Project Title: Nacala Rail & Port Project
Country: Mozambique, Malawi
Division: OPSM3

1. INTRODUCTION

1.1 During 2005 and 2006 Vale undertook feasibility studies for the Moatize Coal Project, which included social and environmental diagnostics, and the assessment of logistical alternatives for the alignment of the Nacala Corridor Project. During the feasibility studies phase, when Vale carried out initial social and environmental studies, the Corridor was divided by the borders of the countries Mozambique and Malawi, because of the different environmental legislations and the green- and brownfield sections. This was done to have a specific analysis of each region, considering the size and interference of the project on the direct and indirect areas of influence of the sections.

1.2 Based on this approach, in 2010 Vale carried out four Environmental Impact Assessments (EIAs) for the Nacala Corridor Project. The first EIA referred to the greenfield section in Mozambique (section 2): from Moatize to the Malawi border; the second EIA was related to Malawi (sections 3 and 5); the third EIA was related to the brownfield section in Mozambique (sections 6 and 7); the fourth EIA covered the greenfield section and the new port in Nacala-à-Velha (section 8 and the Port). The Environmental Impact Assessment (EIA) process for the Nacala rail corridor and the new Nacala-à-Velha (NAV) terminal and port was undertaken in 2010 and comprised 4 separate EIAs all led by the same environmental consortium. These included three for the Nacala rail corridor (one for each section in Mozambique and one for Malawi) and one for the NAV port and terminal and the associated short greenfield Section 8 of the Nacala rail corridor. In addition there was an EIA produced in 2010 for the Moatize Mine expansion (the most significant associated facility that is already operational), which is supported by the more detailed EIA undertaken in 2006 for the original mine development. All EIAs have received regulatory approval. The Lenders for this component of the project requested an update of the assessments hence the compiled 2015 Environmental and Social Due Diligence report and the 2015 standalone ESMP reports.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The Transport Policy, approved by Resolution No. 5/96, of April 2, promotes, in general, the involvement of the private sector in the creation of infrastructure and operation of port terminals and railways, qualified as part of the public domain, as discussed later. There is no general legislation specifically governing rehabilitation works, but there are decrees providing for auxiliary and complementary activities such as those regulating wildlife and wild forest materials, roads, civil works, construction, supply and abstraction of water, power supply.

2.1 Storage and Handling of Explosive and Dangerous Substances
2.2 Electrical installations
No. 48/2007 of October 22 will be taken into account, which approved the Scheme of Licenses for Electrical Installations and established the type of facilities subject to licensing (Article 4), skills and their instruction process (Article 10).

2.3 Occupational health and safety
Law 23/2007 of August 1 makes it compulsory to have insurance for aggravated occupational risks. Legislative Decrees No. 120/71, of November 13, No. 48/73, of July 5, and No. 61/73, of November 20, are relevant when it comes to rules for working in industrial facilities, and no. 1706 of October 19, regulating the matter of occupational accidents and occupational diseases. Employees also have a right to privacy about their personal life. Articles 126 through 236 provide specific rules for the worker’s right to health and safety, including information about the hazards of their work environment. Workers who suffer from occupational illness or a work accident are often entitled to compensation. Special provisions exist to address HIV/AIDS, including requirements for employers to provide alternative jobs if a particular job is too difficult with the illness and to continue medical treatment if the worker can no longer work (Mozambique’s Law for the Protection of Workers with HIV/AIDS).

2.4 The Constitution of the Republic of Mozambique establishes as the right of every citizen to live in a healthy environment and the duty to defend it (Article 90). Article 84 prohibits involuntary servitude and article 85 provides workers the right to a fair wage, rest and vacation, and a safe, hygienic work environment. Through Articles 86 and 87 they have the right to organize unions or professional groups, which may be used to strike without fear of lock-outs.

2.5 The National Environmental Management Program was prepared by MICOA in 1996 to provide guidance for environmental policy, including proposals for institutional strengthening, environmental legislation and environmental strategy, being up to MICOA its coordination and implementation.

2.6 The Environmental Strategic Plan 2005, prepared by MICOA establishes the vision of the Environmental sector to "Lead the country in promoting a healthy environment, in achieving a high quality of life and a balanced social, environmental and economic development".

2.7 The Environmental Policy, through Resolution No. 5/95 of August 3, to ensure sustainable development of the country.

2.8 The Environmental Law, Law No. 20/97 of October 1 applies to all public and private activities that may directly or indirectly affect the environment. The Law prohibits pollution in its various forms including the release into the atmosphere of any toxic or polluting substances outside the legally established limits is not permitted in the country.

2.9 The Regulation on EIA, approved by Decree No. 45/2004, of September 29, regulates the type, size and location of developments requiring an environmental impact assessment and details the process of evaluation of environmental impact. It applies to all public and private activities with direct or indirect influence on environmental attributes.
2.10 **The Regulation on Environmental Audit** process distinguishes (Article 3) between public audits performed by the appropriate state agency, in this case, MICOA; and private audits performed and determined by the entities whose activity is a potential cause of environmental degradation.

2.11 Decree No. 11/2006 of June 15, approved the **Regulation on Environmental Inspection** which, among others, deals on procedural and administrative arrangements for the supervision of public and private activities (licensing, audits and implementation of mitigation measures), rights and duties of inspectors.

2.12 **Land Management Policy** sets principles for planning a sustainable territory.

2.13 **Land Law** establishes, among others, the amount payable in case of expropriation, the land use planning, other general planning tools and approval processes, and the preparation of all instruments is subject to public inspection. The Land Law reiterates the constitutional command that the land is state property and cannot be sold or otherwise alienated, mortgaged or pledged, and may be assigned exclusively by inheritance, and establishing the main conditions for the acquisition of the right of use and enjoyment of land (DUAT) for the allocation of special licenses and the basic regime of automatic partial protection zones.

2.14 **The National Water Policy**, approved by Resolution No. 46/2007 and by the Water Law approved Law No. 16/1991, of August 3 establish the public domain of water, water management by river basin, user payer and polluter payer, the system of concessions and licenses for water use and the safeguarding the ecological of the ecological balance and the environment.

2.15 **The Sea Law** was approved by Law No 4/96 of January 4 and deals with the rights of the State and third parties, the rules for maritime public domain, vessels, maritime activities, among others, only in 2006 was Decree No. 45/2006, of November 30 approved, which approves the rules to be observed to prevent pollution and protect the coastal and marine environment, which are of particular relevance to the activities performed in the port component of the Project.

2.16 **The law of Forestry and Wildlife** 10/99 of 07 July regulates the exploitation of resources by local communities and establishes principles for the protection, conservation, and sustainable use of forestry and wildlife resources and is supplemented by the Forestry and Wildlife Regulation (Decree No. 12/2002).

2.17 **The Biodiversity related international conventions** that deal with relevant issues, such as the Convention on Biodiversity, under it, the regime for Invasive Species, Population of trans zonal and highly migratory fish, Conservation of Migratory Species, Combat to Desertification, Trade of Endangered Species, and on the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, which impose relevant standards for the environmental management of the Project.

2.18 **The Water Law** (Law No. 16/91 of 03 August) makes it clear that all water resources are owned by the state. The Water Law prioritizes water use for sanitation and consumption domestically over commercial use. It also stipulates that the polluter must pay for any contamination of the public water system (Law 16/1991, of 3 August, article 56). Prohibits the accumulation of solid waste, waste or any substance that may contaminate or provide water contamination risks Pollution.
2.19 **The Cultural Protection Law**, approved by Law No. 10/88 of December 22 prescribes, among other requirements, the need to notify the state about findings likely to be covered by this law (qualified as State property). Places with special ecological features are also included in the list of cultural goods.

2.20 **Environmental Crimes** - Mozambique has not yet approved a dedicated piece of legislation specific to environmental crime.

2.21 Regarding **noise and vibration events**, **Decree No. 18/2004**, limits on noise and vibration emission have not yet been set.

