following tasks:

- 1. Relocation of utilities;
- 2. Overpass Works:
 - Preparation of the area for the execution of the piles, with excavation or filling the area;
 - Execution of the bored cast in place concrete piles (bored, preparing heads and temporary steel casing), for the Piers and Abutments Foundations;
 - Execution of the blinding then reinforced concrete for bases, footings, pile caps, and ground slabs;
 - Execution of the face panels for Walls;
 - Execution of Mechanically Stabilized Earth;
 - Assembly the main members of Metallic Structure for overpasses;
 - Assembly the Precast planks;
 - Assembly the bearing bridges;
 - Execution of the rebars on deck;
 - Cast Concrete the deck;
 - Sprayed waterproofing membrane to deck, bituminous protection;
 - Subbase and base in the ramps;
 - Applying the layers of subgrade and asphalt on the deck and ramps; and
 - Applying the Street lightening
- 3. Provisional Roads to traffic deviation:
 - Surface preparation for provisional roads improvement with vegetation and topsoil removal
 - Earth cut and fill to recover the provisional roads
 - Laying of a base of crushed stones or adequate soil
- 4. Road Works:
 - Remove if needed the existent asphalt pavement;

- Surface preparation for new road construction: debris, large rocks, vegetation and topsoil will be removed from the areas to be paved;
- Earthworks Excavation and/or filling;
- Surface preparation laying of a sub-base;
- Applying the kerbs;
- Laying of a base of crushed stones;
- Execution of the walkways;
- Execution of kerbs and walkways;
- Spraying the prime coat;
- Laying the asphalt binder, tack coat and asphalt wearing course;
- 5. Assembly the traffic signs and road marking.

APPENDIX I STAKEHOLDER DATABASE TEMPLATE

Stakeholder Category	Stakeholder Name	Contact Details	Interest in Project

APPENDIX J MINUTES FROM THE SCOPING MEETINGS

See PDF attached - Minutes from the Scoping Meetings

APPENDIX K SUMMARY OF THE KEY INFORMANT INTERVIEWS

Introduction

Interviews were conducted with representatives of the Ministry of Transport (MINTRANS), the railway operator (CFL), Cazenga Municipality, Viana Municipality, Viana Commune, Kalawenda Commune, and Tala Hady Commune across three meetings occurring on 31 May and 1 June 2023.

Meetings were attended by representatives from ERM, BDM and Inzag. A member of the Ministry of Transport accompanied the team during the meetings with the Municipalities and Communes.

At each meeting, a brief presentation was given that introduced the project as well as the objectives of the meeting. This was followed by a question-and-answer session where ERM asked the participants a set of general questions about the project area, followed by questions about the project and data requests.

The findings from the three meetings have been summarised in the sections below.

Section A: General questions about the project area

6. What are the main challenges that your Province / Municipality / Commune / Organisation experience?

Mobility has become increasingly difficult throughout Luanda as the city grows. Various major infrastructure projects have been implemented to try and combat this such as the development of the new international airport, updates to access (road and rail) the new airport, rapid transport bus networks and highway upgrades (new lanes). However, implementing these projects has been difficult due to the high volumes of traffic already present.

Traffic congestion at the railway line intersections has become dangerous, causing delays as the train has to slow down to avoid colliding with vehicles and people. These intersections have become crowded with numerous informal traders that leads to further traffic chaos as well as considerable waste management issues. Accidents between the trains, vehicles and people have become a common occurrence.

With the convergence of numerous forms of transport at these intersections (motorcycle taxis, cars, truck s, trains) there is a significant issue with noise pollution. Many people use the intersections to hail various forms of transport (minibus and motorcycle taxis) which causes crowding and difficulties for pedestrians attempting to cross the railway line.

Access to electricity in the informal settlements north of the railway line is good. However, very few of these areas have access to piped water. Overall, poor access and mobility is restricting both economic and infrastructural development north of the railway line. This area is almost entirely informal and has developed without any town planning. The population is extremely poor and living conditions are bad. There is very little infrastructure north of the railway line such as schools, drainage, etc. This area was established as a result of urban sprawl and infrastructure and services are now only being introduced after the fact.

Waste management is not sufficient. There are private companies that collect waste, but their services are not adequate to meet the demand of these crowded areas, especially where informal traders operate. There is also difficulty for the trucks in accessing the informal areas due to the lack of road infrastructure, so waste collection only occurs on the main roads which results in a build-up of waste at the railway line.

Information campaigns have been started in Cazenga Municipality to try and encourage improved personal waste management. This has been done alongside attempts to control/remove informal traders from key intersections and overcrowded areas.

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7. What are the main livelihood activities in these areas?

Most people north of the railway line make a living through informal trading. Viana Municipality estimated that about 70% of the people living in the area had informal livelihoods.

a. Are there differences between men and women and the work they do?

Yes

b. If so - what is the separation of work?

Women mostly trade in the streets selling goods such as food and clothes. Men sell items such as batteries, cell phones and other electronics or shine shoes – sometimes from small informal shops. The majority of men work within the informal economy but a small percentage work in factories in the area around Viana.

Youth are involved in informal trading as well, selling water, driving and organising passengers for the motorcycle taxis, and carry luggage for people who have arrived on the main roads from the formal taxis.

c. How are street vendors managed? Is there any organisation (formal or informal)?

Street vendors are discouraged due to the waste they generate and the chaos they cause at intersections. More formal market areas have been established by the government but most of these traders prefer to trade at the intersections or along busy roads. The government is currently trying to control who sells and where they sell to avoid street trading. There is no formal or informal organisation that manages the street traders.

8. What do you think are the main opportunities that people experience in the study area on a daily basis?

The various study areas (except SME) are close to the centre of Luanda which gives better access for people to jobs and services in other parts of the city.

In Viana, the presence of the Viana Special Economic Zone provides some formal job opportunities.

For many, this part of Luanda was a safe place to escape from political uncertainty that was close to the economic opportunities at the centre of the city as well as the industrial zone further out.

9. Water:

a. Does the current water supply meet the demand of the current population with regards to drinking water, sanitation, and hygiene? How stable is it?

The current water supply in Viana and Cazenga Municipalities is not considered sufficient to meet the needs of the population. Piped water supply is limited. As such, individual households have drilled boreholes for water access. However, it is not possible to drill boreholes for every household, so people buy water from trucks. Trucks are filled by private companies that buy the water from EPAL (government water supplier) which is then sold to the community.

Viana Municipality has funded some boreholes within the community.

In Cazenga, community members who do have access to piped water are selling water to parts of the area that do not have access.

Most households have some access to sanitation infrastructure.

b. Is the area impacted by diseases related to poor / inadequate drinking water? Please specify.

Yes. There are some issues with diarrhoea related to poor water quality in Viana.

c. If there is a water cut / break, who is responsible for fixing / maintaining it?

EPAL is responsible for maintaining the water infrastructure – depending on the scale of the issue there may be delays in repairs, but they are eventually completed.

In Viana, the Ministry of Power and Water is responsible for the building of further water infrastructure in collaboration with the Municipality. However, the latest project (distribution centre) has not been completed by the Ministry and the Municipality does not know what the issues are or if the project will ever be completed.

d. Does the government provide any alternative water sources (e.g., trucked in water)? If yes, please explain how this works.

No. Water is provided by private companies and community members.

10. Power and electricity:

a. Does the current electricity supply meet the demand of the current population? How stable is it?

Yes. Most people in the various study areas have access to electricity which they pay for. There have been significant improvements in electricity supply in Cazenga over the last three years. However, the supply can be inconsistent and so people use generators as a back-up source.

b. Who are the main electricity providers?

The government are the electricity providers – ENDE.

c. What source of power do most people use in the area? (e.g., for cooking and lighting).

Electricity.

d. If there is an electricity cut / break, who is responsible for fixing / maintaining it?

If a small issue has occurred, then the local Municipality can fix it. Larger issues are dealt with by the government electricity provider. Depending on the scale of the issue it can take a while for repairs to be completed.

e. Does the government provide any alternative electricity sources? If yes, please explain how this works.

No

11. Telecommunications:

Most people have access to telecoms infrastructure with access to the internet through mobile devices.

12. Roads and traffic:

a. Who is responsible for maintaining and fixing the roads?

Maintaining the roads is a serious problem. In the past, maintenance was done by INEA which is the government department responsible for building the roads (main roads). Now the Municipality will be working with ENCIB to maintain the roads.

Secondary roads are the responsibility of the Municipalities.

b. How do you identify and prioritise which roads need to be maintained and fixed?

Priority is given to the roads with the highest frequency and density of use.

c. How do you manage traffic disruptions? How do you manage road accidents?

Accidents and traffic disruptions are managed by the police and fire service.

13. Healthcare

a. Would you consider healthcare capacities as sufficient to meet local demands?

Healthcare facilities are not sufficient to meet the demand within the Municipalities. Cazenga Municipality has put in an application with a government initiative (PIIM) for support in funding new healthcare facilities.

Malaria and TB are the biggest health concerns.

In Viana, monthly outreach programmes are used to provide healthcare to the informal communities.

14. Education

There are not enough schools in the area to cope with the consistently high birth rates and youthful population in Luanda. Viana Municipality is attempting to build new schools to meet demand using the *PIIM* initiative. In Cazenga, they are struggling to build schools fast enough to meet the growing demand.

Section B: Project specific questions

15. Do you believe that this project is an important one for the area? Why?

According to the Ministry of Transport, the Project will benefit Luanda as a whole and communities at the project sites through improved rail services, economic growth and improved access to formal infrastructure south of the railway line.

16. How do you think the proposed project / construction of the overpasses will affect:

a. Local communities' daily lives?

Positive impacts will be experienced by communities through increased mobility and access to infrastructure. The reduction in accidents will also benefit people as the Project will create a boundary between people and transport. People who are resettled by the Project will be moved to an area with better living conditions and may have the opportunity to build a better life or start a business. Many people living in these areas would prefer to live somewhere else. Improved access to informal areas may encourage economic growth north of the railway line on empty land or encourage business to open in the area again. The value of the project areas will improve, bringing in future investments and leading to empowerment of the local communities.

Negative impacts will be experienced by those being relocated through the disruption of social networks and loss of social cohesion. Noise pollution during construction will be an issue. There will also be issues with temporary restrictions to mobility with residents north of the railway line having to find alternative routes out of their communities which may increase traffic at other intersections and within the communities along the diversion routes. Diversion routes will need to be decided in collaboration with the local Municipalities to ensure impacts are minimised.

b. Local businesses' daily lives?

Small businesses may temporarily lose income during construction of the project.

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17. Judging by your experience, do these types of projects attract influx from other areas?

Yes, when it becomes common knowledge that a large infrastructure project is going to be built it can encourage influx from people who think that they might be able to benefit from relocation. They see the Project as a way to make money or improve their living conditions. This has happened with development projects in the past such as the widening of the highway. Sometime information about future projects comes from people/family members working within the Ministry.

