

Project Title : **Development and asphaltting of the Gitega-Ngozi Road Phase II**
Country : **BURUNDI**
Project Number : **P-BI-DB0-016**
Department : **OITC** **Division: OITC.2**

a) Brief description of the project and the main environmental and social components

a.1) The Gitega-Ngozi road construction project is implemented in two phases. On 27 September 2010, the Bank approved financing for Phase I of the project on the 30-km Nyangungu-Ngozi segment. This second phase concerns the Gitega-Nyangungu segment (50km). The components of this 2nd phase are as follows:

- (i) Road works:** (1) development and asphaltting of 50km of the Gitega-Nyangungu road segment; (2) development of parking areas along the road; (3) works control and supervision; and (4) sensitization of the population on STDs and other pandemics, environmental protection and road safety within the project area.

- (ii) Related works:** (1) development of 50 km of rural roads; (2) development of a parking area for heavy vehicles at Gitega within the common regional area of the ALM and OdR; (3) construction of two fences, toilet facilities/latrines and public drinking water taps for two schools; (4) construction of fences, toilet facilities/latrines and construction of public drinking water taps for health centres; (5) support to women's groups; (6) construction of pedestrian bridges; (7) control and supervision of related works.

a.2) At the environmental level and in continuation of the first segment (Phase I), the project is classified in Category 2, considering the nature of the works to be implemented (waterproofing, partial reconstruction of 3 engineering structures and asphaltting) and the direct and indirect impacts it could have. The proposed works concern only the existing national highway (RN15) and feeder roads, which are already integrated into their natural environment; excavations on these facilities are very limited and their impact is minor. It will be necessary to acquire 9.35 ha of land (plots) and expropriate **13** buildings, including **02** residential houses. The project will not affect natural habitats, fauna and flora.

The main activities concern monitoring the implementation of environmental measures, monitoring of the implementation of the environmental and social management plan for the road works and related works in order to improve the living conditions and standards of project-area communities, sensitization of the population on STIs and other pandemics and on road safety, environment, gender and women's empowerment, etc. Most of the specific measures taken to mitigate or eliminate identified negative impacts are adequate and included in the terms of reference for enterprises.

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b) Main Environmental and Social Impacts

b.1) Negative Impacts

The negative impacts relate to inconveniences resulting from worksite organization and works execution. These are: (i) storage of materials, which will modify the structure of site soils through compacting and that of attendant transit roads; (ii) operation of borrow pits and existing quarries; (iii) air pollution by dust and exhaust fumes from construction machines. Rectifications of the road alignment will require the acquisition of land, the destruction of neighbouring farmlands, the destruction of fences and hedges, and the displacement of some networks.

Worksite preparation phase

During the installation of workers' camps and mobilization of construction machines: (i) Disruption of activities carried out in the immediate vicinity of the project. Thirteen (**13**) structures (including **02** residential houses) used mainly for commercial purposes will be directly affected. They will be demolished, and their owners will be affected; (ii) Displacement of networks due to the works, especially electric poles, water pipes and 1 (one) public tap, as well as the destruction of a fence and uprooting of trees along the current road which will be developed; (iii) operation of existing quarries (especially G9) within the area could exacerbate the discomfort to project area communities and disrupt the cemetery located 30 m before the project site.

Construction phase

- (i) Disruption of activities: All activities carried out within the immediate vicinity of the project will be disrupted, and this would lead to loss of jobs and direct incomes. Population mobility will also be disrupted during works execution.
- (ii) Obstruction of traffic and access roads: During the construction phase, traffic will be considerably slowed down and diverted to deviation routes to be constructed; there will also be risk of accidents related to: (i) the movement of construction machines and worksite vehicles as well as the deviation routes, which will be obstructed or flooded during the rainy season; (ii) parking of vehicles along the road, especially near the villages of Mutaho.
- (iii) Displacement of networks: The works require the displacement of three electric poles and a public tap, as well as the destruction of two 25-m fences and uprooting of 1,300 trees along the existing RN15.
- (iv) Acoustic state: The project's impact on the acoustic state of the project area will be relatively significant. Noise pollution from machinery used for excavation, transportation of excavated or backfill material, stripping material and asphalt material will cause temporary local discomfort to project area communities and especially to the services, enterprises, dwellings and religious edifices situated along RN15.