2.22 **International requirements**

The Project and related ESHS documents are structured to be consistent with the Lenders’ requirements which, in addition to the relevant national requirements, include IFC Performance Standards (PS) 1-6 and 8. Regarding AfDB, the report was compiled in consideration of the AfDB Integrated Safeguards System (ISS) (2013):

- Operational Safeguard 1: Environmental and social assessment,
- Operational Safeguard 2: Involuntary resettlement land acquisition, population displacement and compensation,
- Operational Safeguard 3: Biodiversity and ecosystem services,
- Operational Safeguard 4: Pollution prevention and control, hazardous materials and resource efficiency,
- Operational Safeguard 5: Labour conditions, health and safety.

2.3 **Malawi:**

The environment in Malawi is protected constitutionally and statutorily. Chapter 3, section 13 of the 1995 Constitution provides that the State shall actively promote the welfare and development of Malawi by progressively adopting and implementing policies and legislation aimed at achieving responsible environmental management. In that context, the 2004 National Environmental Policy sets the principles to be applied by the government for environmental and natural resource management, with the overarching goal of promoting sustainable social and economic development. It outlines the rights and responsibilities of individuals, communities, and the government. With regard to transportation, the policy promotes environmentally friendly transportation and infrastructure through proper site selection, choice of technology, and application of conservation measures.

2.3.1 **The Environmental Management Act (EMA) 23 of 1996** outlines the requirements for EIA procedures, reports, and compliance monitoring. It stipulates that projects cannot be implemented without an EIA study approval, a process that requires public participation. Section 25 of the EMA outlines the requirements for the content of the EIA, including a description of the project activities and its anticipated environmental impact. Periodic environmental audits may be conducted to ensure compliance with the EMA, including the provision that a developer must take all reasonable steps to mitigate environmental impact.

2.3.2 **The Local Government Act of 1998** makes District Assemblies responsible for environmental impact, including pollution control, waste management, and protection of forests, wetlands, and streams. The Forestry Act of 1997 provides protection for environmentally fragile areas.
2.3.3 The Malawian Employment Act of 2000 sets for the basic obligations of employers in terms of human resources, leave arrangements, sick day provision, and hours of work. Freedom of association is allowed under the law. The Occupation, Safety, Health, and Welfare Act of 1997 provides requirements for employers to maintain a healthy and safe workplace. This includes specific guidelines for accident investigation, fire protection, explosion protection, first aid and organization, medical examination, noise and vibration control, protective clothing, and ventilation.

2.3.3 Land Ownership

Section 28 (2) of the Constitution of Malawi states that “no person shall be arbitrarily deprived of property” while section 44(4) allows for the use of eminent domain, “Expropriation of property shall be permissible only when done for public utility and only when there has been adequate notification and appropriate compensation, provided that there shall always be a right to appeal a court of law for redress”. The National Land Policy outlines policies for government acquisition of land and the necessary compensation. It states that compensation valuation for customary land should be based on the open-market value of the land and improvements on the land and warns of the under-compensation pitfalls of excluding certain items or valuation during valuation and delays in payment.

The Land Act of 1965, CAP 57:01 governs customary, private, and public use of land. It provides the Minister the power to convert customary land into public land by publication in the Gazette. Land Acquisition Act, CAP 58:04 affords the Minister the power to acquire land and outlines the process for payment and assessment of compensation.

2.3.4 Cultural Heritage

Courts in Malawi continue to apply customary law, which gives great deference to decisions made by traditional leaders. According to section 27 of the Monuments and Relics Act (29:01), any entity that finds a relic or archeological element during excavation must halt work and report it to the national government within fourteen days.

2.3.5 International Conventions

Mozambique: As a signatory to the ILO Convention, the government has created the Consultative Labour Council (governed by Decree N. 7/94 of 9 March) to have a multi-stakeholder group set labor policy. As mentioned above, there are special courts for labor matters at the district and provincial level. To make the courts more acceptable, claims can be presented verbally and procedures are simplified (Labor Courts Law art. 16 & 21).

3. PROJECT DESCRIPTION AND JUSTIFICATION

The Nacala Corridor comprises a linear railway development of approximately 913 km which runs from the Moatize coal mine, located close to Tete, the capital of the Tete Province in northwest Mozambique, eastward into Malawi where it connects with the current railway network. The Nacala Corridor then continues eastwards on the existing rail line in Malawi and through the Mozambique provinces of Niassa and Nampula, to a new purpose build Nacala-a-Velha (NAV) coal handing terminal and port on the coast of Nampula Province.

The new NAV terminal and port is located at Namuaxi Point on the eastern shore of the Baia de Nacala, approximately 5 km from the main town of Nacala, and to the northwest of the existing Nacala port. The rehabilitation of the associated railway infrastructure, operated by the concessionaires CDN and CEAR, is located in Malawi and the Mozambique Niassa Province.
The **Nacala Corridor Project (NCP)** components for financing purposes comprise the following elements:

**Nacala Rail Corridor:**
- Section 2 (S2): greenfield line in Mozambique,
- Section 3 (S3): greenfield line in Malawi,
- Section 5 (S5): brownfield line in Malawi,
- Sections 6 (S6) and 7 (S7): brownfield line in Mozambique,
- Section 8 (S8): greenfield line in Mozambique; and

**Nacala-a-Velha (NAV) Coal Terminal and Port,** in Mozambique.

The Nacala rail corridor comprises 230 km of greenfield single gauge rail track and the rehabilitation of 683 km of existing narrow gauge rail track. The new line will enable Vale Mozambique to transport up to 22 million tons per annum (mtpa) of coking (metallurgical grade) and thermal coal to a new coal handling terminal and port at Nacala-a-Velha. The new Terminal is expected to have a stockyard capacity of 1.45 million tons and will manage the arrival of trains, their offloading, the conveyance and storage of coal, coal handling and loading onto ships.

The Marine Terminal will receive ships from between 40,000 DWT (Deadweight Tonnage) to 175,000 DWT of the Cape Size and Panamax models. The process of receiving, storing and loading coal can be...
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summarized in six phases: a) Wagon Tipper; b) Primary Sampling; c) Stacking and Storing; d) Reclaiming; e) Secondary Sampling; f) Ship Loading. The 4800 t/h flow of the tipper will be directed to four conveyor belts, which will feed into a transporter. A flow cut-off sampler to direct the sample flow to the transporter which will feed the Primary Sampling will be installed in the transporter discharger. The return flow of the Primary Sampling will be directed from the exit of the tower to the transporter. The coal loading will proceed to the Operation Platform, where the Ship Loaders and Mooring Dolphins’ crane track will be located.

With regard to Utilities and Systems the following are being constructed: Desalination Plant with a production capacity of 40 m$^3$/h and a seawater intake permit up to 1,500 m$^3$/day, to ensure fresh water availability in the construction site. The plant will remain operational also during operations to supply required water volumes during the terminal activities; Water Treatment Station with a daily capacity of 2,600 m$^3$; Sewage Treatment Station; Drinking Water System; Industrial Water System; Sewage System; Fire Fighting and Prevention System; Compressed Air System; Dust Suppression System (for the roads, stockyard and the coal transfer areas); Reservoirs (for storage, industrial water and fire-fighting); Drainage System; Electrical Substations (Main substation, Stockyard Substation, Conveyor Belt substation, and Ship Load substation); Electricity Distribution System; Lighting Network; IT, Telecommunications, Telephone and CSTV Systems; Industrial Automation Systems; and Maritime Signaling.

The facilitation of the export of coal, iron ore and other minerals from the mineral rich Tete Province is anticipated to have a significant impact on Mozambique’s Gross Domestic Product (GDP). Similarly the refurbished line will assist business in Malawi with the export of its goods, and also the efficient import of products, factors which are anticipated to also have a positive impact on Malawi’s development and GDP.

The associated facilities which have been considered by the ESDD are as follows: the rehabilitation of the associated rail infrastructure operated by the concessionaire (CEAR) in Malawi. This includes approximately 90 km of line connecting Nkaya to Limbe in Malawi which is to be financed by CEAR as part of its commitments to the Government of Malawi. It is anticipated that there will be upgrades to the remaining section of the circa 700 km Mchinji – Lilongwe – Nkaya – Limbe – Blantyre – Mkhanga – Marka line in Malawi, and the workshops in Limbe and Nampula (Mozambique). The expansion of the Moatize coal mine located at the western end of the Nacala Rail Corridor (including Section 1 of the Nacala Rail Corridor which is existing).

4. DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 Physical Environment
The characterization of the physical environment of the areas of influence is defined for the construction of the Nacala Railway and Port as below.

4.2 Climate and Meteorology
By and large the climate in much of the area of interest is the Tropical Dry Steppe Climate and close to the border with Malawi, in areas of higher altitude, it becomes Tropical Wet Climate, characteristic of tropical savanna. At the Port, it is tropical moist. Average annual rainfall is inferior to the annual average of evaporation, where greater rainfall is observed in periods where there are
the highest average monthly temperatures, which may represent 80% of the total annual rainfall, ranging from 1600 mm recorded in Tete and 1200 mm recorded in Lichinga (Kassam et al., 1981). Mozambique comprise the equatorial zone of low pressure and sub Anticyclones. According to Reedy (1984), the equatorial area of low pressure, tropical anticyclones and Antarctic polar fronts determine the atmospheric circulation in Mozambique. Reflecting these interferences, the climate ranges from arid (very dry) to very wet towards the north of the country and the volume of rainfall reduces north-south and from the coast to the countryside. Hot and rainy season occurs between October and March and the dry season and mild temperatures in the period from April to September. 

**Rainfall** - The average annual rainfall ranging from approximately 600 to 800 millimeters in this region, except in the higher regions of the plateau of Angónia, on the edge of the area of interest, close to the border with Malawi, where altitudes above 500 m are observed. In these regions the highest recorded average annual rainfall can reach 1000 mm.

**Temperature** - The highest values occur between October and November with the minimum recorded between June and July and the range is 30.8°C – 18.4°C. Temperature decreases closer to the Malawi border.

**Relative humidity** - January and February values are around 80% with minimum values recorded between August and October at around 50%.

**Evaporation** - it is averaged at 2004 mm (4-6 mm daily evaporation, measured in open tanks, in drier locations). This value is considered significant compared to the average rainfall which is in the range of approximately 600 to 700 millimeters per year.

**Wind Regime** - prevalence from southeast winds is over 40%. September-October has the highest frequencies of about 7-11(11.5 km / h)

**Cyclones**: tropical cyclones affect the weather of Mozambique causing strong winds. In Mozambique the occurrence of cyclones generally prevails between the months of November and April. Cyclonic winds reach maximum speeds ranging from 63 km / h to speeds above 212 km / h. The most frequent categories of hurricane winds are 1-4 at speeds 63-212 km / h, Category 5 speeds above 212 km / ha are rare. Cyclones do not reach most of the railway areas however, there is occurrence of cyclones in the port area around Nov to Apr.

### 4.3 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 in the corridor 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.

### 4.4 Noise and Vibration
The layout of the proposed railway line crosses a variety of remote rural areas, some villages and dispersed population communities such as the Tomba community. In remote locations, away from main roads and large communities, noise levels are very low (approximately 42 dB (A)), with noise levels to lower up to 30 dB (A) at night time, typical of remote rural areas. In larger communities including Nacala, levels of 51 decibels were recorded. Currently, EN-103 road is the only noise source in the vicinity, i.e. at a distance of 150 m on each side of the layout. Human activities located near the future railway line are also a significant source of noise. Regarding vibration, it was found that all measures are below the perception threshold established by the international reference adopted in this assessment. For locations positioned
3m from the railway line, vibrations exceeded the risk threshold for “architectural damage” to houses with walls and ceilings of mortar.

4.5 Geology and Geomorphology
The route starts in Moatize, which is based on the coal-producing strata, i.e., shale, sandstone and sedimentary rocks of the Ecca Group, Karoo Supergroup. The line moves away from this area after a few kilometers and then runs through the area based on intrusive rocks rich in iron and magnesium of the Tete Complex, which includes leucogabros, anorthosite and piroxenites. The route then crosses two strips of the Matambo Group that slope to the north, including shafts and gneiss bands. Near km 40, the route crosses again the settled area in the sedimentary rocks of the Ecca Group. The types of rock formation above are blended with dolerite in localized scale, with dolerite intrusions as prominent masses. Structurally, the area is dominated by northwest oriented faults to the southeast, consistent with Mwanza fault in Malawi, and parallel to this. Standards are also evident oriented more or less at right angles to major flaws. As for geomorphology, the main route generally follows a line in relatively flat territory with some rugged topography.

4.6 Soils
Most of the use of land is arable land and pasture (in the form of subsistence and not on a commercial scale) with some areas of overgrazing and vegetation under pressure.

The main forms of soil range from agricultural soils of moderate quality with a very good economic potential to thin soils and low quality. The physical characteristics of the soils include:
- Topsheet clay percentages ranging from as high as 16 to 20%, depending on geology host / that derived origin and its position in the topography;
- Subsoil clays ranging 18-42%;
- Moderate permeability rates at low situ on the clay loam and muddy clay
- Incorporation rates (infiltration) low to very low
- Moderate capacity (20 to 45 mm / m) of water retention.

The structure of the soil ranges from fine-grained soils and aggregates with simple composition without occasional grainy structure in very loamy soil, to weak and granular structures where the soils are of colluvial and derivation associated with wetlands positioned at the bottom of slopes and surrounding lands the high Malawi geologies. The soil formation mechanisms in the area are dominated by wind, water and usual temperature, which usually resulted in the formation of moderate to shallow soils in situ, with saprolite horizons on hard rock. The positions the hillside and a half lower slopes are dominated by erosion platforms and surfaces of ancient soils, mainly defined by geology host on site. The lower slopes (areas of floodplains) are dominated by recent deposits of transported materials (colluvium) of the highest positions. The end result is a complex of various forms of soil within a relatively small spatial area.

4.7 Water Resources
The new railway line from Moatize to Malawi does not cross major rivers along its route. It follows the course of the Moatize River near the village of Moatize and then runs along the river catchment of Moatize rivers, Revubué, Condedzi, Minjova and Ncombeze to the border with Malawi. At the Port, several rivers empty into the Nacala Bay. According to the hydrogeological map of Mozambique, existing aquifers are classified mainly in class B consisting of fractured or cracked aquifers. It was concluded that the availability of water in zones of influence is limited. Water quality along the route are secondary but it is used for domestic consumption and for agriculture. Groundwater quality was not defined in the project area; sources associated with the alluvium of river catchments are usually acceptable, but very sensitive
to pollution by infiltration and runoff of polluted surface water. Water wells dug in the alluvial sediments along the rivers appear to be common and Moatize and Kambulatsitsi use water drawn from wells and hand pumps. The currently available water has many uses beyond human consumption, consisting of laundry and also to water livestock. Water is also used to irrigate gardens.

4.8 Landscape
the main sensitive areas and with high quality scenic concern are more naturalized areas with less human presence, including landscapes which dominate mountainous areas and water lines. In other areas of the study layout, human presence contributes to a reduction in the scenic quality and landscape sensitivity, either through agricultural use of space, the presence of settlements and localities or transport infrastructure such as roads

4.9 Biotic Environment
Marine environment at the port include phytoplankton communities that have great diversity in summer. The zoo benthic organisms of the shallow parts of the Bay are declining due to being harvested and sold. The terrestrial biota of the railway line was characterized in terms of vegetation and fauna and about 8 km east of the route of the railway line, near the border there is a forest reserve. More than 5 km to the north of the corridor, there is an area classified as Important Bird Areas (IBA) by the BirdLife International. With regard to vegetation a global analysis shows the occurrence of significant anthropogenic influence, particularly around rural residential areas and along access roads. According to the Red List of existing plants for Mozambique there are 19 species and one genus in the Tete province, where the project in question is under development.

