



# Environmental Monitoring Report

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Summary Initial Environmental Examination  
Project Number: 42095  
MPW/871/ADB/ICB  
June 2009

## AFG: Road Network Development Investment Program—Rehabilitation of Fayzabad-Beharak Road Section

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Asian Development Bank

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## ABBREVIATIONS

ADB	-	Asian Development Bank
AIA	-	Afghanistan Interim Administration
EIA	-	Environmental Impact Assessment
EOC	-	Emergency Obstetric Care
EPA	-	Environmental Protection Agency
FAO	-	Food and Agricultural Organization
GDP	-	Gross Domestic Production
IEE	-	Initial Environmental Examination
KWh	-	Kilo watt hours
LPG	-	Liquid Petroleum Gas
MPW	-	Ministry of Public Works
NDF	-	National Development Framework
NEAP	-	National Environmental Action Plan
NGOs	-	Non-governmental Organizations
ROW	-	Right of Way
SC	-	Supervision Consultant
TA	-	Technical Assistance
UN	-	United Nation
UNEP	-	United Nations Environmental Programme
UXO	-	Unexploded Ordnance
WHO	-	World Health Organization

<b>Units</b>			
Cm	Centimeter	Km	Kilometer
°C	Degree Celsius	M	Meter
dB	A' decibel	M <sup>2</sup>	Square meter
Ha	Hectares	Mg/L	Milligram per Liter
Hr	Hour	µg/m <sup>3</sup>	Microgram per cubic meter
Kg	Kilogram	ppm	Parts per million
<b>Currency (as of December 15, 2008)</b>			
\$	United States Dollar	Afs/AFN	Afghanistan Afghani
1\$	Af 50	1 Af	\$ 0.02

# SUMMARY OF INITIAL ENVIRONMENTAL EXAMINATION

## I. INTRODUCTION

1. The purpose of this Initial Environmental Examination (IEE) is to document a screening of the environmental consequences of this project. This IEE is structured in accordance with the requirements of the ADB.
2. The IEE considered environmental impacts on physical, environmental, ecological, social, and cultural resources within the Project influence area during construction and operation phases of the Project.
3. The IEE has been conducted to identify and to minimize the adverse environmental impacts, if any. Environmental issues considered in this IEE are mainly macro-level issues, which can have adverse or beneficial impacts, as a result of the proposed road works.
4. The methodology used for this study is based on the procedures described in ADB Environmental Assessment Guidelines of 2003, ADB Environmental Policy 2002 and IRA's EIA Policy and Environmental Law.

The Initial Environmental Examination has been carried out using current ADB and IRA guidelines, specifically:

- ADB Environmental Policy 2002 ;
- ADB Environmental Assessment Guidelines 2003;
- Project Terms of Reference (TOR);
- EIA Policy of IRA
- Draft Interim EIA Regulation of IRA
- Environmental Law of IRA

## II. DESCRIPTION OF THE PROJECT

5. The Ministry of Public Works (MPW), Islamic Republic of Afghanistan, intends to rehabilitate and reconstruct 44+000 km of Fayzabad - Beharak Road, classified as part of National Highway No. 43 as per the Road Sector Master Plan of Afghanistan. The project road connects two important primary highways one at Beharak (Jurm - Beharak) and other at Zebak (Zebak - Dug Khana). The index map of the project is presented in Fig.1.1.
6. The rehabilitation and reconstruction of the project road will be carried out under civil works contracts by contractors selected through International Competitive Bidding (ICB) procedures.
7. In order to prepare a Detailed Project Report (DPR), MPW has appointed the Messrs Louis Berger Group, Inc., USA as Consultants to carry out the preparation of Detailed Project Report.
8. In the transportation of goods and agriculture products, surface transport plays an important role. To achieve the Government development objectives, it will be necessary

to improve the road sector to an economically viable standard. Road infrastructure component urgently need repair and rehabilitation to 44+000 km long Fayzabad - Beharak Road. It is the main commercial and administrative center of the Pamir region, the city having mills, flour and rice