18. Due to planned construction, do you anticipate challenges with regards to traffic, road infrastructure conditions, and/or transportation safety conditions, community safety (in particular for the deviations).

Yes, as above – Section B Question 2.

19. How does land ownership in the project area work? For example, who owns the properties, who owns the land alongside the roads, etc.

All land is owned by the government with individuals paying to lease the land for a certain period of time. The government is able to take back the land at any point. Each person must register with the local Municipality to receive a land title. There are plans within the Viana Municipality to acquire land from national government and distribute plots with occupation permits to community members.

20. Do you know of any places nearby that are or might be historically important or important to a sense of identity and belonging?

A place of historical significance is located near 4th Avenue (diversion route for 5th Avenue) where the freedom fight was started – Marco Historico

a. Active or formal burials or cemeteries

No

b. Ancestor places

No

c. Old objects such as pottery, grind stones or hearths

No

- 21. Do you know of any places in the area that are or might be considered sacred or of spiritual importance?
 - a. Religious site?

No

b. Sacred places such as trees, groves, forests rocks or streams/rivers?

No

c. Places of worship?

No

d. Churches are present in the study areas. Shrines?

No

e. Places associated with ritual practices?

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No

APPENDIX L STAKEHOLDER ENGAGEMENT PROGRAMME

Engagement Activities	Objective	Target Stakeholders	Format of Engagement	Timing / Frequency	Responsibility			
ESIA Phase Engagen	ESIA Phase Engagement (Disclosure)							
Public disclosure of the ESIA and non- technical summary	 In compliance with Presidential Decree 117/20, Article № 16 and international good practice standards, disclose the findings of the ESIA to stakeholders. Facilitate understanding about the Project and ESIA conclusions, as well as proposed mitigation and management (or enhancement) measures. Solicit feedback on the Project and ESIA. Raise aw areness of the Grievance Redress Mechanism. Contribute to open and positive relationship with Project stakeholders. 	All interested and potentially affected stakeholders identified	 ESIA and non-technical summary published in English and Portuguese. Both documents available online via INZAG's website. Hard copies placed in INZAG office, District Assembly offices, Regional DNPAIA offices, Public Libraries and Front Sites. Stakeholders notified via: Invitation letters (e.g. to national and local government) SMS Flyers Notice boards Radio broadcasts New spaper adverts 	3 w eeks	MINTRANS			
Invite stakeholders to public consultation meetings		 All interested and potentially affected stakeholders identified 	 Stakeholders notified via: Invitation letters (e.g. to national and local government) SMS Flyers Notice boards Radio broadcasts New spaper adverts 	One week prior to consultation meetings	MINTRANS			

Table 9.7 Stakeholder Engagement Programme

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Engagement Activities	Objective	Target Stakeholders	Format of Engagement	Timing / Frequency	Responsibility
Engage with stakeholders to disclosure the findings of the ESIA		 Environmental and Permitting Authorities Other National Government Local Government (Provincial, Municipal, Commune) 	Targeted face to face meetings	Once, during ESIA disclosure period	MINTRANS
		 Parastatals Civil Society Groups / NGOs Local Media 	Open meeting	Once, during ESIA disclosure period	MINTRANS
		 Workers Unions / Business Associations 	Open meeting	Once, during ESIA disclosure period	MINTRANS
		Privately ow ned land and infrastructure in the project footprint	Targeted face to face meetings (e.g. for the Church, hotel and private land ow ners at SME) Community meetings (tw o per site, in the evening)	Once, during ESIA disclosure period	MINTRANS
		 Direct Aol, north of Catete Street 	Community meetings (tw o per site, in the evening)	Once, during ESIA disclosure period	MINTRANS
		 Direct Aol, south of Catete Street 	Community meetings (tw o per site, in the evening)	Once, during ESIA disclosure period	MINTRANS
		Traders	Community meetings (tw o per site, in the evening)	Once, during ESIA disclosure period	MINTRANS
Report detailing steps to be taken, the level of public participation and conclusions draw n	Provide feedback on conclusions draw n from stakeholder engagement process	NA	NA	Within 8 days of completion of the consultation period	MINTRANS

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Engagement Activities	Objective	Target Stakeholders	Format of Engagement	Timing / Frequency	Responsibility
Summarise stakeholder feedback and integrate into Final ESIA	Report on disclosure feedback and integrate it into the Final ESIA as appropriate	NA	NA	14 days after the end of public disclosure	MINTRANS
Pre-Construction Pl	nase Engagement				
Invite stakeholders to public consultation meetings	Facilitate ongoing collaboration and Participation. Share information regarding the status of the project and any modifications to the project description. In addition, remind stakeholders about the GRM.	 All interested and potentially affected stakeholders identified 	 Stakeholders notified via: Invitation letters (e.g. to national and local government) Flyers Notice boards Radio broadcasts New spaper adverts 	One w eek prior to consultation meetings	MINTRANS with support of INZAG and CLOs
Quarterly updates on Project Review and discuss community concerns and issues, including those submitted through the GRM.	Review and discuss community concerns and issues, including those submitted through the GRM.	 Environmental and Permitting Authorities Local Government (Provincial, Municipal, Commune) 	Targeted face to face meetings	Quarterly, throughout pre-construction phase	MINTRANS with support of INZAG
	 Privately ow ned land and infrastructure in the project footprint 	Targeted face to face meetings (e.g. for the church, hotel and privately ow ned land at SME) Community meetings (two per site, in the evening)	Quarterly, throughout pre-construction phase	MINTRANS with support of INZAG and CLOs	
		 Direct Aol, north of Catete Street 	Community meetings (tw o per site, in the evening)	Quarterly, throughout pre-construction phase	MINTRANS with support of INZAG and CLOs
		 Direct Aol, south of Catete Street 	Community meetings (tw o per site, in the evening)	Quarterly, throughout pre-construction phase	MINTRANS with support of INZAG and CLOs
		Traders	Community meetings (tw o per site, in the evening)	Quarterly, throughout pre-construction phase	MINTRANS with support of INZAG and CLOs

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Engagement Activities	Objective	Target Stakeholders	Format of Engagement	Timing / Frequency	Responsibility
Six monthly updates on project		 Other National Government 	Targeted face to face meetings	Six monthly, throughout pre- construction phase	MINTRANS with support of INZAG
		 Parastatals Civil Society Groups / NGOs Local Media Workers Unions / Business Associations 	Open meeting	Six monthly, throughout pre- construction phase	MINTRANS with support of INZAG
Construction Phase	Engagement				
Invite stakeholders to public consultation meetings	Invite stakeholders o public consultation meetingsKeeping stakeholders updated on Project construction activities and schedule, including anticipated delays or changes, and procurement and employment opportunities, as well as the potential impacts that can be expected to occur along with the measures planned to mitigate these.Bi-monthly updates on ProjectFacilitate ongoing collaboration and participation.Share information regarding the status of the project and any modifications to the project description. In addition, remind stakeholders about the GRM.	 All interested and potentially affected stakeholders identified 	 Stakeholders notified via: Invitation letters (e.g. to national and local government) Flyers Notice boards Radio broadcasts New spaper adverts 	One week prior to consultation meetings	MINTRANS with support of INZAG and CLOs
Bi-monthly updates on Project		 Environmental and Permitting Authorities Local Government (Provincial, Municipal, Commune) 	Targeted face to face meetings	Bi-monthly, throughout construction phase	MINTRANS with support of INZAG
		Privately ow ned land and infrastructure in the project footprint	Targeted face to face meetings (e.g. for the church, hotel and privately ow ned land at SME) Community meetings (two per site, in the evening)	Bi-monthly, throughout construction phase	MINTRANS with support of INZAG and CLOs
		 Direct Aol, north of Catete Street 	Community meetings (tw o per site, in the evening)	Bi-monthly, throughout construction phase	MINTRANS with support of INZAG and CLOs
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Engagement Activities	Objective	Target Stakeholders	Format of Engagement	Timing / Frequency	Responsibility
		 Direct Aol, south of Catete Street 	Community meetings (twopersite, in the evening)	Bi-monthly, throughout construction phase	MINTRANS with support of INZAG and CLOs
		 Traders 	Community meetings (tw o per site, in the evening)	Bi-monthly, throughout construction phase	MINTRANS with support of INZAG and CLOs
Quarterly updates on project		 Other National Government 	Targeted face to face meetings	Quarterly, throughout construction phase	MINTRANS with support of INZAG
		 Parastatals Civil Society Groups / NGOs Local Media Workers Unions / Business Associations 	Open meeting	Quarterly, throughout construction phase	MINTRANS with support of INZAG
Focus Group Discussions (FGDs)		 For special interest groups with particular concerns 	Focus Group with approximately 8-10 participants	As needed throughout the construction phase	MINTRANS with support of CLOs
Notice boards and w ebsite updates	An accessible w ay for communicating changes to stakeholders concerning Project design, progress on meeting social and environmental management commitments, details of upcoming construction activities and or changes to schedule.	 All interested and potentially affected stakeholders identified 	Public notice boards and website	Throughout construction phase	MINTRANS with support of CLOs

Source: ERM, 2023

APPENDIX M GRIEVANCE REGISTER TEMPLATE

See Excel attached – INZAG Grievance Register Template

APPENDIX N GRIEVANCE FORM TEMPLATE

Grievance Rec	ord			
Reference No:			1	
(for official use)				
Anonymous:	Yes	No		
Full Name:				
Contact Information: Please mark how you wish to be contacted (letter, telephone, e-mail).				Address/village/traditional authority and ward:
				Telephone:
				E-mail:
Preferred Lang	guage for comm	unication		
Description of	Incident or Grie	vance:	Whato?	at happened? Where did it happen? Who did it happen What is the result of the problem?
Date of Incider	nt/Grievance			
				One time incident/grievance
				(date)
				Happened more than once
				(how many times?)
				On-going (currently experiencing problem)
What would yo	u like to see ha	ppen to resolve t	he pi	roblem?
Additional Con	nments:			

APPENDIX O GRIEVANCE RECEIPT FORM

Grievance Receipt Form						
Grievance Number:	Date Submitted:	Target date for initial meeting to address grievance:				
Name:						
Address and Contact Details						
Grievance Received By:						
Name of Grievance Coordinator:						
Contact details of Grievance Coordinator	Telephone:					
	Email:					
	Address:					