4.10 Social Baseline
Nacala Port has urban areas, higher population densities and urban problems. Nacala-a-Velha shows a pattern of rural occupation, with low densities, dispersed occupations and only one community with semi-urban characteristics. The distribution of population by educational level points to very low levels. The health status of the population in the study area is, generally, similar to that found in the country, with high mortality rates and high rates of transmittable diseases such as malaria, diarrheal diseases, respiratory diseases, HIV/AIDS and malnutrition. Malaria is the disease with the highest number of cases and deaths. Regarding AIDS, although Nampula has the second lowest prevalence rates in the country, the data show an increase in cases of the disease in recent years. The agricultural sector stands out with an average participation of over 50%, fishing is another activity of relevance in the coasts.

5. PROJECT ALTERNATIVES
It is worth noting that construction has long commenced and completion rates in some section are as high as 90% and also for the Port.
Technical and environmental alternatives were based on:
- Relief and topography - minimization of "cut and fill" process in the lower slope areas;
- Natural physical barriers - contour the rivers, mountains, swamps, floodplains and lowlands;
- Areas with productive activities (agriculture) and urban areas with high population density - to prevent interference;
- Geology - preventing interference with cracks in the tectonic plates;
- Pedology - preference for areas with a high density of rocks or composed of rocks in order to take advantage of them for ballast;
• Areas of importance for the protection of water - diverting systems such as reservoirs, rivers, water supplies, sources and drainage system;
• Parks and Reserves - prevention and preservation of these areas;
• Heritage/archaeological site - avoid areas of known historical and cultural value, area with rocks and caves;
• Use of existing infrastructure - use of existing roads for the maintenance phase.

More specifically, several logistic alternatives were studied to ensure the commercial viability of coal produced at Moatize. Considering the flow of the Seine railroad line, the construction of a new terminal in Nhangua was evaluated; export coal with large ships directly by the Port of Beira; and the use of Beira Port facilities, associated with ocean transshipment. The technical / environmental pre-feasibility study indicated that Nhangua alternative had severe limitations in terms of port operations, related to the need for dredging and coastal erosion.

The export via large ships directly from the Port of Beira, has shown technical and commercial attractiveness, given the draft restrictions in the port, featuring an almost continuous demand for dredging. The option to use of Beira Port facilities coupled with ocean transshipment proved viable, and will be used for the export of the coal to be produced in Moatize. The Port of Beira, as well as the transshipments, are subject to specific studies and licensing. In 2005 and 2006, the possibility of disposal via Zambezi River and transport by trucks was also evaluated. However, these options were not attractive to conduct feasibility studies. Given the limitation of railway infrastructure of Sena railroad, and the Port of Beira pier, the outflow option via the port of Nacala was again studied.

6. RESULTS OF COMPARISON OF ALTERNATIVES

The Bay of Nacala has very favorable natural conditions for port operation. However, the existing port in Nacala has limited area "on shore", not allowing the installation of patios for coal piles and other equipment and infrastructure. Thus, an area already studied in Nacala-a-Velha was presented as good alternative to the installation of new coal terminal. The aim of the studies for the alignment of the railway between Moatize and Nacala-a-Velha, boils down to find the shortest route between two points, taking into account technical, operational, economic, social and environmental aspects. Thus, the selected alignment out of 5 alternatives, observed among others, to minimize cutting and filling, the non-interference in parks and reserves, minimizing interference in populated areas, reducing the need to cross rivers (less bridges), as well as the use of already existing structures.

7. POTENTIAL IMPACTS

The environmental impacts from the development of the railway corridor comprise localized impacts and regional impacts: (i) localized impacts are associated with construction phase on the greenfield line and include impacts on soil, topography, fauna and flora from borrow pits, river crossings, and construction camps. Localized impacts will continue into the operational phase with the running of the rail workshops; (ii) linear impacts are associated with the construction phase earthworks along the route of the rail corridor, some of which are significant where there is major cut and fill operations required (e.g. on NCP S2 in Malawi), these impacts affect air quality, noise and vibration, fauna and flora; (iii) regional impacts which apply across the green and brownfield line sections comprise those arising from the operation of the railway, principally noise, vibration, and air pollution, and to a lesser extent fauna mortality.

7.1 Key impacts identified for the Railway Construction Phase - Positive Impacts
Railway Construction Phase - Positive Impacts

<table>
<thead>
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<td>• Increased indirect effect on job creation as a result of the acquisition of material, equipment and services;</td>
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<td>• Improvement of national logistics systems, due to the development of railway infrastructure;</td>
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7.2 Key impacts identified for the Port Construction Phase - Positive Impacts

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<td>• Increase in revenue collection, payment of taxes and fees related to the acquisition of material, equipment and services;</td>
</tr>
<tr>
<td>• Increased indirect effect on job creation as a result of the acquisition of material, equipment and services;</td>
<td></td>
</tr>
<tr>
<td>• Improvement of national logistics systems, due to the development of port infrastructure;</td>
<td></td>
</tr>
</tbody>
</table>

7.3 Key impacts identified for the Railway Construction Phase - Negative Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Average significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Involuntary relocation of the resident population due to the removal of infrastructure;</td>
<td>• Inadequate expectations in relation to the negotiation of land/damages, resulting from the dissemination of information about the undertaking and the entrepreneur;</td>
</tr>
<tr>
<td>• Inadequate expectations for the project, resulting from the dissemination of information about Conflict of Interest, losses and compensation, due to the indemnification for the possible loss of structures and other assets;</td>
<td>• Inadequate expectations regarding compensation due to the dissemination of information about the undertaking and the entrepreneur and the removal of sacred elements;</td>
</tr>
<tr>
<td>• Property speculation, due to the dissemination of information about the undertaking and the entrepreneur;</td>
<td>• Potential formation of contrary public opinion due to the dissemination of information about the undertaking and the entrepreneur;</td>
</tr>
<tr>
<td>• Changes in existing productive activities (also related to information means) due to the removal of structures;</td>
<td>• Temporary interruption of productive activity due to the removal of farming areas in subsistence areas;</td>
</tr>
<tr>
<td>• Changes in the daily life of the local population due to removal of sacred elements and infrastructure;</td>
<td>• Conflict of interest due to the removal of sacred elements;</td>
</tr>
<tr>
<td>• Loss of arable land due to land clearance and movement of land and removal of soil;</td>
<td></td>
</tr>
</tbody>
</table>
### High Significance:
- Changes in the daily life of the local population due to removal of sacred elements and infrastructure;
- Increased crime, due to the opening of temporary jobs;
- Increase of infectious diseases, due to the opening of temporary jobs;
- Limitation in community mobility, due to land clearing and earth moving;
- Changes in the landscape; due to the clearing of land and earth moving and storage of inert material;
- Soil compaction due to the movement of machinery and vehicles;
- Rise in unemployment (during the demobilization phase) due to the reduction of direct and indirect jobs;

### Average significance:
- Changes in cultural practices due to land clearance and earthworks;
- Increased flow of migrants due to the opening of temporary jobs;
- Increased pressure on goods and services due to the opening of temporary jobs;
- Change in water availability, due to the use of water at the construction sites;
- Change in water quality due to effluent generation, generation of sediment and generation of hazardous waste;
- Disorders in local traffic due to the increase of transit of vehicles, personal transport and transport of material;
- Discomfort to the population due to changes in the landscape, increase in noise and vibration, changes in air quality;
- Change in air quality, due to the emission of dust and particulate matter;
- Reduction of vegetation by clearing of land and earth moving;
- Damage to property elements due to clearing of land and earthworks;
- Increase of environmental noise due to noise emission and vibration on the earthwork activity;
- Loss of individuals of the local wildlife, due to clearing of land and earth moving;
- Changes in cultural practices due to land clearance and earthworks;
- Changes in the landscape due to clearing of land and earth moving;
- Wildlife disturbance due to the emission of noise and vibration;
- Changes in soil quality due to the generation of hazardous waste in the workshops;
- Reduction of the formal economy and retraction of the local economy, due to the reduction of direct and indirect jobs;
- Decreased government investment potential due to the reduction of tax collections and social security contributions

### 7.4 Key impacts identified for the Port Construction Phase - Negative Impacts

#### High Significance:
- Involuntary relocation of the resident population due to the removal of infrastructure;
- Conflict of Interest, losses and compensation, due to the indemnification for the possible loss of structures and other assets and removal of sacred elements;
- Property speculation, due to the dissemination of information about the undertaking and the entrepreneur;
- Changes in existing productive activities (also related to information means) due to the removal of structures;
- Changes in the daily life of the local population due to removal of sacred elements and infrastructure;
- Changes in social and cultural relations/rupture of the social fabric;
- Changes in the daily life of the local population due to removal of sacred elements;
- Spatial disruption of activities due to the removal of infrastructure;
- Conflicts of interest, losses and compensation.