9. The project road starts from Fayzabad which is continuation of Eshkashem - Fayzabad Road (NH-43) and traverses north - East direction and ends at Beharak at km 44+000 and passes through Badakhshan Province. It is located in the northeast of Afghanistan, on Kokcha river basin.
10. The 44+000 km of exiting road will rehabilitate along with rehabilitate 7 bridges and 155 culverts. The entire geometric design has been based on the ground modelling by highway design software MOSS/ MX. Efforts have been made, during design of horizontal alignment, to take the proposed centre line 2-lane road within or near to existing ROW, to make maximum use of existing roadway without making any compromise in standards.
11. As per ADB Environmental Assessment Guidelines 2003, the project road falls under Category B project, but not deemed environmentally sensitive. As such, an Initial Environmental Examination (IEE) is required, as no significant adverse impact has been envisaged.
12. Project implementation duration is considered as two years tentatively starting in July 2009. This excludes project preparation and other pre-construction stage activities. The project is expected to start operation early in 2011.

### **III. DESCRIPTION OF THE ENVIRONMENT**

13. The project road is located (maximum) in mountainous terrain and small length in rolling terrain, with ascending gradient from Fayzabad (1224m above msl). Almost the entire alignment of the project road is beset with poor to very poor horizontal and vertical geometric condition which needs major geometric improvements.
14. Around 40% of the PR length passes within the influence zone of Perennial River, out of which 28% length is within 50 m and remaining 12% length is along the river basin where adequate protective measures and safety barriers need to be provided
15. Afghanistan has a continental climate, the summers are warm and winters cold, due to the great mountainous extension. The temperatures vary daily according to the season and depending on the altitude.

