



NATIONAL ROADS ADMINISTRATION

REHABILITATION OF THE ROAD N381/R2151 BETWEEN MUEDA AND ROMA

Contract Nr. 04/DIPRO/2013

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT Updated Environmental and Social Impact Statement

FINANCED BY: African Development Bank (AfDB)

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	1
ABBREVIATIONS AND ACRONYMS.....	9
1. INTRODUCTION.....	10
2. METHODOLOGY	11
2.1 Literature Review.....	11
2.2 Field Survey.....	12
2.2.1 Road Reconnaissance.....	12
2.2.2 Training of Enumerators and Testing of the Questionnaire	12
2.2.3 Administration of the Questionnaires	13
2.2.4 Data Processing.....	13
2.3 Specialized Studies.....	13
2.4 Identification and Assessment of Environmental and Social Impacts Methodology	14
2.4.1 Identification of Environmental and Social Impacts	14
2.4.2 Assessment of Environmental and Social Impacts.....	14
2.5 Public Consultation	19
3 DATABASE ESTABLISHMENT	21
3.1 Identification of the Developer.....	21
3.2 ESIA Team	21
3.3 Context of the Activity	22
3.4 Alternatives to the Activity	22
3.5 Associated Activities	23
3.6 Legal Framework.....	23
3.6.1 Constitution of the Republic of Mozambique.....	23
3.6.2 Environmental Regulation	23
3.6.3 Emissions and Air quality	25
3.6.4 Water	26
3.6.5 Biodiversity.....	26
3.6.6 Waste and Pollution.....	28
3.6.7 Health and Safety.....	28
3.6.8 Land use and planning	29
3.6.9 Resettlement and compensation.....	30
3.6.10 Cultural Heritage	42

3.6.11	Road Public Works	42
3.6.12	Key agreements and Conventions	43
3.6.13	AfDB Integrated Safeguards System	46
3.6.14	World Bank Environmental And Social Safeguards.....	54
3.6.15	Required Licenses and Permissions	58
3.7	Institutional Framework Assessment	62
3.7.1	Ministry of Land, Environment and Rural Development (MITADER).....	62
3.7.2	Ministry of Public Works, Housing and Water Resources (MOPHRH).....	62
3.7.3	National Road Administration (ANE)	63
3.7.4	Government of Mueda District	63
3.7.5	Agricultural Extension support	63
3.7.6	NGOs / Partners	64
3.7.7	Local Leaders.....	64
3.7.8	Administration and Management of Niassa National Reserve	Erreur ! Signet non défini.
4.	PROJECT DESCRIPTION.....	65
4.1	Project Location	65
4.2	Project Characteristics	65
4.2.1	Road Class and Role	65
4.2.2	Relief	Erreur ! Signet non défini.
4.2.3	Traffic Volume.....	66
4.2.4	Speed.....	68
4.2.5	Sight Distance.....	68
4.2.6	Transversal Section	69
4.2.7	Improvement of the Horizontal Alignment	71
4.2.8	Works in Residential Areas	72
4.2.9	Protection Devices	75
4.2.10	Signage and Equipment	75
4.3	Design Phase	77
4.4	Mobilization Phase.....	78
4.5	Construction Phase	79
4.6	Operation Phase.....	80
4.7	Decommissioning Phase	80

4.8	Project Schedule and Budget	80
5	PROJECT'S AREA OF INFLUENCE	81
5.1	Direct Area of Influence	81
5.2	Indirect Area of Influence	81
6	CHARACTERIZATION OF THE INITIAL STATE OF THE ENVIRONMENT	82
6.1	Biophysical Environment	82
6.1.1	Topography, Geology and Soils.....	82
6.1.2	Climate	84
6.1.3	Hydrology	84
6.1.4	Conservation Areas	Erreur ! Signet non défini.
6.1.5	Land use	86
6.1.6	Landscape.....	87
6.1.7	Vegetation.....	87
6.1.8	Fauna.....	89
6.2	Socioeconomic Environment	89
6.2.1	Mueda District.....	90
6.2.2	Communities along the Mueda-Roma Road.....	98
7	POTENTIAL IMPACTS OF THE PROJECT AND MITIGATION MEASURES.....	110
7.1	Potential Impacts on Biological Environment.....	111
7.1.1	Loss of Natural Habitat	111
7.1.2	Interference with animal migration.....	112
7.1.3	Increase in illegal hunting of animals.....	113
7.1.4	Disturbance to Aquatic Fauna.....	113
7.1.5	Use of Resources.....	114
7.2	Potential Impacts on Physical Environment	115
7.2.1	Soil Erosion and Sedimentation	115
7.2.2	Soil and Water Pollution	115
7.2.3	Generation of solid wastes	117
7.2.4	Impacts on topography (landscape)	119
7.2.5	Air Quality and Climate Changes.....	119
7.3	Potential Impacts on Socioeconomic Environment	122
7.3.1	Job Creation	122
7.3.2	Increased agricultural and forests production.....	123

7.3.3	Attracting of investments	123
7.3.4	Increased revenue for the state.....	124
7.3.5	Reduction of transport costs.....	124
7.3.6	Social Inclusion and Community Participation.....	125
7.3.7	Improved Access to Social Services.....	125
7.3.8	Potential Impacts on Gender	126
7.3.9	Expectations on the short term solution for road access and lack of employment...	126
7.3.10	Conflicts between workers and local population in the project area.....	127
7.3.11	Destruction and loss of assets.....	127
7.3.12	Increased migratory movements.....	128
7.3.13	Disturbance of people and vehicle circulation during works.....	129
7.4	Occupational Health and Safety	130
7.4.1	Consumption of improper water	130
7.4.2	Injuries and deaths due to manual handling of cargos.....	131
7.4.3	Falls and Slippery	132
7.4.4	Falls from height	133
7.4.5	Flying objects	134
7.4.6	Injuries and deaths due to the circulation of machinery or vehicles.....	134
7.4.7	Dust emission.....	135
7.4.8	Exposure to chemicals, hazardous and inflammable objects	136
7.4.9	Electrical chocks	136
7.4.10	Potential impacts related to Noise and Vibrations	137
7.4.11	Increased incidence of sexually transmitted diseases, including HIV/AIDS.....	141
7.4.12	Risk of Malaria infection	142
7.4.13	Road accidents	142
7.5	Summary of Impacts Assessment	144
7.6	Residual Impacts	147
7.7	Cumulative Impacts	148
8	ANALYSIS OF ALTERNATIVES.....	152
8.1	Alternative 0 - No Project	152
8.2	Alternative 1 – With Project	152
9	CONCLUSIONS AND RECOMMENDATIONS.....	154
	APPENDIX.....	155

List of Appendixes

Appendix 1: Consulted documents	155
Appendix 2: Questionnaire adopted for the Socioeconomic Survey.....	157
Appendix 3: Minutes of Public Consultation Meetings to Present the Environmental Pre-Feasibility Study and Terms of Reference	2

List of Figures

Figure 1: Training of enumerators and testing of the enumerators.....	13
Figure 2: Assessment of the significance of environmental impacts.....	19
Figure 3: Niassa Reserve Management Structure.....	Erreur ! Signet non défini.
Figure 4: Geographical location of the project	65
Figure 5: Typical cross section	69
Figure 6: Cross section for road crossing in villages	70
Figure 7: Cross section of the road in urban areas	70
Figure 8: Cross section of the road in case of high embankment/cutting.....	71
Figure 9: Type 1 improvement at km125+300.....	Erreur ! Signet non défini.
Figure 10: Type 2 improvement at km66+900.....	Erreur ! Signet non défini.
Figure 11: Type 3 Improvement at km 57+272.....	Erreur ! Signet non défini.
Figure 12: Proportion of the alignment to be improved	72
Figure 13: Parking areas in urban areas.....	73
Figure 14: Protections at the right of schools.....	74
Figure 15: Interventions at bridge areas.....	74
Figure 16: Potential sites for stone and sand extraction along Mueda-Roma road.....	78
Figure 17: Links of Mueda-Roma road with the regional development corridors.....	Erreur ! Signet non défini.
Figure 18: Topography of the project area	82
Figure 19: Geology of the project area	83
Figure 20: Predominant types of soils in the project area.....	84
Figure 21: Main rivers in the project area	85
Figure 22: Predominant aquifers in the project area	Erreur ! Signet non défini.
Figure 23: Conservation area in the project area	Erreur ! Signet non défini.
Figure 24: Vegetation map in the project area.....	88
Figure 25: Savannah visual along Mueda-Roma road.....	88
Figure 26: Type of roads in the project area.....	97
Figure 27: Current and predicted noise estimate along the Mueda-Roma road using the highest scenario in 2037 (considering asphalted road).....	139
Figure 28: Mtwara Development Corridor	149

List of Tables

Table 1: Classification/assessment criteria for the magnitude of potential environmental and social impacts of the project	15
Table 2: Criteria used to determine the magnitude of environmental impacts.....	17
Table 3: Sensibility criteria for value of species.....	18
Table 4: Socioeconomic sensibility criteria.....	18
Table 5: Criteria used to determine the significance of the environmental impacts	18
Table 6: World Bank Safeguard Policies Triggered by the Project.....	54
Table 7: Required licenses and permissions for implementation of the project.....	59

Table 8: Mueda's public officers and agents, by sector, academic level and sex.....	63
Table 9: NGO operating in the district.....	64
Table 10: Senior Management Posts and Responsibilities for Niassa National Reserve.....	64
Table 11: Traffic in Mueda-Roma section (2014).....	66
Table 12: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 - Low Scenario	67
Table 13: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 – Medium Scenario.....	67
Table 14: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 - High Scenario.....	68
Table 15: Sight Distance	69
Table 16: List of new bridges and their characteristics	80
Table 17: Population of Mueda District by administrative post, locality, neighborhood and sex	91
Table 18: Population of Mueda district by administrative post, sex and age groups	91
Table 19: Distribution of the situation of economically active population by sex	92
Table 20: Health service units and number of beds in Mueda District	94
Table 21: Health service professionals per category and planned for 2015	95
Table 22: Distribution of the population by administrative posts, by school attendance and sex	95
Table 23: Education sector capability in Mueda.....	96
Table 24: Number of schools by locality.....	96
Table 25: Villages along the road.....	98
Table 26: Distribution of HH members by sex	99
Table 27: Distribution of HH members by age categories	100
Table 28: Distribution of absolute frequencies and % of households by numbers of members	100
Table 29: Number of wives of Household Head	101
Table 30: Frequency of heads of households with wife living in the same premises.....	102
Table 31: School attendance.....	102
Table 32: Level of education of school-age children	102
Table 33: Distance to school	103
Table 34: Frequencies and% of HH members according to employment status.....	103
Table 35: Frequencies and% of HH members according to type of activity	103
Table 36: Frequencies and% of AF members by type of employer	104
Table 37: Distribution of the number of households by type of goods.....	104
Table 38: Frequencies and % of HH according to the type of housing	105
Table 39: Frequencies and% of the number of rooms of housing of AF	106
Table 40: Absolute frequency and% of the number of bathrooms.....	106
Table 41: Frequencies and% of the number of latrines in the HH.....	106
Table 42: Frequencies and % type of water sources for HH consumption.....	107
Table 43: Frequencies and% of HH sentiments about the project	107
Table 44: Frequencies and% of HH expectations in re to access to health services	108
Table 45: Frequencies and% on expectations for employment opportunities	109
Table 46: Distribution and% on the expectation re business opportunities associated with the project	109

Table 47: Distribution and% on the expectations in re to access to transport and communication services	110
Table 48: Main corridors identified along the road.....	Erreur ! Signet non défini.
Table 49: Foreseen activities, type of residues and their characteristics	116
Table 50: Standard maximum limit values for domestic liquid effluents	117
Table 51: Project activities, solid waste and general characteristics.....	117
Table 52: Estimated CO ₂ project/leakage emissions (tons) from traffic in operation phase based in low, medium and high scenario	121
Table 53: Maximum emission limits for air pollutants permissible to mobile sources or motor vehicles	121
Table 54: Microbiological parameters	130
Table 55: Physical parameters	130
Table 56: Chemical parameters	131
Table 57: Maximum noise levels recommended by the WHO in specific environments	137
Table 58: Level of noise caused by construction equipment before and after mitigation measures	138
Table 59: Summary of residual impacts.....	147

ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Meaning
EPDA	Environmental Pre- feasibility and Scoping Study
TOR	Terms of Reference
MITADER	Ministry of Land, Environment and Rural Development
km	Kilometer
km/h	Kilometers per hour
AfDB	African Development Bank
ANE	National Roads Administration
CFC	Chlorofluorocarbon
EIA	Environmental Impact study
ESIA	Environmental and Social Impact Assessment
GoM	Government of Mozambique
HHS	Hygiene, Health and Safety
IRR	Internal Rate of Return
NGO	Non-Governmental Organization
RAP	Resettlement Action Plan
ESC	Environmental and Social Component
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
PI&As	Project Interested and Affected People
SADC	Southern African Development Community
ISS	Integrated Safeguards System

1. INTRODUCTION

The Government of Mozambique (GoM), through the National Roads Administration (ANE) intends to use the funds from the African Development Bank (AfDB) to rehabilitate the road N381/2151 from Mueda to Roma, situated in the District of Mueda, Cabo Delgado Province.

Investigation of the case led to the classification of the project as Category A project. This report is an updated Environmental and Social Impact Assessment (ESIA) of the project which is a requirement for Category A projects. It has been prepared on the basis of the Environmental Pre-Feasibility Study and Scoping (EPDA) and its Terms of Reference (TOR) which was approved by the National Environment Directorate (DNAIA), in 2015

The outcome of the 2016 ESIA study (Mueda-Negomano 165km) was submitted to the Ministry of Land, Environment and Rural Development (MITADER) and was approved on the 24th of August 2016. The Afdb disclosed the ESIA, ESMP and ARAP for Mueda-Negomano road project (165kms) in September 2016.

The updated 2019 environmental and social impact assessment (ESIA) for the Mueda-Roma (95km) road rehabilitation project N381/R2151) was undertaken between April and May 2019.

The proposed project area is located in northern Mozambique, specifically in Cabo Delgado Province. The road starts from the City of Mueda to Roma. The current road is classified as a primary between Mueda and N'gapa and as secondary between N'gapa and Roma. The proposed improvements in this project will result in a paved 7m wide, 95km road with proper road signs, bridges and culverts. The Mueda -Roma-section will be financed by the African Development Bank (AfDB).

The aim of this updated environmental and social impact assessment report is to:

- Describe the project, its activities and the socio-economic and environmental situation of the project area;
- Summarize the legal basis of ESIA related to the activity;
- Evaluate the significance of the potential impacts (positive and negative) of the project on the biophysical and socio-economic environment in the areas of direct and indirect influence of the project in all its phases;
- Identify mitigation measures to avoid and/or mitigate the negative impacts and measures to enhance positive impacts;
- Develop an environmental management plan to minimize the potential negative impacts of the project.

As part of the requirements demanded by both the national environmental authority (MITADER) and for eligibility for funding from the African Development Bank (ADB), this updated ESIS report (Volume 2) is part of a set of reports that comprises the requirements for environmental licensing of the design, which includes:

- Volume 1: Non-Technical Summary
- Volume 2: Environmental and Social Impact Study
- Volume 3: Environmental and Social Management Plan
- Volume 4: Resettlement Action Plan

2. METHODOLOGY

This Report follows the 45/2004 Decree requirements of September 29 with the amendments of Decree 42/2008 of 04 November¹, which regulate the environmental and social impact assessment process in Mozambique. Directives 129/2006 and 130/2006 that normalize the contents and procedures for the preparation of environmental and social impact assessments and public participation process, respectively, were also the foundation for the present study. In addition, and in response to the project funding requirements, operational safeguards of the African Development Bank (AfDB) have been met.

The Ministry of Lands, Environment and Rural Development(MITADER) approved the ESIS of 2016 in August 2016.The African development bank(AfDB) did disclose the study for 120 days on the website. The GOM, as the owner of the safeguards documents, officially submitted the approved and disclosed safeguards instruments/documents to the Bank and authorized it to disclose the documents at its Infoshop. By making the ESIA/ESMP and/or RAP documents available to the public prior to project appraisal, the proposed project has to be in compliance with the World Bank/African Development Bank Access to Information Policy, and hence ready for Board approval for funding.

The update of the Environmental and social Impact statement(ESIS) was based on the need for rehabilitating the section between Roma and N'gapa 50 kms to be considered for funding by the African Development Bank.

The ESIA report was reviewed and gaps identified through a literature review, consultations with key stakeholders who included (ANE, MITADER, MUEDA administrative, Delegate of Cabo Delgado Province, National Institute of Statistics(INE) and local communities along the project road.

2.1 Literature Review

The literature reviews first started with the collection of secondary data from Maputo, through socio-demographic (National Census 2017), national cartographic data (maps, shape files), sectoral reports, scientific documents, etc. These data helped to draw up the general description of the baseline. An important source were the studies done by the engineering team which were all revised to feed the basic information of both the reference situation of the project area, and in particular the characteristics and activities of the project.

Secondary data were refined using sectoral reports collected at the national and district level. Field observations have helped fill the information on the local situation of influence of the project, i.e. at the level of villages that are situated along the road.

The report was reviewed taking into account the present existing 2019 environmental conditions (bio physical and socio economic) situation.

The process of the field survey is described in detail as follows:

¹ These two combined decrees have been revoked by Decree 54/2015, of December 2015.

2.2 Field Survey

The field survey within the EIA aimed to collect primary data relating to the current situation of the project area of influence through direct observations, interviews with key informants and households. Through administration of questionnaires it was possible to trace the socio-economic profile of households that live along the section to be rehabilitated.

A field visit was undertaken in May 2019 to ascertain and validate the issues through observation, consultations with major stakeholders (institutions and the public). The institutions consulted were: ANE, MITADER and MUEDA administration and N'gapa administration post.

Generally, the situation had not changed significantly since the last ESIA with exceptional few farming activities being observed with not many settlements. The road inventory showed that not many people had encroached on the road reserve except for make shift for selling of food stuff.

2.2.1 [Road Reconnaissance](#)

The consultant team first paid a reconnaissance visit to the road section to be rehabilitated, which identified all villages, the specific environmental characteristics, bridges, potential sites of sandpits and quarries. Photos and notes were taken during this reconnaissance.

2.2.2 [Training of Enumerators and Testing of the Questionnaire](#)

The earlier report did administer a questionnaire with the assistance of district administration 6 interviewers were identified, recruited trained. They were trained to administer the questionnaires and take geographical coordinates of interviewed households. After the training and testing of questionnaires, 2 interviewers were able to administer the questionnaires to the households successfully.



Figure 1: Training of enumerators and testing of the enumerators

2.2.3 [Administration of the Questionnaires](#)

To trace the socio-economic profile of households living along the Mueda-Roma section and seek their perceptions about the project, the questionnaire in Appendix 2 was administered to households. The enumerators selected the first available households and jumped two houses on until the end of the houses along the villages. Of course, in larger villages more households were interviewed. It was noted that some houses were locked during the interview; in these cases, the investigation sought to interview the home situated immediately afterwards.

A total of 100 households were interviewed. After the selection of questionnaires, including the separation of test questionnaires 93 questionnaires were considered for analysis.

2.2.4 [Data Processing](#)

Questionnaires were listed, introduced through the CSPro software and processed using SPSS software. Tables and graphs were prepared to produce the necessary information on the socio-economic profile of the households along the Mueda-Roma road.

2.3 [Specialized Studies](#)

In addition to the studies carried out under the environmental and social impact assessment various technical studies were carried out to assess the technical feasibility of the project, namely:

- reconnaissance of the section;

-
- Geometrical designs
 - Geological and geotechnical surveys
 - hydrological and hydraulic study, and bridges

2.4 Identification and Assessment of Environmental and Social Impacts Methodology

2.4.1 [Identification of Environmental and Social Impacts](#)

The identification of impacts brings together all project characteristics and reference situation of the project area in order to ensure that all potential environmental and social impacts (positive and negative) are identified and taken into account in the ESIA process.

The methods for identifying environmental impacts may be through: (i) checklists; (ii) similar studies; (iii) information specialists; and (iv) public consultation.

The identified impacts were shared and discussed with the engineering team and the Developer before submission to MITADER. The public consultation marks the final stage of investigation of the project impacts.

2.4.2 [Assessment of Environmental and Social Impacts](#)

The evaluation (i.e., description and rating) of impacts will also be made in relation to all phases and components of the project. For a description of the impacts, use is made of primary and secondary information collected on the ground. The valuation of impacts is based on three important factors, namely:

- The magnitude of impact;
- Ecosystem sensitivity; and
- Determination of the significance of the impact.

The term “magnitude” covers all dimensions of the identified impact on the biophysical or socio-economic environment, including:

- Nature of impact (positive or negative)
- Receiver or affected resource (soil, water, air, cultural, historical, aesthetic)
- How the project affects the receptor (directly, indirectly or cumulatively);
- The probability of occurrence;
- The spatial scale (extension); and
- The time scale (duration).

The result of measurement or classification of parameters presented above, indicates the magnitude of the impact. Table 1 presents a description of the parameters that will be used to determine the magnitude of potential environmental impacts.

Table 1: Classification/assessment criteria for the magnitude of potential environmental and social impacts of the project

Criteria	Description	Classification
Character	Whether it is beneficial or not	Positive - if it has a beneficial impact; Negative - those that cause damage to the environment.
Type of impact	Refers to the connection between the activity and the impact received	Direct primary - are the first-order impact, resulting from the direct interaction between the activity and the affected socio-economic or environmental party; Indirect secondary – of secondary, third orders on.
Interaction actions	Indicates interactions between actions	Simple - That the impact can be seen in an environmental component, or whose mode of action is individualized without consequences on the induction of new changes, or the accumulation or synergy. Cumulative - Resulting from the combination of multiple impacts. They can be divided into two categories: additives or aggregates (basically the sum of the effects of various impacts) and synergistic (where the interaction of certain impacts is much greater than the sum of the separate effects)
Probability	It indicates the degree of possibility of occurrence of an impact	Unlikely - the possibility of the project impact is remote Probable - there is a distinct possibility for the impact to occur Highly probable - when it is almost certain that the impact will occur Definitive - when it is certainty that the impact will occur, regardless of the adopted preventive measures
Extension	It refers to the spatial behavior of the activity which could result in impacts	Local - in the area of direct influence of the project In the surrounding area - in the area of indirect influence of the project Regional - the scale of a territorial unit e.g. South Region

Criteria	Description	Classification
		<p>National - impact to occur at the national level</p> <p>Trans-boundary International - impacts that spread to international level, affecting other countries e.g. water availability of an international river.</p>
Duration	Lifetime impact	<p>Short term - when it is expected that the impact will last only for the duration of the activity, e.g. 0 to 5 years</p> <p>Long term - when it is expected that the impact of the project will last for long, but will stop when the project ends, e.g. use of pesticides, 5 to 20 years</p> <p>Temporary - when the impact is expected to be reversible and returns to its previous state when the impact stops or after a recovery period.</p> <p>Permanent - impacts that can cause permanent damage to the receiver or resource that lasts substantially beyond the project lifetime.</p> <p>Continuous - impact occurring continuously or frequently.</p> <p>Intermittent - impact occurring in certain circumstances or occasionally</p>
Environmental recoverability	Recovery capacity by natural processes.	<p>Unrecoverable - when the intermediate impact is lost</p> <p>Irreversible - impact seen as extremely difficult or impossibility of recovery of the situation before impact, by natural means</p> <p>Reversible - where the change can be assimilated by the short, medium and long-term environment, due to the operation of natural processes.</p> <p>Ephemeral - where recovery is immediately after the cessation of activity and does not require mitigation measures.</p>

Source: SALOMON (2016)

The assessment of the magnitude of a given impact is therefore determined, taking into account all the above mentioned dimensions to confirm whether an impact is of low magnitude, medium or high. For social impacts, the magnitude considers the perspective of those affected taking into account the perceived importance of the impact and the ability of people to manage and adapt to change. For impacts on natural resources, the criteria used to determine the magnitude of the impacts are shown in Table 2.

Table 2: Criteria used to determine the magnitude of environmental impacts

Parameter	Magnitude
Description	At which magnitude do impacts afflict rules and regulations, reach populations and social processes and affect the functioning of environmental processes.
Classification	<p>Low - affects a specific group of individuals within the population and for a short period of time (one generation or less *). That is, if the impact occurs in such a way that the operation of natural processes, social and cultural is unaffected.</p> <p>Medium - affects the portion of a population and can change the abundance and/or distribution of one or more generations, but does not threaten the integrity of that population or any population dependent on it. A medium magnitude impact may affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting the integrity. That is, if the impact changes the functioning of natural, social or cultural processes but without affecting their ability to recover after impact.</p> <p>High - affects the entire population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution in the natural restocking (reproduction, migration to not affected areas) without the ability to return to the population or species, or any population or species that depend on it, to its former level within several generations. A high magnitude impact may also adversely affect the site's integrity, habitat or ecosystem. That is, when the operation of natural, cultural or social processes either temporarily or permanently is discontinued.</p>

* These generations are of animal or plant species without including human populations. It should be noted that the potential of restoring an affected habitat also needs to be considered when applying the above criteria.

For environmental impacts “Sensitivity of ecosystems” may be low, medium or high based on the ecological importance of habitats and species. For habitats, it is based on the natural state in the extent, rarity, fragility, diversity and importance as a community resource. Table below presents the criteria to decide on value or sensitivity of individual species.

Table 3: Sensibility criteria for value of species

Parameter	Value/Sensibility
Classification	<p>Low - not protected or in the list as abundant; or not critical to other ecosystem functions</p> <p>Medium - not protected or in the list: a common species at global level but rare in Mozambique; important for ecosystem functions; or under threat or in population decline</p> <p>High - Specially protected in Mozambican legislation and international conventions (e.g. CITES.). Listed as rare, threatened or endangered species (e.g. IUCN Red Lists)</p>

Source: SALOMON (2016)

For socio-economic impacts, the sensitivity is based on the ability of individuals to adapt to change and sustain their livelihoods (Table below).

Table 4: Socioeconomic sensibility criteria

Parameter	Sensibility
Classification	<p>Low - The affected aspects are able to adjust with relative ease and maintain the pre-impact livelihood</p> <p>Medium - Able to adapt with difficulty and maintain pre-impact livelihoods but only with a degree of support</p> <p>High - Those affected will not be able to adapt to change and continue living as they had before the impact</p>

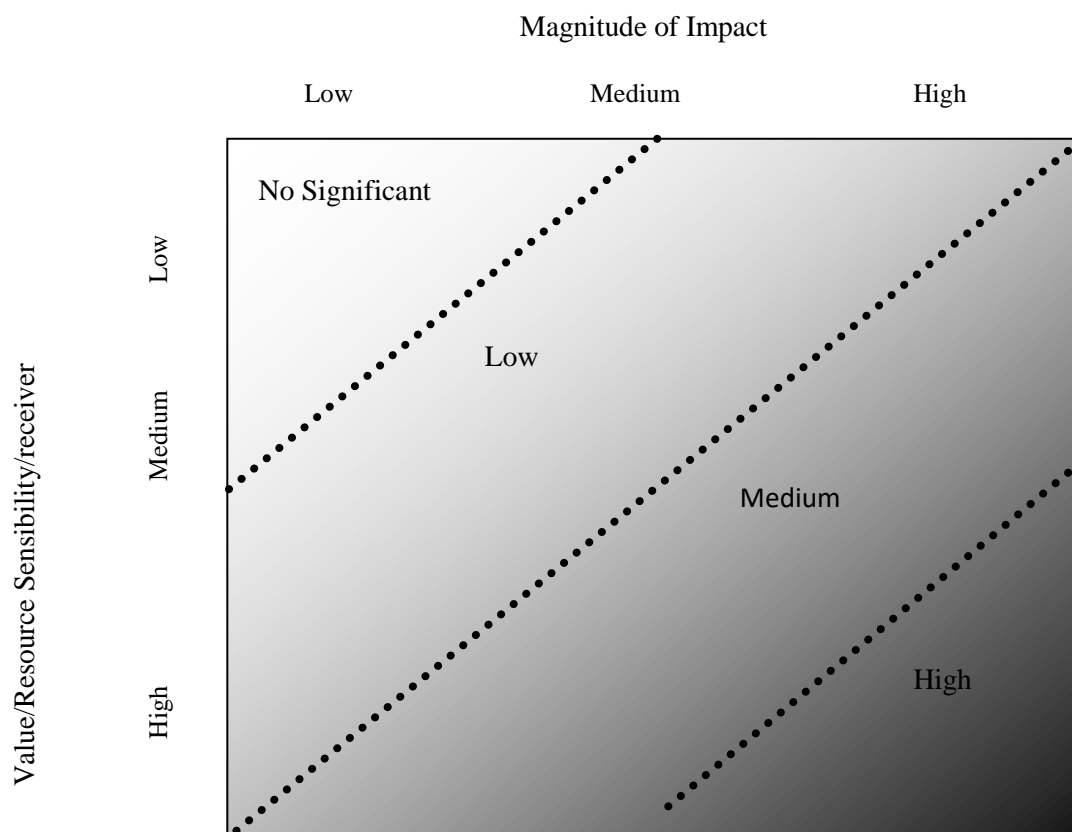
Source: SALOMON (2016)

The significance of a particular impact with a certain magnitude depends on the sensitivity of the resources that are impacted. The magnitude and sensitivity of the ecological and socioeconomic systems are evaluated in combination to determine whether an impact is significant or not and the degree of significance (defined in terms of low, medium or high) (Table below). This principle is illustrated schematically in the figure below.

Table 5: Criteria used to determine the significance of the environmental impacts

Parameter	Significance
Description	The significance of the impact becomes determinable by combining the magnitude and sensitivity of the ecosystem/socioeconomic environment
Classification	<p>No significant (s) - include those which are small or transient, often indistinguishable.</p> <p>Low - the impact should not influence decisions</p> <p>Medium - should influence decisions (unless it is avoidable or mitigable)</p> <p>High - should influence decisions, whatever the degree of mitigation</p>

Source: SALOMON (2016)



Source: SALOMON (2016)

Figure 2: Assessment of the significance of environmental impacts

2.5 Public Consultation

The preparation of the project's E&S documentation (ESIA, ESMP and ARAP) benefited from a participatory and inclusive process being conducted. Various stakeholders were engaged with the aim of enhancing their knowledge of the project and its respective E&S impacts as well as obtaining their perspectives so as to influence the project's design and implementation modalities.

Several public consultations were held. In order to present and discuss the EPDA and TOR, three public meetings were held covering respectively the administrative posts of Mueda Headquarters and its Municipality, Administrative Post of Ngapa. These meetings were used to present and discuss the impacts of the project together with the communities.

The summary of these meetings containing the contributions of participants is presented in Appendix 3.

Additionally, public meetings were planned and carried out in Pemba and Mueda to present and discuss the report.

Three public meetings were held in September 2015 in each administrative post covered by the project, namely Mueda Administrative Post (Miula Locality) and, Ngapa Administrative Post (Nanhamba Locality). A cross section of the society was present, including the administrative authorities of Mueda Government; ANE representatives;

MITADER representatives; local and customary authorities; and the local population. To enable the population to better understand the importance of the project and to support it, local leaders appointed an assistant to interpret the presentations in the local languages (Makonde and Swahili).

Similar meetings were held to support the finalization of the Environmental and Social Assessment, Environmental and Social Management Plan and RAP reports. Efforts were made to ensure the participation of civil society organizations, vulnerable groups and gender sensitive organizations.

There was AfDB mission between the 29th of October to the 9th of November 2019 which held various meetings with the following stakeholders: Ministry of Public Works, Housing and Water Resources, National institute of Land transport, Cooperating Partners(World Bank, European Union, Japan International Corporation Agency), Ministry of Gender, Children and Social Welfare, Provincial Governor ,Pemba, Aga Khan Foundation, Ministry of Land, environment and Rural Development, Ministry of Transport and Communications.

In addition, similar public consultation along the road was conducted (Mueda district leadership, villages dwellers and community, transporters) on the 4th of November 2018 during the preparation mission of Mueda-Negomano Road Project Phase II (Mueda-Roma 95km). Annex 3 list of Consulted people

Further consultations with the stakeholders were held in May 2019 during the updating of the ESIA, ESMP and the ARAP with the following stakeholders; the National Roads Administration(ANE), Ministry of Lands, Environment and Rural Development (MITADER-Climate Change Department), Delegate of Mueda District, National Institute of Statistics(INE). Annex 3 list of people consulted

3 DATABASE ESTABLISHMENT

3.1 Identification of the Developer

The rehabilitation of the N308/R2151 Road, between Mueda and Roma is being proposed by the National Roads Administration (ANE). ANE is a public institution under the Ministry of Public Works, Housing and Water Resources (MOPHRH) responsible for the development and maintenance of all classified roads in Mozambique.

ANE contacts are as follows:



Address: Avenue de Moçambique Nr. 1225; P.O. Box: 1439
Contact person: Eng. Emília Tembe
T: +258 21476163/7
F: +258 21475862
Website: www.ane.gov.mz
Maputo City - Mozambique

3.2 ESIA Team

AfDB contracted an Independent Consultant Dr. Koojo Charles Amooti) to update the 2016 Environment and Social Impact Statement (ESIS). The earlier contract for the preparation of the feasibility study was awarded to STUDI International, which in its turn subcontracted Salomon Ltd to carry out the EIA aspects of the Project. Salomon Ltd is a legally registered Mozambican company, formed in 2001 in Maputo. It is also properly registered with the Ministry of Land, Environment and Rural Development - MITADER (former Ministry for Coordination of Environmental Affairs - MICOA) to carry out environmental impact studies in Mozambique. Salomon Ltd is a company with extensive experience in environmental and social impact assessment in Mozambique. The contact details of Salomon Ltd are given below.



Address: Av. da Malhangalene, Nr. 620 R/C, C.P. 1354
Contact: Mário Souto
T: +258 21 417 605/417 610
F: +258 21 022 268
M: +258 82 326 5523
Maputo - Mozambique

The team involved in the preparation of the ESIA consists of the following members:

- Coordinator of the EIA/Resettlement Specialist: Mario SOUTO
- Environmental Consultants: Francisco SAIMONE, Philip GUILA, Faruk ABUBACAR

-
- Socioeconomic and Public Participation: Mirela ROMAO

This local team is supported by the Environmentalist of STUDI International (Sadok BEN JEMIA) who is also in charge of reviewing reports.

3.3 Context of the Activity

ANE has obtained an environmental license (September 2016) for the rehabilitation and asphaltting of the road between the Mueda and Roma, a distance of about 95 km.

The proposed project is part of the Priority IV of the Five-Year Plan of the Government of Mozambique - to develop economic and social infrastructure - whose strategic aim is to improve and expand the network of roads and bridges vital to the socioeconomic development. Because it is a road that will link two countries (i.e. Mozambique and Tanzania) it will actually allow for rapid regional economic growth and the improvement of the living conditions of communities living along the road.

At the highest level, this project is part of the road policy and its vision. This instrument aims to "increase the percentage of roads in good and reasonable conditions, to ensure the movement of people and goods throughout the year." Among other aspects the objectives of roads policy include: (a) national integration, (b) economic growth, (c) poverty alleviation, (d) regional integration and (e) trade. Due to its characteristics, this road will contribute to each of the objectives of road policy. In the case of a primary road, it constitutes by itself as one of the first priorities of the sector in light of roads policy.

The road sector strategy that embodies the road policy objectives prioritizes the main corridors and the trunk roads linking these corridors. The Mueda-Roma road is part of an international corridor in light of this instrument, which will connect with the Mtwara corridor in Tanzania.

At the micro level, the Mueda-Roma road is a priority in Pillar 4 - the Strategic Infrastructure Development Plan for Mueda District Development from 2015 to 2019 as this road is the one that becomes impassable during the rainy season.

3.4 Alternatives to the Activity

As provided for in paragraph d) of Article 13 paragraph 2 of Decree 45/2004 of 29 September, the EIA should be considered alternatives to the proposed activity. The Ministerial Decree 129/2006 of 19 July, on the development of environmental studies, recommends that a global comparative analysis of alternatives is made. Therefore, they considered two kinds of alternatives, namely: (i) alternative to the implementation of the activity; and (ii) alternative locations of the proposed activity.

Alternative 0 – Doing nothing

The alternative 0 implies maintaining the current situation, i.e. the environmental and socio-economic conditions will remain as characterized in Chapter 6 of this document.

Both for Alternative 1 and 2, the road would be rehabilitated including all hydraulic infrastructure and rails along the crossings of human settlements. The difference is that in alternative 1 the road would

be surfaced with a double sealed surface dressing while the second alternative would be an asphalt concrete surfacing.

As for road location that is intended to rehabilitate, it should be noted that there is no other classified road linking Mueda to Roma. The alternatives would be (1) the opening of a new road section, and (2) asphaltting an unclassified road crossing the interior of the Administrative Post N'gapa. Both alternatives would result in higher environmental and social impacts of the project.

3.5 Associated Activities

The activities associated with the project are:

- Aggregate extraction (stones, water, sand) for the purpose of construction;
- Highway signs;
- Improving access and berms, particularly at junctions with settlements;
- Utility areas (ex.: schools) directly linked to the road;
- Resettlement and compensation of properties located in Right-of-Way of the Road;
- Environmental awareness/environmental education program.

3.6 Legal Framework

The legal framework is done through consultation of Mozambican laws, regional and international applicable legislation and guidelines or those usually recommended for similar activities.

3.6.1 [Constitution of the Republic of Mozambique](#)

In its capacity as the “mother law”, governing the Mozambican legal system, it sets up an important environmental protection tool. Accordingly, Article 90, in respect of the right of the country’s citizens to live in a healthy environment, forms, together with Article 117, which embodies the duty of the State to protect the environment, two of the main pillars of the Mozambican legal and constitutional system with regards to environmental protection.

Paragraph 1 of Article 90 stipulates that “every citizen shall have the right to live in a secure environment and have the duty to protect it.” The implications of such a provision are very relevant, bearing in mind that the acknowledgement of a certain asset means that the environment is a fundamental right- for which all people are required to positively contribute to.

The principles of environmental protection under the Constitution of the Republic of Mozambique should be safeguarded above all else.

3.6.2 [Environmental Regulation](#)

National Environmental Policy

Approved through Resolution N°. 5/95, the policy establishes the ESIA for all environmental legislation. According to Article 2.1, the main aim of this policy is to ensure sustainable development in order to maintain an acceptable balance between the socio-economic development and environmental protection.

To achieve the above objective, the policy must ensure, among other requirements, the management of natural resources in the country and the general environment - in order to preserve its functional and production capacity for the present and future generations.

All developers are responsible for ensuring that all their proposed activities conform to this policy to ensure environmental sustainability of the project.

Environmental Law

Approved through Law 20/97 - Environmental Law, it defines the legal basis for the proper use and management of the environment and its components. It applies to all public and private activities that directly or indirectly may influence environmental components. In its Article 9 it outlaws any form of pollution and environmental degradation.

The Environment Act lays the foundation for there to be damage prevention and environmental protection. As far as the implementation of infrastructure is concerned, Article 14, clause 1 states that “the implementation of housing infrastructure or for any other purpose which, by their size, nature and location, can cause significant negative impact on the environment is outlawed,”

This law determines the relevance of environmental protection and prevention from any harm that may be caused to any of the environmental components by project development.

Regulation on the Environmental Impact Assessment Process

Approved through Decree No. 54/2015 - Regulation on the Environmental Impact Assessment Process, it establishes the rules to be followed for environmental licensing of any activity to be carried out on national territory.

This regulation forms the ESIA for project environmental licensing process that should be followed. All provisions of this piece of legislation need to be followed.

General Guidelines for Environmental Impact Assessment Preparation

Approved through Decree No. 129/2006 - General Guidelines for Preparation of Environmental Impact Assessment, details the procedures for conducting an environmental impact study, and the format, structure and content of the environmental impact assessment report. The purpose of this decree is to standardize the procedures to be followed and the presentation of the environmental impact assessment report.

The environmental impact study report must comply with the specifications of this Decree.

General Directive for the Public Participation Process

Approved through Ministerial Decree No. 130/2006 - General Directive for the Public Participation Process, details the procedures to be followed in the consultation process within the environmental impact assessment process. The purpose of this Decree is to ensure maximum participation of those concerned and affected by the project during the environmental impact assessment process.

All public participation processes must follow the procedures issued by this Decree.

Regulation of the Environmental Audit Process

Approved through Decree No. 25/2011 - Regulation of the Environmental Audit Process, it highlights the importance of environmental audit as a tool for an impartial and documented management process to ensure the protection of the environment. It establishes procedures for evaluating the operational and working processes in relation to the requirements of the environmental management plan, including environmental legal requirements approved for a particular project.

Once the project is authorized, the developer must have in place a functioning, frequent and independent internal audit system, irrespective of the public environmental audit that the project may be subject to under this decree.

Regulation on environmental inspection

Approved through Decree No. 11/2006 - Regulation on environmental inspection, this legal instrument is aimed at supervising, monitoring and making regular verification of compliance with environmental protection standards at national level.

The project will be subject to inspections by MITADER during its implementation in order to verify compliance with the environmental management plan and environmental legislation. The developer must cooperate with such inspections.

Environmental Guidelines for the Road Sector

Approved in 2002, the guidelines make specific recommendations on environmental studies for the road sector. It should be noted that this instrument is relatively nonconformist with the current regulation on the environmental licensing process because it is based on Decree 76/98 that has already been repealed, i.e. after the approval of Decrees 45/2004 and 42/2008, and recently approved Decree 54/2015.

3.6.3 [Emissions and Air quality](#)

Regulation on Environmental Quality Standards and Waste Emissions

Approved through Decree 18/2004 - Regulation on environmental quality standards and waste emissions, this legal instrument provides parameters for the maintenance of air quality; standards for emissions of gaseous pollutants from various industries, including mobile sources.

The project must meet the maximum permissible limits of air quality standards established under this regulation, so as not to harm the environment.

Decree No. 67/2010 proposes Changes to Decree No 18/2004, which are included in Annexes I and V, referred to in Article 7 and 16 of the previous decree. This legal instrument amends and adds new standards for environmental quality to be considered in any activity in the country. The project is to comply with these standards.

3.6.4 [Water](#)

Water Law

Approved by Law 16/91 of August 3, the use of public water basin as a management unit, is based on the principle of user pays and polluter pays. The use of water requires an authorization by the regional administration of water that oversees the basin through license (short term) or lease (long term). The Water Act also emphasizes prevention and control of water pollution and soil protection.

The proposer has the responsibility to implement measures to prevent pollution of water resources during and after project implementation. If there is any discharge to be made in shallow waters, an authorization by ARA-Norte subject to a fee is required.

Regulation on environmental quality standards and effluent emissions

Approved through Decree 18/2004 - Regulation on environmental quality standards and effluent emissions, the Water Act also emphasizes prevention and control of water pollution and soil protection.

The project must comply with the standards of water quality and effluent emissions, considering emissions allowed by law, so as not to harm the environment. Any proposed action should consider the levels permitted under this decree. The violation of such is liable to a fine.

3.6.5 [Biodiversity](#)

Biodiversity Law

Law 16/2014 of 20 June (Conservation Law) establishes the basic principles of protection, conservation, restoration and sustainable use of biological diversity in the areas of conservation, as well as the framework of an integrated management for the sustainable development of the country². All public and private entities that may influence the national system of conservation areas in the country are covered by this law.

Under this law, the Niassa Reserve is considered a full conservation area for the preservation of nature, the maintenance of ecological processes, the functioning of ecosystems and endangered or rare species³. Specifically, under the Reserve Management Plan, the area where it is crossed by road is a buffer zone, which under Article 40, paragraph 3 of this law states that “any activity likely to affect their biotic must first be approved by the agency that manages conservation areas and be subject to environmental licensing, based on an environmental and social impact assessment in accordance with specific legislation”.

² Article 2.

³ Article 15, number 1.

Through Article 11, the Conservation Law establishes that any public or private entity exploiting natural resources in the conservation area or its buffer zone, should contribute financially to the protection of biodiversity in that conservation area. It also states that such interference should ensure that there is no net loss of biodiversity⁴.

Compensation for biodiversity is an important source of potential funding for biodiversity conservation. Although this law considers that this aspect is important it also makes reference to the definition of compensation mechanisms to be defined by specific regulations of conservation efforts. It is expected that these mechanisms will be dealt with by the Regulation of the Conservation Law, which does not yet exist. The importance of compensation for biodiversity has become an important requirement in environmental licensing⁵.

Environmental Law

Approved through Law No. 20/97 - Environmental Law, Articles 12 and 13 of this legal instrument define that project planning, implementation and operation should ensure the protection of biological resources, particularly plants and animals species threatened by extinction, or those that because of their genetic, ecology, cultural or scientific interest, require special attention.

This protection should extend to their habitats, especially in integrated environmental conservation areas.

The project should pay special attention to biodiversity conservation, mainly because part of it is implemented within a conservation area.

Regulation for the Prevention of Pollution of the Marine and Coastal Environment

Decree No. 45/2006 - Regulation for the prevention of pollution of the marine and coastal environment, Article 14 of this legal instrument recognizes the importance of wetlands in flood management, water quality maintenance and their exceptional value in terms of biodiversity.

Article 66 defines as areas of partial protection: the riverbeds, the strip of land up to 50m of width measured from the highest watermark and the ground circle to 250m around dams and artificial lakes.

The project should ensure measures are taken to cause minimum damage or changes to wetlands, by ensuring their continuity and allowing these ecosystems to get the same or approximate water flows as those that prevailed under natural conditions.

Law of Forestry and Wildlife

Law 10/99 - Law of Forestry and Wildlife, recognizes the economic, social, cultural and scientific importance of the forest and wildlife resources and establishes their sustainable use and promotion

⁴ This is the assumption behind the polluter pays principle, stipulated in Article 4, paragraph g) of the Environmental Law which is also referred to in the environmental policy

⁵ By Decree 54/2015 of December 31 that now regulates the environmental and social impact assessment process.

of initiatives for the protection thereof for the benefit of Mozambicans, with particular emphasis on local communities.

No infrastructure should be installed in areas of partial protection without prior authorization from the appropriate entity.

Regulation of the Law of Forestry and Wildlife

Decree No. 12/2002 - Regulation of the Law of Forestry and Wildlife provides for measures to be taken for sustainable use of forests and wildlife.

Articles 103, 104 and 105 relates to the procedures to be followed to obtain authorization to cut down trees.

There is a need to comply with the procedures for obtaining permission to cut down trees, particularly where the road will have a new alignment.

3.6.6 [Waste and Pollution](#)

Regulation on waste management

Decree 13/2006 - Regulations on Waste Management, establishes the legal framework for waste management in Mozambique. The purpose of this legal provision is to establish rules for the generation, transfer and disposal of solid waste. Article 5 classifies waste into two categories: hazardous and non-hazardous. The management of hazardous waste is assigned to the MITADER, including the management of licenses. Only registered and licensed companies and entities are allowed to collect, transport and handle hazardous waste in appropriate locations.

The project should implement measures for the better management of solid waste in accordance with this Regulation.

Environmental Law

Article 9 of this law proscribes the production and disposal of toxic substances or pollutants in the soil, subsoil, water or atmosphere as well as imposing a ban on any activities that may accelerate any form of environmental degradation beyond the limits set by law.

The project should implement the provisions of this Regulation. Measures to prevent any form of pollution beyond the limits set by the regulations must be taken.

3.6.7 [Health and Safety](#)

Labor Law

Law No. 23/2007 - Labor Law applies to legal relations of subordinate work established between employers and workers, national and foreign, of all industries operating in the country. Chapter VI provides the principles and safety rules, hygiene and health of workers.

The project should ensure that their employees carry out their activities in good physical and environmental conditions. Inform them about the risks of their work and instruct them on proper

compliance with health and safety standards at work. Developers/contractors must also provide first aid in case of accident, sudden illness, poisoning or illness.

The developer/contractor in cooperation with the unions shall inform the competent organ of labor administration on the nature of work accidents or occupational diseases, their causes and consequences, after making consultation and registration.

Law of protection of workers with HIV/AIDS

Law No. 5/2002 - Law of Protection of Workers with HIV/AIDS sets out principles designed to safeguard all employees and employment seekers to not be discriminated against in the workplace or when applying for jobs because they are suspected or have contracted HIV/AIDS. Article 8 provides that an employee who is infected with HIV in the workplace, as part of their professional occupation, in addition to compensation they are also entitled to, adequate medical care aimed at easing their state of health, according to the Labor Law and other applicable legislation, funded by the employer.

HIV testing to workers, job seekers to assess them during their application, job maintenance or for promotion purposes is prohibited. All testing is voluntary and should have worker's consent.

The developer/contractor must train and guide all workers to carry out their tasks even if they are infected with HIV-AIDS.

The developer/contractor must raise awareness among workers to prevent, and to know their status on HIV/AIDS and disseminate information about the disease and on how to prevent it.

Regulation on the General Labor Inspectorate

Decree No. 45/2009 - Regulation on the General Labor Inspectorate lays down rules on inspections, under the control of the legality of work. Article 4 paragraph 2 provides for employer's responsibility in the prevention of occupational health and safety risks of the employees.

Developer/contractor must meet the requirements. In the case of inspection, the developer/contractor should help and provide all necessary information to the inspectors.

3.6.8 [Land use and planning](#)

Land Law

Law No. 19/2007 - the Land Law defines the rights of people who use the land, indicating the details of the rights based on customary claims and procedures to acquire titles for its use and benefit communities and individuals.

The project must respect the land use rights of communities. If any activity (such as agriculture) is disturbed by the project, the parties affected should be compensated accordingly.

Land Law Regulation

Defines total protection areas reserved for nature conservation and protection status, as well as partial protection zones, which may be granted land use titles and where activities cannot be

implemented in the absence of a license. The partial protection areas include, among others, the strip of land with 50m wide from the edge of the lakes and rivers' historic maximum, the 250m strip of land wide around the reservoirs, 100m bandwidth on the coast and estuaries.

This regulation defines zones of total and partial protection. In these areas, land use is restricted. The Developer must meet these regulatory requirements.

Land Planning Law

Decree No. 19/2007 - Land Planning Law is intended to guide the spatial planning of the territory recognizing the rights of citizens enshrined in the Constitution. Article 20 refers to the expropriation of private property belonging to or used by the communities due to activities of public interest or necessity/usefulness. In these cases, fair compensation must be paid to cover, among others the loss of tangible and intangible assets, disturbance of social cohesion and loss of productive assets.

The Developer must consider fair compensation if and when it becomes necessary to expropriate private property.

Regulation of Land Use Planning Act

Decree No. 23/2008 - Regulation of Land Use Planning Act establishes the legal systems of land-use planning instruments at national, provincial, district and municipal levels.

All procedures for possible expropriation for alignment purposes and/or implementation of the road necessary infrastructure should be followed.

Urban Land Use Regulation

Decree No. 60/2006 - the Urban Land Use Regulation also features in Chapter X procedures for expropriation for purposes of spatial planning.

The Developer should consider the guidelines in introducing the planned infrastructure at the crossroads of towns and cities.

3.6.9 [Resettlement and compensation](#)

Expropriation laws related with public interest have been there since the colonial period as expressed by Expropriation Law n. º 230 of June 22, 1948 and Decree n. º 43587 as well as Land Law n. º 19/1997, which are also applicable to this project and road. However, after embracing the sustainable development principles in 1992 and subsequently a set of legal instruments that are in line with such principles in environmental and social management, Mozambique was seen as having a vacuum to coherently guide resettlement actions as such.

After many years of not having a single instrument to guide resettlement planning and action on the 8th of August 2012 the Cabinet approved **Decree 31/2012** which is the "Regulation on the Resettlement Process Resulting from Economic Activities". This regulation fills a longstanding void in this regard. The document is valid and applicable in the project under consideration in this document and is briefly described in the following paragraphs.

Article 15 indicates that a Resettlement Action Plan is part of the Environmental Impact Assessment, as per Decree 45/2004, of September 29 of the latter process. This reaffirms what was already part of the latter Decree (i.e. 45/2004).

In terms of principles, the new regulation establishes that the resettlement process should ensure social cohesion, social equity and direct benefits in that the affected people should directly benefit from the interventions that caused their resettlement and respective socioeconomic impacts.

In the definition of objectives, the regulation restates the principle of turning resettlement into a development opportunity by allowing affected people to enjoy quality life, social equity and ensuring the sustainability of the physical, environmental, social and economic aspects around them.

In line with the ultimate interest of linking resettlement with District Land Use Plans, it also indicates that District Governments should approve resettlement action plans and that this should be done by the department that supervises land use planning at that level, i.e. the District Services of Planning and Infrastructures.

In relation to the rights of the affected people, the regulation states that these are entitled to:

- The reestablishment of income and living standards that are equal and/or higher than what they had before resettlement;
- Have their assets transported to the new site;
- Live in an area with adequate social and economic infrastructure;
- Have enough space to develop their subsistence activities; and
- Give their opinions throughout the entire resettlement process.

It then goes on to elaborate on the various units that from the government side should closely supervise, monitor and evaluate the resettlement process to ensure that the best practices are adopted and that lessons are learnt to benefit the process at hand and other related processes in the country. Of particular note in this regard is the establishment of the District Resettlement Committee

Article 13 of the Regulation deals with “Public Participation” and emphasizes that resettlement should be participatory throughout its phases and that major public meetings should be formally made known. Article 14 highlights the importance of the “Right to Information” by affected people and other relevant stakeholders. In relation to public participation and disclosure in general, Article 23 clearly states that the planning, preparation and implementation of a RAP should result in at least four (4) public meetings, which should be heralded in local media.

Articles 16, 17 and 18 deal with specific aspects related with the types of resettlement, land and housing specifications, including details about the social and economic infrastructure that should be made available to the resettled people.

Articles 19, 20, 21 and 22 delve into the steps and work contents related with the planning, preparation and implementation of the RAP and provide the guidelines to be adhered to.

In order to complement Decree 31/2012 in what relates to the establishment and operation of resettlement technical commission as well to provide guidelines for the preparation and implementation of RAPs the GOM enacted decrees 155/2014 and 156/2014 on Internal Regulation for Resettlement Technical Commission and Technical Guidelines for Preparation and Implementation of Resettlement Action Plan. These were also used to recommend the kind of local bodies to assist in RAP management and implementation.

It is worth stressing that this is a new decree, whose practical implications are still to be seen and assessed. Preliminary indications are that it does not solve the need to be specific in certain areas of the resettlement process, which continue to be spread over a series of legal documents.

Thus, it will continue to be necessary to creatively combine those documents to devise the best measures to be adopted in relation to specific issues.

Among other, it will certainly continue to be relevant to basically follow the OP 4.12 of the World Bank on Involuntary Resettlement, which is endorsed by the Mozambican government as has been the case of the resettlement procedures undertaken to date by development initiatives. And where there are discrepancies between the two sets of regulation the WB policies will take precedence. The AfDB adopts the Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation, which in most aspects is harmonized with the WB OP 4.12. Together with the national legal instruments the AfDB's Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation was extensively used to formulate this document.

3.6.9.1 Relevant Mozambican Laws and Regulations

Land tenure and land issues

Land taking is the most sensitive aspect behind any involuntary resettlement. Since its independence in 1975 Mozambique has undertaken a series of legal reforms to regulate the rights of access and use of land by the diversity of citizens. The most relevant are briefly revisited in the following paragraphs.

The **Constituição da República de Moçambique** (Mozambique's Constitution), in relation to Land aspects, stipulates: (i) the maintenance of land as State property; (ii) land may not be transferred (i.e. sold) and the country does not have a "land market" per se. Holders of land rights are able to transfer improvements, such as buildings, from one party to another. Furthermore, other than stating that compensation should be paid when land is expropriated in the public interest, both the Constitution and the Land Law (see below) do not expand on issues related to compensation, in terms of the principles, forms, eligibility, valuation, adequacy, procedures, timing and responsibilities; (iii) the safety of access and use of the land by the population and the investors (...), recognizing the rights of customary access and administration of the land by rural resident populations, promoting the social and economic justice; (iv) the safeguard of the rights of women to access and use of the land; and (v) the sustainable use of natural resources, to guarantee quality of life for the actual and the future generations, ensuring that the areas of total and partial protection maintain their environmental quality and the specific intentions they were established for.

The **Lei de Terras** (Land Law), no. 19/1997 provides the basis for defining people's land use rights, providing the details of rights based on customary claims and the procedures for acquisition of titles for use and benefits by communities and individuals. The law recommends a consultation-based process that recognizes customary rights as the means for identifying the claims of communities and individual members of communities without titles.

The **Regulamento da Lei de Terras** (Regulation of the Land Law), approved by Decree 66/98, of December 8th, indicates that the approval of the construction of public infrastructures, including underground water works, will result in the automatic creation of Partial Reservation Areas i.e. right-of-way (ROW) of 50 m, that borders them. One can neither acquire the rights to use and benefit from that land nor develop activities without a license. In practice this provision is not followed and with poor law enforcement in many parts of the country the encroachment of the ROW tends to become the norm.

The Regulation of the Land Law also identifies the fees to be paid by holders of land titles, before demarcation and authorization are completed, as well as the annual fee for rights of land use and benefits. These fees have recently been updated (2011). The Regulation also recommends compensation resulting from losses by transfer, with basic guidelines for compensation in the form of tables produced and updated by Provincial Directorates of Agriculture. These tables cover the average values (the market value) attributed to several temporary and permanent arboreal crops. In 2010, the National Directorate of Agrarian Services, within the Ministry of Agriculture, produced and updated these tables for the entire country. These tables have been used in this RAP, updated on the basis of an appraisal model adopted in many infrastructure projects lately in Mozambique, as a form of getting around the omissions in the MINAG/DNSA tables, which are considered to be valid for this project. Two of the lacunae/omissions or inconsistencies relate to (i) the non-inclusion of a certain number of common plants; (ii) the adoption of extremely low prices, particularly when compared with the practice in the Southern African region, into which Mozambique falls. The adoption of these tables increases the consistency and it is believed, this should be done in relation to this project.

The **Lei do Ordenamento do Território No. 19/2007 de 18 Julho** (Territorial Planning Law) has the purpose of ensuring the organization of national land and sustainable use of its natural resources; observing legal, administrative, cultural conditions; and providing favorable conditions for the socioeconomic development of the country; the promotion of quality of life of the population; and environmental protection and conservation. This law is applicable at all levels, from national to district level, and requires the preparation of territorial (national, provincial, district, municipal/town) master plans in line with actual conditions at each level. Among other, this law confirms that expropriation for the public interest shall give rise to the payment of fairly calculated compensation in order to compensate for the loss of tangible and intangible goods and productive assets as well as for the disruption of social cohesion⁶. Ministerial Diploma 181/2010, approved in November 2010, is also meant to govern this process of compensation.

The **Decreto No. 23/2008 de 1 Junho/Regulamento da Lei do Ordenamento do Território** (Territorial Planning Law Regulations), Article 68 (No. 2a) further specifies that expropriation for the purpose of territorial planning is considered to be carried out in the public interest when the final objective is safeguarding the common interest of a community through the installation of economic or social infrastructure with large positive social impacts. Article 70 (Nos. 1-3) also establishes that fair compensation must be paid before the transfer or expropriation of property and assets, and should not only cover the real value of expropriated assets, but also damage and loss of profit. As mentioned above specific aspects related with compensation are also governed by Ministerial Diploma 181/2010. This diploma also reiterates the provision in Chapter 10 of Decree 23/2008 in that land taking for the fulfilment of public interests should be made public by the Cabinet under the proposal of the developer. But as will be seen this law and its provisions are recent and the public announcement by Cabinet has not been and it is not yet current practice. There are no clear mechanisms to follow it and it can take a lot of time. Alternative ways of overcoming this gap are necessary and have been applied in this project. These are fundamentally based on the utilization of public communication and participation processes inherent to the ESIA/PGAS itself, and the formulation of the RAP so as to keep interested and affected parties informed as regards the project, and to be told of their points of view and concerns. In addition to the public hearing sessions in the phases for the definition of scope, and of the terms of reference, as well as those for the finalization of the environmental and social studies, the commencement of socio-economic surveys and the inventory of affected persons/entities and assets was preceded by a communication from ANE regarding the fact that, after that date of commencement, persons/entities and assets which did not fall within the COI by that date would not be considered for the purposes of resettlement. The communication processes were handled so as to

⁶ A specific document regulating the process was approved in 2010 (Ministerial Diploma 181/2010 of November 3).

be far-reaching and involved local leaders and communities, in addition to affected persons/entities, with the objective of guaranteeing maximum coverage. This orientation will continue in the subsequent phases of the development and implementation of the RAP. Combined with the procedures for the presentation of complaints and claims, which will form an integral part of the RAP, this is a practical measure, which, it is believed, will assist compliance with the spirit of what is pursued, via communication and publicity.

Valuation of assets and losses and compensation for losses. After many years of a relative vacuum in this area, in the last two-three years there have been new and significant developments in the regulation of compensation for agricultural and infrastructure assets. As said "Regulation No. 66/98 of the Land Law recommends compensation resulting from the transfer of losses, with basic guidelines for compensation in the form of tables produced and updated by Provincial Directorates of Agriculture, covering average values (market value) attributed to several annual crops and trees, but these were rarely available and in most cases they were not up to date when needed. Recently (2010) the National Directorate of Agrarian Services, in the Ministry of Agriculture produced new tables for temporary and permanent crops, which also require updating but no concise criteria have been offered for such a process.

For infrastructures but also for crops in November 3rd, 2010 the then Ministries for the Coordination of Environmental Affairs (MICOA), Finances (MF) and Justice (MOJ) approved the Ministerial **Decree nr. 181/2010 on "Expropriation Process Related with Territorial Planning"**. In addition to putting into practice important aspects of the Territorial Planning Law (Law nr. 19/2007) and the regulation of that law (Decree nr. 23/2008) this Decree gives important steps in filling the gap that existed on the calculation of values for compensation. In its point "4.2.1 Terms for calculating infrastructure" the diploma covers terms for calculating infrastructures and crops. The Diploma does not necessarily revoke the provisions that already existed but provides them with greater consistency. Yet it seems that it does not overcome the shortcomings of "updating prices", and it is also void on infrastructures built using precarious (local) materials, which are usually the most affected when resettlement is also associated with poor land use planning.

Regarding particularly to infrastructures, a factor which tends to result in lower prices when using the legal mechanisms is the "depreciation", which the existing laws and regulations require that be considered.

In all cases the existing laws and regulations do not give straight forward answers and are open to different forms of interpretation, which tends to lead to different results when applied by different resettlement practitioners.

Experience has shown that the above-mentioned tables, both for the agricultural sector and for the public works and housing, are rarely available and when available are often outdated. Moreover, for various reasons and particularly the fact that the property market is not yet consolidated, the Mozambican market rarely provides reliable, consolidated information about prices of comparable assets or acceptable substitutes. This has led practitioners of resettlement actions to look for alternative ways and arrangements to make calculations and valuations that refer only to the costs of tangible assets (i.e. direct/tangible). Intangible aspects (e.g. sentimental attachment to the affected assets, proximity to neighbors or relatives, sacred sites, aesthetic values, etc.) should be treated (negotiation/valuation) separately in consultation with all relevant stakeholders. For the purposes of the initial calculation of resettlement costs covered by this document, which refers to a worst case scenario, and as presented in the entitlement matrix (Chapter 10), a 20% factor (the maximum foreseen in Decree 181/2010) should be used as disturbance compensation factor for a certain number of assets and situations. In the phase involving the adjustment of compensation, after the

levels to which each PAP will be disturbed, have been confirmed, direct arrangements will be made with each PAP, in accordance with specific evaluations and negotiations.

Natural resources usage rights

In regard to natural resources usage rights and environmental protection in general there have been several domestic developments as well as the endorsement of several regional and international provisions that have become national law.

Domestic (Mozambican) Laws

The **Constitution/Constituição**: Mozambique's 2004 Constitution includes two fundamental environmental pylons, namely: "the right of every citizen to live in a clean environment and the responsibility to protect this right" as well as recognition of environmental protection as a public interest.

The **Land Law** (Law n.º 19/97, of 1 of October): as stated above the law and its Regulation 66/98, provide the basis to define access rights and land use and procedures for land title acquisition and use by the communities and individuals. The same law and the regulation embodies key aspects defined in the constitution in relation to the land such as the maintenance of the land as state property and that land cannot be sold as well as the absence of a "land market" per se in the country. Among other aspects it defines "areas destined to meet public interest" as belonging to public domain. It also protects customary and community rights over land.

National Water Law in 1991 and the National Water Policy from 1995: under the water law and policy the following principles are adhered to: (i) water supply and sanitation services should be provided in accordance with the demand and economic capacity of the users; (ii) tariffs should allow for the recovery of operational and maintenance costs, and later contribute to investment and sustainability of the systems; and (iii) in as far as possible water supply and sanitation services should be decentralized to autonomous local agencies.

Regional and international legal instruments that have been turned into domestic law

Mozambique has been adhering to a series of international legal instruments that relate to the need of being proactive in environment protection and conservation. Under line 2 of article 18 of the country's Constitution, the rules of international law have the same value in domestic law and once ratified by the Parliament and Government they become constitutional normative acts. In light of nr 1 of this article, "treaties and international agreements duly approved and ratified, are enacted in the Mozambican legal order".