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- (v) Deterioration of living conditions and health: Household garbage collection along the road (around restaurants, bars, residential areas, etc.) will be disrupted. While the immediate disposal of accumulated construction waste in the appropriate sites may reduce the pollution caused, the selection of private sites without prior agreement risks causing conflicts or protests. Lastly, the works will generate relatively large quantities of fine dust on the worksites and the immediate vicinity. Such dust could affect the project area communities, causing respiratory infections.
- (vi) Soil erosion: The operation of existing borrow sites could increase soil erosion. Unrehabilitated borrow sites could facilitate the stagnation of unhealthy water and proliferation of disease vectors like mosquitoes.
- (vii) Pollution: Bituminous coated material plants could pollute the air with particulate matter and emissions released through combustion. Workers' camps could generate pollution through wastewater or poor waste management.

Operational Phase

- (i) **Biological environment**: Considering that the proposed works concern only the existing road which is already integrated into its natural environment, the project will not affect natural habitats, fauna and flora. The project has no negative impact on natural parks, biosphere reserves or sensitive/protected areas.
- (ii) There is no expected further degradation of the quality of the abiotic environment (air, water, soil) during the operation of the rehabilitated and developed road. The project does not affect any archaeological, cultural or religious sites.
- (iii) **Human environment**: The negative impact of the project during the operational phase remains insignificant. Nevertheless, it will cause some inconvenience to project area communities.
- (iv) Dust emissions: Fine dust will be raised by frequent passage of vehicles, especially heavy vehicles, and this will affect the communities closest to the project road. Such air pollution by dust emissions will also affect materials, plants, buildings and project area ecosystems.
- (v) Noise pollution: During the operational phase, the reference speed on the rehabilitated road will be 60 km/h. Traffic on the road will constantly be on the increase. Noise pollution will be exacerbated by the combined effect of many vehicles plying the road and the greater proximity of the communities along the road.
- (vi) Population and social life: The period of adaptation to the functioning of the rehabilitated road will affect some road usage habits of pedestrians and cyclists. Project area communities will be exposed to increased risk of road accidents resulting from the fluidity and increase of traffic.

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- (vii) Economic activities and habitat: Some operational activities and services will be virtually inaccessible and only partially operational during the operational phase of the new road, particularly those which used the project right-of-way as parking area for their customers or suppliers. Because of the project, the owners of buildings or managers of businesses along the new road will no longer enjoy the same parking facilities they previously had.
- (viii) Real estate speculation: The expansion of the road, the increase of its capacity and the improvement of traffic could change the current usage of roadsides. This could have consequences in terms of land procurement and road safety. The expropriation of a few strips of land composed of outgrowths of built-on land along the project road (Mutaho, Nyangangu) has already been considered by the project, which has reserved a budget for the compensation of occupants and proprietors whose property has been expropriated. Apart from this situation, there will be no significant negative impact on real estate during the operational phase.

Risks related to the project:

By their very nature, the proposed works will cause only temporary or negligible discomfort:

- (i) Risk of accidents during transportation of materials and at traffic deviations;
- (ii) Risk of river pollution in case of accidental spillage of waste oils and fuels or leakage of stored materials;
- (iii) In areas with rugged topography, it is important to prevent erosion risks in areas where the right-of-way has been altered (rockslides and landslides);
- (iv) In the forest areas, it will be necessary to prevent and manage any risks of fire;
- (v) Possible water use conflicts in regions with insufficient water resources due to additional pressure on reserves destined for community use (However, the works will not affect any water catchment areas and aquifers);
- (vi) Any fuel depots that might be installed may pose risks of soil and water pollution in case of accidental spillage of waste oils, fuels or lubricants, as well as fire risks.

b.2) Positive Impacts

During the construction phase

(i) Development of socio-economic activities:

In this phase, the project will help to develop activities related to the functioning of construction sites, such as catering and other services. The project staff will fuel a demand for average and first rate accommodation. The same applies to low-cost and makeshift accommodation often sought by workers and labourers from various backgrounds. The rental income of house owners could also increase. The demand for facilities could encourage house

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owners to improve the state of their houses, and this will have a positive impact on living standards.

