ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

NON TECHNICAL SUMMARY

CONTRACT FOR REHABILITATION OF THE ROAD EC 192 / EN 250 / EC 254 / EC 385, LUAU / CAZOMBO

PROJECT DESIGNATION: CONTRACT FOR REHABILITATION OF THE ROAD EC 192 / EN 250 / EC 254 / EC 385, LUAU / CAZOMBO

PROMOTING ENTITY: Angola Roads Institute – Ministry of Public Works, Urbanism and Housing

EXECUTING ENTITY: QG Konstruktion GmbH

CONSULTANT ENTITY: RESURB Ambiente, Lda.

(Company registered with the Ministry of Environment, as an Environmental Consultant, with Certificate No. 20816908221, valid until 08/09/2023)

Luanda, 25 May, 2023

Elaborated:	**Aproved:**
Edite Machado	
Edite Machado (Technical Coordination - RESURB)	Patrícia de Castro Gonçalves (Manager) Resurb Ambiente, Lda.

INDEX

1.INTRODUCTION

This document constitutes the Non-Technical Summary (NTR) relating to the Environmental and Social Impact Assessment of the Project for the "Contract for the Rehabilitation of Road EC 192 / EN 250 / EC 254 / EC 385, Luau / Cazombo".

The NTS is a document that is part of the Environmental and Social Impact Assessment (ESIA), which summarizes, in common language, the main information found in the ESIA. It is presented separately, in order to facilitate public disclosure of the Project and the respective ESIA.

An Environmental and Social Impact Assessment is a document that contains a description of the project, identification and assessment of positive and negative socio-environmental impacts, socio-environmental management measures aimed at avoiding, minimizing or compensating for negative impacts, the monitoring plan of the project and the Non-Technical Summary of this information.

Any Project is a catalyst in its various aspects, of negative environmental impacts, however, the point of view of the positive impacts that may be generated by it should never be disregarded, highlighting the socio-economic aspects. In this context, it is important to mention in the Environmental and Social Management Plan and in its Social and Environmental Mitigation, Compensation and Improvement Programme, 127 mitigation measures and 9 compensation measures are defined, and environmental and social indicators in the Social and Environmental Monitoring and Monitoring Programme. In addition, other complementary programs were defined, namely, the Stakeholder Engagement Plan, the Safety and Health Plan, the Water Monitoring Plan for Human Consumption, the Wastewater Monitoring Plan, the Soil Monitoring Plan, the Air Quality Monitoring Plan, Environmental Noise Monitoring Plan, Occupational Noise Monitoring Plan, Waste Management Plan, Decommissioning Plan for Jobsites, Support Centers and

"Everyone starts off strong. Success comes to those who have an unwavering commitment to staying that way until the end.."

Howard Schuldz

Biophysical Recovery of Affected Areas, with a view to ensuring the continuous improvement of operational, environmental and social impact of project implementation throughout its life cycle.

With the presentation of the conclusions obtained in a separate chapter, it is intended to advise the promoting entity of the Project in the identification of adequate minimization and/or compensation measures, as well as in the definition of guidelines for monitoring the potential negative effects identified, also seeking to contribute in a sustained way to decision-making on environmental licensing, as well as information to the general public and public and private entities interested in the Project.

2. NATIONAL ENVIRONMENTAL LEGAL FRAMEWORK, REQUIREMENTS AND INTERNATIONAL STANDARDS

2.1. Legal and Environmental Regulatory Framework of the Project

In terms of Angolan legislation, the first law that focused on environmental issues was the Basic Environmental Law, Law no 5/98., which defines that in order to maintain an environment conducive to guaranteeing the population's quality of life, it is necessary to guarantee the least environmental impact of the actions necessary for the development of the country through correct territorial planning and the application of appropriate techniques and technologies.

According to article 15, the implementation of infrastructures in the national space, which, due to their size, nature or location, cause a significant negative impact on the natural or social environment, is conditioned to an Environmental and Social Impact Assessment process, in which determine their social, environmental, economic viability and the methods for neutralizing or minimizing their effects.

The NTS was prepared in accordance with the legislation in force in terms of Environmental Impact Assessment (Decree No. 117/20 of April 22, 2020), in order to bring the project into line with the applicable environmental legislation in terms of environmental licensing.

In view of the provisions of the n. º 1 of Article 4 of the Decree on Environmental Impact (Decree No. 117/20 of April 22, 2020):

"*The licensing of agricultural, forestry, industrial, commercial, housing, tourist or infrastructure processes that, by their nature, size or location, have implications for environmental and social balance and harmony are subject to a prior Impact Assessment process which implies the elaboration of an Environmental Impact Study (EIS) to be submitted for approval by the competent entity responsible for the environmental area*".

"Environmental preservation is essential for sustainable business growth, combined with efficient resource management."

J. Martins

Given the typology of the project under analysis, it fits into **Point 15**, of **Annex II o**f Decree No. 117/20 of 22 April 2020, namely in **Category B Activities, item j)** "All main roads outside the urban area". Thus, it lacks an Environmental Impact Assessment procedure.

2.2. EQUATOR PRINCIPLES

The Equator Principles developed by the financing entities, which govern their action for the management of social and environmental areas with regard to the financing of large investment projects, are the following:

- Principle 1: Review and Categorization;
- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Social and Environmental Standards;
- Principle 4: Socio-environmental Management System and Equator Principles Action Plan;
- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting;
- Principle 10: Communication and Transparency.

The Equator Principles apply globally and to all sectors of the economy. Since the Project is located in Angola, which is a Non-Designated Country, it must, as defined in Principle 3, with respect to the applicable Social and Environmental Standards, comply with the applicable Social and Environmental Sustainability Performance Standards (Performance Standards) of the IFC and with the World Bank Environment, Health and Safety Guidelines (EHS Guidelines).

2.3. INTERNATIONAL FINANCE CORPORATION PERFORMANCE STANDARDS

This ESIA also considered the Performance Standards (PS) of the International Finance Corporation (IFC) of the World Bank Group, given that the project site is located in a Non-Designated Country.

The main objectives of the 8 IFC Performance Standards are presented below.

// Performance Standard 1: Assessment and Management of Social and Environmental Risks and Impacts

// Performance Standard 2: Employment and Working Conditions

// Performance Standard 3: Resource Efficiency and Pollution Prevention

// Performance Standard 4: Community Health and Safety

//Performance Standard 5: Land Acquisition and Involuntary Resettlement

// Performance Standard 6: Biodiversity Preservation and Sustainable Management of Living Natural Resources

// Performance Standard 7: Indigenous People

// Performance Standard 8: Cultural Heritage

Analyzing the IFC Performance Standards, it appears that all PS are applicable for the Project under analysis, with the exception of PS 5 and PS 7.

2.4. International Conventions and Best Practices

2.4.1. Fundamental Convention of the International Labor Organization (ILO)

The Project will adopt the fundamental principles and rights at work contained in the Fundamental Convention of the International Labor Organization (ILO). Considering that economic growth is essential, but not sufficient to ensure equity, social progress and poverty eradication, confirms the need for the ILO to promote strong social policies, justice and democratic institutions.

2.4.2. International Charter of Human Rights

The UN Human Rights System is made up of nine treaties, focusing on all types of human rights. The Universal Declaration, the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) form what is called the International Bill of Human Rights. The International Bill of Human Rights is the cornerstone of a series of international human rights treaties that embody a variety of different rights.

In order to improve the project's social performance, it is committed to complying with human rights, and this commitment is reflected in the Project Management Policies. The organizational policy on the human rights perspective will contribute to the successful management of the project's human relations.

2.4.3. Environmental, Health and Safety Guidelines

The World Bank Group's Environmental, Health and Safety Guidelines (EHS Guidelines) are tools that allow the implementation of practical aspects of environmental protection and safety at work, with the main objective of preventing and reducing accidents, emergencies, and health problems at work. Thus, the project will also take into account the General Environmental, Health and Safety Guidelines and the adoption of recommended mitigation measures.

2.5. Comparison of the National Environmental Legal Framework with IFC Performance Standards, and Equator Principles

Realizing a comparative analysis of the National Environmental Legislation with the International Standards presented above, there is a harmonization regarding the risk categorization of the project, since both the National Environmental Legislation and the IFC international standards and Equator Principles frame the project of the "Contract for the Rehabilitation of Road EC 192 / EN 250 / EC 254 / EC 385, Luau / Cazombo" as **Risk Category B**, that is, of **moderate environmental and social risk.**

The risk categorization was mainly supported by the fact that the project under analysis:

- be related to the rehabilitation of an existing road section that runs between Luau and Cazombo, which is why it is not foreseen, to date, the need to carry out any physical and/or economic resettlement since the area of project intervention will be restricted to the road easement area;
- and its route does not cross any place considered as critical natural habitat, namely, that which is legally protected; officially proposed to be protected; and unprotected, but with high environmental value (whether according to the national and/or international IUCN classification) and because the approach to ecosystem services concludes that the project does not foresee that the project will affect priority services;
- not affect indigenous people. When characterizing the socio-environmental reference situation of the project and the consultation and consultation process with the local community, RESURB identified the presence of ethnic groups in the areas of influence of the project, however the respective communities that speak some dialects/mother tongues also speak the official language (Portuguese) and do not identify themselves as belonging to a distinct indigenous cultural group and are recognized as such. At the same time, they are fully integrated into society;

- and the potential negative impacts and socio-environmental risks identified and evaluated are, reduced in number, generally local, largely reversible and mitigated.