For this project, important and relevant international and regional treaties and conventions ratified so far include:

- The UN Convention on Biodiversity ratified by Resolution n.º 2/94, of 24 of August: this is aimed at "the conservation of biological diversity, the sustainable use of its components and fair and equitable sharing of benefits arising from the use of genetic resources, including by appropriate access to genetic resources and appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies, as well as through adequate funding".
- African Convention on Nature and Natural Resources Conservation ratified by the Parliament's Steering Committee through Resolution n.º 18/81, of 30 December: is aimed at ensuring the conservation, use and development of land, water, forest and wildlife resources

⁷ Updated in 2007

of Member States, bearing in mind not only the general principles of nature conservation, but also the best interests of the communities themselves

Other important international and regional conventions and protocols ratified by the Mozambican State include:

- Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer (Resolution No. 8/93 of 8 December);
- United Nations Framework Convention on Climate Change – UNFCCC (Resolution No. 1/94 of August 24, 1994);
- Kyoto Protocol (Resolution No. 10/2004 of 28 July);
- Convention on International Trade in Endangered Species – CITES (Resolution No. 20/81 of December 30);
- Cartagena Protocol on Biosafety (Resolution No. 11/2001 of 20 December);
- United Nations Convention to Combat Desertification and Drought (Resolution No. 20/96 to November 26);
- Stockholm Convention on Persistent Organic Pollutants and (POPs) (Resolution No. 19/96 of November 26, 1996);
- Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal (Resolution 18/96 to November 26, 1996);
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Resolution 10/2009 of 29 September. The Convention entered into force in Mozambique in July 2010)

Environmental Laws

The **Constitution/Constituição**: the country's fundamental law contains a series of general legal provisions aimed at preventing and controlling pollution and erosion; integration of environmental concerns into sectorial policies; promotion of the integration of environmental values in educational policies and programs; ensuring the rational use of natural resources while maintaining their capacity for renewal, ecological stability and human rights of future generations. It is also concerned with the promotion of land use planning with a view to ensure an adequate location of activities and a sensible socio-economic development.

The **Environmental Law** n.º 20/97, of 1 of October: this Act "is aimed at defining the legal bases for a correct use and management of the environment and its components for the realization of a system of sustainable development in the country".

Article 4. of the Environment Law establishes a range of basic legal principles, which highlight: the principle of rational use and management of environmental components, with a view to further improve the quality of life of citizens and the maintenance of biodiversity and ecosystems; the precautionary principle, whereby the environmental management should prioritize the establishment of systems to prevent acts that could be harmful to the environment, to prevent the occurrence of significant negative environmental impacts or irreversible damage, regardless of the existence of scientific certainty about the occurrence of such impacts, and the principle of global and integrated

vision of the environment as a set of interdependent natural ecosystems, which must be managed so as to maintain their functional balance.

This law has formed the basis for defining specific environmental laws and regulations, namely:

- The **Environmental Impact Assessment (EIA) Regulation**, approved by Decree n.º 54/2015, of 31 of December⁸: Mozambique has developed comprehensive regulations to cover the EIA process, which are included in the Regulation of the Process for Environmental Impact Assessment. The regulation is in line with the world's environmental and social management best practices, including AfDB and World Bank recommendations and procedures. There are three main specific objectives of any EA exercise:
 - Scoping of the proposed developments in terms of their potential impact on the natural and social receiving environment, indicating both its beneficial outcomes and adverse effects. The initial screening is meant to determine the scope of the Environmental Impact Assessment (EIA) required prior to approval of interventions. If any investment is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented (Category A+ and A), the EIA will be more stringent than if the investment has impacts which are less adverse, site-specific, mostly reversible and where adequate mitigation measures can be designed (Category B). For investments with multiple sub-projects, this screening is often done in the form of a checklist of potential impacts included in standard Environmental and Social Management Frameworks (ESMFs).
 - The actual Environmental and Social Impact Assessment (ESIA), which assesses the potential impacts of the investment in detail and evaluates alternatives.
 - Proposal of measures to be taken in order to avoid, mitigate and/or eliminate adverse effects both at the planning, design and installation stages, and during operation and eventual decommissioning of the project. This is generally done in the form of an Environmental and Social Management Plan (ESMP), which is normally an intrinsic part of the EIA.

Certain interventions might require people to be resettled. The Regulation of the Environmental Impact Assessment Process, which governs the EIA process in Mozambique, says very little about resettlement, except in its Annex I, point 1. Infrastructures, line a), where it states “under environmental licensing, all interventions requiring people to be resettled will be considered as Category A Activities”. As stated above Decree 31/2012 has now filled part of the void that existed in this regard.

There are also important international and regional conventions and protocols ratified by the Mozambican State that play a role in environmental management. These include:

- Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer (Resolution No. 8/93 of 8 December);
- United Nations Framework Convention on Climate Change – UNFCCC (Resolution No. 1/94 of August 24, 1994);
- Kyoto Protocol (Resolution No. 10/2004 of 28 July);
- Convention on International Trade in Endangered Species – CITES (Resolution No. 20/81 of December 30);

⁸ Which replaces Decree n.º 45/2004, of 29 of September that regulated the same process from 2004 until March 2016, when the new decree was promulgated.

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- Cartagena Protocol on Biosafety (Resolution No. 11/2001 of 20 December);
 - United Nations Convention to Combat Desertification and Drought (Resolution No. 20/96 to November 26);
 - Stockholm Convention on Persistent Organic Pollutants and (POPs) (Resolution No. 19/96 of November 26, 1996);
 - Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal (Resolution 18/96 to November 26, 1996);
 - Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Resolution 10/2009 of 29 September. The Convention entered into force in Mozambique in July 2010).

Social welfare legislations

The Provincial Directorate for Women, Children and Social Affairs (DPMCAS) and the National Institute of Social Affairs (INAS), are responsible for the subsidy to the poorest and destitute members of the population and for guaranteeing that the rights of the most vulnerable are respected. Although there are no specific legal guidelines for the social aspects of resettlement, the ratification by Mozambique of the **International Conventions on the Child's Rights and Human Rights, the Elimination of All Forms of Discrimination Against Women**, the Mozambique's agenda on Human Settlements and the Labor Law define specific rights based on the fairness and in the equality of opportunities, without discrimination, to the benefits of the enterprises and private investments.

3.6.9.2 Laws and Regulations relating to Agencies Responsible for Implementing Resettlement Activities

The African Development Bank has adopted the following policy objectives in relation to involuntary resettlement:

- a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs;
- b) Resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs; and
- c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation; whichever is higher.

Under the AfDB definition a resettlement action may include (i) loss of land or physical structures on the land, including business, (ii) the physical movement, and (iii) the economic rehabilitation of project affected persons (APs) in order to improve (or at least restore) the levels of income or life prevailing before the action causing the resettlement has taken place”.

The bank has provided the following guiding principles in order to achieve the objectives provided:

- a) Preparation of a resettlement policy framework and resettlement action plan that ensures that displaced people are:
 - Informed about their options and rights pertaining to resettlement;

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- Consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives;
 - Provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project;
 - Provided assistance (such as moving allowances) during relocation;
 - Provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors are at least equivalent to the advantages of the old site;
 - Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living;
 - Provided with development assistance, in addition to compensation such as land preparation, credit facilities, training, or job opportunities; and
 - Provided with an opportunity to resolve disputes through a grievance resolution mechanism.

The policy also advocates that:

- Particular attention should be paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, chronically ill, ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation;
- Implementation of resettlement activities should be linked to the implementation of the investment component of the project to ensure that displacement or restriction of access does not occur before necessary measures for resettlement are in place. These measures include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required. In particular, taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons;
- Displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups;
- In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder); and
- Patterns of community organization appropriate to the new circumstances are based on choices made by the displaced persons. To the extent possible, the existing social and cultural institutions of resettled people and any host communities are preserved and resettled people's preferences with respect to relocating in pre-existing communities and groups are honored.

The policy also sets the following guiding principles on which to base the criteria for determining eligibility for compensation, resettlement and rehabilitation assistance measures for PAPs:

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- (i) Persons that have formal legal rights to land, including customary and traditional; and religious rights recognized under the laws of Mozambique;
 - (ii) Persons who do not have formal legal rights to land or assets at the time the census begins, but have a recognized claim to such land or assets through the national and customary laws of Mozambique. This class of people includes those that come from outside the country and have been given land by the local authorities to settle, and/or to occupy in matrimonial society; and
 - (iii) Persons who have no recognizable legal right or claim to the land they are occupying, using or getting their livelihood from. This class of people includes those that settle at a place on semi-permanent basis, or those settling at a place without any formal grant or authority.

PAPs classified under paragraph (i) and (ii) shall be provided compensation, resettlement and rehabilitation assistance for the land, building or fixed assets on the land and buildings taken by the project. The compensation shall be in accordance with the provisions of this RAP and if PAPs occupied the project area prior to the cut-off date (date of commencement of the Census).

Persons covered under sub-paragraph (iii) above are to be provided with compensation for the improvements on the land. In addition, they have to be given the necessary assistance to satisfy the provisions set out in the policy, if they occupy the project area prior to the established cut-off date. The IFC guidelines also promote this concept and encourage payment of compensation on improvements and provision of assistance to people without recognized rights to land.

Communities including districts, towns, neighborhoods and villages permanently losing land, resources and/or access to assets shall be eligible for compensation. Compensation to communities will include for public toilets, market places, car parks and health posts or other appropriate compensation chosen by the community. Compensation measures shall ensure that pre-resettlement socio-economic status of the communities are restored or improved.

3.6.9.3 Gaps Between Local Laws and AfDB Safeguards

The principal gap which has existed between Mozambican laws and African Development Bank safeguards had to do the fact that Mozambican laws did not require the preparation of resettlement instruments as such, namely, resettlement plans or resettlement policy frameworks, depending on dimension and characteristics. This was partially resolved by the recent adoption of Decree 31/2012.

The approval of Decree 31/2012 and of Diploma 181/2010 brings the content of Mozambican provisions ever closer to those of the AfDB, as regards the treatment to be given to the theme of resettlement and affected persons/entities and assets. An important gap still present in Decree 31/2012 and Diploma 181/2010 relates to the absence of a framework for the phenomenon of resettlement as something which must be avoided and/or minimized. In its current form, the decreed does not concentrate on the discussion of what interventions must do, prior to deciding on the need for resettlement.

The AfDB Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation recognizes that involuntary resettlement can give rise to significant disturbance and risk of increased vulnerability for affected people caused by physical displacement or disruptions to their livelihood systems and income sources.

Specifically, the Safeguard contains the following main principles and provisions:

- Involuntary resettlement should be avoided where feasible or minimized;
- Resettlement activities should be regarded as sustainable development programs with meaningful consultation with affected people in program planning and implementation;

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- Affected people should be compensated for lost assets and assisted in their efforts to improve/restore their standards of living;
 - Resettlement covers relocation/loss of shelter; loss of assets/access to assets; and loss of income sources or livelihood means (whether or not affected persons must physically relocate);
 - A formal resettlement plan or resettlement policy framework is required to address project associated resettlement impacts. According to AfDB Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation a resettlement plan should describe the following:
 - The project, potential impacts and measures taken to avoid or minimize resettlement;
 - Socioeconomic studies carried out to identify who is affected and nature of effects; information on vulnerable groups; local livelihood and land-tenure systems and social and cultural characteristics of affected populations; etc.;
 - Applicable legal framework with which the land acquisition and resettlement process should comply, and any gaps between national laws and AfDB Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation;
 - Affected persons and eligibility for compensation and other resettlement assistance, including cut-off dates;
 - Methodologies to value losses and compensation at replacement cost;
 - Resettlement measures and support to be provided to project-affected people;
 - Resettlement sites including their identification, suitability, resettlement procedures, influx risks and institutional and legal considerations;
 - Plans to provide any necessary housing, infrastructure and social services;
 - Community consultation and participation during resettlement planning and implementation;
 - Measures to mitigate impacts of resettlement on host communities;
 - Grievance mechanisms and procedures;
 - The organizational framework for implementing resettlement;
 - Resettlement implementation schedule;
 - Resettlement costs and budget;
 - Monitoring and evaluation of resettlement implementation (internal and external).

The entry into force of Decree 31/2012 and Diploma 181/2010 has contributed significantly to narrowing the gaps between Mozambican legislation and AfDB Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation. As regards specific aspects such as (i) the need to prepare a resettlement action plan; (ii) conducting socioeconomic studies; (iii) resettlement measures; (iv) community consultation and participation; (v) institutional and organizational framework; and (vi) monitoring and evaluation, where there were differences between the two sides, these have been practically eliminated by the above-mentioned decrees.

A few differences remain though and these can briefly be identified in the following areas (Table next page).

3.6.9.4 *Legal Steps Needed to Ensure Effective Implementation of Resettlement*

Under both the AfDB Operational Safeguard 2 and Policies and the GOM laws and regulations customary rights over land have the same value as other more formal laws.

3.6.10 [Cultural Heritage](#)

Regulation of Funeral Activity

Decree 42/90 - Regulation of Funeral Activity stipulates that the burial of corpses in rural areas can be done in cemeteries or other places approved by the Authorities. But too often there are family cemeteries or even within the properties.

No reference is made in regard to the transfer of corpses in rural areas, that development projects should comply with. It is assumed that traditional leaders should be consulted to define appropriate burial sites and traditional practices to be followed for this purpose.

Under the practice recommended by this decree, the Developer should refer to local community leaders about the existence of graves along the areas of work or implementation of the new sections of road. If so, recommendations for relocation in compliance to traditional practices should be observed.

Cultural Protection Law

Law 10/88 - Cultural Protection Law is aimed at legally protecting property and cultural and intangible heritage of Mozambique. Under this law, the material cultural heritage includes monuments, groups of buildings (of historical, artistic or scientific value), places (of archaeological, historical, aesthetic, ethnological or anthropological importance) and environments (physical and biological formations of particular interest).

Some artifacts can be found during construction. If this happens, the Contractor shall immediately notify the relevant authority.

3.6.11 [Road Public Works](#)

Roads sizing rules

Under the roads sizing rules the design of roads in Mozambique is governed by a multiple device such as:

- Code of Practice for the Geometric Design of Trunk Roads, SATCC, Draft 1998
- Guidelines on Low-volume Sealed Roads, SADC, July 2003
- Code of Practice for the Design of Road Pavements, SATCC, Draft 1998
- Standard Specification for Road and Bridge Works, SATCC, Draft 1998
- Code of Practice for the Design of Road Bridges and Culverts, SATCC, Draft 1998
- Road Traffic Signs Manual, SADC
- Design Standards, ANE, Draft 2001

All established standards should be implemented.

Concrete structures regulation

Decree No. 47 723 - Concrete Structures Regulation

Repealing Decree No. 25948 of 16 October 1935 establishes rules to be observed in the design and execution of concrete structures in general as well as specific rules to each type of infrastructure.

All concrete structures must consider the rules established in this decree.

3.6.12 [Key agreements and Conventions](#)

Mozambique is a signatory to several international agreements and conventions related to environmental management and protection. Some of these arrangements that are relevant for the activity under consideration in this document are presented below.

3.6.12.1 [Air Quality](#)

UN Convention on Climate Change, 1994

UN Convention on Climate Change, 1994 deals with the issue of emissions of greenhouse gases (GHG) and implies that the sustainability of the project should be considered, for example, its activities should minimize the emission of greenhouse gases and therefore contribute to climate change.

Vienna Convention for the Protection of the Ozone Layer, 1985

The Vienna Convention for the Protection of the Ozone Layer, 1985 overall aim is that Member States are required to take measures to prevent or reduce the negative effects of change in the ozone layer caused by human activities.

The Developer should avoid contributing to the destruction of the ozone layer through the emission of gases in quantities that could damage the ozone layer, thus affecting human health and the environment.

Kyoto Protocol of, 1997

The Kyoto Protocol of 1997 sets targets for greenhouse gas emissions. Measures should be taken to reduce emissions of greenhouse gases.

Montreal Protocol on Substances that Deplete the Ozone Layer, 1987

The Montreal Protocol on Substances that Deplete the Ozone Layer, 1987 is aimed at controlling the production of substances that deplete the ozone layer and the banning of chlorofluorocarbons (CFCs).

Developers must avoid the use of equipment using CFCs and other substances that can damage the ozone layer.

3.6.12.2 [Biodiversity](#)

African Convention on the Conservation of Nature, 1969

The African Convention on the Conservation of Nature, 1969 stipulates that Member States undertake to adopt measures to ensure the use, conservation of soil, water, flora and wildlife resources according to scientific principles and taking into account the best interests of the people.

Member States should:

- give special protection to animal and plant species threatened with extinction or that may become so, and to the habitat necessary for their survival.
- Ensure the conservation and management of natural resources as an integral part of regional development plans and/or national level. When any development plan is likely to affect the natural resources of another State, it must be consulted;
- Report and list of protected species of fauna and flora, maintain conservation areas in their territories, take all necessary legislative measures to reconcile customary law with the provisions of this Convention.
- Ensure that their people enjoy their dependence on natural resources and that they understand the need, and rules for the rational use of these resources.
- Encourage and promote research in conservation, utilization and management of natural resources.

The measures of the Convention have been incorporated into national legislation over time. The Contractor must comply with all national laws on nature and natural resources and promote environmental awareness and have an environmental management plan.

Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 1973

The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 1973 ensures that international trade in specimens of wild fauna and flora does not threaten their survival in the wild. The same gives various degrees of protection to more than 5,600 species of animals and 30,000 species of plants.

The Developer shall be aware of the species listed in CITES. When identified on site, the competent authorities must be notified.

UN Convention on Biological Diversity, 1992

The UN Convention on Biological Diversity, 1992 emphasizes the importance of biological diversity and the need for sustainable use of its components and fair and equitable sharing of its components. Member states have the sovereign right to exploit their resources and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Measures already incorporated into national legislation. The Contractor must comply with Mozambican laws on conservation of the environment and biodiversity.

Any potential impact of the project on natural resources from a neighboring state may be a matter of consultation between the states.

It is particularly important because of the potential for pollution of tributaries of the Rovuma basin which is shared with the Republic of Tanzania.

Convention on Wetlands of International Importance (RAMSAR Convention), 1971

The Convention on Wetlands of International Importance (RAMSAR Convention), 1971 it is an international treaty that provides a framework for national action and international cooperation and rational use of wet areas due to their ecological importance and also the pressure they have suffered because of their wealth.

The Developer must ensure that wetlands are not adversely affected or that their functions are restored after intervention.

Stockholm Convention on Persistent Organic Pollutants (POPs), 2001

The Stockholm Convention on Persistent Organic Pollutants (POPs), 2001 is a treaty in which the signatory states prohibit the use of chemicals that persist in the environment, which bio accumulate in the food chain and pose a risk to human health and the environment. These substances are listed in Annex I.

The Developer/Contractor shall not use persistent organic pollutants.

Southern Africa Development Community (SADC) protocol on Conservation of Wildlife and Its Application in Law, 1999

The Southern Africa Development Community (SADC) protocol on Conservation of Wildlife and Its Application in Law, 1999 is meant to ensure the preservation and sustainable development in the use of wildlife resources.

Project activities should not harm wildlife.

3.6.12.3 Cultural heritage

UNESCO Convention for the protection of the world Cultural and Natural Heritage, 1972

This convention promotes cooperation among nations to protect the world heritage of exceptional value, so that its preservation is important for current and future generations.

The Developer should consider the existence of infrastructure of historical and cultural significance and minimize degradation.

Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO), 2003

The Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO), 2003 is aimed at safeguarding the intangible cultural heritage and ensures respect for the intangible heritage of communities, groups and individuals.

The safeguards are already contained in national law. The Developer should consider the provisions of national law.

Convention on the Protection and Promotion of Cultural Expressions (UNESCO), 2005

This convention is aimed at protecting and promoting the diversity of cultural expressions to encourage dialogue between cultures and at fostering respect for cultural diversity.

The Contractor shall ensure compliance with this Convention during project implementation (e.g. promotion and respect for cultural diversity).

3.6.13 [AfDB Integrated Safeguards System](#)

The African Development Bank (AfDB or BAD) is committed to ensuring environmental and social sustainability of the projects it finances. To align with the new policies and strategies, including the AfDB's strategy for the decade 2013-2022 the Bank formulated the Integrated Safeguards System (ISS) in December 2013 to promote the sustainability of project outcomes by protecting people and the environment from adverse impacts of projects.

The ISS were based on two previous safeguard policies: Involuntary Resettlement (2003) and Environmental Management (2004) and three horizontal policies and strategies: Gender (2001), Climate Risk Management and Adaptation Strategy (2009) and the Framework for Involvement of Civil Society (2012). They were also based on sectoral policies of the Bank: Health (1996), Integrated Water Resources (2000), Agriculture and Rural Development (2000, 2010) and Poverty Reduction (2004). It is a consolidated document, which covers the main aspects that guarantee the sustainability of the projects financed by the Bank. Safeguards issued by the ISS supersede all previous policies and safeguards prepared by the ADB. The ISS seeks to: (i) better align the safeguards with Bank's new policies and strategies, including the Bank's new Ten-Year Strategy (2013-2022); (ii) adopt good international practice, including on climate change; (iii) adapt policies to an evolving range of lending products and innovative financing modalities; (iv) work toward greater harmonization of safeguard practices across multilateral finance institutions; (v) tailor safeguard approaches to different clients with varying capacities; and (vi) improve internal processes and resource allocation.

It should be noted that ADB's operational safeguards are largely in line with the requirements/national regulations in terms of environmental and social sustainability of the projects implemented in Mozambique. The national environmental regulations were informed by funding agencies like ADB safeguards.

The safeguards have the following objectives:

- Avoid adverse impacts of projects on the environment and affected people, maximizing the potential benefits of development to the extent possible;
- To minimize, mitigate and/or compensate for adverse impacts on the environment and affected people when these cannot be avoided; and

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- To help borrowers/clients to strengthen their safeguard systems and develop capacity to manage environmental and social risks.

The AfDB has adopted five operational safeguards to achieve the objectives and ensure the optimal functioning of the ISS:

- **Operational Safeguard 1 (SO1): Environmental and Social Impact Assessment** - Establishes the procedure to determine the category of the project and the social and environmental impacts.
- **Operational Safeguard 2 (SO2): Involuntary Resettlement, Land Acquisition, Population Displacement and Compensation** - this safeguard consolidates the political commitments and requirements established by the Bank on involuntary resettlement and incorporates a number of details to improve the operational efficiency of these requirements;
- **Operational Safeguard 3 (SO3): Biodiversity and Ecosystem Services** - has the objective of conserving biological diversity and promoting sustainable use of natural resources. It also reflects the commitment of the AfDB's policy on integrated management of water resources within the operational requirements;
- **Operational Safeguard 4 (SO4): Prevention and Control of Pollution, Hazardous Materials and Efficient Use of Resources** - covers a range of key impacts of pollution, waste and hazardous materials that are part of international agreements and conventions as well as specific standards, including gas greenhouse effect that other development banks also follow.
- **Operational Safeguard 5 (SO5): Working Conditions, Health and Safety** - establishes the bank's requirements to their borrowers or customers with respect to the conditions of workers' rights and protection against abuse and exploitation. It also ensures wide harmonization with most other multilateral development banks.

The Operational Safeguard 1 is a mandatory requirement for projects funded by the AfDB to its borrowers. The remaining safeguards support the implementation of the first and indicate specific requirements related to different environmental and social issues, including gender and vulnerability, which are triggered if the evaluation process shows that the project will have certain risks.

3.6.13.1 Operational Safeguard 1 (SO1): Environmental and Social Impact Assessment

Objectives

This safeguard is intended to:

- Consider environmental, climate and social changes in national and regional strategic documents;
- Identify and assess the environmental and social impacts and risks - including those related to gender, climate change and vulnerability - of Bank-financed operations in their areas of influence;
- Avoid, or when not possible, minimize, mitigate and compensate for adverse impacts on the environment and affected communities;
- Ensure participation of interested and affected parties during the consultation process so that affected communities and other stakeholders have access to timely information in the proper format on the Bank's operations, and that are sufficiently consulted on questions referred to them that may affect them;

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- Ensure effective management of environmental and social risks in projects during and after implementation; and
 - Contribute to the strengthening of the national system member country for the management of environmental and social risks by evaluating and improving the ability to achieve the ADB issued requirements on the integrated safeguards system (SIS).

Scope of application

It is the first requirement and mandatory for all projects financed by the ADB. The environmental and social impact assessment determines whether operations involve initiatives or components that impose certain risks covered by the safeguards 2-5 and therefore if these requirements must be met

Requirements of the Safeguard

To be eligible for AfDB funding, proposed projects should be subject to assessment of environmental and social impact that includes the environmental and social management plan. The process starts with pre-assessment of the project in which it determines the type and level of environmental and social assessment, the projects will be categorized according to their impacts. Projects can have 4 categories: (i) Category 1 - Projects that may cause significant environmental and social impacts. Any project that requires a Full Resettlement Action Plan (RAP) are included in this category. Projects in this category require a full environmental and social impact study; (ii) Category 2 - Projects that may cause adverse environmental and social impacts lower than Category 1. Projects with little impact on resettlement and may require an Abbreviated RAP and an assessment of environmental and social impact that focuses on the expected environmental and social impacts; (iii) Category 3 - projects with negligible environmental and social impacts. Do not require an environmental impact assessment, should consider gender, institutional, social and environmental aspects during project preparation; and (iv) Category 4 - Projects involving loans to financial intermediaries. These may have one of the above categories and are subject to the requirements of this safeguard depending on their category.

In the case of this project, the institution that oversees the environmental area declared it as Category A, equivalent to Category 1 of the Bank's rating. Therefore, subject to full environmental and social impact study. Because of their limited impact on the resettlement, the Bank stipulated that an Abbreviated Resettlement Action Plan be carried out.

The above mentioned aspects are followed by the definition of the scope, which establishes the area of influence, alternatives and identify potential impacts that include physical, biological, socioeconomic, cultural, cross-border and global, that also include emissions of greenhouse gases and vulnerability to the effects of climate change. In scoping discussing the mitigation and adaptation are also considered. Where relevant, it also discusses the cumulative impacts.

The assessment of environmental and social impact covers all phases of the project on all environmental and social impacts identified during the scoping phase, including any of the impacts covered by operational safeguards themselves (SO2-5). The assessment should consider alternative locations and/or technologies to avoid adverse impacts. The mitigation hierarchy to apply is: avoid, reduce and minimize, mitigate and/or restore, and finally compensate for the damage.

Accordingly, assessment should first comply with regulations and national standards. If these do not contradict the Bank safeguards, aspects necessary to meet the requirements stipulated by the Bank should be added. The Bank expects the evaluation process to improve national systems for environmental, social and climate change management.

Some environmental aspects are special and deserve attention by the borrower, namely: (1) risk of climate change, where projects can be under Category 1 (very vulnerable and require detailed assessment of the risks of climate change and adaptation measures), 2 (moderately vulnerable and require design review) or 3 (not vulnerable to climate change and require specific measures of cost management); (2) impacts on vulnerability and communities; and (3) cultural heritage.

The environmental assessment should be consultative and participative. Communities should be consulted to ensure that they are informed and support the implementation of the project. The consultation is based on analysis of stakeholders and is preceded by adequate information about the project. For Category 1 projects, the affected communities are given the opportunity to participate in key stages of the project design. Thus, communities should be consulted for their opinions and suggestions for the preparation of terms of reference of the ESIA and ESMP. The consultation should be conducted with the aim of - especially for projects under Category 1 - obtaining community support and their acceptance of the proposed mitigation measures. The process of engaging communities and stakeholders involves:

- Public entities and civil society organizations as well as community members;
- Ensure the social and cultural inclusion in the appropriate manner;
- Provide sufficient time for decision -making processes of vulnerable groups;
- Facilitate that vulnerable groups have sufficient time to express their views in their own language and understanding, without external manipulation, interference, coercion or intimidation;
- Respect the culture, knowledge and practices of vulnerable communities.

During the project implementation, the Contractor is responsible for implementing the ESMP and report to the ADB on the established monitoring indicators. The Bank coordinates with local authorities to ensure compliance with the safeguards requirements.

3.6.13.2 Operational Safeguard 2 - Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation

Objectives

The term resettlement refers both physical dimension as well as economic. Specifically, this safeguard is intended to:

- Avoid involuntary resettlement where feasible, or minimize the impact of involuntary resettlement where inevitable after all alternatives are considered;
- Ensure that the resettled people are sufficiently consulted and given the opportunity to participate in the planning and implementation of the resettlement plan.

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- Ensure that the resettled persons receive assistance under the project, so that their standard of living, income generation capacity, production level and all livelihoods are higher than before the project.
 - Be a guide for developers of projects financed by the Bank on the requirements to be met to mitigate negative impacts of resettlement.
 - Performance monitoring mechanism to serve resettlement programs in Bank-financed operations.

Scope of application

This OS covers the impacts of Bank-financed projects involving involuntary loss of land, property, or restrictions on land use and access to natural resources. Three groups of people are eligible for compensation or assistance for loss of land or assets: (1) those who are entitled to land use recognized by the country where it will implement the project; (2) those who have no formal right to use the land or property at the time of the census but who can prove that they are owners of the land or property under customary rights; and (3) those who have no formal right of use or there are witnesses who can demonstrate that they occupied a portion within the area of influence for at least six months. This group may be assisted by land compensation to improve their level of previous livelihood.

Requirements of the Safeguard

- Project Design: Consider alternatives in project design to avoid or minimize resettlement, while balancing positive and negative environmental and social costs
- Consultation: consult all stakeholders, particularly the affected people and communities and involve them in all phases of the project cycle in a clear and transparent way- in the design, planning, implementation and monitoring and evaluation of RAP.
- Resettlement planning: resettlement should be based on a detailed socioeconomic census agreed under the ESIA - including census of people and inventory of assets (including natural resources on which people affected people depend partly for their livelihood). This survey identifies those affected and to be resettled; all relevant characteristics of these people, including vulnerable conditions; and the expected magnitude under which they will be affected.
- Resettlement Action Plan (RAP): A complete RAP should be prepared to: (i) projects involving resettlement of 200 or more people; or (ii) projects likely to have adverse impacts on vulnerable groups. An abbreviated RAP must be prepared for projects resettling less than 200 people and where the potential adverse impact on the livelihood of people is less significant, as is the case of this project. According to the policy on involuntary resettlement (2003) of the Bank, abbreviated RAP must contain at least the following content:
 - A census of the people affected, their socio-economic conditions including the values of their assets and other sources of livelihood.
 - The persons affected and the host population should be consulted on the project alternatives and should be informed about the potential impacts on them.
 - The description of compensation options to be offered and other assistance to be provided should be documented and discussed with the people including their preferred choices.

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- The institutional responsibilities for implementation of the resettlement plan including involvement of NGOs in the monitoring plan.
 - Plan, budget and source of funds must be agreed with the executing agency
 - Compensation Procedures: compensation unit (family, household or individual) should be agreed upon during the consultations. Those affected are compensated in full before leaving the area. Preferably compensation for lost land should land compensation and/or in kind including other monetary compensation. Those affected should be made aware that monetary compensation is often quickly exhausted. The resettled persons should be assisted to ensure they reach the standard of living equal to or greater in the host area. The choice of new host area should be discussed in detail with the affected people. The criteria for assessing the value of land, house and other properties are standardized and transparent, and the benefits of clearly established. Procedures for land allocation for cultivation must be transparent and agreed upon with the affected people. Payment procedures should be simple and monitored independently. Detailed records of all transactions should be done. Special attention should be given to avoid internal conflicts in the community during the resettlement process. When the payment is in cash, those affected should receive counseling to ensure they have knowledge to use the money wisely.
 - Host Communities: a detailed analysis of the host communities to identify potential problems associated with the reception of resettled people should be conducted. This assessment should be made in consultation with all parties involved and result in consensual agreements. Should ensure the increase of basic services in the host area and address potential environmental and social impacts.
 - Vulnerable groups: physical, social and economic integrity of vulnerable groups should be protected, in particular the needs of women.
 - Implementation, monitoring and evaluation: the Contractor is responsible for monitoring RAP implementation and for keeping the Bank informed of progress.

3.6.13.3 *Operational Safeguard 3 - Biodiversity, renewable resources and ecosystem services*

Objectives

This OS reflects the objectives of various conventions related to biodiversity conservation⁹. The specific objectives of this safeguard are:

- Conserving biodiversity and ecosystem integrity avoiding, or if not reducing and minimizing adverse impacts on biodiversity.
- Restore biodiversity, including where impacts are inevitable, through the biodiversity offsets to achieve “no net loss” of biodiversity;
- Protecting the natural habitat;

9 Convention on Biological Diversity to conserve biodiversity and promote sustainable development. It also meets the targets set by the Ramsar Convention, Convention on Migratory Species of Wild Animals, Convention on the Trading in Endangered Fauna and Flora Species, Convention on the Cultural Heritage, the UN Convention to Combat Desertification and Evaluation and International Convention on Plant Protection.

- Maintain availability and productivity of ecosystem services to maintain the benefits of the affected communities.

Scope of application

The applicability is established in the environmental and social impact assessment process. It covers natural habitats, modified and critical (including conservation areas). In addition, the project is located in areas that provide ecosystem services on which local communities depend on as their primary source of livelihood.

Requirements of the Safeguard

- Environmental impact assessment: as part of the ESIA all impacts on biodiversity must be identified and mitigation measures proposed. The mitigation hierarchy to follow is: to prevent, mitigate, minimize, rehabilitate and compensate.
- Habitat and biodiversity conservation: the implementation of this OS involves natural habitats, modified habitats and critical habitats (natural habitats or modified with high-value biodiversity and endangered species, endemic, migratory, conservation areas).
- Conservation areas locally or internationally recognized: to ensure that the proposed project is consistent with the management plan for the conservation area, or in the absence of the plan, with the objectives set by the responsible agency.
- Invasive alien species: the introduction of potentially invasive alien species should be prevented. Exceptional cases may be considered if they are in accordance with the international legal framework and the introduction should be subject to a risk assessment. If there is a risk in the area, the activities to be undertaken under the project should not favor the development of these species to the point of causing competition with natural species. This requirement is particularly important for the rehabilitation of degraded areas and biodiversity loss compensation; it is important in the planting of native species.
- Ecological flows: the project should avoid significant change in the hydrological regime of rivers in order to keep their important functions for ecosystems and upstream and downstream communities. This requirement is particularly important because of the great need of water for the road construction and watering activities to reduce the impact of dust

3.6.13.4 Operational Safeguard 4 - Prevention and control of pollution, hazardous materials and efficient use of resources

Objectives

- Manage and reduce pollution resulting from the project - including hazardous waste and non-hazardous - so that they do not cause risk to human health and the environment.
- Be a guide for efficient use of raw materials and natural resources, especially energy and water.

Scope of application

This OS applies to all projects financed by the Bank, established during the process of environmental impact assessment.

Requirements of the safeguard

- Prevention and control of pollution, and efficient use of resources: apply measures to prevent and control pollution in a way that is consistent with national law and recognized international standards, including good health and environmental safety (HES) practices. Also the borrower must apply the principles of pollution prevention as part of the project policy. If these cannot be prevented, the Contractor in consultation with the workers and the community must prepare a management plan for transport, handling, storage, recycling and disposal of hazardous substances.
- Hazardous materials management: the Contractor must determine the potential hazardous materials to be used in the project and consider the use of less polluting materials. The Contractor shall not manufacture, sell, give away or use any chemical banned by international treaties, including substances that destroy the ozone layer and persistent chemical pollutants.
- Emergency procedures: the Contractor must prepare a response plan for emergency cases to address accidents that may cause harm to human health and the environment.
- Efficient use of resources: implement financially viable measures to improve efficiency in the consumption of resources such as energy, water, raw materials and other resources.
- Staff Obligations: the Contractor is required to have environmental, health and permanent security staff with relevant experience for the project.

3.6.13.5 *Operational Safeguard 5 - Working conditions, health and safety*

Objectives

The OS outlines the main requirements for Bidders to protect workers' rights and provide basic working conditions. The specific objectives of this OS are to:

- Protect the rights of workers;
- Establish, maintain and improve the employer -employee relationships;
- Promote compliance with national labor legislation and where the latter has gaps improve the provisions of this SO;
- Align the Bank's requirements with the WTO standards and the UNICEF Convention on the rights of children, where national law does not provide equivalent protection;
- Protect the work force against inequality, social exclusion, child and forced labor ; and
- Establish requirements to provide health and safety conditions at work.

Scope of application

It applies to all projects financed by the Bank, established during the process of evaluating the environmental and social impact.

Requirements of the safeguard

- Working conditions and management of labor relations:
 - Human resource policies and procedures: the Applicant or its service providers must develop and implement a human resources policy and procedures appropriate to the nature and magnitude of the project. All workers should have employment contracts.

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- The working conditions and terms of employment: the Contractor shall provide working conditions and terms of employment, that at least comply with national law, resulting agreements with organization of Mozambican workers (OTM) and otherwise consistent with this OS. Migrant workers are employed in accordance with local regulations and with similar conditions to local workers in the same class. If the Applicant or service providers must provide temporary accommodation to workers, should also provide appropriate conditions, including water and sanitation; in certain circumstances medical care. These services must be provided without discrimination.
 - Workers' organizations: the Contractor must allow workers to form, affiliate and join trade unions. Also the Applicant must allow workers to elect their trade union representatives.
 - Non-discrimination and equal opportunity: the Contractor shall base working relationships under the principle of equality.
 - Dismissals: when the Contractor wants to implement mass layoffs, alternatives should be considered. If no alternative is available there should have a redundancy plan to mitigate the impacts based on the principle of non-discrimination. The Contractor shall notify the public authorities and provide information to employees and conduct the process in accordance with national labor legislation.
 - Grievances and redress mechanisms: the Contractor must ensure that workers have a referral system for their grievances that should be available and be known during the hiring. The grievances mechanisms and internal resolution of possible labor disputes do not exclude the labor or judicial mediation
 - Labor protection: child labor, forced labor or employment of trafficked persons is not allowed. Safe working conditions including a plan or procedures to prevent accidents, injuries and diseases that may arise from, or be associated and occur during the work should be created. These requirements apply to service providers and the Developer shall ensure that raw materials do not come from suppliers that use children, forced labor, or work resulting from inadequate working conditions. The Developer should consider these aspects in the procurement process.

3.6.13.6 AfDB Operational Safeguard triggered by the Project

Due to the nature of the planned activities, the five Operational Safeguards of AfDB are triggered by the Project.

3.6.14 [World Bank Environmental and Social Safeguards](#)

In line with the World Bank Policies and Guidelines for environmental and social management, which are largely endorsed by the African Development Bank and the Government of Mozambique, the road rehabilitation project will finally trigger four of the 10+2 World Bank Operational Safeguards Policies, namely, Environmental Assessment (OP/BP 4.01), Involuntary Resettlement (OP/BP 4.12), Natural Habitats (OP/BP 4.04), and Physical Cultural Resources (OP/BP 4.11). These Safeguard Policies are briefly reviewed and described below.

Table 6: World Bank Safeguard Policies Triggered by the Project

Safeguard Policies Triggered	Yes	No
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)	X	
Forests (OP/BP 4.36)		X
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)	X	
Indigenous Peoples (OP/BP 4.10)		X
Involuntary Resettlement (OP/BP 4.12)	X	
Safety of Dams (OP/BP 4.37)		X
Projects on International Waterways (OP/BP 7.50)		X
Projects in Disputed Areas (OP/BP 7.60)		X

Source: World Bank Safeguard Policies

(i) Environmental Assessment (OP/BP 4.01)

The World Bank's environmental assessment operational policy requires that all proposed Bank-funded projects, no matter the source of funding be screened for potential environmental and social impacts. The policy is triggered if a project is likely to have adverse environmental and social risks and impacts in its area of influence. Likewise, each proposed subproject activity is required to undergo the same social and environmental screening process to be qualified for funding, i.e. the systematic use of both the Environmental and Social Screening Form (ESSF) and the Check-list. Moreover, according to OP/BP 4.01 the Bank classifies proposed projects into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental and social impacts:

Category A: A proposed project is classified as Category "A" if it is likely to have significant adverse environmental and social impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental and social impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental and social performance. For a Category A project, the borrower is responsible for preparing safeguards documents, normally either an Environmental and Social Management Framework (ESMF) when the physical footprint of a project is unknown by appraisal, or an Environmental and Social Impact Assessment (ESIA with an Environmental and Social Management Plan [ESMP]), or an Environmental Audit/Risk Assessment whenever the physical footprint of a project activity is known prior/by appraisal.

Category B: A proposed project is classified as Category “B” if its potential adverse environmental and social impacts on human populations or environmentally and socially important areas, including wetlands; forests, grasslands, and other natural habitats, are less adverse than those of Category “A” projects. These impacts are site-specific and easier to deal with; few if any of them are irreversible; and in most cases appropriate mitigation measures can be readily designed. The scope of ESIA for a category “B” project may vary from project to project, but it is narrower than that of a category “A” ESIA. Like Category A ESIA, it examines the project's potential negative and positive environmental and social impacts and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts while improving the project environmental and social performance. For simple Category B projects with very limited/low social and environmental impacts the preparation of Environmental and Social Management Plan (ESMP) that builds upon an ESMF might be sufficient. Likewise, the preparation of an abbreviated RAP that builds upon an RPF might suffice; but this will be further dealt with under OP/BP 4.12 below.

Category C: A proposed project is classified as Category “C” if it is likely to have minimal or no adverse environmental and social impacts. Beyond screening, no further ESMF/ESIA or ESMP or RPF/RAP action is required for a Category “C” project. Nonetheless, being a category C project doesn’t necessarily prevent a project from ensuring adequate monitoring of both environmental and social aspects of the projects that are beyond safeguards.

The determination of the project Category was confirmed and approved by MICOA/MITADER to verify compliance with Mozambique’s EIA Policy. Even if the World Bank/African Development Bank policies and procedures are those to be followed, the TORs for these ESIA would also need to be approved by both MICOA/MITADER and the World Bank/African Development Bank.

Furthermore, the project has to ensure good compliance with OP/BP 4.04 (Natural Habitats) and OP/BP 4.11 (Physical Cultural Resources). As for this ESMF, OP/BP 4.01 also requires that prior to project appraisal, both the GOM through the Ministry of Land Environment and Rural Development (MITADER) and the World Bank/African Development Bank will approve and disclose the ESIA/ESMP, freestanding ESMP and RAP documents, which need to have an Executive Summary in English and Portuguese in publicly accessible places in the project areas and on ANE’s website, as well as on the Infoshop website of the World Bank/African Development Bank. The disclosure will need to be announced in the local newspapers and on the local radio (the transcripts of these disclosure announcements need to be sent to the World Bank/African Development Bank for records keeping).

The disclosure will provide beneficiaries, affected groups and local NGOs, the chance to comment on the sub-project. A notebook and pencils need to be present at the disclosure sites as means for stakeholders' comments. The time for providing comments will be a minimum of 1 month. Relevant comments need to be included in the final ESIA, ESMP or RAP documents. The GOM, as the owner of the safeguards documents, must officially submit the approved and disclosed safeguards instruments/documents to the Bank and authorize it to disclose the documents at its Infoshop. By making the ESIA/ESMP and/or RAP documents available to the public prior to project appraisal, the proposed project will be in compliance with the World Bank/African Development Bank Access to Information Policy, and hence ready for Board approval for funding.

Subprojects also need to be in compliance with the applicable World Bank/African Development Bank Environmental, Health and Safety (EHS) Guidelines of April 2007. These are i) General EHS Guidelines; ii) some of the Agribusiness/Food Production EHS Guidelines; iii) Tourism and Hospitality Development EHS Guidelines; and iv) Electric Power Transmission and Distribution EHS Guidelines.

(ii) Involuntary Resettlement (OP/BP 4.12)

Under the World Bank Safeguard Policy (OP/BP 4.12 - "Involuntary Resettlement") resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources and means to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in the planning and implementation of resettlement programs.

Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The World Bank also adopts a broader view on involuntary resettlement by not restricting it to its usual meaning, i.e. "physical displacement". Depending on the cases, a resettlement action may include (i) loss of land or physical structures on the land, including business; (ii) the physical movement, and (iii) the economic rehabilitation of project affected persons (PAPs), economic displacement, in order to improve (or at least restore) the levels of income or livelihood prevailing

before the action causing the resettlement has taken place”. The policy applies whether or not the person has to move from the area.

The Project’s overall budget should include sufficient funds to finance the preparation and implementation of site specific RAP.

(iii) Natural Habitats (OP/BP 4.04)

This policy applies to projects, which could have a potential impact on important natural habitats outside protected areas as well as in protected areas as such. Significant conversion of natural habitat is allowed under this policy if there are no viable alternatives, but the affected natural habitats need to be compensated by an ecologically similar area of the same or larger size and the area needs to be better managed and protected. Subprojects involving the significant conversion of critical natural habitat, i.e. protected areas or critical natural habitat areas outside protected areas where endemic or endangered species mentioned on the IUCN Red List species are living and which could be severely affected or made extinct cannot be financed.

(iv) Physical Cultural Resources (OP/BP 4.11)

This policy applies to sub-projects where important physical cultural resources (i.e. archeological sites, special architecture, important cemeteries or where unique immaterial cultural resources) exist or are affected. In case none of these physical cultural resources exist in the project area, the bidding documents and the contractor contracts need to include a “Chance Find Procedure”, which specifies that in case that during construction an important arte-fact is found, construction is stopped and the responsible Mozambican authorities are advised and involved in an investigation of the site. Construction can only resume after the green light has been given by the responsible Mozambican authorities.

3.6.15 [Required Licenses and Permissions](#)

Table below list main required licenses and permissions for project’s implementation in Mozambique.

Table 7: Required licenses and permissions for implementation of the project

Required authorization	Legal instrument related	Institutions	Situation	Taxes / Costs
Environmental License	Pre-requisite for all other licenses (Environmental Law – Law 20/1999 of 01 October, Article 15, number 2) Decree 54/2015 of 31 December – Regulation on Environmental Impact Assessment Process	MITADER – National Directorate of Environment	To be issued after approval of present document.	0.2% of investment cost.
Water Abstraction License	Decree 43/2007 of 30 October – Regulation on water licenses and concessions, Article 6, 80 Water Law – Law 16/91 of 03 August, Article 42 and 43	Regional Water Administration of North	To be issued after request and approval of present ESIA.	$T=A*K1$ (T=value of variable tax expressed in Meticaís; A = volume in m ³ ; K1 = unit value per m ³). K1 value is proposed by National Water Council based on: (1) location, if are benefiting of public hydraulic infrastructure; (2) dimension of the activity, foreseen amount of water, nature of the proponent. As incentive to some activities can be established special taxes or exemption.
Sand extraction	Decree 43/2007 of 30 October – Regulation on water licenses and concessions, Article 81	Regional Water Administration of North	To be issued after approval of present EIAS.	$T = I * K2$ (T=tax expressed in Meticaís; I = volume of sand; K2 = unit price of m ³ of sand)
Quarries and Borrow Pits	Land law and regulation of land law – Land Authorization	District and Provincial Governments	To be requested	-
	Mine title – Mine Law 14/2002 of 26 June: extraction of mine products does not requires mine title when requested by construction projects for road rehabilitation and maintenance or other construction activities for public interest in areas approved by relevant institution.	Provincial directorate of Mine Resources	To be requested	-

Required authorization	Legal instrument related	Institutions	Situation	Taxes / Costs
Provisional Concrete Plant inside construction camp	Decree 54/2015 of 31 December – Regulation on Environmental License Process	MITADER – National Directorate of Environment	To be requested	200 minimum salaries
Construction License	All Contractors must be licensed and registered in Mozambique – Ministerial Diploma 83/2002 of 22 May (Regulation of Public Works and Civil Construction Contractor Licensing), Decree 68/99 of 5 October (Regulation on Contractor Activities on Public Works and Civil Construction), with amendments of Decree 29/2001 of 11 September.	Ministry of Public Works, Housing and Water Resources	To be requested	Inform for updated taxes for registration.
Construction Authorization	<p>Law 10/99 of 07 July: No infrastructure should be installed in areas of partial protection without prior authorization from the appropriate entity.</p> <p>Law 16/2014 of 20 June – On principles and basic rules of protection, conservation, restoration, and sustainable utilization of biological diversity in conservation areas (Conservation Law): any activity likely to affect their biotic must first be approved by the agency that manages conservation areas and be subject to environmental licensing, based on an environmental and social impact assessment in accordance with specific legislation (Article 40, paragraph 3).</p> <p>Decree 12/2002 of 6 July: Regulation on the Forest and Wildlife Law - Articles 103, 104 and 105 relates to the procedures to be followed to obtain authorization to cut down trees</p>	MITADER – Conservation Areas National Administration (ANAC)/ Niassa National Reserve Administration / Private Operator	After approval of ESIA.	-
Waste Disposal	Decree 13/2006 of 15 June – Regulation on Solid Waste Management: District or Municipal Governments are	District Government	To be requested.	-

Required authorization	Legal instrument related	Institutions	Situation	Taxes / Costs
	responsible to establish specific norms for non-hazardous solid waste management. Hazardous waste management must follow MITADER recommendations.			
Labor	Labor Law 23/2007 of 01 August – Required authorization for foreign workers (Article 32, 33), foreign workers quotas must be respected (5% for large companies, 8% for medium companies and 10% for small companies – Article 31, 5) except authorized other exemption in case of investment project approved by the Government (Article 31, 6). Other provisions like minimum salary in construction sector, health and safety, working conditions, working hours are presented in the law and must be followed.	Ministry of Works, Employment and Social Security	To be requested.	To be informed for updated taxes.
Transfer of corpses	Decree 42/90 - Regulation of Funeral Activity stipulates that the burial of corpses in rural areas can be done in cemeteries or other places approved by the Authorities. But too often there are family cemeteries or even within the properties. Under the practice recommended by this decree, the Developer should refer to local community leaders about the existence of graves along the areas of work or implementation of the new sections of road. If so, recommendations for relocation in compliance to traditional practices should be observed.	Traditional leaders	To be requested if found.	Stipulated by traditional leaders / affected family.
Resettlement and compensations	Expropriation Law n.º 230 of June 22, 1948 Decree n.º 43587 Land Law n.º 19/1997 Regulation on the Resettlement Process Resulting from Economic Activities - Decree 31/2012 AfDB Operational Safeguard 2	MITADER / Government of Mueda	RAP to be approved by MITADER as part of ESIA	Estimations provided in the RAP report – Volume 4

3.7 Institutional Framework Assessment

3.7.1 [Ministry of Land, Environment and Rural Development \(MITADER\)](#)

MITADER is the central government institution that ensures the implementation of the policies on land, forest and wildlife, environment, conservation areas and rural development. The organic statute was approved by resolution 6/2015 of 26th June, which defines the following main attribution:

- a) Land use planning for the sustainable development of the country;
- b) Formulation of proposals for policy implementation and integrated development strategies of land, environment, conservation areas, forests, wildlife and rural development;
- c) Administration and land management;
- d) Administration, management and sustainable use of forests and wildlife;
- e) Promoting the development of knowledge in the areas of land, environment, rural development and related areas;
- f) Ensure maintenance and development of cooperation in environment area;
- g) Definition and implementation of education strategy, awareness and dissemination;
- h) Intersectoral coordination and sustainable use of available resources for sustainable development.

3.7.2 [Ministry of Public Works, Housing and Water Resources \(MOPHRH\)](#)

MOPHRH is the central institution which ensures the implementation of government's activities on public works, construction materials, roads and bridges, urbanization, housing, water resources, water supply and sanitation. The organic statute was approved by the Resolution 19/2015 of 17th July which defines the following attributions:

- a) Towards planning the construction of public works, ensuring the efficiency of investments;
- b) Quality control of public works, to ensure the it's safety and durability;
- c) Construction, rehabilitation and maintenance of public infrastructure, including roads and bridges, water supply systems, sanitation, retention, protection and water storage;
- d) Definition of the system for design, execution and supervision of public works;
- e) Regulation of the use and quality control of materials and construction elements;
- f) Development of the construction industry;
- g) Management of public roads and bridges;
- h) Ensuring balanced development, unity and complementarity of the national road network;
- i) Promotion and support of social housing and construction programs;
- j) Implementation of policies and strategies for the exploitation and rational and sustainable use of water resources;
- k) Water resource assessment, determining needs at river basin level;
- l) Supply water in quantity and quality to meet the challenges of socioeconomic development;
- m) Water resource management, ensuring its best use and rational and sustainable use, and prevention and mitigation of the impacts of floods and droughts;
- n) Implementation of policies and strategies for the expansion and improvement of water supply and sanitation services;
- o) Ensuring universal access to water supply and sanitation.

3.7.3 [National Road Administration \(ANE\)](#)

ANE is an autonomous public institution subordinated to MOPHRH. The competences of ANE was approved by Decree 13/2007 that entered in force in 30th May, which declares the following objectives:

- a) To ensure the implementation of Government's policies on maintenance and development of public roads
- b) To ensure unified, effective and efficient treatment of issues related to roads for balanced development of the country;
- c) To promote and ensure participation of road users in various institutions interested on road management.

3.7.4 [Government of Mueda District](#)

The functioning of district government has six organs: (1) district secretariat; (2) planning and infrastructures services; (3) education, youth and technology service; (4) health, woman and social action service; (5) economic activities services; and (6) administrator's office. In addition to these organs, District of Mueda has the prosecutor, police station, registration and notary, court and civil prison. Just over 1000 public officers and agents are part of this organs (Table below).

Table 8: Mueda's public officers and agents, by sector, academic level and sex

Sector	Nr of employees	Academic level					M	M %	Member of Executive
		Elementary	Basic	Secondary	University	Other			
SECRETARIA T DISCTRICT	59	33	7	16	3	0			
SDAE	28	4	11	10	3	0			
SDEJT	136	8	43	31	3	51			
SDSMAS	25	4	7	11	3	0			
SDPI	38	30	3	4	1	0			
Notay	7	0	4	3	0	0			
Prosecutor	5	0	0	4	1	0			
Court	7	0	2	4	1	0			
Prison	0	0	0	0	0	0			
Police Station	11	0	0	0	0	11			
TOTAL	1147	133	403	258	41	312			

Source: Government of the Mueda District (2015)

3.7.5 [Agricultural Extension support](#)

To support technically the farmers of all District of Mueda has one network of 20 extension officers benefiting more than 3400 farmers per year. The ration extension worker per household is about 1 extension worker to 170 households directly. This is considered below recommended average by the national extension services that stipulated the ratio of 200-250 households directly and 750-800

indirectly (DNEA, 2006). Additionally, more than 70.000 inhabitants rely on agriculture as the primary source of income and livelihood. This indicates that less than 5% of farmers are being directly assisted by the public extension services. Taking the average of 1000 farmers per extension officer, counting directly and indirectly assisted, it can be estimated that approximately 29% is being assisted.

3.7.6 [NGOs / Partners](#)

The district is being supported by some NGOs mostly in health and capacity building (Table below).

Table 9: NGO operating in the district

#	ONG	Area	Activity
01	ASSOCIACAO PROGRESSO	SDEJT e SDSMAS	Capacity building, Malaria Program
02	HABIT AFRICA	SD	Capacity building
03	MEDICO DEL MUNDO	SDSMAS	Capacity building
04	EGPAF	SDSMAS	Capacity building
05	FDC	SDSMAS	Malaria program
06	AMODEFA	SDSMAS	Sexual and Reproductive Health

Source: PEDD 2010 - 2014

3.7.7 [Local Leaders](#)

By Decree 15/2000 of 20th June, were legitimated the community authorities namely traditional leaders, neighborhood secretary, chief of village, and other leaders indicated by local community. Mueda District has more than 30 thousand community leaders. There is a clear distinction on their role according to the class of leader. The neighborhood secretariats are responsible for government related activities like community mobilization for social and economic tasks, for example increase the production, conservation of infrastructures, health campaigns, etc. Traditional leaders like clan chiefs, elders, medicine men are responsible for traditional aspects like ceremonies, rites and social conflicts.

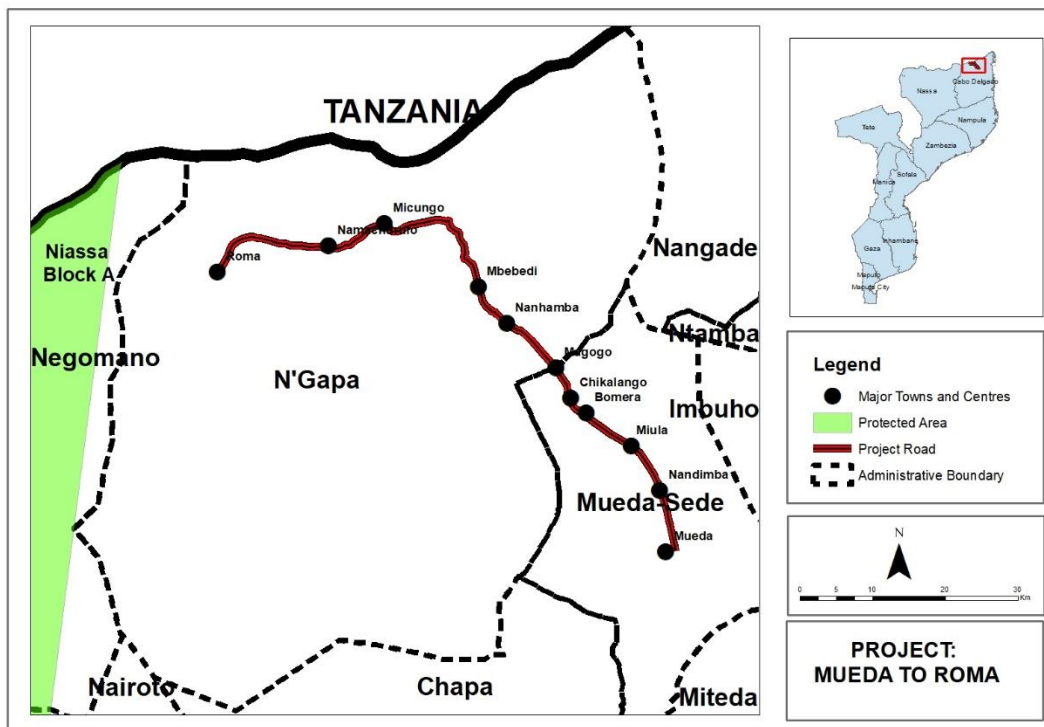
4. PROJECT DESCRIPTION

4.1 Project Location

Located in northern Mozambique area, specifically in Cabo Delgado Province, the road starts in the City of Mueda, in the administrative post of the same name and goes through the headquarters of the administrative post of N'gapa and ends in Roma(95km)

The current road is classified as a primary between Mueda and N'gapa and as secondary between N'gapa and Roma. The road extension after the proposed improvements in this project will be of 95 km. The figure 4.1 below shows a general idea of the geographical context of the road under consideration in this document.

Figure 3.1 : Geographical location of the project



Source: Geographical Information System Data Base (2019)

4.2 Project Characteristics

4.2.1 Road Class and Role

By linking Cabo Delgado Province in the northern Mozambique to the southern area of Tanzania, Mueda-Roma road will be part of the Mtwara Corridor. This road is therefore a primary road because of its international position. Although at present the road is not extensively used it should be taken into consideration that Mtwara Corridor is an important point of socio-economic activities in the context of regional development within the Southern African Development Community (SADC).

4.2.2 [Relief](#)

The terrain in the project area is flat and straight for about 90% of the section. Just 15km from Ngapa the terrain is undulating up to Roma

4.2.3 [Traffic Volume](#)

4.2.3.1 [Current Traffic](#)

As part of the project feasibility study, a traffic study was conducted in 2014. The traffic analysis in the section under consideration determined the figures presented in the table below.

Table 10: Traffic in Mueda-Roma section (2014)

	VP	Van	Minibus	Light Vehicles	Bus	2 Axles	3-4 Axles	>4 Axles	Tractor	Heavy Vehicles	Total Traffic
Mueda-Ngapa	20	20	10	50	4	4	5	4	3	20	70
%	29%	29%	14%	71%	6%	6%	7%	6%	4%	29%	100%
%	27%	27%	13%	67%	7%	7%	7%	7%	7%	33%	100%

Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Negomano (STUDI International, 2015)

From the table above, the following conclusions can be drawn:

- Low traffic on the section, about 70 vehicles per day in Mueda-Ngapa section reflecting the poor condition of the section which is causing a serious isolation of the area of influence, especially during the rainy season.
- Users of the section are mostly light vehicles made up of passenger cars, pickup trucks and a very small portion of minibuses. The cars make up about 2/3 of road users.
- A considerable amount of heavy vehicles passing through the section. On average about 1/3 of the traffic passing by road. However, heavy vehicles (by volume) are still low when compared to the average volumes found in other provincial roads.
- Despite its important position in regional, national and international mobility, the section is at an advanced state of degradation, because of its low demand when compared to other roads of the same class or similar sections. The section also imposes high operating costs to passenger carriers who ultimately pass these costs to users through the cost of the fares. The bad road condition also increases the travel time and fuel cost. It is also the cause of reduced accessibility to the zone of influence and a significant slowdown in economic development, particularly in Mueda District.

- Internationally, Mozambique and Tanzania are joining efforts to establish the road infrastructure to ensure the ongoing social and economic link for operators from both countries. Because of its position, the section of the project, once built and improved, will be a relevant alternative because of lower transport costs and ease of mobility on both sides of the border, guaranteed by the unity bridge over the Rovuma River.

4.2.3.2 Traffic Projections

The traffic projections were done taking into account three factors:

1. the normal traffic that will occur in the section as a result of economic growth on current road conditions;
2. traffic generated by the improvement of the section by the project through increased production and sales, lower transportation costs, attracting more people to the area of influence because of better access and
3. the diverted traffic, which will reflect part of the traffic that will be gained by the development in relation to other less competitive sections.

The traffic study determined the average annual growth projections of daily traffic in Mueda-Roma stretch to the horizons in 2020, 2030 and 2037 for the low scenario, medium and high. The results of these analyses are presented in the tables below.

Table 11: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 - Low Scenario

Type of vehicles	2014	2020	2030	2037
Light vehicles	40	96	190	303
Heavy vehicles	15	37	75	126
Total	55	133	265	429

Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Table 12: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 – Medium Scenario

Type of vehicles	2014	2020	2030	2037
Light vehicles	40	110	250	436
Heavy vehicles	15	42	96	174

Total	55	133	265	610
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Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Table 13: Annual average daily traffic (vehicles per day) in Mueda-Roma section in 2014, 2020, 2030 and 2037 - High Scenario

Type of vehicles	2014	2020	2030	2037
Light vehicles	40	121	334	669
Heavy vehicles	15	45	122	247
Total	55	166	456	916

Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

4.2.4 [Speed](#)

The road has been designed for 100km/h speed. In areas with steep gradient, the speed should be reduced to 60km/h particularly for mountainous areas. In urban areas, villages and human settlements, the speed must be 60km/h as the number of accidents and volume of non-motorized traffic is higher in these locations.

4.2.5 [Sight Distance](#)

Directly related to speed, sight distance is derived from the driver's perception of time and reaction time as well as the resistance between the tire and the road surface.

The sight distance was used to determine the minimum curve of the vertical and horizontal alignment. Where there is visibility obstructions (such as walls, steep descents, buildings and longitudinal barriers) on the inner curve, alignment needs to be adjusted to allow the driver approach with greater visibility.

The following table summarizes for each speed the sight distance for stopping (passing, passage) and intersection (for passenger cars, unit cars and articulated trucks) according to the SATCC 1998 standards.

Table 14: Sight Distance

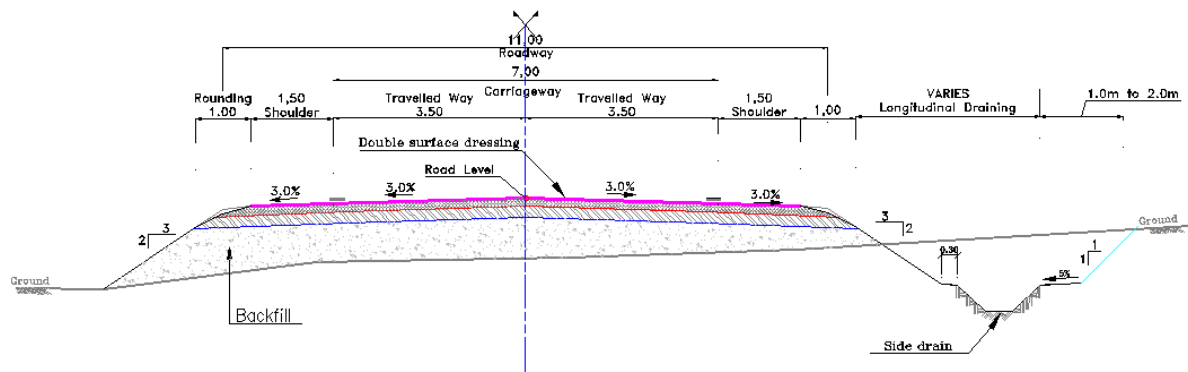
Speed (km/h)	Sight Distance to stop(m)	Sight Distance for passage(m)	Sight Distance for intersection(m)		
			Passenger cars	Unit cars	Articulated trucks
100	155	670	271	483	708
80	115	540	217	388	558
60	80	410	163	292	421

Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

4.2.6 Transversal Section

4.2.6.1 Typical Cross Section

- Road width: : 11.00m
- Lane width: : 7.00m (two lanes of 3.50m)
- Shoulder width: : 1.50m (each side)
- Earthwork: : 1.00m in the high embankment level and in areas equipped with retention devices.