During the works, the project area population will increase due to the presence of project staff and persons coming to engage in commercial activities. This is, more or less, a significant additional number of inhabitants who will have a positive impact on the social balance if measures are taken to facilitate their integration. The authority of the village or neighbourhood chiefs will also be consolidated during the construction phase. Their involvement in the management of commitments made by the various parties (developer, enterprise and community) will guarantee social cohesion.

(ii) Creation of temporary jobs

The project will create jobs at various levels; the number and eligibility conditions of these jobs will be set by the companies and their sub-contractors. These include: (1) direct employment for contract employees, labourers and temporary unskilled labour. The project area communities constitute a natural reserve for labour of this kind for activities such as security guard duty, supervision of arrangements to direct alternate traffic movements, or temporary grass clearing, which can be entrusted to unemployed youths; and (2) indirect employment through the installation of petty trading outfits near the worksites for the sale of food and various consumer items.

(iii) The recruitment of several junior and senior experts, most of whom are nationals, such as: (1) the key staff of the enterprises to which works contracts have been awarded: project managers (engineers), project supervisors (engineers), team leaders (senior technicians), topographers (senior technicians); (2) consultants responsible for works control and supervision: mission chiefs (expatriate or national engineers), works supervisions (engineers), topographers (senior technicians) and laboratory staff; (3) sub-contracting staff: operators of quarries and borrow sites, concrete manufacturers, and producers of bituminous coated material.

(iv) Increase in consumption: The temporary influx of workers into the project area will lead to an increase in the consumption of basic products such as fuel, provisions, etc. This will increase the turnover of business operators.

During the Operational Phase

The beneficial impact of the road on the physical environment relates to works financed by the project and the institution of a maintenance system to extend the service life of road infrastructure: (i) the construction of new bridges will contribute to the decontamination of the water network; (ii) the construction of outlets and culverts for surface water, the reinforcement of road shoulders and earth banks and the stabilization of embankments will reduce rock slides and soil erosion; (iii) regular maintenance will substantially reduce the risk of degradation. The beneficial impact of the road on the biological environment will relate to: (i) its opening up of access, which will enable the administrative services, associations and NGOs to extend their activities in the entire project area.

The project benefits for users and the communities are: (i) improvement of the state of the road and sanitation in social facilities; (ii) faster movement, which will speed up access to health and education infrastructure; (iii) improvement in the marketing of rural produce and

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the supply of manufactured goods to village communities in the project area, which will improve living conditions; (v) an increase in producer prices following the decline of transport costs due to better maintenance of the mechanical state of transport vehicles; (vi) reduced risk of poor sales, almost complete elimination of harvest losses and in-transit damage, resulting in an improvement in income levels for project area farmers; (vii) emergence of investment opportunities in new sectors (tourism, culture) and the creation of micro-enterprises for the processing of agro-pastoral products and induced activities in the area of accommodation rental and catering, which all broaden the scope of socio-economic activities in the project area; (viii) improvement of conditions for deployment of administrative staff (teachers, medical staff) to the districts concerned, which translates into an improvement in the quality of services offered to the communities in education, medical care and organizational capacity-building. Hence, the project will act as a strategic lever for improving the living conditions of the project area communities and reducing poverty for households which have been impoverished and rendered vulnerable by recurrent conflicts.

c) **Mitigation and land reclamation programme**

c.1) *Compensation for freeing up land for the road way*

It will be necessary to acquire 9.35 ha of land (plots) and expropriate **13** buildings, including **02** residential houses, along the Gitega-Nyangangu segment. A total amount of FBU **34** million was set aside for payment of expropriation and loss-of-income compensation. The displacement of three electric poles and the public tap in Murrur school are included in the project and feature under a separate heading in the priced bill of quantities.

c.2) *Mitigation measures during the construction phase*

Mitigation measures are included in the Terms of Reference and are not specifically environmental in nature. For the construction phase, these measures mainly relate to the application of principles based on sound environmental practices to the terms of reference for enterprises, as well as technical civil engineering measures. They relate to staff management, hygiene and living conditions in workers' camps, the organization and management of hydrocarbons depots (controlling risks of leakage, explosion or fire), the origin of materials (quarries) and their transportation conditions, as well as the organization of depots necessary for the works or generated by renewals, traffic regulation, solid and liquid waste management, site rehabilitation and dismantling of provisional installations upon completion of works and renewal of the vegetation around the project sites. Hence, they focus mainly on the organization of works and the equipment of workers' camps in order to mitigate any general discomfort resulting from the works:

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- (i) Installation of worksites: Project work sites will be created in easy access areas which are not used for agricultural, archaeological or religious purposes. The enterprises responsible for the works will establish their living quarters far from wells and rivers in order to avoid any risk of water pollution; no materials depot likely to release pollutants will be allowed within a defined safety perimeter. All access will be guarded to limit any interaction between the work sites and the external environment. Working hours will be adjusted to reduce any discomfort to the local population. Construction machinery speed will be limited on work sites located on the highway.
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- (ii) Traffic and deviation plan: A traffic plan will be prepared for construction machines in order to ensure greater mobility and accessibility for the local population. This plan will evolve in line with the various phases of the works. The plan will be supplemented with road signs and signboards. Works sites will be clearly demarcated.
 - (iii) Installation of fuel and lubricant depots: Storage units for hydrocarbons products will be either tanks or aboveground barrels placed in the appropriate confinement area to avoid any spillage or rupture to the tank and ensure minimum risk of fire. Equipment for cleaning any type of spillage will be provided. Such equipment will be maintained in a perfect state.
 - (iv) Containment of inflammable and dangerous materials: Storage areas for flammable products must have adequate emergency equipment maintained in good working order. Oxygen, propane and acetylene used for soldering or cutting of existing bridges will be stored in an area prepared for that purpose, and will be fenced and protected from any risk of accident with a vehicle. Waste oils will be collected in tanks or barrels for recycling and removal from the site.
 - (v) Felling of trees: The felling of **1300 trees** which have no special ecological value (eucalyptus) along the existing road requires prior authorization from the Department of Forestry (DF). In replacement, trees will be planted on the work sites beyond the drainage units and along the road (after project completion).
 - (vi) General excavation: Extraction sites (quarries) or excess material disposal sites will be carefully chosen to avoid any negative impact or harm to the landscape, and will be rehabilitated after completion of works. Special care (no excavation) will be taken around the cemetery adjacent the **G9** quarry (30m upstream).
 - (vii) Construction of three bridges: The three construction sites will require the execution of civil engineering works while ensuring the steady flow of traffic at all times. Furthermore, water draining from concrete preparation sites will be collected in leak-free settling tanks. The suspended matter accumulating in these tanks will be recovered and the dry residue placed in controlled or authorized dumps.
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- (viii) Dust emissions: In order to reduce dust emission from construction machines and materials transport vehicles, those responsible for the construction sites will water the roads adjacent to residential areas. Provisional disposal areas for excavated earth or rubble may also need to be watered.
 - (ix) Erosion risk and evaluation of soil stability: Contractors will monitor the evolution of soil stability, especially for the setting-up of access ramps to bridges. This will entail identifying those areas of their construction/works sites which are vulnerable to erosion during and after construction. Drainage systems will be set up and physical earth bank stabilization techniques will be applied (booms, gabions, curbs, etc.).
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- (x) Liquid discharge, water pollution risk, and solid waste: Effluent from the installations will be collected and discharged, depending on its composition, into watertight septic tanks or through mobile collection systems. Water from the washing and maintenance of construction engines will be treated to separate the oils from the water. The water will then be channelled into septic tanks, and the oil residue will be collected for recycling or destruction. Any depots for oil and petroleum products (used by construction machines) will be carefully designed to avoid any leakage into the soil or rivers. Solid waste from the construction sites will be taken to authorized dumps for sorting and recycling, especially for wood, metals and organic waste used for composting.
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c.3) *Mitigation measures during the operational phase*

During the operational phase, the measures will relate to the safety of local communities, staff and road users, and maintenance of the developed road and related works (drainage ditches, side slopes, etc.).