3. PROJECT CHARACTERIZATION

3.1. Project Objectives and Justification

The present study focuses on the rehabilitation project of the road section between Luau-Cazombo-Lumbala Caquengue, which is a structural road section, since it will allow the road connection between the municipal headquarters and the circulation in the referred section, which currently, due to poor conditions, also aggravated by the rainy season, it has favored the vulnerability of the surrounding Municipalities, since the non-existence and/or deterioration of the road section, which makes circulation impossible, favors the isolation of the population and delays the socioeconomic development of the region, since it makes the free movement of people and goods impossible.

It is intended, therefore, that the implementation of the project favors the development of regional potential, the reduction of the overall cost and time of transport, the increase of safety in road traffic, the satisfaction of international traffic (between the Province of Moxico and Democratic Republic of Congo), the reduction in the need for maintenance of vehicles that use the road and the dynamization of economic activities, thus improving the quality of life of the populations that use this section of road.

"The land is what we all have in common"

Wendell Berry

3.2. Identification of the Entities Involved in the Project

The Promoting Entity of the project is the Angola Roads Institute of the Ministry of Public Works, Urbanism and Housing of the Republic of Angola and the executing entity is QG Konstruktion GmbH. The technical authorship of the preparation of the Environmental and Social Impact Assessment of the project is the responsibility of RESURB Ambiente, Lda., which has a multidisciplinary team with extensive experience in similar work and which is a company registered with the Ministry of the Environment, as Environmental Consultant, which gives you the skills for this purpose.

3.3. PROJECT DESCRIPTION AND LOCATION

The rehabilitation project for the EC192/EN 250/EC254/EC385 RC Luau/Cazombo road is part of Moxico Province and will extend for 246 km, as shown in the following figure.

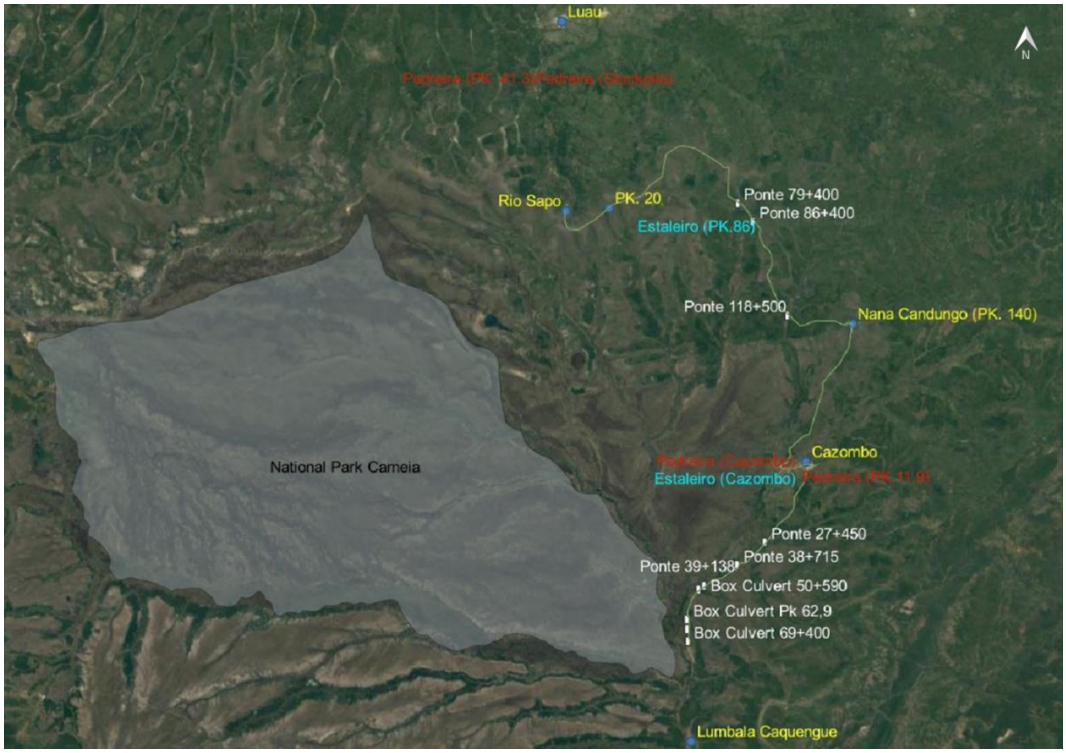

Figure 1 – Geographic location of the project (Source: QGMI).

The rehabilitation of the road section also includes the rehabilitation of seven (7) bridges that exist along the route between Luau-Cazombo-Lumbala Caquengue, according to the schematic representation of the project intervention area (*see* **Figure 2** to **4**).

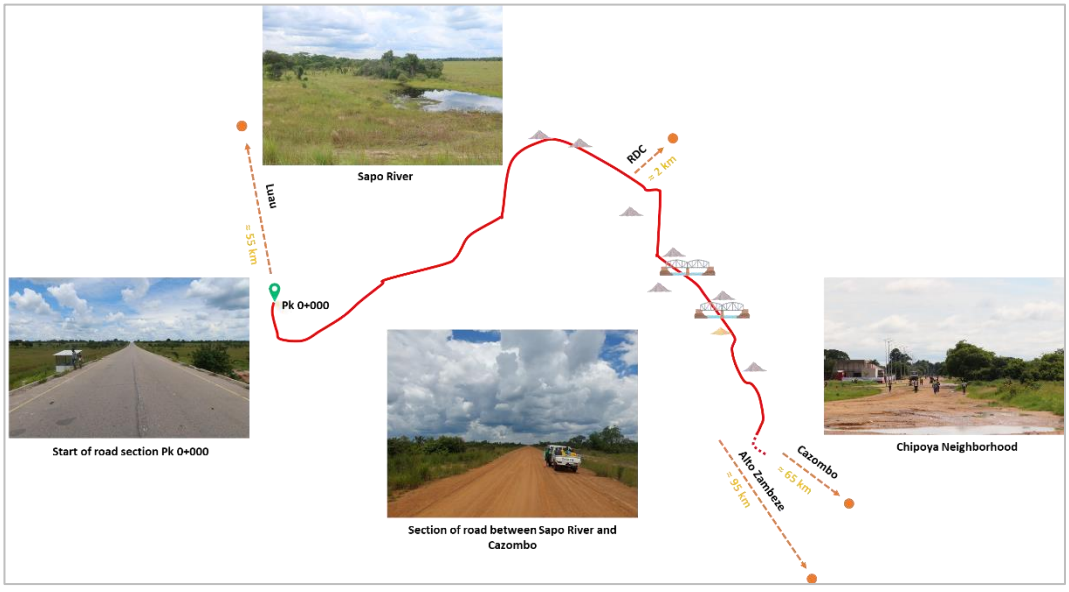

Figure 2 – Layout of the beginning of the road section (Pk 0+000) and location of the nearest Communes and Neighborhoods.

Figure 3 – Layout of the section of the road section up to Pk 196+000 and location of the nearest Communes and Neighborhoods.

Figure 4 – Layout of the section of the road section between Pk 0+000 and Pk 70+000 and location of the nearest Communes and Neighborhoods.

The rehabilitation activity of a road aims to restore the structural integrity of the pavement and allow it to withstand the loads imposed by vehicle traffic. The rehabilitation of roads manages to promote greater mobility of the population, improves access to education and health services, boosts economic activity growth in the regions benefited by the rehabilitated road, reduces the need for maintenance on the vehicles that use it, among others. It is estimated the duration of 48 months (4 years) for the rehabilitation phase of the Project.

In the Exploration Phase of the project, the main planned activities, in addition to using the road, will be those related to the maintenance of road infrastructure and rehabilitated/built bridges in order to guarantee their proper functioning in accordance with the characteristics assigned to them.

3.4. Environmental Informations of the Project Construction Phase

3.4.1. Water

For the construction phase, the project will need to supply water to carry out the construction activities, as well as the installations and support infrastructure. In this sense, the use of water is foreseen for the social and support facilities, for the irrigation of accesses, for the production of concrete, for the work fronts, among others.

The source of the water (non-potable/non-controlled) for use in the contract's construction activities will come from surface catchments and will be stored in 7 reservoirs of 20 to 30 m^3 in the support yard for the project.

Water consumption during the contract will be highly variable since it will be inherent to the construction activities carried out and the weather conditions recorded during the Construction Phase, with an estimated consumption of around 94,000 m^3 for the entire contract. It should be noted that this value is merely indicative and may vary depending on the activities carried out.

With regard to the consumption of drinking water, it will be limited to the use of employees who will live in the base of life (social support yard) and the consumption of drinking water, by other employees, on the work fronts, foreseeing consumption of around 6.500 m^3 for the entire contract.

3.4.2. Energy

During the construction phase, the source of energy consumed will come from fossil sources (diesel and gasoline) for the operation of machinery and equipment, mainly on the work fronts, given that there is no electricity from the public network at the project site. Thus,

there will be groups of backup generators in order to guarantee the supply of energy, namely, three 500 Kva generators, four 125 Kva generators, one 275 Kva generator, three 40 Kva generators and one 75 Kva generator.

For the construction phase of the project and considering the type and quantity of equipment planned for the construction phase, a total consumption of around 23.000.421 L of fossil fuels is estimated.

3.4.3. LIQUID EFFLUENTS

3.4.3.1. INDUSTRIAL LIQUID EFFLUENTS

Regarding to industrial water, during the construction phase of the project, it is considered the existence of waste water arising from the support facilities for the work, namely from washing equipment and vehicles in the yards, technical areas for the storage of materials, equipment and parking of vehicles and machines, place of implantation of generators and fuel tanks, workshops, areas of refueling of vehicles and machines and betuminous and concrete plants. Wastewater from this source should be sent to hydrocarbon separators and, if necessary, be subjected to a treatment system before discharge into the receiving environment.