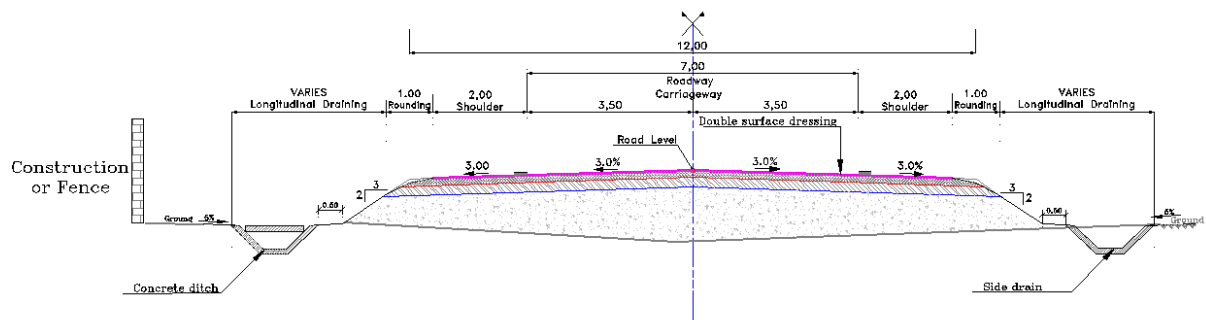
Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Source: Geographical Information System Data Base (SALOMON, 2015)

Figure 4: Typical cross section

4.2.6.2 Cross Section of Crossing Points in Villages

At the village level, the walkways will be of about 2.00m to allow for an additional safety to pedestrians.

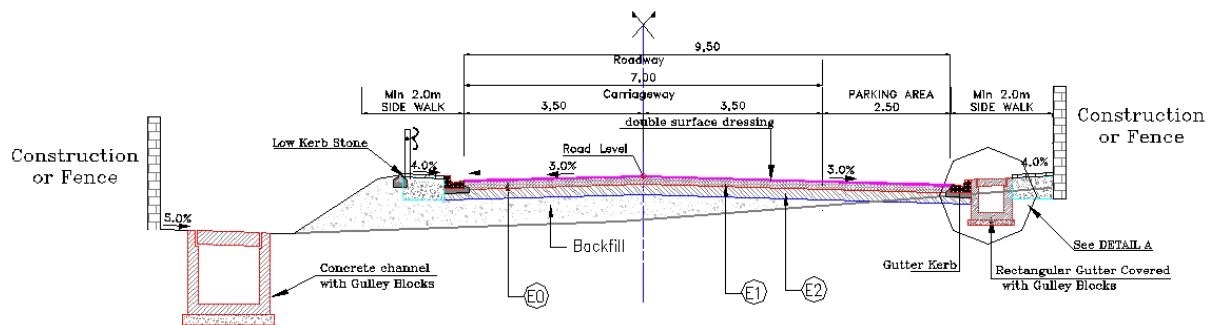


Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and roma (STUDI International, 2015)

Figure 5: Cross section for road crossing in villages

4.2.6.3 Cross Section of the Sections in Urban Areas

In urban areas, the walk ways of around 2.00m must be added to both sides of the road platform. The sections include some parking points.

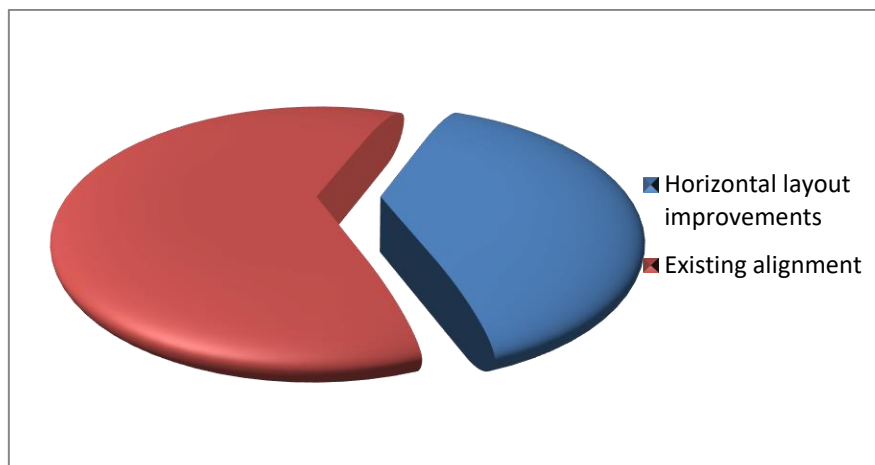


Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Figure 6: Cross section of the road in urban areas

4.2.6.4 Cross Section high embankment/cutting crossings

In case of high embankment and/or high cuttings, a cross section with benches was introduced in order to ensure slope stability.



Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Figure 8: Proportion of the alignment to be improved

The horizontal improvements comprise about 63.105 kilometers representing 38% of the total distance.

4.2.8 [Works in Residential Areas](#)

In addition to the work in the sections, the project includes some specific works to better integrate the project with its environment and to take consideration of the activities performed by residents that live along the road. These include the works described below.

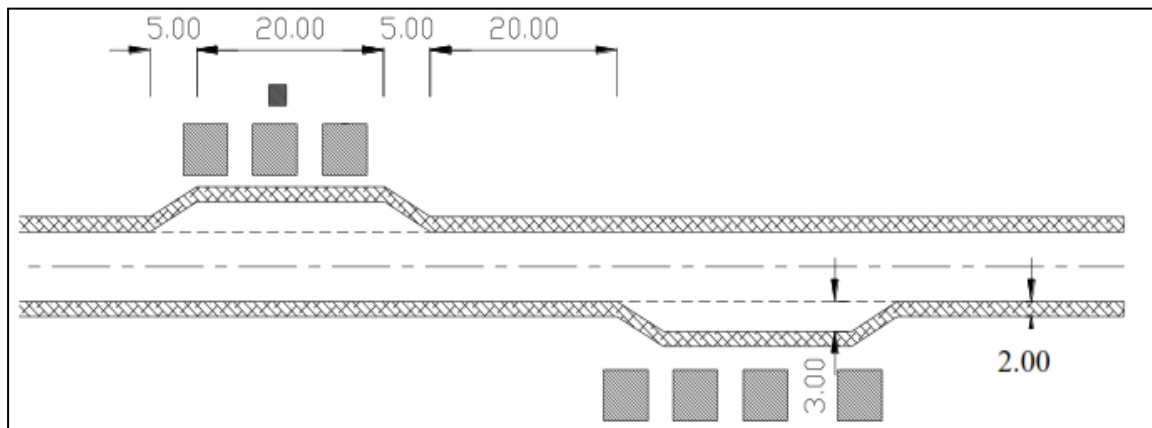
4.2.8.1 [Crossing of Settlements](#)

Depending on the characteristics of each settlement along the section and the availability of space, the key proposed (in coordination between the Technical Team and the Environmental and Social Team of the Consultant) interventions are:

- Increasing width of shoulders to 2.00m wide along the crossing of settlements, except where there are constraints of touching private space. This will ensure enough room for safe movement of pedestrians and cyclists;
- Construction of 2.00m wide walkways on both sides in large towns; these will be used by pedestrians and for trading activities with occasional extensions. The shoulders can be used

for

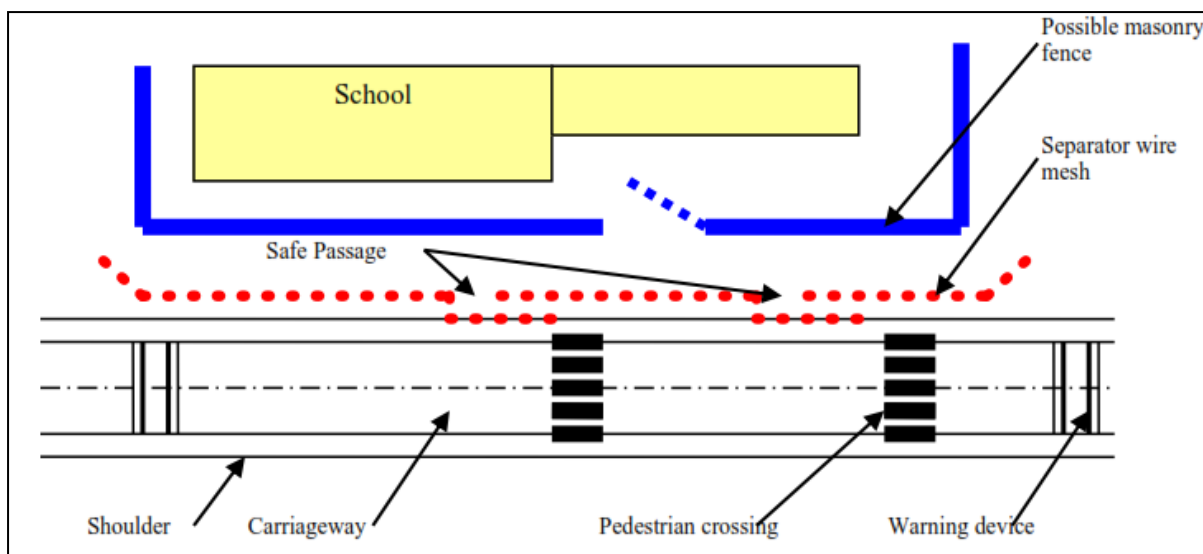
parking;



Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Figure 9: Parking areas in urban areas

- Construction of steps to homes that are difficult access to, due to being located in higher areas relative to the road;
- Construction of access walkways over gutters next to homes;
- Construction of protection around schools through wire fencing or masonry when schools are close to the road. Before that a proper signage will be placed.



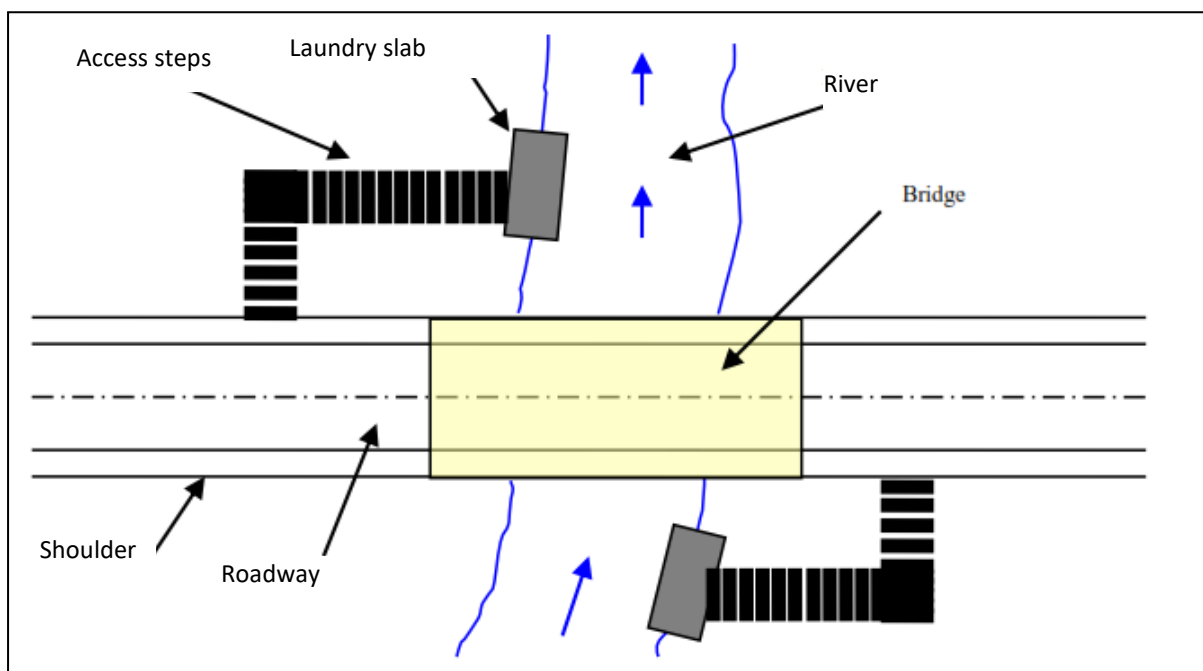
Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Negomano (STUDI International, 2015)

Figure 10: Protections at the right of schools

4.2.8.2 Outside Settlements

Interventions to benefit the residents along the road outside settlements will consist essentially of:

- Construction of access roads to water intake points typically located near large bridges and waterways. Laundry slabs will be built directly on the river to improve daily life conditions and household activities.



Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

Figure 11: Interventions at bridge areas

-
- The waiting areas outside urban areas will include the construction of bus stops on both sides of the road, shelter to protect users from harsh weather elements and appropriate signage.

4.2.9 [Protection Devices](#)

In the sections that run through flood plains, there is considerable risk of erosion damage. In sections with high embankment, there are risks of creating ravines.

In addition to the flow of water on the road, several water intakes were identified that need hydraulic structures for drainage.

The amount of water collected through these structures will be evacuated through ditches.

4.2.9.1 *Protection During Discharges*

Once the road is paved road, the speed of water flow may increase and may aggravate erosion and create craters that could jeopardize the stability of the road platform. The precautions to be taken under this project include the construction of discharge points and rock filled protected ditches and culverts.

4.2.9.2 *Types of Roadways and Approach to Water Drainage*

To ensure roadway stability and sustainability of the planned structures, it is necessary to contain the flow which could be the main cause of damage.

The structures planned to mitigate these damages are:

- Triangular or trapezoidal earth ditches in case of low to medium gradients;
- triangular and/or trapezoidal concrete ditches in towns, in the event of significant gradients or when the use of earth ditches is not functional;
- Rectangular concrete ditches in the cities
- Ditches with concrete ramps are used in the case of areas with high embankments especially the inner side of sharp curves.

4.2.10 [Signage and Equipment](#)

4.2.10.1 *Protection and Safety Equipment*

Safety rails are essential for any road design, but represent relatively high costs. The decision to use or not use railings and the choice of the type to be used, should be considered with flexibility.

Considering the applicable standards, the sections where the height is more than 4m between the roadway and the natural floor, safety guard rails must be installed. The installation of safety guard rails will be made near the edge with a width of 1.75m.

These safety devices generally represent an additional cost that is not negligible, so there is the need for it to be considered against the systematic standard application or to place them only in dangerous points and with considerable height difference between the road platform and the natural ground level.

For this project, this choice will be made after an analysis of the safety situation taking the following parameters into account:

- Height difference between the road platform and the natural ground level;
- Horizontal geometry (tangent or curves) of the concerned area;
- Vertical inclination of the alignment before the section and whether there are bridges.

In addition to the safety guard rails, the project includes the following equipment:

- Mileages display posts across the road;
- Hazard warning stations in tight corners.

4.2.10.2 Vertical Signs and Road Markings

Road markings

The marks are placed on the road surface (continuous and discontinuous lines) and specific marks (directional arrows STOP lines intersecting marks, etc.). The conditions and the zoning of the application of different types will be defined.

Applicable instructions and procedures will be used for marking roads. The plan will include detailed drawings of the longitudinal, transverse road markings, etc. Detailed plans of the crossings will have the details of the marks on them.

Vertical signage

Vertical signage

includes the installations of signs in order to facilitate the movement of traffic and making it safe, and also to provide information to the road users. In this project, vertical signs will consist of:

- Giving warning and orders: triangular or circular signs related to the speed limitation, curves, steep areas and hot spots;
- Giving direction and information: rectangular signs at the entrances and exits of settlements and indications of large rivers;
- Directing traffic at junctions.

For the preparation of these signs, an analysis will be conducted based on the following criteria:

- Indication of the names of rivers in large bridges;
- Indication of the names of entrances and exits of all towns and cities crossed by the road;
- Indication of speed limits for homogeneous sections according to the corresponding the speed limitations;

-
- Give information on specific points such as tight bends, succession of curves, steep areas, overtaking ban and end of overtaking ban ...
 - Directional traffic indication at junctions

With regards to potential roadside obstacles, traffic signals will be installed such that the perception of drivers will not be obscured during the day and at night.

4.3 Design Phase

During the design phase the following activities are planned:

1. Detailed engineering design and feasibility studies

Under this activity the feasibility study, the geometric design of the road, road reconnaissance report, geological and geotechnical study, hydrological study and waterworks and detailed drawings were completed.

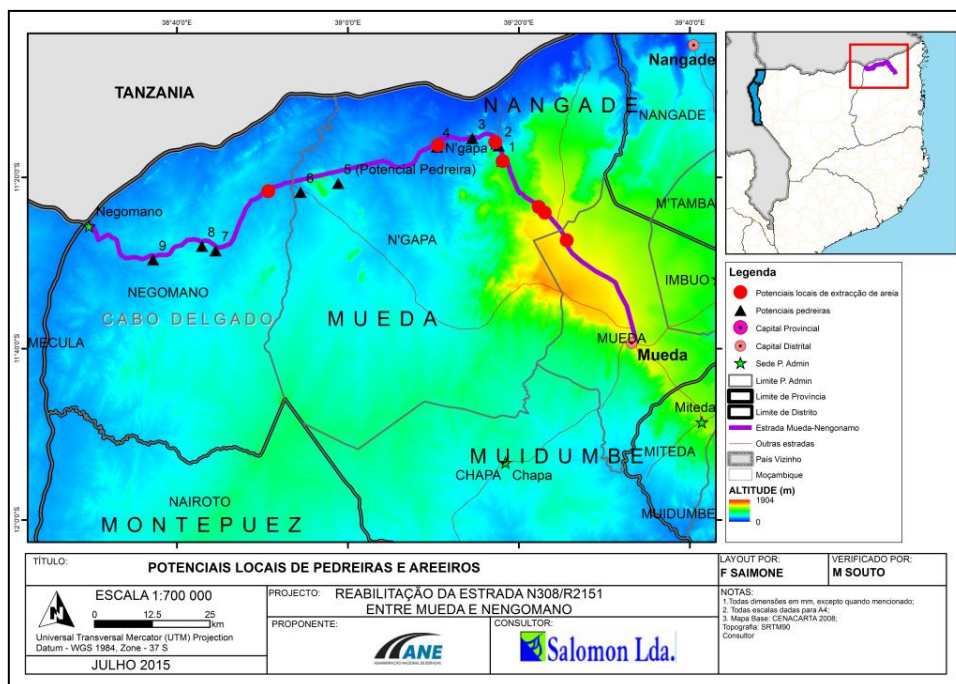
2. Environmental impact assessment and resettlement action plan (should the environmental impact assessment identify the need for resettlement)

This activity is being implemented together with the detailed engineering project that incorporated in advance the necessary mitigation measures.

3. Identification of potential points for the installation of construction camps, borrow pits and water sources

Nine sites have been identified with the potential to install the quarry for road construction material. It should be noted that the extraction of stone aggregates will involve blasting. Figure below shows the location of these sites along the road section. So far, point 5 is earmarked as the likely site for quarry installation.

Potential seven areas have been identified along the road section where sand for construction of infrastructure can be sourced. Figure below shows the location of these sites. To extract aggregates, all licenses should be obtained from the managing institutions.



Source: Geographical Information System Data Base (SALOMON, 2015)

Figure 12: Potential sites for stone and sand extraction along Mueda-Roma road

Water for construction can be obtained directly from the water courses available throughout the section. Licenses must be obtained for raw water abstraction for construction purposes.

4.4 Mobilization Phase

The mobilization comprises: setting up the construction sites, hiring of manpower and installation of machinery and materials.

1. Construction of camp sites, water reticulation, electricity, paving and leveling for machinery installation and material storage, etc.

The Contractor will use various equipment and machines that are expected to be stored in the yard and along the roadsides. Major facilities are not expected, except for water pipes and electrical installation on site and signage along the route of new alignments.

2. Hiring of labor

The project will employ local and foreign labor. It is expected that the project will employ about 1000 to 1200 workers including professionals, semi-professional and unqualified personnel. The Labor force can be changed during the execution of the project and the construction of site camps.

3. Machinery and material mobilization

Road construction involves use of heavy machinery including tractors, compactors, tillers, water tanks, trucks to transport water and inert, etc. In addition, the process involves the mobilization of other

materials that are not available locally, mainly cement and tar, but also other materials for signage and personal protective equipment. Sand, stone aggregates and water is expected to be obtained locally.

4.5 Construction Phase

1. Cleaning, marking and signage of road

This consists of the clearing of vegetation along the new alignments and axis of the existing section, to widening the road in order to carry out of the necessary work. Also it consists of marking the working area and leveling of mounds. Cleared and marked sections are flagged.

2. Earthworks

The earthworks include the following activities:

1. Excavation: Deep excavations will be needed to get to the firm sub-soil layer, usually in places with unstable ground and sections where the horizontal alignment will be improved. Surface excavation will take place in areas the existing sub soil-layer is in relatively good condition. Excavation will also be carried out at sites of Bridge foundations, quarries and sandpits.
2. Loading of: soil, sand, stone, water, asphalt, and other materials;
3. Transporting of: soil, stone, sand, water, asphalt, and other materials (e.g. cement)
4. Spreading of: soil, stone, sand, water, asphalt; and other materials
5. Compaction: Compaction involves sprinkling water on the layer to be compacted. The process may cause the scattering of solid material and water.

Earthworks usually employ heavy machinery like bulldozers, trucks, graders and compactors. The rehabilitation of the road will involve some superficial and deep excavation of the soil.

3. Construction of hydraulic structures (for drainage)

A minimum of 0.5% gradient is proposed to allow for surface drainage.

33 hydraulic structures to be replaced along the road section. Furthermore it is proposed that about 218 new structures among which are pipe culverts, box culverts and bridges are be installed. The engineering team proposes the construction of 07 new bridges to counteract the hydrological, topographic and geometrical constraints along the section. The length and number of spans of each is presented in the table below.

Table 15: List of new bridges and their characteristics

Bridge	Km N°	Length (m)	Number of spans
BRD1	42+860	40	2 x 20
BRD2	69+768	100	5 x 20
BRD3	78+953	40	2 x 20
BRD4	80+601	100	5 x 20

Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Roma (STUDI International, 2015)

4. Use and compacting of sub-base and base mixing

This process enables a greater stability of the road.

5. Asphaltting

It consists of placing the top layer of the road. It involves the use of compactors and pavers.

6. Construction of shoulders, walkways and drains for storm water

The road shoulders and walkways will allow for safer movement of pedestrians. The construction of walkways usually involves concrete works.

7. Road signage

The road signs will enable safer driving and according to the requirements of the road.

4.6 Operation Phase

The road will be operated freely throughout the 24 hours of the day. The maximum permitted speed is 100km/h outside towns and villages, 80km/h on the rural section with flat terrain and 60km/h through settlement areas.

4.7 Decommissioning Phase

The decommissioning activities include:

1. Rehabilitation of areas destroyed during construction (quarries, sand pits);
2. Replacement of soil and re vegetation of degraded or destroyed areas;
3. Landscape recovery work;
4. Possibly distribution of material not used on construction sites for use or improvement of other infrastructure in the community.

4.8 Project Schedule and Budget

It is expected that the project will have a construction duration of 24 to 30 months.

The project cost, as estimated in the framework of the preliminary design report, is about:

-
- 5.5 billion MZN for the basic solution (bilayer coating).
 - 6.2 billion MZN for the alternative solution (asphalt concrete pavement)

Prices based on 2019 US\$/MT rates. Prices fixed in US\$ based on 2019 prices are 150 ,1 million and 160 ,2 million for bilayer coating and asphalt concrete pavement, respectively.

5 PROJECT'S AREA OF INFLUENCE

5.1 Direct Area of Influence

The direct area of influence consists of:

- A major area composed of cities, towns and settlements crossed by the road ((Município de Mueda, Nandimba, Miula, Chicalanga, Magogo, Nanhamba, Mbebedi, Ngapa, Micungo, Nambungale, Namacharufo, Micomela and Roma.)) and villages that have direct access to the road through other roads;
- A secondary area made of main cities adjacent to the major area.

5.2 Indirect Area of Influence

The area of indirect influence comprises the provinces and cities located on the road extension or served by the network of roads linking with the road to be rehabilitated. This area primarily includes Cabo Delgado Province.

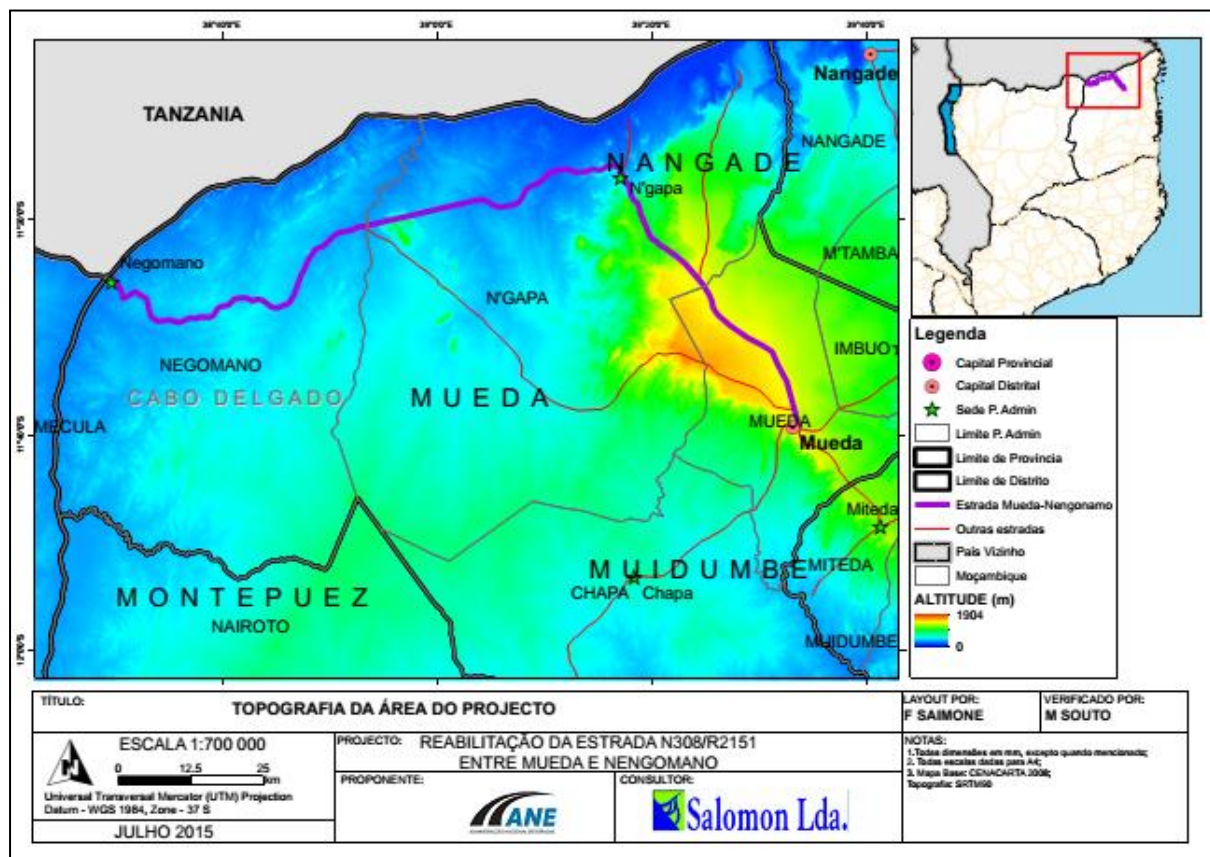
From a macro point of view, once built and rehabilitated the Mueda-Roma road, will ensure a sustainable connection of Mozambique to Mtwara Corridor and allow the country to participate in the economic development of the same Corridor. The construction of Mangata-Mtambaswal road (Unity bridge) (70km) in Tanzania and Mueda-Roma, the project will have an area of indirect influence of international dimension facilitating the transport of people and goods mainly between Malawi, Tanzania and Mozambique.

6 CHARACTERIZATION OF THE INITIAL STATE OF THE ENVIRONMENT

6.1 Biophysical Environment

6.1.1 Topography, Geology and Soils

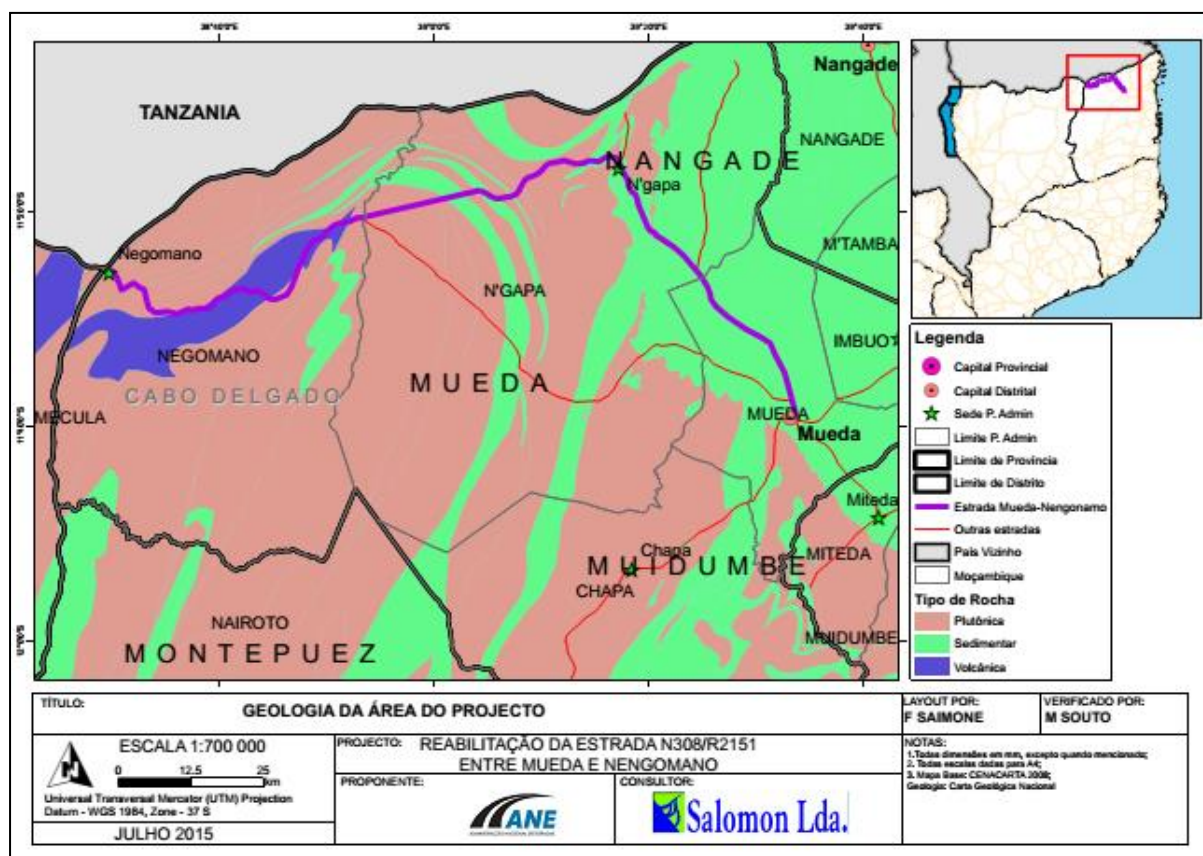
From the physical point of view, the area consists of a plateau region in Mueda-Ngapa section at altitudes ranging from 300 to 900m which gradually go down to a more plain zone in Ngapa-Mueda section, with altitudes of 120 to 300m (Figure below).



Source: Geographical Information System Data Base (SALOMON, 2015)

Figure 13: Topography of the project area

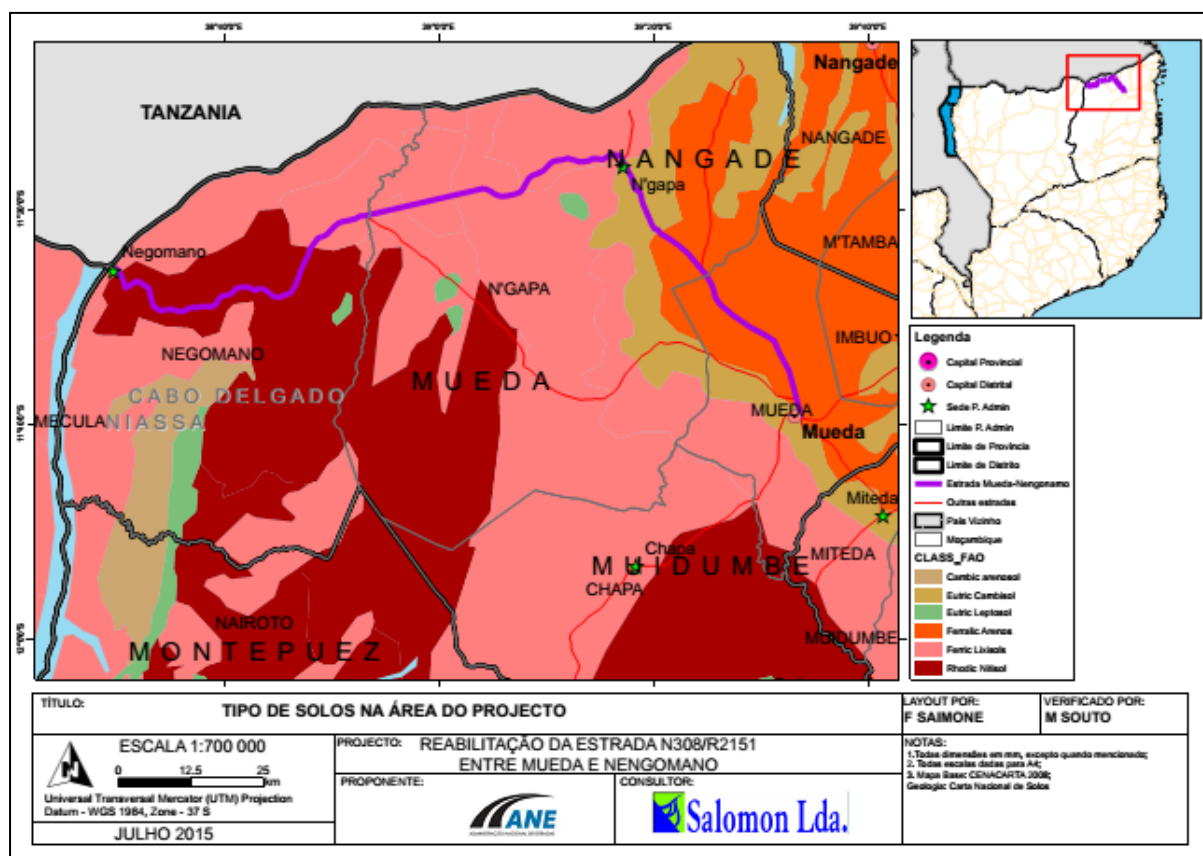
The project area geology consists of sedimentary rocks, plutonic and a very small area of volcanic rocks. The entire area consists of rocks of the Proterozoic. Figure below illustrates the distribution of the types of rocks in the project area.



Source: Geographical Information System Data Base (SALOMON, 2015)

Figure 14: Geology of the project area

The project area is dominated by very deep yellowish-brown sandy textured soils (*Ferralsol*), open clay on shallow limestone (*Eutric Cambisol*), reddish Franco-Sandy (*Ferric lixisols*) and red clay soils (*Rhodic nitisol*). Figure below illustrates the distribution of the predominant types of soils in the project area.



Source: Geographical Information System Data Base (SALOMON, 2015)

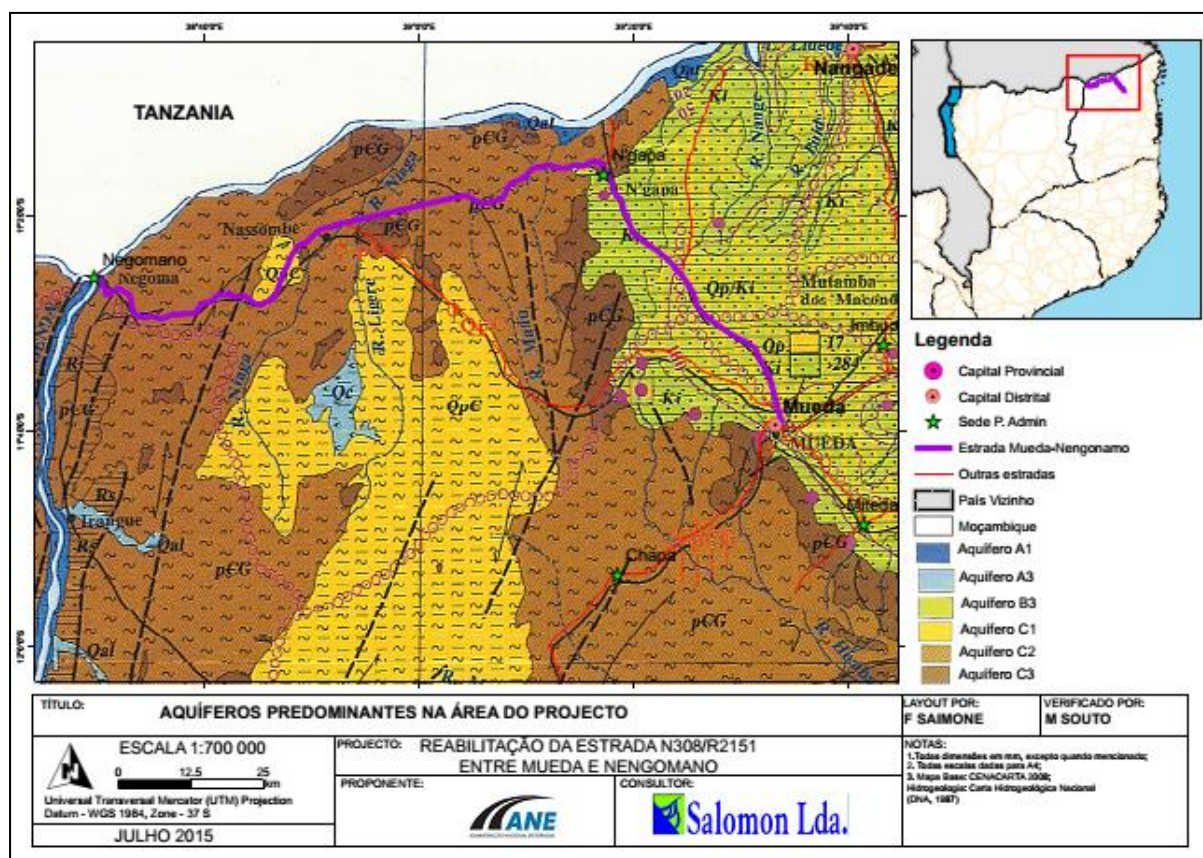
Figure 15: Predominant types of soils in the project area

6.1.2 Climate

Climatically the district is dominated by the semi-arid climates and sub-humid dry type with average annual rainfall above 800mm, reaching the 1200mm, which is concentrated in the period between November and late March. The reference potential evapotranspiration (Eto) is between 1300 and 1500 mm and average temperatures range from 20° C to 25°C.

6.1.3 Hydrology

The study area belongs to the Rovuma Basin. The main tributaries of this river with the highest significance in the project area are: Rio Muimba, Laparanhangha Rio, Rio Nambide, Rio Ninga, Rio Licóá. These tributaries cross the road in the south to north direction mainly in Ngapa-Roma section flowing towards the Rovuma River (Figure below).



Source: Geographical Information System Data Base (SALOMON, 2015)

6.1.4 Land use

This district has about 21,000 agricultural farms with an average area of 1.2 hectares. With a degree of dominant family farm, 54% of the district's farms have less than 1 hectare, occupying only 27% of the cultivated area.

This uneven pattern of distribution of the areas is evident when considering that one third of the cultivated area belongs to only 12% of farms in the district.

In most areas, the land is not titled, especially that in the hands of the so called family sector, which represent nearly 75% of the cases.

With regard to the possession of land, almost 95% of the 37,000 farm areas on which farms are traditionally subdivided, belonging to families in the region, through generational inheritance or are in rental scheme or grant status to individuals and private companies.

Traditional and official authorities hold 5% of the agricultural plots in the district.

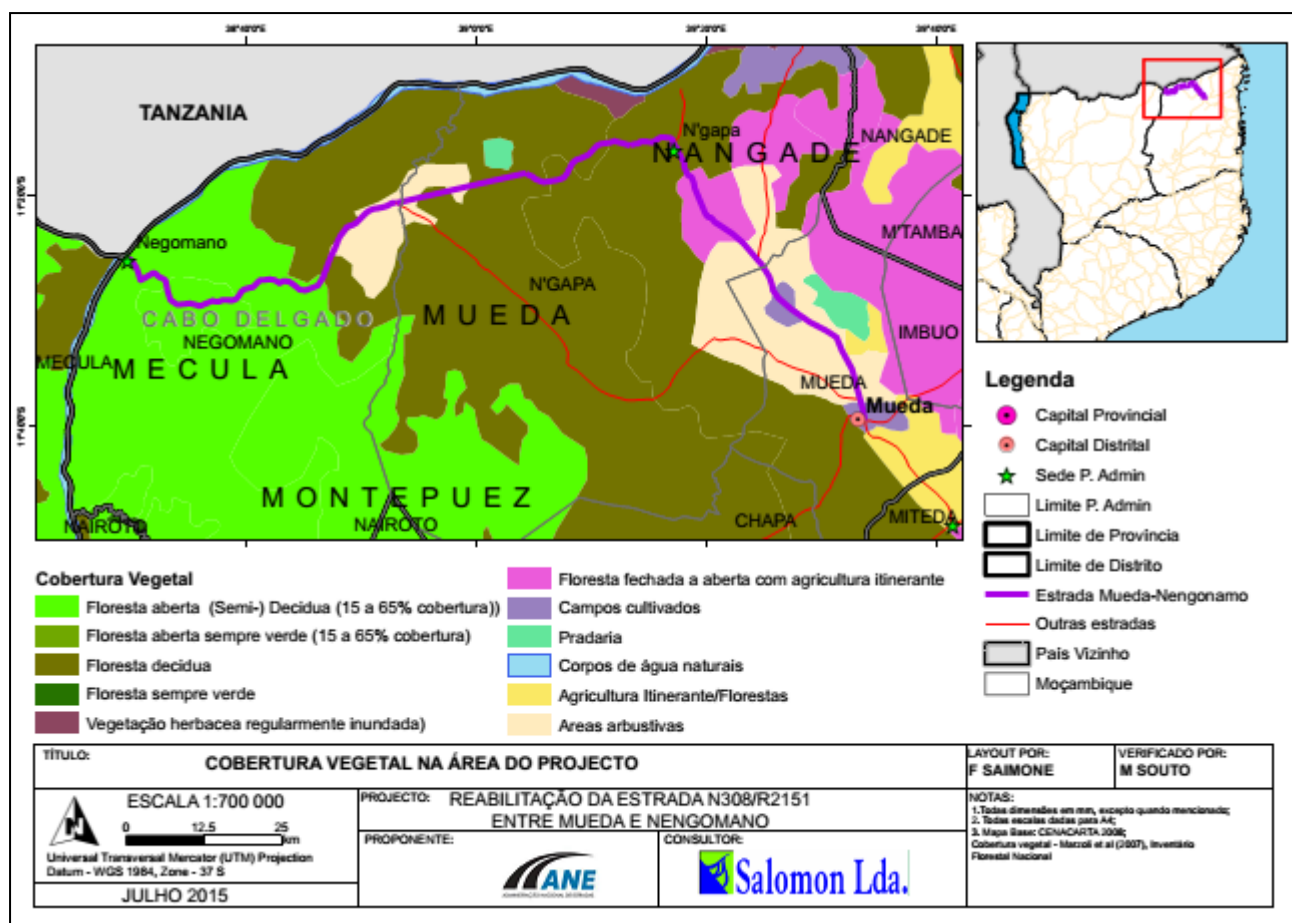
Currently the road is a link between the Mozambique and Tanzania but in a poor state. Most of it is not occupied by people. Eight settlements have been identified that have precarious infrastructure (houses and small kiosks) along the road area of influence. These cases are more prominent in three major centers crossed by the road, namely Mueda and Ngapa.

6.1.5 Landscape

The scenery along the stretch is mostly natural except in Mueda and Ngapa settlements where there is human interference mainly for farming (often associated with fires) and manufacture of dwellings. It is necessary to enhance the presence of the conservation area.

6.1.6 Vegetation

The road goes through a bushy area with some shifting cultivation in Mueda-Ngapa section. From Ngapa to Mueda, the vegetation is typically made of savannah trees mainly characterized by open forest to semi-open deciduous to semi-deciduous. The map shown in Figure below shows the distribution of vegetation cover classes in the project area.



Source: Geographical Information System Data Base (SALOMON, 2015)

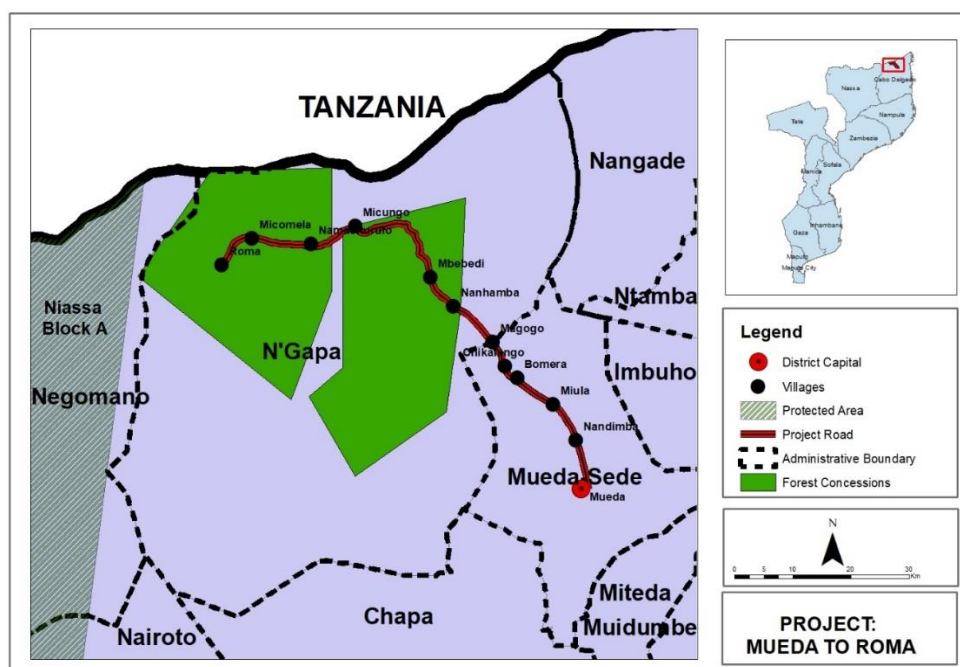


Figure 17: Vegetation map in the project area



Figure 18: Savannah visual along Mueda-Roma road

6.1.7 [Fauna](#)

The local wildlife is not abundant due to the type of the vegetation which does not attract their habitation. The sensitive areas are important ecological areas that provide unique functions which implies a continuity of ecosystem functioning. In the project area, the rivers, swamps and forests are corridors and shelter for fauna, which makes all of them important ecologically sensitive. These areas provide important habitats for many aquatic species, especially for amphibians, fish and some mammals, reptiles and birds, among other wetland fauna species. Furthermore, the streams and environment associated with them are important links between habitats, allowing movement of wildlife and contact between populations. Forests and open rock areas are habitats for many species that migrate from disturbed areas by humans for agriculture and housing purposes.

Generally, the riparian vegetation accommodates imported species, but allow exportation for other close areas. Forests are rich in micro-habitats, which contribute significantly to the survival of many species. And rock areas are specific for some species, but also can be used as shelter. Some species can be important for conservation, but also for local communities' livelihood (for example for food or cultural value, *Trynomys swinderianus*, *Cricetomys gambianus*, *Sylvicapra Grimmia*, *Potamochoerus porcus*) and for traditional practices. Thus, special attention must be taken to save them to ensure conservation and socioeconomic purposes.

6.1.8 [Air Quality](#)

The sources of air pollutants in the project area include domestic fuel combustion, charcoal production, emissions from vehicles, dust raised by the vehicles especially on unpaved roads, wind erosion of open areas and even the dust generated by agricultural activities (i.e. farming and burning of crop residues). In the absence of significant sources of industrial pollution along the project road in question, and taking into account the existing atmospheric dispersion conditions, it may be said that, overall, air quality in the region in question is good.

6.1.9 [Ecosystem Services](#)

Sensitive habitats were chosen based on two criteria namely: (1) ecological services and (2) areas with high species diversity. Based on these criteria, the streams and regularly flooded forests were considered sensitive to this study. Only one habitat was identified (stream) in the area between Mueda and N'gapa, 2km before Mbebedi Village.

The community uses this type of habitat for various resources namely water consumption, wash their clothes and cultural ceremonies, farming in the margin and/or close land (dambos) where they produce various crops for their livelihood and some do fishing.

This habitat is very important for wildlife, as well as for various plants and can probably have species on the red list. Despite being a preferred area for agriculture in Chilucuto most of this type of habitat is intact in most of the section, probably because there are very small areas with around half hectare and they never exceed 5 hectares. However, signs of human presence were also observed, which could be indicative of a considerable encroachment that is taking place as a result of population pressure, due to natural growth and depletion of land resources in traditional living and farming areas.

Socioeconomic Environment

6.19.1 [Mueda District](#)

6.19.1.1 *Demography*

Mueda district is located in the northern part of the Cabo Delgado Province, and is bordered to the north by Rovuma River to the south by the districts of Montepuez, Meluco and Muidumbe to the east by the district of Mocimboa da Praia and to the West by the district of Mecula of Niassa Province. The surface area is of 11,271 square kilometers and the total population is estimated at 217,641((105, 363, male and 112.278 female), Population census, 2017) with 49,618 households. With an approximate population density of 18 inhabitants per km⁻², and it is anticipated that in 2030 the district will reach 290,000 thousand people (MAE, 2017).

6.19.1.2 *Age structure*

The age structure of the district reflects an economic dependency ratio of 1: 1.2. That is, for every 10 children or elders there are 12 people of working age. Formed by a young population (40% below 15 years old), it has a 92% masculinity index (where for every 100 females there are 92 male) and the district's urbanization rate stands at 21%, which is concentrated in Mueda town.

The age distribution of the Mueda district is composed on the one hand by 59 951 (47.8%) that corresponds to the male index, on the other hand 65 476 (52.2%) are female population. Therefore, the district is dominated by a large number of women.

Regarding the age distribution, for administrative posts it can be said that the administrative post of Mueda Headquarters is the most populous compared to the administrative post of and N'Gapa, as can be seen from the table below.

Table 16: Population of Mueda District by administrative post, locality, neighborhood and sex

Administrative area	Total	Men	Women
MUEDA-SEDE administrative post	52 651	24 998	27 653
Locality MUNICÍPIO DE MUEDA	23 480	11 178	12 302
BAIRRO MAIMIO	4 773	2 202	2 571
BAIRRO NTANDEDI	4 089	2 003	2 086
BAIRRO MAPUTO	5 262	2 492	2 770
BAIRRO ROVUMA	4 887	2 305	2 582
BAIRRO CIMENTO	1 683	855	828
BAIRRO LILONDO	2 786	1 321	1 465
Locality LITEMBO	8 043	3 797	4 246
BAIRRO LITEMBO	8 043	3 797	4 246
Locality MIULA	11 198	5 335	5 863
BAIRRO MIULA	11 198	5 335	5 863
Locality MPEME	9 930	4 688	5 242
BAIRRO MPEME	9 930	4 688	5 242
N'GAPA administrative post	30 803	14 790	16 013
Locality N'GAPA – SEDE	8 546	4 194	4 352
BAIRRO N'GAPA – SEDE	8 546	4 194	4 352

The age distribution of the population by sex in the districts covered by the project is characterized by the predominance of young people, aged between 15-44 years of age.

Table 17: Population of Mueda district by administrative post, sex and age groups

	Age Groups					
	Total	0-4	5-14	15-44	45-64	> 65
Mueda district	122.618	18.143	32.593	52.733	14.987	4.163
Men	58.295	8.878	16.492	24.508	6.544	1.873
Women	64.323	9.265	16.101	28.225	8.443	2.289
Mueda administrative post	60.628	9.118	15.96	26.167	7.404	1.979
Men	28.64	4.487	8.032	12.159	3.117	845
Women	31.988	4.631	7.929	14.008	4.287	1.134
Negomano administrative post	2.294	353	623	1.003	266	56
Men	1.152	162	319	486	148	37
Women	1.142	191	303	517	112	19
N'gapa administrative post	33.66	4.989	8891	14.865	3.846	1.075
Men	16.188	2.421	4580	6.832	1.813	541
Women	17.478	2.568	4310	8.033	2.032	534

6.19.1.3 Economics Activities

- **Economic Active Population**

The distribution of the economically active population according to the area of activity reflects the dominance of the agricultural sector, taking into account that this activity is dominant in almost all households. In 2012 out of an estimated total of 124,000 inhabitants, 74,000 (nearly 60%) were of working age (over 15 years). As can be seen from the table below, 76% of the population of 15 years and older (56 million people) form the economically active population of the district. The level of male participation in the economically active population is higher than the female, i.e. 77% against 74%. However, 25% of the economically active population are housewives and full-time students.

Table 18: Distribution of the situation of economically active population by sex

	Total	Men	Women
Total	73,997.00	34,374.00	39,623.00
Working	68.0%	68.9%	67.3%
Not working, most have jobs	4.1%	4.0%	4.1%
Helping family	3.2	3.8%	2.7%
Looking for new job	0.1%	0.1%	0.0%
I am looking for a job for the 1st time	0.1%	0.3%	0.0%
Economically active population	75.5%	77.0%	74.1%
Domestic work	7.2%	4.0%	10.0%
Student	9.4%	11.4%	7.6%
Retired	0.4%	0.4%	0.5%
Differently abled person	4.0%	3.3%	4.5%
Other	3.5%	3.8%	3.3%
Non-working population	24.5%	23.0%	25.9%

Source: MAE (2014)

The distribution of the economically active population indicates that 92% are farmers on their own, mostly women. The percentage of employed persons is 4% of the workforce, which is dominated by men, women wage earners account for 1% of the female workforce.

- **Plant and Animal Production**

Agriculture is the dominant activity and involves almost all households. In general, the cultivation is practiced manually in small family farms. They practice a mix-cropping using local varieties.

In general, it can be said that the region is characterized by the occurrence of three dominant farming systems (MAE, 2014), namely:

1. The first corresponds to the vast low plateau area dominated by the intercropping of food crops, particularly cassava, maize, cowpea and boer beans, as crops for the 1st season (during the rainy season) and the production of rained rice in the river valleys, *dambos* and lower parts of the slopes.
2. The second production system is dominated by the cultivation of sorghum. Occasionally the production of maize and cowpea also occurs. Cassava is the most important crop in the area and is grown in simple cultivation.
3. Finally, the third production system is made of cotton, which is the main cash crop in the region.

The three production systems mentioned above, occur in upland areas.

Encouraging the rearing of livestock has been weak. Despite the existence of good grazing areas, the development of livestock activity is weak. The main obstacles to livestock development are lack of funds, proliferation of the tsetse fly and lack of extension services.

The most important domestic animals for home consumption are chickens, ducks and goats and for marketing are cattle, goats and sheep.

In the 2009/2010 and 2010/2011 campaigns 81,299 and 95,052 animals were counted. This represents a growth of 16.9%. Thus, most of these animals are used for consumption, as sources of income for local households and are also used in religious ceremonies.

Some of the aspects that define the practice of agriculture in the area, which are typical of the so-called “family sector” in Mozambique in general are:

- Cultivation of very limited areas: 0.5 to 1 ha is the common size of most of the farms in the project area¹⁰.
- Use of farming technologies that are rudimentary: cultivation is primarily undertaken using hoes and virtually no external inputs, such as improved seed, fertilizers and chemicals are used¹¹.
- Over the years the family sector farmers have developed livelihood strategies oriented towards minimizing risk through crop diversification, which takes place in a variety ways including:
 - Growing several crops and the dominance of intercropping;
 - Preferring to grow two or more consecutive crops rather than a single one of a longer cycle, even if the potential total yield is higher for the latter, to obtain advantage of moisture availability during the short rainy season; and
 - Growing crops in as many diverse environments (topography/relief/soil) as possible, e.g., in sandy flat areas, in medium textured alluvial deposits of slopes (transition zones), in the fine textured dark colored soils of the river beds (dambos) and in open valleys and alluvial soils.

This results in a combination of plots on different soil types and in different crop preferences, each with different fallow and cropping patterns.

- **Fisheries**

Fishing activities have a weak significance in the District economy.

- **Tourism**

¹⁰ The informal character of agriculture and animal production, which are dominant economic activities in the project-related areas, explains the present land use and land tenure patterns. Ancestral laws establish the distribution and use of land by existing families. Lineage plays a crucial role in the process. Each family and groups of families do their best to secure enough land and to have direct access to areas for housing, fauna, forests, pastures, fertile grounds and water.

¹¹ Due to the monopolistic structure of the market for these products, they are rather very expensive in Mozambique.

Tourism in the district is limited due to lack of serious initiatives and little dissemination of it within the national business.

- Trade

Mueda district is relatively isolated from the main shopping centers of the province. Commercial networks are limited and their distribution is uneven. There are, however, some agricultural trade links. There are also a number of traders operating in the district who come from Pemba and Nampula to buy local products (MAE, 2014).

There are two competing trade systems in the district. On one hand there is the formal trade made of shops and rural canteens. On the other hand, there are the informal traders, who are more active in remote areas due to the inability of formal operators to cover all areas. This latter trade is predominantly practiced by women and the youth. Film and VCR projection booths, and promotion of musical spectacles, which are organized by the informal sector, are the main entertainment activities.

According to the district profile 2014, there are two banking institutions that provide financial services operating in the district, namely: Millennium BIM and Barclays Bank.

6.19.1.4 Health

The district is served by 8 sanitary units, which 3 are located in the villages crossed by the road (Table below). Except from Mueda, the rest of district where there is any health service has only maternity services. For more than 74000 people, is available in total 117 beds, which indicates the poor health service being provided actually. Also it can be emphasized the importance of traditional medicine particularly outside Mueda Municipality. The situation of poor road it makes difficult to implement vaccination program.

Table 19: Health service units and number of beds within the project area of influence in Mueda District

Administrative Division	Village	Type	Number of beds				
			Medicine	Maternity	Pediatrics	Others	TOTAL
P. A. Mueda-Sede							
Municipality of Mueda		HR-I	34	19	31	11	95
Locality of Mueda-Sede							
Locality of Litembo							
Locality of Mpeme		CS-II		3			3
Locality of Miula							
P. A. de Ngapa							
Locality of Ngapa Sede		CS-II		3			3
Locality of Nachitenke	Chilinde	CS-II		3			3
	Namatil	CS-II		4			4
TOTAL			34	32	31	11	107

Source: Government of Mueda (2015)

In relation to the staff, the health service has about 160 professionals, but only 50% of them are technical and most of them are medium level trained nurses (Table below). There are only doctors in Mueda, and the ratio inhabitant/doctor is absolutely tremendous, more than 130 000 inhabitants per

doctor. This staff is supported by 25 health committees created locally, activists and polyvalent trained agent which use to do domiciliary visits to the patients, symptomatic diagnosis of malaria and disinfection of water with chloride. The major health disease is malaria

Table 20: Health service professionals per category and planned for 2015

Category	Real 2013	Forecast	Planed 2015	Increment	Increment
		2014		2014/2013	2015/2014
Senior (doctor)	4	5	10	25%	100%
Medium staff	40	45	50	13%	11%
Basic staff	50	30	25	-40%	-17%
TOTAL technical staff	94	80	85	-15%	6%
Other staff	60	50	75	-17%	50%
Inhabitant /Doctor ratio	128718	130649	131955	2%	1%
Inhabitant / Medium staff ratio	3240	3289	3322	2%	1%
Inhabitant / Basic staff ratio	2592	2631	2657	2%	1%

Source: PESOD (2015)

There are several primary health care programs at various levels that show a positive evolution in recent years, such as: environmental health, which is held in all health units and mobile brigades and places of public interest; occupational health is accomplished through working visits to companies for vaccination of workers, as well as all others who handle food; reproductive health; child health, nutrition, school health; vitamin "A" supplementation; extended immunization and mental health programs (MAE, 2014).

The epidemiology of the district is dominated by malaria, diarrhea and STD/AIDS, which are the mainly reported cases in the district.

6.19.1.5 Education

In general, school attendance in the district is very weak as the population aged 15 or older, 49% of the population have never attended school. Only 26% are currently attending school. The situation is even more dramatic for females. As shown in the table below, in all the district administrative posts there are fewer women who is attending or attended school than men. Over 57% of the people who never attended school are female.

Table 21: Distribution of the population by administrative posts, by school attendance and sex

Administrative posts	School Attendance								
	Attends			Attended			Never Attended		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	26.2%	28.5%	24.1%	24.7%	31.6%	18.6%	49.0%	39.9%	57.3%
Mueda Sede	32.4%	34.2%	30.9%	26.1%	32.8%	20.1%	41.5%	33.0%	49.1%
Chapa	23.6%	26.7%	20.8%	25.5%	32.3%	19.3%	50.9%	41.0%	60.0%
Ngapa	18.8%	21.7%	16.2%	22.4%	29.0%	16.4%	58.7%	49.3%	67.4%

Thus, the analysis of the level of education attended by people who currently attend school reveals a significant concentration in the primary level of education. It was found that of the total population aged 10 or older, 19% completed some level of education, mostly at primary level.

The low level of education is due to the fact that the school system and the teaching staff are insufficient and they have a low educational qualification. These facts are compounded by socio-economic factors, which results in low success rates and high dropout rates. Most teachers have a low educational background, having on average 6 years of education and, in some cases, a year of teaching practice, which greatly affects the quality of education.

Education is basically primary until grade 7 can be completed locally. Students must move to Mueda to continue the secondary grade. There is only one student complex in Mueda. The ratio teacher/student is 55, particularly higher in primary schools, 68 students for one teacher (Table below). Almost 50% of the rooms in primary schools are made of poor materials. Almost 10% of primary school teachers has not pedagogical training. The number of students per room, poor learning conditions are the most and poor training and poor conditions for the teachers are still the factors that challenge the education sector.

Table 22: Education sector capability in Mueda

Level	Number of teachers	Teachers with pedagogical training	Number of Schools	Conventional rooms	Local material rooms	Other materials	Number of Students	Ratio Students/Teacher
EP1 (grade 1 to 5)	332	304	64	135	15	101	29 297	68.4
EP2 (grade 6 to 7)	109	101	41	32*		17*	4 334	56.2
ESG1 (grade 8 to 10)	55	50	2	26*			2 789	57.3
ESG2 (grade 11 to 12)	39	39	2	26*			1 511	53.2
AEA (adult learning)	n.a.		17				4 137	30

* data of 2011

Source: PESOD (2015)

In the project's direct influence area, it can be noted that the number of schools decreased as we move from Mueda (Table below). In align with district situation it can be see that most of schools are until second primary cycle (EPC - grade 7). Although 100% of students in primary grade use to receive books for free, the logistic process to do that is problematic because the actual poor condition of the road mainly during the rainy season. The poor condition of the road also impacts on the assistance for the schools that are distant to Mueda.