A matrix summarizing the measures for mitigating impacts for the main phases is presented in Annex 1.

d) *Monitoring programme and additional initiatives*

d.1) The works surveillance and environmental monitoring programme will be an integral part of the environmental and social reports prepared by the consultancy firms responsible for conducting execution studies for the Enterprise. The Roads Authority (OdR) will set up a Project Monitoring and Management Unit to coordinate monitoring of ESMP implementation, especially relations with the DGE, local authorities and communities. This unit will be tasked with monitoring the impact of the enterprise's activities during the construction phase.

The organization of an information seminar prior to the start of works is indispensable. It will be organized during the project launching workshop. This consultative framework will involve all stakeholders of the road works (elected local representatives, technicians from the various ministerial services and departments, etc.) such that: (i) the proposed measures are considered in consultation with them; and (ii) they design programmes and actions which fall within their area of competence.

This unit will comprise:

- (i) a representative of the OdR (representing the Ministry of Public Works);
- (ii) a representative of the Ministry of Water Resources, the Environment, Territorial Development and Town Planning;
- (iii) an environmentalist from the Control Mission (MDC); and
- (iv) a representative of project beneficiaries.

The Environmental Monitoring Unit will be responsible for: (i) defining the specific areas to be protected in consultation with the villagers, and assisting the local population to mitigate environmental damage during the construction phase; (ii) assisting in the selection of an appropriate site for workers' camps; and (iii) ensuring the effective implementation of all recommended measures to prevent and reduce project impact on the natural and social

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environment. Supervision is aimed at ensuring that the proposed mitigation and land reclamation measures are effectively implemented during the RN15 rehabilitation phase. The main tasks of the environmentalist from the control mission will be to conduct impact surveillance: verification of results and assessment of their relevance (performance indicators and objectives of the ESMP matrix) during the construction phase.

d.2) According to Burundi's environment code, the current Directorate General for the Environment (DGE) will participate directly in the environmental control of the project. Its action will fall closely in line with its institutional prerogatives, namely the control of environmental damage and pollution risk (management of possible pollution risk, liquid effluents, solid waste, including bituminous waste, etc.). The DGE will also manage forestry aspects (felling of trees and reforestation), erosion risk and water conservation risk.

e) **Institutional arrangements and capacity-building needs**

The main government and administrative institutions responsible for environmental issues are:

- the Ministry of Water Resources, the Environment, Territorial Development and Town Planning;
- the Directorate General for Forestry and the Environment;
- the Environment and Nature Conservation Institute (INECN);
- various programmes (including river basin protection programmes).

The Ministry of the Environment is not represented at the provincial level. Management of the evaluation of Environmental and Social Impact Assessments, as well as the issuance of environmental permits and the coordination of monitoring of the conformity of Environmental and Social Management Plans are handled in the Directorate General of Forestry and the Environment. To date, the Directorate General of Forestry and the Environment has not been actively involved in monitoring and supervising the implementation and application of the ESMP in the road sector. Hence, the intervention of a consultant environmentalist from the OdR is necessary to control ESMP implementation.

f) **Public consultations and information dissemination requirements**

The community consultation process will rely on the ESMP. It will focus on three main objectives, namely: (i) highlighting all identified impacts while explaining in detail the measures recommended for their mitigation or improvement; (ii) full involvement of the communities in project implementation while assuming ownership of the ESMP implementation; and (iii) maintenance of the road and community infrastructure on a contractual basis by the local population. A complaints book will be opened at each of the four administrative headquarters of the districts through which the planned RN15 will pass. The books will offer an opportunity to persons who feel wronged or marginalized by the project to lodge complaints. The teams responsible for environmental monitoring will periodically collect information from the books and, if need be, incorporate it in the impact mitigation and compensation programmes.

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In any event, the success of the project and its integration into its environment depend on the effective involvement of the community in its implementation. Consequently, the implementation of road safety measures during the construction works remains closely dependent on the degree of community involvement. Special attention will therefore be paid to effective community participation so that the project can be implemented under the best social conditions through the establishment of a participatory and consultative partnership framework. Such a mechanism will lay a foundation that guarantees the conduct of future maintenance works on the road and community structures.