Regarding to the storage area for chemical products and fuel supply, this should be properly waterproofed, with spill containment kits available, consisting of a bucket containing absorbent material, namely sand, given its good capacity for absorbing liquids, and a shovel, to spread and remove the contaminated absorbent, whenever necessary. The sand, after use, must be sent as contaminated waste by a Waste Management Operator (OGR), duly licensed and trained, and delivered to a final destination for proper treatment. However, this entire area must be surrounded by a retaining wall, in order to contain any small spills that may occur, resulting from a fuel leak. At the same time, installed generators must have retention basins to contain any small oil/fuel spills that may occur, functioning as a first containment tool.

It should be noted that in the event of spillage onto the ground, employees must have specific training to know how to act in this situation, and the spillage site must be immediately contained, slatted/cleaned and the resulting material subsequently deposited and stored in specific container to be collected and forwarded to the authorized final destination.

With regard to the production of concrete, wastewater will be related to the manufacturing process and washing of self-concrete trucks leading to the production of concrete grout. This

wastewater will be stored in dedicated wash wells and after dehydration, the material can be reused.

3.4.3.2. Domestic Liquid Effluents

At the project site, there is no basic sanitation network, so connection to it is not possible. In this way, the domestic effluents resulting from the support installations (eg, from sanitary installations, among others) will be conducted to watertight septic tanks and subsequently collected by a licensed waste operator.

3.4.3.3. Effluents from Kitchens and Canteens

For the construction phase of the project, given the expected number of employees, it is suggested the implementation of grease separators in the kitchens/dining rooms. Grease Separators are watertight containers, intended for the reception and treatment of greasy wastewater from domestic or industrial use, caused by food handling.

3.4.3.4. Rainwater Effluents

In the project under analysis there is no reuse of rainwater. These effluents are only drained and routed through natural drainage ditches.

3.4.4. Waste

In the construction phase of the project, it is expected that the waste generated will be, for the most part, non-hazardous. The most relevant residues in terms of quantity will eventually be the excess soil from ditching. With regard to hazardous waste, this will be related to possible accident situations (spills) and others associated with cleaning and maintenance of equipment used in construction activities.

During construction activities, should always be adopted the Principle of Waste Prevention and Reduction. In this sense, the Executing Entity must implement waste management measures that give priority to reduction operations, followed by reuse/reincorporation, recycling (when feasible) and finally, the disposal operation (landfill), thus reducing the carbon footprint of the project in the forwarding of waste to final destination. It should also be noted that waste prevention is the adoption of measures to reduce the amount of waste produced, namely by reusing products or extending the lifespan of products. Waste prevention also seeks to reduce adverse impacts on the environment and human health resulting from the waste produced and the content of hazardous substances present in materials and products.

The waste produced must be stored in a specific place, duly waterproofed and covered, in the support yards, until it is forwarded to a recovery destination and/or for final disposal by a Waste Management Operator (WMO) duly licensed by the National Waste Agency (NWA).

3.4.5. GASEOUS EFFLUENTS

The main source of pollution identified will be the use of vehicles and other equipment associated with construction activities, concrete and asphalt plants, as well as generators to supply electricity. With regard to vehicles, equipment and concrete and bituminous concrete/asphalt plants, their constant use leads to a large release of pollutants into the atmosphere. The burning of fossil fuel (diesel) into the atmosphere generates emissions of CO_2, NO_x, CO, among other gases, which contribute to the greenhouse effect and to the degradation of air quality. It is therefore suggested that the main mitigation measures include using equipment and machines in good condition and executing and enforcing an equipment maintenance plan, ensuring correct and optimized operation.

The mitigation of the emission of dust and particles will pass through the Awareness, Information and Training (AIT) of workers, in order to carry out the activities of carrying loads, lifting and unloading pulverulent materials, in order to reduce the dispersion/production of dust, through the adoption of good practices (eg respect for transport and unloading regulations for raw materials in bulk, through the placement of side rails when transporting powdery materials, and by carrying out the unloading at a lower height). On the work fronts, regular watering of the access routes to and around the work fronts should be ensured, in order to reduce the production of dust.

3.4.6. NOISE AND VIBRATIONS

Regarding to the construction phase of the project, the existence of two main sources of noise and vibrations is considered, namely those associated with the constructive activities of the project and associated with the circulation of machines, vehicles, heavy vehicles, etc. Discomfort related to noise and vibrations will be mainly felt by workers, population and surrounding fauna. It should be noted that in built-up areas, the circulation of heavy machinery could physically affect the existing buildings and in rural areas, noise and vibrations could lead to the escape of fauna, in particular avifauna (birds) and mammals.

During the construction phase of the project, will be considered noise and vibration emissions resulting from construction activities. The noise and vibration levels generated will result from the type and number of machinery used, activities carried out and circulation routes carried out by vehicles (light and heavy), which will require careful

planning of the places where activities are expected to be carried out, as well as the adjustment of working hours on the different work fronts, in order to mitigate noise pollution in the intervention area and surroundings.

It should be noted that, in accordance with the work's Safety and Health Plan, all workers will be equipped with the necessary Personal Protection Equipments (PPE), based on the risk assessment carried out, for the various construction activities, with hearing protectors provided for the noisiest activities.

4. CHARACTERIZATION OF THE REFERENCE SITUATION

4.1. CLIMATE AND CLIMATE CHANGES

The Province of Moxico, and in particular where the project is located, is characterized by a tropical climate, with average monthly temperatures ranging between 22° and 24° C and an average annual rainfall of around 1.284,6 mm.

Climate change is a natural phenomenon that has always occurred. However, during the last century, the recorded changes have been more intense than in the past. Climate models indicate that there will be a 3.0°C to 4.0°C rise in Angola's surface temperature in the east, and a slightly smaller rise in coastal and northern regions over the next 100 years. There is no consensus on future trends regarding precipitation in the Province. In addition to high temperatures, climate models project more extreme weather phenomena, an expansion of arid and semi-arid zones, seasonal changes in precipitation, localized flooding, higher incidence of wildfires, rising sea levels, increased rainfall in regions in the north of the country, changes in river flows and changes in sea and lake temperatures. Available projections indicate that there will be a shortening of the agricultural cultivation period in the south of Angola and along the coast, while the areas in the north that currently benefit from two vegetative cycles may in the future have only one (Source: National Report of Angola - referring to the identification study “Climate Changes Count” by the Regional Association of Universities of Southern Africa (SARUA)).

Many of the climate changes are not felt locally and can be reflected in another place or region.

In the specific case of the project implementation site, some phenomena whose impacts could also arise from climate change stand out:

- Uncontrolled burning;
- Tree loss;
- Increase in drought episodes.

4.2. GEOLOGY AND GEOMORPHOLOGY

The Province of Moxico is an area of ancient relief with small variations in elevation. The Province is located in an area with altitudes ranging between 1.200 and 1.400 m (except in the Alto Zambeze massif where it reaches 1.800 m, being the highest area) (in wordpress.com). At a more local level, it should be noted that the road section between Luau-Cazombo-Lumbala Caquiengue that will be rehabilitated (about 260 km) has an altitude that varies between 1.068 to 1.181 m

Regarding the geological framework, the area under study is inserted in the ephorphic and archaic sedimentary and undifferentiated sedimentary geological units consisting mainly of quaternary allivation sands, quaternary sands of kalahari and gneiss from the the gneiss complex Archean based.

4.3. WATER RESOURCES

4.3.1. SURFACE WATER RESOURCES

The Province of Moxico is drained by three hydrographic basins, namely, the Zambezi-in the center east, the Kubango in the south and the Zaire in the north. Important water courses cross the entire province, namely the Zambezi, Luena, Lungué-Bungo, Cassai, Chicaluege, Loio, Luanguinga and Kuango.

During the fieldwork carried out, several surface water lines were identified, as well as areas of *chanas* in the area of influence of the project, as can be seen in the following figure (*see* **Figure 5**).

Figure 5 – Photographic record of: A) River Conoegi, B) River Sapo, C) River Maquenhe and D) Chanas Zone.

Water pollution is one of the main causes of diseases such as cholera, typhoid fever and diarrhea, being mainly caused by anthropogenic action.

4.3.2. UNDERGROUND WATER RESOURCES

The project's implantation area is part of an area of Unconsolidated Aquifers of variable productivity (low to high), Sedimentary Aquifers with intergranular pores of moderate to high productivity and Rocky Substrate Aquifers of low to moderate productivity.

4.3.3. WATER QUALITY

Water quality in the water environment is a topic that is little known in the country, and there is no national water quality network, as even the existing hydrometric network is very limited. Due to the absence of analytical reference results for the project site, **were selected 8 surface water collection points (P1, P2, P3, P4, P5, P6, P7 and P8).** These points were chosen **to characterize the reference situation of water resources**. Water quality monitoring was carried out in situ using a multi-parameter probe. The following figure (see **Figure 6**) illustrates the water quality monitoring points.

Figure 6 – Superficial Water Resources Monitoring Points.

Analyzing the results obtained during the *in situ* monitoring of the water quality at the superficial points presented above, it is verified that all the parameters analyzed with the Multi-parametric probe comply with the reference values considered as an indication.

Regarding to the organoleptic analysis carried out, it can be seen that all the samples were colourless, clear and odorless, with the exception of the superficial point P4, whose collected sample was slightly cloudy.

As for the analyzed parameters, in situ, there is no correlation or trend from upstream to downstream of the various analyzed parameters.

The water quality of surface water resources monitored in the area of direct influence of the project, although some sources of pollution of anthropogenic origin have been identified in the areas of influence of the project, does not reveal to be contaminated. On the other hand, the current state of degradation of the road section also does not allow for the dynamization and establishment of economic activities in the region with potential negative impacts on the water quality of surface water resources.