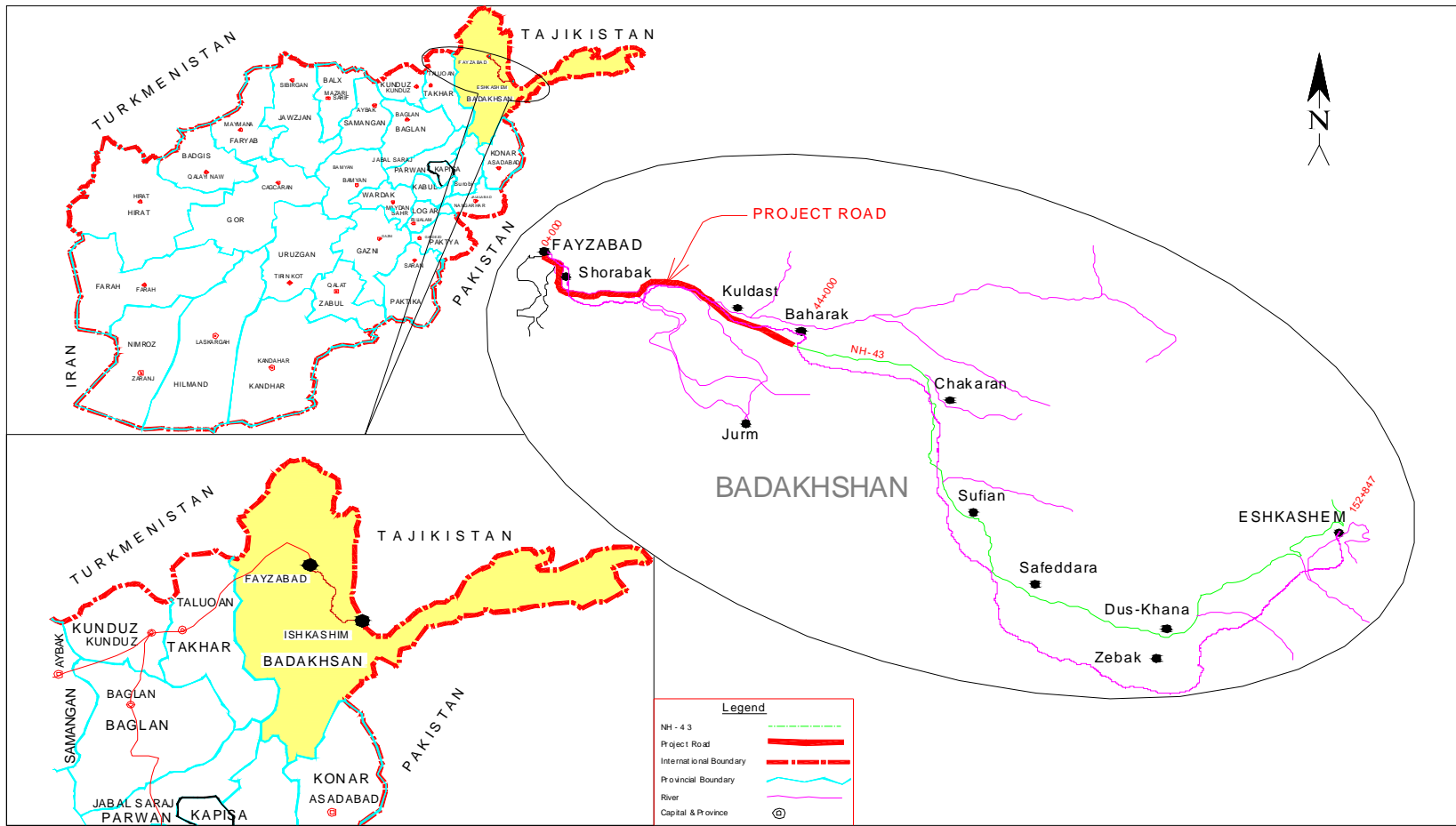


Fig:1.1: Index Map

16. Afghanistan has not yet established its ambient air quality standard. There were no data available on ambient air quality of this area. However, air pollution does not constitute a major problem in the study area but its reliance on inexpensive energy has created some issues. Most vehicles run on diesel fuel, and household energy often relies on burning wood and other materials. As a result, air pollution in urban areas is visible and may pose health issues.
17. The major factors affecting the air quality in the Project area are dust emissions from fuel combustion and brick kilns. Dust from the unpaved roads is the major source of air pollution in rural areas.
18. Presently, unleaded petrol is sold in Afghanistan. There is hardly movement of 1 or 2 vehicle in a day on this project road because it is cart road and this is situated in rural area, so that possibility of lead pollution along the road is negligible.
19. The oldest rocks are Archean and they are succeeded by rocks from the Proterozoic and every Phanerozoic system up to the present day. The soil of the area is alluvial in nature. The region in Afghanistan also experiences earthquakes and also prone for the landslide.
20. There is no water quality data is available in project area. Water quality data is available in some areas of the Kabul River Basin, and it revealed that the groundwater quality is excellent, showing no signs of problematic water constituents.
21. No noise monitoring data is available in the project area and it is expected that noise quality will conform to international noise standards with low background noise level. The field visit also reveals that vehicular traffic, which is low in volume, is the main source of noise level. The ambient noise level seems to be within the humanly acceptable limits and is not an issue of concerned.
22. The vegetation in Afghanistan is directly related to the amount of precipitation. Trees are only found in a few areas as a consequence of massive deforestation which has taken place in recent decades. The project road passes through the barren area with very few stretches having roadside tree plantation. As such there is no forest area within the Project Influence Area (PIA).
23. As mentioned earlier, there is no forest area within the Project Influence Area (PIA), no effective protected area system so that there is no wild life crossing point along the project corridor. With little government infrastructure to discourage hunting, and habitat disappearing because of conflict and drought, much of the country's wildlife is at risk. There is in Afghanistan.
24. There are no listed heritage sites or cultural property<sup>1</sup> of significant value located within project influence area. About more than 60 % length along the project road is barren land & River basin and it would not have any major adverse social effect due to improvement in geometrics. Nomads or Kuchis are prevalent in all the Project area. Kuchi families reside in tents. They mainly move from one place to the other to graze their animals and to seek agricultural jobs. Agriculture has been the mainstay of the Afghanistan economy, and irrigation traditionally provides 85% of all crop production.

