

8. Environmental Impact Assessment Process

8.1. Environmental Impact Assessment Process and Mitigation

All developments change the bio-physical and socio-economic environments to some degree. It is imperative to identify the changes to the environment and determine the severity of these changes, it can be both negative or positive, short term, medium or long term.

A checklist is designed to help users identify the likely significant environmental effects of proposed projects during scoping. It is to be used in conjunction with the Checklist of Criteria for Evaluating the Significance of Impacts. There are two stages:

- **First**, identifying the potential impacts of projects;
- **Second** selecting those which are likely to be significant and therefore require most attention in the assessment.

A useful way of identifying the potential impacts of a project is to identify all the activities or sources of impact that could arise from construction, operation or decommissioning of the project, and to consider these alongside the characteristics of the project environment that could be affected, to identify where there could be interactions between them. The two parts of the Scoping Checklist have been developed to assist in this process.

Start with the checklist of questions set out below. Complete Column 2 by answering:

- yes - if the activity is likely to occur during implementation of the project;
- no - if it is not expected to occur;
- ? - if it is uncertain at this stage whether it will occur or not.

For each activity for which the answer in Column 2 is “Yes” or “?”, refer to the second part of the Scoping Checklist which lists characteristics of the project environment which could be affected, and identify any which could be affected by that activity. Information will be used about the surrounding environment in order to complete this stage. Note the characteristics of the project environment that could be affected, and the nature of the potential effects in Column 4.

Finally, use Checklist of Criteria for Evaluating the Significance of Impacts to help complete Column 5. This will identify those impacts which are expected to be significant. The questions are designed so that a “yes” answer will point towards a significant impact.

It is often difficult to decide what is or is not significant, but a useful simple check is to ask whether the effect is one that is of sufficient importance that it ought to be considered and have an influence on the development consent decision.

Table 7: Environmental Impact Assessment Checklist

PART 1 OF THE SCOPING CHECKLIST: QUESTIONS ON PROJECT CHARACTERISTICS				
1. Will construction, operation or decommissioning of the Project involve actions that will cause physical changes in the locality (topography, land use, changes in water bodies, etc)?				
No.	Questions to be considered in the Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and	Is the effect likely to be significant? Why?
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	The borrow pit operations will temporarily alter the land use, land cover and, for the borrow pits - topography of the area.	Low significance because of possible mitigation measures that can be implemented. Rehabilitation of borrow pits normally return the land use to its original
1.2	Clearance of existing land, vegetation, and buildings?	Yes	Clearing of vegetation for construction operations influencing the vegetation, soils, and topography. It is very unlikely that any	Clearing of vegetation is always regarded as significant when it comes to road construction. However, mitigation measures can
1.3	Creation of new land uses?	No	The new roads will be built mostly on the existing alignment.	Low significance.
1.4	Pre-construction investigators e.g., boreholes, soil testing?	Yes	Materials testing are required to obtain construction materials which will affect the topography and	The areas of disturbance are very small. Holes are dug to excavate samples and closed after sampling. Low
1.5	Construction works?	Yes	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	The existing alignment will be used therefore there are no significant impacts anticipated.
1.6	Demolition works?	No		
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be	Should these activities not be managed, it might have a negative impact on the soils, water and health and safety of the contractor workers. No permanent

1.8	Above ground buildings, structures or earthworks including linear structures cut and fill or excavations?	Yes	The above ground earthworks will be regarded as primarily for the road construction.	It is anticipated that the impact will not be significant due to the flat topography of the
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		
1.12	Coastal structures egg seawalls, piers?	No		
1.13	Offshore structures?	No		
1.14	Production and manufacturing processes?	No		
1.15	Facilities for storage of goods or materials?	Yes	The storage of machines, gravel, sand, and bulk fuel.	The storage of goods or materials can be mitigated therefore limiting the significance.
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	Yes	Sewage effluent from the camp sites need to be treated or disposed.	This might have a significant negative impact on Health / Safety as well as soils and water if not
1.17	Facilities for long term housing of operational workers?	No		
1.18	New road, rail or sea traffic during construction or operation?	Yes	Construction of a bypass and traffic increase due to movement of construction vehicles.	Low significance due to the low traffic anticipated.
1.19	New road, rail, air, water borne or other transport infrastructure including new or altered routes and	No	The current alignment will be followed.	The significance will be low due to the width and current alignment to be used.
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic	Yes	There will be temporary bypasses constructed.	The significance is likely to be low due to the temporary nature of the activities.
1.21	New or diverted transmission lines or pipelines?	No		