Table 23: Number of schools by locality

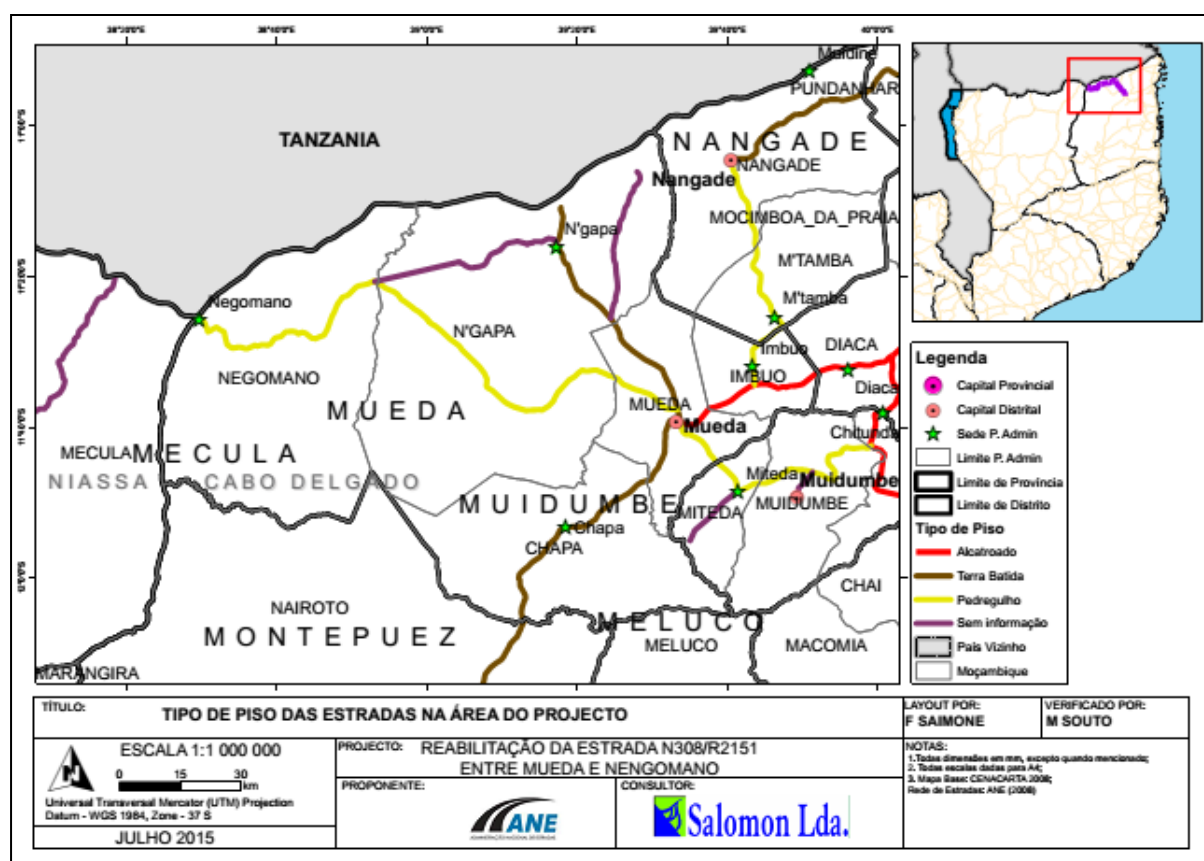
Administrative Post	Locality	Village	Number of schools			
			EP1	EPC	ESG1	ESG2
Mueda Sede	Mueda Municipality	Bairro Cimento	1	9	2	2
		Nandimba				
	Miula	Miula	3	5		

		Chicalanga				
		Magogo				
Ngapa		Nanhamba				
		Mbebedi				
		Ngapa				
		Mikungo				
		Nambungali				
		Namachurufo				
		Ninga				
		Chirucuto				
TOTAL			8	17	2	2

6.19.1.6 Infrastructure

• Roads

The classified and unclassified district road network is made of 1025.7 km. The district has only one paved road that connects the Nangade Districts and Mocímboa da Praia. All other links, including the 165km between Mueda and Negomano are gravel roads and becomes problematic and sometimes impassable during the rainy season. Figure below shows the Mueda district roads network according to their motorability.



Source: Geographical Information System Data Base (SALOMON, 2015)

Figure 19: Type of roads in the project area

Mueda District has an operating paved airstrip, which has allowed the normal movement of aircrafts.

The most widely used type of transport is road. People move around using bicycles, motorized transport and semi-collectives also known as “chapa 100”, as the main means of transport. However, open vans that connect the district headquarters to the five administrative posts are still visible (MAE, 2014).

- **Water Supply and Electricity**

Water supply to rural and urban populations of Mueda District is from mechanized boreholes, traditional wells and the rivers. To date, Mueda district has two water supply systems, which are: Chudi and Chomba. For the population living in the downtown area, the water supply is from wells and boreholes.

The existing water supply systems do not meet the needs of the district, despite the efforts that have been made. It should be noted that there are areas that consume untreated water, which causes waterborne diseases.

Chomba and Chudi water supply systems are operational and produce 162.094m³ against the planned 120,000 m³. The achievement of the target is justified by the introduction of a new water pumping technology and electric pumps that replaced the previous pumps. These systems are connected to the Cahora Bassa national electricity grid and to cater for emergency situations, Chomba system and Chudi system have purchased and installed four and one generators, respectively.

Mueda District is served by the National Electricity Grid of Cahora Bassa. At present, the Government is investing in the expansion of power line to all districts in the country.

- **Telecommunications**

Regarding telecommunications, in addition to TDM (fixed line) and MCEL (mobile), the District is officially served by two more mobile telephone services including VODACOM and MOVITEL.

- **Waste Management**

The district of Mueda (including along the Road N381/R2151) doesn't have waste management structure. Even in the beginning of the road N381/R2151 as part of Municipality of Mueda, the waste management system is still in the beginning and includes collection and deposit in an open space environment. The rest of the project's direct influence areas are rural, and people use to burn or buried directly wastes on the soil.

[6.19.2 Communities along the Mueda-Roma Road](#)

In this subchapter we present the socio-economic characteristics of a sample of households living along the Mueda-Roma road. 93 households were interviewed randomly throughout the villages.

The road crosses 15 villages starting from the municipality of Mueda as presented in the table below.

Table 24: Villages along the road

Administrative Post	Locality	Village	Start km	End km
Mueda Sede	Mueda Municipality	Bairro Cimento	0	1+640
		Nandimba	8+550	10+000
	Miula	Miula	15+900	17+450
		Chicalanga	23+350	24+750
		Magogo	30+700	31+550
Ngapa	Ngapa Sede	Nanhamba	40+000	41+350
		Mbebedi	46+350	46+700
		Ngapa	49+500	51+450
		Mikungo	60+500	61+200
		Nambungali	67+600	69+150
		Namachurufo	74+800	75+300
	Chipingo	Micomela	86+200	86+800
		Roma	93+700	94+200

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.1 Distribution of households by sex

Although there is balance in terms of gender, women are slightly in a greater proportional than men, which is not a new thing brought by this study. In a population of 516 members of all families surveyed, we identified 259 male members, corresponding to 50.2%, while the other are about 257 male members with a percentage of 49.8%. According to these results, it is necessary to take into account the gender issues since it can significantly interfere with the project as women and men feel the impacts of the project in different ways, which is caused by cultural issues.

Table 25: Distribution of HH members by sex

Sex	Frequency	%
Male	257	49.8%
Female	259	50.2%
TOTAL	516	100.0%

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.2 Distribution of members of households by age group

There is a greater incidence of births in the study areas, since the data show a significant tendency to reduce each time as the ages increase.

The table below shows that from 0 up to 15 years of age, there is a higher concentration of people in the interviewed families, a cumulative aggregation would allow us to see that more than half of the members are represented in that universe. Thus, this table allows us to see that households are mostly made of a predominantly young population, which means that the implementation of the project must take into account the needs and expectations by young population regarding the viability of implementation of the project.

Another fact that cannot be neglected in the data is the fact that there is a difference between those that were reported not knowing their ages. In a way this has a relationship with the lack of education

or lower education, something that is extremely important in the context of communication that should be established with local communities throughout the implementation of the project so that all messages are perceived.

Table 26: Distribution of HH members by age categories

Age	N	(N/306)*100	(N/516)*100
0-5 years	71	23.2	13.8
6 - 10 years	64	20.9	12.4
11-15 years	49	16.0	9.5
16-20 years	31	10.1	6.0
21-25 years	21	6.9	4.1
26-30 years	20	6.5	3.9
31-35 years	10	3.3	1.9
36-40 years	11	3.6	2.1
41- 45 years	6	2.0	1.2
45- 50 years	4	1.3	0.8
51-55 years	11	3.6	2.1
56 (+)years	7	2.3	1.4
Does not know	211	100	40.9
Total	516	100	100

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.3 Number of members per household

More than half of the households covered by the study have an extended family consisting predominantly of at least 4 members. In a universe of 93 respondent households, 19 families corresponding to 20.4% have 5 members, followed by 18 families, accounting for 19.4% of which have 7 members, followed by 4 families with 14 members, these represent a percentage of 15.1%, and 12 with 6 and 10 members (12.9%) and 3 (10.8%) members respectively. On average, families living in villages along the road Mueda – Roma have 6 members. INE indicates that households in rural areas in Mozambique in general tend to have less members than those living in urban areas. While the average for rural areas is 4-5 in urban areas in tends to be above 7 (INE, 2007). The study population shows a mix of urban and rural traits.

Table 27: Distribution of absolute frequencies and % of households by numbers of members

Number of members	Frequency	%
2	6	6.5

Number of members	Frequency	%
3	10	10.8
4	14	15.1
5	19	20.4
6	12	12.9
7	18	19.4
8	8	8.6
9	2	2.2
10	3	3.2
13	1	1.1
Total	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.4 Main characteristics of households

Number of wives by head of households

Most of Household Heads (HHH) representing 68.8% have only one wife, and 16.1 % represent those who said they have no wife (this percentage is mostly represented by children who head households). In the third position are 10.8 % of HHH who claimed to have two wives, with smaller representativeness are those who claimed to have 3 or 4 wives, they represent 3.2% and 1.1% respectively.

Table 28: Number of wives of Household Head

Number of wives	Frequency	%
0	15	16,1
1	64	68,8
2	10	10,8
3	3	3,2
4	1	1,1
Total	93	100,0

Source: Socio-economic Surveys (SALOMON, 2015)

Presence of wives in the houses of their heads of households

The following table illustrates the household organizational model that characterizes households in areas covered by the study. It can be seen that spouses do not always share the same geographical space with the same head of the HH.

Table 29: Frequency of heads of households with wife living in the same premises

Do the spouses share the same space as the HHH	Frequency	%
Yes	70	89,7
No	8	10,3
Total	78	100,0
No answer	15	
TOTAL	93	

Source: Socio-economic Surveys (SALOMON, 2015)

It can be seen from the table above that from a total of 78 heads of households who reported having at least one wife, most of these representing a percentage of 89.7%, which corresponds in absolute terms to 70 who claim that the wives are all in the same space (premises), while 8 of respondents, representing a percentage of 10.3% said they were not living in the same space with all the wives. This draws attention to the fact that households characterized by polygamous relationships tend to live in separate spaces. This has implications in the treatment to be given to this kind of families, although it is present in small proportions, since the household head is the same in more than one household.

6.19.2.5 Education

All school-age children are currently attending school, since a total of 119 children distributed in all households surveyed reported to be enrolled.

Table 30: School attendance

School attendance by children	Frequency	%
Yes	119	100,0%
No	0	0.0%
TOTAL	119	100,0%

Source: Socio-economic Surveys (SALOMON, 2015)

As shown below, most of the children from interviewed households are attending primary school, accounting for 93.3%, which corresponds in absolute terms to 111 children. In smaller representation are 5.9% of children who are in secondary school, corresponding to 7 children in absolute numbers, and only one child (8%) that is in the kindergarten.

Table 31: Level of education of school-age children

Level	Frequency	%
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Kindergarten	1	0.8%
Primary (1 - 7 classes)	111	93.3%
Secondary (8 – 10 classes)	7	5.9%
TOTAL	119	100.0%

Source: Socio-economic Surveys (SALOMON, 2015)

Schools mostly the primary school, are close to the places of residence, as 76 (63.9 %) walk between 5 and 30 minutes to the school and 29 (24.4 %) of children walk less than 5 minutes to reach school. In smaller representation are 14, corresponding to 11.8 % of that cover more than 30 minutes to reach school.

Table 32: Distance to school

Time to school	Frequency	%
Less than 5 minutes	29	24,4%
Between 5 to 30 minutes	76	63,9%
More than 30 minutes	14	11,8%
TOTAL	119	100,0%

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.6 Employment and Occupation

Most members of the HH within working age are unemployed, that is, they correspond to 321 representing 62.2%, while in a smaller number there are 195 who are employed, corresponding to 37.8%. This may affect the viability of the road rehabilitation project, as there is a higher percentage of unemployed people, which can lead to the occurrence of higher expectations on the part of those affected by the project.

Table 33: Frequencies and% of HH members according to employment status

Employment	Frequency	%
Yes	195	37,8%
No	321	62,2%
TOTAL	516	100,0%

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.7 Type of occupation

Most household members within working age depend on agriculture as a source of livelihood (94.9%). The rest are employed in other activities, such as trade number, which corresponds to 3.1%.

Table 34: Frequencies and% of HH members according to type of activity

Activity	Frequency	%
Agriculture	185	94,9%
Formal trade (shops)	1	0.5%
Trade (tent or other informal business)	6	3.1%
Unskilled labor (unskilled. – car keeping, bus fee collector)	1	0.5%

Activity	Frequency	%
Journeyman ((with skill, self-employed - mechanic, electrician, carpenter, etc.))	1	0.5%
Professional (with formal contract - teacher, nurse, accountant, etc.)	1	0.5%
Total	195	100.0%

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.8 Type of Employer

Most respondents are self-employed (87.7%). This combined the results of the type of activity, which found that most respondents practice agriculture, leads to the conclusion that the type of agriculture is subsistence. Once again this can be interpreted as an indication that the employment situation is not stable, which also leads to the need to be cautious to the involvement of local communities in the project to ensure its viability. In smaller representation are the others who said their employers were the government and the private sector, i.e. 1 and 3%, respectively.

Table 35: Frequencies and% of AF members by type of employer

Employer	Frequency	%
Government	2	1,0%
Private company	6	3,1%
Individual	171	87,7%
Self-employment	16	8,2%
TOTAL	195	100,0%

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.9 Goods, property and housing characteristics

There were a total of 440 goods that were recorded as having been used by households for various purposes inherent to their daily activities. Data from the table below allows us to state that local communities affected by the project essentially own goods used for activities aimed at the agricultural sector, mainly family-type farming for self-sufficiency. This is illustrated by the 89 (20.2%) families with hoes, 76 (17.3%) households reported having axes. In turn, the bicycle is a means of transport which most communities rely upon for transport, and these are in number of 57 (13%). The bed is another among the goods that 55 families said that they have, corresponding to 12.5%, paired with radios that more than half of the families said that they have, i.e. 54 in total corresponding to a percentage of 12.3%. The phone appears just below as being associated with at least half (42) of respondents, corresponding to 9.5%.

Table 36: Distribution of the number of households by type of goods

Type of goods	Nr of HH/type of goods	%
Radio	54	12,3
TV	10	2,3
Video DVD player and CD	11	2,5

Type of goods	Nr of HH/type of goods	%
Call phone	42	9,5
Wristwatch	10	2,3
Bed-not-just-mattress	55	12,5
Electrical stove	1	0,2
Iron	6	1,4
Refrigerator-fridge	1	0,2
Deep freezer	1	0,2
Sewing machine	3	0,7
Plow	6	1,4
Hoe	89	20,2
Axe	76	17,3
Tractor	4	0,9
Bicycle	57	13,0
Motorcycle	11	2,5
Wotor vehicle	1	0,2
Water pump	2	0,5
Total	440	100

Source: Socio-economic Surveys (SALOMON, 2015)

Regarding the type of housing, the table below shows that most families have housing in rectangular 72 (77.4%), and quadrangular format about 19 (20.4%). In smaller proportion appear 2 families, corresponding to 2.2% who have circular huts. Circular huts are increasingly being reduced, by being replaced by square or rectangular houses as a result of extending the compartments of the houses.

Table 37: Frequencies and % of HH according to the type of housing

House format	Frequencies	%
round	2	2.2
Quadrangular (four equal sides)	19	20.4
Rectangular	72	77.4
Total	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

The data in the table below confirms the trend of increasing the number of compartments of the dwellings of the interviewed households, since more than half of respondents claimed to have at least 2 bedrooms to sleep in the main house, and 43 (46.2 %) reported three rooms, 25 (26.9%) reported 2 bedrooms, 14 (15.1%) said they had 1 room reduce and in smaller percentages appear those who said

that they had 4 bedrooms totaling 6, corresponding to 6.5%, while 2 claimed to have 5/4 and the remaining talked about 9 rooms and 10 rooms respectively, these have a 1.1% weight.

Table 38: Frequencies and% of the number of rooms of housing of AF

Number of bedrooms	Frequency	%
0	1	1.1
1	14	15.1
2	25	26.9
3	43	46.2
4	6	6.5
5	2	2.2
9	1	1.1
10	1	1.1
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

The data presented in the table below, suggests that most families do not have bathrooms, as in this case, from a total of 93 families that were interviewed, 90 families have no bathrooms, corresponding to 96.8% and only three families reported having at least 1 bathroom and basically latrines, most of which classified as below standard in the sanitation programs.

Table 39: Absolute frequency and% of the number of bathrooms

Number of bathroom	Frequency	%
0	90	96.8
1	2	2.2
2	1	1.1
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

The data presented in the following table confirm the precarious situation of the sanitation issue. Besides not having in house facilities, most families do not have latrines. From a total of 93 respondents, 81 corresponding to 87.1% indicated not having any latrine, and only 12 corresponding to a percentage of 12.9% said they have a latrine.

Table 40: Frequencies and% of the number of latrines in the HH

Number of Latrines	Frequency	%
0	81	87.1
1	12	12.9
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.10 Household water supply

Most households rely on natural water (wells, rivers and lakes) to meet their water needs. The table below shows that about 53 families, i.e. 57% get water from the river/lake following families who total

28, corresponding to a percentage of 30.1% who get water from wells/boreholes/hand pump/standpipe. While to a lesser extent are the families there are whose sources of water for consumption are water tank in the yard 9 (9.7%), 2 families get water from a backyard well and correspond to 2.2% and only one family has access to piped water and this has a weight of 1.1%. The latter correspond to households residing in the Municipality of Mueda.

Table 41: Frequencies and % type of water sources for HH consumption

Water source	Frequency	%
Neighbors water	1	1.1
Water tank in the yard (water purchased outside)	9	9.7
Well/borehole in the backyard	2	2.2
Well/public borehole/hand pump standpipe	28	30.1
River/lake/dam	53	57.0
Total	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

6.19.2.11 Perceptions about the project

The data in this section reflect the perceptions about the road rehabilitation project between Mueda and Roma by the households directly affected by it. This aspect was explored to understand the needs and interests of the target group in its relationship with the development of the project in order to assess their expectations and the social viability of the project.

The data collected show that most households have several expectations regarding the road construction project, in the form of increasing the possibilities of access to public services, especially transport and communication services, health, business and employment opportunities. These expectations built around the road rehabilitation project can be positive and negative depending on how the execution of road rehabilitation activities are implemented. The following table illustrating the feelings that respondents said they had regarding the project between Mueda and Roma.

Table 42: Frequencies and% of HH sentiments about the project

Sentiments	Frequency	%
I am very happy with it	80	86.0
I'm happy with it	10	10.8
I look forward to see it	1	1.1
I have no opinion	2	2.2
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

Most respondents (HHH) welcome the project to the extent that 80 respondents corresponding to 86% fall under the category “very happy with it”, and that following category, of those who said “to

be happy with the Project”, corresponding to 10 in absolute terms are equivalent to 10.8%. In general, there is a positive assessment of the proposed road rehabilitation, since in smaller representation are respondents who said “no opinion” (1.1%) and said “they will wait and see” (2.2%).

In order to deepen the evidence of the expectations of households affected by the project, the following tables present data on access to services that will be provided through road rehabilitation. Note that in the comments to each table illustrative descriptions that support the expectations around the project by the directly affected HH are made.

Health

The table below contains information relating to the degree to which respondents believe that road rehabilitation will increase access to health services.

Table 43: Frequencies and% of HH expectations in re to access to health services

Expectations related to access to health services	Frequency	%
Not likely	2	2.2
It will be the same	13	14.0
Fairly likely	18	19.4
Very likely	59	63.4
Do not know or have no opinion	1	1.1
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

The data in the table allows us to affirm that the communities affected by the project in greater proportion expect to have improved access to health services, whereas 59 respondents representing 63.4%, are found in the category of 'very likely' to have increased access to health, this is followed by 18 respondents who correspond to 19.4% of who fall under the category of “fairly likely”. In short 82.8% of all respondents have positive expectations with regard to access to health services, and to a lesser extent are the respondents who think all will “remain the same” (14%) and those who think improvements “are unlikely” (2.2%) and those who have “no opinion” (1.1%). The following are the statements that underpin the justification of respondents about their positive expectations with regard to access to health services through road rehabilitation:

"With the road pregnant mothers may be assisted by nurses in the hospital and it will bring development in commercial and agricultural activities." (Interviewee)

"It is a positive sign of peace and will reduce health problems mainly on respiratory problems during the cold season. (Interviewee)

"Ease of transport, will make it easier for our children to be taken to the clinic faster through the transport" (Interviewee).

Employment Opportunities

Respondents are in an area where it is assumed that families are economically characterized by resorting to subsistence farming, a situation that characterizes most of the Mozambican population. Nevertheless, expectations with respect to employment opportunities are a common feature in the

rehabilitation and construction of public infrastructure of this kind of projects. In this particular case the following was found:

Table 44: Frequencies and% on expectations for employment opportunities

Expectations for employment	Frequency	%
It is totally unlikely	3	3.2
Not likely	7	7.5
It will maintain the same	21	22.6
Fairly likely	35	37.6
Very likely	25	26.9
Do not know or have no opinion.	2	2.2
Total	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

The table data illustrates that the majority of respondents say the project is "fairly likely" to increase/provide access to employment opportunities and these correspond to 35 respondents, with a percentage of 37.6%, and in second position are those who said it is "very likely" 25 (26.9%). Together, the two positive categories correspond to the highest number of people, and as in the previous case the smaller representation is distributed among those who said "no opinion" (2.2%), "totally unlikely" (3.2%), "is not likely" (7.5%).

Business Opportunities

The data in the table allows us to state that the respondents have good expectations regarding the business opportunities to be associated with the rehabilitation of the road, since a total of 93 respondents, 65 of these with 69.9% claim the emergence of opportunities is "very likely", 19 respondents claim to be "fairly likely" and they correspond to 20.4%, while in smaller representation are the categories that said: "will remain the same" 7 (7.5 %); "totally unlikely" 1 (1.1%), and "not likely" 1 (1.1%). Good expectations on the part of respondents with regard to the development of business opportunities from the project are illustrated on the following statements:

"With the road we will have energy, increased business opportunities, decreased accidents caused by excessive potholes on the road "(Interviewee)

"Business Growth, will decrease the potholes on the road, it will be easy to get to Mueda headquarters district" (Interviewee)"It will facilitate trade, transport of food for sale in other towns

Table 45: Distribution and% on the expectation re business opportunities associated with the project

Expectations regarding the business opportunity	Frequency	%
It is totally unlikely	1	1.1
Not likely	1	1.1
It will maintain the same	7	7.5
Somewhat likely	19	20.4

Very likely	65	69.9
TOTAL	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

Transportation and communication

As in previous cases, the majority of respondents consider to be "very likely" for access to transport and communication services to improve and these are 63 respondents, corresponding to 67.7%, followed by 16 who said they were "fairly likely". Thus communities have positive expectations regarding the improvement of access to transport and communication services, and we present the statements that reflect the feelings of the communities.

It will allow the expansion of electricity, reduces the lack of transport and existing high prices - facilitate the circulation from Miula to Mueda, even in rainy weather." (Interviewee)

"It will allow flexibility in movement that will bring peace and security on the road and will facilitate the sale of products, this is a development and growth for the communities." (Interviewee)

"Reducing the price of transportation, will bring development to our community, the community's children can go to school and when we want to go to the bank in Mueda it will be closer." (Interviewee)

Table 46: Distribution and% on the expectations in re to access to transport and communication services

Expectations regarding access to transport and communication services	Frequency	%
Not likely	2	2.2
It will maintain the same	10	10.8
Fairly likely	16	17.2
Very likely	63	67.7
Do not know or have no opinion.	2	2.2
Total	93	100.0

Source: Socio-economic Surveys (SALOMON, 2015)

In summary there are high expectations surrounding the project and these will need to be adequately managed in order to avoid a situation where this can work against the project.

POTENTIAL IMPACTS OF THE PROJECT AND MITIGATION MEASURES

6.20 Potential Impacts on Biological Environment

6.20.1 Loss of Natural Habitat

During the construction phase there may be need for logging in some sections where a new alignment, road widening and diversion will be carried out to facilitate works. Additionally, in the areas dedicated to the construction of construction sites, the extraction of aggregates (sand and stone). The borrow pits currently used for road maintenance are small and are expected to be extended. As a result, there will be a destruction of the natural habitat. The occurrence of this impact during construction is localized as for the most part, the section will only be rehabilitated. Its impacts in units such as construction sites, quarries and sandpits can be mitigated through a recovery plan.

Also expected habitat destruction during the operation phase due to migration from rural communities to the vicinity of the road, leading to deforestation for the purposes of construction of new homes, opening new farms (machambas) and wood harvesting for the production of coal or own consumption. Additionally, the easy access by road may encourage illegal logging, more coal production for sale including the danger of these activities affecting Block A conservation area. Yet improved access may allow forest concessions to increase their annual cutting volumes that are now limited by the difficulty of access. This impact during the operation phase is long term and can be irreversible if no action is taken. Coordination between the provincial departments of agriculture and the environment to control deforestation during the operation phase is required.

This impact is likely to occur in the surrounding area. Due to its catalytic effect the development will attract more people in the long run. However, it may be reversible if mitigation measures are taken to reduce the high significance on the average.

6.20.1.1 *Impact Classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	Average

6.20.1.2 *Mitigation Measures*

- Select sparsely or relatively reforested areas near the construction sites;
- Limit the area occupied by the construction camp;
- Transfer buildings to the road maintenance services of the ministry in charge of roads as well as other entities;
- Rehabilitate all quarries and borrow pit operation areas;
- Compensate the felling of trees by reforestation and planting of roadside trees in the villages and towns crossed by roads;

- Involve and strengthen the need for coordination between public institutions responsible for the area of agriculture and environment to monitor deforestation during the operation phase;
- Develop awareness campaigns about environmental conservation in the communities;
- Strengthen the control to ban any illegal logging and monitoring compliance with management plans for forest concessions, particularly the allowable annual cuts;
- In partnership with NGOs, provincial department of agriculture and existing forest concessions, develop and/or strengthen reforestation projects in communities;
- Promoting alternative livelihood for the community to reduce the use of forest, eg honey production;
- Provide alternative sources of energy for cooking food and heating in the construction sites;
- Prohibit the use of wood fuel by workers during construction;
- Increased monitoring of forest licenses and logging, particularly within the Reserve;
- The Contractor shall provide these basic products to their employees and not allow any use of natural resources;
- Cutting trees for purpose of alignment enhancement should be done by prior authorization according to Decrees 103, 104 and 105 of the Regulation on forest and wildlife (Decree 12/2002 of 6th June);
- All activities related to tree cut inside Block A must be avoided as much as possible and informed by the operator and the Niassa Reserve Administration. All requisites stated in the Niassa Reserve Management Plan must be followed in that area.

6.20.2 [Interference with animal migration](#)

During the construction phase there will be a great movement of vehicles and machinery. The risk of disturbance of fauna may be increased, particularly in the areas where some animals cross the road.. The constant presence of workers and machines can prevent or hinder the migration of animals. However, this impact can be minimized by limiting the construction of construction sites close to the migration routes of animals.

During the operation phase, the interference with the migration routes of animals crossing the road risk of road kill may be higher. This impact may be due to better circulation conditions of the track that will allow motorists to travel at high speeds. Yet due to the fact that it is a now remote and uninhabited area, particularly in Luwiri Block (km 105-163).

However, the significance may be low if measures such as identification of corridors and appropriate signs thereof are taken.

6.20.2.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	likely	In the surrounding area	Long term	Reversible	High	low

6.20.2.2 Mitigation Measures

- Build far away from animal crossing likely areas especially within the forest conservation areas ;
- [Increase in illegal hunting of animals](#)

This impact is particularly important during the phase of operation due to the easy access that is expected with the road rehabilitated by the poachers and meat/wild animal's buyers. During the construction phase it can be circumvented through hunting prohibition for the workers, awareness and constant monitoring.

6.20.2.3 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	In the surrounding area	Long term	Reversible	Average	Average

6.20.2.4 Mitigation Measures

- Prohibit any form of hunting by workers;
- Promote awareness campaigns on the protection of animals and nature with the workers and communities;
- Promoting alternative sources of protein for local communities;
- Strengthen enforcement against poaching, especially in collaboration with local communities.

6.20.3 [Disturbance to Aquatic Fauna](#)

The impacts **during construction** can be caused by the resulting sedimentation due to work to be done in riverbeds (sand extraction and water abstraction), erosion in the areas of construction, pollution by oil, fuel and other chemicals. Large amounts of eroded sediments in rivers (at least seven bridges will be built in addition to aqueducts to be rehabilitated) can directly affect fish downstream through damage or accumulation in their gills leading to death or sub-lethal effects. Sedimentation can indirectly affect fish by modifying the habitats or reduce primary production and therefore the amount of fish. Spillage of Fuel and chemicals can directly affect the aquatic fauna or the availability of fishery products for humans. In addition, water abstraction from the rivers can disturb the aquatic fauna or affect their integrity depending on the amount to be collected and the source. These impacts are particularly important in the works to be held on the Ninga River which is the natural source of greater importance over the stretch.

During the **operation and road maintenance phase**, surface water can be polluted by vehicles crossing the road. Small spillage of oils and fuels from vehicles in poor condition and asphalt compounds can be washed in to the watercourses. This impact is minor and of short-term. Thus, it is probable that the operation and road maintenance will have little significant impact on water resources. In case of traffic accidents, it is to be expected that higher volumes of spilled fuel and oil on the road can be washed into rivers. In these cases, the impact can be moderate to severe, depending on the amount of fuel spilled. Severe, irreversible and permanent cases can happen from an accident caused by a fuel tanker.

Therefore, impacts on water quality can be significant, requiring the adoption of mitigation measures to be incorporated during the operation and road maintenance.

The **decommissioning** of structures located on or near water courses may have some minor impact on the water quality and ecology of rivers. However, general mitigation measures should be applied in case there is the risk of this kind of contamination to reduce their impact to a minimum.

6.20.3.1 Impact classification

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short Term	Reversible	Medium	Low

6.20.3.2 Mitigation Measures

- Compliance with erosion control measures;
- Regular maintenance of machinery and vehicles to prevent leakage of oils and fuels;
- Better signaling of bridges and steep slopes to reduce the risk of accidents and spills;
- Proper location of the construction sites to prevent runoff to watercourses.

6.20.4 Use of Resources

The workers engaged in the road construction works will increase energy demand, wood, sand, stone, fuel, food and water.

Access to Food can be provided by suppliers in Mueda and Pemba subject to the availability of food at the local level. There are also fuel pumps to supply the project, since that is provided for in advance subject to the local supply.

A feature that is particularly important in the construction of roads is water and it will put pressure on local sources. Large amounts of water are needed for the compaction of the sub-base, reduction of dust during the work, concreting of drainage structures, and supply to the construction sites, sandpits and quarries. Although it is temporary, depending on the amount and source to be extracted, it can cause impacts on water availability for the surrounding populations and affect the aquatic fauna of the source. There is no new water course realignment in the project. Thus, the construction activities will have significant impacts on the change in the hydrological regime of the water courses in the short-term.

6.20.4.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short Term	Reversible	Low	Low

6.20.4.2 Mitigation Measures

- The Contractor shall provide these basic products to their employees and not allow any use of natural resources.
- Licenses should be obtained from supervisory institutions for the exploitation of local resources;
- Procurement should consider purchasing products sold by local merchants.

6.21 Potential Impacts on Physical Environment

6.21.1 Soil Erosion and Sedimentation

Erosion can be expected in areas where the soil is disturbed and exposed subject to intense precipitation. The clearing of vegetation in geometric improvement of sections of road or widening the track, building bridges, aqueducts, extraction of sand in sandpits will expose the soil to erosion during the rainy season and may result in increased erosion and sedimentation of watercourses. The increased erosion during construction and operation can further contribute to clogging of rivers. The project involves both superficial and deep excavation. This will result in erosion especially on sections with steep gradient.

Other areas associated with road can contribute to soil erosion, including temporary deviations, curbs and parking areas.

6.21.1.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short Term	Reversible	Medium	Low

6.21.1.2 Mitigation Measures

- Restrict, wherever possible, construction activities in the dry season to reduce the risk of erosion;
- Minimize work in or along rivers such as sand removal or collecting water from these rivers for building;
- Use machines with rubber tires instead of metal pads, particularly those which will work in the area of the bridges to allow less disturbance of soil and vegetation;
- Stabilization of slopes particularly along the sections with steep gradient and in the vicinity of the drainage works, if possible make use of gabions to prevent erosion;
- Use of native vegetation in disturbed areas to allow rapid recovery of stabilized soil
- Construction of drainage structures, particularly in sections with steep gradients;
- Restore and re-vegetate the sandpits.

6.21.2 Soil and Water Pollution

Nearly all wastes generated during construction, except the gases are eventually deposited on the ground. The largest sources of pollutants include camps, storage areas and civil works. Effluent and runoff from camps and storage areas can contain high levels of pollutants including human waste, free from asphalt compounds, persistent organic pollutants, fuels and oils, bitumen and cement particles, detergents, heavy metals and corrosive substances from old batteries and antiseptic substances, salts

and other elements. These pollutants can increase the BOD, COD, fecal coliforms, STD and nutrients when they reach waterways after runoff. The camps can therefore be a very important source of pollution to waterways.

The civil works result in movement of soils that may be carried by rain to the next watercourses increasing turbidity, nutrients and STD, and thus reduce the quality of the water. The magnitude of the impact on the rivers that will be affected by the pollutants will depend on the location of camps and nature of the civil works.

Other sources of pollution of rivers are the asphalt plants, quarries and sandpits. In areas where there is the asphalt plant, the pollution of both surface and ground water may occur due to leakage or escape of substances used in the production of asphalt and/or improper storage of lubricants and other building materials. At the sandpits and quarries, there is the possibility to intercept the water table during the excavation.

The impacts of the road operation on water quality are sporadic in case of road accidents. The damaged vehicles can release fuels and oils after an accident and can be washed or drain towards the waterways. The probability of occurrence is relatively low and depends on the location of the accident, the magnitude of the accident and the vehicles involved.

During demobilization, solid waste and debris as obsolete or damaged materials as well as waste water can be washed out to the waterways and adversely affect its quality.

Water pollution has direct impacts on aquatic fauna.

The table below presents some characteristics of the effluents that can pollute soil and water. The amount generated, its importance and treat solid waste in following separate.

Table 47: Foreseen activities, type of residues and their characteristics

Project activity	Residue	General characteristics and sources
Construction and construction site operation	Effluent	Pias (white water containing soap and detergent)
	Effluent	Septic tank (black water containing faecal sludge, detergents, antiseptics, high BOD and COD, etc.)
	Electrical installations	PCBs
Inert excavation	Residual waters	Erosion and runoff from soils (may contain high levels of fecal coliform, turbidity, BOD, COD, etc.
Excess water drainage	Surface runoff	May contain high levels of fecal coliform, turbidity, BOD and suspended solids, etc.
Road signs	Effluent	Compounds of paints and solvents

Project activity	Residue	General characteristics and sources
Demobilization	Residual waters	runoff (may contain high levels of fecal coliform, turbidity, BOD, suspended solids, etc.

Source: SALOMON, 2015

6.21.2.1 Impact classification

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Medium	Low

6.21.2.2 Mitigation Measures

- Implement erosion mitigation measures by planting erosion sedimentation;
- appropriate treatment of solid waste;
- storage and proper handling of fuels, oils, lubricants, paints, tar and other substances to prevent spillages and leakages;
- Regular maintenance of machinery and vehicles to prevent leakage of oils and fuels their systems; appropriate treatment of waste water on construction sites, quarries and sandpits;
- Better signaling of bridge sites and steep slopes to reduce the risk of accidents and spills;
- Proper location of the construction sites, sandpits, quarries and asphalt plants to prevent runoff to watercourses;
- Ensures maximum emission limits for domestic effluents according to the Decree 18/2004 of 2nd July on environmental quality standards and effluent emissions (Table below).

Table 48: Standard maximum limit values for domestic liquid effluents

Parameter	Maximum admissible level	Unit	Observation
Color	Dilution 1:20	Presence / absence	
Smell	Dilution 1:20	Presence / absence	
pH, 25°	6.0 – 9.0	Sorensen scale	
Temperature	35°	°C	Increase in the receptor
Chemical oxygen demand (COD)	150.0	mg/l O ₂	
Suspended total solids	60.0	mg/l	
Phosphorous total	10.0	mg/l	3 mg/l in sensitive areas
Nitrogen total	15.0	mg/l	

6.21.3 Generation of solid wastes

The road construction activity generates a huge amount of waste that must be managed properly to avoid pollution. The table below shows the activities of the project, type of waste and its features.

Table 49: Project activities, solid waste and general characteristics

Project activity	Residue	General characteristics and sources
Construction and construction site operation	domestic solid waste	food scraps, packaging material (plastic bottles, cans, paper), old fabrics, wood, metal, grass, etc.
	solid waste warehouses	Material damaged or obsolete (cement, explosives, metals, plastics, paper, old batteries, etc.)
	Waste from demolition	Debris (sand, blocks, wood, metal, plastic, cement, asphalt, lime, oil, etc.
Operation of quarries	Solid waste	Inert
vegetation cleaning along new alignments and berms of the existing road to extend	solid waste and debris	Stems and branches of trees, grass, topsoil, sand, stones, etc.
Cutting and filling for changing the vertical alignment of the road, removal of the surface layer to facilitate the construction of road infrastructure and	solid waste	spoils
Construction-related road and infrastructure including bridges, aqueducts, parks, sidewalks, signage and other drainage infrastructure	solid waste	Mud, stones, pebbles, cement, metal, wood
Demobilization	solid waste from demolition	Debris (sand, blocks, wood, metals, plastics, cement, asphalt, oils, etc.)
	general waste	Obsolete or damaged materials (cement, bitumen, explosives, metals, plastics, paper, etc.)

Source: SALOMON, 2015

6.21.3.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Highly probable	Localized	Short term	Reversible	Medium	Low

6.21.3.2 Mitigation Measures

- Measures for waste management are included in the ESMP (Volume 3).

- In absence of any solid waste system, requirements of the regulation on waste management (Decree 13/2006 of 15th June) must be followed. According to this decree, the District Government must:
 - Approve specific norms on waste management;
 - Define the mode, process for remove and means to do that, transport, deposit and treatment of waste;
 - Set fees, provide waste collection, transport, deposit and treatment services;
 - Provide license to entities who can provide hazardous waste management.

6.21.4 [Impacts on topography \(landscape\)](#)

Under landscape point of view, it can be considered that the road will bring a better look to the location than the current state. One of the biggest impacts of **Mueda-Roma road** rehabilitation will be the impact on the topography caused by the operations of quarries and sandpits both during construction and in operation. Measures can be taken to re-vegetate the area and make it more attractive, but it will be irreversible recovery from existing current topography in the areas of sandpits and quarries. Because of its length, it is expected that the impact is of medium magnitude and applying appropriate mitigation measures to reaching the medium significance.

6.21.4.1 *Impact classification*

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Highly probable	Localized	Permanent	Irreversible	Medium	Low

6.21.4.2 *Mitigation Measures*

- Only licensed quarries and sandpits should be used for the project; if there is no licensed sandpits and quarries, the contractor or sub-contractor shall have established one by means of a separate environmental permit;
- Management Plan Compliance with sandpits and quarries;

6.21.5 [Air Quality and Climate Changes](#)

Some project activities could contribute to air pollution and climate change. During the **construction phase**, the sources of air pollution include fumes from exhausts of vehicles and construction machinery, waste burning, volatile substances such as fuels and solvents, asphalt fumes, dust from construction works, explosions in the quarries and operations in sand pits. The primary pollutants of such activities include: sulfur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), volatile organic compounds (VOC), particulate matter, chlorofluorocarbons (CFCs) ammonia (NH₃), odors, furans and difurans, radioactive pollutants. The main secondary pollutants include suspended particles formed by the primary pollutants and compounds formed from photochemical reaction of pollutants such as nitrogen dioxide; ozone formed from the reaction between NO_x and VOC.

The rehabilitation of Mueda-Roma road will result in a release of a considerable amount of long-term greenhouse gas emissions. During construction, greenhouse gases can be emitted from burning waste, operation of vehicles and machinery and decomposition of waste.

During **operation**, emissions from agricultural vehicles and equipment will increase substantially. Mozambique is still importing sulfur based fuel and there is no age limit for imported vehicles. In fact, most recent cars pay more taxes than the older cars who matter the most, which encourages the importation of older cars. The older vehicles tend to release more greenhouse gases than the recent ones. The significant increase in traffic along the road will therefore contribute significantly to climate change in the long term, even though they travel at a more efficient speed with improved circulation conditions. It should be noted that there will be a decrease to practically zero with respect to particulate matter that is in chaos now.

Based on the traffic projections and UNFCCC CDM (United Nation Framework Convention on Climate Change – Clean Development Mechanism) Tool 12, project or leakage CO₂¹² emissions were calculated. In worst situation, it is estimated that CO₂ emissions can double each 10 years based on the traffic increase from 2014 to 2037 (Table of next page). Maximum Gross mass weight of 26t and 44t where used for light and heavy vehicles, respectively.

Despite the expectations of an increase in air pollution and the consequent effect on climate change, the project will allow good circulation and dispersion of gases released by cars. If measures such as vehicle maintenance and maintenance of vegetation are taken, the impact could be mitigated to lower significance levels.

6.21.5.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Cumulative	Highly probable	In the surrounding area	Long-term	Reversible	High	Medium

6.21.5.2 Mitigation Measures

- Control over the annual inspection of vehicles;
- Sprinkling of water on construction areas to prevent dust;
- Proper location of quarries and sandpits, i.e. far from the areas of concentration of people and conservation areas;
- Approve regulations that will limit the maximum age of imported vehicles;
- Create facilities for the purchase of new vehicles, particularly for passenger and cargo transport services;
- Incentive to change to a less carbon-intensive fuel (ex: natural gas, possibly linked to the gas production project in North Cabo Delgado)
- Ensures the inspection for maximum limits for construction car/vehicles emissions and during the operation phase by annual inspection. Limits established in the Decree 18/2004 of 2nd July on environmental quality standards and effluent emissions (Table below).

¹² The tool only provides to determine CO₂ emissions. Other GHG like CH₄ and N₂O are excluded for simplification as they are small compared to CO₂ emissions.

Table 50: Estimated CO₂ project/leakage emissions (tons) from traffic in operation phase based in low, medium and high scenario

	Year																							
Scenario	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Low	55	59	62	70	126	133	133	145	153	164	176	189	203	217	232	250	267	286	306	329	351	376	401	431
Medium	55	59	65	72	140	151	153	166	181	194	213	231	252	272	295	320	348	377	409	444	482	523	566	616
High	55	61	70	76	147	163	166	186	205	225	252	276	306	339	375	416	459	507	560	619	684	756	835	925

Source: Salomon Lda (2016)

Table 51: Maximum emission limits for air pollutants permissible to mobile sources or motor vehicles

Type of vehicle	Assumed fuel consumption (km/l)	CO ₂	NO _x	SQOVNM	CO	N ₂ O	Particles
Light vehicle	5.1	3188	6.05	3.09	6.29	0.08	0.06
Diesel small trucks	4.3	3188	7.17	4.11	7.96	0.08	0.10
Diesel heavy trucks	2.2	3188	42.86	7.63	21.80	0.08	0.26
Motorcycle	12.8	3172	32.30	11.1	40.50	0.08	5.6

SQOVNM – organic chemical volatile substance non-metil

6.22 Potential Impacts on Socioeconomic Environment

6.22.1 Job Creation

During construction, one of the direct positive impacts of the project will be the creation of employment opportunities for local communities. The Contractor will employ skilled and unskilled labor for the execution of the contract, such as socio-economists, engineers, professional technicians, security, casual workers, cooks, cleaning staff to the site, among others. The job for the execution of works can increase income for local people improving their current condition. Even during construction, there are indirect employment opportunities through other local services such as small businesses and services to be provided for workers in construction and construction sites in general. Among the small vendors, including women are the elderly and the poor.

The operation of the road means more traffic and more people using the road. This may create self-employment opportunities for small businesses for sale of local products and not only for travelers. Additionally, small businesses (ex.: passenger) may employ more people. The road maintenance activities create job opportunities for national companies and also for the poor local population with no formal education. The companies may include small/medium-sized construction companies for repairs and maintenance of roads. This will bring an increase of income for local communities and possibly improve their living conditions.

All activities relating to demobilization and dismantling of sites, and restoring of damaged areas can also create employment opportunity for small businesses and the local community.

6.22.1.1 Impact classification

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Direct	Simple	Highly probable	Regional	Long term	Irreversible	High	Medium

6.22.1.2 Improvement measures

- Ensure the involvement of the local structures and the communities that live along the section to be benefited directly by the employment opportunities necessary to carry out the works;
- Employment opportunities should be explained clearly and realistically not to raise false or too high expectations;
- The Contractor shall prepare a list of the type of hand-unskilled labor needed, clearly indicating the number of posts, duration, working conditions and remuneration;
- Create opportunity for small traders and suppliers of local goods and services to serve the Contractor during the execution of works;
- The positive impact on women's living conditions can be encouraged further if the Contractor has a specific orientation to give opportunity to women at the time of hiring of hand labor;
- All contracts and relations established between the employer and employees must be guided by the labor law (Law 23/2007).

6.22.2 [Increased agricultural and forests production](#)

The workers engaged in the road construction works will increase the demand for agricultural and livestock products and forestry (timber, fuel wood, food, and others), which can encourage local production.

The poor state of roads is one of the main constraints to agricultural marketing in Mozambique (PEDSA, 2011) and the area of influence of the project is a good example of this situation. During operation phase, we can expect a bigger and better exploitation of forest concessions, increased agricultural and greater marketing production areas. This increase is a result of the improved circulation conditions that facilitate the placement of their products on the market. Additionally, the situation may be related to the increased availability of agricultural inputs or by using public programs as well as NGOs or private sellers, encouraged by the demand for these services by producers. This results in higher family income of the households and operation of agro-livestock companies in that section.

6.22.2.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Likely	In the surrounding area	Long-term	Reversible	High	High

6.22.2.2 *Improvement measures*

- Increase access to extension services to local producers;
- Delivering more agricultural inputs to encourage local production;
- Implement the mitigation measures listed in sections related to prevent habitat destruction and illegal hunting of animals, especially in the conservation area.

6.22.3 [Attracting of investments](#)

The road construction works will attract companies and investors both during construction and in operation phase. With improved mobility conditions expected to catapult or attract investments that are currently operating on a limited ESIA or not triggered because of the particularly related operating costs due to the poor state of the road. Among the investments that can be attracted by the good road conditions are: agriculture, tourism, timber industry and transportation.

New investments mean more jobs and consequent improvement of living conditions of local communities.

6.22.3.1 *Classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness

Positive	Indirect	Cumulative	Likely	Regional/National	Long-term	Reversible	Low	High
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6.22.3.2 *Improvement measures*

- Increased monitoring of forest concessions;
- Involvement of the promotional institutions of agriculture, tourism, timber, transportation, etc. to attract investment in the region.

6.22.4 Increased revenue for the state

During the road construction, the contractor will be required to import some materials that require custom clearance and hence generation of revenue for the state. In addition, the creation of direct and indirect jobs during the construction will increase the local tax base with direct effects on the tax revenue. In addition, it is expected that the number of contributors will grow due to jobs creation in trade and other investments attracted by the improved road.

One can therefore conclude that, indirectly, the project may contribute to state revenues to be used to invest in other social infrastructure throughout the country.

6.22.4.1 *Impact classification*

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Likely	National	Long term	Reversible	Medium	High

6.22.4.2 *Improvement measures*

Border post building for both countries with adequate capacity to inspect the cargo and processing of people's documentation.

6.22.5 Reduction of transport costs

Long distances, high transportation costs, poor road and lack of transportation is a major challenge for poor and vulnerable communities (women, children and the elderly) to have access to markets, financial services, health centers and schools. The transport cost is unbearable for the communities living along the road, almost prohibitive, hindering access to all basic services. Improved road conditions will allow existing carriers and new interested operators to introduce buses with capacity to carry more people and at a lower unit cost than current situation. In addition, there will be reduced maintenance costs due to improved conditions of circulation. Thus, the operators should reduce the transportation costs.

Cumulatively and indirectly the reduction of transportation costs will provide an increased flow of goods and people, increased agricultural production and marketing, better access to basic services, etc., ie with direct impact on the living conditions of the poorest and vulnerable population.

6.22.5.1 Impact classification

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Highly probable	In the surrounding area	Long term	Reversible	High	High

6.22.5.2 Improvement measures

- Ensure the involvement of local associations of carriers to participate in the operation of the road section in the transportation of goods and services;
- Together with the protection of institutions, establish adequate tariffs for the transportation of goods and people;
- Create parking conditions with safety and convenience in the main stations/destinations.

6.22.6 Social Inclusion and Community Participation

Communities living along the Mueda-Roma Road have limited mobility due to their economic, social or physical dependence. Women, particularly the poor and those who have children, tend to be economically dependent on their husbands; young people and children and dependent on their parents and the disabled dependent on their relatives. The spatial isolation, poverty and social exclusion, prevent people from getting out of poverty. Thereby improving access and mobility is crucial to reduce the isolation and dependence of women, youth, the elderly and people with disabilities and thus facilitate their participation in the economic, social and political processes.

People will visit each other more once the road is in a better circulation condition and this will strengthen ties in the community among its members.

6.22.6.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Likely	In the surrounding area	Permanent	Reversible	Medium	Medium

6.22.6.2 Improvement measures

Strengthening of public initiatives, private and NGOs in the areas of training, social services, education and health awareness, etc. especially for the most disadvantaged (elderly, children, disabled, combating poverty associations, etc.).

6.22.7 Improved Access to Social Services

The improved road will contribute to improved mobility and therefore to improved access to health services. Additionally, it will help expand the distribution of medicines and facilitate the safe and timely transport of patients from other health facilities to the referral health facility of the district, the

Rural Hospital of Mueda. Access to health services is particularly important for the treatment of chronic diseases such as tuberculosis, HIV treatment and other preventive treatments and/or immunization among communities located in remote and isolated areas with limited access to transportation.

Additionally, other services will be closer to the citizens, e.g. better access to other services such as birth registration. In addition to facilitating the work of the police, it is expected that the local government will be closer to the relatively isolated communities due to the difficult conditions of mobility on the road.

6.22.7.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	High

6.22.7.2 *Improvement measures*

Provision of basic social services to the local community.

6.22.8 [Potential Impacts on Gender](#)

The positive impacts of the project as employment opportunities, income generation, potential for increased local production, attracting investment, increased tax revenue, greater access to public services has a significant impact on women. Women are directly engaged in the activity of agricultural production and small businesses that can bloom throughout the year.

6.22.8.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Positive	Indirect	Cumulative	Likely	Localized	Long term	Reversible	Medium	High

6.22.8.2 *Improvement measures*

- The important aspects to consider with respect to the gender issue is to ensure that the project design and implementation recognize that men and women have different needs and transport constraints and are affected differently by such projects;
- Through own internal policies and/or set in the contract, establish a minimum quota of direct participation of women in project implementation.

6.22.9 [Expectations on the short term solution for road access and lack of employment](#)

Given the importance of circulation problem and consequent poverty along the Mueda-Roma road, the project creates very high expectations in the population of the district and particularly in communities living along this road as an immediate solution to all problems. However, there are steps to be followed for materialization of the project and subsequent use of the benefits of this important

infrastructure. Apart from the specific improvement of access, there is a huge expectation for resulting employability from the project.

6.22.9.1 *Impact classification*

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Medium	Low

6.22.9.2 *Mitigation Measures*

- Dissemination of information in the local communities as to the scope of the measures to be taken in the short term, to prevent false expectations and to ensure the credibility of the project among the communities;
- Coordinate with local authorities, local and traditional leaders on the timing of the development process and the project implementation goals.

6.22.10 Conflicts between workers and local population in the project area

Large projects often generate social conflicts between workers who are temporarily in place and resident community. These incidents are generally related to socially unacceptable behavior contrary to the local social standards, for example, cases of drunkenness and disregard/disrespect towards local customs. Although part of the hand labor will be recruited locally, this impact should be considered not only in the case of other workers from other areas, but also with respect to the local workers which could lead to social unrest in the community.

6.22.10.1 *Impact classification*

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	temporary	Reversible	Medium	Medium

6.22.10.2 *Mitigation Measures*

- Reinforce the importance of maintaining a good relationship with the local communities in dialogue with the health and safety workers;
- Among local workers there should be a liaison group with the community responsible for establishing communication between the project staff and the community, which is particularly important in cases of conflict. This group should be familiar with the project in general and be able to properly eliminate any difficulties or pass on any complaints/claims;
- Asset of rules (or a Code of Conduct) must be established and implemented in the workplace. The standards should include, among others, the prohibition of entry of outsiders or unauthorized service and the prohibition of prostitution in the construction sites and related areas (e.g.: storage areas).

6.22.11 Destruction and loss of assets

Throughout the section there are some villages and towns that are located on right of way of the road. There are about 12 villages along the Mueda-Roma section. The houses along the villages are relatively far from the road, although there are some cases of some stalls that are closer. Despite the fact that

many of houses are relatively well located far from the road, there are some structures, trees, bunkers, fences and fields that may be affected by the rehabilitation of the road, specifically when making some detours and localized realignments to improve the road geometry.

Details about affected assets (houses, kiosks, fences, farm land, fruit trees) are given in the Abbreviated Resettlement Action Plan (ARAP) for Roma-N'gapa.

6.22.11.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Permanent	Reversible	Low	Medium

6.22.11.2 *Mitigation Measures*

- An Abbreviated Resettlement Action Plan (ARAP) for Roma-N'gapa (50 kms) is prepared for the Project and is submitted in a separate Report. It contains all the mitigation measures necessary that should be implemented before the start of works;
- As for the remaining section to a RAP will be undertaken
- When the Contractor accidentally damage any structure or property of the people, he should undertake the necessary compensation in coordination with the Local Authorities and the project Proponent. According to National Land Planning Law (Decree 19/2007), fair compensation must be paid to cover, among others the loss of tangible and intangible assets, disturbance of social cohesion and loss of productive assets;
- When the Contractor needs to carry out activities around the houses and farmland, preference should be given to the use of manual means;
- The locations for the installation of construction sites and warehouses along the road should be selected carefully, and whenever possible, in fields already open to avoid over compensation and destruction of the natural environment. The selected sites must be approved by the Proponent;
- National legal instruments must be followed and reinforced by AfDB safeguards to ensure proper compensation and resettlement process.

6.22.12 *Increased migratory movements*

The ease of communication and improved performance can provide opportunity for people to migrate seeking better living conditions. Internally increased migration of people within the proximity to the road and also of people to large domestic urban centers (Mueda, Mocimboa da Praia, Pemba) is to be expected. There is also a great opportunity to increase the flow of people from Mozambique to Tanzania and vice and versa.

The impact of the likely increase of migration on gender may be: (i) separation of families; (li) increase in female-headed households; (lii) increased number of women to care for children and the elderly. By improved circulation conditions, it is expected many men begin business activities across the border in Tanzania. This can cause family breakup.

Although children may be more financially secure if one or both parents are working and some children can benefit from access to higher education, the situation may be different. Some of these children can be explored. They may be required to work in the fields much earlier. Allied to this question they may be forced to leave school to support themselves in the absence of parents. Ultimately they may become street children or end up in orphanages or run the risk of being trafficked.

The immigrant man is more likely to contract the HIV virus during travel and pass it to his partner when he returns home. On the other hand, women who migrate to work as domestic servants are still vulnerable to all kinds of exploitation and abuse. The risk of HIV infection tends to be higher in migrating populations that is living along corridors (International).

6.22.12.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Cumulative	Likely	Border	Long-term	Reversible	Medium	Low

6.22.12.2 Mitigation Measures

- Support to local productive sector and initiatives to support local initiatives can help reduce the number of emigrants.

6.22.13 Disturbance of people and vehicle circulation during works

The construction works will increase the traffic of heavy vehicles and equipment locally. This will disturb the patterns of access and circulation, involving traffic diversion and the difficulty of access, with the potential to create traffic congestion.

The transportation of goods or products to the markets could be negatively impacted during the construction phase. Inadequate planning of activities can affect the normal traffic, creating congestion and cause an increase in fuel consumption and the delivery time of the products.

Except in peak season of marketing maize, transportation of goods and products is only by means of some open box vehicles for people higher in Mueda-Ngapa section. Thus, the project impacts during the construction phase and demobilization will be negligible on the agricultural chain and current fishing.

6.22.13.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.22.13.2 Mitigation Measures

- Report traffic restrictions, where this is provided for;
- Install adequate signage in work areas, indicating alternative routes, speed restrictions and detours on the road while the works are taking place;
- Hire and train operators of traffic lights to guide drivers and pedestrians in high-traffic areas;
- Build a safe passage over the ditches will be opened in order to minimize the inconvenience to the local population.

6.23 Occupational Health and Safety

There is a potential for accidents during road construction and maintenance activities. Safety is not only an issue for the community but also for the workers. The first relates to the danger that the activities can cause to local communities and drivers on the road. In the latter case, it refers to unsafe practices among road workers.

The risks associated with occupational health and safety are: (1) consumption of improper water; (2) injuries or fatalities due to cargo handling; (3) falls, slips and trips; (4) falls from height; (5) loss and projecting objects; (6) injuries and fatalities due to moving machinery and vehicles; (7) health issues related to the emission of gases and dust; (8) exposure to chemical, hazardous and flammable substances; (9) electric shock; (10) health issues related to exposure to noise.

To communities, we must highlight the following: (1) accidents and injury to people in the community; (2) exposure to noise and vibration; (3) exposure to gases and dust.

6.23.1 Consumption of improper water

Dirty and unclean water not complying with health requirements can result in diseases for workers, ending in fatality. Since the work will be carried out in locations without access to drinking water, there is a risk of contamination from unsafe water consumption during construction. Depending on the location of areas of work such as construction sites, quarries, pits, this risk can be great.

6.23.1.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.1.2 Mitigation Measures

The drinking water to be provided by the Contractor must comply with the recommendations and national and applicable WHO guidelines. Water quality standards according to the Ministerial Diploma 180/2004 of 15th September, on water quality for human consumption are presented below.

Table 52: Microbiological parameters

Parameter	Maximum admissible limit	Unit
Total coliforms	Absent	Number of colonies / 100 ml
Fecal coliforms	Absent	Number of colonies / 100 ml
Vibrio cholera	Absent	1000 ml

Table 53: Physical parameters

Parameter	Maximum admissible level	Unit
Color	15	TCU
Odor	Odorless	
Electrical conductivity	50 – 2000	µhmo/cm
pH	6.5 – 8.5	
Taste	Tasteless	
Total solids	1000	mg/l

Turbidity	5	NTU
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Table 54: Chemical parameters

Parameter	Maximum admissible level	Unit
Ammonia	1.5	mg/l
Aluminum	0.2	mg/l
Arsenic	0.01	mg/l
Boron	0.3	mg/l
Cadmium	0.003	mg/l
Calcium	50	mg/l
Lead	0.01	mg/l
Cyanide	0.07	mg/l
Chlorides	250	mg/l
Total residual chlorine	0.2 – 0.5	mg/l
Copper	1.0	mg/l
Chromium	0.05	mg/l
Total hardness	500	mg/l
Phosphorous	0.1	mg/l
Total iron	0.3	mg/l
Fluoride	1.5	mg/l
Organic matter	2.5	mg/l
Magnesium	50	mg/l
Manganese	0.1	mg/l
Mercury	0.001	mg/l
Molybdenum	0.07	mg/l
Nitrite	3.0	mg/l
Nitrate	50	mg/l
Nickel	0.02	mg/l
Sodium	200	mg/l
Sulfate	250	mg/l
Selenium	0.01	mg/l
Total dissolved solids	1000	mg/l
Zinc	3.0	mg/l
Total pesticides	0.0005	mg/l
Polycyclic aromatic hydrocarbons	0.0001	mg/l

- Water should be stored in a cool and shaded place.

6.23.2 [Injuries and deaths due to manual handling of cargos](#)

Incorrect manual handling of loads during construction can result in diseases and musculoskeletal injuries in different parts of the body (back, neck, shoulders, arms, hands, etc.) and includes sprains and strains the muscle injuries, joints and blood vessels. Other injuries include cuts, bruises, lacerations and fractures.

6.23.2.1 [Impact classification](#)

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.2.2 Mitigation Measures

- The Management Plan for Health and Safety shall include procedures to avoid repetitive movements and incorrect manual handling of loads.;
- Use load-lifting equipment;
- Arrange the manual handling tasks safely, dividing into smaller loads;
- Provide information and training to workers in the tasks, the use of equipment and the correct techniques for handling loads;
- The manual work should be performed by workers who have physical conditions to carry out tasks without bringing risks to their health;
- They must be implemented and organized with enough breaks to ensure that there is a rest, especially in conditions of too much heat. Arrangements of breaks should be communicated to all the workers concerned;
- The Personal Protective Equipment (PPE) proven and appropriate must be provided to each employee at no cost at all;
- The employer must ensure that their employees carry out their activities in good physical and environmental condition as stated in the Labor Law (Law 23/2007);
- The employer must provide first aid in case of any accident or illness.

6.23.3 Falls and Slippery

During the construction phase there is the risk of falls by tripping and slipping. The incorrect cleaning and storage can be the cause of accidents such as tripping over loose objects on the floor, stairs and platforms, slipping on wet or oily surfaces, shock against poorly stacked materials and out of place. This can cause mild to serious injuries.

6.23.3.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.3.2 Mitigation Measures

- The Health and Safety Management Plan should include procedures to avoid slips and falls, and also ensure the maintenance of local works.
- Good practice for cleaning and storage include:
 - Covering the cables and ropes on the ground and crossing the paths to prevent falls (and damage to own power cables);
 - Remove the obstacles from paths/walkways;
 - the sweeping or scrubbing material that remains on the ground;
 - Keep the work areas and walkways well-lit;
 - Making the rugs and carpets safer (holds the ground, create grip, etc.);
 - Close the file cabinets and drawers.
- Work instructions should be implemented to avoid the presence of garbage debris, construction materials and liquid spillage outside the areas designated for them;
- Signs must be placed to warn against potential risk of falling, even if it is temporary;

- All employees must be vigilant to situations that cause distress and always communicate with the supervisor;
- Provide appropriate PPE (e.g.: boots);
- The employer must ensure that their employees carry out their activities in good physical and environmental condition as stated in the Labor Law (Law 23/2007);
- The employer must provide first aid in case of any accident or illness.

6.23.4 [Falls from height](#)

Some work at height as at the bridge sites can endanger workers during the construction phase and demobilization. Falling from high level associated with working on ladders and scaffolding work or on the edges or near excavations (ex. sandpits) are significant sources of permanent disabling injuries and fatalities.

6.23.4.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.4.2 *Mitigation Measures*

- Scaffolding and ladders
 - should be inspected by a competent person before being used. So they can be used on level ground and must be in good condition - no damage or missing parts - that may affect the safety of the ladder or scaffolding;
 - the scaffolding can be erected by competent persons;
 - the Before using a ladder or scaffolding, the appointed employees should be familiar with the risks and the results of evaluations;
- Trenching and excavation
 - There must be protection against the workers falling into the ditch;
 - The Trenches should be shaped to allow workers to get out in case of a fall (eg have a slope.);
- Use fall prevention devices
 - The safety belts and lanyards with rod limiter to allow access to the areas with the danger of falling;
 - Fall protection devices such as safety harness used in conjunction with shock absorbing lanyards tied to a fixed anchor point or horizontal lines-of-life;
- Installation bodyguard bars, including security footers on the edge of any fall hazard area;
- Proper training in the use, maintenance and integrity of the required PPE;
- Inclusion of rescue plans and/or recovery, and equipment to respond workers after a fall.
- The employer must ensure that their employees carry out their activities in good physical and environmental condition as stated in the Labor Law (Law 23/2007);
- The employer must provide first aid in case of any accident or illness.

6.23.5 [Flying objects](#)

Construction and demolition activities can bring significant hazards related to the potential fall of materials and tools. Being struck by an object can cause both minor injuries such as minor cuts, as injuries and serious injuries such as amputation, blindness or death.

6.23.5.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.5.2 *Mitigation Measures*

- Building materials must be protected against falls if they are to be used at high levels. Appropriate measures depend on the height of the work being performed and should include:
 - Use of network security, security platforms or awnings to retain or divert an object from falling;
 - Use of safety footers, screens, or bodyguard in scaffolding bars to prevent objects from falling.
- The health and safety team must provide information to workers on the risk of being struck by objects, during health and safety meetings,
- Power tools should only be used by trained and competent workers;
- PPE must be used (especially eye protection and helmets);
- Whenever working at heights, this area should be barricaded and safety signs should be erected indicating how hazardous the area is;
- The runners should be marked so as to avoid the walking and/or working under moving/suspended loads.
- The employer must ensure that their employees carry out their activities in good physical and environmental condition as stated in the Labor Law (Law 23/2007);
- The employer must provide first aid in case of any accident or illness.

6.23.6 [Injuries and deaths due to the circulation of machinery or vehicles](#)

The circulation of vehicles and machinery on the construction site may pose temporary hazards such as physical contact, spillage, dust, gas emissions and noise. As a result, the following may occur: (a) people hit by vehicles; (B) overturning of an industrial vehicle; (C) vehicle rollover (B) one drop of the industrial vehicle.