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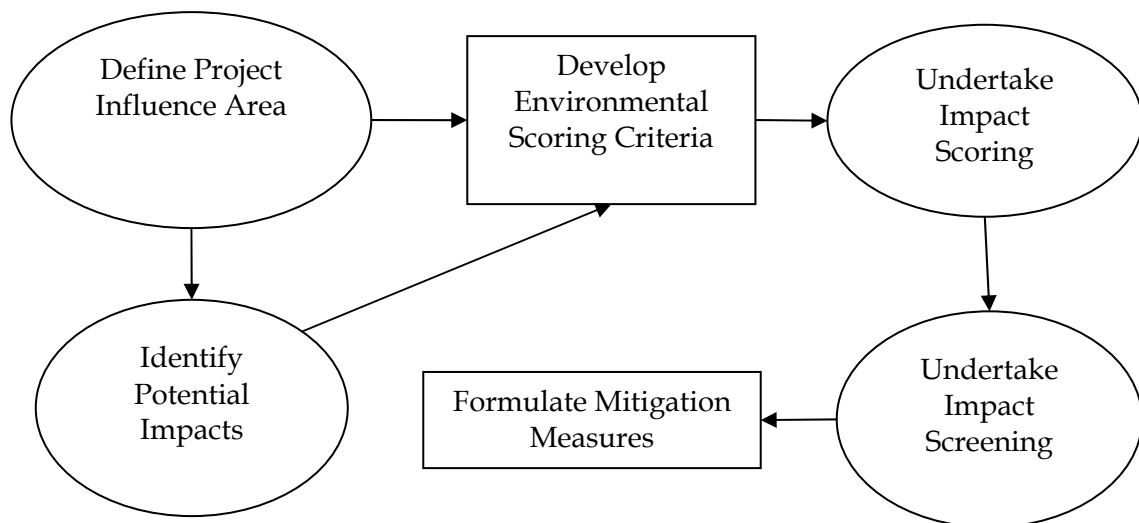
<sup>1</sup> Cultural Property defined as “movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.”

#### IV. FORECASTING ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

25. After studying the existing baseline environmental scenario, identifying environmental hotspots, the actual and potential adverse impacts due to the project design, construction and operation phases have been identified, evaluated and assessed. The likely positive impacts and scope for environmental enhancement are also specified. By adopting suitable safeguard measures in the design and during construction and operation, potential adverse impacts on various environmental components would be avoided and mitigated. The potential impacts and their suitable mitigation measures are identified and are presented at the end in a Tabular form.

##### Methodology Adopted

26. The methodology adopted for environmental impact screening and formulating mitigation measures is outlined through flow chart given below:



##### Locational Issues

27. Major Highways shall have a standard lane width of 3.50m. The carriageway width of 7.0m wide is adopted for the project road. Extra widening of carriageway for the hilly and mountainous roads will be provided based on the design speed and the curvature at that location. The rehabilitation of the project road will follow the existing road location and alignment. The pavement is generally 7 m wide, and rehabilitation work will involve widening of the existing road, only at few locations.
28. It is expected that construction materials for the road rehabilitation work will be mined from the approved quarries. The following criteria will be used for locating project borrow areas.
- Borrow areas will not be established in ecological sensitive areas,
  - Villagers will be consulted regarding the design and location of all borrow areas to ensure safety of local communities and to incorporate beneficial post construction issues for villages,