1.22	Impoundment, damming, culverts, realignment, or other changes to the hydrology of watercourses or aquifers?	Yes	New culverts will be constructed.	Should proper planning and consultation with local communities be applied, negative impacts on the hydrology of the rivers and tributaries should be limited therefore reducing the significance.
1.23	Stream crossings?	No		
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	Water will be extracted for the construction phase of the project.	Water from boreholes will be used and the significance will be medium due to the scarcity of available
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The existing road impact on the drainage patterns.	The significance will be Low positive due to improved capacity of the drainage structures
1.26	Transport of personnel or materials for construction, operation, or commissioning?	Yes	Surface characteristics.	No significance.
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area is either temporarily or permanently?	?	It is uncertain what the impact might have on the migration of people in the region.	The significance is estimated to be low, but possible.
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		

2. Will construction or operation of the Project use natural resources such as land, water, materials, or energy, especially any resources which are non-renewable or in short supply?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
2.1	Land especially undeveloped or agricultural land?	Yes	During construction, geological materials will be used for the filling and layer works. Soils will be affected and might therefore impact negatively on the agricultural / communal land.	The significance is low. The existing alignment will be followed with some small adjustments.
2.2	Water?	Yes	Water is used for domestic and construction purposes.	The available water will be used for construction. The significance will be medium due to the low volumes available.
3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water)?	Yes	Hydrocarbons always pose a risk to the environment.	Water and soils are normally affected by spillages of hydrocarbons. The significance might be medium without mitigation.
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (e.g., insect or water borne diseases)?	No		
3.3	Will the project affect the welfare of people e.g., by changing living conditions?	?	There is always a risk of altered quality with regards to living conditions of the adjacent people and the environment. This is with reference to	The significance of such risks can be mitigated, ensuring low impact significance.
3.4	Are there especially vulnerable groups of people who could be affected by the project e.g., hospital patients, the elderly?	Yes	The proposed route will impact positively on the vulnerable groups due to improved mobility network and increased safety.	Positive medium significance.
3.5	Any other causes?	No		

4. Will the Project produce solid wastes during construction or operation or decommissioning?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
4.1	Spoil, overburden or mine wastes?	Yes	Spoils will be generated during construction affecting the aesthetics appeal of the area.	No. This activity can be mitigated very successfully. Low significance.
4.2	Municipal waste (household and or commercial wastes)?	Yes	Domestic waste will be generated.	Medium significance should it not be properly managed.
4.3	Hazardous or toxic wastes (including radioactive wastes)?	Yes	Used oils and old batteries.	Mitigation measures are important to manage the handling and disposal of used oils and old batteries.
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludge from effluent treatment?	Yes	Sewage is produced at the construction camp.	Sewage is always a very important impact that might have a negative impact on soils, water and health.
4.7	Construction or demolition wastes?	No		
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	Yes	There is always a possibility that contamination of soils can occur during operation due to spillage.	No. The scale of contamination is very limited and can be mitigated.
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		
5. Will the Project release pollutants or any hazardous, toxic, or noxious substances to air?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	Yes	Gasses such as Nox and Sox are deposited in the air from the machines.	The quantity of these gasses will not impact significant negatively on the environment.
5.2	Emissions from production processes?	No		

5.3	Emissions from materials handling including storage and transport?	No		
5.4	Emissions from construction activities including plant and equipment?	Yes	Construction vehicles, power plants and the crusher plant will generate gaseous	The impacts might be low significant and can mitigated.
5.5	Dust or odours from handling of materials including construction materials, sewage, and	Yes	Dust from material handling and transport.	Yes. Dust might be a nuisance to receptors.
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (e.g., slash material, construction debris)?	Yes	Burning of waste will negatively affect the air quality.	The significance will be low negative.
5.8	Emissions from any other sources?	No		
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
6.1	From operation of equipment e.g., engines, ventilation plant, crushers?	Yes	The mining of borrow pits and production equipment produces noise and vibrations	No. The ambient receptors are minimal. The Health and Safety within close distance must be noted.
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	Construction will produce noise.	Low significance due to low receptor density.
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	The hauling trucks will produce noise and vibration.	No. The impact is very local and is not significant.
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		

6.8	From any other sources?	No		
7. Will the Project lead to risks of contamination of land or water from releases of pollutants on the ground water into sewers, surface water, groundwater, coastal waters, or the sea?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	Yes	Spillage of oils and other hydrocarbon may affect the water and	With no mitigation the significance might be medium
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?	Yes	Effluent at the construction site might impact negatively on the surface water, soils and health and safety of the workforce.	Should the sewage not be properly managed the negative impact might be significant.
7.3	By deposition of pollutants emitted to air, onto the land or into water?	Yes	Gasses from the machines.	No. The volumes of emissions are limited.
7.4	From any other sources?	No		
7.5	Is there a risk of long-term build-up of pollutants in the environment from these sources?	No		
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	No		
8.2	From events beyond the limits of normal environmental protection e.g., failure of pollution controls systems?	No		
8.3	From any other causes?	Yes	The health and safety of road users might be affected by construction vehicles.	Might be significant if proper road traffic management is not conducted during the construction phase