Consequently, the consultative process to be implemented will follow the action plan recommended in the ESMP and will be divided into three major stages: (i) the preparatory stage prior to the construction phase, requiring the use of grassroots social communication; (ii) the works stage; and (iii) works completion and participatory planning of the operational phase.

g) Cost Estimates

The measures outlined in this ESMP will be included in the terms of reference of bidding enterprises for implementation; they comprise best practice clauses, soil and water conservation and preservation measures and those related to human perceptions (deviations, noise reduction, work schedules, watering, etc.). ESMP implementation costs cover environmental protection measures, related works and environmental/social control. The amounts are as follows:

(i) sensitization on health, road safety, environmental best practices and capacity building; planting of trees and shrubs; the establishment of three village committees to monitor the state of the road, and the surveillance of road signs and other accessories amount to FBU **745,000,000**.

(ii) implementation costs for related works amount to FBU **5,500,575,288**.

(iii) implementation costs for environmental surveillance and monitoring costs amount to FBU **50,000,000**.

The other Environmental and Social Management Plan (ESMP) costs are included in the cost of the works; they concern: installation of oil change vats, provision of bins for solid waste from workers' camps, recovery and disposal of waste oils, establishment of refuelling stations, rehabilitation of massive rock quarries, rehabilitation of disposal sites for subgrade and subbase materials, development of oil change sites at the enterprise's office base or in specialized facilities, development of materials storage sites, systematic watering of works sites and deviations close to residential areas, establishment of work schedules, water supply for sand dune stabilization works, rehabilitation or development of borrow sites and quarries, recovery of excess materials, signposting on works sites and deviations, development and construction of parking areas, signaling and speed reduction for construction machinery, and protective gear for construction workers (helmets, protective footwear, gloves, etc.) .

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h) Implementation Schedule and Reporting

With respect to the implementation of the current ESMP, the monitoring unit attached to the OdR will: (i) prepare a weekly project statement containing the most relevant information on construction site safety; (ii) prepare a monthly report on environmental and social monitoring. An assessment of the activities carried out (preventive control, site visits, and training) will be presented in a monthly report. The report will be accompanied by all documents which can illustrate and justify the environmental control action: plans, photographs, non-conformity forms, minutes of meetings; (iii) prepare a half-yearly summary environmental and social audit report on project works; and (iv) prepare an environmental and social monitoring final report. At the end of the construction phase, a general environmental monitoring summary report of the project will be prepared. The Monitoring Unit will, in conjunction with the Control Mission, conduct an assessment of the activities carried out in the field and gauge the efficiency of the measures and methods used on the construction site to prevent the temporary effects of the works.

The ESMP implementation schedule is summarized in the table below:

Activities	Schedule	Reports
Environmental monitoring of the ESMP*	Before, during and after the works	Monitoring report
Organization of information sessions on the ESMP	Before commencement of the works	Appraisal report
Information and sensitization for construction workers	Before commencement of the works	Appraisal report
Installation of sanitary facilities, oil-change areas and waste oil recovery tanks	Before commencement of the works	Monitoring report
Installation of construction site road signs, traffic deviations and speed limits	Before and during the works	Monitoring report
Management of toxic product spillage	During the works	Monitoring report
Priority to the use of local labour	During the works	Appraisal report
Management of liquid and solid waste from the living quarters	Before and after the works	Surveillance report
Waste management	Before and after the works	Surveillance report
Management of storage and spillage of toxic products	During the works	Surveillance report
Public information and sensitization on safety issues	Before and after the works	Appraisal report
Site rehabilitation (works sites + borrow sites) and degree of application of the ESMP and PPES	During and at the end of the works	Appraisal and monitoring report
Street tree planting	After completion of works	Monitoring report

*A report will be produced periodically (during construction site meetings). The report will include:

- a summary of activities carried out,
- the level of ESMP application by the enterprise,
- if need be, an increase in number of meetings at the “Collines” and/or Zones (for example: identify, together with the population, the disposal area for tree stumps; organize the AIDS sensitization programme; negotiate to secure borrow sites and quarries belonging to individuals; rehabilitate the sites at the end of the construction phase, etc.;

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- a record of incidents and accidents;
- a summary of the Complaints Book content. At the end of the project, these books will be handed over to the Head of the Environmental Service at OdR (who has primary responsibility for the road project).