APPENDIX P STAKEHOLER ENGAGEMENT LOG

See Excel attached – INZAG Stakeholder Engagement Log Template

APPENDIX Q CULTURAL HERITAGE IMPACT ASSESSMENT GAZETTEER

Unique Name Sensitivity Direct,			Construction Phase			Operation Phase					
ldentifier	Identifier / Value Indire or No Impac	Indirect or No Impact	Nature of impact	Magnitude of Impact	Residual Impact (pre- mitigation)	Residual Impact (post- mitigation)	Nature of impact	Magnitude of Impact	Residual Impact (pre- mitigation)	Residual Impact (post- mitigation)	
INZ_CH_001	Baobab Tree	Low	Direct	This resource is situated w holly w ithin the construction corridor. Any intangible cultural heritage remains w ill be w holly removed by earthw orks, resulting in a direct impact	Large	Permanent, Moderate, Adverse	Permanent , Moderate, Adverse	The impact from construction w ill have removed the resource and therefore there w ill be no impact at operation phase	n/a	n/a	n/a
INZ_CH_002	Industrial Heritage	Low	Direct	This resource is situated w holly w ithin the construction corridor. Any intangible cultural heritage remains w ill be w holly removed by earthw orks, resulting in a direct impact	Large	Permanent, Moderate, Adverse	Permanent , Moderate, Adverse	The impact from construction w ill have removed the resource and therefore there w ill be no impact at operation phase	n/a	n/a	n/a

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Unique Name Sensitivity Di		Direct,	Construction Phase				Operation Phase				
lde ntifie r		/ Value	Indirect or No Impact	Nature of impact	Magnitude of Impact	Residual Impact (pre- mitigation)	Residual Impact (post- mitigation)	Nature of impact	Magnitude of Impact	Residual Impact (pre- mitigation)	Residual Impact (post- mitigation)
INZ_CH_003		Low	Direct	This resource is situated w holly w ithin the construction corridor. Any intangible cultural heritage remains w ill be w holly removed by earthw orks, resulting in a direct impact	Large	Permanent, Moderate, Adverse	Permanent , Moderate, Adverse	The impact from construction w ill have removed the resource and therefore there w ill be no impact at operation phase	n/a	n/a	n/a

Source: ERM, 2023

APPENDIX R GEOTECHNICAL STUDIES

See PDF attached - INZAG Geotechnical Studies

APPENDIX S SPECIES POTENTIALLY OCCURRING IN THE AREA

See PDF attached - Species potentially occurring in the area

APPENDIX T BDM TRAFFIC DEMAND STUDY

See PDF attached – BDM Traffic Demand Study

APPENDIX U AIR QUALITY BASELINE DATA

Table U1 outlines the raw diffusion data for NO_2 obtained for the monitoring period. Table U2 outlines the averages of the raw baseline data which was used in the modelling.

Nearest Junction	Date On	Date Off	Measurement Time (hours)	NO ₂ Values (µg/m³)
SME	27/06/2023	26/07/2023	687.90	29.21
SME	27/06/2023	26/07/2023	687.83	27.83
SME	27/06/2023	26/07/2023	687.95	30.08
SME	27/06/2023	26/07/2023	688.12	33.16
SME	27/06/2023	26/07/2023	688.12	28.63
SME	27/06/2023	26/07/2023	688.15	33.75
Viana	28/06/2023	26/07/2023	669.95	36.51
Viana	28/06/2023	26/07/2023	669.98	46.19
Viana	28/06/2023	26/07/2023	670.00	33.65
Viana	28/06/2023	26/07/2023	669.87	56.90
Viana	28/06/2023	26/07/2023	669.70	56.09
Viana	28/06/2023	26/07/2023	669.67	57.62
Viana	28/06/2023	26/07/2023	669.63	58.63
Viana	28/06/2023	26/07/2023	669.57	40.87
Estalagem/Cazenga	28/06/2023	26/07/2023	667.95	55.85
Estalagem/Cazenga	28/06/2023	26/07/2023	667.93	53.17
Estalagem/Cazenga	28/06/2023	26/07/2023	667.93	56.91
Estalagem/Cazenga	28/06/2023	26/07/2023	667.98	44.30
Estalagem/Cazenga	28/06/2023	26/07/2023	668.02	47.86
Estalagem/Cazenga	28/06/2023	26/07/2023	668.00	54.31
Estalagem/Cazenga	28/06/2023	26/07/2023	668.05	61.84
Mulenvos	28/06/2023	26/07/2023	667.93	64.62
Mulenvos	28/06/2023	26/07/2023	668.03	66.01
Mulenvos	28/06/2023	26/07/2023	667.90	53.76
Mulenvos	28/06/2023	26/07/2023	667.90	50.33
Mulenvos	28/06/2023	26/07/2023	667.88	50.10

Table U1 NO₂ Diffusion Tube Data

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Construction and Operation of 5 $\operatorname{Overpasses}-\operatorname{Luanda}$ Railway Track, Angola

Nearest Junction	Date On	Date Off	Measurement Time (hours)	NO ₂ Values (µg/m ³)
Mulenvos	28/06/2023	26/07/2023	667.88	58.56
Mulenvos	28/06/2023	26/07/2023	667.87	57.01
Mulenvos	28/06/2023	26/07/2023	667.85	61.74
5° Avenida	28/06/2023	26/07/2023	667.73	63.87
5° Avenida	28/06/2023	26/07/2023	667.70	62.19
5° Avenida	28/06/2023	26/07/2023	667.63	53.82
5° Avenida	28/06/2023	26/07/2023	667.62	60.00
5° Avenida	28/06/2023	26/07/2023	667.62	61.56
5° Avenida	28/06/2023	26/07/2023	667.63	63.30
5° Avenida	28/06/2023	26/07/2023	667.68	60.45
5° Avenida	28/06/2023	26/07/2023	667.68	62.71

Table U2 NO₂ Diffusion Tube Data: Averages and Max

Location	Average (µg/m ³)	Max (µg/m³)
SME	30.44	33.75
Viana	48.31	58.63
Estalagem/Cazenga	53.46	61.84
Mulenvos	57.77	66.01
5 Avenida	60.99	63.87
All	50.19	66.01

NO₂ baseline used in model results processing was taken as an average of the all the measurements across the whole site for that pollutant.

Table U3 outlines the raw PM data obtained from the Dust Track monitoring at the SME junction site. Note: only 1 week of data was obtained due to a malfunction of the Dust Trak while on site.

Table U3 PM_{2.5} and PM₁₀ Raw DustTrak Data

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
27/06/2023	17:17:52	0.036	0.054
27/06/2023	17:32:52	0.039	0.06
27/06/2023	17:47:52	0.048	0.067
27/06/2023	18:02:52	0.048	0.07
27/06/2023	18:17:52	0.051	0.068
27/06/2023	18:32:52	0.037	0.056
27/06/2023	18:47:52	0.038	0.056
27/06/2023	19:02:52	0.033	0.044

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
27/06/2023	19:17:52	0.032	0.046
27/06/2023	19:32:52	0.033	0.043
27/06/2023	19:47:52	0.033	0.049
27/06/2023	20:02:52	0.031	0.042
27/06/2023	20:17:52	0.028	0.036
27/06/2023	20:32:52	0.028	0.037
27/06/2023	20:47:52	0.026	0.034
27/06/2023	21:02:52	0.024	0.031
27/06/2023	21:17:52	0.025	0.032
27/06/2023	21:32:52	0.028	0.035
27/06/2023	21:47:52	0.026	0.032
27/06/2023	22:02:52	0.028	0.034
27/06/2023	22:17:52	0.028	0.035
27/06/2023	22:32:52	0.028	0.035
27/06/2023	22:47:52	0.027	0.033
27/06/2023	23:02:52	0.028	0.035
27/06/2023	23:17:52	0.03	0.038
27/06/2023	23:32:52	0.024	0.03
27/06/2023	23:47:52	0.023	0.028
28/06/2023	00:02:52	0.023	0.028
28/06/2023	00:17:52	0.024	0.029
28/06/2023	00:32:52	0.022	0.027
28/06/2023	00:47:52	0.023	0.03
28/06/2023	01:02:52	0.024	0.03
28/06/2023	01:17:52	0.025	0.031
28/06/2023	01:32:52	0.022	0.027
28/06/2023	01:47:52	0.02	0.024
28/06/2023	02:02:52	0.019	0.024
28/06/2023	02:17:52	0.019	0.024
28/06/2023	02:32:52	0.02	0.025
28/06/2023	02:47:52	0.021	0.026
28/06/2023	03:02:52	0.028	0.034
28/06/2023	03:17:52	0.022	0.027
28/06/2023	03:32:52	0.021	0.026
28/06/2023	03:47:52	0.021	0.026
28/06/2023	04:02:52	0.021	0.027
28/06/2023	04:17:52	0.022	0.027
28/06/2023	04:32:52	0.022	0.027
28/06/2023	04:47:52	0.024	0.03
28/06/2023	05:02:52	0.025	0.032
28/06/2023	05:17:52	0.028	0.033
28/06/2023	05:32:52	0.03	0.036
28/06/2023	05:47:52	0.029	0.035
28/06/2023	06:02:52	0.029	0.035

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
28/06/2023	06:17:52	0.028	0.034
28/06/2023	06:32:52	0.032	0.038
28/06/2023	06:47:52	0.034	0.041
28/06/2023	07:02:52	0.032	0.039
28/06/2023	07:17:52	0.034	0.041
28/06/2023	07:32:52	0.03	0.036
28/06/2023	07:47:52	0.033	0.04
28/06/2023	08:02:52	0.031	0.037
28/06/2023	08:17:52	0.03	0.036
28/06/2023	08:32:52	0.029	0.036
28/06/2023	08:47:52	0.032	0.04
28/06/2023	09:02:52	0.033	0.041
28/06/2023	09:17:52	0.034	0.043
28/06/2023	09:32:52	0.031	0.039
28/06/2023	09:47:52	0.031	0.041
28/06/2023	10:02:52	0.031	0.04
28/06/2023	10:17:52	0.03	0.042
28/06/2023	10:32:52	0.031	0.042
28/06/2023	10:47:52	0.034	0.046
28/06/2023	11:57:34	0.027	0.039
28/06/2023	12:12:34	0.034	0.051
28/06/2023	12:27:34	0.025	0.039
28/06/2023	12:42:34	0.024	0.037
28/06/2023	12:57:34	0.027	0.048
28/06/2023	13:12:34	0.022	0.032
28/06/2023	13:27:34	0.022	0.033
28/06/2023	13:42:34	0.019	0.024
28/06/2023	13:57:34	0.021	0.029
28/06/2023	14:12:34	0.023	0.034
28/06/2023	14:27:34	0.023	0.034
28/06/2023	14:42:34	0.022	0.032
28/06/2023	14:57:34	0.027	0.045
28/06/2023	15:12:34	0.034	0.054
28/06/2023	15:27:34	0.039	0.061
28/06/2023	15:42:34	0.044	0.062
28/06/2023	15:57:34	0.037	0.05
28/06/2023	16:12:34	0.055	0.08
28/06/2023	16:27:34	0.076	0.115
28/06/2023	16:42:34	0.082	0.123
28/06/2023	16:57:34	0.081	0.12
28/06/2023	17:12:34	0.071	0.109
28/06/2023	17:27:34	0.069	0.104
28/06/2023	17:42:34	0.067	0.103
28/06/2023	17:57:34	0.064	0.103