8.4	Could the project be affected by natural disasters causing environmental damage (e.g., floods, earthquakes, landslip, etc)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
9.1	Changes in population size, age, structure, social groups etc?	No		
9.2	By resettlement of people or demolition of homes or communities or community facilities e.g., schools, hospitals,	No		
9.3	Through in-migration of new residents or creation of new communities?	?	In-migration of people might be a possibility.	The significance is unsure.
9.4	By placing increased demands on local facilities or services e.g., housing, education,	No		
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	The local and larger community will benefit from the construction phase.	The significance might be positive medium due job creation and increased mobility.
9.6	Any other causes?	No		
10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				
No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment e.g., more housing, new roads, new supporting industries or utilities.	Yes	New roads will be constructed which will benefit the communities. Lower vehicle operating costs will contribute to the	The significance will be positive but the extent uncertain.

10.2	<p>Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:</p> <ul style="list-style-type: none"> • supporting infrastructure • housing development • extractive industries • supply industries 	Yes	Stimulating the commercial sector.	This might be a significant positive impact on the linked towns
10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	?	Unlikely	
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

PART TWO OF THE SCOPING CHECKLIST: CHARACTERISTICS OF THE PROJECT ENVIRONMENT

For each project characteristic identified in Part 1 consider whether any of the following environmental components could be affected.

Table 8: Characteristics of the Project Environment

<p>Question - Are there features of the local environment on or around the Project location which could be affected by the Project?</p> <ul style="list-style-type: none"> • There are no areas protected by law in the vicinity of the proposed site. • There is a low possibility of features of high historic or cultural importance. • Surface drainage patterns will be addressed through proper engineering design.
<p>Question - Is the Project in a location where it is likely to be highly visible to many people?</p> <p>This road is not used extensively; therefore, the location is not highly visible to many people.</p>
<p>Question - Is the Project located in a previously undeveloped area where there will be loss of Greenfield land?</p> <p>No, the road will be constructed on the existing alignment.</p>
<p>Question - Are there existing land uses on or around the Project location which could be affected by the Project?</p> <p>There will be few borrow pits that will be opened but will not affect the existing land uses significantly.</p>
<p>Question - Are there any plans for future land uses on or around the location which could be affected by the Project?</p> <p>No. The area will probably remain agricultural / communal.</p>
<p>Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?</p>
<p>Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project?</p> <p>No.</p>
<p>Question - Are there any areas on or around the location which contain important, high quality or scarce resources</p>

There are no scarce resources found around the project that could be influenced by the construction or operational phases of these projects, but there are some flora species (trees) that are protected by Forestry Legislation.
Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?
Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?
Question - Is the Project likely to affect the physical condition of any environmental media? No, the proposed project will be constructed on the existing alignment with some small deviations as to ensure a proper vertical alignment.
Question - Are releases from the Project likely to have effects on the quality of any environmental media? <ul style="list-style-type: none"> • The air quality might deteriorate due to dust generation during construction but will improve during operation. • The quality of soil might deteriorate without proper management. • Acidification of soils or waters will probably not occur. • There will be some noise generated during the construction and operational phase of the road but will be limited to the site. Noise levels will decrease during the operation phase of the project.
Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? <ul style="list-style-type: none"> • The project will use fossil fuels in liquid (diesel). • Water will be used for dust suppression, construction, and domestic use.
Question - Is the Project likely to affect human or community health or welfare? <ul style="list-style-type: none"> • The quality of air will be affected due to construction activities and hauling. Even though this is the case, human health might not be problematic. • No mortality or morbidity might be experienced by human receptors. • The project will have a positive impact on the social economic welfare of the region.

In the Scoping checklist, the significance must be indicated. To facilitate this procedure, the following questions were considered during the rating:

Questions that were considered to determine significance:

1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the effect be unusual in the area or particularly complex?
4. Will the effect extend over a large area?
5. Will there be any potential for trans frontier impact?
6. Will many people be affected?
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8. Will valuable or scarce features or resources be affected?
9. Is there a risk that environmental standards will be breached?
10. Is there a risk that protected sites, areas, features will be affected?