Currently, the surroundings of the surface water resources monitoring points are predominantly natural, as can be seen from the previous figure (*see* **Figure 6**).

4.4. SOILS

According to the Soil Charter of Angola, the road section of the project under analysis is mostly made up of Ferrassolos, followed by Arenosols and Gleissolos. The latter are found essentially in zona de chana (wetlands).

Regarding to the organoleptic analysis carried out, when carrying out the field work, it was found that soils of the Ferrasolos type are essentially reddish to brownish in color, Arenosols with a yellowish color and Gleissolos with a color that varies from reddish-brown to bluish grey, depending on the depths of the soil profile. The following figures show the typical profiles of each soil identified above and the respective photographic record that allows illustrating their predominant colours.

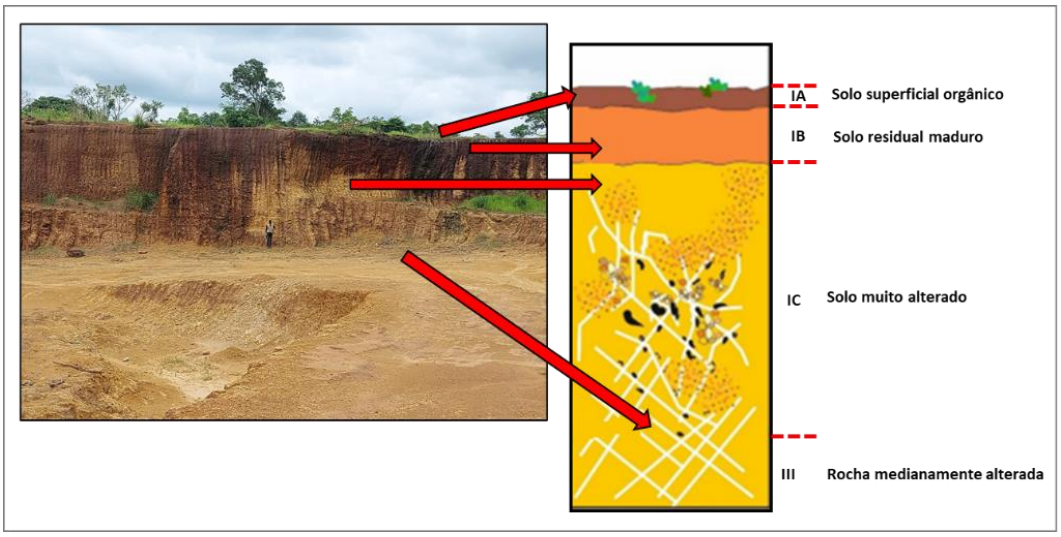

Figure 7 – Soil profile: Ferrasols at PK 193+400 (Commune of Cazombo).

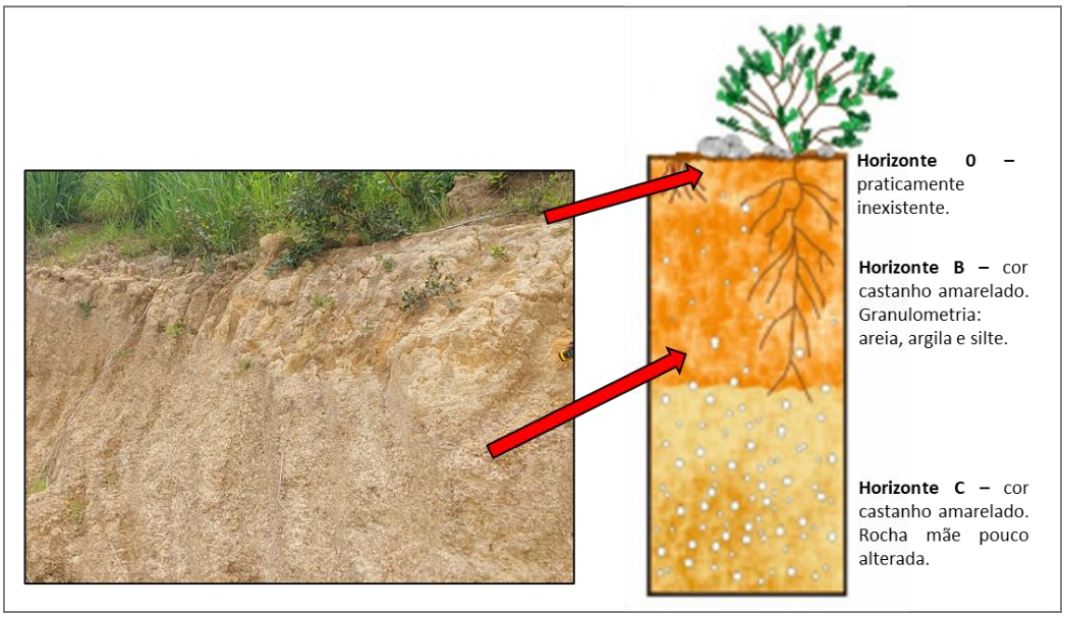

Figure 8 – Soil profile: Arenosols in KP 132+400 (Nana Candundo Commune).

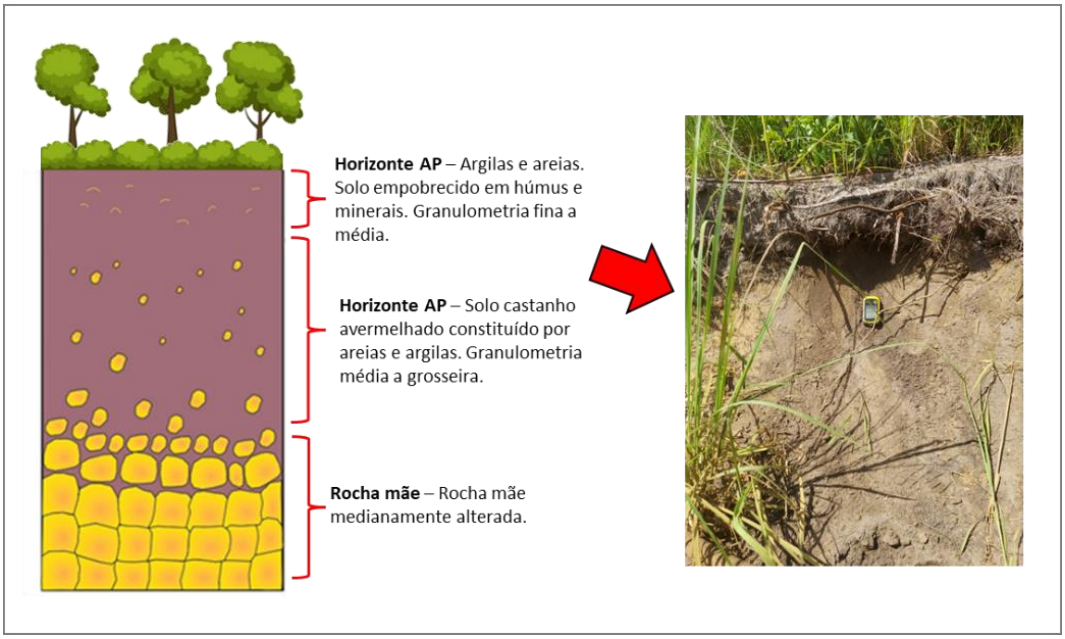

Figure 9 – Soil Profile: gleissolos háplicos arenosos no PK 153+700 (Comuna do Nana Candundo).

4.5. LAND USE AND SPATIAL PLANNING

Burning of waste (uncontrolled) contributes to the depletion of the ozone layer.

The soils in the Province of Moxico are generally not very fertile, with little or no aptitude from an agricultural point of view. The clusters located in the chana areas (deposits in an elongated shape) show a marked halomorphism (salinization of the soil) and hydromorphism (excess water on the soil), which makes them unsuitable for the establishment of tillage. The only soils in the Province that have acceptable levels of cation exchange capacity are located in the eastern zones, along the rivers and in the Várzea of Bulozi. However, high rainfall has stripped most of the nutrients from the ferrasols to the east, and gleysols along rivers are often too acidic or waterlogged for crop cultivation (Source: Moxico Atlas and profile, Angola, 2015).

At a more local level, the site of the project's implantation presents, for the most part, a **land use characterized by the presence of natural vegetation (trees and herbaceous vegetation)**, having been registered during the field work to characterize the reference situation of the project that the Municipalities covered by the project, namely the rural area, **depended heavily on the primary sector**.

Regarding to the descriptors Land Use and Spatial Planning and given that the project under analysis is for the rehabilitation of existing roads and that the project is part of the National Strategic Plan, it is not expected conflicts within the scope of constraints imposed by municipal territorial instruments and land use planning. It should be noted that the project is part of the road right-of-way, which is why it is not foreseen, to date, the allocation of the

local community's means of subsistence and/or the need to carry out any economic and/or physical resettlement for the implementation of the project.

4.6. ENVIRONMENTAL NOISE

The main source of noise pollution to which the population surrounding the project is subject is related to road traffic and socio-economic dynamics.

To obtain a perception of the significance of road traffic in the area of direct influence of the project, road traffic was counted during the day. At the same time, monitoring was carried out with the aim of characterizing the reference sound environment, in the surroundings of the project, in the absence of construction activities, for the daytime period, in **4 locations** (*see* **Figure 10**) defined considering the sensitive receptors identified in the area direct influence of the project, respectively **Ramb1, Ramb2, Ramb3, and Ramb4.**

The following table (*see* **Table 28**) presents the location and description of the sound environment monitoring points.