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
28/06/2023	18:12:34	0.071	0.113
28/06/2023	18:27:34	0.069	0.109
28/06/2023	18:42:34	0.079	0.118
28/06/2023	18:57:34	0.078	0.116
28/06/2023	19:12:34	0.046	0.058
28/06/2023	19:27:34	0.032	0.041
28/06/2023	19:42:34	0.032	0.041
28/06/2023	19:57:34	0.029	0.04
28/06/2023	20:12:34	0.033	0.044
28/06/2023	20:27:34	0.025	0.034
28/06/2023	20:42:34	0.025	0.033
28/06/2023	20:57:34	0.026	0.035
28/06/2023	21:12:34	0.023	0.03
28/06/2023	21:27:34	0.023	0.03
28/06/2023	21:42:34	0.021	0.027
28/06/2023	21:57:34	0.02	0.026
28/06/2023	22:12:34	0.021	0.026
28/06/2023	22:27:34	0.019	0.024
28/06/2023	22:42:34	0.019	0.023
28/06/2023	22:57:34	0.022	0.028
28/06/2023	23:12:34	0.018	0.022
28/06/2023	23:27:34	0.018	0.022
28/06/2023	23:42:34	0.017	0.021
28/06/2023	23:57:34	0.017	0.021
29/06/2023	00:12:34	0.017	0.021
29/06/2023	00:27:34	0.016	0.02
29/06/2023	00:42:34	0.018	0.022
29/06/2023	00:57:34	0.017	0.022
29/06/2023	01:12:34	0.017	0.022
29/06/2023	01:27:34	0.017	0.021
29/06/2023	01:42:34	0.018	0.021
29/06/2023	01:57:34	0.016	0.02
29/06/2023	02:12:34	0.016	0.02
29/06/2023	02:27:34	0.017	0.021
29/06/2023	02:42:34	0.019	0.024
29/06/2023	02:57:34	0.023	0.04
29/06/2023	03:12:34	0.018	0.021
29/06/2023	03:27:34	0.018	0.022
29/06/2023	03:42:34	0.018	0.023
29/06/2023	03:57:34	0.018	0.022
29/06/2023	04:12:34	0.018	0.022
29/06/2023	04:27:34	0.018	0.022
29/06/2023	04:42:34	0.019	0.024
29/06/2023	04:57:34	0.03	0.038

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
29/06/2023	05:12:34	0.019	0.025
29/06/2023	05:27:34	0.022	0.028
29/06/2023	05:42:34	0.021	0.033
29/06/2023	05:57:34	0.02	0.027
29/06/2023	06:12:34	0.021	0.033
29/06/2023	06:27:34	0.034	0.052
29/06/2023	06:42:34	0.035	0.058
29/06/2023	06:57:34	0.032	0.046
29/06/2023	07:12:34	0.029	0.049
29/06/2023	07:27:34	0.031	0.06
29/06/2023	07:42:34	0.03	0.051
29/06/2023	07:57:34	0.03	0.053
29/06/2023	08:12:34	0.026	0.05
29/06/2023	08:27:34	0.026	0.039
29/06/2023	08:42:34	0.037	0.054
29/06/2023	08:57:34	0.024	0.04
29/06/2023	09:12:34	0.024	0.037
29/06/2023	09:27:34	0.024	0.037
29/06/2023	09:42:34	0.027	0.038
29/06/2023	09:57:34	0.03	0.048
29/06/2023	10:12:34	0.032	0.053
29/06/2023	10:27:34	0.031	0.047
29/06/2023	10:42:34	0.033	0.051
29/06/2023	10:57:34	0.034	0.05
29/06/2023	11:12:34	0.034	0.051
29/06/2023	11:27:34	0.047	0.065
29/06/2023	11:42:34	0.043	0.061
29/06/2023	11:58:34	0.044	0.064
29/06/2023	12:13:34	0.046	0.071
29/06/2023	12:28:34	0.043	0.069
29/06/2023	12:43:34	0.046	0.071
29/06/2023	12:58:34	0.049	0.073
29/06/2023	13:13:34	0.047	0.069
29/06/2023	13:28:34	0.036	0.052
29/06/2023	13:43:34	0.049	0.079
29/06/2023	13:58:34	0.055	0.09
29/06/2023	14:13:34	0.055	0.088
29/06/2023	14:28:34	0.052	0.082
29/06/2023	14:43:34	0.051	0.08
29/06/2023	14:58:34	0.048	0.075
29/06/2023	15:13:34	0.046	0.072
29/06/2023	15:28:34	0.045	0.073
29/06/2023	15:43:34	0.047	0.076
29/06/2023	15:58:34	0.045	0.072

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
29/06/2023	16:13:34	0.039	0.064
29/06/2023	16:28:34	0.037	0.064
29/06/2023	16:43:34	0.04	0.068
29/06/2023	16:58:34	0.049	0.084
29/06/2023	17:13:34	0.049	0.079
29/06/2023	17:28:34	0.044	0.069
29/06/2023	17:43:34	0.045	0.073
29/06/2023	17:58:34	0.043	0.067
29/06/2023	18:13:34	0.056	0.086
29/06/2023	18:28:34	0.045	0.07
29/06/2023	18:43:34	0.047	0.067
29/06/2023	18:58:34	0.041	0.058
29/06/2023	19:13:34	0.05	0.069
29/06/2023	19:28:34	0.055	0.073
29/06/2023	19:43:34	0.043	0.06
29/06/2023	19:58:34	0.04	0.057
29/06/2023	20:13:34	0.037	0.052
29/06/2023	20:28:34	0.03	0.041
29/06/2023	20:43:34	0.022	0.029
29/06/2023	20:58:34	0.022	0.028
29/06/2023	21:13:34	0.03	0.055
29/06/2023	21:28:34	0.021	0.029
29/06/2023	21:43:34	0.019	0.025
29/06/2023	21:58:34	0.016	0.02
29/06/2023	22:13:34	0.021	0.036
29/06/2023	22:28:34	0.014	0.018
29/06/2023	22:43:34	0.015	0.019
29/06/2023	22:58:34	0.014	0.018
29/06/2023	23:13:34	0.014	0.018
29/06/2023	23:28:34	0.015	0.018
29/06/2023	23:43:34	0.015	0.018
29/06/2023	23:58:34	0.013	0.016
30/06/2023	00:13:34	0.014	0.017
30/06/2023	00:28:34	0.015	0.018
30/06/2023	00:43:34	0.015	0.018
30/06/2023	00:58:34	0.015	0.019
30/06/2023	01:13:34	0.014	0.017
30/06/2023	01:28:34	0.013	0.017
30/06/2023	01:43:34	0.013	0.017
30/06/2023	01:58:34	0.013	0.016
30/06/2023	02:13:34	0.013	0.017
30/06/2023	02:28:34	0.014	0.017
30/06/2023	02:43:34	0.013	0.017
30/06/2023	02:58:34	0.013	0.017

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
30/06/2023	03:13:34	0.013	0.017
30/06/2023	03:28:34	0.022	0.033
30/06/2023	03:43:34	0.013	0.016
30/06/2023	03:58:34	0.023	0.031
30/06/2023	04:13:34	0.013	0.017
30/06/2023	04:28:34	0.017	0.024
30/06/2023	04:43:34	0.015	0.022
30/06/2023	04:58:34	0.014	0.017
30/06/2023	05:13:34	0.016	0.023
30/06/2023	05:28:34	0.017	0.026
30/06/2023	05:43:34	0.02	0.031
30/06/2023	05:58:34	0.019	0.03
30/06/2023	06:13:34	0.021	0.036
30/06/2023	06:28:34	0.025	0.042
30/06/2023	06:43:34	0.026	0.046
30/06/2023	06:58:34	0.027	0.039
30/06/2023	07:13:34	0.023	0.036
30/06/2023	07:28:34	0.026	0.046
30/06/2023	07:43:34	0.025	0.038
30/06/2023	07:58:34	0.021	0.037
30/06/2023	08:13:34	0.025	0.048
30/06/2023	08:28:34	0.033	0.08
30/06/2023	08:43:34	0.026	0.059
30/06/2023	08:58:34	0.027	0.063
30/06/2023	09:13:34	0.024	0.048
30/06/2023	09:28:34	0.022	0.045
30/06/2023	09:43:34	0.025	0.051
30/06/2023	09:58:34	0.023	0.045
30/06/2023	10:13:34	0.015	0.025
30/06/2023	10:28:34	0.018	0.029
30/06/2023	10:43:34	0.018	0.029
30/06/2023	10:58:34	0.016	0.023
30/06/2023	11:13:34	0.018	0.027
30/06/2023	11:28:34	0.017	0.026
30/06/2023	11:43:34	0.017	0.025
30/06/2023	11:55:48	0.002	0.002
30/06/2023	11:59:34	0.02	0.028
30/06/2023	12:14:34	0.025	0.041
30/06/2023	12:29:34	0.023	0.036
30/06/2023	12:44:34	0.021	0.03
30/06/2023	12:59:34	0.026	0.041
30/06/2023	13:14:34	0.026	0.04
30/06/2023	13:29:34	0.024	0.033
30/06/2023	13:44:34	0.026	0.039

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
30/06/2023	13:59:34	0.024	0.037
30/06/2023	14:14:34	0.024	0.033
30/06/2023	14:29:34	0.024	0.033
30/06/2023	14:44:34	0.027	0.042
30/06/2023	14:54:57	0.012	0.025
30/06/2023	14:59:34	0.021	0.029
30/06/2023	15:14:34	0.026	0.039
30/06/2023	15:29:34	0.023	0.03
30/06/2023	15:44:34	0.034	0.045
30/06/2023	15:59:34	0.034	0.061
30/06/2023	16:14:34	0.031	0.053
30/06/2023	16:29:34	0.026	0.042
30/06/2023	16:44:34	0.028	0.044
30/06/2023	16:59:34	0.027	0.042
30/06/2023	17:14:34	0.026	0.043
30/06/2023	17:29:34	0.026	0.04
30/06/2023	17:44:34	0.022	0.035
30/06/2023	17:59:34	0.023	0.035
30/06/2023	18:14:34	0.021	0.032
30/06/2023	18:29:34	0.029	0.04
30/06/2023	18:44:34	0.028	0.038
30/06/2023	18:59:34	0.025	0.036
30/06/2023	19:14:34	0.022	0.03
30/06/2023	19:29:34	0.025	0.035
30/06/2023	19:44:34	0.025	0.034
30/06/2023	19:59:34	0.022	0.03
30/06/2023	20:14:34	0.019	0.025
30/06/2023	20:29:34	0.017	0.023
30/06/2023	20:44:34	0.017	0.024
30/06/2023	20:59:34	0.017	0.022
30/06/2023	21:14:34	0.018	0.028
30/06/2023	21:29:34	0.016	0.021
30/06/2023	21:44:34	0.02	0.033
30/06/2023	21:59:34	0.016	0.021
30/06/2023	22:14:34	0.016	0.021
30/06/2023	22:29:34	0.014	0.018
30/06/2023	22:44:34	0.014	0.018
30/06/2023	22:59:34	0.016	0.02
30/06/2023	23:14:34	0.014	0.018
30/06/2023	23:29:34	0.016	0.02
30/06/2023	23:44:34	0.017	0.02
30/06/2023	23:59:34	0.013	0.017
01/07/2023	00:14:34	0.016	0.021
01/07/2023	00:29:34	0.015	0.019

