

# NWFP Environmental Protection Agency

## Environmental Assessment Checklists and Guidelines

### Forest Road Constructions

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## 1. Introduction

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Properly planned, constructed, and maintained roads are an asset to forest for most uses. Access to the forest is necessary for harvest, regeneration, protection, other management activities, and recreational uses. Excluding access is also appropriate for such objectives as protecting sensitive areas or for maintaining semi-primitive and wilderness areas. Thus carefully planned roads can add to the value of the forest through improved management. Conversely, a road developed without any consideration to its impact can result in loss of natural resources, exploitation

and can even lead to complete destruction of the forest.

### 1.1 Scope of the guidelines

These guidelines are applicable to construction of new roads or rehabilitation of existing roads in forests and ecologically sensitive areas that have a total cost of less than Rupees ten million.

### 1.2 How to use these guidelines

The project proponent (the local government, municipal government, city

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government or the cantonment board) is obliged to use these guidelines. The project proponent has to fill in an environmental impact assessment form. The following steps are to be taken in this regard:

Step 1: Provide information on project [use **Section I**]

Step 2: Determine Applicability (*Are you sure that IEE or EIA is not required?*) [use **Section II**]

Step 3: Describe the physical, biological and social environment [use **Section III**]

Step 4: Assess potential impacts and applicable mitigation measures [use **Section IV**]

Step 5: Provide undertaking to the EPA on mitigation measures and compliance [use **Section V**]

Completed form is to be submitted to the NWFP Environmental Protection Agency for evaluation. NWFP EPA may request for additional information or decide to undertake visit to the proposed project site in order to assess the environmental impact of the proposed project.

### 1.3 Glossary

**Act** means the Pakistan Environmental Protection Act, 1997

**Carriageway** is the part of the road which is used for the traffic.

**Contamination** introduction of impurities in the environment

**Ditch** is the drain provided along one or the both sides of the road, so as to drain away water

**Drainage Pattern** system of drains

**Exotic Species** a species that is

introduced into an area or region from outside

**Environment** means (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clause (a) to (f).

**Environmental Assessment** a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead.

**Gradient** pertains to longitudinal slope of the road, which is expressed in ratio of rise or fall, corresponding to the length of the road.

**Habitat** the general place or physical environment in which a population lives

**Impact on Environment** means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.

**Landslide** a slide of a large mass of dirt and rock down a mountain or cliff

**Mitigation Measure** means a measure for the control, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure.

**Pollution** the presence in the environment or the introduction into it, of substances that have harmful or unpleasant effects

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**Regulations** means the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000

**Soil Erosion** physical removal of soil, either by wind or by running water

**Siltation** accumulation of silt in a water body

**Threatened or Endangered Species** a species in danger of becoming extinct

## 2. Project Profile

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### 2.1 Description

Constructing roads in forest involves the following:

- ▶ Removing trees and clearing ground of vegetation
- ▶ Cutting steep slopes that may required use of dynamite
- ▶ Filling gullies and ditches. This may be done with the material cut from the slopes or may require additional material from outside
- ▶ Compaction and leveling to prepare the surface for road
- ▶ Laying gravel and other base material
- ▶ Preparing asphalt
- ▶ Paving the road with asphalt
- ▶ Finishing road shoulders, side walls and drains

activity the soil also losses its compaction and is loosen up. The area thus becomes prone to erosion by wind and water action.

Stream crossings are particularly vulnerable to water induced erosion for unpaved roads. Traffic on unpaved roads results in disturbing the stream banks from where a process of erosion may start.

Tree cutting alone simply does not directly cause erosion. However, removal of trees in a large area can indirectly affect the ground vegetation, which after loosing the shade provided by the trees may eventually disappear and lead to erosion.

Erosion also becomes a problem if the road, culverts and water channels are not properly maintained. Leaves and other debris block water path and that may result in damaging road, creating new channels for water and erosion.