Table 1 - Location and description of environmental noise monitoring points

Monitoring Point	Description	Coordinates
Ramb1	Houses near the beginning of the road section between River Sapo and Cazombo (Pk 0+000)	11°12'41.24"S 22°14'30.30"E
Ramb2	Houses near the end of the road section between River Sapo and Cazombo (Pk 196+000)	11°53'47.26"S 22°54'49.64"E
Ramb3	Houses near the beginning of the road section between Cazombo and Lumbala Caquengue (Pk 0+000)	11°53'56.91"S 22°53'12.17"E
Ramb4	Houses near the end of the road section between Cazombo and Lumbala Caquengue (Pk 196+000)	12°22'59.72"S 22°34'56.01"E

Next, a photographic record of the places where the monitoring took place is presented.

"Nature is the only book that offers valuable content in all its pages."

Johann Hoethe

Figure 10 – Noise Environment Monitoring Points – Reference Situation.

The following table (*see* **Table 2**) presents the Reference Limit Values defined in the EHS Guidelines (for the daytime), considered as an indication, and the values obtained, in Points Ramb1, Ramb2, Ramb3 and Ramb4.

Table 2 – Presentation of the results regarding the measurement of the environmental noise at points Ramb1, Ramb2, Ramb3 and Ramb4

Point	Measurement Period	Reference Value (dB) defined in the EHS Guidelines*	Results(dB)
Ramb1	Daytime (07:00-20:00) - 30 min of measurement	55	54,0
Ramb2			52,6
Ramb3			52,9
Ramb4			51,3

(*) Reference Limit Values defined in the EHS Guidelines (Table 1.7.1: Noise Level Guidelines).

The results obtained in the baseline situation (without the implementation of the project) showed that all monitoring points recorded values lower than the reference **values defined in the Environmental, Health and Safety Guidelines** (EHS Guidelines) considered as an indication given the lack of national legislation for that purpose.

"Man will never invent anything simpler or more beautiful than a manifestation of nature. Given the cause, nature produces the effect in the shortest way in which it can be produced."

Leonardo da Vinci

4.7. EFFLUENTS AND WASTE

The development of cities and the increase in populations contribute on a large scale to the increase in waste production. In an analysis of the area surrounding the project, it was found that there was no/deficit availability of means for packaging and collecting urban and similar waste, which thus made it difficult to manage them properly. For this reason, they end up finding other ways to dispose of them, more often than not dumping the waste in open areas and then burning it, or even burying it or dumping it in the ground and/or water lines, as can be seen in the following figure that presents some situations recorded during the field visit (*see* **Figure 11**).

Figure 11 – Photographic record of improper disposal of waste on the ground by the local population.

The previously illustrated situations corroborate the information obtained when carrying out surveys to the population in the areas of influence of the project to characterize the reference situation. The analysis and treatment of the results showed that about 29% of the sample interviewed stated that they deposited waste on the ground and, given the non-existence and/or poor functioning of the system for collecting and managing waste in the Province of Moxico, 42% stated that they burned for the control and treatment of waste produced and the remaining 36% stated that they sometimes bury waste. With regard to waste management, all respondents stated that there was no municipal collection of waste in their Municipality/Commune.

Regarding to wastewater management, the situation of the basic sanitation network in the Province of Moxico is weak, with an inefficient and/or nonexistent wastewater drainage and treatment system, which may lead to public health problems and contribute to the environmental degradation of the environment.

4.8. AIR QUALITY

Given the lack of air quality monitoring stations in Angola that provide up-to-date data on this descriptor in the territory and in particular for the Moxico region, the characterization of the reference situation for this descriptor was carried out using **bibliographic data,**

recognition of field and environmental monitoring carried out *in situ* at **4 monitoring points (point Qar1 to Qar 4)** (*see* **Figure 12**). In this fieldwork, the main sources of air pollutant emissions and the main receptors were identified in the project's direct intervention area and in its immediate surroundings. During the monitoring, meteorological data were also collected, namely measurements of temperature and relative humidity of the air, direction and intensity of wind and precipitation, which influence the conditions of dispersion of pollutants in the atmosphere.

The following table (*see* **Table 3**) presents the location and description of the air quality monitoring points.

Table 3 - Location and description of air quality monitoring points

Monitoring Point	Description	Coordinates
Qar1	Houses near the beginning of the road section between River Sapo and Cazombo (Pk 0+000)	11°12'41.24"S 22°14'30.30"E
Qar2	Houses near the end of the road section between River Sapo and Cazombo (Pk 196+000)	11°53'47.26"S 22°54'49.64"E
Qar3	Houses near the beginning of the road section between Cazombo and Lumbala Caquengue (Pk 0+000)	11°53'56.91"S 22°53'12.17"E
Qar4	Houses near the end of the road section between Cazombo and Lumbala Caquengue (Pk 196+000)	12°22'59.72"S 22°34'56.01"E

Next, we present the photographic record (*see* **Figure 12**) of the places where the monitoring was carried out at points Qar1, Qar2, Qar3 and Qar4.

Figure 12 – Air Quality Monitoring Points.

The following table (*see* **Table 4**) presents the results obtained at the monitored points (Points Qar1, Qar2, Qar 3 and Qar4) as well as the Reference Limit Values defined in the WHO Guidelines which will be considered, for purely indicative purposes, in view of the absence of Angolan legislation for this purpose.

Table 4 – Presentation of results referring to points Qar1, Qar2, Qar3 and Qar4

Parameter	Qar1	Qar2	Qar3	Qar4	Reference Value (EHS Guidelines* and European Directive 2019/130 - Carcinogenic and Mutagenic Substances**)
T (°C)	26,0	26,0	27,0	27,5	-
Humidity (%)	44,3	44,6	36,8	39,2	-
Air velocity (m/s)	0,93	1,26	0,41	0,36	-
PM_{10} (µg/m^3)	57	71	60	52	150 µg/m^{3*}
PM $_{2.5}$ (µg/m^3)	32	53	37	41	75 µg/m^{3*}
$PM_{1.0}$ (µg/m^3)	32	53	37	41	-
Formaldehydes (HCHO) (mg/m^3)	0,0	0,0	0,0	0,0	3,25 mg/m^{3*}
VOCT (µg/m^3)	0,0	0,0	0,0	0,0	<120-140 µg/m^{3*}
Benzene (mg/m^3)	0,0	0,0	0,0	0,0	3,25mg/m^{3**}

(*) Reference Limit Values defined in the EHS Guidelines (Table 1.1.1: WHO Ambiente Air Guidelines).
(**) Occupational Exposure Limit Values – Directive 2019/130 amending Directive 2004/37/EC on the protection of workers against risks related to exposure to carcinogens or mutagens during work.

The results of the monitoring carried out show that all monitored points had lower particle values than the reference values considered as a reference (EHS Guidelines). With regard to formaldehyde, benzene and COVT parameters, all monitored points registered zero values. This situation may be related to the predominantly residential use of the monitoring sites, with no economic activities being recorded in the surroundings conducive to the emission of volatile organic compounds (industrial processes that use combustion and transport).

4.9. FLORA AND HABITATS

In the strip where the project is inserted, miombo forests predominate, as shown in the following figure (*see* **Figure 13**).

Figure 13 – Photographic record of the dry deciduous forest typical of the project implementation area.

It refers to the project location does not intersect/overlap any conservation area and/or Key Biodiversity Areas, either in accordance with Angolan legislation or in accordance with the international conventions.

It should be noted that the Cameia National Park (conservation area closest to the project), is located approximately 125 km east of the city of Luena (capital of the Province) and is approximately 47.972 km from the beginning of the road section, approximately 105.389 km from the intermediate section of the road sectio and, finally, about 5.718 km from the end of the road section.

Below is a photographic record of some of the floristic species identified during the field survey in the area surrounding the project (*see* **Figure 14**).

Figure 14 – Illustration of some floristic species identified during fieldwork.

However, it should be noted that according to the classification of the IUCN Red List of Species (2022), of the 25 plant species identified during the field work by RESURB, no species is classified as vulnerable and/or critically endangered. Although these species have been identified in the project's area of influence, they have not been recorded in the Directly Affected Area ("footprint") along the road section that will be rehabilitated.

4.10. FAUNA

Regarding to the faunal resources, during the course of the field work, some species that represent the various faunal families were recorded in the direct surroundings of the project (*see* **Figure 15**).