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
01/07/2023	00:44:34	0.014	0.017
01/07/2023	00:59:34	0.013	0.017
01/07/2023	01:14:34	0.013	0.016
01/07/2023	01:29:34	0.013	0.017
01/07/2023	01:44:34	0.013	0.017
01/07/2023	01:59:34	0.013	0.016
01/07/2023	02:14:34	0.013	0.016
01/07/2023	02:29:34	0.014	0.017
01/07/2023	02:44:34	0.014	0.017
01/07/2023	02:59:34	0.014	0.017
01/07/2023	03:14:34	0.024	0.029
01/07/2023	03:29:34	0.018	0.021
01/07/2023	03:44:34	0.016	0.019
01/07/2023	03:59:34	0.016	0.02
01/07/2023	04:14:34	0.016	0.019
01/07/2023	04:29:34	0.015	0.02
01/07/2023	04:44:34	0.017	0.022
01/07/2023	04:59:34	0.017	0.022
01/07/2023	05:14:34	0.016	0.021
01/07/2023	05:29:34	0.016	0.021
01/07/2023	05:44:34	0.02	0.025
01/07/2023	05:59:34	0.02	0.028
01/07/2023	06:14:34	0.02	0.027
01/07/2023	06:29:34	0.021	0.029
01/07/2023	06:44:34	0.021	0.03
01/07/2023	06:59:34	0.025	0.037
01/07/2023	07:14:34	0.021	0.03
01/07/2023	07:29:34	0.024	0.035
01/07/2023	07:44:34	0.024	0.036
01/07/2023	07:59:34	0.021	0.032
01/07/2023	08:14:34	0.025	0.036
01/07/2023	08:29:34	0.028	0.043
01/07/2023	08:44:34	0.024	0.037
01/07/2023	08:59:34	0.028	0.044
01/07/2023	09:14:34	0.025	0.04
01/07/2023	09:29:34	0.028	0.04
01/07/2023	09:44:34	0.021	0.03
01/07/2023	09:48:52	0	0
01/07/2023	09:59:34	0.019	0.028
01/07/2023	10:14:34	0.025	0.037
01/07/2023	10:29:34	0.02	0.03
01/07/2023	10:44:34	0.021	0.032
01/07/2023	10:59:34	0.026	0.046
01/07/2023	11:14:34	0.031	0.046

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
01/07/2023	11:29:34	0.03	0.043
01/07/2023	11:44:34	0.031	0.043
01/07/2023	12:00:34	0.035	0.05
01/07/2023	12:15:34	0.032	0.043
01/07/2023	12:30:34	0.027	0.036
01/07/2023	12:45:34	0.029	0.04
01/07/2023	13:00:34	0.033	0.047
01/07/2023	13:15:34	0.029	0.04
01/07/2023	13:30:34	0.027	0.04
01/07/2023	13:45:34	0.028	0.04
01/07/2023	14:00:34	0.023	0.034
01/07/2023	14:15:34	0.024	0.035
01/07/2023	14:30:34	0.024	0.034
01/07/2023	14:45:34	0.024	0.035
01/07/2023	15:00:34	0.026	0.039
01/07/2023	15:15:34	0.023	0.034
01/07/2023	15:30:34	0.022	0.032
01/07/2023	15:45:34	0.024	0.037
01/07/2023	16:00:34	0.025	0.034
01/07/2023	16:15:34	0.027	0.04
01/07/2023	16:30:34	0.032	0.056
01/07/2023	16:45:34	0.03	0.046
01/07/2023	17:00:34	0.03	0.046
01/07/2023	17:15:34	0.032	0.054
01/07/2023	17:30:34	0.032	0.049
01/07/2023	17:45:34	0.042	0.067
01/07/2023	18:00:34	0.037	0.06
01/07/2023	18:15:34	0.033	0.047
01/07/2023	18:30:34	0.028	0.044
01/07/2023	18:45:34	0.032	0.045
01/07/2023	19:00:34	0.033	0.047
01/07/2023	19:15:34	0.041	0.058
01/07/2023	19:30:34	0.037	0.053
01/07/2023	19:45:34	0.031	0.042
01/07/2023	20:00:34	0.024	0.032
01/07/2023	20:15:34	0.028	0.037
01/07/2023	20:30:34	0.024	0.033
01/07/2023	20:45:34	0.032	0.049
01/07/2023	21:00:34	0.036	0.054
01/07/2023	21:15:34	0.023	0.033
01/07/2023	21:30:34	0.019	0.025
01/07/2023	21:45:34	0.017	0.025
01/07/2023	22:00:34	0.018	0.026
01/07/2023	22:15:34	0.016	0.024

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
01/07/2023	22:30:34	0.017	0.024
01/07/2023	22:45:34	0.031	0.041
01/07/2023	23:00:34	0.015	0.02
01/07/2023	23:15:34	0.016	0.02
01/07/2023	23:30:34	0.016	0.021
01/07/2023	23:45:34	0.016	0.021
02/07/2023	00:00:34	0.017	0.023
02/07/2023	00:15:34	0.017	0.022
02/07/2023	00:30:34	0.016	0.021
02/07/2023	00:45:34	0.016	0.019
02/07/2023	01:00:34	0.016	0.02
02/07/2023	01:15:34	0.017	0.021
02/07/2023	01:30:34	0.016	0.02
02/07/2023	01:45:34	0.016	0.02
02/07/2023	02:00:34	0.02	0.024
02/07/2023	02:15:34	0.019	0.023
02/07/2023	02:30:34	0.017	0.021
02/07/2023	02:45:34	0.017	0.021
02/07/2023	03:00:34	0.017	0.021
02/07/2023	03:15:34	0.017	0.021
02/07/2023	03:30:34	0.017	0.02
02/07/2023	03:45:34	0.018	0.022
02/07/2023	04:00:34	0.021	0.025
02/07/2023	04:15:34	0.019	0.023
02/07/2023	04:30:34	0.02	0.03
02/07/2023	04:45:34	0.022	0.028
02/07/2023	05:00:34	0.027	0.032
02/07/2023	05:15:34	0.03	0.046
02/07/2023	05:30:34	0.024	0.033
02/07/2023	05:45:34	0.022	0.03
02/07/2023	06:00:34	0.022	0.028
02/07/2023	06:15:34	0.026	0.037
02/07/2023	06:30:34	0.036	0.061
02/07/2023	06:45:34	0.042	0.07
02/07/2023	07:00:34	0.055	0.075
02/07/2023	07:15:34	0.066	0.095
02/07/2023	07:30:34	0.064	0.105
02/07/2023	07:45:34	0.057	0.079
02/07/2023	08:00:34	0.047	0.063
02/07/2023	08:15:34	0.034	0.049
02/07/2023	08:30:34	0.021	0.031
02/07/2023	08:45:34	0.019	0.033
02/07/2023	09:00:34	0.017	0.026
02/07/2023	09:15:34	0.017	0.025

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
02/07/2023	09:30:34	0.017	0.024
02/07/2023	09:45:34	0.017	0.023
02/07/2023	10:00:34	0.016	0.025
02/07/2023	10:15:34	0.018	0.024
02/07/2023	10:30:34	0.018	0.025
02/07/2023	10:45:34	0.017	0.024
02/07/2023	11:00:34	0.018	0.023
02/07/2023	11:15:34	0.022	0.029
02/07/2023	11:30:34	0.021	0.028
02/07/2023	11:45:34	0.024	0.034
02/07/2023	12:01:34	0.027	0.04
02/07/2023	12:16:34	0.03	0.043
02/07/2023	12:31:34	0.031	0.045
02/07/2023	12:46:34	0.032	0.044
02/07/2023	13:01:34	0.037	0.051
02/07/2023	13:16:34	0.031	0.041
02/07/2023	13:31:34	0.034	0.049
02/07/2023	13:46:34	0.031	0.043
02/07/2023	14:01:34	0.039	0.051
02/07/2023	14:16:34	0.042	0.058
02/07/2023	14:31:34	0.047	0.063
02/07/2023	14:46:34	0.031	0.044
02/07/2023	15:01:34	0.032	0.047
02/07/2023	15:16:34	0.03	0.049
02/07/2023	15:31:34	0.028	0.047
02/07/2023	15:46:34	0.03	0.05
02/07/2023	16:01:34	0.027	0.045
02/07/2023	16:16:34	0.023	0.035
02/07/2023	16:31:34	0.025	0.041
02/07/2023	16:46:34	0.023	0.038
02/07/2023	17:01:34	0.034	0.048
02/07/2023	17:16:34	0.031	0.048
02/07/2023	17:31:34	0.027	0.039
02/07/2023	17:46:34	0.031	0.046
02/07/2023	18:01:34	0.026	0.037
02/07/2023	18:16:34	0.033	0.045
02/07/2023	18:31:34	0.031	0.041
02/07/2023	18:46:34	0.025	0.034
02/07/2023	19:01:34	0.035	0.044
02/07/2023	19:16:34	0.048	0.06
02/07/2023	19:32:50	0.015	0.024
02/07/2023	19:40:38	0	0
02/07/2023	19:47:13	0	0
02/07/2023	20:01:34	0.044	0.055

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
02/07/2023	20:07:18	0	0
02/07/2023	20:13:53	0	0
02/07/2023	20:16:34	0.022	0.027
02/07/2023	20:31:34	0.031	0.039
02/07/2023	20:46:34	0.028	0.034
02/07/2023	20:50:04	0	0
02/07/2023	21:02:39	0	0
02/07/2023	21:16:34	0.021	0.026
02/07/2023	21:31:34	0.022	0.027
02/07/2023	21:46:34	0.024	0.03
02/07/2023	22:01:34	0.023	0.031
02/07/2023	22:16:34	0.022	0.028
02/07/2023	22:31:34	0.023	0.03
02/07/2023	22:46:34	0.022	0.028
02/07/2023	23:01:34	0.022	0.027
02/07/2023	23:16:34	0.024	0.031
02/07/2023	23:31:34	0.025	0.033
02/07/2023	23:46:34	0.025	0.032
03/07/2023	00:01:34	0.025	0.032
03/07/2023	00:16:34	0.024	0.031
03/07/2023	00:31:34	0.025	0.033
03/07/2023	00:46:34	0.025	0.033
03/07/2023	01:01:34	0.026	0.032
03/07/2023	01:16:34	0.026	0.032
03/07/2023	01:31:34	0.025	0.031
03/07/2023	01:46:34	0.025	0.032
03/07/2023	02:01:34	0.025	0.031
03/07/2023	02:16:34	0.023	0.029
03/07/2023	02:31:34	0.022	0.028
03/07/2023	02:46:34	0.025	0.031
03/07/2023	03:01:34	0.027	0.033
03/07/2023	03:16:34	0.031	0.037
03/07/2023	03:31:34	0.028	0.034
03/07/2023	03:46:34	0.023	0.028
03/07/2023	04:01:34	0.02	0.025
03/07/2023	04:16:34	0.02	0.025
03/07/2023	04:31:34	0.023	0.029
03/07/2023	04:46:34	0.023	0.028
03/07/2023	05:01:34	0.023	0.029
03/07/2023	05:16:34	0.02	0.026
03/07/2023	05:31:34	0.024	0.03
03/07/2023	05:46:34	0.027	0.037
03/07/2023	06:01:34	0.023	0.03
03/07/2023	06:16:34	0.033	0.053