### 2.2 Environmental Aspects

#### ***Soil Erosion and Landslides***

Most soil erosion potential in a road project occurs during the construction period. Ground surface and slopes that were previously covered with vegetation and exposed. Due to the construction

Removal of trees and vegetation cover, alteration of surface gradient, vibrations caused by the construction activity such as the use of dynamite and movement of heavy machinery, change in drainage pattern and alteration in soil compaction effects the slope stability and may eventually lead to landslides.

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***Drainage Pattern***

Road embankments restrict cross drainage, and cause the land on either side of the embankment to flood in case of heavy rains. This in turn may affect the communities and also cause natural streams and irrigation channels to become silted.

If cross-drainage structures are not adequately maintained, culverts and water channels tend to become choked with debris and eroded soil, adversely affecting the quality of surface water.

***Disturbance to Wildlife Habitat***

Forests are important habitat for different species of flora and fauna. Road construction causes direct and indirect disturbance to the habitat. Removal of trees, clearing and leveling of ground directly destroys the habitat. This may be a serious issue if the road passes through the habitat of threatened or endangered wildlife species.

Factors that may result in degradation of habitat include:

- ▶ Bifurcation of the habitat by the road
- ▶ Disturbance due to noise and vibration during construction and operation
- ▶ Change in drainage pattern, and
- ▶ Introduction of exotic species through the construction material (sand and clay) brought from outside

***Compliance with Forest Management Plan***

All forests in NWFP have documented and undocumented management objective and plan. New roads in the forest should not conflict with the

management objective. For example, the road may open up new area for tree harvesting. It is important that whether the road is built by the Forest Department or any other agency, the impact on the forest management plan should be critically reviewed.

***Construction Material Sourcing***

Different types of construction material are required during road construction. These mainly include borrow material for earth-fill and aggregate. The aggregate is brought from quarries, whereas material for earth-fill is usually obtained as close to the construction site as possible. In general, areas used to acquire borrow material have significant impact. Removal of soil for road construction is a permanent change and can induce long-term impact on drainage, soil erosion and land use pattern. It can affect the productivity of the land; result in conflicts with landowners regarding the restoration of borrow areas; may prove hazardous to human beings, livestock and wildlife; can become breeding ground for mosquitoes if water stagnates in the pit.

***Asphalt Plant Operation***

The installation and operation of asphalt plant results in gaseous emission. The plant is usually installed on leased land. After the completion of work conflicts may arise with the landowners regarding restoration of land and clearance of waste material. Spills from the plant may contaminate the soil and water sources.

***Waste***

Waste is generated during road construction and also during operation. Road construction waste includes, removed vegetation, waste asphalt,

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excess construction material, used oil, camp waste, excavated material. Inappropriate disposal of these apart from creating pollution of water and soil, also lowers the general aesthetic value of forest.

Construction of road opens up the area for visitors, tourists, transporters and also for the local community who benefit from the road. It is commonly seen that the users of the road throw trash indiscriminately along the road. Heaps of litters consisting of plastic bags, wrapping papers, and packaging material, are commonly seen on both sides of the road and particularly close to popular recreation sites and roadside kiosks.

**Community Safety**

The communities living in the surrounding of the road and construction facilities may be affected during the construction. The general mobility of both local residents and their livestock in and around the construction area is often hindered. Unmonitored construction activities, eg, blasting, may create an accident risk for local residents, particularly their children

**2.3 Mitigation Options**

**Route Planning**

Most environmental issues associated with mountain and forest road construction project can be addressed by proper design of the road. Unlike plain areas where the road is almost the shortest distance between the two terminals points, the route of a mountain road is also determined by the terrain and gradient. Apart from the technical considerations, the route should be selected such that:

- ▶ Other potential users can also benefit from the road. These may include the local communities and potential tourists.
- ▶ Steep slopes are avoided to minimize excavations.
- ▶ Road length in the path of streams, storm water runoff, and floodplains are minimized.
- ▶ As much distance as possible is maintained from core wildlife habitats and areas of endangered and threatened species.