- Borrow areas will be located away from the road and hill slopes or settlements facing the road, so as to minimize visual impacts,
29. Afghanistan in general is prone to a number of natural disasters: earthquakes, flooding, drought, landslides and avalanches. Floods are dominant in the spring, when the snow begins to melt and rainfall is heavy, so that considering all these factors, care has been taken during designing of all structures like bridges, culverts and pavements. In 2006 the Federal Highway Administration (FHWA) published a major revision to the 'Seismic Retrofitting Manual for Highway Bridges, it will be followed during design and construction.
  30. While the ROW for project road is 30 m in open area and 19 m in built up area, only houses and other structures within 5 - 6 m from the centre line of the road will need to be relocated. There are few shops / structures which are likely to be affected during construction of this road section.
  31. Field surveys indicate that all affected households support the implementation of the project and expressed willingness to relocate, if necessary.
  32. Rehabilitation of the road will greatly reduce the vehicular emissions impacts on the flora and fauna and help in the improvement of macro-level environment, which is now affected by the multiple parallel tracking systems adopted by the vehicles travelling along the road section. Along the road, vegetation is predominated by grasses, shrubs and forest areas that have been degraded by heavy exploitation for fuel wood. The major trees and plants seen along the right of way are Bed, Pines and Apple trees. There are no pristine forests close to the project road. The road will not traverse any existing and proposed sensitive areas.
  33. There is no precious ecology located near the project road nor any endangered species are report within corridor on impact and thus there will be no encroachment on such resources.
  34. The rehabilitation of project road will have no significant adverse impact on Flora and Fauna because there are no ecologically sensitive areas along the road.
  35. There are few burial-grounds along the project road, which are away from the right of way (ROW). There are no protected national parks in the project area. Earthwork associated with quarrying or borrow pits could reveal sites or artifacts of cultural significance. In the event of such a discovery, the proper authority will be informed. This will be incorporated in contract documents. The project will not have any adverse impact on historical places / monuments.
  36. Minor impacts on the water resources due to the present rehabilitation work are expected during construction phase. Since no construction of new bridges is involved, no changes in the existing drainage pattern are envisaged. However, rehabilitation of existing bridges may cause soil erosion and turbidity of water bodies existing in downstream areas. To mitigate this, slope stability measures will be undertaken throughout the construction period. The construction work at the bridges will be avoided during the rainy seasons to minimize erosion and sedimentation of the rivers.
  37. The primary objective of the road improvement is to repair damaged culverts and rectify poor cross road drainage that has resulted in localized flooding on some road sections

during rainy seasons. The local people are using streams/rivers for irrigation as well as domestic purposes. The project road is situated in rural area, some localized cutting and filling on the steeper areas will be carried out. Visual impacts of the road rehabilitation will be minor and will be concentrated during construction phase only. Area to be cleared for quarries and borrow will be well defined in the field.

38. During construction air quality is likely to be degraded at micro level and short term, due to exhaust emission from the operation of construction machinery; fugitive emission from brick, concrete, and asphalt plants; and dust generated from haul roads, exposed soils and material stockpiles.

Following actions will be implemented in order to minimize the likely impacts-

- Regular check-up and maintenance of the construction equipments, idling of engines discouraged. Machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from construction sites,
  - Mixing plants i.e. asphalt, concrete, and bricks, will be operated within the permissible limits of the Government pollution control legislation, and will be located away from settlements,
  - The contractor has to submit a dust suppression and control program to MPW prior to construction. The plan will detail actions to be taken to minimize dust generation and will identify equipment to be used,
  - Vehicles delivering loose and fine materials will be covered to reduce spills on existing roads.
39. Noise generation is expected due to operation of heavy machinery. Piling will also cause vibration problems. Noise and vibration from piling will be unavoidable but temporary impacts will principally affect the population near the locations of piling. Stringent control measures to follow a limit of 75 dB(A) at construction site boundary will be engaged. At construction sites within 500 m of settlement, noisy operation will be stopped between 2200 to 0600 hrs. Regular maintenance of the construction vehicle and machinery will be done to reduce additional noise due to poor maintenance.
40. Rehabilitation of road will involve selective clearing of road margin within the ROW. Spoil and waste generated at construction camps will be properly disposed off otherwise it can create odour, nuisance, etc. and can also cause disturbance to the drainage system of the area. Quarries and borrow pits resources have not been identified. Localized problem are expected due the quarries and borrow areas. This includes localized dust pollution, noise pollution and respiratory problems to the workers as well as local residents. The likely effects on various environmental features due to construction, operation activities along with their mitigation measures are summaries in a tabular form at the end.