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
03/07/2023	06:31:34	0.026	0.035
03/07/2023	06:46:34	0.026	0.037
03/07/2023	07:01:34	0.028	0.039
03/07/2023	07:16:34	0.023	0.035
03/07/2023	07:31:34	0.026	0.04
03/07/2023	07:46:34	0.028	0.044
03/07/2023	08:01:34	0.028	0.042
03/07/2023	08:16:34	0.027	0.04
03/07/2023	08:31:34	0.028	0.041
03/07/2023	08:46:34	0.029	0.044
03/07/2023	09:01:34	0.029	0.044
03/07/2023	09:16:34	0.03	0.046
03/07/2023	09:31:34	0.026	0.042
03/07/2023	09:46:34	0.027	0.039
03/07/2023	10:01:34	0.025	0.037
03/07/2023	10:16:34	0.023	0.042
03/07/2023	10:31:34	0.023	0.033
03/07/2023	10:46:34	0.022	0.034
03/07/2023	11:01:34	0.023	0.033
03/07/2023	11:16:34	0.024	0.039
03/07/2023	11:31:34	0.019	0.028
03/07/2023	11:46:34	0.02	0.029
03/07/2023	12:02:34	0.018	0.023
03/07/2023	12:17:34	0.019	0.025
03/07/2023	12:32:34	0.019	0.026
03/07/2023	12:47:34	0.02	0.027
03/07/2023	13:02:34	0.025	0.039
03/07/2023	13:17:34	0.032	0.048
03/07/2023	13:32:34	0.025	0.034
03/07/2023	13:47:34	0.027	0.04
03/07/2023	14:02:34	0.032	0.054
03/07/2023	14:17:34	0.031	0.049
03/07/2023	14:32:34	0.032	0.047
03/07/2023	14:47:34	0.043	0.06
03/07/2023	15:02:34	0.042	0.064
03/07/2023	15:17:34	0.058	0.087
03/07/2023	15:32:34	0.07	0.102
03/07/2023	15:47:34	0.064	0.098
03/07/2023	16:02:34	0.049	0.077
03/07/2023	16:17:34	0.049	0.074
03/07/2023	16:32:34	0.038	0.058
03/07/2023	16:47:34	0.035	0.053
03/07/2023	17:02:34	0.026	0.04
03/07/2023	17:17:34	0.021	0.033

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
03/07/2023	17:32:34	0.028	0.042
03/07/2023	17:47:34	0.027	0.04
03/07/2023	18:02:34	0.04	0.053
03/07/2023	18:17:34	0.044	0.058
03/07/2023	18:32:34	0.024	0.033
03/07/2023	18:47:34	0.025	0.034
03/07/2023	19:02:34	0.023	0.031
03/07/2023	19:17:34	0.022	0.031
03/07/2023	19:32:34	0.021	0.03
03/07/2023	19:47:34	0.022	0.032
03/07/2023	20:02:34	0.018	0.024
03/07/2023	20:17:34	0.017	0.022
03/07/2023	20:32:34	0.017	0.022
03/07/2023	20:47:34	0.015	0.018
03/07/2023	21:02:34	0.015	0.019
03/07/2023	21:17:34	0.014	0.019
03/07/2023	21:32:34	0.014	0.018
03/07/2023	21:47:34	0.014	0.017
03/07/2023	22:02:34	0.014	0.018
03/07/2023	22:17:34	0.017	0.02
03/07/2023	22:32:34	0.018	0.024
03/07/2023	22:47:34	0.016	0.019
03/07/2023	23:02:34	0.017	0.021
03/07/2023	23:17:34	0.017	0.021
03/07/2023	23:32:34	0.017	0.021
03/07/2023	23:47:34	0.019	0.025
04/07/2023	00:02:34	0.017	0.021
04/07/2023	00:17:34	0.017	0.021
04/07/2023	00:32:34	0.017	0.022
04/07/2023	00:47:34	0.016	0.019
04/07/2023	01:02:34	0.016	0.022
04/07/2023	01:17:34	0.015	0.021
04/07/2023	01:32:34	0.016	0.021
04/07/2023	01:47:34	0.015	0.018
04/07/2023	02:02:34	0.015	0.018
04/07/2023	02:17:34	0.014	0.017
04/07/2023	02:32:34	0.014	0.017
04/07/2023	02:47:34	0.021	0.037
04/07/2023	03:02:34	0.015	0.02
04/07/2023	03:17:34	0.015	0.019
04/07/2023	03:32:34	0.015	0.019
04/07/2023	03:47:34	0.015	0.019
04/07/2023	04:02:34	0.017	0.022
04/07/2023	04:17:34	0.017	0.022

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
04/07/2023	04:32:34	0.016	0.02
04/07/2023	04:47:34	0.025	0.035
04/07/2023	05:02:34	0.02	0.029
04/07/2023	05:17:34	0.022	0.04
04/07/2023	05:32:34	0.021	0.032
04/07/2023	05:47:34	0.022	0.036
04/07/2023	06:02:34	0.022	0.03
04/07/2023	06:17:34	0.02	0.029
04/07/2023	06:32:34	0.023	0.032
04/07/2023	06:47:34	0.027	0.045
04/07/2023	07:02:34	0.026	0.038
04/07/2023	07:17:34	0.028	0.043
04/07/2023	07:32:34	0.036	0.059
04/07/2023	07:47:34	0.028	0.043
04/07/2023	08:02:34	0.034	0.058
04/07/2023	08:17:34	0.028	0.049
04/07/2023	08:32:34	0.032	0.055
04/07/2023	08:47:34	0.024	0.036
04/07/2023	09:02:34	0.028	0.048
04/07/2023	09:17:34	0.025	0.037
04/07/2023	09:32:34	0.029	0.046
04/07/2023	09:47:34	0.023	0.035
04/07/2023	10:02:34	0.022	0.034
04/07/2023	10:17:34	0.024	0.033
04/07/2023	10:32:34	0.025	0.035
04/07/2023	10:47:34	0.032	0.045
04/07/2023	11:02:34	0.028	0.043
04/07/2023	11:17:34	0.027	0.039
04/07/2023	11:32:34	0.024	0.032
04/07/2023	11:47:34	0.027	0.036
04/07/2023	12:03:34	0.026	0.036
04/07/2023	12:18:34	0.025	0.033
04/07/2023	12:33:34	0.031	0.045
04/07/2023	12:48:34	0.032	0.045
04/07/2023	13:03:34	0.035	0.057
04/07/2023	13:18:34	0.031	0.048
04/07/2023	13:33:34	0.035	0.048
04/07/2023	13:48:34	0.031	0.042
04/07/2023	14:03:34	0.03	0.04
04/07/2023	14:18:34	0.03	0.042
04/07/2023	14:33:34	0.038	0.062
04/07/2023	14:48:34	0.035	0.05
04/07/2023	15:03:34	0.033	0.047
04/07/2023	15:18:34	0.042	0.06

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
04/07/2023	15:33:34	0.034	0.048
04/07/2023	15:48:34	0.032	0.045
04/07/2023	16:03:34	0.036	0.057
04/07/2023	16:18:34	0.033	0.06
04/07/2023	16:33:34	0.028	0.045
04/07/2023	16:48:34	0.035	0.054
04/07/2023	17:03:34	0.036	0.054
04/07/2023	17:18:34	0.041	0.057
04/07/2023	17:33:34	0.048	0.065
04/07/2023	17:48:34	0.054	0.071
04/07/2023	18:03:34	0.056	0.078
04/07/2023	18:18:34	0.039	0.055
04/07/2023	18:33:34	0.038	0.053
04/07/2023	18:48:34	0.052	0.069
04/07/2023	19:03:34	0.047	0.062
04/07/2023	19:18:34	0.053	0.069
04/07/2023	19:33:34	0.038	0.051
04/07/2023	19:48:34	0.053	0.068
04/07/2023	20:03:34	0.047	0.06
04/07/2023	20:18:34	0.038	0.052
04/07/2023	20:33:34	0.038	0.051
04/07/2023	20:48:34	0.04	0.051
04/07/2023	21:03:34	0.033	0.042
04/07/2023	21:18:34	0.031	0.041
04/07/2023	21:33:34	0.032	0.046
04/07/2023	21:48:34	0.029	0.039
04/07/2023	22:03:34	0.03	0.039
04/07/2023	22:18:34	0.042	0.064
04/07/2023	22:33:34	0.033	0.042
04/07/2023	22:48:34	0.033	0.04
04/07/2023	23:03:34	0.032	0.038
04/07/2023	23:18:34	0.034	0.041
04/07/2023	23:33:34	0.034	0.041
04/07/2023	23:48:34	0.035	0.043
05/07/2023	00:03:34	0.033	0.04
05/07/2023	00:18:34	0.034	0.043
05/07/2023	00:33:34	0.05	0.093
05/07/2023	00:48:34	0.042	0.064
05/07/2023	01:03:34	0.043	0.059
05/07/2023	01:18:34	0.036	0.044
05/07/2023	01:33:34	0.03	0.036
05/07/2023	01:48:34	0.028	0.033
05/07/2023	02:03:34	0.03	0.035
05/07/2023	02:18:34	0.027	0.033

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Construction and Operation of 5 $\operatorname{Overpasses}-\operatorname{Luanda}$ Railway Track, Angola

Date	Time	PM2.5	PM10
dd/MM/yyyy	hh:mm:ss	mg/m^3	mg/m^3
05/07/2023	02:33:34	0.025	0.03
05/07/2023	02:48:34	0.025	0.03
05/07/2023	03:03:34	0.026	0.032
05/07/2023	03:18:34	0.025	0.03
05/07/2023	03:33:34	0.025	0.03
05/07/2023	03:48:34	0.024	0.029
05/07/2023	04:03:34	0.024	0.028
05/07/2023	04:18:34	0.026	0.031
05/07/2023	04:33:34	0.028	0.034
05/07/2023	04:48:34	0.03	0.037
05/07/2023	05:03:34	0.027	0.032
05/07/2023	06:09:25	0	0
05/07/2023	06:18:34	0.03	0.034
05/07/2023	06:32:49	0	0
05/07/2023	06:35:52	0	0
05/07/2023	06:48:34	0.02	0.027
05/07/2023	07:03:34	0.018	0.025
05/07/2023	07:18:34	0.02	0.028
05/07/2023	07:33:34	0.021	0.032
05/07/2023	07:46:47	0	0
05/07/2023	07:48:34	0.017	0.023
05/07/2023	07:52:15	0	0
05/07/2023	08:00:43	0	0
05/07/2023	08:03:34	0.015	0.018
05/07/2023	08:12:41	0	0
05/07/2023	08:18:34	0.024	0.031
05/07/2023	08:33:51	0	0
05/07/2023	08:48:34	0.022	0.031
05/07/2023	09:03:34	0.021	0.03
05/07/2023	09:18:34	0.013	0.018
05/07/2023	09:33:34	0.021	0.028
05/07/2023	09:48:34	0.028	0.043
05/07/2023	10:03:34	0.028	0.044
05/07/2023	10:18:34	0.018	0.024
05/07/2023	10:33:34	0.019	0.024
05/07/2023	10:48:34	0.019	0.025
	MIN	0	0
	MAX	0.082	0.123
mg/m^3 to ug/m^3	MAX	82	123
	AVERAGE	0.03	0.04
mg/m^3 to ug/m^3	AVERAGE	26.66	37.91

PM baseline was taken as an average of the automatic monitoring data over the measurement timeframe for each pollutant.