6.23.6.1 *Impact classification*

Nature	Kind	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
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Negative	Direct	Simple	Likely	Localized	Short term	Reversible	High	Medium
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6.23.6.2 Mitigation Measures

- Establish a traffic plan for the construction site: prioritization (right of way), speed limits, car inspection requirements, standards and operating procedures (eg forklifts always with forks down.) And control standards and directions of traffic in and around the construction site;
- Ensure that all drivers and visitors are reported to the administration of the work before entering the construction site;
- Ensure the segregation of vehicles and pedestrians (provide a physical barrier to make this segregation where possible);
- Ensure segregation of vehicles and pedestrians (provide a physical barrier to make this segregation where possible);
- Installation of speed bumps and warning signs. These signs should be implemented in order to warn about the possible risks of moving machinery;
- There should be traffic aids and operations available to help drivers and operators as needed;
- Construction vehicles shall have audible warning devices (eg trucks to give rear movement sound.) Headlights and flashing lights (to increase the visibility of vehicles);
- Clearly demarcate areas of restricted access to the public and other workers;
- The circulation of private vehicles and delivery vehicles should be restricted to those areas and defined routes; giving preference to one-way roads, where appropriate;
- Advance planning by the architects and construction managers to reduce the risk of vehicle accidents;
- The industrial vehicle operators should be trained and qualified in the safe operation of specialized vehicles, such as forklifts, bulldozers, compaction rollers, scrapers, etc.
- The employer must ensure that their employees carry out their activities in good physical and environmental condition as stated in the Labor Law (Law 23/2007);
- The employer must provide first aid in case of any accident or illness.

6.23.7 Dust emission

The sources of dust during the construction phase include the movement of vehicles and machinery, operations in sandpits and quarries and earthmoving works and earthworks. Inhalation of dust may cause irritation, discomfort and possible respiratory diseases to workers.

6.23.7.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	Direct	Simple	Likely	Localized	Short term	Reversible	Medium	Low

6.23.7.2 Mitigation Measures

- Where it is not possible to prevent, control methods should be initiated such as:
 - The use of wet suspension (dirty tracks and the land exposed through excavations should be kept wet on regular basis to prevent dust formation);

- Use of vacuum cleaners instead of brooms;
- PPE use can be vital, but it should be the last resource for protection. The PPE should not replace the control of dust and should only be used where dust control methods are not effective or are inadequate.

6.23.8 [Exposure to chemicals, hazardous and inflammable objects](#)

Chemicals such as fuels, oils, lubricants, asphalt and others used during construction can pose as risk of illness or injury, whether for single acute exposure or by repeated chronic exposure, particularly as the chemical has a corrosive, toxic or oxidizing property.

They also carry a risk of uncontrolled reactions, including the risk of fire and explosion, if incompatible chemicals are inadvertently mixed.

6.23.8.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	direct	Simple	Likely	Localized	Short-term	Reversible	Medium	Low

6.23.8.2 *Mitigation Measures*

- The fuel tanks are at lower practicable volume. Spillages should be prevented and if they occur, be removed immediately.
- Fuel storage areas must be protected from damage and collision by vehicles;
- should be provided with adequate ventilation in enclosed spaces;
- Emergency numbers should be available and made public;
- Workers should be trained and qualified to handle chemicals and hazardous materials or flammable products;
- Workers should be instructed to follow the emergency risk plan, particularly for cases of contamination and fire hazard;
- Provide fire extinguishers and instruct workers on how to use them.

6.23.9 [Electrical chocks](#)

Incorrect handling or poor maintenance of power tools, cables and wires can be sources of electrical shock. Also non or improper insulation of wires and cables can cause electric shock, resulting in a fatality.

The severity of shock damage depends on the current voltage, amount of current, the body's resistance to electric shock and the time period that the body was in contact with the current. The combination of these factors can have consequences ranging from a slight tingling to instant death.

6.23.9.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness

Negative	Direct	Simple	Likely	Localized	Short-term	Reversible	Low	Low
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6.23.9.2 Mitigation Measures

- Power tools must be inspected regularly (for frayed or exposed wires) in order to ensure they are in safe conditions of use;
- All energized electrical devices must be marked with warning signs for danger;
- Cables and extensions must be protected from damage in traffic areas by covering them or suspending them;
- The identification of "electrical hazard" in the control rooms with high-voltage equipment or in places where entry is prohibited or controlled should be fixed;
- To must carry out detailed identification and indication of all buried electrical wiring before starting any excavation work.

6.23.10 Potential impacts related to Noise and Vibrations

During construction, noise levels along the corridor will be higher due to the use of heavy equipment standing still or moving. Table below presents the maximum noise levels recommended by the World Health Organization (WHO).

Table 55: Maximum noise levels recommended by the WHO in specific environments

Environment	Health implications	Leq [dB(A)] ^a	Exposure time (hours)	Lmax (dB) ^b
Living area outdoors	Severe irritation, day and night	55	16	-
	Mild irritation, day and night	50	16	-
House, indoor	Speech intelligibility, moderate irritation, day and night	35	16	45
Inside the room	Sleep disturbance, night	30	8	
Outside the room	Sleep disturbance, window open	45	8	60
Classroom, indoor	Speech intelligibility, disturbance to retain information	35	During classes	-
Kindergarten, indoor	Sleep disturbance	30	Resting time	45
School, playground	Irritation	55	Playing time	-
Hospital, ward rooms, indoor	Sleep disturbance, night	30	8	40
	Sleep disturbance, night and day	30	16	-
Hospital, treatment rooms, indoor	Interference with rest and recovery	^c		

Industrial areas, commercial, traffic, indoor and outdoor	Hearing deficiency	70	24	110
Environment	Health implications	Leq [dB(A)] ^a	Exposure time (hours)	Lmax (dB) ^b
Ceremonies, festivals and entertainment events	Hearing deficiency (< 5 times/year)	100	4	110
Public areas, indoor and outdoor	Hearing deficiency	85	1	110
Music by earphones	Hearing deficiency	85	1	110
Sound impact by toys, fireworks and guns	Hearing deficiency (adults) Hearing deficiency (children)	- -	- -	140 ^d 120 ^d
External parks and conservation areas	Uneasiness	e		

Source: World Health Organization (WHO)

- a. Leq is the average or constant sound level during a period having the same energy.
- b. Lmax is the maximum noise level that is measured over a period.
- c. The lowest possible
- d. Measured at 100mm from the ear

External quiet areas should be preserved and the introduction of noise to natural environments should be kept low.

As shown in the table below, the construction equipment used in road rehabilitation often exceeds the WHO recommended levels for receptors at 15m distance. Because of the relative proximity of the houses along the villages, and the fact that traffic will be maintained during construction, it is expected that people along the village will be subjected to noise levels above the maximum set by the WHO. **The impact of noise can and will be mitigated by the Contractor, but it will remain significant even after mitigation.**

Table 56: Level of noise caused by construction equipment before and after mitigation measures

Construction equipment			Noise level at 15m (dBA)	
			With no noise control	with noise control
Equipment powered by an internal combustion engine	Excavation	Frontal shovels excavators	79	75
		Back excavators	85	75
		Bulldozers	80	75
		Tractors	80	75
		Scrapers	88	80
		Graders	85	75
		Trucks	91	75
		Pavers	89	80

	Material handling equipment	Mixers	85	75
		Concrete pumps	82	75
		Cranes	83	
	Stationary	Pumps	76	75
		Generators	78	75
		Compressors	81	75
Impact Equipment		Pneumatic keys	86	80
		Jackhammers	88	75
		Forklifts	101	95
Other		Vibrator	76	75
		Saws	78	75
		Asphalt plants	81	

Source: EPA, U.S. Environmental Protection Agency (1971)

The vibrations are important, and are influenced by the distance between the road and the houses, the conditions of the pavement and the type of vehicle. During construction the use of heavy equipment and soil compaction that may cause vibrations, is expected. The risk is relatively minor if these activities are conducted within the required time and during the day.

During the operating phase, the main source of noise will be cars in circulation. The noise source of a moving vehicle is mainly generated by the engine and the friction between tire and asphalt. Factors such as speed, number and type of vehicles, topography and obstacles between the transmitter and the receiver of noise influence the impact of noise on the receiver. By the year 2037, it is expected that the low traffic scenario will be at least at about 8 times more than the present and about 17 times more in the high scenario and crossing the road at higher speeds (up to 100km/h in and out of the localities). The American noise prediction model¹³ was used to estimate the current and expected noise during operation of the rehabilitated road. Figure below illustrates the current situation and expected situation using the high scenario in 2037 in terms of noise at different distances.

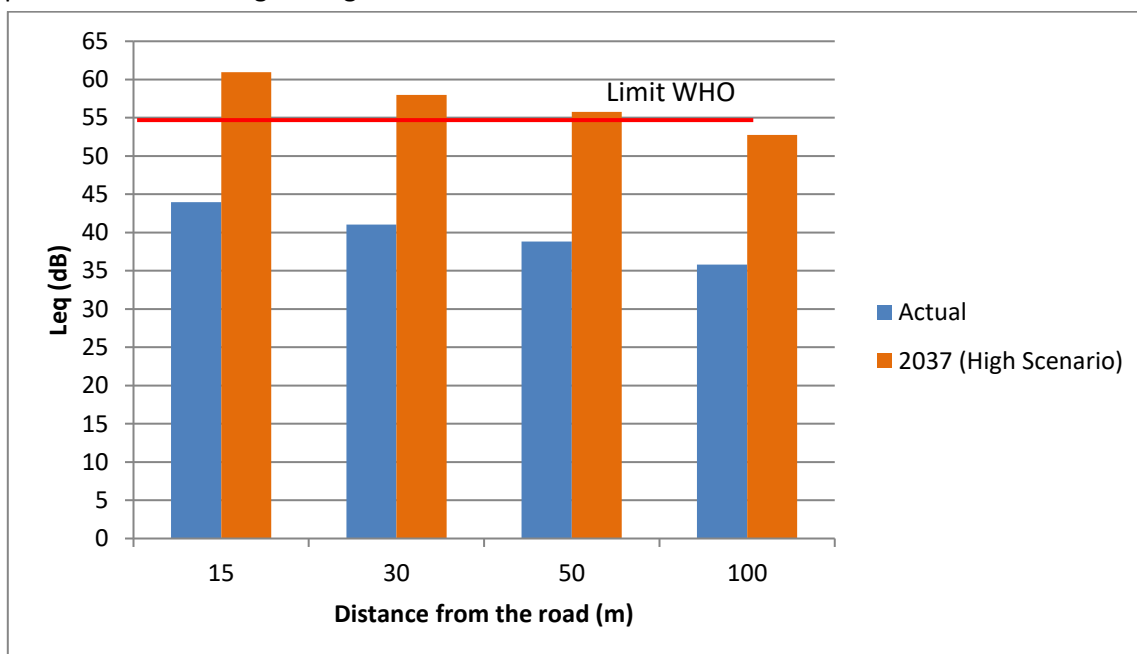


Figure 20: Current and predicted noise estimate along the Mueda-Roma road using the highest scenario in 2037 (considering asphalted road)

¹³ U.S. Federal Transit Administration (2006). Transit Noise and Vibration Impact Assessment.

Current levels of noise, taking into account the current traffic, are below the critical level set by the WHO. The Highest Case scenario it is expected to cause a significant impact on the noise component at 15m and 30m distance from the road assuming a maximum speed of 60km/h. Therefore, mitigation measures must be taken to mitigate the effects of noise throughout the villages. These measures include reducing speed through signs, speed bumps, awareness campaigns, and installation of noise barriers in sensitive areas such as schools and hospitals.

Improved road conditions, will allow for high tonnage trucks to circulate, to transport products between Mozambique and Tanzania for 24 h. The crossing of trucks along the villages can cause vibrations and thereby disturbing people's sleep.

During the decommissioning of the camp sites, there may be noise for people who live near the sites. The Contractor may consider placing the camps at distant from the inhabited areas. Thus, it is expected that the impacts of the project on the production of noise during the demobilization will be insignificant if the camps are installed far away from villages and sensitive areas.

Workers' exposure to high noise levels can result in injuries, accidents and fatalities. Noise exposure's short-term effects include headaches, nervousness and inability to concentrate. It may be years before the damage become apparent.

Hearing loss induced by noise is usually gradual, but it can also be caused immediately by a sudden loud noise. Hearing loss is irreversible.

6.23.10.1 Impact classification

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	direct	Simple	Likely	Localized	Long term	Reversible	High	Medium

6.23.10.2 Mitigation Measures

- Select less noisy equipment;
- Install mufflers on some equipment, when possible;
- Install noise barriers, particularly in crossing areas of high population density such as schools, churches, places of worship, etc. Barriers should be located closer to the source or receiver to be more effective;
- Limit the hours of work for certain mobile machinery, particularly in conurbations;
- Place sources of noise at less sensitive areas to take advantage of distance and natural barriers;
- Road construction areas (concrete plants, Asphalt plants, quarries, etc.) and distant construction site communities whenever possible;
- Use the topography as an advantage to naturally reduce the effect of noise during the construction of construction sites;
- Develop mechanism to register and respond to claims;
- Be alert to effects on health, education and training of employees to avoid generating unnecessary noise;
- Schedule the noisiest jobs to times where fewer workers are present;
- Surveillance of the places where noise exposure is significant;

- Reducing the level of noise to a minimum. Noise levels should be kept below 80 dB (A) whenever possible;
- concentrate all activities to the daytime hours will decrease the incidence of noise effects;
- No construction activity should be performed when the noise exceeds 45 dB (A) during the night (22:00 to 7:00) near residential, institutional or educational areas;
- Vehicles and equipment should be inspected regularly to ensure their proper operation and minimize noise emission;
- avoid working on heavy windy days, in order to control the incidence of this impact;
- If possible, reduce the impact of noise at source through devices such as noise mufflers to be fitted to the equipment;
- Provide hearing protection gear for all staff who will work directly with the noise generation machines, including their short stay in areas where noise is excessive;
- The Transportation of materials must be done within the loading and speed limits. On unpaved roads the speed should be limited to 20 km/h.

6.23.11 [Increased incidence of sexually transmitted diseases, including HIV/AIDS](#)

There is a potential for increased incidence of sexually transmitted diseases (STDs) and HIV/AIDS due to the project. During construction and maintenance, it relates to the possibility of local workers and outsiders who due to greater affordability and can attract more women (both local and sex workers) to have sex. For workers outside the added fact is that they are working for some time away from their families. In addition, there is chance to attract or encourage workers to sex at the project site. During operation, particularly because it is an international corridor, there is the possibility of an increase of sexually transmitted diseases because of helpers and drivers of trucks that are often associated with irresponsible sexual behavior. Since this is a section that will be part of the Mtwara Corridor this risk is great. Awareness should continue mainly in shopping centers as well as in the truckers' accommodation centers.

6.23.11.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	direct	Simple	Likely	In the surrounding area	Long term	Reversible	High	Medium

6.23.11.2 *Mitigation Measures*

- Conduct awareness campaigns for workers on the ways of transmission of STDs and HIV/AIDS, including risk behaviors;
- Conduct or recruit a specialized organization to provide awareness services to community workers on prevention of STDs and HIV/AIDS. Special attention should be given to workers, local women and girls;
- Provide free condoms in the project area;
- Encourage workers and the community to do the HIV test with the existing health facilities;
- Encourage employees to submit to the treatment of STDs and HIV in early infection/diagnosis;
- Principles established in the law of protection of workers with HIV/AIDS must be followed, which includes but not limited to:
- Employee who is infected with HIV in the workplace, as part of their professional occupation, in addition to compensation they are also entitled to, adequate medical care aimed at easing their state of health, according to the Labor Law and other applicable legislation, funded by the Employer;

- HIV testing to workers, job seekers to assess them during their application, job maintenance or for promotion purposes is prohibited;
- All testing is voluntary and should have worker's consent;
- The developer/contractor must train and guide all workers to carry out their tasks even if they are infected with HIVAIDS;
- The developer/contractor must raise awareness among workers to prevent, and to know their status on HIVAIDS and disseminate information about the disease and on how to prevent it.

6.23.12 [Risk of Malaria infection](#)

Malaria is a leading cause of deaths from infection at national level, so that preventive measures should be taken to prevent infection to workers and the community around the project.

6.23.12.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

6.23.12.2 *Mitigation Measures*

- focus should be given to preventing the occurrence of the vector (mosquito), i.e., the appearance of standing bodies of water and/or its increase (in number and surface area) which serves as a mosquito breeding site;
- Periodic Reduction of mosquitoes by spraying the dorms and the construction site in general;
- All construction sites should be kept clean to avoid formation of mosquito breeding areas.

6.23.13 [Road accidents](#)

During construction, there will be movement of vehicles and machines with great intensity to and from sandpits, quarries, construction sites and especially along the stretch. The transport of materials and movements during earth moving increases the risk of road accidents both for workers and for the communities and animals along the stretch.

The deviations will be required during the construction in some sections, but in general traffic will flow conditioned medium over the current section. These deviations are ideally kept in the road reserve. In sections where it is not possible, traffic will be diverted temporarily. The vehicles in such conditional situation as the deviations, increases the risk of road accidents.

Currently the road is unsafe for transporting in open box vans, for most pedestrians, cyclists and motorcyclists. In the operating phase, with the improvement of the road conditions will allow people to be transported in the safest possible conditions, i.e., on buses or mini-buses instead of open cash vans. In addition, the project provides an appropriate signaling including speed bumps, traffic signs.

On the other hand, improvement of road's motorability will encourage drivers to drive at a higher speed than which is possible with the current road condition and posing a risk for pedestrian, cyclist, bikers and pets.

6.23.13.1 *Impact classification*

Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Meaningfulness
Negative	direct	Simple	Likely	Localized	Long term	Reversible	High	Average

6.23.13.2 Mitigation Measures

- Provide safety instructions to operators for vehicles and machines in all aspects of the project operation, in order to prevent accidents and minimize injuries to employees and the public. Work instructions should include:
 - Enabling the drivers and machine operators;
 - Training for drivers and machine operators to improve their skills, if necessary;
 - Adoption of time limits for journeys and planning schedules and layovers for drivers to avoid fatigue.
- Provide adequate temporary signs and traffic controllers along the stretch under construction to prevent accidents and reduce traffic congestion;
- Ensure appropriate signage in all crossings to settlements and migration routes of animals (speed bumps, rumble strips, road signs, road markings) and to give alert on hazardous conditions;
- Do regular maintenance of vehicles and the use of original manufacturer parts to minimize potential accidents that can be caused by failures and malfunctions of equipment;
- Collaborate with local communities in education on road safety, particularly along the schools or other pedestrian concentration sites particularly children;
- Coordinate with the emergency team to ensure that in the event of an accident, first aid is always made;
- Find the dormitories and other facilities next to the construction site and arrange transportation of workers, in order to minimize the external traffic;
- Restricted Access Areas to the public should be implemented and clearly demarcated.
- The Contractor shall provide signaling and possibly regulate traffic in the deviations;
- Design has considered vertical and horizontal alignment to improve the security for drivers and community.

6.24 Summary of Impacts Assessment

Environment	Impact	Phase			Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Significance
		C	O&M	D									
Biological	Loss of natural habitat	X	X		(-)	Direct	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	Average
	Interference with the migration of animals	X	X		(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Increased poaching of animals	X	X		(-)	Direct	Simple	Likely	In the surrounding area	Long term	Reversible	Average	Average
	Disruption of aquatic fauna	X	X	X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Use of Funds	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
Physical	Soil erosion and sedimentation	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Water pollution	X		X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Production waste	X			(-)	Direct	Simple	Highly probable	Localized	Short term	Reversible	Average	Low
	Impacts on the topography (landscape)	X			(-)	Direct	Simple	Highly probable	Localized	Permanent	Irreversible	Average	Low
	Air Quality and Climate Change	X	X		(-)	Direct	Cumulative	Highly probable	In the surrounding area	Long term	Reversible	High	Average
socioeconomics	job creation	X	X	X	(+)	Direct	Simple	Highly probable	Regional	Long term	Irreversible	High	Average
	Increased agricultural and livestock production and forestry	X	X		(+)	Indirect	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	High
	Attracting investment	X	X		(+)	Indirect	Cumulative	Likely	Regional/National	Long term	Reversible	Low	High
	Increased tax revenues	X	X		(+)	Indirect	Cumulative	Likely	National	Long term	Reversible	Average	High

Environment	Impact	Phase			Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Significance
		C	O&M	D									
	Reducing transportation costs		X		(+)	Indirect	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	High
	social inclusion and community participation		X		(+)	Direct	Cumulative	Likely	In the surrounding area	Permanent	Reversible	Average	Average
	Better access to social services		X		(+)	Indirect	Cumulative	Likely	In the surrounding area	Long term	Reversible	High	High
	Impacts on gender	X	X		(+)	Direct	Simple	Likely	Localized	Long term	Reversible	Average	High
	short-term solution expectations of access roads problems and the lack of jobs	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Conflicts between workers and the local population in the project area	X			(-)	Direct	Simple	Likely	Localized	Temporary	Reversible	Low	Average
	Destruction or loss of property (total or partial destruction of houses, stalls, fences, farmland and fruit trees)	X			(-)	Direct	Simple	Likely	Localized	Permanent	Reversible	Low	Average
	Increased migration		X		(-)	Direct	Cumulative	Likely	border	Long term	Reversible	Average	Low
	Traffic disruption of people and vehicles	X			(-)	Direct	Simple	Likely	Local	Short term	Reversible	Low	Low
	improper water use	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low

Environment	Impact	Phase			Nature	Type	Interaction	Probability	Extension	Duration	Reversibility	Magnitude	Significance
		C	O&M	D									
Occupational Health and Safety	Injuries or fatalities due to manual handling	X		X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Falls, slips and trips	X		X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Falls from height	X		X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Flying objects	X		X	(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Injuries or fatalities due to moving machinery	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	High	Average
	Dust emissions	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	Exposure to chemicals, hazardous materials and flammable	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Average	Low
	electric shock	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Exposure to noise and vibrations	X	X	X	(-)	Direct	Simple	Likely	Localized	Long term	Reversible	High	Average
	increasing incidence of sexually transmitted diseases including HIV/AIDS	X	X		(-)	Direct	Simple	Likely	In the surrounding area	Long term	Reversible	High	Average
	malaria infection risk	X			(-)	Direct	Simple	Likely	Localized	Short term	Reversible	Low	Low
	Increased risk of road accidents	X	X		(-)	Direct	Simple	Likely	Localized	Long term	Reversible	High	Average

Source: SALOMON, 2015

6.25 Residual Impacts

Residual impacts are those felt after implementing mitigation measures at the end of the project. Adverse residual impacts include: (i) landscape patterns due to change of topography on quarry/borrow pit operation, landscape in alignment improvements, and presence of new infrastructures; (ii) issues related to safety of the local population due to road traffic exacerbated by an increase in the frequency of vehicles running at higher speeds; and (iii) issues related to noise due to increase in frequency of vehicles running at higher speeds. These impacts are summarized in the table below.

Table 57: Summary of residual impacts

Activity	Negative impacts	Proposed mitigation measures	Residual impacts
Construction phase			
Installation of construction camp	Clearing of vegetation	Selecting open areas and avoid unnecessary cut of trees	Marginal
		Limit the area occupied by the construction camp	Marginal
Vacation of right-of-way and quarries and borrow pits areas	Clearing of vegetation in works and quarries right-of-way	Compensate the felling of trees by reforestation and planting of roadside trees in the villages and towns crossed by the road	Positivo
No final construction	Contamination by bituminous products or oils	Implement a waste and pollutant management plan	Positive
		Collect, remove and convey drain oil to authorized disposal mounds, and clean-up sites	Positive
	Risk of accidents and health impacts of air pollution	Adopt speed limits and adequate signaling at the project site (road signs, reflectorized markings and speed bumps)	Minor
		Wetting the soil to reduce dust impacts, particularly in the construction camp and crossing the villages	Minor
		Provide protective equipment to the construction workers	Minor
Decommissioning			

Activity	Negative impacts	Proposed mitigation measures	Residual impacts
Construction camp	Camp buildings and facilities	Transfer buildings to the road maintenance services of the ministries in charge of roads as well as other entities	Positive
Operation			
Frequent and heavy traffic	Noise pollution	Indicate maximum speed limits, especially at villages crossing	Minor
	Traffic accidents	Construct speed bumps Install vertical and horizontal road signs	Minor
Impacts on wildlife and vegetation	Increase in illegal logging	Establish forest post	Positive
	Increase in poaching	Support forest and wildlife audits	Positive

Source: SALOMON, 2016

6.26 Cumulative Impacts

Cumulative impacts are those resulting from the combined action of activities related to the project itself and related actions and/or projects in the same impact area. Given the potential for project impacts to have wider implications (both positive and negative) when considered in the context of other development trends, a cumulative impact assessment (CIA) has been conducted to analyze the combined impacts of projects, and of future developments and plans in relation to this road upgrading project. Other development projects and plans in the same region includes: Mtwara Corridor Development Project, Forestry and Wood Industry, Oil and Gas project in Rovuma Basin, Tourism Industry (Niassa National Reserve and Quirimbas National Park), Agriculture, Fishery and recently built Unity Bridge.

Mtwara Corridor Development Project

The Mtwara Corridor Development Project is a spatial development program of the zone covering Southern Tanzania, Northern Mozambique, North and Center of Malawi as well as the North and East of Zambia. In the current situation, this area is isolated with very difficult access especially during the rainy season. The objectives set by the program specifically address the following points:

- Strengthening the growth of agro-industry, tourism and services, through the private sector participation and Public-Private Partnership (PPP);
- Maximizing the sustainable use of natural resources, especially the arable lands;
- Reorientation of trade and investments, by facilitating the development of new living centers aiming to reduce migration to cities and decrease poverty

Operationally, the Mtwara Corridor Development Project is to provide road, rail and waterways access from surrounding region of Port of Mtwara. Over 800 km of road and railway will link the Port of Mtwara from Mbamba Bay on Lake Nyassa to link Malawi to the corridor and further road links into Mozambique will facilitate access to Northern Mozambique (Figure below).



Source: https://en.wikipedia.org/wiki/File:Tanzania_mtwara_development_corridor_preliminary.png

Figure 21: Mtwara Development Corridor

Mtwara Port is a deep water port that can accommodate two large vessels along its two quays in deep water and three medium-sized ships along the other quays. It has covered warehouses with a capacity of 150,000 tons and spaces for storing containers. Its capacity is 400,000 tons that can be extended to 750,000 tons, particularly for receiving containers. The actual demand is relatively reduced (90,000 tons per year), particularly due to the poor conditions of roads of access to the platform.

Improvement and modernization of the road network along the corridor will allow the import and export traffic from Malawi to perform using the Mtwara Port. The road axis between Mbamba Bay and Mtwara (850 km) passes through the towns of Masisi, Tunduru, Songea and Mbinga. It is scheduled to be rehabilitated and modernized with funding from Japan, AfDB and Tanzania. The strap long of 70 km and connecting Mangaka (located on the corridor, East of Masisi) to Mtambaswala (where is located the Unit Bridge) via Nyaumbu, is also being studied under AfDB financing. Agreements for the development of the Mtwara Corridor were also signed between the representatives of Cabo Delgado Province and those of Mtwara Province in 2004.

The construction of the road section Mangata-Mtambaswala (unit bridge) (70 km) in Tanzania and Mueda-Roma (163 km) in Mozambique will link Cabo Delgado Province to this corridor by crossing the Rovuma River by unit bridge newly built (2010).

The project axis, which complements the unit bridge built over the Rovuma River, will fill the missing link between the road network of Tanzania and that of Mozambique, allowing to meet the demand of transport between the two countries, on a completely paved road network. It also complete the Trans African Cairo-Gaborone which, starting from Dodoma, turn off to Zimbabwe and Botswana.

Mtwara port is geographically well located and can receive traffic from the neighboring countries (Malawi, Zambia and Mozambique) if proceed rapidly with the implementation of the necessary transport infrastructures. This transport demand may also accelerate with the development, by the private sector, of new industries among which we can mention the projects: (i) Forestry and wood industry; (ii) Oil and gas in Rovuma basin; (iii) Tourism development in Niassa National Reserve and Quirimbas National Park, and (iv) agriculture and fisheries.

Forestry and Wood Industry

Mozambique will not only benefit from development activities that will be carried out along the Mtwara Development Corridor but it can also use the Port of Mtwara for its exports and imports of the North of the country, especially wood.

Cabo Delgado is one of the most contributing provinces on productive forest, with about 3.2 million hectares based on the last forest inventory of 2007 (Marzoli, 2007). The same inventory found that Cabo Delgado province is the second province with commercial forest of about 7.3 m³/ha. Fact that the along the Mueda-Roma axis has two forest concessions (Mahate Florestal and Moçambique Madeiras) with 140,000 hectares that can be directly stimulated by improvement of the Mueda-Roma axis. At present, wood is collected and transported along the poor conditioned Mueda-Roma road to Mocimboa da Praia where there is wood processing unit. Due to lack conditions to export from Mocimboa da Praia Port, processed wood is transported to Port of Pemba. As established in contract between the Government and the Forest Concessioner, 10,000 of native wood species is being replanted yearly per forest concession.

The fact that the closeness and the increased handling capacity of Mtwara Port and upgrading Mueda-Roma axis can stimulate local wood processing industry, increase exports using Mtwara Port. It can likely to stimulate investments in Port of Mocímboa da Praia in order to satisfy the demand. This induced expected developments can create more job, increase local taxes and exports, and ultimately promotes socioeconomic development.

Additionally, as established in the Regulation on Forest and Wildlife Law (Decree 12/2002 of 6th July), in Article 102, 20% of any forest and wildlife tax must return to the community. The mechanism to transfer the revenue of forest and wildlife taxes to community is established in the Ministerial Diploma 93/2005 of 04th May. At present 04 community committees were stablished along the forest concessions and use to receive 20% of concessions taxes to the Forest and Wildlife Provincial Services (SPFFB). Induced increase in wood industry along Mueda-Roma axis due to easy access will increase community wellbeing.

As conclusion, the induced forestry and wood industry development by the Mueda-Roma rehabilitation and upgrading road project, will result in cumulative impact on the sustainable economic development with significant impact on the community livelihood.

Oil and Gas Projects in Rovuma Basin

The actual potential of Rovuma basin is estimated to be 175Tcf of gas covering three areas of Mnazi Bay, Tanzania and Offshore and Onshore Rovuma, Mozambique. Multiple monetization solutions in Mnazi bay are defined, namely: (i) supplying of gas to the Mtwara to Dar-es-Salaam transnational project; (ii) supplying of gas to a proposed power facility in the Mtwara region in the Southern Tanzania; and (iii) supplying of gas to the gas-to-petrochemicals projects. All these projects will request logistics far north from the Mueda-Roma axis, in Tanzania. In Mozambique, oil and gas drilling prospection are being carried out, being the Liquid Natural Gas (LNG) most prominent and immediate project to be implemented in Northern Cabo Delgado. This regional project does not expect to have additional impact to the Mueda-Roma upgrading road project.

At other hand, the Mtwara port in full extension is used as the basis for future enterprises of gas fields exploitation. Many companies capable of using this gas, are now moving into the port where more than 2,700 hectares have been reserved for this purpose.

A similar development will be set up at Mocimboa da Praia Port located near the border with Tanzania. There is currently no bridges to cross the Rovuma River to the height of the coast and transport is taking place mainly on very old and unsafe containers. The unity bridge, through far from Mocimboa da Praia and Mtwara, is currently the only structure between these two fully growing areas. Based on the fact that, the unity bridge is the only way to link the ports of Mtwara and Mocimboa da Praia (and also Port of Pemba) by road, it is expected that support services and logistics of the Oil and Gas developments can use the Mueda-Roma Road increasing traffic and also stimulate economic development in the region.

Agriculture

Agriculture development is one of the main objective of the Mueda District Strategic Development Plan. Agriculture development is being hampered by poor road conditions and total lack of communication between the production and consumption areas. One of the main constrain for Mueda District is in fact the Mueda-Roma axis. Upgrading this axis, will induce agriculture development along the axis (and other areas) clearing new areas, increasing the livelihood condition of local community. But also, this situation can potentially loss of habitat.

Fishery

In 2012, Cabo Delgado Province has 225 fishing centres (14% of the country) in top of all provinces. This is also related to the potential for fishing industry development in the province. One of the main areas that will benefit by the project is the Mocímboa da Praia district. This high potential district also benefits from the coast, besides having potential for aquaculture and seaweed farming. At present supply Pemba, Mueda and other points of the provinces. The upgrading of Mueda-Roma axis can stimulate new market for fishing products in Mocímboa such as Ngapa, Negomano and other interior cities in Tanzania.

7 ANALYSIS OF ALTERNATIVES

In terms of routes options, the existing road from Mueda to Roma is to be followed to link to the Unity Bridge, so no alternatives were considered, but rather different surfaces of the road were compared in terms of economic viability. Therefore, in environmental and social terms, the project alternatives to be considered are the “no project” and “with project” options.

7.19 Alternative 0 - No Project

Alternative 0 (No implementation of the proposed activity) implies maintaining the current situation. Its impacts will result in:

- Progressive deterioration of road, with the greatest long-term rehabilitation costs;
- Isolation of communities every rainy season because of the cuts that take place annually;
- More and increased erosion. Over time, the process of erosion will increase the amount of the eroded material from road to waterways, direct impact on the water quality, and consequently on the aquatic fauna and humans;
- The forests continue to be degraded due to illegal logging and wild fauna will be killed due to logistical difficulties for supervision;
- Opening craters capable of causing traffic accidents and accidental fuel spills and that may pollute the soil and watercourses;
- Travel time increasingly long and increased atmospheric emissions;
- The road deteriorated conditions hamper local investment and come as an obstacle in attracting new investors because of the high fuel consumption, maintenance costs and long driving time;
- Dust emission due to the movement of vehicles on dirt road with impact on health of the population along the road;
- High transport costs and the consequent impact on the livelihoods of communities, particularly vulnerable groups.

The Alternative 0 will not achieve the main objectives of the project and roads policy, specifically those of improving the income levels of the local population, by reducing transportation costs, costs of goods and services, national economy reduction caused by poor road conditions and reduce accidents through improved traffic conditions.

Because of its environmental, social and negative economic impacts that are expected from maintaining the current state of Mueda-Roma road, this alternative is not recommended.

7.20 Alternative 1 – With Project

The option retained for the road follows the existing alignment in order to: (i) reduce expropriations as much as possible, as well as the risks of isolation in population displacements; (ii) reduce new road construction costs; (iii) serve as effectively as possible all the towns and villages along the roadway and improve their living conditions; (iv) design the geometry of the roadway in order to improve driving safe by changing vertical and horizontal alignment; (v) rehabilitate all hydraulic structures in order to make the road always trafficable.

Two alternatives was selected for the rehabilitation and upgrading of axis Mueda-Roma: **(1) a basic solution about a development of bilayer coating type** and **(2) an alternative solution that consists in an asphalt concrete pavement**. The recommended works includes:

- Earth works of retirement of the total fresh water of the platform and of building of longitudinal and transverse remediations;
- Building a coated pavement with seven (7) meters wide (bilayer for the basic solution and asphalt concrete pavement for the alternative solution), lined on both sides by shoulders;
- Rehabilitation and construction of engineering structures;
- The construction of drainage structures;
- Safety, signaling and environmental protection facilities.

Both solutions are intended to stimulate development and it is expected that will facilitate socioeconomic growth and promote investments in the project area of influence. The socioeconomic benefits can be summarized as economic development due to: (i) direct and indirect job creation; (ii) increased agricultural and forest development; (iii) attracting of investments; (iv) increased revenue for the state; (v) reduction of transport costs; (vi) social inclusion and community participation; (vii) improved access to social/public services.

The project will address completely the main goal of the road policy which intends to improve income level of local population, by improving traffic conditions.

In terms of environmental and social point of view, both solutions are identical, although differences in construction technology. The ESIA process concluded that environmental and social impacts can be mitigated. Due to the need of more frequent of maintenance and potentially less comfort, the basic solution is less advantageous. More frequent maintenance requires more resources that could be used for other socioeconomic activities that could benefit more people. Due to lack of funding and changes in less favorable global economic situation, fail in maintenance can aggravate the road condition with risk of accidents and require more financial resources to rehabilitate. Less comfort can cause accidents.

Based on 2014 US\$ prices, the economic feasibility study (Studi 2015) estimated that the basic solution will cost 136,1M and the alternative solution 145,2M US\$.

These opportunities cost of the project was estimated at 80% of costs excluding taxes, to which are added the costs of control and monitoring of works (estimated at 5% of the investment). Same study, based on economic calculations came out with a slight advantage of the basic solution (bilayer coating) where the Internal Rate of Return (IRR) is 12.4% compared to 11.6% of the alternative solution (asphalt concrete pavement). The IRR would at a satisfactory level of 13.4% for basic solution and 12.6% for alternative solution given the impact of the competition between civil engineering companies that should be able to reduce the project cost by 5% to 10%.

Both technically and in terms of comfort, the bilayer solution is less advantageous. It requires higher maintenance efforts due to higher frequency of maintenance and offers less comfortable traffic conditions.

Given the above results, from economic and technical point of view the “Asphalt Concrete Pavement” is considered more appropriate and is recommended for upgrading Mueda-Roma Road.

8 CONCLUSIONS AND RECOMMENDATIONS

The evaluation of the potential environmental and social impacts of the project of rehabilitation of Mueda-Roma road did not identify any highly significant or fatal impact, which makes the implementation of the project undesirable.

The project is of great socio-economic importance to the resident community along the road, to the Mueda district and to the country in general. The positive socio-economic impacts are of medium magnitude to high and equally significant.

Without discarding the importance of other negative impacts, through this study it was possible to identify the negative impacts as being of medium significance and they deserve careful attention for the successful implementation of the project, namely: (1) loss of habitat; (2) increased poaching of animals; (3) impact on air quality and climate change; (4) conflicts between workers and the local community; (5) destruction and/or loss of property (total or partial destruction of houses, fences, farmland and fruit trees); (6) injuries or fatalities due to the movement of vehicles and machinery; (7) increased incidence of sexually transmitted diseases, including HIV/AIDS; and (8) risk of road accidents.

Most impacts are short term and concentrated during the construction phase. The most important impacts that are long-term and likely to be of an average magnitude during the operation phase are impacts 1, 2, 3, 7 and 8.

The rest of the negative impacts can be mitigated to low or insignificant levels of significance, provided that adequate mitigation measures are implemented in compliance with the guidelines of the Environmental and Social Management Plan.

The project should be put in place in line with the guidelines of the environmental management plan in such a way as to reduce the significance of impacts to the average levels as provided in this study. Particular attention should be given to the impacts on the biological environment (habitat loss and risk of increased poaching) given the fact that the road, although existing, passes through a conservation area and once rehabilitated will be used at higher levels of intensity than what is currently happening.

Synergies can be created with the entity that oversees tourism in such a way that meets public-private partnerships interests to ensure the sustainable exploitation of the area and better surveillance to logging and animal poaching within this conservation area.

APPENDIX

Appendix 1: Consulted documents

Legislation

- Lei do Ambiente (Lei n.º 20/97, de 01 de Outubro);
- Regulamento sobre o processo de Avaliação de Impacto Ambiental (Decreto n.º 45/2004, de 29 de Setembro);
- Regulamento sobre o processo de Avaliação de Impacto Ambiental (Decreto n.º 42/2008, de 04 de Novembro, que altera os artigos 5, 15, 18, 20, 24, 25 e 28 do Decreto 45/2004);
- Directiva Geral para o Processo de Participação Pública (Diploma Ministerial n.º 130/2006, de 19 de Julho);
- Directiva Geral para o Estudo de Impacto Ambiental (Diploma Ministerial n.º 129/2006, de 19 de Julho);
- Regulamento sobre o Processo de Auditoria Ambiental (Decreto n.º 25/2011, de 15 de Julho, que revoga o Decreto n.º 32/2003, de 12 de Agosto);
- Regulamento sobre Inspeção Ambiental (Decreto n.º 11/2006, de 15 de Junho);
- Regulamento sobre Padrões de Qualidade Ambiental e de Emissão de Efluentes (Decreto n.º 18/2004, de 02 de Junho);
- Regulamento sobre Gestão de Resíduos (Decreto n.º 13/2006, de 15 de Junho);
- Lei de Águas (Lei n.º 16/91, de 03 de Agosto);
- Regulamento dos Sistemas Públicos de Distribuição de Água e de Drenagem de Águas Residuais (Decreto n.º 33/2003, de 01 de Julho);
- Regulamento sobre a Qualidade de Água para o Consumo Humano (Diploma Ministerial n.º 180/2004, de 15 de Setembro);
- Lei do Trabalho (Lei n.º 3/2007, de 01 de Agosto);
- Lei do Turismo (Lei n.º 4/2004, de 17 de Junho);
- Lei das Pescas (Lei n.º 03/90, de 26 de Setembro);
- Regulamento da Pesca Recreativa e Desportiva (Decreto n.º 50/99, de 31 de Agosto);
- Lei de Terras (Lei n.º 19/97, de 01 de Outubro);
- Regulamento da Lei de Terras (Decreto n.º 66/98, de 08 de Dezembro);
- Regulamento de consumo e comercialização do tabaco (Decreto n.º 11/2007, de 30 de Maio);
- Regulamento sobre os Requisitos Higiénicos de Estabelecimentos Alimentares (Diploma Ministerial n.º 51/84, de 03 de Outubro);
- Regulamento sobre os Requisitos Higiénico-Sanitários de Produção, Transporte, Comercialização e Fiscalização de Géneros Alimentícios (Decreto n.º 15/2006, de 22 de Junho).

Conventions

- Convenção da Biodiversidade (Resolução n.º 2/94, de 24 de Agosto);
- Convenção para a Protecção, Gestão e Desenvolvimento do Ambiente Marinho e Costeiro da Região Oriental Africana (Resolução n.º 17/96, de 26 de Novembro);
- Convenção Africana sobre a Conservação da Natureza e dos Recursos Naturais (Resolução n.º 18/81, de 30 de Novembro);

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- Convenção de Estocolmo sobre Poluentes Orgânicos e Persistentes (Resolução n.º 56/2004, de 31 de Dezembro);
 - Salvaguardas Operacionais do Banco Mundial

Technical documents

- Ministério de Administração Estatal, 2014, Perfil do Distrito de Mueda
- African Development Bank, 2013, African Development Bank Group's Integrated Safeguard System. Policy Statement and Operational Safeguards. Safeguards and Sustainability Series, Vol. 1, Issue 1
- U.S. Environmental Protection Agency, 1971, Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances
- WHO. 1999. Guidelines for Community Noise. <http://www.who.int/docstore/peh/noise/guidelines2.html> (acedido em 17/08/2015)
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Feasibility Study
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Executive Summary, Vol. 1
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- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Hydrological, Hydraulic and Bridges Studies, Vol. 5
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Drawings, Vol. 6

Appendix 2: Questionnaire adopted for the Socioeconomic Survey

HOUSEHOLD QUESTIONNAIRE

NR. Of Questionnaire		Date	
Enumerator			

INSTRUCTIONS TO THE ENUMERATOR:

- Request to speak with head of the household or the spouse for consent to conduct the interview.
- The questionnaire should preferably be administered to the head of household together with the spouse. If only one of them is available, talk to him/her alone. If neither is available the possibility of meeting either of them elsewhere or waiting for them to return should be examined and/or a different household should be selected for the interview.

INTRODUCTION:

Good morning/afternoon. My name is I am an interviewer for Salomon, a Mozambican research company registered in Mozambique as an independent environmental Consultant within the National Directorate of Environmental Impact Assessment of the Ministry of Land, Environment and Rural Development (MITADER), to conduct environmental impact assessment studies. Salomon, Lda was subcontracted by STUDI International, a consultancy firm, based in Tunisia, to participate in the preliminary studies and design of the road rehabilitation. Our focus is on the Environmental and Social Impact Assessment of the Rehabilitation of Mueda and Negomano Road.

The objective of this work is to get a better understanding of the socioeconomic conditions of the households living along the road between Mueda and Negomano that might be affected by the project. Your responses will be used to prepare a report that will characterize the living conditions of the families in the project area, but will otherwise remain confidential. Your participation is extremely valuable to the study and we would appreciate if you and/or your spouse would spend some time with us and explain about how you and your household live.

1. HOUSEHOLD IDENTIFICATION

Household Coordinates	x
	y
District	Mueda
Administrative Post	1 – Mueda; 2 – N'gapa; 3 – Negomano
Locality	
Village/Town/Neighbourhood	
Quarter	
House number	
Name of household head	
Name by which the household head is better known	
Name of respondent	

1. HOUSEHOLD COMPOSITION

Instructions to interviewer:

- List everyone in the household from the eldest to the youngest. Do not forget to include babies, toddlers and the person providing the information.
- Consider as 'household member' everyone eating from or contributing to the same pot, whether living or not presently at the homestead.

#	Name of the household member	A1. Relationship to the household head	A2. Gender	A3. Age	A4. Marital status	A5. Highest level of education completed
1		_	_	_ _	_	_ _
2		_	_	_ _	_	_ _
3		_	_	_ _	_	_ _
4		_	_	_ _	_	_ _
5		_	_	_ _	_	_ _
6		_	_	_ _	_	_ _
7		_	_	_ _	_	_ _
8		_	_	_ _	_	_ _
9		_	_	_ _	_	_ _
10		_	_	_ _	_	_ _
11		_	_	_ _	_	_ _
12		_	_	_ _	_	_ _
13		_	_	_ _	_	_ _
14		_	_	_ _	_	_ _
15		_	_	_ _	_	_ _
	A6. Total number of people in the household _ _	1. Household head (HH) 2. Spouse of HH 3. Son/daughter of HH 4. Son-in-law/Daughter-in-law of HH 5. Parent of HH 6. Parent-in-law of HH 7. Brother/sister of HH 8. Grandparent of HH 9. Grandchild of HH 10. Adopted/foster/stepchild of HH 11. Other relative of HH (specify) 12. Not related to HH (specify)	1. Male 2. Female	99. Doesn't know	1. Single 2. Married civil 3. Married church 4. Married traditional 5. Married mixed ceremonies (civil and/or church and/or traditional) 6. De facto married (living together) 7. Separated/divorced 8. Widower	1. None 2. Knows how to write and read the name and some numbers 3. Kindergarten/pre-school 4. Primary 5. Secondary 6. Pre-university 7. Vocational training 8. University 99. Doesn't know

2. HOUSEHOLD HEAD CHARACTERISTICS

Instructions to interviewer:

- Cross [x] the correct option in the questions with codes.

a. What is the HH mother tongue?

[01] Macua

[02] Maconde

[03] Portuguese

[04] English

[98] Other (specify) _____

b. What is the religion of the household?

[01] None

[02] Catholic

[03] Protestant (specify) _____

[04] Other Christian (specify) _____

[05] Muslim

[06] Animist

[07] Zion

[08] Jehovah Witness

[98] Other (specify) _____

c. How many spouses does the HH have?

|_|_|

Register 00 if the HH is not married (single, separated/divorced or widowed) then pass to Section C.

d. Do all spouses live in the same compound?

[1] Yes

[2] No

1.

3. EDUCATION

Instructions to interviewer:

- Please list all the children in school age (from 6 to 15 years of age)
- Provide information based on the listing above in Section A, i.e. the numbers attributed to the household member in the first table should remain the same throughout the questionnaire.

#	C1. Is the child currently enrolled in school?	C2. In what education level is the child enrolled?	C4. How does the child usually go to school?
1	[1] Yes [2] No	_ _	_ _
2	[1] Yes [2] No	_ _	_ _
3	[1] Yes [2] No	_ _	_ _
4	[1] Yes [2] No	_ _	_ _
5	[1] Yes [2] No	_ _	_ _
6	[1] Yes [2] No	_ _	_ _
7	[1] Yes [2] No	_ _	_ _
8	[1] Yes [2] No	_ _	_ _
9	[1] Yes [2] No	_ _	_ _
10	[1] Yes [2] No	_ _	_ _
11	[1] Yes [2] No	_ _	_ _
12	[1] Yes [2] No	_ _	_ _
13	[1] Yes [2] No	_ _	_ _
14	[1] Yes [2] No	_ _	_ _
15	[1] Yes [2] No	_ _	_ _
	<i>If [2] No: pass to question C5</i> <i>If [1] Yes: pass to the next person</i>	01. Kindergarten 02. Primary (grades 1-7) 03. Secondary (grades 8-10) 04. High School (grades 11-12) 05. Basic Level Vocational Training (grades 8-10) 06. Technical Level Vocational Training (grades 11-12) 07. University 99. Does not know	01. By foot 02. Bicycle 03. Personal motorized vehicle 04. Free ride from private motorized vehicle 05. Paid ride from private motorized vehicle 06. Public road transportation (machimbombo/chapa) 98. Other (specify)

4. OCCUPATION AND EMPLOYMENT

Instructions to interviewer:

Provide information based on the listing above in Section A, i.e. the numbers attributed to the household member in the first table should remain the same throughout the questionnaire

Fill the table in relation to each member of the household

#	Employment status – Does the household member work?	Main occupation – What type of work	Type of Employer
1	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 1. Farming	<input type="checkbox"/> 1. Government
2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 2. Fishing	<input type="checkbox"/> 2. Private company
3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 3. Handcraft	<input type="checkbox"/> 3. Individual
4	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 4. Domestic work	<input type="checkbox"/> 4. Self-employed
5	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 5. Trading (with store)	<input type="checkbox"/> 5. Relative (with remuneration)
6	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 6. Trading (stall or other informal infrastructure)	<input type="checkbox"/> 6. Relative (no remuneration)
7	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 9. Skilled labourer (mechanic, electrician, etc.)	
8	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 10. Professional (teacher, nurse, etc.)	
9	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 98. Other (specify)	
10	<input type="checkbox"/> Yes <input type="checkbox"/> No		

5. ASSETS

Does any of the household members have any of the assets listed below?

Instructions to interviewer:

- Cross [x] the correct option.
- Consider only goods that are in use and are functional.
- All rows should be crossed at one option or the other.

Assets	Possession	Quantity	Main user
1. Radio/Hi-Fi	[1] Yes [2] No	_ _	_ _
2. TV	[1] Yes [2] No	_ _	_ _
3. Video/DVD/CD player	[1] Yes [2] No	_ _	_ _
4. Telephone/Mobile phone	[1] Yes [2] No	_ _	_ _
5. Watch/Clock	[1] Yes [2] No	_ _	_ _
6. Bed (not only mattress or straw mat)	[1] Yes [2] No	_ _	_ _
7. Electrical stove	[1] Yes [2] No	_ _	_ _
8. Gas stove	[1] Yes [2] No	_ _	_ _
9. Iron	[1] Yes [2] No	_ _	_ _
10. Fridge	[1] Yes [2] No	_ _	_ _
11. Sewing machine	[1] Yes [2] No	_ _	_ _
12. Plough	[1] Yes [2] No	_ _	_ _
13. Hoe	[1] Yes [2] No	_ _	_ _
14. Axe	[1] Yes [2] No	_ _	_ _
15. Ox-Cart	[1] Yes [2] No	_ _	_ _
16. Tractor	[1] Yes [2] No	_ _	_ _
17. Bicycle	[1] Yes [2] No	_ _	_ _
18. Motorbike	[1] Yes [2] No	_ _	_ _
19. Motor vehicle (car, truck, bus, van, etc.)	[1] Yes [2] No	_ _	_ _
20. Water pump	[1] Yes [2] No	_ _	_ _
21. Other important asset (specify)	[1] Yes [2] No	_ _	_ _
22. Other important asset (specify)	[1] Yes [2] No	_ _	_ _
23. Other important asset (specify)	[1] Yes [2] No	_ _	_ _
24. Other important asset (specify)	[1] Yes [2] No	_ _	_ _
			1. HH Head 2. Wife/Husband of the HH Head 3. Sons/Daughter of the HH Head 4. All

6. PROPERTY

For how long have you and your household been living in this house? (years)

|_|_|

7. HOMESTEAD CHARACTERIZATION

I1. What is the shape of the main house of the homestead?

- [1] Round
- [2] Quadrangular (four equal sides)
- [3] Rectangular
- [4] L shape

How was it acquired?

Instructions to interviewer: select only one option.

- [01] Purchase
- [02] Built locally
- [03] Other (specify)

How many rooms/compartments compose the homestead?

Compartments	Quantity
1. Lounge	_ _
2. Dining room	_ _
3. Sleeping rooms	_ _
4. Toilets	_ _
5. Washing rooms	_ _
6. Latrine	_ _
7. Kitchen	_ _
8. Barn	_ _
9. Chicken coop	_ _
10. Piggery	_ _
11. Kraal	_ _
12. Worship space	_ _
13. Garage	_ _
14. Kiosk/vending stall	_ _
15. Other compartment (specify use)	_ _
Total number of compartments	_ _

What is the household's primary source of water?

Source of Water	Human Consumption	Cooking
[01] Piped water to the house/yard	[1] Yes [2] No	[1] Yes [2] No
[02] Piped water from neighbours	[1] Yes [2] No	[1] Yes [2] No
[03] Water tank in yard	[1] Yes [2] No	[1] Yes [2] No
[04] Well/borehole in yard	[1] Yes [2] No	[1] Yes [2] No
[05] Public well/borehole	[1] Yes [2] No	[1] Yes [2] No
[06] River/lake/dam	[1] Yes [2] No	[1] Yes [2] No
[98] Other (specify)	[1] Yes [2] No	[1] Yes [2] No
[01] Piped water to the house/yard	[1] Yes [2] No	[1] Yes [2] No

How often does the household fetch water outside the homestead?

- [01] More than once a day
 [02] Every day
 [03] Every other day
 [04] 2-3 Times a week
 [05] Once a week
 [06] 2-3 times per month
 [07] Once a month
 [08] Never. Use household piped water
 [98] Other (specify) _____

How much time do you spend each time you fetch water? (minutes)

Instructions to interviewer:

- 1 Hour = 60 minutes
- If the household does not fetch water outside the homestead, write 00 and move to I11.

What means of transportation do you use to go fetch water?

- [01] By foot

-
- [02] Bicycle
 - [03] Household's own vehicle
 - [04] Ride in private vehicle
 - [05] Paid transportation in private vehicle
 - [06] Public transportation (machimbombo/chapa)
 - [98] Other (specify) _____

What is the household's primary source of fuel for lighting?

- [01] Electricity
- [02] Paraffin
- [03] Grass
- [04] Wood
- [05] Candles
- [06] Flashlight
- [07] Battery/solar panel
- [98] Other (specify) _____

12. What sanitation facility does the household own and use?

- [01] Bathroom and WC inside the house
- [02] Simple pit latrine in yard
- [03] Latrine with shower in yard
- [04] Neighbour's latrine/WC
- [05] Open field/bush
- [98] Other (specify) _____

13. How do you dispose of its garbage?

- [01] Bury it in the yard
- [02] Burn it in the yard
- [03] Throw away in public dump
- [98] Other (specify) _____

8. AGRICULTURE

Please list all the land owned (even if it is not currently being used) or normally used by the household:

#	J1. Name of land/plot	J2. Location	J3. Approximate size	J4. Ownership	J5. Usage arrangement	J6. Main irrigation form	J7. Major crop cultivated	J8. Approximate amount produced in last season	J9. Use of crop	J10. Income earned with sale in the past year
1			 football field(s)					 50 kg bags		. . . MT
2			 football field(s)					 50 kg bags		. . . MT
3			 football field(s)					 50 kg bags		. . . MT
4			 football field(s)					 50 kg bags		. . . MT
5			 football field(s)					 50 kg bags		. . . MT
6			 football field(s)					 50 kg bags		. . . MT
7			 football field(s)					 50 kg bags		. . . MT
8			 football field(s)					 50 kg bags		. . . MT
9			 football field(s)					 50 kg bags		. . . MT
10			 football field(s)					 50 kg bags		. . . MT
	J11. Total number of plots 	1. Within the courtyard 2. Less than 30 min away from home 3. 1/2 to 1 hour away from home 4. 1 to 2 hours away from home 5. More than 2 hours away from home	99. Doesn't know	1. Household Head 2. Other: household member 3. Other: relative (not household member) 4. Other: non-relative	1. Household use 2. Sharecrop 3. Rent/lease 98. Other (specify)	1. Rain fed 2. Well 3. Pumps from river/lake/dam 4. Flush 98. Other (specify)	1. Beans 2. Pigeon peas 3. Maize 4. Rice 5. Sorghum 6. Cassava 7. Peanuts 8. Pumpkin 9. Tomato 10. Potato 11. Sweet potato 12. Tobacco 98. Other (specify) 99. Not in use		1. Household consumption 2. Trade 3. Sale 4. Household consumption and sale 98. Other (specify)	1. for household consumption 2. for trade 3. for sale 4. for household consumption and sale 98. Other (specify)

9. PERCEPTIONS ABOUT THE PROJECT

What are your opinions about the Road Rehabilitation Project between Mueda and Negomano?

In a scale from 1 to 5, where 1 = is absolutely improbable, 2 = not probable, 3 = all will remain the same, 4 = relatively probable, 5 = highly probable.

Instructions to interviewer:

- Write 9 if the interviewee **does not know** or **does not have an opinion**.
- Read aloud each of the options to the interviewee.

Resources	Opinion/Assessment					
1. Job opportunities	1	2	3	4	5	9
2. Business opportunities	1	2	3	4	5	9
3. More infrastructures	1	2	3	4	5	9
4. Literacy/education	1	2	3	4	5	9
5. Health	1	2	3	4	5	9
6. Transport & communication	1	2	3	4	5	9
7. Access to water	1	2	3	4	5	9
8. Access to energy	1	2	3	4	5	9
9. Other important resources for the community (specify)	1	2	3	4	5	9
10. Other important resources for the community (specify)	1	2	3	4	5	9

What do you think (in general) about the Road Rehabilitation Project between Mueda and Negomano?

Instructions to interviewer: select only one option.

[1] I am very happy with it

[2] I am happy with it

[3] I will wait and see

[4] I am not happy

[5] I am not happy at all with it

[9] I have no opinion

Why?

Sketch of the homestead

Appendix 3: Minutes of Public Consultation Meetings to Present the Environmental Pre-Feasibility Study and Terms of Reference

Introduction

After completion of the Environmental Prefeasibility Study (EPDA) and Terms of Reference (TOR) of the Environmental and Social Impact Assessment Report, an announcement was released for public consultation for discussion of the report. Three meetings were held to present the EPDA and TOR of the report, particularly in the administrative post headquarters (Miula Locality), administrative post of Ngapa (Nanhamba Locality) and Administrative Post of Negomano (Ninga Locality). This report presents the minutes of these meetings.

MINUTES OF THE PUBLIC CONSULTATION IN MIULA LOCALITY – ADMINISTRATIVE POST OF MUEDA-SEDE

Date: 09/29/2015

Time: 09:00

Preparation meeting with local Authorities

Before the beginning of the meeting, local authorities requested a separate meeting so that they could be informed about the objectives of the consultation.

at such a meeting the representative of the district, Ms. Amalia Bernardo, Director of District Services for Planning and Infrastructure, explained that the meeting was aimed at informing the community about the project to rehabilitate Mueda-Roma road and hear from the public about their views on positive and negative impacts of the project.

Head of the Administrative Post wanted to know what would happen to the people living along the road who could be affected by the rehabilitation process (Figure 1). In response to the question, Mr. Francisco Saimone, the Consultant for environmental impact assessment of the project informed those present that the road extending from Mueda to the intersection of access to the Unity Bridge will be paved and all hydraulic infrastructures will be rehabilitated. He further stressed that the project will bring many benefits to the community from employment opportunities, increased revenue, reduced dust, and reduced cost of transportation, among others. For the people with the potential to be affected, it should be noted that the road will have a width of 7m (3.5m per lane) over 1m edge off the clusters and 2m at the crossing of the clusters. Studies are underway to identify infrastructures, farms and affected trees. As part of the environmental impact study of the project a resettlement action plan will be prepared that will make an inventory of all affected people and assets and deal with the consequences. Additionally, provincial, district and local authorities and affected parties will work together to define measures to be taken for each case.



Figure 1. Head of the Administrative Post welcoming participants

After the clarification of these issues, all people in the preparatory meeting were invited to the meeting with the community at large.

Public Consultation with the Community

Opening the consultation with the community, the Head of the Administrative Post said that Miula locality is composed of 6 villages and that the villages along the road were two, Chicalanga and Miula. Members of these villages are present at this meeting in addition to the population of Miula (Figure 3). After the introductory address the Head of Administrative Post gave the floor to the Director of District Services for Planning and Infrastructures, Ms. Amalia Bernardo.

Upon taking the floor, Ms. Amalia Bernardo thanked the presence of all participants (Figure 2). She added that the meeting was about Mueda-Roma road rehabilitation project. The community consultation is for everyone to stay informed and have a unique knowledge and to garner community concerns for project development and finalization. She further added that project needed everybody's help for everything to go well. She asked all members of the district government and the municipality to introduce themselves. After the introductions, the floor was given to the consultant responsible for the project's environmental impact study.

Figure 2: Director Amália Bernardo addressing participants



Figure 3: Part of participants in the public meeting



Taking the floor, Mr. Francisco Saimone reported that the Mueda-Roma road will be rehabilitated, and that it will be asphalted. A study was underway, which includes these community consultations so that everything goes in the best way. The project wants contribution from all present. The 165km from the village headquarters of Mueda to the intersection with the access that will lead to the Unity Bridge will be tarred. All bridges and culverts will also be rehabilitated. The rehabilitation of this road will bring positive impacts such as employment for local people, reducing the cost of transport by enabling people and goods to circulate throughout the year without interruption as happens now in the rainy season, it will also allow families to visit each other more easily because transport will be easier and at a lower cost, it will enable school books to arrive on time to schools, ambulances will transport patients more easily, that is, greater access to public services; increased sales because more cars will be able to be in the area. These are some advantages that the road will bring.

Moreover, in some cases it will be necessary to cut down some trees , affect farm fields , houses and fences that lie too close to the road to allow machines to work safely. In some cases this will be necessary because the road has to be widened and have bigger shoulders for cyclists and passage ways for pedestrians. So we will talk to everyone in order to identify these cases and can come up with acceptable agreements for the loss of these assets.

Then gave the floor to the participants so they could express their doubts and opinions making it clear that should be free to do so.

Presentation of issues

All present were asked to freely raise any questions they had regarding the project. People should say the name and then present the issues (Figure 4). Below are the questions and suggestions that came from the participants.

Habi Tenda Nehapualele: what is being talked about are not things that will happen this year, maybe next year. The project idea is good and should be implemented immediately.



Figure 4: One of the participants raising issues

Pandissa Muidumbe: thanks for the presence of the project. I would like to see local population being involved in the selection of road construction workers.

Miguel Matias Pajune: if they are to remove trees, farms, homes, all is possible because we want road; provided that solid and good agreements are worked out.

Pius Antonio: I agree with the project of the road, provided that compensation will be fair.

Valerio Nkunha: there should be coordination in the act of compensation for affected fences, houses and farms.

Joan Constâncio: thanks for the project, which should start immediately. Many young people rely on stealing to make a living; probably this will reduce when they start working in the road works.

Suzana John, she thanks the project and expects to be taken seriously and the implementation activities to begin immediately.

Orestes Shipum: asks to be employed in road rehabilitation works.

Biata Paulo: the job cannot be only for young people, we also want the ladies to benefit.

Merina Kumunga: we want a road that is rehabilitated and good. Is it going to be this year or next year? We want to reach Tanzania easily.

Faustino Casimiro: I ask for that project workers are local young people than young people from other provinces.

Answers

Taking the floor on behalf of the environmental impact assessment consultants, Mr. Francisco Saimone thanked the contributions of all. Responding to questions he emphasized: you must realize that the Government of Mozambique through ANE is striving to rehabilitate the road. There are reasons to believe that the road will, in fact, be rehabilitated. Your contributions are important so that the necessary studies can be completed to obtain financing and the environmental permit for implementation of the project.

We are pleased that the people of Miula are able to collaborate positively. There will be a specific plan to compensate for the loss of trees, some of the fields, and houses that are on the road margin. The Contractor shall receive clear instructions on how to proceed with the hiring of labor, camp site; and project will not only engage men, women will also be hired and should feel free to sign up when the time comes.

Closing

By way of conclusion, the Director of the District Services of Planning and Infrastructure, Amalia Bernardo, thanked the community contributions, and expressed hope that all was clear. Youth, women and young people will have the opportunity to work on the project. Have confidence that the project will start soon.

In closing the consultation the Head of the Administrative Post asked people to avoid trying to take advantage of possible compensation in the event of fences, houses, farms being affected by the project.

MINUTES OF THE PUBLIC CONSULTATION IN NANHAMBA LOCALITY – ADMINISTRATIVE POST OF N’GAPA

Date: 30/09/2015

Time: 9H

Brief preparation meeting with local authorities

Before the consultation, and in response to the authorities request a brief meeting to present the project team and the consultant took place while the community was getting organized (Figure 5). The Head of the Administrative Post took the floor and presented the local structure of the post. He gave the floor to the Director of District Services of Planning and Infrastructure and informed about the objectives of the meeting, which is the rehabilitation of Mueda-Roma road. The aim is to inform and to listen to opinions of the host community in the project area.



Figure 5: preparation meeting with local authorities

On behalf of the consultant team that is preparing the environmental impact study, Mr. Francisco Saimone reported that the main purpose of community consultations has to do with the asphaltting of the road from the Municipality of Mueda to the junction with the road that will lead to the Unity Bridge in Negomano. The project will have positive and negative impacts, and these need to be discussed with the community.