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Potential Impact	Mitigation Measures	Surveillance Programme	Responsible		Performance indicators	Performance targets
			Application	Monitoring		
1. SITE PREPARATION						
Displacement / relocation of the population	Expropriations - compensation	Regular monitoring of the conduct of expropriation procedures: - surveys (inventory of property to be expropriated) - cost assessment - payment of compensation	State OdR and the district services concerned	MDC Monitoring team	Number of protests and complaints received	Compensation paid prior to commencement of works
Demolition of houses						
Demolition of structures built for business purposes						
Loss of farmland located along the road						
Loss of farmland due to the operation of borrow sites and quarries		Regular monitoring of concession contracts between enterprises and owners (private persons) of borrow sites and quarries	Enterprise	MDC Monitoring team	Number of protests and complaints received	Compensation paid prior to operation borrow sites and disposal sites
Impact on the cultural heritage (cemeteries)	Avoid trespassing on the area forbidden by owners of the cemetery	Regular monitoring of the concession contracts between the enterprise and owners (private persons) of the cemetery	Enterprise	MDC Monitoring team	Number of protests and complaints received	Occupancy fees (rent) requested by owners is paid prior to operation of the site
Displacement of electric poles	. Restoration of the equipment within the shortest time possible to avoid long interruptions in water and electricity supply to customers; . Inclusion of equipment displacement costs. These are not provided for in the budget of REGIDESO.	Negotiations with REGIDESO on: - the appropriate time to displace the equipment; - duration of interruptions in water and electricity supply; - displacement costs; - rehabilitation of facilities (underground channels, etc.).	State OdR	MDC Monitoring team	Number of protests and complaints received	Information of <u>all</u> communities affected by interruptions in water and electricity supply No complaint received
Displacement of water pipes						
Displacement of public taps	Construction of public taps within the shortest time possible	Announcement of interruptions in electricity and water supply to REGIDESO customers				
Felling of trees Tree stump extraction	Work in close collaboration with the districts concerned on: . expropriations - compensation of owners of trees (including fruit trees) to be felled; . identification of disposal sites for tree stumps.	Regular monitoring of expropriation procedures: - surveys (inventory of trees to be felled); - cost assessment; - payment of allowances;	OdR District services concerned	MDC Monitoring team	Number of protests	Authorization of the DE Complaints on choice of location for storage of tree stumps

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2. WORKS IMPLEMENTATION						
2.1. INSTALLATION OF WORKS SITE						
Potential degradation of forests (felling/stripping of trees at the workers' camp; trampling of vegetation)	Measures to ensure that workers' camps are not installed near forest areas * Institution of an internal regulation prohibiting the consumption of game and the use of wood fuel; *Staff sensitization on environmental protection.	. The enterprise will take into account the regulatory and contractual provisions for the establishment and design of workers' camps Monitoring of the choice and design of the site	Enterprise OdR	MDC Monitoring team	Protests and complaints received concerning: choice of the site for workers' camps Number of complaints received	No complaint received Non-payment of rent for site occupancy
Poor sanitation due to the production of household garbage in workers' camps	Garbage sorting system Burial of waste Recovery of dangerous waste	Verification of the level of application of the rules of hygiene in workers' camps	Enterprise	MDC Monitoring team	Degree of application of technical and environmental clauses	Full compliance with clauses
Risk of surface water contamination with wastewater	. Avoid the installation of workers' camps near drinking water points; . Collection of liquid domestic waste through a drainage network. Treat it in accordance with the applicable national regulations	Verification of efficiency of the sanitation network as soon as the worksite is established	Enterprise	MDC Monitoring team	Effective application of the terms of reference	Full compliance with clauses
Risk of: . water and soil pollution through spillage of hydrocarbons; . fire through hydrocarbons storage; . water and soil pollution through spillage of waste oils;	Areas for maintenance and washing of machinery will be concreted and provided with a sump to recover run-off oils and grease. Hydrocarbons storage sites and refuelling areas will be concreted. . Tanks will be created to drain fluids towards leakage verification reservoirs. Waste oil will be collected in barrels and stored in a safe place pending its collection for recycling. Hydrocarbons storage sites and refuelling areas must be water-tight concreted areas with less than 15% of stored hydrocarbons	Weekly inspection of facilities (hydrocarbons and waste oil disposal sites)	Enterprise	MDC Monitoring team	Effective application of the terms of reference	Full compliance with clauses
Risk of disease due to poor hygiene in the workers' camp	Office areas and workers' camps provided with sufficient sanitary facilities and water tanks in quantity and quality; . Kitchen and refectory areas provided with smooth concrete floors to be disinfected and cleaned daily; . A drinking water tank will be set up whose volume matches water needs; . Toilets will be part of the facilities.	Verification of the degree of application of hygiene rules in workers' camps	Enterprise	MDC Monitoring team	Degree of application of technical and environmental clauses	Full compliance with clauses