#### Average significance:
- Inadequate expectations for the project, resulting from the dissemination of information about the undertaking and the entrepreneur;
- Formation of contrary public opinion due to the dissemination of information about the undertaking and the entrepreneur;
- Inadequate expectations in relation to the negotiation of land/damages, due to the dissemination of information about the undertaking and the entrepreneur and in relation to the mobilization of affected communities;
- Change in air quality, due to the emission of dust and particulate matter;
- Loss of individuals of the local wildlife, due to clearing of land and earth moving;
- Disturbance of wildlife due to clearing of land, earthmoving and noise emissions and removal of soil in the borrow areas and quarries;
- Damage to property elements due to clearing of land and earth moving;
- Temporarily interruption of production due to the removal of subsistence farming areas;
- Inappropriate expectations regarding compensation related to the removal of sacred elements;
- Changes in social and cultural relations/rupture of the social fabric due to the removal of infrastructure;
- Reduction in the area covered by vegetation, due to clearing of land and earth moving;
- Habitat fragmentation due to clearing of land and earth moving;
- Loss of topsoil due to land clearing and earth moving;
- Changes in cultural practices due to land clearance and earthworks;
- Soil erosion due to clearing of land and earth moving;
- Changes in the landscape due to clearing of land and earth moving and construction of the pier and mooring;
- Change in water availability due to increased use of water on site;
- Sedimentation in the ecosystem (land and sea) due to the construction of product yard;
- Interruption and restriction of normal movement of fauna due to the separation of the port area;
  - Rise in unemployment (during the demobilization phase due to the reduction of direct and indirect jobs in the demobilization phase);
  - Reduction of the formal economy and retraction of the local economy (during the demobilization phase) due to the reduction of direct and indirect jobs in the demobilization phase;
  - Decreased government investment potential due to the reduction of tax collections and social security contributions (during the demobilization phase);

7.5 Key impacts identified for the Railway Operational Phase - Positive Impacts

<table>
<thead>
<tr>
<th><strong>High Significance:</strong></th>
<th><strong>Average significance:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased infrastructure to support the load in function of the potential transport of general cargo;</td>
<td>Workforce more skilled and with more training due to worker qualification;</td>
</tr>
<tr>
<td>Increased infrastructure to support the transport of passengers according to passenger transport potential;</td>
<td>Increased multiplier effects on the local economy (including procurement of goods, money spent in the area by workers) and macroeconomics (GDP) due to acquisition of equipment, materials and services;</td>
</tr>
<tr>
<td>Stimulation of the local and regional economy due to the payment of wages and increased demand for services from local and regional suppliers;</td>
<td></td>
</tr>
<tr>
<td>Direct effect on the economy (market) due to the purchase of equipment, materials and services;</td>
<td></td>
</tr>
<tr>
<td>Indirect effect on the local economy (including procurement of goods, money spent in the area by workers) due to the acquisition of equipment, materials and services;</td>
<td></td>
</tr>
<tr>
<td>Indirect effect on job creation due to the acquisition of equipment, materials and services;</td>
<td></td>
</tr>
<tr>
<td>Direct effect on macroeconomics (GDP) due to the acquisition of equipment, materials and services;</td>
<td></td>
</tr>
<tr>
<td>Revenue collection with the payment of fees and taxes.</td>
<td></td>
</tr>
</tbody>
</table>
### 7.6 Key impacts identified for the Port Operational Phase - Positive Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Average significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased multiplier effects on the local economy (including procurement of goods, money spent in the area by workers) due to the acquisition of equipment, materials and services.</td>
<td>Increased multiplier effects in macroeconomics (GDP) due to the acquisition of equipment, materials and services; Increase in qualifications and competencies of the workforce due to the capacity building and development of skills; Improvement of local road networks due to the opening of new access roads.</td>
</tr>
</tbody>
</table>

### 7.7 Key impacts identified for the Railway Operational Phase - Negative Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Average significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety risks of the surrounding community due to the passage of the train; Discomfort to the population due to changes in the landscape, noise and vibration emission, emissions of dust and particulate matter; Increased environmental noise due to increase in the emission of noise and vibration;</td>
<td>Change of Air Quality due to the emission of dust and particulate matter; Change in local culture due to the intrusion of the train in the landscape; Disturbance of wildlife due to the intrusion of the train in the landscape, emission of noise and vibration; Changes in the landscape due to the intrusion of the train in the landscape; Discomfort to the population due to the deposition of dust and carbon particles;</td>
</tr>
</tbody>
</table>

### 7.8 Key impacts identified for the Port Operational Phase - Negative Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Average significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in the availability of water due to increase in water consumption in the port operation; Changes in the landscape due to the intrusion of port facilities; Changes of Air Quality due to issue of coal dust particles; Interruption and restriction of the community movement due to restriction in the access to the port area;</td>
<td>Rise in crime due to the hiring of permanent staff; Increase of infectious diseases due to the hiring of permanent staff; Disorders in local traffic due to increase of vehicle traffic for the transport of workers; Change of Water Quality due to the generation of solid waste and emission of treated effluent; Health risk due to the generation of solid waste; Loss of vegetation or deficiency in growth due to deposition of coal dust in the vegetation; Disturbance of marine ecological habitats due to collection of seawater; Interruption and restriction of normal movement model of fauna due to the separation of the port area; Disruption of traditional fishing activity due to the restrictions in the use of the area; Changes in the local culture due to the visual intrusion of the port in the local landscape;</td>
</tr>
</tbody>
</table>
7.9 Key impacts identified for the Port Decommissioning Phase - Positive Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Positive Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased availability of land due to the return of the right of land use (DUAT)</td>
<td>Average significance:</td>
</tr>
<tr>
<td></td>
<td>Improvement in air quality due to the stoppage of dust emissions and particulate matter;</td>
</tr>
<tr>
<td></td>
<td>Restoration of ecosystem services (artisanal fishing, etc.) due to the decommissioning of port structures.</td>
</tr>
</tbody>
</table>

7.10 Key impacts identified for the Port Decommissioning Phase - Negative Impacts

<table>
<thead>
<tr>
<th>High Significance:</th>
<th>Negative Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased government investment potential due to the reduction of tax collections and social security contributions;</td>
<td>Average significance:</td>
</tr>
<tr>
<td>Reduction in the revenue of suppliers due to the interruption of acquisition of equipment, materials and services;</td>
<td>Increase in unemployment due to the extinction of direct and indirect jobs;</td>
</tr>
<tr>
<td></td>
<td>Reduction of the formal economy and retraction of the local economy due to the extinction of direct and indirect jobs;</td>
</tr>
</tbody>
</table>