**General Measures**

- ▶ Camps and asphalt plants should be located at a minimum distance of 500 m from existing settlements, built-up areas, wildlife habitats, or archaeological and cultural monuments.
- ▶ As far as possible, barren land ie, areas not under agricultural or residential use, and natural areas with a high elevation should be used for setting up project facilities.
- ▶ Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer should be stripped and stockpiled for redressing the land after the required borrow material has been removed.
- ▶ The excavation of earth fill should be limited to an approximate depth of 50 cm, particularly in farmlands.
- ▶ Ditches or borrow pits that cannot be fully rehabilitated should be landscaped to minimize erosion and to avoid creating hazards for people and livestock.
- ▶ Side drains should be constructed to prevent flooding on the road.

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- ▶ An adequate number of bridges and culverts should be constructed across the road embankments and across intersecting rivers, natural streams and runoff paths. During operations these should be regularly monitored and kept cleaned.

***Soil Erosion and Landslides***

Good engineering practices should help control soil erosion, both at construction sites and in borrow areas. These include the following measures:

- ▶ Low embankments should be protected from erosion by planting indigenous grasses
- ▶ High embankments, ie, over 2 m high, should be protected by constructing stone pitching or a riprap across the embankment. This practice should also be applied along cross-drainage structures where embankments are more susceptible to erosion by water runoff.
- ▶ The size of the construction corridor should be minimized. The corridor should be physically demarcated on the ground. No construction related activity should take place outside the zone to minimize disturbance to vegetation.
- ▶ Exposed soil should be revegetated quickly after construction and not exposed without mulch or vegetation over winter.
- ▶ Unpaved surfaced roads should have a minimum of 10 cm of gravel.
- ▶ Road maintenance is important in order to minimize erosion and the expense of reconstruction. A well-

designed road maintenance plan will minimize cost and environmental damage.

- ▶ Where possible, road should be located on well-drained soils.
- ▶ Road should be located outside riparian zones except at stream crossings.
- ▶ Road should follow natural contours to minimize cut and fill.
- ▶ Design road in a way to balance cut and fills to minimize to need for fill or removing excess materials.

***Drainage Pattern***

- ▶ Cross-drainage structures across road embankments, intersecting rivers, natural streams and canals should be constructed at appropriate locations and of required capacities to protect nearby agricultural land and settlements from flooding.
- ▶ Measures should be undertaken to prevent earth and stone material from blocking cross-drainage structures on sections along or close to water channels.
- ▶ Measures should be undertaken to ensure that storm drains and road drainage systems are periodically cleared to maintain storm water flow.

***Water and Soil Contamination***

- ▶ Roadside slopes and ditches must be carefully located and designed in order to prevent stream siltation.
- ▶ Seed and mulch should be used and temporary sediments control structures should be installed

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- immediately following construction to reduce erosion.
- ▶ Construction activity should be limited in water to periods of low and normal flow
  - ▶ Use of equipment in a stream should be kept to a minimum.
  - ▶ Camps should be located at least 500 m away from the nearest local settlement to prevent the contamination of community-owned water resources.
  - ▶ Construction camps should be established in areas with adequate natural drainage channels in order to facilitate flow of the treated effluents.
  - ▶ Wastewater effluent from construction workshops and equipment washing-yards should be passed through gravel/sand beds to remove oil and grease contaminants before discharging it into natural streams.
  - ▶ Materials and chemicals that can potentially cause contamination of soil should be identified and the workforce should be trained in safe storage and handling of these material.
  - ▶ A solid waste disposal site should be identified and all solid waste generated during construction and at campsites should be disposed of only in waste disposal sites.
- ▶ If construction work close to certain habitats is unavoidable, disturbance due to noise and vibration should be minimized by using construction technologies that generate low noise, for example muffled blasting instead of conventional blasting, and avoiding construction during night
  - ▶ The need for fill should be minimized. If unavoidable, the fill material should be brought from similar ecological zone to ensure that seeds of exotic species are not introduced
  - ▶ A tree plantation program should be initiated to compensate for the anticipated loss of vegetation during construction activities, and to help abate pollution caused by emissions, dust, and noise during road operation.
  - ▶ Campsites and asphalt plants should be established on barren land rather than on forested or agriculturally productive land. The cutting of trees should be minimized.
  - ▶ Construction vehicles, machinery and equipment will remain confined within their designated areas of movement.