APPENDIX V

ROAD MODEL INPUTS

Road	Base Case	Future case (assumptions)		
Deolinda Rodrigues Avenue (Estr. de Catete)	Traffic Counts supplied by the client (outlined in Section 4.3.14 of this ESIA)	Traffic count *1.28 (account for diverted traffic)		
Viana Crossing	Zero, pedestrian only	Assume 10% of traffic turns off	Split 50:50 for the on/off ramps	
Avenida 5	Assume 10% of traffic turns off	Assume 10% of traffic turns off	Split 50:50 for the on/off ramps	
Mulenvos	Assume 10% of traffic turns off	Assume 10% of traffic turns off	Split 50:50 for the on/off ramps	
Cazenga	Assume 10% of traffic turns off	Assume 10% of traffic turns off	Split 50:50 for the on/off ramps	
SME	Assume 10% of traffic turns off	Assume 10% of traffic turns off	Split 50:50 for the on/off ramps	

Table V1 Traffic Assumptions

Table V2 Road Model Inputs – ID and Widths

Road Name	Road Model ID	Road Width (m)
Estr. de Catete	Road 1a	26
Estr. de Catete	Road 1b	22
Estr. de Catete	Road 1c	24
Estr. de Catete	Road 1d	24
Estr. de Catete	Road 1e	28
SME/Gas Station	Road 2a	4
SME/Gas Station	Road 2b	4
Viana	Road 3a	4
Viana	Road 3b	4
Cazenga	Road 4a	4
Cazenga	Road 4b	4
Mulenvos	Road 5a	9
Mulenvos	Road 5b	9
Avenida 5	Road 6a	8
Avenida 5	Road 6b	8

Table V3 Road Traffic Numbers and Speeds

Road ID	AADT (Do Nothing Scenario 2026)	%HGV (Do Nothing Scenario 2026)	AADT (Do Something Scenario 2026)	%HGV (Do Something Scenario 2026)	Speed (mph) LDVs	Speed (mph) HGVs
Road 1a	8522	34%	10908	34%	70	60
Road 1b	33986	20%	43502	20%	40	10

Road ID	AADT (Do Nothing Scenario 2026)	%HGV (Do Nothing Scenario 2026)	AADT (Do Something Scenario 2026)	%HGV (Do Something Scenario 2026)	Speed (mph) LDVs	Speed (mph) HGVs
Road 1c	14342	32%	18358	32%	40	15
Road 1d	14342	32%	18358	32%	20	10
Road 1e	14342	32%	18358	32%	45	15
Road 2a	426	34%	545	34%	70	60
Road 2b	426	34%	545	34%	70	60
Road 3a	0	0	2175	20%	40	10
Road 3b	0	0	2175	20%	40	10
Road 4a	717	32%	918	32%	40	15
Road 4b	717	32%	918	32%	40	15
Road 5a	717	32%	918	32%	20	10
Road 5b	717	32%	918	32%	20	10
Road 6a	717	32%	918	32%	45	15
Road 6b	717	32%	918	32%	45	15
APPENDIX W GAP ASSESSMENT BETWEEN ANGOLAN AND INTERNATIONAL LEGISLATION ON HUMAN RIGHTS

Theme	National Law	Observation	
Child labour and minimum age for work	Article 80.5 of the Constitution Articles 253-261 of the General Labour Law No. 7/15 Joint Executive Decree on Hazardous Occupations Prohibited for Children No. 171/10	The legal minimum age to work is 14 years old with consent of parents, guardian, legal representative, person or institution with the minor in charge or in the absence thereof General Labour Inspectorate. Annual medical examination must be performed up to the age of 18 years. As per labor regulations, minors should receive suitable working conditions considering their age, including provisions for safety, health, and education. They may engage in light work that doesn't require significant physical exertion, pose a risk to their well-being or hinder their physical and mental grow th. Minors under 16 years-old cannot work more than 6 hours a day and 34 hours a week while the limit for minors from 16 to 18 years old is of 7 hours a day and 39 hours a week. Hazardous work is prohibited to workers under 18 years old. A list of hazardous activities have been adopted by the government.	The legislatic supervision of w hich create Moreover, th (Committee Recommenda
Prohibition of forced labour/human trafficking	Article 60 and 76 of the Constitution Articles 5,194 and 212 of the General Labour Law No. 7/15 Article 178 of Law No. 38/20 approving the Penal Code Article 1.2 of Act No. 33/20 on Civil Requisitioning	The Labour Code prohibits forced and compulsory labour. Workers have the right to change employment with the condition to serve due notice to their employer. The Penal Code punishes human trafficking for labour purposes prescribing imprisonment ranging from 8 to 12 years. It also penalizes employers or labor agents who seize workers' identification documents, change contracts without the workers' approval, or withhold salary payments. The law allows civil requisition which is a mechanism used exceptionally allowing the State to resort to a set of determined and necessary measures to ensure, in particularly serious circumstances, the regular functioning of services or the availability of goods essential to the public interest or to vital sectors of the national economy. Refusal to perform the duties requested constitutes a crime of disobedience and is subject to the corresponding disciplinary procedure.	It is unclear exception to Labour Conv endangering of the popula
Working hours, overtime and leave	Articles 95.1 and 95.2 of the General Labour Law No. 7/15	As per the Labor Law, standard working hours are limited to 44 hours per week or 8 hours per day. How ever, there is flexibility to extend working hours up to a maximum of 54 hours per week of intermittent work. The labor legislation regulates the use of overtime and the associated compensation rates which differ depending on the number of hours and the size of the company. Employees are entitled to 22 days of annual leave after completing one full year of service. Female workers with children under the age of 14 are eligible for an additional day of annual leave for each child.	The law rega international Convention, intermittent w exceeds the limit of nine (In addition, s w orkers of s remunerated hours of w or the Conventio one and one of the compa
Termination of employment	Articles 206 to 210 of the General Labour Law No. 7/15	Termination of employment can be due to objective causes, beyond the control of the parties; voluntary decision of both parties; or unilateral decision by either party, enforceable against the other. When originating from the employer, the dismissal requires a valid reason and substantiation. Valid reasons encompass severe disciplinary infractions or external factors that make maintaining the employment relationship impossible. The Labor Law provides an enumeration of permissible grounds for disciplinary dismissal. Justifications for termination may also pertain to economic, technological, or structural circumstances such as internal reorganization, restructuring, downsizing, or business closure.	The list of ca the ILO Term Labor Law a based on uni filing of a cor marital status opinion, natio due to illness
Wages	Articles 161 - 165 of the General Labour Law No. 7/15	The Labour Laws guarantee a minimum wage for all workers. The rate is determined by of the Council of Ministers based upon the proposal made by the Minister of Protection, Labour and Finance following the recommendations of the National Council of Social Dialogue. As of February 2023, the minimum guaranteed wage is of 32,181 kwanzas (equivalent of about 63.094 USD) per month.	
Freedom of Association/Collective Bargaining	Articles 50 and 51 of the Constitution Article 7.1 of the General Labour Law No. 7/15 Articles 4-17 of the Trade Union Act No. 21- C/92 Strike Law No. 23/91 Law on the Right to Collective Bargaining No. 20-A/92	The Constitution ensures the right to freedom of association, including the freedom for all workers to establish trade union organizations to safeguard their collective and individual interests. The legislation recognises the fundamental right to collective bargaining and freedom of association without any discrimination. By law employers are required to reinstate workers who have been dismissed for union activities. Under the Constitution, employees possess the right to engage in strikes. The Strike Law governs the procedures and methods for exercising this right to strike. Striking workers can neither be transferred, fired nor discriminated against, according to this Act. How ever, certain employees who provide "essential services" and oil workers may not legally strike. Moreover, workers are required to negotiate with their employer for at least 20 days prior to a work stoppage.	The country Convention, Convention, The labour less standards re- or to strike. The but also the barriers to the government interference and voluntary bargaining in strike actions as w ell as ur the course o

Gaps against International Standards

on only applies to workers under the organization and of an employer through an employment relationship es risks for children working in the informal economy. ne legislation excludes casual work from its scope of Experts on the Application of Conventions and ations (CEACR) 2022).

if civil requisitioning remains within the limits of the forced labour outlined in Article 2(2)(d) of the Forced vention, 1930 (No. 29), which are circumstances the existence or the well-being of the whole or part ation (CEACR 2022b).

arding working hours is not fully in line with standards as defined in the Hours of Work (Industry) 1919 (No.1) given that the 54-hour weekly limit for work set in section 95(2) of the General Labour Act 48-hour limit set in the Convention and that no clear (9) hours per day is established.

section 117 of the General Labour Act provides that mall and micro-sized enterprises shall be

I for overtime with an increase of the rate of normal rk of 20 per cent and 10 per cent respectively, while ion requires a rate of pay for overtime not less than e-quarter times the regular rate, regardless of the size any (CEACR 2019).

ases excludes those that are considered invalid by nination of Employment Convention, making national ligned to this convention which include termination ion membership or participation in union activities, mplaint against an employer, race, colour, sex, is, family responsibilities, pregnancy, religion, political onal extraction or social origin, temporary absence s, or absence from work during maternity leave.