Community Consultation

After the brief meeting, the Head of the Administrative Post made the introduction of the project team to the community (Figure 6). He called the participants to actively get involved.

The Director of District Services of Planning and Infrastructure, Amalia Bernardo Tambe, in her capacity as the representative of the district's structure introduced the team that came from the district to the meeting. Then she informed about the objective of the consultation indicating that it is related with the rehabilitation of Mueda-Roma road and that as part of the studies that are being conducted it is necessary to inform communities and interact with them. This is necessary to prevent lack of knowledge, because when the project starts, the community must know what is happening. Then she gave the floor to the Consultant.



Figure 6: Head of the Ngapa Administrative Post addressing participants to the meeting

On behalf of the environmental and social impact assessment Consultant Francisco Saimone, reiterated that the meeting is related with the rehabilitation and asphaltting of the road from Mueda to Negomano. The contributions of the communities are extremely important in this process. The road will no longer be unpaved and will be asphalted, drainage ditches will be constructed, culverts and bridges necessary for the flow of the water in rainy weather will be set up. The road will have a width of 7m and 1m berms off the clusters, and 2m at the crossing of the clusters. The project will bring employment opportunities for local communities, reduce transportation costs and will allow public services to be closer to the community. Among other advantages it can be said that textbooks will always arrive on time and the classes will not be interrupted due to cuts on the road especially during the rainy season, it will be easier to transport patients to hospitals. Among other aspects the studies are aimed at preparing a plan to minimize the negative impacts of the project. Some fences, farm fields, trees and houses that are in the road borders will be affected to allow the machines to work on the road. Having finished, he asked people to speak openly about what they think will be positive and negative impacts of the project.

Issues that were Raised:

Cristiano Tadeu Madimba: expressed his appreciation of for the project and indicated that he sees no problem in removing trees or fences, but would like to get clarification on the treatment to be given where homes might be affected by the road (Figure 7).

Matthew Shinangudume: he also expressed his deep appreciation for the project. He reiterated that the employment opportunities expected from the project should benefit the young people who live on site and not those from other areas.

Rachide Assane: he reiterated the issue of employment for local youth.



Figure 7: Mr Cristiano Mandimba raising his questions and suggestions to participants that attended the meeting

Answers

In response to the questions, Francisco Saimone said that the aim of the project is to build the road and not to destroy houses. Efforts have been made to avoid affecting people living along the road. However, in some cases it is impossible to avoid. A plan is being drawn to get all the recommended procedures in place so that those likely to be affected will be compensated. This work will always be done in coordination with local authorities.

As for employment, he said that all unskilled labor will be sourced locally. The Contractor shall receive clear recommendations on how to proceed in the hiring of unqualified labor for the project. Men and women will have equal opportunity to work in the project works. The road is long and many communities live along the road, so there are many young people along the same. It will not be possible to hire everyone, but an effort will be made to give opportunity to the local community living in the project area.

Closing

By way of closing, the Head of the Administrative Post said that the project is welcome and that the population of Ngapa will ensure that everything goes well. The population is suffering a lot with the precarious state in which the road is at the moment. This is a good sign of development and thanks a lot.

MINUTES OF THE PUBLIC MEETING IN NINGA LOCALITY – ADMINISTRATIVE PORT OF NEGOMANO

Venue: Hall of Ninga Locality Building

Date: 30/09/2015

Time: 14H

Brief preparation meeting

While the population was getting organized, the local authorities organized a small preparation meeting for the consultation (Figure 8). The Head of Negomano Administrative Post informed those present that the visiting team came from Maputo, Pemba and Mueda Headquarters and had information that concerned all people in the area. Then gave the floor to the Director of District Services of Planning and Infrastructure.



The Director, Amalia Bernardo Tambe, reported that the intention was to conduct a community consultation to get to know people's concerns regarding the proposed rehabilitation of Mueda-Roma road. The road is currently difficult to use and will have significant improvements after rehabilitation, so there is a need to talk to the community, because in the end, it is them who are in charge. She then opened the floor for everybody to introduce themselves and for the Consultant to say a few words.

After the introductions, on behalf of the consultant Mr. Francisco Saimone said that the project is aimed at asphaltting, extending the pavement and berms, rehabilitation of all ditches, culverts and bridges, signaling along a stretch of 165km from Mueda to the interception with the road tar that will lead to the Unity Bridge in Negomano. The contribution of all is critical for the project to run satisfactory.

Pereira Kaine Tivi, one of the participants in the brief meeting took the floor and said that he had difficulty understanding the message, in particular when exactly was the project expected to start.

The Director of Infrastructure said the questions would be asked and also answered at the community consultation meeting to avoid answering the same questions several times probably because the community would have the same issues. The concern was noted.

Community Consultation

Opening the consultation with the community, The Head of the Administrative Post asked the community to pay a lot of attention and to bring all their queries forward.

After greeting the community, the Director of Infrastructures, asked that the entire team to make introductions. As a way of getting the meeting started she said it she was representing the Government of Mueda District, since both the Administrator as well as the Permanent Secretary could not attend the meeting because they were preparing for the presidential visit. She also indicated that there were two other consultations in other administrative posts covered by road. The purpose of the meeting was to deal with issues arising from the Mueda-Roma road rehabilitation project, which required communities living along the road to be consulted. Then she gave the floor to Consultant to the make the presentation.



Figure 9: Overview of participants to Miula (Negomano) consultation meeting

Taking the floor, Mr. Francisco Saimone reported that the Mueda to Negomano road will be paved. It will be extended, will berms for motorbikes and bicycles, drainage ditches, culverts, bridges and signage. Moreover, he indicated that this meeting was to gather the views of the community on the project. He outlined that there were some positive impacts that can be expected from the project, for example, it will reduce the cost of transportation, it will make it easier to transport patients to health facilities, it will facilitate the transport of basic commodities, allow for greater access to public services, it will enable everybody to produce more and market their products, there will be more buyers and investors can come because the road will be able to make it easy to carry the production. He added that to improve the road, there would be the need to cut some trees, fences and interfere with a few houses, which are very close to the road to allow for machines to work. All the persons likely to be directly affected by project will be consulted in order to find consensus for compensation. A plan is being prepared only to address this particular issue.

Questions

Rajabu Magoio: wanted to know how the owner of affected houses or trees would be treated.

Abdala John Mussa: when is the road construction expected to get started?

Mariamo: the work opportunities to be created will they be given to local workers or to workers from elsewhere? Because what we usually notice is that most people who come to work in local works are from other places and we would not want that to happen in this project.

Alima Ndalimo: my house is near the road. In case of it being affected by the road, what kind of support will I get?

Amina Macanica: if the road was to be built today I really would appreciate it a lot because transport costs are high, we want the road to be built.

Tina Calisto: thanks, but I would like to see these promises being made to be put in place because already there have been several kinds of promises from other projects in similar consultations, which then did not happen and we have lost hope.

Zainabo Tengtenga: believes in the positive impact that the road will bring. Now there are many promises without implementation. Calls for the project to begin soon.

Amisse Cassimo: wanted to know whether those who made holes near the road were part of the same group.

Answers

Taking the floor, the Consultant said that the study was done to avoid having to affect people along the road. The rehabilitated road is to benefit people who live here. However, in some cases it is inevitable because people even built near the road, which can hamper the work of the machines. Let's make a plan to contact all these people and we are preparing a plan to compensate people.

All unskilled labor will be local, both men and women have the same opportunity to work in the rehabilitation of the road. The Contractor shall receive clear recommendations on how to engage and involve local communities. We have to be aware that they are 165 km and there are many villages along the road. The project cannot employ everyone.

As for the start of works, a date cannot be given at this stage. What can be guaranteed is that there is a great desire from the Government of Mozambique, through the National Roads Administration for this project to take place as soon as possible. The necessary studies to submit for project funding are currently being finalized. To get funding all necessary studies should be completed. After getting the funding, the contractor to begin the works will then be hired. It is a process that takes time, because there a need to make sure that all details are right because it is very expensive.

Closing

By way of closing, the Director District Services of Planning and Infrastructure gave a practical example of the need to have patience and hope that the project will happen.

The Head of the Administrative Post thanked community participation and called for young people to be well behaved during the works. They should be decent and serious and avoid stealing materials or parts from the works. Everybody should collaborate.

List of People consulted

No	Names	Designation
1.	Mr. Adriano Ubisse	National Director of Treasury
2.	Ms. Fatima Rungo	Desk Officer AfDB
3.	Paula Bie	
4.	Honorable João Machatine	Honorable Minister
5.	Humberto Gueze	Director of Planning and Corporation
6.	Marco Vaz Dos Anjos	Director General
7.	Cesar Macuacua	Head Project Directorate
8.	Raul Cossa	Director Finance
9.	Emilia Tembe	Head of Dept
10.	João Godinho	Coordinator
11.	Francisco Simbine	Project coordinator
12.	Ernesto Correia	Coordinator
13.	Jose Lichucha	Procurement
14.	Harnnip Janhia	
15.	Jabinel Nhamússua	Financial
16.	Carla Mangane	Financial
17.	Anastacia Mauricio	Procurement
18.	Francisco J. Manheche	Coordinator
19.	Horacio Sambo	Procurement
20.	Miguel Durão	Procurement Specialist
21.	Dante Taddia	Team Leader T.A Contract Specialist
22.	Antonio Mahave	Project coordinator
23.	Firmino Macuiane	Disbursement Officer
24.	Arlindo Cumbane	Head of Technical Dept
25.	Joao Ricotso	Technician
26.	Angelina Balate	Project Coordinator
27.	Antonio Devesse	Head of DAC
28.	Angelina Lubrino	DNG
29.	Sansão Buque	DNAG
30.	Paulina Niuaia	DNG
31.	Palmira Antonio	DNG
32.	Ambrosio Adolfo Siteo	Director
33.	Aniato Pedro Chauque	Tecnico
34.	Ernesto Nampio	Tecnico
35.	Angelo Macuacua	Chairman
36.	Francisco Alvaro	Director of External Relations
37.	Carlos Fortes	Director of Planning
38.	Inacio Tique	Director Administration
39.	Cilenia Chipepo	Technician
40.	Reginaldo Siteo	Director Human Resources

	Mueda district	
41.	Edson Lino	Mueda-SEDE
42.	Manuel Pita Alavalave	President C.M.U Mueda
43.	Santos Pinto Velolo	SDPI
44.	Joaquim Jocio	Lider Rovuma
45.	Commelio Maloca	Lider Maitoit
46.	Bernaïdo Bichar	Lilondo
47.	Xavier Faia Ngumbe	Lider de Migungo
48.	Alfane issa Chionda	Lider Ngapa
49.	Heuriques Ernesto Lidimo	Lider de Ntauredi
50.	Bulaimu Samoja	Lider Ngapa
51.	Andere Litumba	Lider Magogo
52.	Damiao Nhomuessio	Lider Nanhamba
53.	Fabiao Panaingo	C/P.A/Ngapa
54.	Edmunde Hanga	ANE/CD
55.	Emilia Boeng	ANE/Maputo
56.	Angelina Bolate	ANE/Social Specialist
57.	Eng.Francisco Simbine	ANE/Project Coordinator
58.	Robert Jani	ANE Cabo Delgado
59.	Hasha	MITADER
60.	Fernando Tavares canina	MITADER-Climate Change Dept
61.	Tomas Cambule	MITADER-Climate Change Dept

Environmental and Social Management Plan

TABLE OF CONTENTS

TABLE OF CONTENTS.....	14
ABBREVIATIONS AND ACRONYMS.....	20
1. INTRODUCTION.....	21
1.1. Purpose.....	21
1.2. Scope.....	21
1.3. Structure of the ESMP.....	22
2. ORGANIZATION AND MANAGEMENT STRUCTURE.....	22
2.1. Lead Authority - MITADER.....	22
2.1.1. Role.....	22
2.1.2. Responsibilities.....	23
2.2. Other Authorities.....	23
2.3. ANE Environmental and Social Team.....	23
2.3.1. Role.....	23
2.3.2. Responsibilities.....	23
2.3.3. Reporting Structure.....	24
2.4. Consultants.....	24
2.5. Resident Engineer (RE).....	24
2.5.1. Role.....	24
2.5.2. Responsibilities.....	25
2.5.3. Reporting Structure.....	25
2.6. Environmental and Social Officer (ESO).....	25
2.6.1. Role.....	26
2.6.2. Responsibilities.....	26
2.6.3. Reporting Structure.....	27
2.7. Contractor.....	27
2.7.1. Role.....	27
2.7.2. Responsibilities.....	27
2.7.3. Reporting Structure.....	28

2.8.	Occupational Health and Safety Officer (OHSO).....	28
2.8.1.	Functions.....	28
2.8.2.	Responsibilities	28
2.8.3.	Reports.....	28
2.9.	Sub-Contractors	29
2.9.1.	Role	29
2.9.2.	Responsibilities	29
2.9.3.	Reports	29
3.	STAKEHOLDER ENGAGEMENT PLAN.....	30
3.1.	Overview of Existing Stakeholder and Community Relations.....	30
3.2.	The Future Stakeholder Engagement Plan	33
3.2.1.	Objectives of the Plan	33
3.2.2.	General Stakeholder Communication Record Maintenance	33
3.2.3.	Stakeholder Identification.....	33
3.2.4.	Community Liaison/ Monitoring Group.....	34
3.2.5.	Disclosure of Information	35
3.2.6.	The Future Engagement Programme.....	35
3.2.7.	Monitoring, Reporting and Feedback Mechanisms.....	36
3.2.8.	Grievance Mechanism.....	37
3.2.9.	Roles and Responsibilities.....	39
4.	ENVIRONMENTAL SPECIFICATIONS	40
4.1.	Detailed Design	40
4.1.1.	Small realignments.....	40
4.1.2.	Protection against erosion	40
4.1.3.	Signalization	40
4.2.	Planning.....	40
4.2.1.	Environmental Principles for the Construction Works	40
4.2.2.	Compliance with Environmental Legislation.....	41
4.2.3.	Site Inspection.....	41
4.2.4.	Permits and Permissions.....	41
4.2.5.	Negotiation for Land Access and Compensation	41
4.2.6.	Construction Method Statements	42
4.2.7.	Existing Services and Infrastructures	43

4.2.8.	Site Location and Contractor's Camp.....	43
4.2.9.	Environmental Training and Awareness	43
4.2.10.	Labor force	46
4.2.11.	Cultural heritage	46
4.3.	Site Establishment.....	47
4.3.1.	Site Identification	47
4.3.2.	Working Areas and No-go Areas	47
4.3.3.	Site Demarcation.....	47
4.3.4.	Contractor's Camp	48
4.3.5.	Water supply	48
4.4.	Site Clearance.....	48
4.4.1.	Land Mine Clearance.....	48
4.4.2.	Site Clearance.....	48
4.4.3.	Topsoil Conservation and Stockpiling	49
4.4.4.	Access Roads	49
4.5.	Site Housekeeping.....	49
4.5.1.	Site housekeeping	49
4.5.2.	Workshop, Equipment Maintenance and Storage.....	50
4.5.3.	Cooking Facilities.....	50
4.5.4.	Security	50
4.5.5.	General Materials Handling, Use and Storage	51
4.5.6.	Spoil Sites	51
4.5.7.	Fuels, Oils, Hazardous Substances and other Liquid Pollutants	51
4.5.8.	Solid Waste Management.....	53
4.5.9.	Sanitation	58
4.5.10.	Wastewater and Contaminated Water Management	58
4.5.11.	Storm-water Management and Erosion Control	58
4.5.12.	Air emissions control and limitation	59
4.5.13.	Noise Control	59
4.5.14.	Traffic Control	59
4.5.15.	Disruption of Access to Property	60
4.5.16.	Dust Control and Air Pollution	60
4.5.17.	Conservation of Vegetation and wildlife.....	60

4.5.18.	Protection of features of Cultural, Historical and/ or Archaeological Importance.....	61
4.5.19.	Protection of Sensitive Environments and Natural Features.....	61
4.5.20.	Fire Prevention and Control.....	62
4.5.21.	Emergency Procedures	63
4.5.22.	Health and Safety General	63
4.5.23.	Community Relations and Control of Community Disruption	64
4.6.	Construction Activities	65
4.6.1.	Manual Excavation.....	65
4.6.2.	Planning Borrow Pits and Quarries	65
4.6.3.	Construction and Operation of New Borrow Pits and Quarries	65
4.6.4.	Blasting.....	66
4.6.5.	Asphalt, Bitumen and Paving	66
4.6.6.	Cement / Concrete Batching.....	67
4.6.7.	Bridges and Culverts	67
4.6.8.	Work Stoppage and Temporary Site Closure.....	67
4.6.9.	Crushing	68
4.6.10.	Retaining Walls and Gabions	69
4.7.	Rehabilitation.....	69
4.8.	Complementary Initiatives.....	70
4.8.1	Works in Residential Areas	70
4.8.2	Protection Devices	73
4.9.	Completion of Contract and Decommissioning of the Site.....	73
4.9.1.	Completion of Contract.....	73
4.9.2.	Decommissioning of the Site	73
4.10.	Operation Phase.....	74
4.10.1.	Awareness campaign to prevent road accidents.....	74
4.10.2.	Community Development Programs	74
4.10.3.	Public Transport and Population Mobility	74
4.10.4.	Financial Sector	74
4.10.5.	Planning the Land use	74
4.11.	Additional Measures for Gender	75
4.11.1.	Legal Framework.....	75
4.11.2.	Planning.....	77

4.11.3.	Construction.....	78
4.11.4.	Decommission.....	78
4.11.5.	Operation and Maintenance.....	78
4.12.	Biodiversity Management.....	78
4.13.	ESMP Summary table.....	88
5.	MONITORING PLAN.....	96
5.1.	Planning.....	96
5.2.	Construction Phase	96
5.2.1.	General.....	96
5.2.2.	Labor Force	96
5.2.3.	HIV/AIDS.....	97
5.3.	Operation phase	97
5.3.1.	Erosion	97
5.3.2.	Traffic accidents	97
5.3.3.	CO ₂ emissions and Climate Change	97
5.3.4.	Noise and vibration	98
5.3.5.	HIV/AIDS.....	98
5.4.	Tolerance	98
5.5.	Penalties.....	98
APPENDIX	101
Appendix 1: Consulted Documents.....		101

List of Figures

Figure 1: ESIA Phases & Public consultation	31
Figure 2: The Grievance Procedure.....	37
Figure 3: Parking areas in urban areas.....	71
Figure 4: Protections at the right of schools.....	72
Figure 5: Interventions at bridge areas.....	72

List of Tables

Table 1: Public consultation meetings	32
Table 2: Future stakeholder engagement programme.....	35
Table 3: Public grievance form.....	37
Table 4: Grievance log.....	38
Table 5: Solid Waste Management Plan	55

Table 6: AfDB strategy to address women economic empowerment (Pillar 2) and knowledge management and capacity building through infrastructure development project.....	75
Table 7: Main corridors identified along the road	88
Table 8: ESMP Cost summary by project phase.....	88
Table 9: ESMP Summary Table	90
Table 10: Typical incidents incurring penalties.....	100

ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Meaning
EPDA	Environmental Pre- feasibility and Scoping Study
TOR	Terms of Reference
MITADER	Ministry of Land, Environment and Rural Development
km	Kilometer
km/h	Kilometers per hour
AfDB	African Development Bank
ANE	National Roads Administration
CFC	Chlorofluorocarbon
EIA	Environmental Impact study
ESIA	Environmental and Social Impact Assessment
GoM	Government of Mozambique
HHS	Hygiene, Health and Safety
NGO	Non-Governmental Organization
RAP	Resettlement Action Plan
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
PI&As	Project Interested and Affected People
SADC	Southern African Development Community
ISS	Integrated Safeguards System

2. INTRODUCTION

The Government of Mozambique (GoM), through the National Roads Administration (ANE) intends to use the funds from the African Development Bank for Development (ADB) to rehabilitate the road N381 / 2151 from Mueda and Roma (95km) , in the District of Mueda, Cabo Delgado Province.

The project has been classified as Category A, in terms of the Mozambican regulations. This report is the Environmental and social Plan (ESMP), which is a requirement for Category A projects.

This Environmental and social Plan (ESMP) provides a set of good environmental practices that should be followed by the Contractor(s) to be hired to participate in the rehabilitation process. It is in line with the best international practices and environmental requirements in force in Mozambique. It also presents 5 plans (i.e. environmental monitoring, risk management plan and emergency; Plan for solid waste management, landscape recovery plan (sandpits and quarries); and engagement plan with interested and affected parties (I & APs)), which form a set of operations to be carry out in the next five years to comply with the principles of environmental protection.

This ESMP was also based on the General Guidelines for Environmental Impact Assessment Development (Ministerial Decree nr. 129/2006 of 19 July) and other national legal provisions.

2.1. Purpose

The general purpose of an ESMP is to ensure that all project activities are conducted and managed in an environmental and responsible manner. Specifically, this ESMP aims to:

- Provide the entity that oversees the environmental area (currently the Ministry of Land, Environment and Rural Development - MITADER), with a tool to facilitate environmental monitoring of all project activities in line with the Mozambican environmental legislation;
- Provide clear guidelines to the Developer/Contractors (employees, service providers and others) with the domestic and international legal requirements of sustainable environmental and social standards;
- Incorporate environmental and social in the Contractor's operating procedures;
- Serve as an action plan for environmental and social;
- Provide a framework for implementation of mitigation measures related with the environmental impacts;
- Prepare and maintain environmental performance records of project activities.

2.2. Scope

This ESMP is applicable for the Rehabilitation Project of the Road between Mueda and Roma (95 km) on all activities at all stages of its implementation (design, planning, construction, operation and maintenance and decommissioning).

The ESMP is a dynamic document and subject to change. As some details of the executive project are still unknown at this stage, it can be expected that, as a working document, it will be updated before the bidding process so that competitors are familiar with the environmental conditions and obligations

expected for the project. However, any proposed amendment must be submitted to the Developer (ANE) for approval.

2.3. Structure of the ESMP

This ESMP is structured as follow:

- Chapter 1 – Introduction: introduces the document, the purpose and the content;
- Chapter 2 – Organization and Management Structure: describes the roles, responsibilities and lines of authorities for those organizations and individuals who are to be associated with the implementation of the ESMP;
- Chapter 3 – Environmental Specifications: sets the environmental specifications that should be implemented to ensure the mitigation of negative impacts and enhance the positive impacts of the project;

3. ORGANIZATION AND MANAGEMENT STRUCTURE

Compliance with the instructions in this document is the responsibility of the Project Proponent. However, in order to ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project.

The following entities will be involved on the present ESMP:

- Lead Authority – Ministry of Land, Environment and Rural Development (MITADER);
- Other Relevant Authorities;
- ANE Team in charge of Environmental and Social Aspects (Departamento de Administração de Contratos – Gabinete de Assuntos Transversais (GAT)/Contracts Management Department – Cross-cutting Issues Office (GAT));
- Consultant;
- Resident Engineer (RE);
- Environmental and Social Officer (ESO);
- Contractor;
- Occupational Health and Safety Officer (OSHO);
- Sub-contractors.

The following descriptions represent the minimum level of roles and responsibilities of above actors to implement the ESMP. The roles and responsibilities described below can be updated as necessary.

3.1. Lead Authority - MITADER

Ministry of Land, Environment and Rural Development (MITADER) is the national Government institution created by the Resolution 6/2015 of 26th June.

3.1.1. Role

Among other responsibilities, MITADER is responsible to ensure the implementation of the environmental policies.

3.1.2. [Responsibilities](#)

- Participate in meetings with the Project Proponent and other stakeholders at the start of the EMP process in order to reach agreement on the approach to the ESMP;
- Review the draft ESMP submission. Based on the review, the authority will either (i) approve the ESMP (with or without conditions), (ii) return the ESMP for further improvement and re-submission, giving guidance on what needs to be revised or added, or (ii) reject the ESMP, giving reasons;
- Process and issue the environmental license for construction and operation of the project;
- Review monitoring and audit reports, if required;
- The authority may perform random controls to check compliance of the ESMP. In case of persistent non-compliance, the Project Proponent will be required to provide an action plan with corrective measures and have approved by the authorities;

3.2. [Other Authorities](#)

Other authorities may be involved in activities relating to the ESMP. For example, local authorities may be involved in monitoring activities. Other authorities may also be involved in the development, implementation, review and approval of the ESMP. The reason for their involvement is primarily to verify the accuracy and comprehensiveness of the information provided from the viewpoint of their specific mandates and areas of responsibility (e.g. Permits and licenses).

3.3. [ANE Environmental and Social Team](#)

ANE is the Client/Employer/Proponent and has overall responsibility for ensuring the implementation of the project and its ESMP, taking into account the requirements of the following entities:

- National Environmental Authority (MITADER);
- Funding Agency (AfDB).

3.3.1. [Role](#)

Environmental and Social Team of ANE will be required to assume overall responsibility for the environmental and social aspects of the project. An important part of this role will be to:

- Ensure that the ESMP approved by MITADER and the Funding Agency is included in the bid documentation for selection of contractors;
- Audit the implementation of the ESMP by the Contractor;
- Report on the implementation of the ESMP to ANE senior managers, MITADER and/or the funding agencies as and when necessary.

3.3.2. [Responsibilities](#)

The responsibilities of the ANE Environmental and Social Team will include the following:

- Hire the contractor and supervision team (resident engineer and environmental control officer);

-
- Establish and maintain regular and proactive communications with the consultant, resident engineer, contractor, etc.
 - Undertaking periodic site visits and site inspections to perform an environmental audit of the implementation of the project ESMP;
 - Review and comment on environmental reports produced by the Resident Engineer, Contractor, etc.;
 - Report to Funding Agencies and/or MITADER as and when required on the state of the environmental and social for the project ESMP;
 - Ensure that the Generic ESMP is reviewed and updated as necessary.

3.3.3. [Reporting Structure](#)

The ANE Environmental and Social Team will take instruction from the following:

- ANE Project Engineer;
- MITADER and/or the Funding Agencies.

The following will liaise the ANE Environmental and Social Team:

- The Resident Engineer, and/or
- The Occupational Health and Safety Officer.

3.4. [Consultants](#)

ANE has already hired STUDI International to prepare the tender documents for the selection of contractors. Within this process, the Consultant has responsibilities both in engineering and in the environmental and social fields. The following activities are being carried out by the Consultant:

- Prepare a concept design and consider the feasibility of the sub-project within an engineering, logistical, economic and environmental context;
- Submit the environmental impact assessment reports for approval to MITADER;
- Submit the Environmental Assessment Report approved by MITADER to ANE for submission to the pertinent Funding Agency for approval.
- Prepare an ESMP on the basis of the results of the environmental assessment studies and submit to the relevant authorities for approval.

3.5. [Resident Engineer \(RE\)](#)

The Resident Engineer (RE) will be appointed by ANE and will be required to oversee the construction program and construction activities performed by the Contractor.

3.5.1. [Role](#)

The role of the RE will be:

- Review and approve method statements by the contractor in connection with the ESMP;
- Oversee the general compliance of the Contractor with the ESMP and other pertinent site specifications;

-
- Liaise between and with the contractor and the ANE Environmental and Social Team on environmental and social matters, as well as any pertinent engineering matters where these may have environmental consequences.

3.5.2. [Responsibilities](#)

The RE will be required to:

- Be familiar with the contents of the ESMP;
- Monitor the Contractor's compliance with the Environmental Specifications on a daily basis, through the Site Diary;
- Communicate to the Contractor, verbally and in writing, necessary advices to perform environmental and social management of the works;
- Request for, review and approve the Method Statements prepared by the Contractor;
- Review and approve drawings produced by the Contractor in connection with, for example, the construction site layout, access/haul roads and so on;
- Advise on materials that may be used to designate working areas and materials to be used for the works as and when necessary;
- Communicate to ANE, verbally and in writing, at least 10 working days in advance, any proposed actions which may have negative impacts on the environment;
- Undertake damage assessments where incidents, accidents and serious infringements have occurred on/off site;
- Review and approve all areas that have been rehabilitated by the Contractor;
- Review complaints received and make instructions as necessary;
- Accompany ANE Team during site inspections and/or inform it in writing of any infringements of the Environmental Specifications and to issue instructions to the Contractor;
- Discuss with the ANE Team the application of penalties for the infringement of the Environmental Specifications, and other possible enforcement measures when necessary;
- Issue penalties as and when necessary;
- Implement Temporary Work Stoppages where serious environmental infringements and non-compliances have occurred;
- Maintain a record of complaints from the public and communicate these to the Contractor and the ANE Team;
- Facilitate proactive communication between all role-players in the interests of effective environmental and social.

3.5.3. [Reporting Structure](#)

The RE will report to ANE.

The Contractor will report to the RE.

3.6. [Environmental and Social Officer \(ESO\)](#)

An Environmental Officer (ESO) will be appointed by the RE to monitor, review and verify the implementation of the ESMP.

3.6.1. [Role](#)

The overall role of the ESO is to be the on-site for the implementation, integration and maintenance of the ESMP in accordance with the contractual requirements with ANE.

The ESO will be required to liaise with the ANE Environmental and Social Team on the level of compliance with the ESMP achieved by the Contractor on a regular basis for the duration of the contract. His intervention can be as part or full time.

3.6.2. [Responsibilities](#)

The ESO will have the following responsibilities:

- To advise the RE on the interpretation and enforcement of the Environmental Specifications, including discussions on non-compliances;
- To supply environmental information as and when required;
- Review and approve Method Statements produced by the Contractor with the RE;
- To demarcate particularly sensitive areas and pass instructions through the RE concerning works in these areas;
- To monitor any basic physical changes to the environment as a consequence of the construction works – e.g. evidence of erosion, dust generation and silt loading in runoff;
- To undertake regular inspections and submit reports on the Contractor's compliance with the Environmental Specifications: these reports shall be copied to the RE and to the ANE Environmental and Social Team;
- To undertake quarterly audits of the construction works and submit audit reports to the ANE Environmental and Social Team for review;
- To communicate frequently and openly with the Contractor and the RE to ensure effective, proactive environmental and social, with the overall objective of preventing or reducing negative environmental impacts and/or enhancing positive environmental impacts;
- Undertake damage assessments with the RE where incidents, accidents and serious infringements have occurred on/off site;
- To advise the RE on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities;
- Review and approve all areas that have been rehabilitated by the Contractor;
- Review complaints received and make instructions as necessary;
- Identify and make recommendations for minor amendments to the ESMP as and when appropriate;
- Prepare and maintain the material for the Environmental Training Awareness courses and Environmental Information Posters as part of the overall environmental training for the contract;
- Ensure that the Contractor, his employees and/or Sub-Consultants receive the appropriate environmental awareness training prior to commencing and during activities;
- Establish and maintain an Environmental Site Diary to record all environmental incidents related to the construction of the Project.

3.6.3. [Reporting Structure](#)

The ESO will report to the RE.

The ESO will liaise and/or receive instructions from:

- RE;
- ANE Environmental and Social Team.

The ESO will advise the RE and the Contractor on environmental and social aspects.

3.7. Contractor

ANE will appoint a Contractor to undertake the construction of the given project.

The 'Contractor' will be contractually required to undertake his activities in an environmentally responsible manner, as described in the ESMP.

3.7.1. [Role](#)

The role of the Contractor will be to:

- Implement, manage and maintain the ESMP for the duration of the contract;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the ESMP;
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties;
- Provide appropriate resources, budgets, equipment, personnel and training – for the effective control and management of the environmental risks associated with the construction.

3.7.2. [Responsibilities](#)

The Contractor will have the following responsibilities:

- Be familiar with the contents of the ESMP;
- Comply with the Environmental Specifications contained in the ESMP and subsequent revisions;
- Confirm legislative requirements for the construction works, and ensure that appropriate permissions and permits have been obtained before commencing activities;
- Ensure that access to the land for the construction site and works has been acquired;
- Prepare Method Statements, program of activities and drawings/plans for submission to the RE;
- Undertake daily site inspections (with the RE) to monitor environmental performance and conformance with the Environmental Specifications;
- Review the site inspection reports and take cognizance of the information/recommendations contained therein;
- Notify the RE, verbally and in writing, immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken;

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- Ensure environmental and social awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them;
 - Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract;
 - Undertake rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the RE;
 - Undertake the required works within the designated working areas;

The Contractor will also set up his own management system to ensure and monitor the application of the sub-project ESMP and associated Environmental Specifications. This system shall, at a minimum, provide for:

- The preparation of Method Statements as required by the project ESMP;
- The effective and accountable management of construction activities relative to the Environmental Specifications;
- Reporting on a regular basis and as required to the RE on environmental issues;
- Recording, in writing, all communication/correspondence with all pertinent stakeholders and other parties on environmental and social issues;
- The development of emergency and contingency plans for the key range of accidents and emergencies that may be associated with the project;
- Regular, constructive and proactive liaison with the ANE Team and the RE.

3.7.3. [Reporting Structure](#)

The Contractor will receive instructions from the RE and ANE Team.

3.8. Occupational Health and Safety Officer (OHSO)

3.8.1. [Functions](#)

The Occupational Health and Safety Officer will be hired by the Contractor to ensure the health and safety of both workers and the community.

3.8.2. [Responsibilities](#)

The Occupational Health and Safety Officer will ensure compliance with the same specifications.

The Occupational Health and Safety Officer will be responsible for conducting workers' induction and regular sessions on occupational health and safety, including emergency procedures.

The Occupational Health and Safety Officer will be responsible for ensuring that the material and human conditions for response to accidents at work are available and on standby.

3.8.3. [Reports](#)

The Occupational Health and Safety Officer receives instructions from the Contractor.

3.9. Sub-Contractors

3.9.1. [Role](#)

The subcontractors will be hired by the Contractor to perform certain activities related to the project.

3.9.2. [Responsibilities](#)

The Subcontractors must comply with the Environmental Specifications and instructions given by the Contractor to ensure compliance with the same specifications.

Sub-contractors and their workers should be induced on Environmental Specifications by the Contractor.

3.9.3. [Reports](#)

The Subcontractors received instructions from the Contractor.

4. STAKEHOLDER ENGAGEMENT PLAN

4.1. Overview of Existing Stakeholder and Community Relations

Public participation and communication is being conducted mainly to meet the requirements of ANE's Environmental Directive for Road Sector, AfDB ISS and above all the requirements of the national environmental regulation as stipulated by both Decree 54/2015 and Diploma 130/2006 and other related regulatory instruments.

Under the above-mentioned regulations and guidelines, the ESIA process emphasizes the clear need for frequent interaction and communication between general public, affected parties by proposed Project, external interested and concerned organizations, as well as project scientists and engineers.

Each aspect of the technical investigations generally includes a data collection and verification phase, followed by analysis and evaluation, then synthesis and conclusions. The findings of each phase are communicated as appropriate to external parties. The ESIA process was divided into five major phases, namely:

- Inception Phase: Pre-assessment application form and Project categorization
- Scoping Phase and definition of detailed ESIA Terms of Reference (ToR)
- Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) Phase
- Compilation Phase and Draft ESIA and ESMP
- Final ESIA and ESMP

Each one of above mentioned phases will be marked by series of public meetings in which relevant Interested and Affected Parties (I&APs) will be present. The end of the Scoping Phase and the presentation of the Draft Final Report was marked by mandatory public meetings. These were announced 15 days' prior the meeting day. In addition to being invited by public notice (main national newspaper), a certain number of participants to these meetings was directly invited by letters of invitation to be drafted by the Consultant and issued and distributed by ANE. In line with the regulations hard copies of the Scoping Report was made available to the public in certain places such MITADER-Central and Provincial, Government of Mueda, ANE-Central and Provincial. The meetings took place in September 2015 with general Project information disclosed for the public, with the Terms of Reference (ToR) for environmental and social assessment. The second mandatory round of public consultation are to be held to discuss the draft ESIA and ARAP to the local communities along the alignment. During the meetings, the ESIA team in collaboration with ANE representatives will maintain I&APs informed of the main issues and findings of each phase and collect concerns and interested expressed by various project stakeholders. All the public meetings will be non-technical and are expected to contribute to get stakeholders' inputs in terms of avoiding/minimizing negative impacts and optimizing the positive impacts of the project. Minutes of these meetings will be produced and public participation process report will be drafted and included in the Final Reports.

A phasing of public consultation and involvement for the project should be structured as shown in the figure (diagram) and table below.

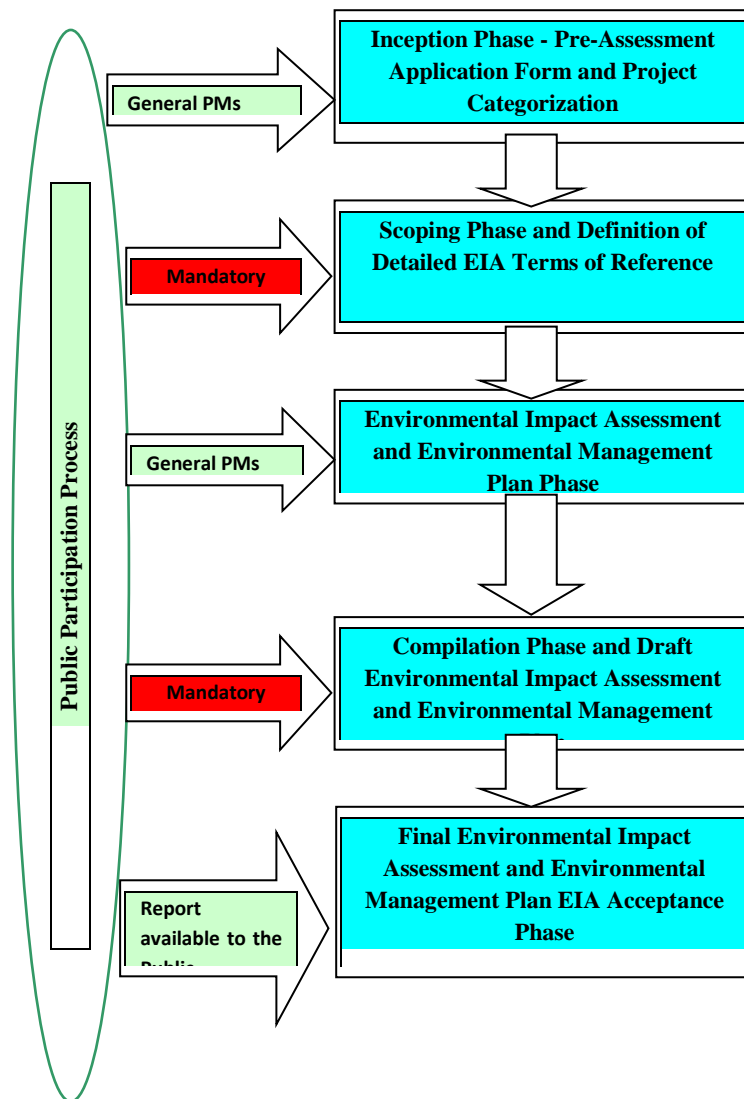


Figure 22: ESIA Phases & Public consultation

Table 58: Public consultation meetings

Phases/Types of Meetings	Objectives	Participants	Location	Remarks
1. Inception Phase – Pre-Assessment Application Form and Project Categorization 1.1. Individual and household interviews	Road recognition Initial interviews and collection of concerns from I&APs Literature and legal/regulatory review Understanding of gender roles and needs	Households along the road Mueda Government representative – planning, administration, infrastructures	Mueda All villages	No mandatory general public meeting
2. Scoping Phase and Definition of ESIA Terms of Reference 2.1. General Public Meetings	Presentation of design specifications Pre-assessment of possible impacts Timings Collect feedback and concerns	Community leaders Households sample MITADER – Cabo Delgado representative ANE – GAT Government of Mueda Administration Secretariat, Planning and Infrastructure Service	Ninga (Negomano Administrative Post) Miula (Ngapa Administrative Post) Nanhamba (Mueda Administrative Post)	General public meetings in each administrative post affected by the project with relevant communities along the road.
3. ESIA and EMP Phase 3.1. Individual and Focus Group Meetings	Data collection and dissemination of information on project characteristics and possible impacts Collect feedback and concerns	Key informants Community leaders Census of affected households	All section	No mandatory general public meeting
4. Compilation Phase and Draft ESIA and ESMP	Discussion of findings Collect feedback	ANE Team members I&APs MITADER	Pemba Mueda Ngapa	Meetings in each city and other places identified as relevant

Even during environmental and social impact assessment (ESIA) process, key informant's interviews were conducted with Government representatives namely: administrator, permanent secretariat,

education, planning and infrastructures. Additional separate meetings were conducted with all community representatives in the three administrative posts affected by the road. Key informant's interviews were conducted during surveys for abbreviated resettlement action plan (ARAP) and biodiversity offset plan (BOP).

As part of this SEP, a formal grievance mechanism is proposed with an appropriate form to record complaints, comments and questions about the project and designated roles and responsibilities to manage the process during the pre-construction, construction and operation phases.

4.2. The Future Stakeholder Engagement Plan

4.2.1. [Objectives of the Plan](#)

The Stakeholder Management Plan (SEP) aims at summarizing the methods, procedures and activities that will be implemented by the Proponent to inform stakeholders in an inclusive and timely manner about the potential impacts of the project.

The SEP contains a stakeholder identification table where all relevant stakeholders are identified with the most appropriate communication channels and strategies, information disclosure and grievance process processes that will be adopted. If there are stakeholders who are not included in the SEP they can get in contact with the Proponent to receive information about the Project and be added to the stakeholder engagement programme in this SEP.

4.2.2. [General Stakeholder Communication Record Maintenance](#)

Consultation records, minutes of meetings and write-ups of informal consultations will be maintained by the Environmental and Social Officer (ESO) clearly logging the key information provided to stakeholders and also the key incoming communications, complaints and questions along with a summary of actions taken. The minutes of meetings should, among other aspects, contain:

1. Date
2. Venue – City, Village
3. Summary of the main issues presented during the meeting by the developer and/or his representative (ESIA and/or Engineering team)
4. Summary of the main issues presented by the participants (Note: all concerns and interests expressed should be recorded)
5. Feedback given
6. List of participants including names and position of the organizers as well as contact details of all who attended the meeting.

As part of this communication procedure, ESO will record and update these stakeholder engagement activities on an on-going basis and will prepare monthly reports summarizing the activities and key emerging themes raised by affected people.

4.2.3. [Stakeholder Identification](#)

This section will identify all relevant stakeholders including interested parties and other affected communities, local, district and provincial level authorities. Stakeholders could also be individuals and

organizations that may be directly or indirectly affected by the project either in positive or negative way, who wish to express their view.

From previous consultations during the ESIA preparation, where identified stakeholders that can be grouped into following categories:

- Affected/beneficiary household
- Government (e.g. ANE-GAT, ANE-Cabo Delgado Delegation, Provincial Directorate of Land, Environment and Rural Development, MITADER-Directorate of Environment, Government of Mueda District representative including community leaders and administrative post chiefs, others);
- Local Non-governmental organizations;
- The media;
- International (e.g. International NGOs)

If stakeholders are not on the list above and would like to be informed about the Project, contact should be made with the ESO or other members of the local authorities.

Vulnerable Groups

The stakeholder identification examined if there are any groups of affected people who might be more vulnerable to potential Project impacts. Discussions have been held with relevant personnel from several institutions. During the assessment and the preparation of this SEP, groups were examined who might be affected by the project differently due to their gender, age, ethnicity, religion, physical or mental disability or other attributes. The assessment identified that there are no vulnerable groups affected by the project who might require different channels of communication.

During Project implementation the ESO might identify vulnerable groups who will then be added to the SEP and appropriate communication methods will be identified.

4.2.4. [Community Liaison/ Monitoring Group](#)

1. The ESO shall facilitate the establishment of Communities Liaison/Monitoring Groups for the sections of the road;
2. The Community Liaison/Monitoring Groups shall involve representatives of the Contractor and the workers (chose by the workers), Local Authorities (*Administradores and Chefes de Posto*), traditional Leaders and representatives of women and youth from the local communities;
3. The Community Liaison/Monitoring Groups will be available to deal with issues arising out of construction activities that negatively impact on residents living along the road and shall be involved in:
 - Resettlement plan;
 - Selection of the location of camp site, borrow pits, spoil area and all other areas required for construction;
 - Recruitment of labor force;
 - Use of natural resources.

-
4. The Liaison/Monitoring Groups shall be informed about the Contractor's organization, Camp Site facilities, Contractual Conditions with the local employers and about the work plan;

4.2.5. [Disclosure of Information](#)

The types of information disclosed and the specific methods of communication to be undertaken by the local authorities for this Project is summarized in the Stakeholder Engagement Programme (SEP) in the Table below. The objectives of external communications are to provide continuous engagement with affected people and other relevant stakeholders and to inform them about the activities, performance, development and implementation of the project.

The SEP is a live document that will be revisited and updated if necessary on an annual basis to reflect the changes in stakeholder engagement due to project developments and new stakeholders if any. The information that is required to be disclosed may change if there are changes in the Project design, schedule or area of influence. The external and internal communication methods and information for disclose identified in the Table are not exclusive, the Proponent may choose to disclose more information upon request by stakeholders.

Local authorities will be responsible for internal and external communications regarding the project and they will appoint the ESO to be the main contact point for affected people. All related Project documents and communications related to the Project will be available and undertaken in Portuguese.

4.2.6. [The Future Engagement Programme](#)

The envisaged programme of public consultation and disclosure activities are presented below. This programme includes immediate consultation and engagement activities required to address current stakeholder concerns, as well as regular consultation and disclosure activities throughout the project life cycle.

ESO will be responsible for SEP implementation. Contact details such as name, telephone and email must be clearly available.

The local authorities and ESO will collate any comments and feedback associated with this Project and will document these.

All comments received will be reviewed in accordance with the commitments made. All communications will be reviewed for the feasibility to make changes to satisfy the request and interest and the communicator will be informed of the outcome.

The future stakeholder engagement programme is detailed in table below.

Table 59: Future stakeholder engagement programme

Stakeholders	Communication method	Information to be disclosed	Timeframe
People affected by land acquisition	Information boards with post box and personal visits to herders and farm houses	Grievance mechanism, vacancies, EIA, SEP, timeline of construction	Prior to construction. During project implementation weekly update on grievance and quarterly update on vacancies
All affected people, residents and employees of farms, and villages, informal land users	Information boards with post box and personal visits in affected villages	Grievance mechanism, vacancies, SEP, timeline of construction	Prior to construction. During project implementation weekly update on grievances and quarterly update on vacancies
Regional public	Internet. Newspapers. Telephone. E-mails	Information about the project. Grievance mechanism. Vacancies	Quarterly update
Local NGOs	Telephone, newspaper, documents and meetings on request	Project information on request	Quarterly update
Village area and district government	Meetings, telephone, e-mail, information boards in district administration	EIA, ESMP, SEP, vacancies	Quarterly update
Construction works	Information boards and meetings in construction camp	Health and safety requirements, workers protection requirements, workers' grievance mechanism	Prior to construction, weekly updates during construction
International NGOs and all above	No direct contact, documents available on ANE and AfDB websites	EIA, ESMP	120 before AfDB board discussion and for the loan duration

4.2.7. [Monitoring, Reporting and Feedback Mechanisms](#)

The Community Liaison/Monitoring groups and the ESO will monitor the communication channels such as media, one-to-one meetings and periodic meetings and will provide feedback as appropriate. A complaint and suggestion box will be available for stakeholders participating in public consultation meetings and will also be available at the major's office, at the office of Construction Supervision (Resident Engineer - RE). The messages left in the box will be registered in the book for complaints and suggestions. Those messages will be supervised by the community liaison/monitoring group and then will be sent to the RE for further consideration.

4.2.8. Grievance Mechanism

A grievance mechanism will be implemented to ensure that the Proponent is responsive to any concerns and complaints particularly from affected stakeholders and communities. Special care will be focused on the training of the designated staff involved in the management of the grievance mechanism. This grievance mechanism covers both employees and non-employees (i.e. affected people and other relevant stakeholders).

Any comments or concerns can be brought to the attention of the company verbally or in writing (by post or e-mail) or by filling in a grievance form. The grievance form will be made available in the construction camp office, community centers and other public places that are accessible for all relevant stakeholders, alongside a description of the grievance mechanism. Grievance forms can then have submitted to the ESO.

All grievances will be:

- Acknowledged within 14 working days;
- Responded to no later than within 30 working days;

The grievance log presented in the table below will assist in recording comments, complaints and grievances for monitoring purposes. The grievance procedure is depicted in Figure below.

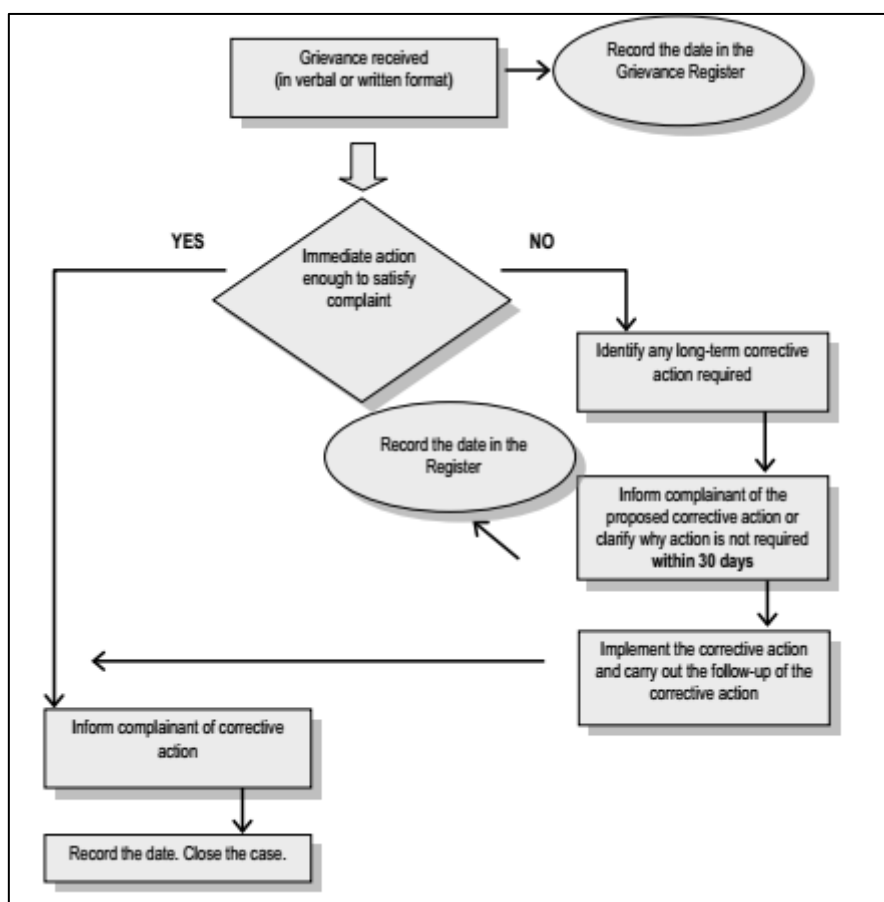


Figure 23: The Grievance Procedure

Table 60: Public grievance form

Name / Contact details	Date received	Details of complaint/comment	Responsibility	Action taken	Date resolved

4.2.9. [Roles and Responsibilities](#)

The community liaison/monitoring groups and the ESO will have the overall responsibility for handling the consultation and information disclosure process, including organization of consultation process, communications with identified stakeholder's groups, collecting and processing comments/complaints and responding to any such comments and complaints. Depending on the nature of a comment/complaint, some comments or complaints will be provided to the appropriate person in the authorities for a response.

Environmental and Social Officer

The Proponent will appoint or sub-contract an Environmental and Social Officer (ESO) who will be responsible for community liaison and arranging communications with local communities. The ESO will be available throughout the Project and will be largely responsible for implementation of the SEP, particularly receiving and channeling comments and concerns during the construction phase as well as management of the grievance mechanism during the construction and some of the operational phase. The ESO will ideally be located close vicinity of the Project and its affected stakeholders to ensure their accessibility.

5. ENVIRONMENTAL SPECIFICATIONS

To facilitate the use of the present ESMP, the environmental and social instructions are presented according to the sequence of project stage activities as the following:

- Detailed Design;
- Planning;
- Site Establishment;
- Site Clearance;
- Site Housekeeping;
- Construction Activities;
- Rehabilitation;
- Completion of Contract and Decommissioning of the Site;
- Operation phase.

5.1. Detailed Design

5.1.1. [Small realignments](#)

- The cemeteries and ritual sites identified along the road shall be preserved and not affected by the alignment.
- The realignment should be minimal in the crossing section of the conservation area to prevent the destruction of natural vegetation and crossing the villages to avoid or minimize resettlement and compensation, provided that road safety is maintained.

5.1.2. [Protection against erosion](#)

- The Consultant shall prepare details and specifications for the erosion protection, downstream of the outlets of the transversal and longitudinal drainage structures. The protection shall include energy dissipation, gabions and vegetation.

5.1.3. [Signalization](#)

- Speed shall be limit to 60 km/h in the settlements. Signs defining the speed limits shall be installed at the entrances of the settlements.
- In the settlements with more than 1000 inhabitants, speed humps shall be installed close to schools, markets and collective transport stops;
- All the curves with low visibility shall have signs with speed restriction;
- Informative signs shall be considered for all schools, health centers, cemeteries, wildlife crossing and high risk accident zones.

5.2. Planning

5.2.1. [Environmental Principles for the Construction Works](#)

- The environment is considered to be composed of both biophysical and social components.
- Construction is a destructive activity of the environment, including the social environment and to consider all measures to minimize the impact on the affected parties
- Minimization of areas disturbed by construction activities to minimize many environmental impacts associated with the construction and reduce the need for rehabilitation and costs.

- All relevant standards relating to international, national, provincial and local legislation, as applicable, should be adhered to. This includes requirements relating to waste emissions, waste disposal practices, noise regulations, road traffic ordinances, etc.
- All relevant permits and permissions shall be obtained from relevant authorities to undertake construction activities as necessary.
- Every effort should be made to minimize, reclaim and/or recycle waste material.
- The Contractor will be required to prepare an Environmental Policy Statement that will state his commitment to achieving the basic principles for environmental protection and control for the duration of his contract. This statement will be displayed at the site as part of the Environmental Information display Poster.

5.2.2. [Compliance with Environmental Legislation](#)

- The Contractor shall ensure that all pertinent legislation concerning the protection of the natural environmental and prevention of pollution is strictly enforced.
- This includes:
 - ✓ Mozambican legislation (including any international standards and criteria that have been adopted in absence of Mozambican standards)
 - ✓ AfDB requirements – as described in Environmental Assessment reports prepared in support of the project design (Volume 2).
- The Contractor shall maintain a database of all pertinent legislation, regulations and guidance pertinent to the environmental and social of the project for the duration of the contract.

5.2.3. [Site Inspection](#)

The RE and the Contractor shall undertake a pre-construction inspection of each section of the road alignment. The RE, ESO and Contractor shall undertake a pre-construction inspection of each section of the alignment and all ancillary sites. The inspections shall involve a site review of the alignment and any identified ancillary sites required by the Contractor. It will serve to:

- identify site-specific construction or environmental problems;
- Identify services that are required to be reinstated; identify cut and spoil disposal or storage sites;
- Identity workforce camp and work compound sites; and plan the phasing of construction along the road alignment.

5.2.4. [Permits and Permissions](#)

The Contractor shall ensure that all pertinent permits, certificates and permissions have been obtained prior to any activities commencing on site and are strictly enforced/adhered to. This includes, for example, land mine clearance certificates.

The Contractor shall maintain a database of all pertinent permits and permissions required for the contract as a whole and for pertinent activities for the duration of the contract.

5.2.5. [Negotiation for Land Access and Compensation](#)

- A detailed survey shall be carried out to identify all the displaced people, agricultural plots, fruit trees, houses and other structures to be affected by the project;
- An Abbreviated Resettlement and Compensation Plan should be prepared and implemented before the start of activities;
- Negotiations for access to land and payment of compensation for partial or total loss of property shall be undertaken by ANE.

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- The Contractor will be required to:
 - ✓ Negotiate with appropriate landowners for land to be used as access areas outside the designated construction site, and in particular provide appropriate compensation for the temporary loss of such land.
 - ✓ Make a representative available, where required by the RE, to discuss issues raised by residents regarding property and related issues and to help resolve any conflicts.
 - ANE and the Provincial and District Government shall establish terms and conditions for compensation jointly without trampling of legal provisions and best practices internationally accepted for this purpose.
 - District authorities (District directorates for Agriculture and Food Security, of Work, of Health, of Housing, Public Works and Water Resources, for Land, Environment and Rural Development, for Gender, and Child Welfare) and the District Administration shall be involved in the resettlement plan.
 - A group with representatives of the above district directorates, led by the Administrator should be responsible for the defining the locations for the resettlement. The sites should have natural resources and access to basic infrastructure (schools, health, water) for sustenance and well-being of the resettled community.
 - The awareness approach about rights and proceedings for relocation and compensation to be used by the Government teams in the interactions with the community shall be participative, encouraging the involvement of the community members in the decision-making that affects their own future.
 - Members of this group shall consult the resettles to identify their preferences and Local Leaders, to avoid land use conflicts.
 - The resettlement and compensation shall consider the following categories for compensation/assistance:
 - ✓ Families living in a band of 10m from the road, who shall have compensation for all loss structures, compensation in cash for crop loss and availability of alternative land for farming, compensation in cash for loss of small businesses, assistance after relocation, namely through supplying domestic and agriculture materials/equipment's (i.e. crops, fertilizers, tools).
 - ✓ Families with farming land in a band of 10m from the road, who shall be compensated in cash for crop loss, receiving an alternative land for farming.
 - ✓ Church or schools in the 10m band shall be replaced with new structures.
 - ✓ Individuals with infrastructures related to small business along the road, which shall have the compensation of all the structures and compensation in cash for interruption of the business.
 - ✓ Communities with important ritual sites in the 10m band, that shall be assisted.
 - Compensations for agricultural crops and trees should be done according to the values established by the provincial directorates for Agriculture and Food Security.

5.2.6. [Construction Method Statements](#)

- The Contractor shall submit written Method Statements to the RE for approval before commencement of any activity.
- Method Statements shall indicate what will be done to comply with relevant environmental (and technical) specification and shall state clearly:
 - ✓ Timing and location of activities.
 - ✓ Materials, equipment and staffing requirements.
 - ✓ Transporting the materials and/or equipment to, from and within the site.
 - ✓ The storage provisions for the materials and/or equipment.
 - ✓ Emergency procedures.

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- ✓ The proposed construction procedure designed to implement the relevant Environmental (and Technical) Specifications.
 - ✓ Other information deemed necessary by the RE and/or ESO.
 - Method Statements shall be submitted at least ten (10) working days prior to the proposed commencement of work on an activity to allow the RE (and/or ESO) time to study and approve the method statement.
 - The Contractor shall not commence work on that activity until such time as the Method Statement has been approved in writing by RE.
 - The Contractor shall carry out the activities in accordance with the approved Method Statement.
 - Under certain circumstances the RE may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the RE, and appropriate records retained.
 - Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel.
 - Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract.

5.2.7. [Existing Services and Infrastructures](#)

- The Contractor shall ensure that existing services (e.g. roads, water pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the RE.
- The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted.
- Such repair or reinstatement will be at the Contractor's cost and shall receive top priority over all other activities.
- A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.
- It is the Contractor's responsibility to familiarize himself with the position of existing services and infrastructure that may get damaged due to construction activities.

5.2.8. [Site Location and Contractor's Camp](#)

- The site for the Contractor's Camp shall be determined in collaboration with the RE and ESO, taking into consideration:
 - ✓ Preferentially to be located on land already cleared wherever possible;
 - ✓ It should also avoid area where the soil has higher erosion risk.
 - ✓ The need to be more than 20 meters from watercourses and wetlands in a position that will facilitate the prevention of storm water runoff from the site from entering the watercourse;
 - ✓ Communities shall be involved in the site location to avoid destruction of any ritual site or any other conflict.
- The Contractor's Camp layout shall take into account availability of access for deliveries and services and any future works;
- The Contractor's Camp should also be of sufficient size to accommodate the needs of all sub-contractors that may work on the project.

5.2.9. [Environmental Training and Awareness](#)

- The Contractor and sub-contractors shall be aware of the environmental requirements and constraints on construction activities contained in the provisions of the ESMP;
- The Contractor will be required to provide for the appropriate Environmental Training and Awareness as described in this instruction in his costing and programming;
- An initial environmental awareness training session shall be held prior to any work commencing on site;

- The target audience is all project personnel;
- The training should include reference, but not be restricted, to the following:
 - ✓ Basic awareness and understanding of the key environmental features of the work site and environs;
 - ✓ Understanding the importance of and reasons why the environment must be protected;
 - ✓ Ways to minimize environmental impacts;
 - ✓ Relevant requirements of ESMP;
 - ✓ Prevention and handling of fire;
 - ✓ Health risks pertinent to the site, including prevention of diseases such as malaria and cholera;
 - ✓ Awareness, prevention and minimization of risk with regard to the contraction and spread of HIV/AIDS and other sexually transmitted diseases.
- Registers of attendance shall be maintained by the Contractor and ESO.
- The Contractor shall erect and maintain Environmental Information Posters for his employees regarding HIV/AIDS, protection to wildlife and forest;
- The Environmental Information Posters shall be erected at the eating areas and any other locations specified by the RE.

5.2.9.1. Occupational, Health and Safety (OHS)

- All new employees must undergo induction SSO to ensure that they are familiar with the basic rules of work on site and personal protection and that of their colleagues;
- The training should consist of basic hazard awareness, site-specific hazards, safe work practices and emergency procedures in case of fire, evacuation and natural disasters. Any hazard warning system or color codes in use should be used as part of orientation.
- Redemption liability with workers and first aid should receive dedicated training so that they do not exacerbate the exposure for themselves unduly or for their colleagues. Training should include the risk of becoming infected with through contact with blood and body fluids and tissues;
- Through contractual specifications and monitoring, ANE must ensure that service providers, as well as hired labor and subcontractor, are adequately trained before starting any work.

Guidelines for Visitors

- Visitors are in principle are not allowed to enter in unauthorized service areas. If necessary, guidance should be given to safeguard their safety;

Training of Contractors and New Tasks for Workers

- The complex should ensure that workers and contractors have received proper training before the start of new works. Training should adequately cover:
 - Knowledge of materials, equipment and tools;
 - Knowledge of dangers in operations and how to control them;
 - the potential risks to health;
 - the hygiene requirements;
 - Use of personal protective equipment;
 - the appropriate response to extreme operations, incidents and accidents.

Signage in the Area

- Dangerous Areas (shelter for generators, compressors, etc.), installations, materials, safety measures and emergency exits, etc. They must be properly marked ;

-
- The signs must be in accordance with international standards and be well known, and easily understood by workers, visitors and the general public.

Labeling of Equipment

- All piping that may contain hazardous substances due to their chemical and toxicological properties, or temperature or pressure, should be labeled according to their content and danger or appropriate color code;
- The pipes can also indicate the direction of flow and check valves.

Communication of Danger Codes

- Danger code system Copies shall be posted on the outside of the infrastructure in emergency exits to call attention to workers;
- Information on the type of hazardous materials stored, handled and used on site should be shared by emergency and security services personnel to provide appropriate response when needed;
- Representatives of local emergency and security services should be invited to participate in periodic training and inspections to ensure familiarization with the potential impacts.

5.2.9.2. HIV/SIDA awareness and prevention campaign

- The Contractor shall institute HIV/AIDS awareness and prevention campaign amongst his workers for the duration of the contract, contracting and implementing organization, with preference for an organization already working on this issue in the region;
- The campaign shall include the training of facilitators within the workers, information posters in more frequented areas in the campsite and public areas, availability of promotional material (T-shirts and caps), availability of condoms (free), theatre groups;
- The implementing agency shall work in close liaison with the ESO, who will make the liaison with the ANE;

5.2.9.3. Malaria awareness and prevention

An effective program of malaria control can be based on the ABCDE model:

- A – Awareness
- B – Bite Prevention
- C – Chemoprophylaxis
- D – Diagnosis and Treatment
- E – Environmental Control

A – Awareness

Workers should be sensitized to the key points of information:

- *Malaria kills*

It is estimated that malaria kills more than 1 million people each year, and about 500 million become severely ill;

- Malaria is a parasite that is spread by mosquitoes

There are four types of malaria parasites that cause diseases in humans. They are spread by a species of mosquito, Anopheles.

- A mosquito bite is enough just to give you malaria

As a mosquito bite is sufficient to transmit malaria. The Anopheles bites are not necessarily large or are itching and may go unnoticed.

- Malaria causes fever and flu symptoms appears

The initial symptoms of malaria are fever with headache, extreme tiredness, body aches. This disease may progress rapidly (within 24 hours) to coma and death.

- Expatriates will never develop immunity

Some people who live from childhood in malaria areas can develop the so-called semi-immunity. But expatriates will never develop such protection. And even with semi-immunity, there is still a risk of catching malaria.

- The malaria mosquitoes bite at night

The greatest risk is in the morning and late in the day. Should avoid staying in the exterior and if this is the case, one should use repellents. Should sleep under mosquito nets.

B – Bite Prevention

Focus on preventing bites by taking measures such as distributing mosquito nets to workers; wear long sleeves and distribution of repellents for night shifts; and design accommodations and lodging with nets on doors and windows.