### ***Disturbance to Wildlife Habitat***

- ▶ Critical wildlife habitats should be identified before road design and construction
- ▶ The road should be designed to avoid the critical habitat and minimize bifurcation of the habitat

### ***Compliance with Forest Management Plan***

All roads should be critically viewed against the management objectives of the forest. Any conflict should be resolved. The forest department should be involved in the assessment and the process should be documented.

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***Asphalt Plant Operation***

- ▶ Quarry areas and asphalt plants should be located at least 500 m downwind from populated areas, wildlife habitats, and contractors’ camps, to minimize the impact of dust emissions.
- ▶ Asphalt, hot mix and batching plants should be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce the level of dust emissions.

***Waste***

A dumping site should be identified for construction waste. The site should be:

- ▶ At least 500 m from any community, water well, surface water source
- ▶ Outside the floodplain or storm water runoff
- ▶ Outside critical wildlife habitat
- ▶ Not on steep land or cultivated area

The landfill should be prepared in the following manner:

- ▶ About 50 cm of topsoil should be first removed.
- ▶ After dumping the waste, road rollers should be used to compact the waste as much as possible.
- ▶ The topsoil should then be spread back and landscaping should be undertaken.

No hazardous waste should be buried in the dumping site.

To keep the forest clean once the road become operational following measures should be taken:

- ▶ A public education program should be initiated. The program should focus on visitors, tourists,

transporters and the local community.

- ▶ An annual road and forest clean-up campaign should be initiated in which all road users should be invited to attend.
- ▶ Waste bins should be provided at regular intervals. The bins should be cleaned regularly.

***Community Safety***

- ▶ All communities living in the vicinity of the road project should be informed in advanced about the construction schedule, the work plan, and safety hazards. Any community concerns should be documented and addressed.
- ▶ Before any hazardous activity that poses accident risk for local residents, community should be informed and watchmen posted at strategic points to ensure that no unauthorized person comes within the hazard zone.
- ▶ Road safety audits should be undertaken.
- ▶ Road markings and signage should installed
- ▶ Road should be widened and design appropriately near settlements and intersection of tracks and roads to eliminate bottlenecks.
- ▶ Public facilities, including bus bays with passenger waiting sheds and latrines, service lanes, footpaths, pedestrian-crossing facilities, and fences should be constructed at appropriate places.

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## Environmental Assessment Checklist

### Section I: Project Description

File No \_\_\_\_\_ (To be filled by EPA)

Date \_\_\_\_\_

#### General Information

1. Project Name or Title \_\_\_\_\_
2. Project Proponent (Department, organization, or owner) \_\_\_\_\_
3. Address \_\_\_\_\_
4. Telephone \_\_\_\_\_
5. Fax \_\_\_\_\_
6. E-mail \_\_\_\_\_
7. Representative of the Proponent \_\_\_\_\_
8. Designation \_\_\_\_\_
9. Name of the person who conducted this assessment \_\_\_\_\_
10. Designation \_\_\_\_\_
11. Qualification \_\_\_\_\_

#### Project Information

12. Project Location \_\_\_\_\_
13. Name of Forest \_\_\_\_\_
14. Cost of the Project \_\_\_\_\_
15. Period of construction (start and end dates) \_\_\_\_\_

#### Proposed Activity

16. Length of the proposed road \_\_\_\_\_ km
17. Width of road \_\_\_\_\_ m
18. Surface type \_\_\_\_\_
19. Purpose of the road \_\_\_\_\_
20. Brief Project Description \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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*Please attach a map of the proposed project area*