11. Is there a high probability of the effect occurring?
12. Will the effect continue for a long time?
13. Will the effect be permanent rather than temporary?
14. Will the impact be continuous rather than intermittent?
15. If it is intermittent, will it be frequent rather than rare?
16. Will the impact be irreversible?
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

8.2. Environmental Impact Assessment Summary

The following environmental impacts in Table 9 were identified during the assessment procedure as described above. The impacts are classified as either positive or negative and the significance ratings as low, medium and high.

Table 9: Environmental Impacts

Activity	Aspect / Impact	Positive / Negative	Significance
Land use / topography, and land use cover.	The quarry operations will permanently alter the land use, land cover and, for the borrow pits - topography of the area.	Negative	Low
	Areas zoned as undetermined or agricultural will change to transport (land use).	Negative	Low
Clearance of existing land, vegetation, and buildings.	Clearing of vegetation for construction operations influencing the vegetation, soils, and topography.	Negative	Low
Creation of new land uses.	The existing land use will change from agricultural to road (land use).	Negative	Low
Pre-construction investigators egg boreholes, soil testing?	Materials testing are required to obtain construction materials which will affect the topography and vegetation cover.	Negative	Low
Construction activities.	During construction aspects such as social, soil, surface water, vegetation and geology can be affected.	Negative	Low
Temporary sites used for construction works or housing of construction workers?	A temporary construction camp will probably be constructed where water and waste management are the most important activities that need to be mitigated.	Negative	Low

Above ground buildings, structures or earthworks including linear structures cut and fill or excavations.	The above ground earthworks will be regarded as primarily for the road construction. Permanent changes will take place (land use).	Negative	Low
Facilities for storage of goods or materials.	Pollution of soils and water.	Negative	Medium
Facilities for treatment or disposal of solid wastes or liquid effluents?	Sewage effluent from the camp sites need to be treated or disposed.	Negative	Medium
New road, rail or sea traffic during construction or operation?	Limited traffic increases due to movement of construction vehicles.	Negative	Low
Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	There will be temporary bypasses constructed.	Negative	Low
Impoundment, damming, culverts, realignment, or other changes to the hydrology of watercourses or aquifers.	Water balancing is an important aspect to be evaluated. Improving the culverts on the road will be positive.	Positive	Low
Abstraction or transfers of water from ground or surface waters?	Water will be extracted for the construction phase of the project.	Negative	Medium
Changes in water bodies or the land surface affecting drainage or run-off?	Drainage will improve due to the increased structures (culverts) and widening of the bridges.	Positive	Medium
Influx of people to an area in either temporarily or permanently	Migration of people might impact on the socio-economic structure of the area. The risk of HIV/AIDS may increase due to the influx.	Negative	Low
Loss of native species or genetic diversity?	Surface disturbances always impact on the biodiversity of an area.	Negative	Low
Resources such as land and water.	Very limited agricultural land will be affected due to the construction of the road.	Negative	Low
	Water is used for domestic and construction purposes.	Negative	Medium
Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, and water supplies)?	Hydrocarbons always pose a risk to the environment.	Negative	Medium

Will the project affect the welfare of people e.g., by changing living conditions?	The proposed route will impact positively on the vulnerable groups due to improved mobility network.	Positive	Medium
Spoil, overburden or mine wastes?	Spoils will be generated during construction affecting the aesthetics appeal of the area.	Negative	Low
Pollution on site (domestic and construction waste).	Pollution of the natural environment (soil and water).	Negative	Medium
Sewage sludge or other sludge from effluent treatment?	Sewage is produced at the construction camp.	Negative	Medium
Contaminated soils or other material.	There is always a possibility that contamination of soils can occur during operation due to spillage of oils / diesel.	Negative	Low
Emissions from combustion of fossil fuels from stationary or mobile sources.	Gasses such as Nox and Sox are deposited in the air from the machines.	Negative	Low
	The movement from vehicles will generate noise, dust, and gaseous emissions.	Negative	Low
Will the project cause noise and vibration from blasting?	Blasting might be conducted which will impact on existing water sources, houses and other receptors in the area.	Negative	Low
Emissions from burning of waste in open air (e.g., slash material, construction debris)?	Burning of waste will negatively affect the air quality.	Negative	Low
By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	The local community will benefit from the construction phase through additional employment opportunities.	Positive	Medium
Will the project lead to pressure for consequential development which could have significant impact on the environment e.g., more housing, new roads, new supporting industries, or utilities, etc?	New road will be constructed which will benefit the communities by improving access to schools, clinics and churches.	Positive	Medium
	New road will be constructed which will benefit the communities. Lower vehicle operating costs will contribute to the National economy.	Positive	Medium

Will the project lead to development	Access improvement to facilities in the region will benefit the local and regional communities.	Positive	Medium
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