8. MITIGATION/ENHANCEMENT MEASURES AND COMPLEMENTARY INITIATIVES

8.1 Air impacts:
- Key additional management actions to reduce the risk to the physical/chemical environment during the operation of the rail corridor is the application of suppressants to the coal to minimise the generation of dust from the open coal cars as they pass along the line;
- Application suppressive agents (binders) in the coal packed in the cars, in order to mitigate the effects arising from the increasing amount of particulate suspended in the air.
- Care of the loading of coal wagons and correct stowage to prevent dust formation.
- Inspection and preventive maintenance of vehicles, machinery and equipment, aimed at regulation of combustion engines to minimize the emission of gases and smoke;
- Establishing a maximum vehicle speed used in monitoring activities and railway maintenance mainly on unpaved roads, to reduce the suspension of particulate soil materials;
- Prioritization of public transport for the staff. It is noteworthy that the emissions also depend on engine technology and the composition of the fuel used;
- Ban of burning combustible materials, waste and organic matter or any other materials, dangerous or not, along the railway line in structures under the responsibility of the concessionaires;
- Replacement, whenever possible, of equipment or machinery by most modern models that release fewer pollutants to the environment;
- Care to avoid dust formation during loading of bulk cargoes and the correct packaging in the cars;
- Use closed or covered wagons for bulk cargo transportation
- monitoring of 10 points situated close to the emission sources for TSP, PM10,
- monitoring meteorological parameters wind direction and speed (WD and WS), air temperature (AT), rainfall (PP), atmospheric pressure (AP), solar radiation (SR) and the relative humidity (RH)
- Prior to the sampling will be carried out calibration of equipment to ensure quality monitoring;
- Emergency cases shall be reported through the social monitor interface to the community and relevant stakeholders.
8.2 Waste Impacts:
- Segregation; Identification and packing, collection and transportation, treatment, recovery and disposal.
- The waste material central (CMD) of the CLN will be built in order to meet the needs of proper disposal of waste generated.
- The collection and transport of waste within the producer's facilities will be carried out by skilled employees of an outsourcing company, specialized and licensed for the activity in accordance with environmental legislation.
- Vale shall keep details of transport operators and owners of the vehicles used to transport hazardous waste and they shall be registered with the relevant authorities.
- Waste records shall be kept and shall be accompanied by evidence like photographic records and supporting documents.
- Develop training related to solid waste management under the Program for Environmental Education for employees as a whole.

8.3 Fauna Impacts:
- Survey of the main run over species in conservation areas;
- Consider and develop actions to control domestic animal running over;
- Provide educational guidelines in order to assist the fight against wildlife trafficking, capture and illegal hunting.
- Parallel to educational activities, partnerships shall be created with the competent authorities to supervise railway stations, with easy access to government inspection teams;
- Establishment of a toll free line that allows the population to make reports anonymously, which are passed on to the competent authorities.

8.4 Social Impacts:
- Hold meetings for the disclosure of relevant updated information about the project.
- Implement the management of demands and grievance mechanisms.
- Creation of an interface of the social monitors with the neighboring communities. (social monitors are local professionals who establish direct communication between the community and concessionaires)
- Workshops will be held with community leaders about issues deemed important by the developers and the communities. Workshops will be held to engage community leaders in order to analyze and monitor the actions in progress in the areas of agricultural areas, food safety and practices for boosting and local economic development in communities.
- Strengthen relationships and generate knowledge about the main social environmental investments of the Project.
- Implementing of the Railway Road Safety Program, aimed at the general community, including the school community, community leaders, service providers, own employees and third parties, government authorities. The Railway Road Safety program is based in 4 milestones, they are: i) 1st Milestone – Traffic Safety Management; ii) 2nd Milestone - Safer infrastructure and mobility; iii) 3rd Milestone
8.5 Health & Safety Impacts:

- During the Project implementation phase, a Road Safety Program was created along the Nacala Corridor because of the risk of accidents on the roads involving employees and contractors with members of nearby communities. With the transition to the operational phase of the Nacala Corridor Railway there is a change in risk, making it necessary to also establish a Railroad Safety Plan throughout the Corridor.
- The articulation and strengthening of partnerships direct interfaced with the Stakeholders Engagement Plan belongs to the Social Communication Sub Program and will follow the methodology and periodicity described on the related plan.
- The Malaria Program aims to adopt a preventive strategy to break the disease cycle with the support of Elementary Multipurpose Agents for its implementation. A Pilot Project was executed in Nacala-a-Velha by carrying out an Epidemiological Study. As a result, Community Multipurpose Agents were trained who work for preventing and optimizing forward diagnoses and treating malaria in communities surrounding the project.
- The Program should be implemented in all project sections by hiring and monitoring community multipurpose agents and building up partnerships. After the Program is implemented, its outcomes shall be monitored.
- The implementation of the Mobile Clinics Project in the communities throughout the Nacala Corridor is performed together with the Elizabeth Glaser Foundation for Children with AIDS (EGFAP) and with the Health District Board (DPS).

8.6 Resettlement Impacts:

- To assess the evolution (or devolution) the quality of life level of the households impacted by the Nacala Corridor Project (railway) analysis should be carried out - according to each target audience - of the data in the socioeconomic indicators database made and updated by the Socioeconomic Indicators Monitoring Sub Program.
- For resettled households and regarded as "special cases" the analysis should be made individually for each household, and will consist in the evaluation of socioeconomic indicators, which should present relatively better results than the collected in the monitoring reference period (baseline).
- Where household present worsening of indicators, a home visit should be performed by the sub-team in order to assess the reason for the worsening and the potential for improving household's quality of life.
- For public targets of economic activities (farms and other), where the monitoring is done by sampling, in addition to the analysis and individual visit, the group's situation (target group) should be considered as a whole so that if there is a recurring negative situation, the actions to reverse the situation can be developed and implemented for the entire set of affected households, and not just for those who are in the cut of the sample.
- After the home visit to the household that presented worsened quality of life, the team should identify by which actions of the Social Development Sub Program the household should be attended, so that there may be a reversal of the identified situation. Once set the appropriate actions to solve the case, the Social Compensation Sub-Program shall take the necessary measures to

8.7 Water Impacts:

- The water management plan extends to the control of effluents including that from oil water separators in the rail workshops. Historical rail workshops shall be subjected to a detailed audit (and potentially a site investigation) to establish the key risks and impacts with respect to surface and groundwater (and soils) and site specific monitoring and management plans developed.
9. MONITORING PROGRAM

<table>
<thead>
<tr>
<th>Specific Objective</th>
<th>Goal</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>To present the general framework of the solid waste management</td>
<td>Approve internal procedure for waste management.</td>
<td>Approved version of the document.</td>
</tr>
<tr>
<td>To conduct register of solid waste generated by the project operation</td>
<td>Performance of register of solid waste generated</td>
<td>Requirement documentation; Contract with specialized company.</td>
</tr>
<tr>
<td>Create and / or customize relevant computerized instrument for the effective implementation of this program</td>
<td>Create and / or customize relevant computerized instrument for the effective implementation of this program</td>
<td>Requirement documentation; Elaboration of the Reference Terms. Contract with specialized company. Invoice of the equipment.</td>
</tr>
<tr>
<td>Provide a routine for the management of this program</td>
<td>Develop internal procedure for the management of this program.</td>
<td>Draft version of the document. Approved version of the document.</td>
</tr>
<tr>
<td>Environmental education for employees in general and specific training for employees involved in managing solid waste.</td>
<td>Defined under the Programs for Training of Work and Environmental Education</td>
<td>Defined under the Programs for Training of Work and Environmental Education</td>
</tr>
<tr>
<td>Diagnose the most susceptible places of running over of animals</td>
<td>Diagnose the main points of running over of wild animals within or on the edges of protected areas and areas identified as sensitive;</td>
<td>Number of run over species and amount corresponding to each Location of road kills and time</td>
</tr>
<tr>
<td>Assist, indirectly, the competent authorities for the supervision of possible actions involving the trafficking of wild animals</td>
<td>Placement of information materials about wildlife trafficking in the stations with loading and unloading of passengers, renewed annually, seeking guidance on program objectives</td>
<td>Quantity of information materials about wildlife trafficking available at the stations with passengers boarding and disembarking Number of reports received in the center</td>
</tr>
<tr>
<td>Develop and implement mechanisms for clarification to guide the population about the damage and the laws involving illegal hunting of wild animals</td>
<td>Disseminate information about illegal activities</td>
<td>Participation of local people in combating the illegal trafficking of wild animals.</td>
</tr>
</tbody>
</table>

10. PUBLIC CONSULTATION AND PUBLIC DISCLOSURE

10.1 Stakeholder Engagements Actions already performed
Since the beginning of the Nacala Corridor Project, in 2011, over 2,705 communication and engagement actions have been performed, aimed at the understanding of the needs, wishes and doubts of the several groups involved with the project. The bullets below presents a summary of the actions performed, organized under the four themes defined in the Stakeholders’ Engagement Planning, 2015.

i) General Information and Demand Over 273 actions have been developed.
ii) Management Impacts Over 153 actions have been developed.
iii) Accident Prevention Over 2,100 actions have been developed
iv) Local Content Over 179 actions have been developed
10.2 Informal Victims Program
Among others public participation will also include conducting informal visits, seeking to update project relevant information and strengthen the relationship with stakeholders. Interested and affected parties as per need, community leaders bi-monthly; and monthly for government.