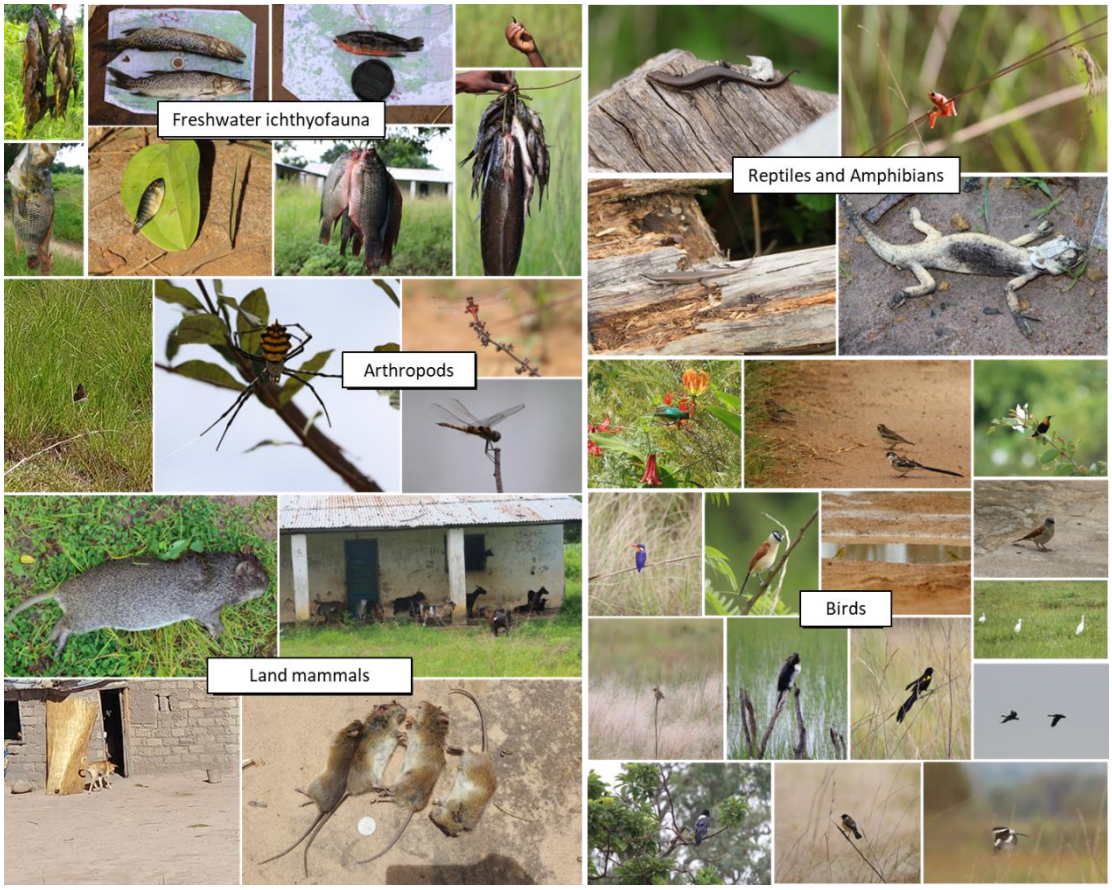

Figure 15 – Illustration of some faunal species identified during fieldwork, schematized by faunal families.

When carrying out the field work, Resurb's technical team did not register the presence of species included in the Red List of Species in Angola.

4.11. CULTURAL HERITAGE

Regarding to built heritage, some places and buildings with historical and cultural value are identified, enhancing cultural tourism. The Province of Moxico has only one monument in the national heritage, namely the Ruins of Fort Cameia, a sign of the resistance of the natives against the Portuguese colonial occupation. Currently, 94 monuments and historic sites are registered with the Provincial Directorate of Culture (*in* www.jornaldeangola.ao).

In the following figure (*see* **Figure 16**) are presented some of the sites of national historical interest, as well as other natural, archaeological and built heritage elements identified in the area of direct influence of the project.

"Nature is wise and just. The

Figure 16 – Photographic record of some sites of national historical interest existing in the Province of Moxico: A) Church Sacalundo Our Lady of Victories of Luena, B) Monument to Agostinho Neto and C) Monument of Peace located in Luena.

When carrying out the field work, no property occurrences were identified in the directly affected area ("footprint"), even though the presence of elements of high cultural and heritage value is admitted, as shown in the previous figures, in the area of direct influence and indirect of the project. However, preventively, mitigation measures were defined since, although the existence of relevant archaeological sites had not been identified at a previous stage, it is considered important to provide for closer monitoring and care during the rehabilitation phase of the road section. All heritage occurrences identified at this stage must be preserved *in situ* in their entirety and mobile finds registered during the archaeological monitoring must be placed in a deposit accredited by the cultural heritage guardianship body.

It should also be noted that the Implementing Entity has, within the scope of its Management System, a procedure for safeguarding property occurrences, which will be implemented during the construction phase of the project.

4.12. LANDSCAPE

The landscape is a complex system, permanently dynamic, in which different natural and cultural factors influence each other and change over time. For this reason, the landscape is

considered to combine natural and cultural aspects, expressing and at the same time supporting the spatial and temporal interaction between man and the environment, in all its diversity and creativity (Green, 2000; Wolters, 2000). In this sense, when carrying out the field work and to arrive at a global understanding of the landscape, in order to carry out a holistic approach to the landscape, the landscape units that integrate the ecological dimensions (which include the components physical and biological aspects of ecosystems), cultural (in which both historical factors and issues of identity and narrative capacity of the landscape are considered), socioeconomic (referring to social factors and human activities, which permanently build and change the landscape) and sensorial (linked to how landscapes are appreciated by different people or groups of people).

In the following figures (*see* **Figure 17** to **22**) are presented the various landscape units identified in the areas of influence of the project.

Figure 17 –Photographic record of the natural landscape of the Province of Moxico.

Figure 18 – Photographic record of the natural landscape of Moxico influenced by the presence of surface water resources: A) Luanguinga River north of Cangamba, B) Zambeze River in Cazombo, C) Cuito River south of Tempué and D) Casai River in Camanongue (Source: Atlas and profile of Moxico, Angola, 2015).

Figure 19 – Photographic record of the cultural landscape of Moxico.

Figure 20 – Photographic record of the humanized landscape in Moxico, with emphasis on housing.

"The environment and the economy are two sides of the same coin, if we don't know how to sustain the environment, we can't sustain ourselves."

Wangari Maathai

Figure 21 – Photographic record of the humanized rural landscape of Moxico with emphasis on precarious housing.

Figure 22 – Photographic record of the humanized landscape inherent to socioeconomic activities – informal sale.

4.13. SOCIO-ECONOMY

The social and economic characterization was carried out on the basis of published literature, available statistical elements (national and international), official Angolan information (published and/or available on the portals of various state bodies) and fieldwork carried out locally by members of the RESURB team, namely when listening to and consulting the local community and carrying out surveys which took place on the 5th and 6th of January 2023. During this period, 194 surveys were carried out.

At the time of the General Population and Housing Census, carried out in 2014, **the Province of Moxico registered around 758.568 inhabitants**, of which 369.437 were male and the remaining 389.131 were female. The **Municipality of Luena is the most populous,**

concentrating 48% of the Province's population, followed by the Municipalities of Alto Zambeze with 14%, Luau with 12% and Budas-Lumbala, Nguimbo with 9%. The project implementation area mainly intersects the Ganguela ethnic group (or Ngangela).

When conducting interviews with the local community, with regard to basic sanitation in homes, **100% of respondents said they had no connection to the public sanitation network**.

Regarding to the existence of health infrastructures (hospital and health post or center), the majority of respondents **(91%) reported that there were health infrastructures** in their Commune, to the detriment of **9% who referred to the lack of these infrastructures in their Commune**. They also mentioned that these infrastructures needed rehabilitation and better conditions.

When carrying out field work and carrying out surveys of the population, it was found that **most school-age children in rural areas do not attend school** due to lack of financial resources, lack of parental interest, maternity/pregnancy and lack of time to combine with work. The population also refers to the **lack of teachers** in the existing education infrastructures in their Commune/ Neighborhood.

With regard to water supply, 1**00% of respondents stated that they did not have access to potable water**. At the same time, with regard to the origin of the water consumed, 79% of the interviewees mentioned that they supplied water from the river and the remaining 21% mentioned that they used other sources (eg, fountains, wells/cacimbas, etc.).

At the local level, it was found that **39% of respondents were unemployed**, 16% of respondents did not answer this question and the remaining 44% were employed. Of the employed interviewees, 44% worked in the agricultural sector, 1% in the transport sector, 1% in the commercial sector, 2% in the fishing sector, 1% in the public sector and the remaining 53% did not indicate their profession.

Finally, **100% of respondents stated that they did not have access to energy in their homes from the public network**. With regard to the main source of energy and lighting, 41% of the interviewees mentioned that they used battery lamps, 37% used candles, 18% used other sources of energy and only 5% of the interviewees mentioned that the energy came from generators.

At a more local level, in the area of direct influence of the project (*see* **Figure 23**), it was verified that a **large part of the existing houses in the surroundings of the project implantation area are precarious dwellings, with lack of basic sanitation and lack of connection to supply of water and electricity from the public network.**

Figure 23 – Illustration of precarious housing existing in the project's area of influence.

5. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

5.1. IMPACT ASSESSMENT

The Socio-Environmental Impact Assessment is a preventive instrument of environmental and social policy, based on carrying out studies and consultations, with effective public participation and analysis of possible alternatives, which aims to collect information, identify and predict environmental effects and social aspects of certain projects, as well as the identification and proposal of measures that avoid, minimize or compensate for these effects, with a view to deciding on the viability of executing such projects and the respective post-evaluation.

It should be noted that the socio-environmental impact and risk assessment matrices, being of a more technical nature, are included in the EIAS Synthesis Report, with the present Non-Technical Summary highlighting the potential impacts of greater magnitude:

"We've forgotten how to be good guests, how to walk lightly on earth like other creatures do"

Barbara Ward

- ✓ **Positive Nature**
  - Creation of indefinite term (limited to the duration of the project - 4 years) employment for new employees and maintenance of jobs for existing employees;
  - Promotion of trade associated with various areas, from the production of materials and equipment, rental of machinery, hiring of waste management operators, among others;
  - Improvement of the quality of life of the population;
  - Decrease in the number of road accidents associated with the improvement of road infrastructure (roads and bridges);

- Stimulation of economic activities and indirect increase in employability given the attractiveness of investments and reduction of transport costs inherent in road rehabilitation;
- Social inclusion and community participation.

✓ **Negative Nature**

- Emission of particles and GHG into the atmosphere resulting from road traffic and movement of machinery;
- In the event of an accident or environmental emergency, possible contamination of soil or water resources;
- Depletion of natural resources;
- Increased incident sound levels on surrounding sensitive receptors.