C – Chemoprophylaxis

While no medication can fully protect against malaria, prophylactic drugs, if taken correctly and consistently, can reduce the risk of contracting malaria. Most offer of 75-95 % protection, and this should be taken into consideration for workers who come from malaria-free countries. Only a doctor can prescribe use of chemo prophylactic.

D – Diagnosis

Malaria suspicion is a medical emergency

If left untreated, severe malaria is almost always fatal. And even with the best available treatment, 15-20 % of people die. For this reason, it is essential not to ignore the initial symptoms.

Knowing the prevalence of malaria is based on: (i) clinical signs and symptoms of the patient; (ii) detection of malaria parasites through blood samples (test).

Workers should be encouraged to take the test as soon as the first symptoms are felt. Rapid Diagnostic tests can be acquired and made available in the doctor's office complex, and establish an appropriate procedure for treatment.

E – Environmental Management

Malaria can also be prevented by reducing the mosquito population, killing adults and larvae mosquitoes. This can be achieved by: (i) control of larvae - Chemical control (fumigation); (ii) use of insecticides in the interior to kill adult mosquitoes.

5.2.10. Labor force

- Wherever possible, the Contractor shall use local labor, with a minimum of 25% being women.
- Community Liaison/Monitoring Groups shall be involved in the recruitment and in the development of the construction works.
- The Contractor shall select a local Human Resource co-director.

5.2.11. Cultural heritage

- Contractor shall contract an anthropologist or other history expert to carry out a research in collaboration with Cabo Delgado-ARPAC regarding heritage of N'gapa memorial monument;
- The Contractor shall contract an archaeologist expert to make a scoping study through bibliographic and aerial photo review and site reconnaissance to identify areas with higher probability on finding archaeological artifacts. The archaeologist shall follow the site clearance in those areas.

5.3. Site Establishment

5.3.1. [Site Identification](#)

- The Contractor will produce a plan illustrating the proposed construction camp and proposed working and 'no-go' areas. The plan must be approved by the RE and ESO. The plan should include reference to the following aspects where pertinent as and where these are required:
 - Proposed working areas;
 - 'No-go' areas;
 - Contractor's Camp;
 - Quarries, borrow pits and spoil areas;
 - All buildings, offices and/or hostels. Cooking and eating areas, Sanitation/ablution facilities;
 - Storage, spoil, stockpile and lay down areas;
 - Hazardous and fuel storage areas;
 - Batching plant and workshop/equipment maintenance areas;
 - Vehicle wash areas;
 - Waste disposal facilities;
 - Access routes;
 - Security gates and gatehouses;
 - Parking areas and other infrastructure required for the running of the site.
- The working areas shall be kept to a minimum to reduce the total physical 'footprint' of the construction site and to reduce environmental damage;
- The Contractor shall not use the land forming or connected with the construction site for any purpose other than for the proper carrying out of the works under the contract.

5.3.2. [Working Areas and No-go Areas](#)

- The Construction Site shall be divided into working areas and 'no-go' areas and shall be marked on appropriate plans for reference;
- Working areas are those areas required by the Contractor to construct the works and as approved by the RE and ESO.
- 'No-go' areas are generally those large areas outside the designated working areas, and may include, but not be limited to:
 - Occupied villages and homesteads;
 - Ritual and historical sites;
 - Large trees (> 200 mm in diameter);
 - Cultivated lands and all fruit and nut trees;
 - Riparian and wetland areas.

5.3.3. [Site Demarcation](#)

- Prior to commencing construction, the Contractor, RE and ESO shall inspect the site and identify any sensitive environments and other 'No-go' areas.
- The Contractor shall clearly mark out the extent of clearing within the approved worksite areas with pegs or tape at 25 meters' intervals or less. No construction activity shall occur outside defined work areas. The maximum width of clearing shall be two meters beyond the limits of the road prism.
- Locate, peg out and seek approval for each ancillary site prior to the commencement of related activities.

- Where necessary, the No-go areas shall be demarcated using materials as specified by the RE. These shall include fencing, plastic tape or other approved materials or means.
- Identify and fence or otherwise protect individual trees or groups of trees and shrubs for retention within the marked area of clearing. This is especially important at ancillary sites where this vegetation provides screening, shade and erosion protection.
- Instruct all construction workers to restrict clearing to the marked areas and not to work outside defined work areas.
- Stockpile cleared shrub foliage within the road corridor for later use as a brush layer and seed stock.
- Any areas disturbed outside the demarcated areas or without the permission of the RE shall be subject to rehabilitation at the Contractor's cost.

5.3.4. [Contractor's Camp](#)

- The Contractor shall implement the following, as required:
 - A suitable storm water drainage system to prevent soil erosion, protect storage areas and to prevent stagnant ponds forming;
 - A suitable potable water supply;
 - Suitable facilities for bathing, washing clothes or vehicles – site staff will not be permitted to use open water bodies for such activities;
 - Suitable sanitation facilities, adequate for the number of staff on site;
 - Facilities for cooking;
 - Facilities for solid waste collection;
 - Facilities for waste water management.
- The method for provision of these services will be approved by the RE and ESO.

5.3.5. [Water supply](#)

- Abstractions from natural, municipal and/or private water resources (e.g. streams, lakes, boreholes and well points) for potable water and construction water shall be approved by the RE;
- The Contractor shall arrange for the necessary approvals/permits from the District Direction for Housing and Public Works for the abstraction of water.

5.4. [Site Clearance](#)

5.4.1. [Land Mine Clearance](#)

- The Contractor shall obtain a de-mining certificate for the construction site.

5.4.2. [Site Clearance](#)

- The Contractor shall ensure that all negotiations and compensation for land, crops, trees, houses, grave sites and other relevant items have been satisfactorily completed as defined in the Environmental Instruction, before the site is cleared.
- Where specified, areas may be cleared of grassland and scrub vegetation. No large trees (trunk diameter > 200mm) shall be removed unless approved by the ESO.
- Wood obtained from clearing and grubbing operations remains the property of the ANE and may only be disposed of after consultation with the ANE.
- Cleared fibrous vegetation shall be separated in piles, and made available for local community use;
- No soil, vegetation or construction material shall be dumped in wetlands or water bodies.
- No burning of vegetation to clear the Site will be permitted.
- The works shall be supervised by an expert in archaeology to identify eventual archaeological sites, giving the proper instructions to the Contractor.

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- The Contractor shall notify the RE if any previously unidentified graves or artifacts of archaeological or cultural significance are uncovered during site clearance. Work shall be stopped while the appropriate authorities (ARPAC) are notified, they have inspected the site and given approval to proceed.

5.4.3. [Topsoil Conservation and Stockpiling](#)

- Where topsoil occurs within the limits of the area to be cleared and grubbed, the Contractor shall remove the topsoil to reuse for replanting.
- Wherever practical the Contractor should use hand labor for topsoil removal.
- Where specified, topsoil shall be excavated to the base of the organic rich A-Horizon and stockpiled separately. The topsoil shall not be mixed or contaminated with any other material.
- Storage mounds for topsoil shall have a maximum depth of two meters. Sow a cover crop on each topsoiled batter within 2 days of topsoiling. In borrow pits, topsoil is to be stored to the longitudinal side of the pit.
- Subsoil shall be stockpiled separately.
- Compaction of the topsoil stockpiles is not permitted.
- Topsoil stockpiles are to be maintained in a weed free condition.
- Erosion of soil stockpiles will not be permitted and appropriate protection of the stockpiles from wind erosion and water erosion must be provided.
- The movement of soils from one part of the construction site to another should be minimized and undertaken with the consent of the ESO.
- Where soil is to be stockpiled for several months, these stockpiles should be seeded with a quick germinating, annual grass species to stabilize the stockpiles. Alternatively, the stockpiles may be protected by a mulch cover (which is free from alien vegetation and seeds).
- No materials classed in terms of this Specification as topsoil shall be used as backfill for any excavation.

5.4.4. [Access Roads](#)

- The Contractor shall comply with all applicable legislation and by-laws with regard to road safety and transport;
- Access to the construction site and works area shall utilize existing roads and tracks where possible;
- Upgrading of the access roads shall not be undertaken within the existing confines of the road, unless otherwise agreed with the RE;
- Movement of vehicles is to be confined to identified roads as far as possible and vehicles may not drive through or make turning circles in wetland areas, “Machambas” or yards of homesteads under any circumstances;
- All temporary access routes shall be rehabilitated at the end of the contract to the satisfaction of the RE;
- Damage to the existing access roads as a result of construction activities shall be repaired to the satisfaction of the RE. The cost of the repairs shall be borne by the Contractor.

5.5. [Site Housekeeping](#)

5.5.1. [Site housekeeping](#)

- The Construction Site and surrounds are to be maintained in a clean orderly and presentable condition at all times;
- Regular inspections by the Contractor and the ESO will be undertaken using checklists to ensure a minimum standard of orderliness is maintained;
- Construction activities shall avoid causing unnecessary disruption and nuisance to adjacent settlements, “landowners” and the public as a whole.

5.5.2. [Workshop, Equipment Maintenance and Storage](#)

5.5.2.1. *Workshop*

- Where practical, all maintenance of equipment and vehicles on Site shall be performed in the workshop;
- If it is necessary to do maintenance on site, but outside of the workshop area, the Contractor shall obtain the approval of the RE prior to commencing activities;
- The Contractor shall ensure that there is no contamination of the soil, vegetation or surface water in his workshop and other plant or emergency maintenance facilities;
- The workshop shall have a smooth impermeable floor either constructed of concrete or suitable plastic covered with sufficient gravel to protect the plastic from damage; The floor shall be bonded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil); Drip trays shall be used to collect the waste oil and lubricants during servicing and shall also be provided in construction areas for stationary plant (such as compressors); The drip trays shall be inspected and emptied daily. Drip trays shall be closely monitored during wet weather to ensure that they do not overflow;
- The workshop shall be kept tidy at all times.

5.5.2.2. *Equipment Maintenance and Storage*

- All vehicles and equipment shall be kept in good working order, are serviced regularly and stored in an area approved by the RE;
- Leaking equipment shall be repaired immediately or removed from the site;
- All washing of equipment shall be undertaken in the workshop or maintenance areas which shall be equipped with suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate/nitrate and low using-type detergents;
- Rivers and streams shall not be used for washing of equipment and vehicles.

5.5.3. [Cooking Facilities](#)

- The Contractor shall designate cooking and eating areas, subject to the approval of the RE.
- Any cooking on site shall be done on either well maintained gas cookers or by containing fires (e.g. in a drum) and locating them away from flammable vegetation or construction materials;
- The Contractor shall provide kerosene stoves and fuel (or other alternative non-wood stoves) for workers to cook;
- The following will not be permitted:
 - Cooking outside the designated areas and in particular beyond the site;
 - Open cooking fires or fires for heating;
 - The use of surrounding and/or indigenous vegetation for cooking or heating fires;
 - The feeding or leaving of food for animals.
- Sufficient bins for waste disposal, as described in the Environmental Instruction, shall be present in this area.

5.5.4. [Security](#)

- Appropriate fencing, security gates, shelter and/or security guards are to be provided at the Construction Site to ensure the security of all plant, equipment and materials, as well as to secure the safety of site staff;
- The Contractor must ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft;
- Valuables are to be stored in secure, locked areas;
- Site staff that are found to be involved in incidences of theft or pose other security risks to the local community are to be dismissed and reported to the authorities.

5.5.5. [General Materials Handling, Use and Storage](#)

- All materials shall be stored within the Contractor's camp unless otherwise approved by the RE;
- Stockpile areas shall be approved by the RE;
- All imported fill, soil and/or sand materials shall be free of weeds, litter and contaminants. Sources of imported materials shall be listed and approved by the RE;
- Topsoil stockpiles shall be located and managed in accordance with the above instructions;
- The Contractor shall ensure that delivery drivers are informed of all procedures and restrictions (including 'No go' areas) required;
- Any electrical or petrol driven pumps shall be equipped and positioned so as not to cause any danger of ignition of the stored product;
- Collection containers (e.g. drip trays) shall be placed under all dispensing mechanisms for hydrocarbons or hazardous liquid substances to ensure contamination from any leaks is reduced;
- Regular checks shall be conducted by the Contractor on the dispensing mechanisms for all above ground storage tanks to ensure faulty equipment is identified and timely replaced;
- Only empty and externally clean tanks may be stored on bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

5.5.6. [Spoil Sites](#)

- Where the Contractor is required to spoil material, environmentally acceptable spoil sites must be identified and approved by the RE, taking into consideration:
 - Preferentially to be located on land already cleared wherever possible;
 - The need to be more than 20 meters from watercourses and wetlands in a position that will facilitate the prevention of storm water runoff from the site from entering the watercourse;
 - Communities shall be involved in the site location to avoid destruction of any ritual site or any other conflict.
- The development and rehabilitation of spoil areas shall include the following activities:
 - Stripping and stockpiling of topsoil;
 - Removal (to a nominal depth of 500mm) and stockpiling of subsoil;
 - Contouring of spoil site to approximate natural topography and drainage and/or reduce erosion impacts on the site;
 - Placement of excavated subsoil and then topsoil over spoil material;
 - Contouring and re-vegetation.
- The Contractor shall ensure that the placement of spoil is done in such a manner to minimize the spread of materials and the impact on surrounding vegetation and that no materials 'creep' into 'no-go' areas.

5.5.7. [Fuels, Oils, Hazardous Substances and other Liquid Pollutants](#)

- Hazardous materials shall not be stored within 2 kilometers of the top water level of public water supply reservoirs;
- Hazardous materials shall be stored above flood level and at least twenty meters from any watercourse;
- Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations;
- In public drinking water source areas, total fuel tank storage volume shall not exceed 5000 liters unless written approval is granted from ANE or ANE's representative based on a specific environmental risk assessment;
- Chemicals and fuel shall be stored in storage tanks within a secure compound. All chemicals and fuels shall be stored in accordance with manufacturer's instructions;

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- Compounds shall be constructed of waterproof reinforced concrete or approved equivalent, which is not adversely affected by contact with chemicals captured within them;
 - The minimum compound volume shall be 110% of the capacity of the largest tank system, plus 25% of the total capacity of all other separate tanks and containers within the compound. Containment compounds shall have sufficient capacity to retain spilt chemicals and not be overtopped during rainfall events. Additional capacity for rainfall captured within the compound shall be calculated using a rainfall depth of 100mm over the entire compound. The compound shall also capture any leak or jet of liquid from any perforation of the tank or associated equipment;
 - In drinking water areas, underground pipe-work carrying product from the tank to facilities outside the containment compound shall not be acceptable. In these areas above ground pipe-work shall be double contained. In other areas, any underground pipe-work shall have double containment. Pipe-work within the containment compound does not require double containment;
 - In drinking water catchments, the containment compound shall be enclosed or roofed to prevent accumulation of storm water: The roof shall be extended at least 1 meter past the edge of the compound. Side walls or vertical roof turn-downs shall be used (if appropriate) to prevent intrusion of wind -driven rainfall;
 - Tank equipment such as dispensing hoses, valves, meters, pumps, and gauges shall be located within the containment compound;
 - The base of the containment compound shall grade towards a liquid retention sump to facilitate recovery of spilt liquids. The compound if exposed to storm water intrusion, shall be emptied by pumping, not through a valve gravity outlet, which could inadvertently be left open. Enclosed containment compounds shall have adequate inspection and venting ports. They shall not have “speed bumps” or irregular surfaces that may cause accidents with containers;
 - Gully pits used for collecting spills shall have a sealed base and be easily accessible for pump-out. Pits that capture run-off from large areas shall drain to a lined storage basin which can be isolated by valving. This is to avoid leakage to surrounding soil or external drainage systems. Pits shall never discharge direct to soaks where contaminated waste could easily leach into groundwater or surface water;
 - Security shall be provided to guard against vandalism when the site is unattended. This includes:
 - Fencing of the tank compound with locks or other adequate security controls at the site;
 - Locks on unattended dispensing hoses;
 - Emergency procedures shall be prepared, documented and approved by ANE prior to commencement of construction activities;
 - Depositing of any substance which may contaminate waters is strictly prohibited;
 - Appropriate training for the handling and use of such materials is to be provided by the Contractor as necessary. This includes providing for any spills and pollution threats that may occur;
 - Extreme care will be taken when transferring chemicals and fuels from storage vessels to equipment and machinery on an impervious sealed area which is kerbed and graded to prevent run-off. Chemical and fuel transfer areas shall drain away from the perimeter bund to a containment pit. The design shall provide for the safe and efficient movement of vehicles;
 - All chemicals stored within the bonded compounds shall be clearly labeled detailing the nature and quantity of chemicals within individual containers. Sight gauges indicating the current volume are recommended for tanks larger than 250-liter capacity;
 - Any chemical or fuel spills shall be cleaned up immediately on discovery. The spilt liquid and clean-up material shall be removed, treated and removed and transported to an appropriate site licensed for its disposal;
 - The compound shall be maintained in a clean condition and the accumulation of storm-water and litter will be prevented. Only storm-water assessed as uncontaminated by a qualified and experienced person may be released to the environment;

- Storm-water shall be diverted away from the containment compound and an oil water separator shall be provided to treat any rainwater collecting in the compound. Any liquid released to the environment shall be equivalent or better quality than raw water for drinking water supply.
- Bulk containers used to decant chemicals or fuel shall be fitted with drip trays;

5.5.8. [Solid Waste Management](#)

As mentioned in the ESIA Report, the district of Mueda (including the section along the Road N381/R2151) does not have a waste management structure. Even at the beginning of the road N381/R2151 which is part of Municipality of Mueda, the waste management system is still elementary and includes collection and deposit in an open space environment. The rest of the project's direct influence areas are rural, and people use to burn or buried directly wastes on the soil.

The Contractor shall take into account these constraints and respect the following basic rules for the duration of the works:

- The Contractor should implement measures for the better management of solid waste in accordance with the regulation on waste management, namely:
 - Decree 13/2006 - Regulations on Waste Management, establishing the legal framework for waste management in Mozambique. The purpose of this legal provision is to establish rules for the generation, transfer and disposal of solid waste. Article 5 classifies waste into two categories: hazardous and non-hazardous. The management of hazardous waste is assigned to the MITADER, including the management of licenses. Only registered and licensed companies and entities are allowed to collect, transport and handle hazardous waste in appropriate locations.
 - Article 9 of Environmental Law proscribing the production and disposal of toxic substances or pollutants in the soil, subsoil, water or atmosphere as well as imposing a ban on any activities that may accelerate any form of environmental degradation beyond the limits set by law.
- The Contractor shall implement measures for waste minimization and waste management:
 - The site is to be kept clean, neat and tidy at all times;
 - No burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted;
 - All personnel shall be instructed to dispose of all waste in a proper manner;
 - At all places of work, the contractor shall provide litter collection facilities;
 - The final disposal of the site waste shall be done at the project site, which location shall be approved by the RE, after agreement of the Local Administration and Local Leaders (see below);
 - The provision of sufficient bins (preferably vermin and weatherproof) at the camp and work sites to store the solid waste produced on a daily basis;
 - Wherever possible, materials used or generated by construction shall be recycled;
 - Provision for responsible management of any hazardous waste generated during the construction works.
- Waste Disposal on Site:
 - The landfill shall be constructed in an exploited site (for example a disaffected borrow pit or quarry) to avoid disturbing additional areas. It shall be located in an impermeable ground

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- (clayey soil) and at least 200 meters from the nearest house or farm so that the local community is not affected by odor, noise, flies or aesthetic impacts;
- The landfill location shall be approved by the RE;
 - The landfill shall not be located in a designated drinking water catchment;
 - The landfill shall be located at least 200 meters from an active water source used by the local community;
 - The base of the landfill shall be at least 3 meters above the highest water table level;
 - The landfill shall not be located on land which is used for commercial or other land uses important to the local community;
 - If the landfill is to be located in a borrow pit, the pit must have been exhausted of its resource or waste disposal kept separate from resources use to prevent contamination of resource materials with wastes or water contaminated by wastes. Separation includes measures such as placing wastes down-slope of the resource materials to prevent water contaminated by the wastes flowing into the resource material;
 - Surface drains and bonding shall be used around the perimeter of the landfill to prevent surface run-off coming into contact with the wastes. The only water infiltrating the landfill shall be direct rainfall;
 - Waste shall be disposed into the landfill pit in lifts so that each lift can be compacted and covered on disposal. The cover layer shall comprise stockpiled material dug from the pit and shall be at least 10 cm depth once compacted. Daily compaction and covering prevents windblown litter, discourages birds and vectors and reduces rainfall infiltration;
 - Vehicles transporting waste to the landfill shall be covered to prevent windblown litter;
 - Vehicles operating at the landfill shall be kept free of wastes and litter to prevent trucking of waste outside the landfill area;
 - Once land-filling is complete the whole landfill shall be covered by soils and compacted. The compacted depth of cover shall be at least one meter. Soils containing impermeable material such as clays are preferable as they will promote run-off and minimize infiltration of rainwater into the wastes. Some infiltration is beneficial to promote decomposition of wastes;
 - The surface cover of the landfill shall be contoured to fit in with the surrounding landscape. Finished slopes shall not be steeper than 4 horizontals to 1 vertical;
 - The surface of the landfill shall be revegetated with grasses and small shrubs. Trees should be avoided as their roots will penetrate the wastes and provide channels for water ingress;
 - Panels will be placed near the landfill to signal its presence during and after operation.
- Awareness and training:
 - Awareness campaign will concern all personnel working on the site including heads of services and subcontractors. It will be made periodically through weekly and monthly meetings.

The Heads of Services shall provide continuous awareness sessions to the workers under their responsibility. They will create a climate in their teams for the good receptivity of "behavior to be" which will be provided by the HSE Team.
 - The training concerns persons who will implement the operational part of the SWMP. It will focus on guidelines to be followed when collecting, sorting and transferring waste.
 - Traceability in the waste removal

- Traceability is required upon removal of certain waste produced on the site such as used oil, mechanical parts and tools, used tires, scrap metal, etc. It will be ensured through a "waste abductions fees" to complete each shipment of waste.
- The amounts of the various types of waste produced on site must be registered and monthly monitoring is done in the Monthly Report.
- Before signing outsourcing contracts for solid waste management, subcontractors are subject to the approval of the RE.
- During the preparatory phase and in the framework of the installation of its works' infrastructure, the Contractor shall develop a Solid Waste Management Plan (SWMP) that takes into account the installation sites of camps, workshops, mechanical garages, quarries, borrow pits, etc., in which it shall:
 - ensure compliance with the regulatory framework for waste management in Mozambique;
 - identify all wastes that may be produced on site;
 - determine the sort modes, collection, storage and disposal;
 - identify possible courses of treatment, disposal and recovery;
 - ensure as far as possible the traceability of waste during its management;
 - ensure awareness and training of staff for the collection, sorting and storage of waste and minimization of waste generation.

The following table can be used as an example to follow and adapt to the actual conditions and terrain constraints.

Table 62: Solid Waste Management Plan

Kind of waste	Type of waste	Production site	Storage mode	Method of disposal	Collection frequency	Responsibility
Non-Hazardous Wastes	Paper / cartons	Camps	Drums and bins	Controlled incineration (without smoke) / Reuse of cartons	1 to 2 times per week	Occupational Health and Safety Officer (OHSO)
		Mechanical workshop	Drums and bins			
		Laboratory	Barrels			
		Offices				
		Restaurant	Plastic bags and bins			Restaurant manager
	Plastic bottles and bags	Mechanical workshop	Carton / Trash bags	Reuse bottles (local residents) / Landfill to create (Plastic bags)	Continuously	All staff / Occupational Health and Safety Officer (OHSO)
		Offices				
		Camps				
		Laboratory				
		Restaurant				Restaurant manager
	Pallets / Wood	Mechanical workshop	Storage in reserved area	Reuse by employees and local residents	Continuously	All staff / Occupational Health and Safety Officer (OHSO)
	Ink cartridges	Offices	Storage in cartons	Reuse	Continuously	Occupational Health and Safety Officer
		Mechanical workshop				

Kind of waste	Type of waste	Production site	Storage mode	Method of disposal	Collection frequency	Responsibility
		Laboratory				(OHSO) / IT Manager
	Scrap	Mechanical workshop	Storage in reserved area	Removal by licensed subcontractors (Recycler)	Storage threshold	Equipment Supervisor / Occupational Health and Safety Officer (OHSO)
	Used tires	Mechanical workshop	Storage in reserved area	Removal by licensed subcontractors (Recycler)	Storage threshold	Equipment Supervisor / Occupational Health and Safety Officer (OHSO)
	Marketable diameter wood logs	Trace	Storage along the track or in the woods parks	Sale to mills / Use for the job needs	As of production	Work Supervisor / Occupational Health and Safety Officer (OHSO)
	Debris and branches	Trace	Storage along the track or in the woods parks	composting	As of production	Work Supervisor / Occupational Health and Safety Officer (OHSO)
	Wooden ball diameter of recoverable for residents / Tree Trunks	Trace	Storage along the track or in the woods parks	Made available to local populations	As of production	Work Supervisor / Occupational Health and Safety Officer (OHSO)
Inert Waste	Excavated materials	Trace	Embankment	Reuse in the works	Continuously	Foreman
	surplus excavated materials	Trace	Deposit	Final deposit		
	Concrete cylinders	Laboratory	Provisional deposit	Reuse		
	Rubble	Trace	Final deposit	Final deposit		
	Concrete demolition	Trace	Deposit	Final deposit		
	Topsoil	Trace / Borrow pits / Provisional and final deposits	Provisional deposit under special conditions	Reuse in the framework of the restoration of sites and areas used by the Contractor		

Kind of waste	Type of waste	Production site	Storage mode	Method of disposal	Collection frequency	Responsibility
Hazardous Waste	Used batteries	Mechanical workshop	Storage on a concrete, sealed and covered area	Removal by licensed subcontractors (Recycler)	Storage threshold	Equipment Supervisor
	Used oils	Mechanical workshop	Storage in tanks	Recycling in the central asphalt / Use for formwork / Surplus entrusted to a recycler	Storage threshold	Equipment Supervisor
	Used filters	Mechanical workshop	Storage in a container after draining	Removal by licensed subcontractors (Recycler)	Storage threshold	Equipment Supervisor
	Waste water	Mechanical workshop	Hydrocarbons/ Water Separator	Infiltration after natural treatment	Continuously	Equipment Supervisor / Occupational Health and Safety Officer (OHSO)
		Camps	Septic tanks			
		Offices				
		Laboratory				
	Soiled fabrics	Mechanical workshop	Storage in a covered tank	Controlled incineration (without smoke)	1 time per week or as needed	Occupational Health and Safety Officer (OHSO)
	Medical waste	Infirmaries / Dispensaries	Storage in a covered tank	Controlled incineration (without smoke)	1 time per week	Occupational Health and Safety Officer (OHSO)
	Used bitumen drums	Asphalt plant	storage on defined areas	Reuse by the Contractor	Continuously	Asphalt Plant Manager / Occupational Health and Safety Officer (OHSO)
				Removal by licensed subcontractors (Recycler)		
	Bitumen - Oil	Emulsion / asphalt plant	Barrels	Removal by licensed subcontractors (Recycler)	Continuously	Asphalt Plant Manager / Occupational Health and Safety Officer (OHSO) / Laboratory Manager
				Mix asphalt oil added to asphalt to scrap runway layout of the site		
Laboratory		Barrels				

Kind of waste	Type of waste	Production site	Storage mode	Method of disposal	Collection frequency	Responsibility
	Perchloroethylene	Laboratory	Barrels	Recycling	Storage threshold	Laboratory Manager
	Hydrocarbon sludge and contaminated waste	Mechanical Workshop / Oil separator and decanter	Barrels	Temporary storage in special tanks waterproofed with geotextile	Storage threshold	Occupational Health and Safety Officer (OHSO) / Equipment Supervisor

5.5.9. [Sanitation](#)

- Adequate washing and toilet facilities are to be provided close to the works;
- Portable chemical toilets at a ratio of 1 toilet per 15 workers shall be provided within 200m of each working front and shall be moved as the working front progresses;
- Portable toilets shall not be located on flood plains where the possibility of flooding exists, and must be at least 50m from any water bodies;
- All temporary/portable toilets shall be secured to the ground to the satisfaction of the RE to prevent them from toppling over;
- The type and exact location of the toilets shall be approved by the RE prior to establishment. The use of septic tanks may only be used after appropriate investigations have been made and the option has been approved by the RE;
- All toilets shall be maintained by the Contractor in a clean sanitary condition to the satisfaction of the RE;
- Toilet paper shall be provided;
- A wash basin with adequate clean water and soap shall be provided alongside each toilet. Staff shall be encouraged to wash their hands after use of the toilet, in order to minimize the spread of possible disease;
- The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site to an appropriate location/facility;
- Discharge of waste from toilets into the environment and burial of waste is strictly prohibited;
- The Contractors shall instruct their staff and sub-contractors that they must use toilets provided and not the veldt, bush or streams;
- Staff shall not be permitted to wash themselves or their personal effects in rivers.

5.5.10. [Wastewater and Contaminated Water Management](#)

- No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent watercourses and/or water bodies shall be permitted;
- The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or water bodies;
- Potential pollutants of any kind and in any forms shall be kept, stored and used in such manner that any escape can be contained and the water table not endangered.
- Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;
- The Contractor shall notify the RE of any pollution incidents on site.

5.5.11. [Storm-water Management and Erosion Control](#)

- The Contractor shall take reasonable measures to control storm-water and the erosive effects;
- During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works.
- Areas affected by construction related activities and/or susceptible to erosion must be monitored regularly for evidence of erosion – this includes:

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- Areas stripped of topsoil;
 - Soil stockpiles;
 - Spoil sites;
 - Borrow pits;
 - River banks;
 - Steep slopes.
 - On any areas where the risk of erosion is evident, special measures may be necessary to stabilize the areas and prevent erosion. These may include, but not be restricted to:
 - Confining construction activities;
 - Using cut off berms;
 - Removing grass sods before construction and replacing them after backfilling;
 - Using mechanical cover or packing structures such as geofabric to stabilize steep slopes or hessian, gabions and mattress and retaining walls;
 - Straw stabilizing;
 - Mulch or chip cover;
 - the vegetation cover planting;
 - Constructing anti-erosion berms.
 - The erosion prevention measures must be implemented to the satisfaction of the RE;
 - Where erosion does occur on any completed work/working areas, the Contractor shall reinstate such areas and areas damaged by the erosion at his own cost and to the satisfaction of the RE and ESO;
 - Traffic and movement over stabilized areas shall be restricted and controlled. Any damage to the stabilized areas shall be repaired and maintained to the satisfaction of the RE;
 - The Contractor shall be liable for any damage to downstream property caused by the diversion of overland storm-water flows.

5.5.12. [Air emissions control and limitation](#)

- Workers shall be trained on management of air pollution from vehicles and machinery;
- Asphalt plants and concrete batching plants shall be well sealed and equipped with a dust removal device.

5.5.13. [Noise Control](#)

- The Contractor shall keep noise level within acceptable limits and construction activities shall, where possible, be confined to normal working hours in the residential areas.
- Silencers are to be installed and maintained in good working order on machinery, plant and equipment where practical.
- The Contractor shall not use sound amplification equipment on site unless in emergency situation or as instructed by RE.
- Noise levels exceeding 85 dB(A) shall only be permitted where approved by RE.
- Any such approved construction activities generating output levels of 85 db(A) or more, in residential areas, shall be confined to the hours 08h00 to 17h00 Mondays to Fridays.
- Schools, hospitals and other noise sensitive communities shall be notified by the Contractor at least 5 days before construction is due to commence in their vicinity. Any excessively noisy activity shall be conducted outside of school hours, where approved by the RE.
- Any complaints received by the Contractor regarding noise will be recorded and communicated to the RE.

5.5.14. [Traffic Control](#)

- The Contractor will be required to prepare Method Statements on traffic safety measures for construction traffic entering and exiting public roads and for the general control of construction traffic.

- Any need for temporary disruption shall be indicated in the Method Statements and informed in advance to the RE, ESO and Community Liaison/Monitoring Groups.
- On the gravel or earth roads within the site and within 500m of the site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 45 km/h.
- Appropriate traffic warnings signs shall be erected and maintained.
- Trained and equipped flagmen shall be used where access roads intersect any intense traffic zone, reduced visibility zones or along the settlements.
- Any complaints received by the Contractor regarding traffic disruption will be recorded and communicated to the RE.

5.5.15. [Disruption of Access to Property](#)

- Disruption of access to property must be kept to a minimum at all times;
- Where such disruption is unavoidable, the Contractor shall advise the affected parties and the RE at least seven working days in advance of such disruption.

5.5.16. [Dust Control and Air Pollution](#)

- The Contractor shall ensure their vehicles and equipment are perfect maintained to minimize air pollution.
- Dust is regarded as a nuisance when it reduces visibility; soils private property is aesthetically displeasing or affects palatability of grazing. Dust generated by construction related activities must be minimize;
- The Contractor shall be responsible for the control of dust arising from his operations and activities;
- Workers shall be trained on dust minimization techniques;
- The removal of vegetation shall be avoided until such time as clearance is required and exposed surfaces shall be re-vegetated or stabilized as soon as practically possible;
- Do not carry out dust generating activities (excavation, handling and transport of soils) during times of strong winds. The RE shall suspend earthworks operations wherever visible dust is affecting properties adjoining the road;
- Water sprays shall be used on all earthworks areas within 200 meters of houses and agriculture plots. Water shall be applied whenever dust emissions (from vehicle movements or wind) are visible at the site boundaries in the opinion of the RE;
- Vehicles delivering soil materials shall be covered to reduce spills and windblown dust;
- Vehicle speeds shall be limited to minimize the generation of dust on site and on access roads;
- Cover crop shall be sow on each top soiled batter within two days of top soiling;
- Any complaints received by the Contractor regarding dust will be recorded and communicated to the RE and ESO.

5.5.17. [Conservation of Vegetation and wildlife](#)

- Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed. Nor should any unauthorized planting of vegetation take place;
- The clearance of the site for construction purposes shall be kept to a minimum. The use of existing cleared or disturbed areas for the Contractor's Camp, stockpiling of materials etc shall be encouraged;
- Areas of indigenous forest vegetation are not to be removed unless required for construction purposes, nor shall new access routes be cut through indigenous vegetation;
- Trees should be trimmed rather than removed wherever possible;
- The Contractor's staff must not remove or harvest trees or medicinal plants, nor must they poach (through trapping, poisoning or shooting) or otherwise harm wild animals in the area;
- The use of indigenous plants as firewood is prohibited unless they are obtained from approved cleared areas;
- There is a possibility of encountering large mammals during the construction works – these animals should be avoided and not perturbed;

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- Hunt will be forbidden;
 - No domestic pets or livestock are permitted on site.

5.5.18. Protection of features of Cultural, Historical and/ or Archaeological Importance

- The Contractor will be required to produce Method Statements for all construction activities that will occur within or close to grave sites, graveyards or other cultural, historical or archaeologically sensitive areas;
- Local leaders shall be notified by the Contractor at least 5 days before construction is due to commence in the vicinity of grave sites, cemetery, and cultural, historical and archaeological areas;
- If remains or artifacts are discovered on site during earthworks, work shall cease and the Contractor shall immediately inform the RE and contact the relevant authority.

5.5.19. Protection of Sensitive Environments and Natural Features

- Sensitive environments and natural features within and/or close to a construction site will be designated as 'no-go' areas and will be subject to the conditions described in the Environmental Instruction.

5.5.19.1. *Rivers and Streams*

- The Contractor shall ensure that the footprint of construction activities is minimized at river and stream crossings;
- Sedimentation from the construction works of rivers and streams must be minimized;
- No construction materials shall be stockpiled within areas that are at risk of flooding;
- The Contractor shall ensure that all construction activities within the flood plain and lagoon, including the removal of vegetation, stockpiling of top material, excavating of pipeline route, laying of pipeline, backfilling of excavations and rehabilitation occur within as short a period as possible;
- All temporary and permanent fill used adjacent to, or within, the river / streambed shall be of clean sand or larger particles. Silts and clays shall not be permitted in the fill;
- Plastic sheeting, sandbags or geofabric approved by the RE shall be used to prevent the migration of fines through the edges of the fill into the river;
- Banks shall be suitably stabilized incrementally immediately after construction allows. Upkeep of stabilization facilities shall be continuously maintained;
- The Contractor shall not modify the banks or bed of a watercourse other than necessary to complete the specified works. If such unapproved modification occurs, the Contractor shall restore the affected areas to their original profile;
- The Contractor shall preserve all riparian and wetland vegetation for use in rehabilitation of those environments. This vegetation shall be kept moist until replanting. Replanting is to be undertaken immediately after surface reinstatement has been completed;
- The Contractor shall not pollute the watercourse through any construction activities;
- Rocks for use in any gabion baskets or other structures must not be obtained from a watercourse.

5.5.19.2. *Wetlands*

- Wetlands shall be avoided where at all possible and practicable. Where unavoidable, the footprint for construction activities and associated damage to the wetland shall be minimized;
- Construction shall not permanently alter the surface or subsurface flow of water through the wetland;
- Wetlands shall not be drained at any stage;
- If construction activities unavoidably affect a wetland, the Contractor shall remove and store all wetland vegetation with their root balls intact as indicated by the RE and EO. This vegetation shall be kept moist until replanting. Replanting is to be undertaken immediately after surface reinstatement has been completed;
- No construction materials shall be stockpiled in any wetland areas;
- No spoil material shall be deposited in any wetland areas;
- No vehicles shall be driven through wetland areas;

- Any affected wetland areas are to be restored to as similar state as before construction commenced. The surface reinstatement of wetland areas is to ensure that no depressions, ridges or channel features remain that could affect the hydrological regime of the wetland.

5.5.19.3. *Residential dwellings or Machambas*

- The Contractor shall avoid working near residential dwellings, machambas and cultivated lands wherever possible;
- Where this is not possible, the Contractor shall minimize impacts of construction by abiding by the relevant terms of this ESMP and instructing all site staff accordingly.

5.5.19.4. *Naturals Features*

- The Contractor shall not deface, paint, damage or mark any natural features (such as rock formations) situated within or around the site for survey or other purposes unless agreed with the RE;
- Any features affected by the Contractor shall be restored/rehabilitated to the satisfaction of the RE at the expense of the Contractor;
- The Contractor shall not permit his staff to make use of any natural water feature, including springs, streams or open water bodies for the purposes of swimming, personal washing and the washing of machinery or clothes.

5.5.20. Fire Prevention and Control

- The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site;
- Fires within Nature Reserves and other natural areas are prohibited;
- Permitted heating and cooking facilities are described in the Environmental Instruction. No cooking fires are to be left unattended;
- The Contractor shall ensure that there is basic fire-fighting equipment available on site. This shall include, but not be limited to:
 - Rubber beaters when working in grass/bush areas;
 - At least one fire extinguisher of the appropriate type when welding or other 'hot' activities are undertaken;
- The Contractor shall supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other areas identified by the RE with tested and approved firefighting equipment;
- Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires;
- 'Hot' work activities shall be restricted to a site approved by the RE;
- Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include:
 - Workshop;
 - Fuel storage areas;
 - Any areas where vegetation or other material is such as to make liable the rapid spread of an initial flame.
- The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This shall include, but not be limited to:
 - Regular fire prevention talks;
 - Posting of regular reminders to staff.
- Any fires which occur shall be reported to the RE immediately and then to the relevant authorities;
- In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring the fire under control;
- Costs incurred through fire damage will be the responsibility of the Contractor.

5.5.21. Emergency Procedures

- The Contractor shall submit Method Statements covering the procedures for the main activities which could generate emergency situations through accidents or neglect of responsibilities. These situations include, but are not limited to:
 - Accidental fires;
 - Accidental leaks and spillages;
 - Vehicle and plant accidents.
- Specific to accidental leaks and spillages:
 - The Contractor shall ensure that his employees are aware of the procedure for dealing with spills and leaks;
 - The Contractor shall also ensure that the necessary materials and equipment for dealing with the spills and leaks is available on site at all times.
- Specific to hydrocarbon spills:
 - The source of the spill shall be isolated and the spillage contained using sand berms, sandbags, sawdust, absorbent material and/or other materials approved by the RE;
 - The area shall be cordoned off and secured;
 - The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown the spill;
 - The quantity of such materials shall be able to handle a minimum of 200 l hydrocarbon liquid spill;
 - The Contractor shall notify the relevant authorities of any spills that occur.
- The Contractor shall assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures;
- The treatment and remediation of areas affected by emergencies shall be undertaken to the reasonable satisfaction of the RE at the cost of the Contractor where his staff have been proven to be responsible for the emergency.

5.5.22. Health and Safety General

- The Contractor shall comply with all standard and legally required health and safety regulations as promulgated by Mozambican law.
- The Contractor shall provide a standard first aid kit at the site office.

5.5.22.1. Public Liability

- The Contractor shall ensure that staff are made aware of the risks of contracting or spreading sexually transmitted diseases, particularly HIV/AIDS and how to prevent or minimize such risks;
- The Contractor shall be responsible for the protection of the public and public property from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by the construction activities;
- All works which may pose a hazard to humans and domestic animals are to be protected, fenced, demarcated or cordoned off as instructed by the RE. If appropriate, symbolic warning signs must be erected;
- Speed limits appropriate to the vehicles driven are to be observed at all times on access and haul roads. Operators and drivers are to ensure that they limit their potential to endanger humans and animals at all times by observing strict safety precautions.
- Telephone numbers of emergency services shall be posted conspicuously in the Contractor's office near the telephone.
- No unauthorized firearms are permitted on the site.

5.5.22.2. *Diseases, Heat Stress and Wounds*

Consideration must be given to the following:

- Malaria is prevalent in the area and the Contractor must ensure that regular monitoring occurs amongst construction staff for symptoms of malaria to enable timely treatment;
- Open trenches and other depressions that accumulate stagnant water should be backfilled as soon as possible to prevent the creation of breeding areas for malaria carrying mosquitoes;
- Cholera and dysentery outbreaks are possible during times of flood. Outbreaks of these diseases must be prevented by providing uncontaminated potable water, suitable ablution, sanitation and eating facilities for site staff;
- The Contractor should be aware of the signs of heat stress/heat stroke. Plenty of drinking water must be made available on site to prevent dehydration and overheating;
- Open wounds must be timely treated with antiseptic/antibiotics to prevent the development of tropical ulcers.
- Contractor shall provide at least 100 condoms (free) a year to each worker.
- Establish, staff and maintain a STDs and HIV/AIDS clinic at the worker camps. The clinic shall be staffed and equipped to enable the screening, diagnosis and counseling of STDs and HIV/AIDS cases within all workers. Each clinic shall provide free treatment for general STD cases. HIV/AIDS cases shall be referred to a Province's general HIV/AIDS program.

5.5.23. Community Relations and Control of Community Disruption

5.5.23.1. *General*

- The Provincial Delegations of ANE and the RE shall liaise with Community Liaison Groups on regular basis.
- If so required, the Contractor shall erect and maintain information boards in the position, quantity, design and dimensions required by the RE;
- Such boards shall include contact details for complaints by members of the public.

5.5.23.2. *Community Disruption*

The Contractor shall minimize any disruption to adjacent communities through any or all of the following, at a minimum through the application of the relevant instructions in this ESMP:

- Destruction of graves or others ritual sites;
- Use of natural resources;
- Sexual abuse of members of the community;
- Dust nuisance;
- Disruption to access;
- Risk of accidents from traffic or the works themselves.

5.5.23.3. *Private Land and Community Properties*

- Prior to commencing construction activities, the Contractor shall provide appropriate advance warning as described above;

- Temporary fences may be required in certain circumstances as instructed by the RE;
- Are shall be taken not to damage trees, crops, structures and roads etc. on properties of members of the local community. No site clearance will be allowed to proceed without the prior written approval of the RE and the Community.

5.5.23.4. *Grievance Mechanism*

- The RE is to establish a formal grievance mechanism through which affected people can lodge a grievance and to help ensure a speedy satisfactory resolution of any disputes;
- The Contractor will be required to minimize the risk of grievances with the local communities through implementing the specifications described in the ESMP;
- Where grievances occur, the Contractor will be required to assist in the process to investigate and resolve the grievance as effectively and quickly as reasonable;
- The Contractor shall keep a 'Complaints register' on Site. The register shall contain:
 - All contact details of the person who made the complaint and information regarding the complaint itself;
 - The investigations undertaken and response provided;
 - Actions taken and by whom;
 - Any follow-up actions taken;
 - Copies of complaints received are to be copied to the RE, and where pertinent, the ESO.

5.6. Construction Activities

5.6.1. Manual Excavation

Wherever practically possible, excavation activities shall be done manually and not with machine excavators. This is necessary to reduce negative environmental impacts and to enhance the economic benefits to the local communities.

5.6.2. Planning Borrow Pits and Quarries

- All borrow pits sites shall be clearly indicated on a plan and approved by the RE;
- The Contractor will be responsible for ensuring that appropriate authorization to use the proposed borrow pits and quarries has been obtained before commencing activities;
- Borrow pits and quarries shall be located more than 20 meters from watercourses and wetlands in a position that will facilitate the prevention of storm-water runoff from the site from entering the watercourse. It shall also not be located where the soil has higher erosion risk, neither more than 2 km far from the road;
- The Contractor shall give 14 days' notice to nearby communities and farmers of his intention to begin excavation in the borrow pits or quarries;
- The Contractor shall prepare and implement borrow pit plans and borrow pit rehabilitation plans, which would minimize the risk of erosion.

5.6.3. Construction and Operation of New Borrow Pits and Quarries

- The development of the borrow pits shall be done with its long axis longitudinally along contours (i.e. long axis parallel to the ground slope). Confine vehicles to a single pit access track;
- Develop the borrow pit sequentially. The maximum disturbed area shall not exceed one hectare;
- Clear the vegetation from the borrow pit to the longitudinal side of a pit;
- Topsoil shall be stripped prior to removal of borrow and stockpiled on site. This soil shall be replaced on the disturbed once the operation of the borrow site or quarry is complete;
- Storm-water and groundwater controls shall be implemented to prevent runoff entering streams and the slumping of soil from hillside above;

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- The use of borrow pits or quarries for material spoil sites may be approved by the RE (and/or with the appropriate consent of the “landowner”). Where this occurs, the materials spoiled in the borrow pit shall be profiled to fit into the surrounding landscape and covered with topsoil.

5.6.4. [Blasting](#)

- The Contractor will be responsible for obtaining a current and valid authorization from the relevant authorities prior to any blasting activity. A copy of this authorization shall be given to the RE;
- All Mozambican laws and regulations relating to blasting activities shall be adhered to at all times;
- A qualified and registered blaster shall supervise all blasting and rock-splitting operations at all times;
- The Contractor shall ensure that appropriate pre blast monitoring records are in place (i.e. photographic and inspection records of structures in close proximity to the blast area);
- The Contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on Site;
- The Contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting/drilling shall be repaired at the Contractor’s expense to the satisfaction of the RE;
- The Contractor shall ensure that adequate warning is provided to the local communities immediately prior to all blasting. All signals shall also be clearly given;
- The Contractor shall use blast mats for cover material during blasting. Topsoil shall not be used as blast cover.

5.6.5. [Asphalt, Bitumen and Paving](#)

- The site of the asphalt plant shall be selected and maintained according to the following basic criteria:
 - The plant should be situated on flat ground;
 - Topsoil shall be removed prior to site establishment and stockpiled for later rehabilitation of the site;
 - Bitumen drums/products shall be stored in an area approved by the RE. This area shall be indicated on the construction camp layout plan. The storage area shall have a smooth impermeable (concrete or thick plastic covered in gravel) floor. The floor shall be bonded and sloped towards a sump to contain any spillages of substances;
 - The area shall be covered to prevent rainwater from contacting the areas containing fuels, oils, bitumen etc. and potentially generating contaminated runoff;
 - The plant shall be secured from trespassers and animals through the provision of fencing and a lockable gate to the satisfaction of the RE;
 - Well-trained staff shall be responsible for plant workings;
 - Within the bitumen plant site, areas shall be demarcated/marked for plant materials, wastewater and contaminated;
 - An area should be clearly marked for vehicle access;
 - Drums/tanks shall be safely and securely stored;
 - Materials requiring disposal shall be disposed of at an appropriate waste facility.
- During the application/use of the bitumen products, the following shall apply:
 - Over spray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using a method approved by the RE;
 - When heating bitumen products only LPG or a similar zero emission fuel shall be used and the Contractor shall take cognizance of appropriate fire risk controls;
 - Stone chip/gravel excess shall not be left on road/paved area verges. This shall be swept/raked into piles and removed to an area approved by the RE;

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- Milled or cut out bitumen shall be removed to an area approved by the RE;
 - Water quality from runoff from newly /fresh bitumen surfaces shall be monitored by the RE and remedial actions taken where necessary.

5.6.6. [Cement / Concrete Batching](#)

- Concrete batching plant shall be located more than 20 m from the nearest river;
- Topsoil shall be removed from the batching plant site and stockpiled as above instructions;
- The batching plant site shall be bonded with earth berms or sandbags such that runoff cannot escape from the plant site;
- Concrete shall not be mixed directly on the ground;
- The concrete batching works shall be kept neat and clean at all times;
- Contaminated storm-water and wastewater runoff from the batching area and aggregate stockpiles shall not be permitted to enter streams/river;
- Unused cement bags are to be stored so as not to be effected by rain or runoff events;
- Used bags shall be stored and disposed of in a manner which prevents pollution of the surrounding environment (e.g. via windblown dust);
- Concrete transportation shall not result in spillage;
- Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment;
- Suitable screening and containment shall be in place to prevent windblown contamination associated with any bulk cement silos, loading and batching;
- Waste concrete and cement sludge shall be scraped off the site of the batching plant and removed to an approved disposal site;
- All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete and disposed at an approved disposal site. Washing the remains into the ground is not acceptable;
- All excess aggregate and sand shall also be removed;
- After closure of the batching plant or any area where concrete was mixed all waste concrete/cement sludge shall be removed together with contaminated soil. The surface shall then be ripped to a depth of 150mm and the topsoil replaced evenly over the site and re-grassed as per the Environmental Instruction.

5.6.7. [Bridges and Culverts](#)

- The Contractor shall ensure that provision is made to facilitate continuity of base water flow at all times during construction of these features across streams, rivers, lagoons and flood plains;
- Reduction of baseline water quality through construction actions/activities shall be prevented;
- Water quality monitoring regimes shall be established prior to the onset of any construction activities within watercourses;
- The Contractor shall not divert, dam or modify any watercourse without the approval of the RE;
- The Contractor shall submit a Method Statement to the RE for approval prior to commencing construction of bridges or culverts;
- The fording of watercourses by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (i.e. no oil leaks, etc.) and along a single track. The methodology of vehicle crossings via fording shall be detailed in a Method Statement.

5.6.8. [Work Stoppage and Temporary Site Closure](#)

- The RE shall have the right to order work to be stopped in the event of significant infringements of the Environmental Instructions contained within this ESMP, until the situation is rectified in compliance with the specifications. In this event, the Contractor shall not be entitled to claim for delays or incurred expenses;
- In the event of temporary site closure (i.e. a period exceeding one week) the Contractor's Safety Officers shall check the site, to ensure that the following conditions pertain and report on compliance with this clause. The check shall be made in consultation with the RE.

5.6.8.1. *Fuels/Flammables/Hazardous Materials Stores*

- Fuel stores are as low in volume as practicable;
- There are no leaks;
- The outlet is secure and locked;
- The bund is empty;
- Fire extinguishers are serviced and accessible;
- The area is secure from accidental damage through vehicle collision and the like;
- Emergency and contact numbers are available and displayed;
- There is adequate ventilation in enclosed spaces;
- There are no stores or containers within the 1:50 year flood line.

5.6.8.2. *Safety*

- Site Safety checks have been carried out in accordance with the pertinent Occupational Health and Safety requirements prior to site closure;
- That there is an inspection schedule and log for use by security or contracts staff;
- All trenches and manholes are secured;
- Fencing and barriers in place;
- Applicable notice boards are in place and secured;
- Emergency and Management contact details are prominently displayed;
- Security personnel have been briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;
- Night hazards such as reflectors, lighting, traffic signage etc. are in order and have been checked;
- Fire hazards identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.;
- Pipe stockpiles are wedged/secured;
- Scaffolds are secure;
- Structures vulnerable to high winds secure;

5.6.8.3. *Erosion*

- Wind and dust mitigation measures such as straw, brush packs, irrigation etc are in place;
- Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows;
- Re-vegetated areas have a watering schedule and the supply to such areas is secured;
- There are sufficient detention ponds or channels in place.

5.6.8.4. *Water Contamination and Pollution*

- Hazardous fuel stores are secured;
- Cement and materials stores are secured;
- Toilets are empty and secured;
- Refuse bins are empty and secured;
- Bonding is clean;
- Drip trays empty and secure.

5.6.9. *Crushing*

- The positioning of the crusher plant shall take cognizance of minimizing noise nuisance to adjacent communities and “landowner’s”;
- The site of the crusher shall be fenced and sign-posted, and access to all unauthorized persons and vehicles shall be strictly prohibited;

- In order to minimize dust a water spray system may be required at the crusher and pre- and post-crush stockpiles;
- All fuels and oils required for the crusher infrastructure shall be stored in the fuel store, if one is present on Site, or in an appropriately bonded and secured area.

5.6.10. [Retaining Walls and Gabions](#)

- Rocks for use in gabion baskets/reno mattresses shall be obtained from a source approved by the RE;
- Rocks for use in gabion baskets/reno mattresses shall not be obtained from a watercourse.

5.7. Rehabilitation

- Rehabilitation shall be required for all specified areas disturbed by the works;
- Where possible, the natural re-vegetation of the areas should be encouraged;
- Rehabilitation shall ensure that all specified areas disturbed by the works are returned to a similar or better state than before the construction works commenced;
- The Contractor shall rehabilitate all disturbed areas to the satisfaction of the RE;
- The Contractor should implement a program of progressive rehabilitation, i.e. once works are complete in particular areas, rehabilitation and/or re-vegetation could begin;
- A program of progressive rehabilitation will provide an opportunity to assess whether or not the methods employed are suitable and successful and would help prevent erosion in impacted areas. Where rehabilitation of an area is not successful, the Contractor will rehabilitate these areas at no additional cost to the Employer;
- The Contractor shall provide the RE with a comprehensive plan for the rehabilitation of the entire site for approval. The following points must be taken into account when drawing up the Rehabilitation Plan:
 - The plan should be flexible – i.e. where measures are found to be inefficient, the plan shall be modified at no additional cost to the Employer;
 - Restoration will include, at a minimum, removing unused materials, rubble and foundations, ripping any compacted ground to loosen soil, spreading topsoil evenly over the former site and re-establishing grass cover;
 - The Contractor shall be responsible for the successful rehabilitation and/or re-vegetation of the site within the contract defect/warranty period;
 - Successful re-vegetation means $\geq 80\%$ of the seeded area is covered with grass/groundcover;
 - The inclusion of grass seed mixes for summer and winter;
 - The inclusion of suitable fertilizers and application rates;
 - The rehabilitation of all temporary access tracks, haul roads and any other disturbed areas outside of the approved working areas to their original condition will be at the Contractor's expense.
- A rehabilitation may include the following activities:
 - Clearance of rubble associated with construction, including removal of surplus materials, excavation and disposal of consolidated waste concrete and concrete wash water, litter etc.;
 - Covering and capping of boreholes as specified and/or as directed by the RE;
 - Removal of all soil contaminated by hydrocarbons by excavation to the depth of contaminant penetration and removal to an appropriate landfill site;
 - Backfilling and contouring using stockpiled subsoil removed during site clearing;

-
- Finishing and grading of final levels of all disturbed areas shall be consistent with the natural topography of the area, where feasible;
 - Rehabilitation of all drainage lines affected by construction to approximately their original profile. Where this is not feasible due to technical constraints, the profile is to be agreed upon by the RE;
 - Ripping along the contour of compacted disturbed areas, including stockpile areas, to a depth of 150mm prior to the replacement of topsoil, except where otherwise specified by the RE;
 - Replacing topsoil to the required depth and scarification consistent with the natural contour;
 - Re-vegetation if insufficient topsoil is available, e.g. selective sodding or seeding;
 - The method of vegetation removal and establishment where required may be specified by the RE;
 - Vegetation shall give preference to native vegetation species, including seeds collected during the campaign carried out prior to clearing;
 - The eradication of young invasive/alien species that may have grown up during the construction period in impacted and rehabilitated areas;
 - The removal of visually detracting or environmentally unacceptable piles of blast rock and boulders to an approved spoil site.

Grass Seeding

- Grass seeding shall be carried out where specified by the RE under the guidance of the EO. In most cases, replacement of existing topsoil and original groundcover should be sufficient;
- In assessing the need for seeding, the RE and EO shall take into account the following conditions:
 - On slopes where the gradient exceeds 15% in long or cross section;
 - On high-lying exposed slopes where the soil will dry out easily;
 - Where existing topsoil is thin (less than 80 mm);
 - Where soil is very infertile;
 - Adjacent to a watercourse;
 - On embankments of permanent roads created as part of the Contract;
 - The need to inhibit re-infestation of alien invasive weeds.
- The RE shall assess the conditions in a timely manner before final cut or filling is undertaken and specify areas which are to be seeded;
- Where grass seeding is deemed to be necessary, the whole of the disturbed corridor shall be seeded and not only the width of the excavation;
- Seeding is to be undertaken during the growing season.

5.8. Complementary Initiatives

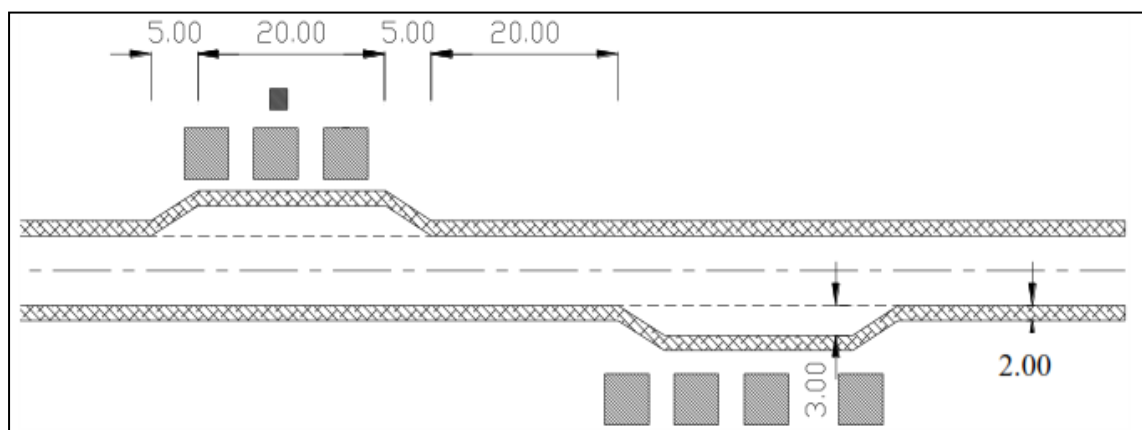
4.8.1 Works in Residential Areas

In addition to the work in the sections, the project includes some specific works to better integrate the project with its environment and to take consideration of the activities performed by residents that live along the road. These include the works described below.

4.8.1.1 Crossing of Settlements

Depending on the characteristics of each settlement along the section and the availability of space, the key proposed (in coordination between the Technical Team and the Environmental and Social Team of the Consultant) interventions are:

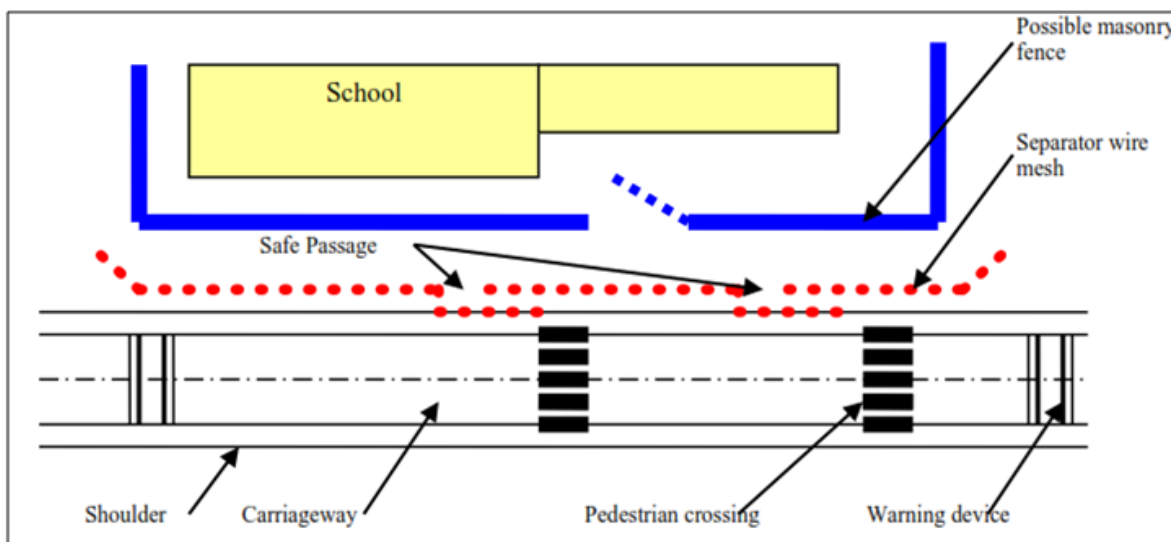
- Increasing width of shoulders to 2.00m wide along the crossing of settlements, except where there are constraints of touching private space. This will ensure enough room for safe movement of pedestrians and cyclists;
- Construction of 2.00m wide walkways on both sides in large towns; these will be used by pedestrians and for trading activities with occasional extensions. The shoulders can be used for parking;
- Construction of parking areas in all towns. They will be built in special areas for commercial activities or as attraction areas (administrations, churches, etc.). The dimensions will consider possible parking of trucks.



Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Negomano (STUDI International, 2015)

Figure 24: Parking areas in urban areas

- Construction of steps to homes that are difficult access to, due to being located in higher areas relative to the road;
- Construction of access walkways over gutters next to homes;
- Construction of protection around schools through wire fencing or masonry when schools are close to the road. Before that a proper signage will be placed.



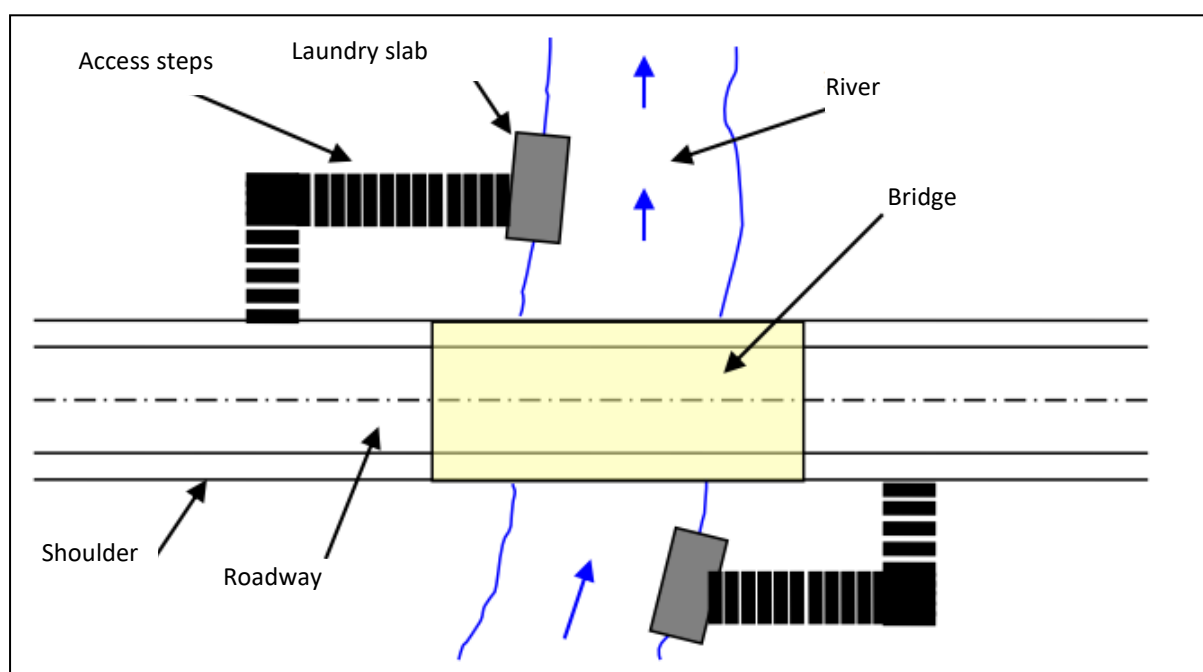
Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Negomano (STUDI International, 2015)

Figure 25: Protections at the right of schools

4.8.1.2 Outside Settlements

Interventions to benefit the residents along the road outside settlements will consist essentially of:

- Construction of access roads to water intake points typically located near large bridges and waterways. Laundry slabs will be built directly on the river to improve daily life conditions and household activities.



Source: Feasibility study, preliminary design and detailed engineering design of rehabilitation of the road N381/R2151 between Mueda and Negomano (STUDI International, 2015)

Figure 26: Interventions at bridge areas

-
- The waiting areas outside urban areas will include the construction of bus stops on both sides of the road, shelter to protect users from harsh weather elements and appropriate signage.