21. Number and type of major construction equipment that will be used \_\_\_\_\_

\_\_\_\_\_

22. The total construction material that will be utilized? \_\_\_\_\_

\_\_\_\_\_

23. Will any new land be acquired? \_\_\_\_\_

If yes, please specify

The total area: \_\_\_\_\_

Present ownership of land \_\_\_\_\_

What is the present use of the land? \_\_\_\_\_

How the land will be acquired (Through Land Acquisition Act or Direct Purchase)? \_\_\_\_\_

When the compensation will be paid? \_\_\_\_\_

24. In case of state land, are there any squatter settlements on the land? \_\_\_\_\_

If yes, please specify

Number of settlements \_\_\_\_\_

Will any compensation be paid? \_\_\_\_\_

When the compensation will be paid? \_\_\_\_\_

25. Is construction work during the night planned? \_\_\_\_\_

26. How many trees will be removed for the construction of the road? \_\_\_\_\_

27. Will any existing asphalt be removed? \_\_\_\_\_

If yes, how much? \_\_\_\_\_

Where it will be disposed? \_\_\_\_\_

28. How many trees will be removed for the construction of the road? \_\_\_\_\_

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29. Please provide the information on the following facilities:

Facility	Location	Land Size	Nearest community and Its Distance	Nearest Water Body and its Distance
Construction Camp 1				
Construction Camp 2				
Construction Camp 3				
Asphalt Plant				
Waste Dumping Site				
Borrow Area 1				
Borrow Area				
Borrow Area				
Borrow Area				
Aggregate Quarry				

### **Section II: Screening**

Is the proposed road or part of the proposed road:

A federal highway?  Yes  No

A provincial highway?  Yes  No

In an ecologically sensitive area?  Yes  No

Is the cost of the road more than Rs 10 million?

Yes  No

If the answer to any of the above questions is yes, then the project would require an initial environmental examination or an environment impact assessment. Refer to the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000 for appropriate category.

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**Section III: Environmental Profile**

1. Describe the terrain of the project area:  Flat or Level (Slope < 3%)  
 Level to moderately steep (Slope 3%-30%)  
 Moderately steep to mountainous (Slope > 30%)

(In case the proposed road will pass through terrain in which the slope varies, indicate the approximate percentage of each type of terrain)

2. What is the maximum elevation of the proposed road?  
 < 400 meters above sea level (masl)  
 400-800 masl  
 > 800 masl

3. Will the road cross any natural stream or canal?  
 Yes  No

If yes, describe each water body:

<b>Name</b> (including type, ie, canal or stream)	<b>Dimensions</b> (Width and depth at the proposed road crossing)	<b>Flow</b> (flow rate in cusecs or m <sup>3</sup> /s)	<b>Status and Uses</b> (Is it polluted? Upstream pollution, eg, sewage discharge? Downstream uses, eg, agriculture, domestic, industrial, washing, fishery)

4. Is there any site of cultural importance (graveyard, shrine, mosque, archeological site) in the vicinity of the proposed road?  
 Yes  No

If yes, Please describe? \_\_\_\_\_

5. How many sensitive receptors (schools, colleges, hospitals, and clinics) are located in the vicinity of the proposed road? \_\_\_\_\_

*Please attach a list along with the approximate distance from the road*

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6. For every 250 m section of the road describe the present land use on both sides of the road as follows:

Section and Side	Residential (Thick, Moderate, Sparse)	Commercial (Office, Shops, Fuel Stations)	Open Land (Parks, Farmlands, unutilized plots, barren land	Sensitive Receptors and Sites of Cultural Importance	Other
0-250 m Right					
0-250 m Left					
250-500 m Right					
250-500 m Left					
500-750 m Right					
500-750 m Left					

7. If the proposed project entails rehabilitation of an existing road, what is the existing level of traffic on this road? \_\_\_\_\_

8. Are there any ecologically sensitive areas within 1,000 m of the proposed road? \_\_\_\_\_

If yes, please describe \_\_\_\_\_

\_\_\_\_\_

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### Section IV: Impact Assessment and Mitigation Measures