has neither ratified the Workers' Representatives 1971 (No. 135) nor Collective Bargaining 1981 (No. 154)

egislation is not fully aligned with international egarding the right to organize, to bargain collectively The International Trade Union Confederation (ITUC), CEACR, have identified several limitations including ne establishment of trade unions (including approval to form and join unions), employer with union activity, restrictions on the principle of free ry bargaining, limitations or ban on collective n certain sectors (public sector), obstacles to law ful s, limitations or ban on certain types of strike actions, ndue interference by authorities or employers during of strike. In particular, the law does not contain any

Theme	National Law	Observation	
			effective me strikers.
Non-discrimination and equal treatment	Articles 21.h, 23, 50 and 51 of the Constitution Articles 4.1, 4.2, 19.2b, 157.2, 242 7.1 of the General Labour Law No. 7/15 Article 212 of Law No. 38/20 approving the Penal Code	The Constitution prohibits discrimination on the grounds of origins, race, party affiliations, sex, colour, age or any other form of discrimination. The principle of non-discrimination also applies in the working context. The employer may face a minimum prison sentence of 2 years or a fine along with 240 days of imprisonment. The law ensures equal pay for work of equal value and requires that aspects of the remuneration scheme to be the same for men and women. Equal opportunity is also guaranteed in training and careers progress. The law also institutes a quota system to encourage the public and private sectors to employ more persons with disabilities. The quota for the private sector is of tw o (2) percent.	The UN Hun general law Angola to ac protection as a compreher 2019). Although the for men and several cate excluded fro sets out sev accommodat security ben "remuneratio Convention, by prohibiting equality and to employme With regards legislation pi w ork and fail (CEACR 202
Migrant workers and refugees	Article 24 of the Constitution Article 19.2 b) of the General Labour Law No. 7/15 Article 1.3 b) of the Decree No. 53/05 Law No. 6	 The Constitution prohibits the depravation of rights based on several criteria including territory of origin. Migrants enjoy fundamental rights and freedoms, are benefit from the protection of the State. The labour law prohibits discrimination in employment based on several criteria including citizenship. The law establishes equality of treatment betw een foreign w orkers and Angolans in health care, security against accidents at w ork and retirement pensions, as w ell as for the fixing of w ages and the payment of income tax. The right to compensation for damages resulting from accidents at w ork and occupational diseases also applies to migrant w orkers without prejudice to special regimes provided for by law and by applicable international conventions. 	The country Protection o Their Familie (Supplement The country fundamental w orkers and The legislation The legislation The legislation
Women	Article 21.k of the Constitution Articles 212 and 246 of the General Labor Law No. 7/15 Presidential Decree No. 29/17 approving the list of w orks prohibited to w omen	Although the Constitution promotes equality between men and women, certain types of employment are prohibited to women. Indeed, the labor legislation prohibits the employment of women in occupations that involve unhealthy and hazardous work, as well as those classified as risk measures with actual or potential harmful effects. Additionally, women are not permitted to work underground or in mines. Pregnant women should work in conditions that are adequate to their situation and should not engaged in overtime or night work.	Restrictions maternity pro footing. With regard Committee r to ensure ad forms of viol private sphe
Harassment	Article 186 of the Law No. 38/20 approving the Penal Code	The labour legislation does not prohibit sexual harassment in employment and occupation. The penal law punishes sexual harassment, including in a hierarchal relationship of work, with imprisonment for up to two (2) years or a fine of up to 240 days.	The country Convention, The criminali existence of Code only fo and harassn the legislatio
Corruption	Law of Public Integrity No. 3/10 Law No. 38/20 approving the Penal Code	The law of Public Integrity governs the legal and institutional framework of corruption in Angola. Corruption is prohibited and constitutes a criminal offence that may be punished between 3 to 5 years of imprisonment or fines.	N/A
Occupational health and safety (OHS)	Articles 81 to 91 of the General Labor Law No. 7/15	Employers have a responsibility to ensure that working conditions support the physical, mental, and social well-being of their workers. To this regard, they are required to design facilities and processes that minimize or eliminate risks and integrate occupational safety and health (OSH) activities into their	The country Health Conv

Gaps against International Standards

asures to prohibit employer retribution against

nan Rights Committee highlighted the absence of a on equality and non-discrimination, recommended dopt such legislation providing full and effective gainst discrimination in all aspects of life and covering nsive list of grounds (UN Human Rights Committee,

e labour legislation provides for equal remuneration women for the same work or for work of equal value, egories of workers, including casual workers, are om the scope. Section 155 of the General Labour Law veral aspects of remuneration (such as travel and tion allow ances, family allow ances, and other social hefits) that are included within the definition of on" stated in Article 1(a) of Equal Remuneration 1951 (No. 100) (CEACR 2023a). In addition, the law, g night work, does not respect the principle of gender does not ensure that men and women have access ent on an equal footing.

s to workers with family responsibilities, the labour rovides for measures to assist women in reconciling mily responsibilities that are not available to men 23b).

is not party to the International Convention on the f the Rights of All Migrant Workers and Members of and has not ratified the Migrant Workers ary Provisions) Convention, 1975 (No. 143).

legislation does not guarantee the protection of rights and freedoms to undocumented migrant their families.

on does not allow migrant workers the leadership of a professional associations.

on does not allow refugees to work and restricted om obtaining business licenses.

for the protection of women should be limited to otection to ensure access to employment on an equal

to violence against women, the UN Human Rights recommended Angola to adopt a comprehensive law dequate prevention, protection and punishment of all lence against women and girls, both in the public and eres (UN Human Rights Committee, 2019).

has not ratified the Violence and Harassment 2019 (No. 190).

lization of the behaviour seems to be subject to the f a hierarchical relationship. Moreover, as the Penal ocuses on sexual harassment, other forms of violence ment in the workplace do not seem to be covered by on.

has not ratified neither the Occupational Safety and ention, 1981 (No. 155) nor the Promotional

Theme	National Law	Observation	
	Articles 9 to 19, 25 of the Decree No. 31/94 Executive Decree No. 6/96 on the general rules of OSH services in enterprises	management practices. The health monitoring of workers should be ensured, including through medical examinations, with special attention given to those exposed to hazardous substances, engaged in unhealthy or repetitive work, or working at heights or depths. Night workers in industrial activities should also undergo periodic medical examinations. Companies with 50 or more employees are required to establish an OSH service staffed with trained occupational safety technicians. Employers must provide workers with all reasonable personal protective equipment necessary to prevent, to the extent that is reasonable, the risks of accidents or of injurious health effects and free of charge. In addition, employers are obligated to offer occupational safety and health (OSH) training to workers in the follow ing situations: when they start working or change positions, when they need to learn new techniques, materials, or substances that may pose risks, and when they return to work after a six-month absence. The management of the company should incorporate OSH activities and the implementation of preventive measures. Sufficient resources should be allocated, and institutionalized mechanisms should be established to ensure employee participation.	Framew ork ((No. 187). There is no themselves The legislatic of people oth companies of create risks Rights and p company and access OHS right to acco
Social security	Presidential Decree No. 8/11	Social security benefits, including pensions, family allow ances, sickness and maternity benefices, are provided through a social insurance system in which employees contribute 3% of their total monthly earnings, and employers contribute 8% of their employees' monthly earnings to the National Social Insurance Institute. Social security is only mandatory for Angolan nationals and for individuals with a residency permit. Foreign nationals employed in Angola (without a residence permit) could be exempted from Angolan social security requirements if they can demonstrate that they are already covered by the social security system of their home country.	
Land property and use	Article 37 of the Constitution Land Act No. 9/04 Law No 1/21 for the Expropriation of Public Utility Presidential Decree No. 117/16 Regulation for Resettlement Operations	The Angolan Constitution recognizes the right to private property and establish that expropriations are permitted only when based on reasons of public interest and by paying a prompt, full, and fair compensation, in accordance with the law and the principle of non-discrimination. In case of expropriation, the landow ner should be informed six months in advance. The Land Act recognizes the right of rural communities to collectively ow n, administer, utilize, and benefit from rural community lands. As per section 23(2) of the Act, the delineation of rural land is preceded by consultations with rural families and with the institutions of the traditional authorities within the specific area in which the land in question is located. This recognition of customary land rights, which are based on habits or usage, requires that rights-holders be compensated fairly and promptly if this land is expropriated for public use.	In 2019, the about the lac affected con development their access strengthen it minorities, in Committee, The Angolar Finance Cor acquisition a limited to) co livelihood re individuals (compensatio and scope o
Indigenous Peoples	N/A	N/A	Although An Populations recognize th references to (Internationa Therefore, Ir protection as core human some public The last rep Convention
Cultural Heritage	Article 21 of the Constitution Decree No 80/76	The Constitution outlines the duty of the State with regards to the promotion and protection of historical and cultural heritage. The legislation determines the form of the conservation and protection of Angolan People's Historical and Cultural Heritage.	
Public forces / Use of force	National Police Discipline Regulations of 1996 Presidential Decree No. 38/14 Framew ork Act on the Organization and Functioning of the Police No. 6/20	The principles that govern police conduct, including legality, integrity, responsibility, courtesy, and privacy, are laid out by the Framework Act on the Organization and Functioning of the Police (No. 6/20 of March 24, 2020). The Regulations on the Staff Disciplinary Code, established through Presidential Decree No. 38/14 of February 19, 2014, outline the disciplinary measures that apply to different offenses and oversee the behaviour of the national police.	The UN Hun non-complian standards. T that the prim reflected in t Committee,

Gaps against International Standards for Occupational Safety and Health Convention, 2006

clear provision about the right for workers to remove from a dangerous situation.

on does not require employers to cover the protection her than own employees or collaborate with other engaging in activities simultaneously, which could for contracted workers.

powers of OHS workers' representatives within the re not fully guaranteed by the legislation (e.g., right to 6 information, right to be present during interviews, company inspectors).

UN Human Rights Committee raised its concern ck of national legal framew ork for consultation with mmunities, in particular ethnic minorities, prior starting t activities and the adverse impact this could have on s to land. The Committee recommended the country to ts legislation in order to protect the rights of ethnic ncluding their land rights (UN Human Rights 2019).

n legislation is not fully in line with International rporation (IFC) Performance Standards (5) on land and resettlement, in particular regarding (but not onsultation process with affected persons, inclusion of estoration aspects, grievance mechanism, eligible (informal land and asset ow ners and users), on framew ork (in cash and in-kind compensations), of vulnerable groups.

ngola has ratified the Indigenous and Tribal Convention of 1957 (ILO 107), the country does not be concept of Indigenous Peoples and there are no to such Minority in the Constitution or domestic law al Work Group for Indigenous Affairs 2023). Indigenous People do not receive the special is per international standards and a number of their rights remain unrealised. The San have received recognition.

ort issued to the ILO CEACR on the application of the was in 2010.

nan Rights Committee raised its concern about the nce of the national legislation with international The Committee recommended the State to ensure iciples of necessity and proportionality are properly the national legislation (UN Human Rights 2019). ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Construction and Operation of 5 Overpasses – Luanda Railway Track, Angola

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