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

The Environmental and Social Management Plan (ESMP) gathers information on the activities associated with the implementation of the Project in its various stages, the socio-environmental components likely to be affected by the Project, and the set of environmental and social management procedures to be adopted based on the measures of impact mitigation and monitoring programs proposed in the EIAS. The ESMP thus aims to make available in a systematic way the set of socio-environmental management activities to be implemented and the ways to control their implementation, ensuring compliance with the applicable legal, regulatory or normative requirements, and the commitments assumed by the Project Management Policies, with emphasis on environmental and social matters.

For this purpose, the Socio-Environmental Mitigation and Improvement Program were defined and presented in the ESIA Synthesis Report, in which a set of measures was identified (127 Mitigation Measures and 9 Compensation Measures) aimed at reducing the negative impacts and enhancing the positive impacts and the Socio-Environmental Monitoring and Accompaniment Program and Security, which includes the following monitoring plans:

- Stakeholder Engagement Plan;
- Health and Safety Plan;
- Water Monitoring Plan for Human Consumption;
- Wastewater Monitoring Plan;
- Soil Monitoring Plan;
- Air Quality Monitoring Plan;
- Environmental Noise Monitoring Plan;

The adoption of Good Environmental Practices improves the environmental performance of projects

- Occupational Noise Monitoring Plan;
- Waste Management Plan;
- Decommissioning Plan for the Jobsites, Support Centers and Biophysical Recovery of the Areas Affected by the Contract.

The project promoter must guarantee, through contractual or other mechanisms, the fulfillment of all the specifications defined in the ESMP, by the various stakeholders.

7. PARTICIPATION AND PUBLIC CONSULTATION

The Stakeholder Engagement Plan is an essential tool for managing the Project's potential social risks. Under the provisions of the World Bank's new environmental and social policy framework, the Stakeholder Engagement Plan is an integral part of the contractual documents to be prepared prior to any project approval.

It should be noted that the Stakeholder Engagement Plan was developed in a comprehensive and participatory approach, with 3 public meetings/project presentation group and 194 surveys (individual) of the local population, including disadvantaged or vulnerable individuals or groups. The public consultations carried out on the 5th and 6th of January 2023 covered the 8 existing locations/neighborhoods surrounding the project in Moxico Province:

- Luau;
- Lunachi;
- Manguxi;
- Cassombo;
- Capango;
- Fazenda;
- Sede Comunal de Nana Candungo;
- Kakheleca.

"People may doubt what you say, but they will believe what you do"

Lewis Cass

It should be noted that the Stakeholder Engagement Plan is a dynamic document that will evolve throughout the various phases of the project in order to consider the needs and expectations of the stakeholders whose actions should provide added value in achieving the objectives defined for the project. project.

The following figure (*see* **Figure 24**) shows geographical distribution of the locations/neighborhoods where the group and individual consultation sessions were carried out.

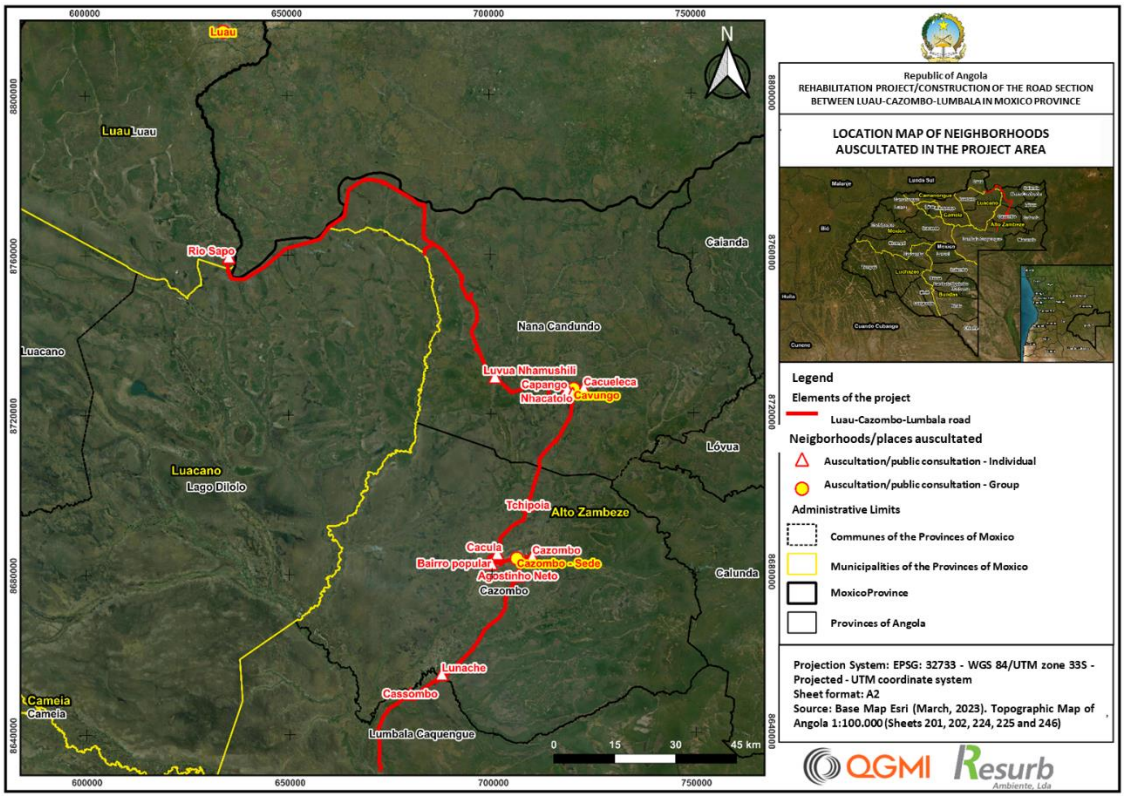

Figure 24 - Location of the places where group consultations were carried out (represented with the symbol of the "circle" and designation of the neighborhood in yellow/red color) and individual (represented with the symbol of the "triangle" and designation of the neighborhood in white /red color).

"We are what we repeatedly do. Excellence, therefore, is not an achievement, but a habit."

Aristóteles

As part of the face-to-face public consultations, appealing brochures were distributed to present the project and explain the entire environmental and social impact assessment process and the complaints and grievances management mechanism that will be adopted, as well as the various public consultation sessions that will be held around the throughout the life cycle of the project.

It should also be noted that all stakeholders present within the scope of the public consultations carried out in the preparation phase of the project, gave their consent and participated freely in the entire process of participation and public consultation.

In the following figure (*see* **Figure 25**) is presented a photographic synthesis of this process.

Figure 25 - Photographic summary of the stakeholder consultation and survey process.

Through the interviews carried out, it was found that a large percentage of the local population **lives in very precarious living conditions, without access to basic sanitation, public water supply and electricity. Most roadways are also not paved and some communities are isolated due to the deterioration/degradation of road access (roads and bridges).**

The surveys carried out among the population by RESURB, within the scope of the consultation process and public consultation carried out in the phase prior to the construction of the project, which took place in January 2023, led to the conclusion that with regard to the question regarding the benefits and/or improvements that the sampled population considered that the project, in the analysis, could “encourage employability”

(39%), “promote the dynamization of economic activities” (16%) and “contribute to the improvement of the quality of life” (45%).

With regard to the needs and expectations referred to by the Stakeholders interviewed during the consultation and public consultation process, the following stand out:

- have access to water in homes and collective water points (community fountains and tanks);
- have access to the electricity grid;
- rehabilitation of the telecommunications network;
- job creation;
- improvements/rehabilitation of access roads, with emphasis on those in “dirt”;
- the rehabilitation/construction of health, education and service infrastructures;
- the provision of food;
- proper waste management in municipalities.

It is concluded, therefore, that no objections were raised to the project's preparation phase, thus meeting all the conditions for carrying out an environmental and social impact assessment, considering it to be an excellent starting point for the entire process of participation and Stakeholder involvement and successful project implementation.

8. CONCLUSIONS

The Project under analysis, in this report, concerns the rehabilitation of the section of roads EC 192/EN 250/EC 254/EC 385 that integrates the roads that develop between Luau and Cazombo, in the Province of Moxico, which is a structural road section, since it will allow the road connection between the municipal headquarters and the circulation in the aforementioned section, which currently, due to the bad conditions, also aggravated by the rainy season, has favored the vulnerability of the surrounding Municipalities, since the non-existence and/or deterioration of the road section, which makes road traffic in safe conditions impossible, favors the isolation of the population and delays the socio-economic development of the region, since it prevents the free movement of people and goods and the socio- economic dynamism of the Province, thus it is considered that the project itself is already a compensatory measure.

The objective of the environmental and social assessment carried out was to identify the environmental and social implications associated with the project's road rehabilitation, with a length of 246 km and which will include the rehabilitation/construction of the bridges. The environmental and social assessment of the project covered the entire life cycle of the project (construction, exploration and deactivation phase) and also focused on preventing the main risks and environmental and socio-economic impacts. Given that the project concerns road rehabilitation, alternatives were not considered, and the environmental and social impact assessment carried out in the present study was carried out by comparing it with alternative zero (h0), which refers to non-implementation of the project.