<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
Sound Planning	<input type="checkbox"/>	Other potential users have been identified and their need taken into account in the project design	<input type="checkbox"/>	
		Steep slopes have been avoided	<input type="checkbox"/>	
		Road length in the path of streams, storm water runoff, and floodplains have been minimized	<input type="checkbox"/>	
		Core wildlife habitat have been identified	<input type="checkbox"/>	
		A minimum distance of ___ m have been maintained form core wildlife habitats, areas of endangered and threatened species	<input type="checkbox"/>	
		Road is design road in a way to balance cut and fills to minimize to need for fill or removing excess materials	<input type="checkbox"/>	
		The road plan has been critically assessed against the management objectives of the forest; the forest department was involved in the assessment; the process was documented.	<input type="checkbox"/>	
General Measures	<input type="checkbox"/>	Camps and asphalt plants will be located at a minimum distance of 500 m from existing settlements, built-up areas, wildlife habitats, or archaeological and cultural monuments	<input type="checkbox"/>	

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<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
		Barren land ie, areas not under agricultural or residential use, and natural areas with a high elevation will be used for setting up project facilities	<input type="checkbox"/>	
		Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer will be stripped and stockpiled for redressing the land after the required borrow material has been removed	<input type="checkbox"/>	
		The excavation of earth fill will be limited to an approximate depth of 50 cm, particularly in farmlands.	<input type="checkbox"/>	
		Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people and livestock	<input type="checkbox"/>	
		Side drains will be constructed to prevent flooding on the road.	<input type="checkbox"/>	
		An adequate number of bridges and culverts will be constructed across the highway embankments and across intersecting rivers, natural streams and runoff paths	<input type="checkbox"/>	
		During operations, the cross-drainage structures will be regularly monitored and kept cleaned	<input type="checkbox"/>	

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<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
Soil Erosion and Landslides	<input type="checkbox"/>	Low embankments will be protected from erosion by planting indigenous grasses	<input type="checkbox"/>	
		High embankments, ie, over 2 m high, will be protected by constructing stone pitching or a riprap across the embankment. This practice will also be applied along cross-drainage structures where embankments are more susceptible to erosion by water runoff	<input type="checkbox"/>	
		The size of the construction corridor will be minimized. The corridor will be physically demarcated on the ground. No construction related activity will take place outside the zone to minimize disturbance to vegetation	<input type="checkbox"/>	
		Exposed soil will be revegetated quickly after construction and not exposed without mulch or vegetation over winter	<input type="checkbox"/>	
		Unpaved surfaced roads will have a minimum of 10 cm of gravel	<input type="checkbox"/>	
		A road maintenance plan will be prepared as soon as the construction is complete	<input type="checkbox"/>	
		Where possible, road will be located on well-drained soils	<input type="checkbox"/>	
		Road will be located outside riparian zones except at stream crossings	<input type="checkbox"/>	
		Road will follow natural contours	<input type="checkbox"/>	

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<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
Drainage Pattern	<input type="checkbox"/>	Road will be located outside riparian zones except at stream crossings	<input type="checkbox"/>	
		Road will follow natural contours	<input type="checkbox"/>	
		Cross-drainage structures (such as culvert and causeways) across road embankments, intersecting rivers, streams and canals will be constructed at appropriate locations and of required capacities to protect nearby agricultural land and settlements from flooding	<input type="checkbox"/>	
		Measures will be undertaken to prevent earth and stone material from blocking cross-drainage structures on sections along or close to water channels	<input type="checkbox"/>	
		Measures will be undertaken to ensure that storm drains and road drainage systems are periodically cleared to maintain storm water flow	<input type="checkbox"/>	
Water and Soil Contamination	<input type="checkbox"/>	Roadside slopes and ditches will be carefully located and designed in order to prevent stream siltation	<input type="checkbox"/>	
		Seed and mulch will be used and temporary sediments control structures will be installed immediate following construction to reduce erosion	<input type="checkbox"/>	
		Construction activity in water will be limited to periods of low and normal flow	<input type="checkbox"/>	