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Risk of STD/HIV-AIDS spread	<ul style="list-style-type: none"> . Staff sensitization on this risk; . At least one low-cost condom sales point in the workers' camp; . Drafting of an AIDS programme within the enterprise and for the communities. 	Verification of implementation of the sensitization campaign	Enterprise	MDC Monitoring team Local AIDS Programme Officer	Number of awareness-raising sessions conducted Number of persons affected	Full implementation of the AIDS Programme
2.2. OPENING AND OPERATION OF BORROW SITES, DISPOSAL SITES, QUARRIES AND BITUMINOUS COATED MATERIAL PRODUCTION AREA						
Disfigurement of the landscape due to a pile-up of plant matter, debris and rubble on the roadsides. Disfigurement of the landscape due to the accumulation of heaps of garbage, tree stumps and rubble at the disposal sites	All plant matter, debris and rubble will be rapidly removed from the roadsides or other facilities and disposed of in areas designated by the engineer.	Regular control of waste collection at the disposal sites	Enterprise	Monitoring team / Monitoring MDC	Number of well compacted disposal sites	Time limit to be specified in the contract Disposal sites well developed
Impact on the vegetation (trees and crops) in and around the project sites	Compensation of site owners	Regular monitoring of concession contracts between enterprises and owners (private persons) of borrow sites and quarries	Enterprise	MDC Monitoring team	Number of protests and complaints received	Compensation paid prior to operation borrow sites and disposal sites
Impact on soils (erosion of soils which are unprotected against surface water; gully erosion on materials extraction sites; embankment instability because of excavations and backfilling; creation of excavations on borrow sites)	Implementation of measures recommended in the environmental clauses	Regular control of the degree of application of technical and environmental clauses stipulated in the contract of the enterprise	Enterprise	MDC / Monitoring team	Number of protests and complaints received	Full compliance with environmental and technical clauses At the end of the project, the enterprise shall execute the necessary works to rehabilitate the project areas.
Noise pollution caused by rock blasting at the borrow sites and quarries - noise pollution at the bituminous coated material plant	Installation of the quarry and processing plant far from densely populated areas	Regular verification of the degree of application of technical and environmental clauses stipulated in the contract of the enterprise	Enterprise	MDC Monitoring team	Number of protests and complaints received	Full compliance with environmental and technical clauses
2.3. WORKS EXECUTION ON THE ROAD SURFACE						
Deterioration of air quality during excavation	Watering of the road surface from time to time	Regular verification of the degree of application of technical and environmental clauses stipulated in the contract of the enterprise	Enterprise	MDC Monitoring team	Number of protests and complaints received	Full compliance with environmental and technical clauses
Potential impact of works on water resources and water quality downstream of the works site and borrow areas	The enterprise will comply with: (a) technical clauses stipulated in its contract; and (b) the recommendations of the environmentalist in charge of monitoring					
Inconveniences caused by possible obstruction of the road (because of	<ul style="list-style-type: none"> . Prior announcement of any obstructions on radio and television; 	Verification of road user behavior	Enterprise	MDC Monitoring team	Number of local protests received	Full compliance with environmental clauses

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felled trees which have not yet been moved to the corner of the road)	. Removal of tree trunks as soon as possible.					
Risk of casualty accident (especially for children)	. The contractor will ensure that traffic circulates under adequate safety conditions especially where the road goes through villages; . It will take all useful precautions in order not to cause harm to local peoples.	Repeated reminders to the enterprise of the instructions and rules to be respected	Enterprise	MDC Monitoring team	Number of casualty accidents recorded	No one injured or killed during the project
Risk of accident for project workers in the course of their work.	Institution of internal regulations setting out safety rules during the project					