4.8.2 [Protection Devices](#)

In the sections that run through flood plains, there is considerable risk of erosion damage. In sections with high embankment, there are risks of creating ravines.

In addition to the flow of water on the road, several water intakes were identified that need hydraulic structures for drainage.

The amount of water collected through these structures will be evacuated through ditches.

4.8.2.1 *Protection during discharges*

Once the road is paved road, the speed of water flow may increase and may aggravate erosion and create craters that could jeopardize the stability of the road platform. The precautions to be taken under this project include the construction of discharge points and rock filled protected ditches and culverts.

4.8.2.2 *Types of Roadways and Approach to Water Drainage*

To ensure roadway stability and sustainability of the planned structures, it is necessary to contain the flow which could be the main cause of damage.

The structures planned to mitigate these damages are:

- Triangular or trapezoidal earth ditches in case of low to medium gradients;
- triangular and/or trapezoidal concrete ditches in towns, in the event of significant gradients or when the use of earth ditches is not functional;
- Rectangular concrete ditches in the cities
- Ditches with concrete ramps are used in the case of areas with high embankments especially the inner side of sharp curves.

5.9. [Completion of Contract and Decommissioning of the Site](#)

5.9.1. [Completion of Contract](#)

Prior to completion of the Contract, the RE is to timely notify the EO and the Employer's Environmental Engineer of 'Practical Completion', arrange meeting and 'preparation of snag list' and to provide an opportunity to identify work outstanding or incomplete.

The RE is to timely inform the EO and the ANE of the Contract Completion so that a final audit can be arranged.

5.9.2. [Decommissioning of the Site](#)

On completion of the Contract, the Contractor shall decommission the Contractor's Camp and works. This shall include the following:

-
- Removal of all remaining structures, services, facilities, unless sold or given to the “landowner”;
 - Removal of all remaining construction rubble and waste, to be disposed of at an appropriate waste disposal site;
 - Reinstatement and rehabilitation of all remaining disturbed area, including temporary access routes, turning circles, parking areas, etc.

5.10. Operation Phase

5.10.1. [Awareness campaign to prevent road accidents](#)

Prior to completion of the Contract, the Contractor shall contract an implementing agency to undertake an awareness campaign in the communities, mainly in schools, about road accidents prevention and security behavior for pedestrian and bicycles.

5.10.2. [Community Development Programs](#)

The objectives of these programs are the minimization of the negative impacts of the project and reduction of the risk of no benefit of the project on the local population;

These programs are to be followed by the local authorities, district and provincial governments and should be included in the future Regional Development Plans and in the already existent plans;

Some recommendations of the priorities for these programs are listed below:

- a. Agriculture production and commercialization
 - i. Awareness campaign for the local peasants about the positive and negative impacts of the new infrastructure for commercialization of agriculture products.
 - ii. Establishment of measures to support the commercial sector, namely through the Agriculture Information System (SIMA).

5.10.3. [Public Transport and Population Mobility](#)

Provincial authorities and NGOs shall promote small-scale credit programs for the development of semi-collective transport through the N381/R2151.

Encouragement for the establishment of association of collective transporters.

Provincial Directorate of Transports and Communication should identify the most important routes for the local communities, reducing or supporting the taxes for the less lucrative routes.

5.10.4. [Financial Sector](#)

The development of a financial sector to support and encourage new investments in order to maximize the positive impacts of the project.

5.10.5. [Planning the Land use](#)

The rehabilitation of the N381/R2151 will attract population and economical activities for the surroundings of the road. To avoid land use conflicts and a high demand on natural resources the

provincial government (namely the Provincial Directorates for the Coordination of Environmental Affairs) shall plan the land use, defining the needs of basic infra-structures for the inhabitants.

5.11. Additional Measures for Gender

5.11.1. [Legal Framework](#)

AfDB's Strategy for Gender Equality

Women play a crucial role in agricultural and rural development as well as natural resource management. This measures were stipulated to guarantee gender equity in all project stages. Gender equity refers to equal rights, responsibilities and opportunities for women and men; implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men (UNIDO, 2015).

The Integrated Safeguard System (ISS) was prepared in order to promote environmental and social sustainability of AfDB (the Bank) operations for Bank's ten-year strategy 2013-2022, which among other previous safeguards, policies and strategies includes requirements of the Gender Policy (2001). The two objectives of the AfDB Gender Policy (2001) are to promote gender mainstreaming in Bank operations and support Regional Member Countries (RMCs) efforts to attain gender equality. Gender equality is a concept that covers more than addressing women's status – rather, it refers to eliminating any inequalities between the sexes. To guide the Bank to effectively integrate gender equality into his operations and promote gender equality in Africa, the Gender Strategy 2014-2018 were prepared.

To align the gender agenda and the Bank's core operational priorities with Africa needs and increase impact in RMCs, the Bank will focus on three mutually reinforcing pillars:

- Pillar 1: Legal status and property rights
- Pillar 2: Economic empowerment
- Pillar 3: Knowledge management and capacity building

The Bank will address above pillars through work in the five priority areas defined in the Ten-Year Strategy 2013-2022:

1. Infrastructure development
2. Regional integration
3. Private sector development
4. Governance
5. Skills and technology

The Rehabilitation of the Road N381/R2151 between Mueda and Negonamo project as infrastructure development project will address pillar 2 and 3. Table below presents the description on how the Bank will address these two pillars through its work in the strategic priority areas.

Table 63: AfDB strategy to address women economic empowerment (Pillar 2) and knowledge management and capacity building through infrastructure development project

Pillar 2: Economic Empowerment

The Bank will place greater emphasis on rehabilitating and building new facilities to increase access to clean water and decent sanitation, which will reduce women's travel time and will free their time for other productive activities. Bank-financed infrastructure projects will promote affirmative action to increase women's engagement in project design and project-related employment, and the participation of women-owned business in the procurement of works and services. **Road projects** will be designed to reduce the incidence of sexual exploitation; abuse and violence; sexually transmitted diseases, including HIV/AIDS; and the unsupported parenthood that is occasioned by the high influx of male workers into communities during road projects. The Bank will ensure that on-going infrastructural initiatives deliver gender-sensitive infrastructure and related facilities and services that support women's economic empowerment.

Pillar 3: Knowledge management and capacity building

Under infrastructure development, the Bank will ensure endeavor to increase its knowledge on gender-sensitive infrastructure planning and to increase the number of skilled working in the infrastructure sector. The Bank will also support mobile and other information technologies to deliver health and education services that target rural women.

Source: AfDB Group Gender Strategy 2014-2018

Mozambique's Institutional and Legal Arrangements for Gender Equality

The Constitution of Mozambique recognize the equality between men and women through the Article 36: *"Men and women are equal by law in all spheres of political, economic, social and cultural life"*. Article 122 refers to the promotion and valuation of the participation of women in economic and social development.

The Family Law emphasize the role of women protection. The Labor Law established in Articles 10, 11 and 12 the rights of women in work. Also the commercial code recognizes the equality between women and men in trade activities. At justice access level, resulting from campaigns of civil society organizations it enters in force in 2009, the Law on domestic violence against women (Law 29/2009).

On the operational point of view, it was defined two main policies namely on social action and on gender to guide the principles established on the above mentioned laws. More specifically on the 5-year government plan 2015-2019 is specified in human capital development (pillar 2), the promotion of gender equality in all dimensions. Special attention is given to infrastructure development that has direct impact on enhancement of quality of life for women and child.

On institutional point of view, the Mozambique's Government institution with mandate to promote gender equality is Ministry of Women, Child and Social Work (MMCAS). Inside MMCAS, the National Directorate of Gender (DNG) is responsible for gender issues. The mandate of DNG are¹⁴:

- a) Draft proposals of laws, policies, strategies, programs and plans in gender perspective, as well as disclose, control and evaluate its implementation;

¹⁴ Resolution 18/2015 of 10th July

-
- b) Promote actions to eliminate discrimination based on sex and promoting of the role of gender relations in the family and society;
 - c) Promote the adoption of rules and norms to ensure equal opportunities of access to goods and services for women and men, girls and boys;
 - d) Develop mechanisms and programs that raise the awareness of society about the importance of gender equality and equity, for socioeconomic development of the country;
 - e) Adopt and promote measures to prevent and combat gender-based violence, including domestic violence;
 - f) Promote equal participation of women and men, boys and girls at all levels, sector and decision-making bodies;
 - g) Promote the realization of training actions on gender and women's empowerment in the country;
 - h) Promote research on women and gender in Mozambique;
 - i) Perform other activities that are superiorly determined in accordance with the Statutes and other applicable legislation.

At provincial level, the Directorate of Women, Child and Social Work has the responsibility of include gender perspective into strategic plans, economic and social plans, development programs and project at provincial level. The Women Enhancement Provincial Council is responsible for inter-sectoral coordination of provincial directorates with the main objective of promote and follow the inclusion of gender equality in the provincial level plans. At each provincial directorate has a gender unit to ensure the introduction of gender perspective in all activities.

At district level, the Women, Child and Social Action Services and Gender Units established in each District Service are responsible to ensure women equality.

These Government institutions have been working with civil society organizations and NGOs to ensure the application of approved mechanisms for women participation and priority in all spheres of development.

5.11.2. [Planning](#)

- Prior construction, recruitment team should remove barriers to women's participation in the construction of the road by having transparent recruitment procedures; ensuring that women are also part of the recruitment process. People with disabilities should be given special attention.
- Wherever possible, the Contractor shall use local labor, with a minimum of 25% being women.
- Abbreviated Resettlement Action Plan (ARAP), should take into consideration gender analysis to make sure the women also participate and benefit from the compensation process. Women should constitute at least 30% of the total participants during consultation.
- For user friendly road for all members of the community – men, women, children, the elderly, and people with disabilities – the design should ensure proper foot paths and cycle tracks, public spaces, junctions, road signs, bus stops and designated places for hawkers and vendors.
- Special attention should be paid to the needs of women, the elderly, children and people with disabilities during the assessment and compensation process.

5.11.3. [Construction](#)

- Contractor and sub-contractors ensure provision of safe working conditions (boots, gloves, lighting, etc.) and separate women's and men's latrines at construction sites;
- Ensure that all civil works contractors engaged under the project, participate in HIV prevention, road safety programmes, and anti-human trafficking and that information reaches the local communities (women, men, the youth and vulnerable groups) living and working along the corridor.
- Ensure dissemination meetings are held at times and locations convenient for women.
- Awareness facilitators shall include women.

5.11.4. [Decommission](#)

- Special attention to small demolitions and scrap should be given to women. At least 15% of workers employed shall be women.

5.11.5. [Operation and Maintenance](#)

- Promoting employment of women in road maintained services. At least 15% of the workers employed for road maintenance should be women.

5.12. [Biodiversity Management](#)

The need for Biodiversity Management

This section is important in relation with the richness of biodiversity in the Project area and the risks that this diversity is exposed to, both during the construction and operation phases:

- ✓ The scenery along the stretch is mostly natural except in Mueda and Ngapa settlements where there is human interference mainly for farming, often associated with fires and manufacture of dwellings.
- ✓ The road goes through a bushy area with some shifting cultivation in Mueda-Ngapa section. From Ngapa to Mueda, the vegetation is typically made of savannah trees mainly characterized by open forest to semi-open deciduous to semi-deciduous.
- ✓ The local wildlife is abundant due to food availability, low population density and part of the road being located within a conservation area.

Potential impacts of the project on the biodiversity

There are two forest concessions, are important: forest exploitation for coal production may be increased by the road project, loss of natural habitat, risk of increased poaching, etc.:

- During the construction phase there may be need for logging in some sections where a new alignment, road widening and diversion will be carried out to facilitate works. Additionally, in the areas dedicated to the construction sites, the extraction of aggregates (sand and stone). The borrow pits currently used for road maintenance are small and are expected to be extended. As a result, there will be a destruction of the natural habitat. The occurrence of this impact during construction is localized as for the most part, the section will only be

rehabilitated. Its impacts in units such as construction sites, quarries and sandpits can be mitigated through a recovery plan.

- Also expected habitat destruction during the operation phase due to migration from rural communities to the vicinity of the road, leading to deforestation for the purposes of construction of new homes, opening new farms (machamas) and wood harvesting for the production of coal or own consumption. Additionally, the easy access by road may encourage illegal logging, more coal production for sale. Yet improved access may allow forest concessions to increase their annual cutting volumes that are now limited by the difficulty of access. This impact during the operation phase is long term and can be irreversible if no action is taken.

This impact is likely to occur in the surrounding area. Due to its catalytic effect the development will attract more people in the long run. However, it may be reversible if mitigation measures are taken to reduce the high significance on the average.

- Interference with animal migration: During the construction phase there will be a great movement of vehicles and machinery and in operation phase, it is expected that the cars and lorries traffics increase consequently and also the speeds in relation with the better circulation conditions. In fact, improvement of road's motorability will encourage drivers to drive at a higher speed than which is possible with the current road condition and posing a risk for pedestrian, cyclist, bikers and pets.
- Increase in illegal hunting of animals: This impact is potentially important during the phase of operation due to the easy access that is expected with the road rehabilitated by the poachers and meat/wild animals' buyers. During the construction phase, it can be circumvented through hunting prohibition for the workers, awareness and constant monitoring.
- Disturbance to Aquatic Fauna: The impacts during construction can be caused by the resulting sedimentation due to work to be done in riverbeds (sand extraction and water abstraction), erosion in the areas of construction, pollution by oil, fuel and other chemicals. Large amounts of eroded sediments in rivers (at least seven bridges will be built in addition to aqueducts to be rehabilitated) can directly affect fish downstream through damage or accumulation in their gills leading to death or sub-lethal effects. Sedimentation can indirectly affect fish by modifying the habitats or reduce primary production and therefore the amount of fish. Spillage of fuel and chemicals can directly affect the aquatic fauna or the availability of fishery products for humans. In addition, water abstraction from the rivers can disturb the aquatic fauna or affect their integrity depending on the amount to be collected and the source.
- During the operation and road maintenance phase, surface water can be polluted by vehicles crossing the road. Small spillage of oils and fuels from vehicles in poor condition and asphalt compounds can be washed into the watercourses.
In case of traffic accidents, it is to be expected that higher volumes of spilled fuel and oil on the road can be washed into rivers. In these cases, the impact can be moderate to severe, depending on the amount of fuel spilled. Severe, irreversible and permanent cases can happen from an accident caused by some fuel tankers. Therefore, impacts on water quality can be significant, requiring the adoption of mitigation measures to be incorporated during the operation and road maintenance.
- Use of Resources: The workers engaged in the road construction works will increase energy demand, wood, sand, fuel, food and water and therefore the demand for agricultural and livestock products and forestry (timber, fuel, wood, food and others).

Summary of Impact Assessment

The following description of the potential residual impacts and the mitigation measures to reduce them to acceptable levels. These mitigation measures essentially comprise the “management plan” to address biodiversity related impacts.

The predicted biodiversity-related impacts resulting from the rehabilitation of Mueda-Roma Road Project that were identified in the ESIS are presented in Table below, with breakdown of their occurrence during various phases of the project.

Table 6: Predicted biodiversity-related impacts and their expected occurrence during the construction, operation and decommission/closure phases of the Project

Predicted impact	Project Phase		
	Construction	Decommission	Operation
Direct loss and degradation of habitat through logging in some sections where new alignment, road widening and diversion will be carried out. Areas dedicated to the construction sites, extraction of aggregates (sand and stone). Possible increased human influx during construction, decommission and operational phases of the project	X	X	X
Indirect loss of habitats and associated aquatic fauna through construction activities in hydraulic infrastructures, water abstractions and quarries and borrow pit operations, and pollution risks. Due to potential to great traffic of vehicles there is a (low) risk of pollution of the rivers and streams resulting from accidents and consequent oil/fuel runoff.	X	X	
Loss of threatened faunal species through increasing poaching mainly during operation due to easy access to poachers and meat/wild animals’ buyers. There is a potential for car accidents against animals during due to great movements during construction and mainly operation.	X		X
Use of resources like wood, water, sand, rocks, energy	X		

Several mitigation measures are proposed below for the biodiversity management and protection:

- (1) **All stakeholders** (namely the Contractors) should totally comply with the national regulations and international conventions applicable to the Project:
 - Approved through Law No.20/97 - Environmental Law, Articles 12 and 13 of this legal instrument define that project planning, implementation and operation should ensure the protection of biological resources, particularly plants and animals species threatened by extinction, or those that because of their genetic, ecology, cultural or scientific interest, require special attention. This protection should extend to their habitats, especially in

integrated environmental conservation areas. The project should pay special attention to biodiversity conservation, mainly because part of it is implemented within a conservation area.

- Law 10/99 - Law of Forestry and Wildlife, recognizes the economic, social, cultural and scientific importance of the forest and wildlife resources and establishes their sustainable use and promotion of initiatives for the protection thereof for the benefit of Mozambicans, with particular emphasis on local communities. No infrastructure should be installed in areas of partial protection without prior authorization from the appropriate entity.
- Decree No. 12/2002 - Regulation of the Law of Forestry and Wildlife provides for measures to be taken for sustainable use of forests and wildlife. Articles 103, 104 and 105 relate to the procedures to be followed to obtain authorization to cut down trees. There is a need to comply with the procedures for obtaining permission to cut down trees, particularly where the road will have a new alignment.
- Land Law Regulation defines total protection areas reserved for nature conservation and protection status, as well as partial protection zones, which may be granted land use titles and where activities cannot be implemented in the absence of a license. The partial protection areas include, among others, the strip of land with 50m wide from the edge of the lakes and rivers' historic maximum, the 250m strip of land wide around the reservoirs, 100m bandwidth on the coast and estuaries.
- The African Convention on the Conservation of Nature (1969) stipulates that Member States undertake to adopt measures to ensure the use, conservation of soil, water, flora and wildlife resources according to scientific principles and taking into account the best interests of the people. Member States should:
 - Give special protection to animal and plant species threatened with extinction or that may become so, and to the habitat necessary for their survival.
 - Ensure the conservation and management of natural resources as an integral part of regional development plans and/or national level. When any development plan is likely to affect the natural resources of another State, it must be consulted.
 - Report and list of protected species of fauna and flora, maintain conservation areas in their territories, take all necessary legislative measures to reconcile customary law with the provisions of this Convention.
 - Ensure that their people enjoy their dependence on natural resources and that they understand the need, and rules for the rational use of these resources.
 - Encourage and promote research in conservation, utilization and management of natural resources.
- The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 1973 ensures that international trade in specimens of wild fauna and flora does not threaten their survival in the wild. The same gives various degrees of protection to more than 5,600 species of animals and 30,000 species of plants.
- The UN Convention on Biological Diversity (1992) emphasizes the importance of biological diversity and the need for sustainable use of its components and fair and equitable sharing of its components. Member states have the sovereign right to exploit their resources and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. Any potential impact of the project on natural resources from a neighboring state may be a matter of consultation between the states. It is particularly important for this Project because of the potential for pollution of tributaries of the Rovuma basin which is shared with the Republic of Tanzania.

- The Convention on Wetlands of International Importance (RAMSAR Convention), 1971 is an international treaty that provides a framework for national action and international cooperation and rational use of wet areas due to their ecological importance and also the pressure they have suffered because of their wealth.
- The Southern Africa Development Community (SADC) protocol on Conservation of Wildlife and its application in Law, 1999 is meant to ensure the preservation and sustainable development in the use of wildlife resources.
- Conserving biological diversity is a requirement by AfDB Operational Safeguard (OS) 3 – Biodiversity, renewable resources and ecosystem services. It reflects the objective of the Convention on Biological Diversity to conserve biological diversity and promote the sustainable management and use of natural resources. It also aligns with the Ramsar Convention on Wetlands, the Convention of Migratory Species of Wild Animals, the Convention of Migratory Species of Wild Animals, the Convention on International Trade in Endangered Species of Wild Flora and Fauna, the World Heritage Convention, the UN Convention to Combat Desertification and the Millennium Ecosystem Assessment (AfDB, 2013). Mozambique is signatory member of these conventions.
- On the process of ESIA, the Borrower of AfDB fund must apply the mitigation hierarchy: to avoid potential adverse impacts; if avoidance is not possible, to reduce and minimize potential adverse impacts; if reduction or minimization is not sufficient, to mitigate and/or restore; and a last resort to compensate for and offset. The main goal is to design mechanisms to achieve No Net Loss and improve biodiversity outcomes whenever possible. The implementation of OS 3 involves the following categories:
 - Natural habitats: habitats with original populations of native flora and fauna whose species composition, richness and abundance have not been modified by human activities;
 - Modified habitats: habitats whose primary ecological functions have been significantly altered by human activities and whose original species compositions, richness and abundance have been reduced, with evidence of colonisation by non-native species of flora and fauna.
 - Critical habitats: natural or modified habitats that have a high biodiversity value; they include the following:
 - Habitats important to critically endangered and footprint impacted species (as per the IUCN classification);
 - Habitats of significant importance to endemic and/or restricted-range species and sub-species
- The biodiversity offset report presented here also compliance with the IFC Performance Standard (PS) 6 on Biodiversity. To satisfy IFC PS6 requirements, an offset is needed as both Natural and Critical Habitat will suffer residual impacts.
- More recently approved Decree 54/2015 Regulation on Environmental Impact Assessment Process in Mozambique requires the preparation of biodiversity offset plan for Category A⁺ projects.

(2) During the works phase:

The key impacts during the construction phase are associated with:

- Direct loss and degradation of habitat – through development of infrastructure and possible increased human influx. As identified in the ESIA (Volume 2), degradation of habitat has cumulative impact to the forest concession conservation area that can threaten the maintenance of the wildlife.

-
- Indirect loss of habitat and associated aquatic fauna – through construction activities in hydraulic infrastructures, water abstractions and quarries and borrow pit operations, and pollution risks

Management Actions During Construction Phase:

- The Contractor must comply with all national laws on nature and natural resources and promote environmental awareness and have an environmental management plan.
- Avoid loss of sensitive habitats:

The layout of the infrastructure footprint has successfully avoided sensitive habitat, however, additional disturbances resulting from activities are expected (viz. excavation of borrow pits, equipment laydown areas, temporary storage, parking for trucks, others). In this regards, the following will be undertaken:

- Sensitive environments and natural features within and/or close to a construction site will be designated as ‘no-go’ areas and will be subject to the conditions described in the Environmental Instruction.
 - A minimum 50-meter buffer around sensitivity habitats will not be disturbed.
 - Natural drainage lines will not be disrupted significantly and development of borrow pits will be located far away from any sensitive habitats as possible to avoid disturbances.
- Containment of construction activities and avoiding footprint creep

Construction activities will be contained within a reasonable minimum area through a planning and disciplined approach that accounts for the following considerations to avoid undesirable “footprint creep”:

- The reasonable minimum area required for the construction activity will be determined in advance and clearly demarcated on the ground. These areas will consider equipment laydown areas, vehicles parking and turning space.
 - Construction teams will be made aware of the demarcations prior to initiating construction works, and follow-up checks are to be done to ensure the construction areas are not being exceeded.
 - Toilets facilities and rest areas will be provided for construction teams to avoid the need for them to venture beyond the demarcated area in search of such necessities.
- Installation of Culverts
 - The road will include facilities that allow the underpass of fauna, such as culverts, so as to prevent unnecessary fragmentation of habitats. Terrestrial faunal species needing to move includes hyenas, jackals, and others. Other faunal species passes directly over the road sections such as gazelles, monkeys, lions and elephants.
 - Avoid disruption of natural drainage systems
 - Many small culverts will be installed to allow the lesser drainage lines to continue operating, and appropriate culverts or bridges installed on larger drainage lines.
 - Promote use of raptor-friendly transmission line designs

Depending on the location chosen for camp establishment will require long or short power transmission line. This transmission line could have a negative impact on the vulture or other large birds in the area. Electrocutions of raptors and other large birds can cause power disruptions and alter reliability.

The following design aspects illustrations have been shown to reduce raptor mortality elsewhere in Africa:

- Perches can be fitted to the top of the poles to provide additional perching space for large raptors and to lure them away from the cross-arms.
- Insulating switches, jumpers, circuit breakers and cross-arms with PVC insulation.
- Proactively mark the line (every 5 meters) with an appropriate design of bird flight diverters in order to increase visibility of the line.
- Regular monitoring and maintenance of the line has proven to significantly increase the effectiveness once many of the above measures have been implemented.
- Integrate biodiversity importance into induction programmes

The importance of the natural environment and the local biodiversity will be incorporated into induction programmes for all Contractors' staff working in the Project area. These components of the induction will be regularly, and will include the following topics:

- Awareness of the biodiversity that exists in the Project area and surroundings and the impact caused during the construction and operational phases of the project.
- Implement an internal biodiversity protection statement. The following activities will be **prohibited** by Contractors and sub-contractors within and surrounding the Project area, both during and outside of work hours:
 - Any forms of hunting of wildlife or fishing or blank firing of guns.
 - The intentional killing of any animals including snakes, lizards, birds or other animals. Awareness of Animal Rescue Plan (Mitigation Item 9) will be promoted as a means of addressing the presence of animals at risk or presenting a risk to the implementation of activities.
 - Purchase, sale or transport of any live animals, bush meat or other local wild animal products from local communities or passing traders.
 - Collection of any animals or animal products for consumption, medical or other use.
 - Sellers of wildlife are not to be allowed on the construction camp site. Such people must be reported to local authorities or appropriate wildlife agencies.
 - Camp residents keeping pets, either introduced species such as cats or dogs, or native wildlife.
 - Camp residents purchasing local wildlife or wildlife products for any reason.
 - Purchase or transport of fuel wood from or for surrounding communities.
 - The Contractor shall not pollute the watercourse through any construction activities;
 - Contamination or disposal of waste into aquatic environments.
 - The Contractor's staff must not remove or harvest trees or medicinal plants, nor must they poach (through trapping, poisoning or shooting) or otherwise harm wild animals in the area

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- No construction materials shall be stockpiled in any wetland areas;
 - No spoil material shall be deposited in any wetland areas;
 - No vehicles shall be driven through wetland areas;
 - Outline the individual responsibilities to reduce impacts to the environment.
 - Present the company procedures on land clearance and waste disposal.
 - Vehicle speed limits and the reasons for them.
 - Highlight who are the responsible person on any biodiversity related issues that may arise, for example in the event of a problem animal needing to be rescued or removed.
 - Provide alternative sources of energy for cooking food and heating in the construction sites by acquisition of gas cylinder for workers and prohibit the use of wood fuel by workers during construction;
 - The Contractor shall provide basic products to their employees and not allow any use of natural resources.
 - Avoid construction in the migratory corridors;
 - Flag migration corridors of animals;
 - Licenses should be obtained from supervisory institutions for the exploitation of local resources;
 - Where the Contractor is required to spoil material, environmentally acceptable spoil sites must be identified and approved by the RE, taking into consideration: Preferentially to be located on land already cleared wherever possible and avoidance of the area with denser forest);
 - Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed. Nor should any unauthorized planting of vegetation take place;
 - The clearance of the site for construction purposes shall be kept to a minimum. The use of existing cleared or disturbed areas for the Contractor's Camp, stockpiling of materials, etc. shall be encouraged;
 - Areas of indigenous forest vegetation are not to be removed unless required for construction purposes, nor shall new access routes be cut through indigenous vegetation;
 - Trees should be trimmed rather than removed wherever possible;
 - The Contractor shall ensure that the footprint of construction activities is minimized at river and stream crossings;
 - Sedimentation from the construction works of rivers and streams must be minimized;
 - The Contractor shall ensure that all construction activities within the flood plain and lagoon, including the removal of vegetation, stockpiling of top material, excavating of pipeline route, laying of pipeline, backfilling of excavations and rehabilitation occur within as short a period as possible;
 - All temporary and permanent fill used adjacent to, or within, the river / streambed shall be of clean sand or larger particles. Silts and clays shall not be permitted in the fill;
 - Plastic sheeting, sandbags or geofabric approved by the RE shall be used to prevent the migration of fines through the edges of the fill into the river;
 - Banks shall be suitably stabilized incrementally immediately after construction allows. Upkeep of stabilization facilities shall be continuously maintained;

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- The Contractor shall not modify the banks or bed of a watercourse other than necessary to complete the specified works. If such unapproved modification occurs, the Contractor shall restore the affected areas to their original profile;
 - The Contractor shall preserve all riparian and wetland vegetation for use in rehabilitation of those environments. This vegetation shall be kept moist until replanting. Replanting is to be undertaken immediately after surface reinstatement has been completed;
 - Rocks for use in any gabion baskets or other structures must not be obtained from a watercourse.
 - Wetlands shall be avoided where at all possible and practicable. Where unavoidable, the footprint for construction activities and associated damage to the wetland shall be minimized;
 - Construction shall not permanently alter the surface or subsurface flow of water through the wetland;
 - Wetlands shall not be drained at any stage;
 - If construction activities unavoidably affect a wetland, the Contractor shall remove and store all wetland vegetation with their rootballs intact as indicated by the RE and ESO. This vegetation shall be kept moist until replanting. Replanting is to be undertaken immediately after surface reinstatement has been completed;
 - Any affected wetland areas are to be restored to as similar state as before construction commenced. The surface reinstatement of wetland areas is to ensure that no depressions, ridges or channel features remain that could affect the hydrological regime of the wetland.
 - The Contractor shall not deface, paint, damage or mark any natural features (such as rock formations) situated within or around the site for survey or other purposes unless agreed with the RE;
 - Any features affected by the Contractor shall be restored/rehabilitated to the satisfaction of the RE at the expense of the Contractor;
 - The Contractor shall not permit his staff to make use of any natural water feature, including springs, streams or open water bodies for the purposes of swimming, personal washing and the washing of machinery or clothes;
 - The Developer must ensure that wetlands are not adversely affected or that their functions are restored after intervention.
 - Implement an Animal Rescue Plan

An animal rescue procedure will be developed and implemented by the Contractor for the safe translocation of any faunal species found to be at risk from construction, quarry or borrow pit operations or posing a threat to workers in the construction camps. These may include medium to large aggressive animals such as hyenas, lions, elephants, jackals that became trapped or seek refuge inside infrastructure; venomous snakes present in work and accommodation areas and a remote possibility of crocodiles. The animal rescue procedure will include the following aspects:

- Selected staff will be professionally trained and equipped to handle venomous snakes, with particular emphasis during works in the conservation area.
- Selected staff, preferably with some medical background, will be trained and equipped with sedative drugs to safely subdue and translocate aggressive animals.

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- Safe areas of similar habitat type will be identified, with local authorities and Block A operator, where animal rescued from areas of risk can be released without harm construction workers, surrounding communities or harm to that animal.
 - A register of all relocated species including their confirmed identification and photographs will be used to update the species register.
 - Proactive dissemination of information

The Proponent represented by the Resident Engineer will inform about the progress of the construction activities to the communities through the local authorities on monthly basis. The Proponent will consolidate information that demonstrate the compatibility of their activities with conservation and present the steps taken to avoid ecological impacts and promote cultural harmony. The ESO will provide that information and supervise the implementation of the mitigation measures presented in this BOP.

- Collaborate with local authorities and other entities (forest concession and Block A operator)

Information that demonstrate harmony between construction activities and conservation must be shared with local authorities (economic activities, forest and wildlife, infrastructures) and forest concession and the Block A operator. Monitoring of logging area must be accountable and ensure some compensation for the national reserve.

(3) During Decommission Phase

The Decommission Phase of the Project has the potential to result the following potential impacts on biodiversity:

- Direct loss and degradation of habitats – through possible increase of human influx; and
- Indirect loss of habitats and associated aquatic fauna – through rehabilitation activities and risk of pollution.

Management Actions during Decommission Phase:

Rehabilitation Programmes

The following issues will be considered:

- All disturbed areas will be rehabilitated, particularly sloping areas with high risk of erosion.
- Hybridized or alien species to the local environment will not be introduced for rehabilitation programmes.

(4) During the operation phase:

- Capacity building of Forest Guards (equipment with tents, motorcycles, telecommunication facilities, etc.) in the framework of this project, which will allow the Provincial Departments of Wildlife and Forest:
 - To define migratory roads with the local population, ensure appropriate signage in all crossings to migration routes of animals (speed bumps, rumble strips, road signs, road markings) and give alert on hazardous conditions;
 - To strengthen the control of illegal hunting and deforestation, installing more control posts along the N381/R2151;

- To strengthen the control to ban any illegal logging and monitoring compliance with management plans for forest concessions, particularly the allowable annual cuts;
- To Strengthen enforcement against poaching, especially in collaboration with local communities;
- To increase monitoring of forest licenses and logging, particularly within the Reserve and its buffer area;
- To hold awareness campaigns for the local communities and drivers related with the importance of wildlife and forest;
- To set in place organized communities' structures for the collection and marketing of dead wood of the forests within the project area, and the protection of the forest reserve concession;
- To create synergies with the entity that oversees tourism in such a way that meets public-private partnerships interests to ensure the sustainable exploitation of the area and better surveillance to logging and animal poaching particularly within the conservation area;
- Verification of corridors listed in the Table below and installation of appropriate signs, speed humps and awareness panels in areas of animal crossings;
- Installation of awareness panels against hunting and deforestation.
- In partnership with NGOs, provincial department of agriculture and existing forest concessions, develop and/or strengthen reforestation projects in communities;
- Promoting alternative livelihood for the community to reduce the use of forest, eg honey production.

Table 64: Main corridors identified along the road

N°	Latitude	Longitude	Settlement	Adm. Post	Species	Common Name	Corridor Description
6	510197	875252	Nambungale	Ngapa	<i>Crocodylus niloticus</i>	Crocodile	Lipalanganga River
7	524696	8754948	Nambungale	Ngapa	<i>Crocota crocuta</i>	Hyena	Forest
8	524696	8754948	Nanhamba	Ngapa	<i>Crocota crocuta</i>	Hyena	Ntopwatopwa Mountain
9	548881	8729396	Chicalanga	Mueda	<i>Crocota crocuta</i>	Hyena	Chiluno Forest
10	554150	8725723	Miula	Mueda	<i>Crocota crocuta</i>	Hyena	Ntende Mountain
11	545223	873557	Magogo	Mueda	<i>Crocota crocuta</i>	Hyena	Nachitacota River

5.13. ESMP Summary table

The cost of ESMP implementation is detailed in the two tables below.

Table 65: ESMP Cost summary by project phase

	Cost (USD)
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1-	Pre-Construction Phase (not including the cost of implementation of the RAP)	596 700
2-	Construction Phase	217. 000
3-	Post-construction Phase	70 000
4-	Operations and Maintenance Phase	275 000
Total Cost (USD)		1 158 700

Table 66: ESMP Summary Table

Environment and social Management Plan(ESMP)

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting		
	Nº	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)			
Construction Phase Pre	1.1	Compensation for expropriated properties (buildings, crops, fences, tombs, etc.) according to the RAP, leaving enough time for the AP (at least 3 months) for clearing rights-of way	Measure not generating any additional costs				ANE / Local Authorities	MITADER / Environmental and Social Management Unit (ESMU)	At least 3 months before clearing rights-of-way Minutes of receipt of compensation / N. of complaints recorded in the registers of complaints
	1.2	Moving graves by a specialized structure (funeral homes) under sanitary control and with religious/customary ceremonies	Measure accounted in the RAP				ANE / Local Authorities	MITADER / ESMU / Ministry of Public Health	At least 1 month before clearing rights-of-way N. of complaints recorded in the registers of complaints
	1.3	Support / assistance for people affected by the project, particularly for vulnerable populations	Costs included in those of NGO's to be recruited by ANE				ANE through an NGO to recruit	ANE / MITADER ESMU	During and after the resettlement N. of persons /households receiving assistance from the NGO OR N. of complaints recorded in the registers of complaints
	1.4	Recruitment of a facilitator NGOs for support for people affected by the project (during the resettlement phase), for population information, authorities and road users during all phases of the project, organization, animation and reporting regular consultation meetings with all the parties involved, the management of the information office of the project, maintaining the register of grievances and processing of local population and authorities demands before transmission to ANE with proposals for solutions, social intermediation for solving social problems that occur in all phases of the project, and achieving operating phase surveys of local residents and road users to determine the positive and negative impacts of the project and recommend additional measures to mitigate the nuisance	LS/month	36	4 000	144 000	ANE through an NGO to recruit	ANE / MITADER ESMU / Supervision Mission	Start: At least 1 month before the start of resettlement End: 12 months after works completion Monthly reports of NGO activities
	1.5	Soliciting the opinion of the dealers on the movement of networks in the grip of the project and possibly new networks projected in this grip	Measure not generating any additional costs				ANE Contractors	ANE	As part of the establishment of execution files Dealers provided to ANE and taken into account by contractors in the execution records

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting		
	Nº	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)			
	1.6	Creating of an Environmental and Social Management Unit (ESMU) managed by ANE (Coordinator) and bringing those responsible of Quality, Health, Safety and Environment (QHSE) of each Contractor, the local authorities, the Labor Inspectorates and the Supervision Mission Environmentalist	Measure not generating any additional costs				ANE / Contractor / Local Authorities	ANE	Before starting works ESMU established and operational / Monthly reports established and archived by ESMU and submitted to ANE and MITADER

	1.7	Publication of the ESMP & the ARAP and keeping registers of complaints at Mueda and, Ngapa	Measure not generating any additional costs	ANE / NGO	ANE	Beginning of the works & 1yr of the operational phase	ESMP and ARAP published and posted / Existence of register of complaints / Number of complaints received and processed by week
	1.8	Integration in the Tender Documents of selective criteria for the selection favoring those contractors that will provide the most respectful of the environment (availability of human and material resources)	Measure not generating any additional costs	Consultant in charge of Technical Studies	ANE	During the preparation of bidding documents and bid opening	Choice of enterprises in accordance with the contract specifications
	1.9	Establishment by each Contractor of an Environmental Management System (EMS), a Health and Safety Plan (HSP) and an Environmental and Social Management Plan (ESMP) based on the present ESMP and taking into account the specific site constraints / Will be annexed to this ESMP, environmental and social procedures on the solutions advocated by the contractors on HSE, solid waste management, operation and restoration of sites, solving social problems, etc.	Included in the services under the Contractors responsibility	Contractors	ANE / MITADER ESMU / Supervision Mission	Before the actual start of works and during works progress (ESMP and PHS updating and developing specific procedures)	Existence + relevance + consistency of documents
	1.10	Conducting preliminary investigations to choose areas for the use of each Contractor (choice of location of the camp sites, park equipment, borrow pits and deposition, etc.).	Included in the services under the Contractors responsibility	Contractors through independent consultants	ANE / Supervision Mission / ESMU	Before the operation of each new site	Sites' sheets established and validated by ANE / Supervision Mission / ESMU
	1.11	Establishment of the contradictory initial state of sites (before works)	Included in the services under the Contractors responsibility	Contractors by an independent consultant	ANE / Supervision Mission / ESMU	Before starting works	Report on the initial inventory established by an independent consultant and approved by ANE and Supervision Mission

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	1.12	Temporary signage project, using standard reflective panels and special devices for night signaling	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission / ESMU	At startup and during works	Number of panels installed / Number of accidents caused by the lack of signage
	1.13	Proper management and upkeep of the tracks used for the temporary diversion of traffic	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission / ESMU	Before works and depending on the progress of works	Road users' complaints registered
	1.14	Fence and / or guarding areas for the use of each Contractor (Camps, garages, etc.) / Fluorescent bands for delineating other areas closed to the public or with special danger to the public	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission	Before starting works	Registration of accidents caused by the intrusion of outsiders to site in areas used by the Contractor (Contractor HSE Monthly reports / ESMU monthly reports)
	1.15	Construction of wooden fences around the trunks identified as outstanding by the local population for tree protection against fire, shock, injury	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission / ESMU	Before starting works	1st Report of ESMU / Supervision Mission Reports
	1.16	Installation of panels (in metal or wood) for indication and information on the progress of the works (2 panels per village on the project axis)	U	24	500	12 000	Contractors	ANE / Supervision Mission / ESMU	Before starting works	1st Report of ESMU / Supervision Mission Reports
	1.17	Facilities for solid waste management in the camp of each Contractor (bins, buckets, etc.).	LS/Lot	2	2 000	4 000	Contractors	ANE / Supervision Mission	Before starting works	1st Report of ESMU / Supervision Mission Reports / Availability and functionality of equipment / Complaints of the population recorded in the register of complaints about possible pollution from contractors facilities
1.18	Appropriate arrangements of each Contractor for the supply of all sites with fresh water and drainage of waste-water in septic tanks	LS/Lot	2	10 000	20 000					
1.19	Equipment by each Contractor of yards with sealed concrete platforms, equipped with berms, pits and recovery devices for fuel	LS/Lot	2	20 000	40 000					

	tanks, drainage operations and stocks of oils and used filters								
1.20	Equipment by each Contractor of yards by settling decanters / oil separator, basin for water washing equipment and staffing of the carwash a water-closed system	LS/Lot	2	6 000	12 000				

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	Nº	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing	Performance indicators
			Unit LS/Lot	Quantity	Unit Cost (USD)	Total Cost (USD)				
	1.21	Installation of canteens (equipped with stoves and gas cylinders) and rest areas for the workers		2	4 000	8 000	Contractors	ANE / Supervision Mission	At the same time than camps construction	1st Report of ESMU / Supervision Mission Reports
	1.22	Installation and equipment of clinics and / or infirmaries site for the life bases	LS/Lot	2	5 000	10 000	Contractors			
	1.23	Distribution of personal protective equipment (PPE) to all workers, according to the workplace: helmets, gloves, dust masks, fluorescent vests, welding goggles, safety shoes (including renewal shoes 1 times per year and gloves every month)	LS/Worker	1 200	400	4800 000	Contractors	ANE / Supervision Mission	At startup and during works (renewal)	ESMU and Supervision Mission Reports / Monthly HSE reports of the Contractors / Effective use of equipment by all workers
	1.24	Organization of two training sessions of three days each for the members of the ESMU in environmental and social management of works	men x days of Training Expert	10	750	7 500	ANE through an independent consultant	MITADER	Before starting works and during works	Number of persons trained
	1.25	Proper management of topsoil resulting from stripping sites for use in green areas and sites rehabilitation	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission	Before operation of each new site	Availability of topsoil for site rehabilitation at the end of work
	1.26	Cover of the trucks reserved for transportation of fine material and asphalt	U	80	140	11200	Contractors	ANE / Supervision Mission / ESMU	During works	ESMU and Supervision Mission Reports / Complaints from residents and road users (dust) recorded in the registers of grievances
Construction Phase 2	2.1	Environmental and social monitoring: operating expenses of the Environmental and Social Management Unit (ESMU) + costs of monitoring missions by the MITADER and the Environment Service of ANE	LS/Month	20	1 000	20 000	Contractors	ANE	During works	ESMU, Contractor and Supervision Mission Reports / Minutes of site visit by ANE/MITADER experts

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	2.2	Acquisition of condoms for workers with 10 condoms per worker per month	U	360 000	0,2	72 000	Contractors	ANE / Supervision Mission	During works	ESMU, Contractor and Supervision Mission Reports
	2.3	Organization of quarterly training sessions in Health, Safety and Environment (HSE) and quarterly campaigns on road safety, environment protection and against STDs and AIDS with the possibility of voluntary AIDS tests for personnel on site (workers, managers, Supervision Mission, subcontractors) road users and riparian, including acquisition of test kits, condoms and animation and media awareness (T-shirts, caps, brochures, banners, etc.)	LS/Session	15	3 000	45 000	Contractors	ANE / Supervision Mission	A session of one day every 3 months	Mission reports to be prepared by the training firm under each session summarizing the number of people trained, themes, etc .; with evaluation every 6 months

2.4	Monthly management fee clinics / infirmaries site throughout the construction period: nursing fees, medicines, care, condoms, etc. including costs of an agreement with the Ministry of Health, a clinic or a private doctor to make monthly visits of life bases, monitor the health of workers, be aware of compliance with hygiene and conduct screenings STIAIDS among volunteer workers.	LS/Month/Lot	40	1 500	60 000	Contractors through public or private health institutions	ANE / Supervision Mission	During works	Quarterly reports to establish by the health institution on the state of hygiene and health in the works' areas
2.5	Watering during the dry season for borrowed material transport tracks and work areas to reduce dust emissions	Included in the services under the Contractors responsibility				Contractors	ANE / Supervision Mission / ESMU	During works	ESMU, Contractor and Supervision Mission Reports / Complaints from residents and road users (dust) recorded in the registers of grievances

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	2.6	Choice of the most appropriate site (prefabricated elements, intensive labor, etc.) and equipment best suited to the context of work	Measure not generating any additional costs				Contractors	ANE / Supervision Mission / ESMU	During works	Respect of deadlines + Number of workers employed
	2.7	Services and regular maintenance of site facilities for the preservation of the environment: Adding lime to septical tanks for disinfection, transfer of waste to the landfill, transfer of used oils to a recycler or a cement plant for incineration, cleaning pools decanting of the wash water equipment, fresh water providing, refill gas cylinders for canteens, etc.	LS/Month/Lot	40	1 000	40 000	Contractors	ANE / Supervision Mission / ESMU	During works	ESMU, Contractor and Supervision Mission Reports / Complaints from residents and worker recorded in the registers of grievances
	2.8	Regular and systematic monitoring of the construction equipment (emissions, noise, oil leaks, brake systems, cranes, etc.)	Measure not generating any additional costs				Contractors	ANE / Supervision Mission / ESMU / Police	Daily during works	Contractor, ESMU and Supervision Mission Reports / Complaints from residents and road (pollution, noise, smoke) users recorded in the registers of grievances
	2.9	Submission to ANE and MITADER of monthly HSE (Health - Safety - Environment) reports summarizing key data on water management (consumption by post, emptying septic tanks, etc.), the management of solid waste (quantity, destination), energy consumption (fuel and electricity), use of labor (average number of staff employed by post), incidents and environmental accidents, workers health and safety (number of accidents and occupational diseases, number of days off work, etc.)	Measure not generating any additional costs				Contractors	ANE / Supervision Mission	At the end of each month	HSE monthly reports submitted by the contractor and approved by ANE and the Supervision Mission
	2.10	Strict control of bush meat consumption in camps including by supply from outside the site	Measure not generating any additional costs				Contractors	ANE / Supervision Mission / ESMU / Forest-Guard	During works	Minutes established by ANE, ESMU or Supervision Mission

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	2.11	Maximum use of workers from the local population, contribution of women and youth in the project in compliance with laws: respect minimum age, avoidance or hazardous work requiring considerable effort for women /	Measure not generating any additional costs				Contractors	ANE / Supervision Mission / ESMU / Labor Inspection	During works	Minutes of Labour Inspection / ESMU reports / Monthly HSE Contractor Reports summarizing the number and percentage of workers recruited locally, signed contracts, unfair dismissals, the grievances of the workers, etc.

		Appeal as much as possible to high work labor-intensive (HLI)							
	2.12	Respect of the Mozambican regulations relating to the environment and the Labor Act	Measure not generating any additional costs				Contractors	MITADER / ANE / Supervision Mission / ESMU / Labor Inspection	Contractor, ESMU and Supervision Mission Reports / Complaints from residents and road (pollution, noise, smoke) users recorded in the registers of grievances
Construction Phase Post 2	3.1	Restoration of the sites (slope correction, transport and spreading of topsoil, revegetation, maintenance and irrigation until the perennial cover) And including the development of drains for flood water.	LS/Lot	2	20 000	40 000	Contractors	ANE / Supervision Mission	Report on final state of sites / Payment of related works / Conditional Return of the performance bond
	3.2	Establishment of the contradictory final state of sites (at the end of works) by an independent consultant	Included in the services under the Contractors responsibility				Contractors by an independent consultant	ANE / Supervision Mission	Final acceptance minutes / Conditional return of the performance bond
	3.3	Delivery of wells, boreholes and ponds created for the work to the local populations	Measure not generating any additional costs				Contractors	Local Authorities	Final acceptance minutes
	3.4	Camp site transformation in rest area by keeping up the water point, toilets, garbage, sanitation facilities, etc. and achieving some additional facilities (benches and wooden tables, planting shade trees, etc.)	LS/Lot	2	15 000	30 000	Contractors	ANE / Supervision Mission / Local Authorities	Final acceptance minutes
	3.5	Warranty extension to the environmental aspects	Included in the services under the Contractors responsibility				Contractors	ANE / MITADER	Final acceptance minutes / Conditional return of the performance bond
Maintenance Phase	4.1	Planting alignment trees on both sides of the road along crossed villages for landscaping, creation of carbon sinks, beautification, shading and the use of fruits and leaves by the local people: planting one tree every 10 m, including maintenance until final acceptance	U	700	100	70 000	Contractors in the framework of the works	ANE / Supervision Mission	Number of trees planted and percentage of successful trees

Project Phases/ Activities	Proposed Environmental and Social Measures						Monitoring and Reporting			
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing of End works	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	4.2	Development of warning speed bumps in the form of rumble strips to reduce vehicle speeds near villages	U	20	500	10 000	Contractors in the framework of the works	ANE / Supervision Mission		Number of road accident during operation phase explained by speed compared with figures before the beginning of works
	4.3	Marking protuberance with reflective studs in relief for strengthening night perception through villages (200 ml per village)	lm	2 000	50	100 000	Contractors in the framework of the works	ANE / Supervision Mission	End works	Number of night accident during operation phase compared with figures before the beginning of works
	4.4	In villages, channel drainage water until the natural outlets to avoid flooding of surrounding neighborhoods and farmland	Included in the services under the Contractors responsibility				Contractors in the framework of the works	ANE / Supervision Mission	In the framework of the works	Absence of flooding and standing water in the villages / Minutes of final work reception
	4.5	Capacity building of Forest Guards by equipment with tents, motorcycles, telecommunication facilities, etc.	U	2	5 000	10 000	Contractors in the framework of the works	ANE / Provincial Departments of Wildlife and Forest	End works	Actually acquired equipment / Number of Forest Guards equipped
	4.6	Installing awareness signs against STD-AIDS and waterborne diseases and promoting road safety and environmental protection (one two sided 3m x 4m metal panel every 10 km)	U	100	5 000	50 000	Contractors in the framework of the works	ANE / Supervision Mission	End works	Final acceptance minutes / prevalence rate
	4.7	Development of parking lanes by widening shoulders within the areas and sections of reduced visibility	Measures planed in the technical studies and included in the works				Contractors in the framework of the works	ANE / Supervision Mission	End works	Final acceptance minutes / Number of parking cars created

	4.8	Fences installation for delimitation of highly frequented roadside sites (schools, health centers, water points, markets, playgrounds, etc.)	Measures planed in the technical studies and included in the works				Contractors in the framework of the works	ANE / Supervision Mission	End works of	Final acceptance minutes / Number of fenced sites
	4.9	Installation of stairs or ramps (from either side) to major rivers crossed by the road and the villages or houses located in vertical drop from the road	Measures planed in the technical studies and included in the works				Contractors in the framework of the works	ANE / Supervision Mission / ESMU	End works of	Number restored access
	4.10	Coverage gutters of slabs situated to the right of cities and dwellings to facilitate pedestrian access to homes and vehicles inside villages	Measures planed in the technical studies and included in the works				Contractors in the framework of the works	ANE / Supervision Mission / ESMU	End works of	Number restored access
Project Phases/ Activities	Proposed Environmental and Social Measures							Monitoring and Reporting		
	N°	Proposed management measures, their objectives and technical / operational requirements	Cost Estimates				Implementation Institutional Responsibilities	Responsibilities for Monitoring and Reporting	Timing End works of	Performance indicators
			Unit	Quantity	Unit Cost (USD)	Total Cost (USD)				
	4.12	Installation of waiting shelters for public transport with local materials (wood, straw)	Measure not generating any additional costs				Local population in the framework of community services	Local population		Number of shelters installed
	4.13	Construction of stalls on both sides of the road at villages to organize the trade circuits	LS/village	10	2 000	20 000	Contractors in the framework of the works	ANE / Supervision Mission / ESMU	End works of	Number of stalls installed
	4.14	Revegetation operations for the protection and stabilization of slopes and riverbanks and regular maintenance of road embankment including ensuring that drains are always not blocked.	Included in the current road maintenance fees				ANE	ANE	Operation Phase	Stable slope / Erosion phenomenon limited
	4.15	Regular maintenance of the road and its structures to ensure the viability and sustainability of the project	Included in the current road maintenance fees				ANE	ANE	Operation Phase	Project Life
	4.16	Study of an operational program operating and road maintenance	LS	1	15 000	15 000	ANE by the mean of a Consultant	ANE	Operation Phase	Study done and recommendation applied

6. MONITORING PLAN

6.1. Planning

Relocation and Compensation:

- The Government team of Mueda District, created for the relocation and compensation shall be responsible for the following and monitoring of the resettled, after the relocation, monitoring the effectiveness of the compensation, relocation and assistance programs.

6.2. Construction Phase

6.2.1. General

- The RE shall:
 - Liaise with the Employer and ESO as appropriate.
- The ESO shall conduct quarterly audits to ensure that the system for implementation of the ESMP is operating effectively. The audit shall check that a procedure is in place to ensure that:
 - The ESMP being used is the up to date versions;
 - Variations to the ESMP and non-compliance and corrective action are documented.
 - Appropriate environmental training of personnel is undertaken.
 - Emergency procedures are in place and effectively communicated to personnel.
 - Keep a register of major incidents (spills, injuries, complaints, legal transgressions, spot fines and penalties etc) and other documentation related to the ESMP.
 - Ensure that appropriate corrective and preventive action is taken by the Contractor once instructions have been issued through the RE.
 - Liaise with the RE on a regular basis.
- The Contractor shall:
 - Inspect the site on a daily basis to ensure that the environmental specifications are adhered to.
 - Report weekly to the RE on the implementation of the ESMP.
 - Maintain records of major accidents (spills, impacts, complaints, legal transgressions, etc.) as well as corrective and preventive actions taken.
- The ANE Environmental and social team shall:
 - Undertake independent environmental audits to ensure that the system for implementation of the ESMP is operating effectively, and that the ESO is undertaking his tasks effectively.

6.2.2. Labor Force

The Community Liaison/Monitoring Groups shall monitor the relation between the Contractor, local labor and the community. At least the following aspects should be monitored:

- **Operation of the Community Liaison/Monitoring Groups** – (through the record of meetings held, presentation and discussion of the monitoring the workers, opinion of the group members on the operation of the group, providing the reports drawn up and approved for external consultation;

- **Women participation**– (meeting the goal of women's participation, verify if the woman is involving in the decision-making process in connection with community liaison/monitoring, and that the woman did not desist the work;
- **Work conditions and campsite facilities** – task division between men and women, considering the physical and mental characteristics of each gender and local behavior, salaries paid without delays, individual employment *contracts actualized with copy for the worker*, medical assistance and proper treatment, condom distribution and treatment of DTs, existence of sanitation facilities separated by sex, distribution of potable water for workers during the work).
- The Environmental and Social Officer shall quarterly monitor the same items, reporting it to ANE Unit for Gender, Poverty Alleviation, HIV/AIDS and Environment.

6.2.3. [HIV/AIDS](#)

The implementing agency for HIV/AIDS campaign shall monitor activities regularly to assess effectiveness and impact. This should include an initial, interim and final assessment of basic knowledge, attitude and practices (KAP) taking account of existing data sources and recognizing the limitations due to the short timeframe to show behavior change. The KAP will be supported by qualitative information from focus group discussions.

6.3. Operation phase

6.3.1. [Erosion](#)

The hydraulic structures shall be inspected by ANE after every intense rain (defined by more than 5 mm of precipitation in each 24-hour period). All the damaged culverts shall be repaired and additional measures for velocity reduction and erosion protection shall be implemented in case or development of erosion.

6.3.2. [Traffic accidents](#)

ANE shall monitor the traffic accidents through records kept at the local police stations. ANE and Provincial Departments of Wildlife and Forest shall instruct the Local Administrations to record accidents with large mammals. In the first two years a semester report shall be produced by the ANE Provincial representatives and send to the “Unit for Gender, Poverty Alleviation, STD/HIV/AIDS and Environment”. The introduction of additional mitigation measures shall be considered, in accordance with the results of the monitoring.

6.3.3. [CO₂ emissions and Climate Change](#)

During construction period, the following parameters should be monitored:

- Quantity of fuel combusted per year;
- Average mass fraction of carbon by fuel type and year. Values provided by fuel supplier in invoices.
- Average density of fuel.

This values will allow to estimate CO₂ emissions during the construction. Contractor must have this amounts and verified by the ANE.

In order to verify level of CO₂ emissions during the **operation phase**, traffic should be recorded and if possible gross mass weight. Mozambique-Tanzania boarder in the Unity Bridge can be the source for information about traffic. Additionally, yearly monitoring can be performed by local authorities guided by ANE.

6.3.4. [Noise and vibration](#)

The ESIA concluded that there is no potential risk of being affected by noise pollution if the houses are located 15m from the road. By 2037 is expected to affect people located less than 100m from the road. To monitor impacts of the noise, the Government of Mueda with Community Liaison groups shall monitor construction, avoiding to build before 100m from the road.

Annual noise monitoring shall be performed by ANE (or hired consultant) along the main villages in order to identify points to install noise barriers.

6.3.5. [HIV/AIDS](#)

Health authorities shall monitor the prevalence of HIV/AIDS along the corridor.

6.4. Tolerance

- Environmental management is concerned not only with the final results of the Contractor's operations to carry out the works, but also with the control of how those operations are carried out.
- Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operation required to complete the works.
- It is thus required that the Contractor shall comply with the environmental requirements on a regular basis and any failure on his part to do so will entitle the RE to certify the imposition of a penalty subject to the details set out in the contract.

6.5. Penalties

- Penalties will be issued for the transgressions and non-compliances where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications. The Contractor is deemed NOT to have complied with this Environmental Specification if:
 - a. There is evidence of contravention of the Environmental Specification within the boundaries of the site, site extensions and/or haul/access roads.
 - b. Environmental damage ensues due to negligence.
 - c. The Contractor fails to comply with corrective or other instructions issued by the RE within a specific time.
 - d. The Contractor fails to respond adequately to complaints from the public.
- Penalties may be issued per incident at the discretion of the RE. The value of the penalty imposed shall be as defined in the contract and enforcement shall be at the discretion of the Employer.
- The RE will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the contract.

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- The penalty monies will become the property of the Employer.
 - Payment of any penalty in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.
 - An Environmental Performance Guarantee of at least 5% of the contract value shall form part of the 'Performance Bank Guarantee (Unconditional)' which the Contractor is required to provide as part of the Contract with ANE. This guarantee shall be used in the event of non-conformance or contraventions of the ESMP.
 - Penalties for the typical incidents detailed below, will be imposed by the RE on the Contractor and/or his sub-contractors.

Table 67: Typical incidents incurring penalties

Incident	Penalty (US\$)
Failure to submit Method Statements timorously	200 – 500
Failure to demarcate working servitudes and/or maintain demarcation tape	10 – 200
Working or parking vehicles outsider of the demarcated servitude and/or within the boundaries of a no-go area.	10 – 200
Failure to strip topsoil with intact vegetation.	10 – 200
Failure to stockpile topsoil correctly.	100 – 500
Failure to stockpile materials in designated areas.	50 – 200
Pollution of water bodies – including increased suspended solid loads.	50 – 500
Failure to provide adequate sanitation, waste disposal facilities or services.	200 – 500
Failure to demarcate 'No-go' areas before commencing construction clearance and other activities.	200 – 500
Insufficient education of staff regarding environmental matters and site housekeeping practices.	100 – 500
Use of soil in an unspecified manner	50 – 200
Inappropriate mixing of cement/concrete and poor management of slurry	50 – 200
Untidiness and litter at camp.	50 – 250
Unauthorized removal of indigenous trees, fruits and nut trees, medicinal or other plants.	100 – 500
Failure to erect temporary fences as required.	50 – 200
Failure to reinstate disturbed areas within the specified timeframe.	50 – 500
Failure to provide equipment for emergency situations.	50 – 500
Animal poaching.	100 – 700
Defacing, painting or damaging natural features.	50 – 500
Damaging cultural, historical and/or archaeological sites of importance.	100 – 500
Failure to maintain basic safety measures on site.	50 – 500
Failure to obey site protection measures specified by the RE.	50 – 500
Failure to carry out required community liaison, damage to property etc., without prior negotiation and/or compensation and other social infringements.	200 – 500
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refueling.	50 – 200
Failure to provide drip trays and/or empty them frequently.	100 – 300
Inappropriate use of bins and poor waste management on site.	50 – 200
Inappropriate offsite disposal of waste from site.	50 – 250
Dust or excess noise on or emanating from the site.	100 – 200
Inappropriate use of adjacent watercourses and water bodies – such as for unapproved water abstraction, washing of vehicles, wastewater disposal and use by staff for washing.	100 – 500
Construction vehicles not adhering to speed limits.	100 – 200
Failure to maintain a register of incidents on site.	50 – 200
Failure to rehabilitate damaged areas after completion of the Works.	50 – 250
Any other contravention of the environmental specification.	50 – 500

APPENDIX

Appendix 1: Consulted Documents

Legislation

- Lei do Ambiente (Lei n.º 20/97, de 01 de Outubro);
- Regulamento sobre o processo de Avaliação de Impacto Ambiental (Decreto n.º 54/2015);
- Regulamento sobre o processo de Avaliação de Impacto Ambiental (Decreto n.º 42/2008, de 04 de Novembro, que altera os artigos 5, 15, 18, 20, 24, 25 e 28 do Decreto 45/2004 e Decreto 54/2015);
- Directiva Geral para o Processo de Participação Pública (Diploma Ministerial n.º 130/2006, de 19 de Julho);
- Directiva Geral para o Estudo de Impacto Ambiental (Diploma Ministerial n.º 129/2006, de 19 de Julho);
- Regulamento sobre o Processo de Auditoria Ambiental (Decreto n.º 25/2011, de 15 de Julho, que revoga o Decreto n.º 32/2003, de 12 de Agosto);
- Regulamento sobre Inspeção Ambiental (Decreto n.º 11/2006, de 15 de Junho);
- Regulamento sobre Padrões de Qualidade Ambiental e de Emissão de Efluentes (Decreto n.º 18/2004, de 02 de Junho);
- Regulamento sobre Gestão de Resíduos (Decreto n.º 13/2006, de 15 de Junho);
- Lei de Águas (Lei n.º 16/91, de 03 de Agosto);
- Regulamento dos Sistemas Públicos de Distribuição de Água e de Drenagem de Águas Residuais (Decreto n.º 33/2003, de 01 de Julho);
- Regulamento sobre a Qualidade de Água para o Consumo Humano (Diploma Ministerial n.º 180/2004, de 15 de Setembro);
- Lei do Trabalho (Lei n.º 3/2007, de 01 de Agosto);
- Lei do Turismo (Lei n.º 4/2004, de 17 de Junho);
- Lei das Pescas (Lei n.º 03/90, de 26 de Setembro);
- Regulamento da Pesca Recreativa e Desportiva (Decreto n.º 50/99, de 31 de Agosto);
- Lei de Terras (Lei n.º 19/97, de 01 de Outubro);
- Regulamento da Lei de Terras (Decreto n.º 66/98, de 08 de Dezembro);
- Regulamento de consumo e comercialização do tabaco (Decreto n.º 11/2007, de 30 de Maio);
- Regulamento sobre os Requisitos Higiénicos de Estabelecimentos Alimentares (Diploma Ministerial n.º 51/84, de 03 de Outubro);
- Regulamento sobre os Requisitos Higiénico-Sanitários de Produção, Transporte, Comercialização e Fiscalização de Géneros Alimentícios (Decreto n.º 15/2006, de 22 de Junho).

Convention

- Convenção da Biodiversidade (Resolução n.º 2/94, de 24 de Agosto);
- Convenção para a Protecção, Gestão e Desenvolvimento do Ambiente Marinho e Costeiro da Região Oriental Africana (Resolução n.º 17/96, de 26 de Novembro);

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- Convenção Africana sobre a Conservação da Natureza e dos Recursos Naturais (Resolução n.º 18/81, de 30 de Novembro);
 - Convenção de Estocolmo sobre Poluentes Orgânicos e Persistentes (Resolução n.º 56/2004, de 31 de Dezembro);
 - Salvaguardas Operacionais do Banco Mundial

Technical Documents

- Ministério de Administração Estatal, 2014, Perfil do Distrito de Mueda
- African Development Bank, 2013, African Development Bank Group's Integrated Safeguard System. Policy Statement and Operational Safeguards. Safeguards and Sustainability Series, Vol. 1, Issue 1
- U.S. Environmental Protection Agency, 1971, Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances
- WHO. 1999. Guidelines for Community Noise. <http://www.who.int/docstore/peh/noise/guidelines2.html> (acedido em 17/08/2015)
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Feasibility Study
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Executive Summary, Vol. 1
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Road Reconnaissance, Vol. 2
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Geometric Design, Vol. 3
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Geological and Geotechnical Studies, Vol. 4
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Hydrological, Hydraulic and Bridges Studies, Vol. 5
- STUDI International, Jan 2015, Rehabilitation of the Road N381/R2151 Between Mueda and Negomano, Preliminary Design Notes – Drawings, Vol. 6