10.3 Actions to be performed
Such actions are organized in accordance with the four themes defined in the Stakeholders' Engagement Plan (General information and demand management, impacts, accident prevention and local content).

10.4 Stakeholder Identification
In relation to the Malawi component of the project, identified stakeholders are government representatives, including District Authorities (DAs), Traditional Authorities (TAs) and/or headmen/women, Community Based Organisations (CBOs), Faith Based Organisations (FBOs), support groups, NGOs and donors.

For Mozambique, stakeholders associated with the NCP and the associated expansion of the Moatize coal mine that could directly or indirectly, positively or negatively, be affected and influenced by the project were identified as part of the baseline studies conducted for the EIA. The stakeholders are summarized below:

<table>
<thead>
<tr>
<th>Summary of stakeholders identified</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government agencies</strong></td>
</tr>
<tr>
<td><strong>PAPs (directly affected) by physical &amp; economic displacement</strong></td>
</tr>
<tr>
<td><strong>People indirectly affected by the project</strong></td>
</tr>
<tr>
<td><strong>Traditional Authorities</strong></td>
</tr>
<tr>
<td><strong>Donors, NGOs &amp; other civil society groups</strong></td>
</tr>
</tbody>
</table>
Educational Institutions | Universities and other educational institutions were also identified as key stakeholders, including Universidade Eduardo Mondlane (UEM), Faculdade de Agricultura de Cuamba and Universidade Catolica de Moçambique (UCM).

Media | The Project relied on the media for information dissemination and reputation management. The newspapers O País and Notícias played a role in announcing the public consultation meetings, as well as online news provider LUSA.

Special Interest Groups | Other interest groups identified included informal and formal traders in the markets located along the railway, and travellers from Cuamba to Nampula. Significant national companies (CFM, EDM, FIPAG, TDM) and multinational companies operating in the Project area (Mota Engil Engeneering and FEDEX) were also identified.

Vale’s large contractors | Companies involved in developing the Project were also included in the consultations, such Odebrecht and Concremat.

### 10.5 Information Disclosure and Public Consultation

The public consultation process was developed to present EIA results and to meet the information needs of the urban and rural populations directly and indirectly affected by the project; and the various levels of local government, civil society organizations and public institutions involved in both the Moatize coal mine expansion and Nacala Rail Corridor project.

In Mozambique, the public consultation meetings were conducted in various locations (including Cuamba, Lichinga, Maputo, Nacala-a-Velha, Vila de Moatize and Nampula). The general public was invited via public announcements in two different local newspapers on 25-27/10/2010 and 5/11/2010. In Tete Province, announcements were also made through radio spots broadcast by Radio Moçambique (RM) on 03/11/2010 and 05/11/2010. In addition, invitation letters were sent to specific stakeholders to participate in the consultation. As promoted by Vale, the public meetings represented a tool to provide information about the progress of the EIA studies and a space to involve key stakeholders. The intent was to ensure stakeholders were aware of the project and were able to give their opinions on social and environmental issues, so that the necessary adjustments to the project could be made. The public consultations (dates and locations are tabulated below), predominantly involved central, provincial and district government representatives, some members of civil society and other stakeholders such as universities and companies within Vale’s supply chain. During construction, Vale developed a broad Communications Plan, introducing participative methodologies (e.g. individual and group meetings) to strengthen stakeholder engagement, as well as mechanisms of information disclosure (e.g. visits to NRC project, dialogue forums, etc) to various stakeholders, such as community, traditional and religious leaderships, community members, educational institutions, NGO’s, cooperation agencies and public institutions, suppliers, media and employees.

In Malawi, the stakeholder groups engaged and the mechanisms employed differed from Mozambique. The approach to the public consultation process followed the Guidelines for Environmental Impact Assessment prescribed by the Malawi Government. Respecting the Guidelines, public meetings took place in Traditional Authority (TA) areas affected by NRC. The meetings were arranged through a District Authority (DA), which transmits to the TA the responsibility to set up a suitable meeting date with community members. These public meetings are open to all members of the TA’s community. There is no data on numbers of meetings taken place or a list of participants; instead photos were used to evidence the participation of community members. Two formal rounds of consultation with authorities were undertaken. The first was between 7/10/2010 and 15/10/2010, during the scoping phase of the EIA, and the second was between 10/11/2010 and 19/11/2010, during the impact assessment phase. Consultation
with formal authorities was undertaken at the same time at district administrator level, as well as formal meetings with relevant ministries. A unified public hearing to consider the official approval of the EIA or the entire project is not commonly held in Malawi and was therefore not part of the consultation methodology. Alternatively, information disclosure and discussion of EIA results, including a) the purpose, nature, and scale of the project; b) the duration of activities; (c) potential impacts; and (d) management measures, was conducted in eight Malawian districts affected by NCP. To support the transition from construction to operations, meetings are currently being held with Ministries and government Departments in order to share information on the operations, safety aspects and social investment programs. Additionally, the communications plan for Malawi includes other strategies such as local radio releases, public open events, leaflets and site visits to inform DAs, TAs and affected communities of the abovementioned aspects. In general, the results reported from the above consultation activities were positive.

Nonetheless, during the construction phase in both Mozambique and Malawi, focus group meetings were organized and public meetings were held. Disclosure and dissemination of relevant information appears to be adapted to the needs of affected communities and accessible to different stakeholders.

11 ESMP

Following the assessment of impacts, mitigation measures were established in order to minimize or eliminate the negative impacts and maximize positive impacts. These measures are set out in the Environmental Management Plans for both the Railway and the Port, which includes the following sub-programs.

- **Air Quality Management Program** - aims to minimize the change in air quality, providing the control measures to be implemented to reduce the emission of coal dust (application of polymers), as well as actions of air quality monitoring, during the operational phase, to ensure that this effect does not have significant negative consequences for the communities;

- **Noise and Vibration Management Program** - aims to minimize noise levels and vibrations caused by the project, providing control activities necessary for this, as well as noise and vibration monitoring activities to validate the evaluations carried out and to propose additional measures for noise and vibration management, if necessary;

- **Recovery of Degraded Areas Program** - aims to minimize the impacts of the project on soils, flora and landscape, providing the necessary actions to affect the smallest possible area and the rehabilitation and revegetation of all areas affected temporarily by the project and reshaping and revegetation actions of areas interfered and their landscaping;

- **Water Resources Management Program** - aims to minimize the impacts of the project on changing the quality of surface and ground waters and sea water, providing all the control actions in this sense, such as the treatment of effluents as well as the proposed monitoring activities for surface and ground waters and sea water;

- **Waste Management Program** - aims to minimize the generation of waste, and ensure that its management and treatment is done properly, so as not to cause impacts on the environment. Thus it provides all necessary actions to collect, treat and dispose of waste produced by the project in all its phases;

- **Biotic environment Management Program** - aims to minimize the impacts of the project on wildlife and land and marine flora, focusing especially on control actions, monitoring and compensation to ensure that the various stages of the project do not generate significant impacts at this level;
• Archaeological Heritage Protection Program - aims to ensure that the project has no significant impact on the archaeological heritage, or other elements of cultural or historical value, and actions of prospecting and archaeological monitoring during the construction phase, so that this heritage is not affected by construction activities;

• Socio-economic Management Program - provides all necessary actions to reduce the negative impacts on communities and to enhance the effects of positive impacts on the economy. It is an extensive program that includes the following subprograms:

  - Social Communication Subprogram - includes all communication standards of Vale, both for its workers (so that all workers are knowledgeable about the environmental viability of the project) and also for local communities. Contact with the communities is essential to ensure that people know how the project will interfere with their lives, and can adapt to it;

  - Environmental Education and Safety Subprogram - provides for the education of workers in Vale, as well as in the communities where the project is located, so that they know what actions and right behaviors to adopt in the day-to-day, so that they do not cause impacts on the environment;

  - Health Subprogram - provides actions for the education and prevention, health and fight of infectious diseases, applicable to workers and surrounding communities;

  - Local Development Subprogram - results from the social accountability mechanisms of Vale, and indicates the guidelines to be followed for the compensation and empowerment of local development in terms of infrastructure, access, safety on the railway, etc.