*Continued...*

## Forest Road Constructions

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...Continues

<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
		Use of equipment in streams will be kept to the minimum	<input type="checkbox"/>	
		Camps will be located at least 500 m away from the nearest local settlement to prevent the contamination of community-owned water resources.	<input type="checkbox"/>	
		Construction camps will be established in areas with adequate natural drainage channels in order to facilitate flow of the treated effluents	<input type="checkbox"/>	
		Wastewater effluent from construction workshops and equipment washing-yards will be passed through gravel/sand beds to remove oil and grease contaminants before discharging it into natural streams.	<input type="checkbox"/>	
		Materials and chemicals that can potentially cause soil contamination of soil will be identified and the workforce will be trained in safe storage and handling of these material.	<input type="checkbox"/>	
		A solid waste disposal site will be identified and all solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.	<input type="checkbox"/>	

*Continued...*

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...Continues

<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
Disturbance to Wildlife Habitat	<input type="checkbox"/>	Critical wildlife habitats will be identified before road design and construction	<input type="checkbox"/>	
		The road will be located to avoid the critical habitat and minimize bifurcation of the habitat	<input type="checkbox"/>	
		If construction work close to certain habitats is unavoidable, disturbance due to noise and vibration will be minimized by using construction technologies that generate low noise	<input type="checkbox"/>	
		Construction work during night will be avoided	<input type="checkbox"/>	
		The need for fill will be minimized. If unavoidable, the fill material will be brought from similar ecological zone to ensure that seeds of exotic species are not introduced	<input type="checkbox"/>	
		A tree plantation program will be initiated to compensate for the anticipated loss of vegetation during construction activities, and to help abate pollution caused by emissions, dust, and noise during road operation.	<input type="checkbox"/>	
		Campsites and asphalt plants will be established on barren land rather than on forested or agriculturally productive land. The cutting of trees for this purpose will be minimized.	<input type="checkbox"/>	
		Construction vehicles, machinery and equipment will remain confined within their designated areas of movement.	<input type="checkbox"/>	

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<i>Potential Negative Environmental Impacts</i>	<i>Tick, if relevant</i>	<i>Mitigation Measures</i>	<i>Tick, if proposed</i>	<i>Monitoring Plan</i>
Asphalt Plant Operation	<input type="checkbox"/>	Quarry areas and asphalt plants will be located at least 500 m downwind from populated areas, wildlife habitats, and contractors' camps, to minimize the impact of dust emissions.	<input type="checkbox"/>	
		Asphalt, hot mix and batching plants will be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce the level of dust emissions.	<input type="checkbox"/>	
Waste	<input type="checkbox"/>	A solid waste disposal site has been identified and all solid waste generated during construction and at campsites will be disposed of only in waste disposal site	<input type="checkbox"/>	
		The landfill will be prepared as per the guidelines	<input type="checkbox"/>	
		No hazardous waste will be buried in the dumping site	<input type="checkbox"/>	
		A public awareness program will be initiated to keep the forest clean	<input type="checkbox"/>	
		Annual road and forest clean-up campaign will be initiated	<input type="checkbox"/>	
		Waste bins will be provided at regular intervals. The bins will be cleaned regularly.	<input type="checkbox"/>	

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**Section V: Undertaking**

I, \_\_\_\_\_ (*full name and address*) as proponent for \_\_\_\_\_ (*name, description and location of project*) do hereby solemnly affirm and declare:

1. The information on the proposed project and the environment provided in Forms I, II and III are correct to the best of my knowledge
2. I fully understand and accept the conditions contained in the Guidelines for \_\_\_\_\_ (*name, number and version of the guidelines*)
3. I undertake to design, construct and operate the project strictly in accordance with the project described in Form I, submitted with this undertaking.
4. I undertake to implement all mitigation measures and undertake monitoring stated in Form IV, submitted with this undertaking.

Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Designation \_\_\_\_\_

(with official stamp/seal)

Witnesses:

Signature

Name

Address

1

\_\_\_\_\_

2

\_\_\_\_\_