The present Environmental and Social Impact Assessment (ESIA) considered the structure defined in the National Legislation, as well as the international requirements, namely those defined by the Equator Principles, the Performance Standards of the International Finance Corporation (IFC) and EHS Guidelines, since Angola is a Non-Designated Country. Also noteworthy is the fact that the project intends to comply with International Conventions and

Good Practices, namely, the Human Rights Convention, the International Convention for Labor Organization (ILO), Environmental, Health and Safety Guidelines (EHS Guidelines) and Measures defined in the National Strategy for Adaptation to Climate Change. From the comparative analysis carried out, between the national legal requirements and the Bank's international requirements, there is a harmonization with regard to the risk categorization of the project, since both the National Environmental Legislation and the IFC international standards and the Equator Principles frame the "Contract for the Rehabilitation of Road EC 192 / EN 250 / EC 254 / EC 385, Luau / Cazombo" project as Risk Category B, that is, of moderate environmental and social risk. The risk categorization was mainly supported by the fact that the project under analysis:

- be related to the rehabilitation of an existing road section that runs between Luau and Cazombo, which is why it is not foreseen, to date, the need to carry out any physical and/or economic resettlement since the area of project intervention will be restricted to the road easement area;
- and its route does not cross any place considered as critical natural habitat, namely, that which is legally protected; officially proposed to be protected; and unprotected, but with high environmental value (whether according to the national and/or international IUCN classification) and because the approach to ecosystem services concludes that the project does not foresee that the project will affect priority services;
- not affect indigenous people. When characterizing the socio-environmental reference situation of the project and the consultation and consultation process with the local community, RESURB identified the presence of ethnic groups in the areas of influence of the project, however the respective communities that speak some dialects/mother tongues also speak the official language (Portuguese) and do not identify themselves as belonging to a distinct indigenous cultural group and are recognized as such. At the same time, they are fully integrated into society;
- and the potential negative impacts and socio-environmental risks identified and evaluated are, reduced in number, generally local, largely reversible and mitigated.

For this purpose, for the studies of the physical, biotic and social environment, different areas of influence of the project were defined, namely the Directly Affected Area (DAA) the Direct Influence Area of the Project (DIA) and the Indirect Influence Area (IIA). The DAA corresponds to the area where the rehabilitation activities of the road section, including

bridges, will be carried out; the DIA for the studies of the physical environment and the biotic environment, was defined as a radius of 1.000 m around the DAA since this will be the area where the impacts generated during the construction, exploration and deactivation period are expected to be directly felt of the project. The DIA for the socioeconomic component was defined taking into account the relevance that the project will have in the surrounding community, namely the Municipalities of Luau, Luacano and Alto Zambeze, as the road project will cross these three Municipalities and will contribute to local socioeconomic dynamism; finally, the IIA was defined for studies of the physical and biotic environment, as the area corresponding to a radius of 3 km around the DIA. With regard to the socio-economic environment, the Province of Moxico was considered as an IIA, since it will be the one that will benefit most from this project, since it will allow the creation of road corridors in the Province.

The characterization of the reference situation made it possible to verify the socioeconomic importance of the implementation of the project under analysis in this ESIA, since, with regard to accessibility, there are several isolated and vulnerable Communes in view of the high state of degradation of the road section and whose some bridges are destroyed and impassable. The Province of Moxico is a region that lives essentially from trade and the provision of services, based on the Province's vulnerability to agriculture, which is why road rehabilitation is a structural and priority for the Province. In a more environmental component, it was found that the project implementation area is characterized by meadows, savannahs, bushy savannahs and tropical and subtropical forests, typical of the Angolan Miombo Forest and Central Zambezian ecoregions and is not part of any conservation or area of high ecological interest. There were also some sources of pollution, essentially of anthropogenic origin, as a result of the lack of sanitation and water supply infrastructure networks (100% of the sampled population reported that there is no type of water supply and sanitation network) and deficient management of urban waste, which lead the local community to carry out bad environmental practices. Of the population sampled, it was recorded that 29% deposited waste on the ground due to the non-existence and/or poor functioning of the waste collection and management system in the Province of Moxico, 42% stated that they set fires to control and treat the waste produced and the remaining 36% declared sometimes burying waste. With regard to waste management, all interviewees stated that there was no municipal collection of waste in their Municipality/Commune.

In order to complement the collection of primary data, in order to carry out the assessment of the project's environmental impact, and given the absence of reference values for

pollutant emissions as well as reference environmental characterizations for the project implementation area, Several *in situ* monitoring points were carried out (4 environmental noise monitoring points including road traffic counts, 4 air quality monitoring points, biophysical factors (DAA and DIA) and 8 water resources monitoring points). The results of the monitoring carried out are in line with the characterization of the socio-environmental reference situation, since, although, as mentioned above, Resurb's technical team has identified some sources of pollution of anthropogenic origin, the parameters of water quality, air and noise fully comply with the reference limit values considered as an indication, namely the WHO reference values, Directive 2019/130 and EHS Guidelines, since, on the other hand, the current state of degradation of the road section also does not allow for a greater dynamism and fixation of economic activities in the region, that eventually, could reflect negatively on the results of monitoring carried out during the month of January 2023.

In order to carry out the Assessment of Social and Environmental Impacts, Public Consultations were also carried out and surveys carried out *in loco* with the local community in the Communes of Cazombo, Lumbala Caquengue and Nana Candungo. Regarding the question referring to the benefits and/or improvements that they considered the project could bring, the highlights were "employability" (39%) "stimulation of economic activities" (16%) and "improvement in the quality of life" (45%). The three biggest needs mentioned by the stakeholders were access to drinking water, electricity and telecommunications (59%), the rehabilitation of transport infrastructure (roads and bridges) (24%) and the rehabilitation of service infrastructure (schools, hospitals/health centers, bank branches) (18%).

It was concluded that this project with compensatory nature for the local population is much awaited by the community since the population hopes to obtain an improvement in accessibility conditions with the consequent development of socio-economic activities and an improvement in the quality of life. During the process of participation, auscultation and public consultation in the preparation phase of the project, no objections were raised by the various stakeholders consulted. As part of this process, 194 stakeholders were interviewed during the project preparation phase and 6 group sessions were also held to present the Project, the Stakeholder Engagement Plan, publicize the complaints and grievances management mechanism, Project Management Policies and socio-environmental impact assessment procedure.

In terms of socio-environmental risks identified for the project, these are generally associated with emergency and accident/incident scenarios and may, eventually, be inherent to existing constraints on the site, materials applied with special risks, equipment installed

with risk in use, conservation and maintenance, maintenance of infrastructures and equipment, works whose access and circulation present risks, transport of materials/equipment, poor storage/treatment of domestic and industrial wastewater, infrastructural and technological risks, intentional acts/malevolence, technical failure or human life, biological hazards and natural hazards. The Risk Management Plan identifies, for each accident scenario, the danger, risks and respective prevention control measures - pre-accident scenario and control measures - post-accident scenario, where the means available for minimizing these same are described risks, allowing effective risk management.

With regard to the negative impacts identified for the construction phase, the following stand out:

- Pollution and disturbance associated with carrying out the works, namely the carrying out of earthworks, paving and rehabilitation of works of art (bridges), although globally with reduced expression;
- Disturbance due to the existence of jobsites, concrete plants, bituminous concrete and crushing, work accesses and areas for depositing excess land;
- Disturbance of the sound environment surrounding the road section, inherent to construction activities, support infrastructures for the work and movement of heavy vehicles and machinery.

It should also be noted that these negative impacts can be prevented, avoided or mitigated through the adoption of control and socio-environmental management measures recommended in the Environmental and Social Management Plan of the ESIA, which are included in the Mitigation, Compensation and Socio-environmental Improvement Program and the Monitoring Program and Social and Environmental Monitoring, the following Plans:

- Socio-environmental monitoring and implementation of a socio-environmental management system;
- Security Monitoring;
- Water Monitoring Plan for Human Consumption;
- Waste Water Monitoring Plan;
- Soil Monitoring Plan;
- Air Quality Monitoring Plan;
- Environmental Noise and Occupational Noise Monitoring Plan;

- Waste Management Plan;
- Decommissioning Plan for Jobsites, Support Centers and Biophysical Recovery of Affected Areas.

With regard to positive socio-environmental impacts, the following stand out:

- Improved accessibility at local and regional level, and increased internal cohesion, particularly in the Moxico region;
- Improvement in the level of service and, consequently, a reduction in travel times and average costs, benefiting the economic context of families and bringing people together, as well as economic activities;
- Increased convenience, speed and safety in circulation, promoting accessibility and consequent attractiveness of the surrounding area for the settlement of population and industrial/commercial units.

In this way, the completion of the project will contribute to improving the quality of life in the surrounding area of Luau-Cazombo-Lumbala Caquengue.

In all the factors of socio-environmental interest, the cumulative impacts foreseen in the construction, exploration and deactivation phases of the project were also evaluated in order to carry out an integrated analysis of the impacts, having been concluded that for most of the impacts identified there is cumulative of the same. Of particular note in this context is the planned implementation of various socio-economic development projects for the Province of Moxico in accordance with the various National Strategic Policies of the Republic of Angola in progress.

In summary, according to the assessment carried out, no impacts were identified that would make the implementation of the project unfeasible, socially and environmentally. It should be noted that without the rehabilitation of the project (hypothesis of non-implementation of the project), there would most likely be a lack of socio-economic dynamism in the region, isolation and/or exodus from the community, an increase in road accidents, as well as the growing aggravation of the vulnerability of isolated stakeholders and the quality of life of the population. It should also be noted that the implementation of the project could have positive effects related to reducing the risk of road accidents, favoring social inclusion and boosting the socio-economic activities inherent to the free movement of goods and people that, eventually, will result from the road rehabilitation of road EC 192 /EN 250/EC 254/EC 385 between Luau and Cazombo.

From the global analysis carried out, it can be concluded that the project being analyzed does not present fatal issues, that is, any issues that, from the point of view of the physical, biotic and/or socioeconomic environment, could make its implementation unfeasible.

ESTAMOS JUNTOS A CUIDAR DO AMBIENTE!

Resurb
Ambiente, Lda