  - Recruitment and Training Subprogram - provides for the hiring rules of Vale, encouraging the employment of local workers in order to increase the effect of positive impacts on the local economy. It also provides workers' training, so that they increase their knowledge and their training. This will allow a transfer of knowledge to local workers;

  - Compensation Subprogram - establishes the guidelines for the compensation plan, which is still in development, and is expected to be widely negotiated with stakeholders and approved by the competent authorities. The compensation plan's main objectives are to establish clear and transparent criteria for eligibility to receive benefits in order to restore the living standards of displaced families up to the previous standard of living, or better.

  - Monitoring of Socio-economic Indicators Subprogram - provides for the monitoring of a set of socioeconomic indicators in the nearby communities of the railway line, in order to monitor during the operation phase how the coal transport by railway is influencing people, the economy and society, and verify whether it is necessary to take any further action in this regard.

12 INSTITUTIONAL CAPACITIES AND STRENGTHENING PLAN

12.1 Institutional Framework (Mozambique)
Mozambique is a constitutional democracy governed by an executive and legislative branch. The executive is led by the president, followed by the prime minister and a cabinet of ministers. Environmental issues in Mozambique received treatment at constitutional level. The Constitution of the Republic of Mozambique sets the right of every citizen, the right to live in a healthy environment and have the duty to protect (Article 90). The Ministry for the Coordination of Environmental Action is the government institution responsible for ensuring the preservation and responsible use of natural resources, and environmental licensing. In 2000 an Environmental Fund was created as a contingency fund in case of
environmental damage. The other central government agencies and local, including municipal, involved in both component mining and logistics of the project include those who hold key powers development activities related to environmental protection: mines (Ministry of Mineral resources), and planning (Ministry of Planning and Development). At the central government level these bodies are the National Directorates for the Evaluation of Environmental Impact Assessment (DNAIA), Planning (DNP), and Mines (DNM). Also the ministries for electricity (Ministry of Energy), and civil works and engineering (Ministry of Public Works and Housing) intervene during the activities, granting authorizations as may be required. The Ministry of Labor is the primary organization responsible for overseeing the implementation of the labor law, ensuring labor standards are adhered to, and creating training and technical centers.

MICOA, created in 1994 by Presidential Decree No. 2/94 of 21 December, is the competent authority in the environmental area; its main objectives and functions were established by Presidential Decree No. 6/95 of November 16, and the Ministerial Decree No. 259/2005, of December 29, approves its organic statute. In 2000 the Fund for the Environment (Decree No. 39/2000 of October 17) was created, tutored by MICOA, with the aim of promoting the activities of environmental promotion and management, also serving as a contingency fund in case of environmental accidents or damage. The other central and local government agencies, including municipal, involved both in the mining component and in the logistics of the project, include those who hold key powers in the development of activities related to environmental protection: mines (Ministry of Mineral Resources), and planning (Ministry of Planning and Development). At the central government level, these bodies are the National Directorates for Environmental Impact Assessment (DNEIA), Planning (DNP), Mines (DNM) and Directorate of Infrastructure (DI) of the Ministry of Transport and Communications. These directions and their responsible functional departments are competent by law to implement the duties of ministries, particularly regarding matters concerning the technical forum.

Also the ministries of electricity (Ministry of Energy), and civil works and engineering (Ministry of Public Works and Housing) will intervene during activities, granting authorizations as it may be required. In terms of indirect administration, both the Zambezi Regional Water Administration and the National Institute of Maritime Administration play a crucial role in the public institutions list, with competencies directly related to the Project, as later discussed in Title 3. At the local level, the Provincial Directorates for planning and organization (DNAPOT) for the coordination of environmental action (DPCA) and for by the transport sector (DPTC), will be critical to the development of the Project, as are the services and district departments of Nacala-a-Velha. Still at the local authorities level, the structure of municipalities, in this case Nacala-a-Velha, is such that, generally, the powers on the exercise of economic activities, land use and construction, abstraction and water supply networks and infrastructure are divided between different directions and departments, which will be actively involved through the granting of authorizations or licenses, as appropriate for accommodation and temporary auxiliary means, access roads, resettlement and expropriation.

During the construction phases, and then more firmly during the operation phase, communication activities will be developed (Communication with Communities, Internal Communication, Corporate Communication, Communication with Media and Planning and Management), and in them due and proper commitment will be given to the relationship with informal leaders, community and local authorities, interest groups, nongovernmental organizations, institutions and partner companies of the Government and the Province, press groups and members of civil society in general. From the private sector, the
environmental efforts of the entrepreneur shall be exercised in close collaboration with the Concessionaire of the Port of Nacala and the North railway line, Corredor de Desenvolvimento do Norte S.A.

12.2 Institutional Framework (Malawi)
Malawi is a constitutional multi-party democracy with a unitary State and a unicameral legislature. The President, who is head of state and government, is elected the Environmental Affairs Department (EAD) in the Ministry of Natural Resources and Environmental Affairs is responsible for the administration, implementation, and monitoring of EIAs. The Technical Committee on the Environment (TCE) is an inter-agency committee that advises the EAD in terms of evaluating project briefs, terms of reference and EIA reports. It also reports to the National Council for the Environment with reviews of project auditing programs and project approval conditions. Sectoral/Line Ministries ensure projects regulated by the Environmental Management Act adhere to requirements through their participation on the TCE and direct advice to project developers.

The Constitution of Malawi, which contains a clause specifically requiring protection of the environment in Malawi, is the overarching framework for environmental legislation and responsible environmental management. As such, it plays an important role in working towards sustainable development, improved standards of living and conservation of natural resources. To coincide with the ethos of the Malawi Constitution, a number of policies, guidelines and vision statements have been developed to implement and monitor the environmental right embedded in the Constitution such as The National Environmental Action Plan, 1994 (NEAP), Malawi’s Vision 2020, the National Environmental Policy, 2004 (NEP) and the National Land Policy.

13 CONCLUSION
The NCP has established an Environmental Management System (EMS) to cover the ongoing Nacala Rail Corridor activities and covers all project’s employees and contractors. The EMS was developed based on ISO 14001 and Vale’s standards for Environmental and Management systems. The Project sustainable development Policy includes environmental and social objectives and principles to operate through a responsible management approach, voluntary corporate actions and establishing partnership with institutional stakeholders and private sector and civil society. The Sustainable Development Policy POL-003-G is based on three pillars: be sustainable operator, be a catalyst for local development and be an agent of global sustainability. A draft social policy for CLN operations of the NCP is also being prepared and outlines the framework and principles for social performance and community relationship. Likewise, a draft HS policy for CLN operations of the NCP is being prepared and outlines the HS principles for ensuring HS at the workplace. In addition, a Human Rights Policy is also being prepared in line with Vale’s principles and is based on the UN Guiding Principles on Business and Human Rights. A code of ethics including business-related objectives are in place. Current ESHS management is mainly focused and strong in terms of compliance to regulators. It should be noted that project concessionaires, including CDN and CEAR, possess their own EMS which are based on Vale’s principles and standards, though differ from the Nacala Corridor Project EMS in terms of ESHS level of implementation. Likewise, these organisations do not have the same level of ESHS management and there is an ongoing action plan to implement additional ESHS measures, operational safety guidelines and golden rules in their ESHS management.
14 REFERENCES AND CONTACTS

14.1 References


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