## **V. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN**

41. The MPW, through its Project Implementing Unit (PIU), is the Executive Agency of the Project. PIU is already established and headed by a Project Director. There is no separate Environmental Officer within PIU. The Project Director is overall responsible for EMP

implementation. The following key players are involved in EMP implementation during construction stage:

- MPW/PIU and its environmental unit
- Construction Supervision Consultant (SC) i.e. Engineer and his representatives
- Contractor

42. There is a need for establishing an Environmental Management Unit (EMSU) within the PIU. It is recommended that one of the senior officers of PIU could be designated as Environmental Officer for monitoring implementation of proposed safeguard measures, as IEE does not envisage any significant impact and thus additional senior staff requirements is not envisaged. EMU will be headed by the Project Director but coordinating and supervising implementation of safeguard measures will be undertaken by the designated Environmental Officer. The capacity of MPW on project management and implementation including safeguard measures has been developed which is limited to day-to-day implementation of funded projects. The large projects implemented / being implemented by aids are mainly managed and implemented by PMU consultants attached with MPW. The MPW staff skill being upgraded by on-the-training and secondment to contractors and consultants. The capacity of MPW is now being developed for facilitating it to carry out its core function of sustainably planning, designing, managing and implementing road rehabilitation. However, there is a need for upgrading / enhancing skill of MPW in monitoring and supervising implementation of environmental safeguard measures.
43. The Project Director of PIU with the assistance of designated Environmental Officer will be overall responsible for ensuring compliance of safeguard measures and will be reporting to the regulatory bodies and ADB certifying that relevant environmental safeguard measures have been complied with during project implementation. At the provincial level, the senior engineer of MPW's local office with the assistance of construction supervision consultant will supervise implementation of safeguard measures and submit monthly reports to PIU. The Supervision Consultant (SC) will liaise with PIU environment unit to ensure that Contractor complies with the requirements of various environmental safeguard measures through supervision, monitoring and reporting on the same.
44. This section identifies and assesses the potential adverse impacts on different environmental components due to planning and design, construction and operation of the proposed project. After studying the existing baseline environmental scenario, identifying environmental hotspots, the actual and potential adverse impacts due to the project design, construction and operation phases have been identified, evaluated and assessed. The likely positive impacts and scope for environmental enhancement are also specified. By adopting suitable safeguard measures in the design and during construction and operation, potential adverse impacts on various environmental components would be avoided and mitigated. The potential impacts and their suitable mitigation measures are described here.
45. Environmental monitoring is an essential tool for environmental management as it provides the basic information for rational management decisions. To ensure the effective implementation of mitigation measures and environmental management plan

during construction and operation phase of the upgradation of project road, it is essential that an effective Environmental Monitoring Plan has been designed and followed. The effects monitoring will be undertaken to track and report the defined performance indicators / parameters as given in end of the report as tabular form.

## **VI. POTENTIAL ENVIRONMENTAL ENHANCEMENT**

46. One of the most effective, economical and useful remedies for control of environmental pollution is tree plantation. Trees have innumerable direct and indirect benefits of supplying timber and fuel at maturity. During their life time, they supply fodder, fruits, seeds, help in soil and water conservation, offer shade and are oxygen producing noise and dust pollution. Due to water scarcity and problems of protecting the saplings against grazing, tree plantation along the road is not feasible at all the locations; however, plantation of 5000/ sapling are recommended only along the urban areas, like Fayzabad city to improve the aesthetic beauty of the areas

## **VII. PUBLIC CONSULTATION AND DISCLOSURE**

47. Public participation and community consultation has been taken up as an integral part of social and environmental assessment process of the Project. Public participation has been viewed as a continuous two way process, involving promotion of public understanding of the processes and mechanisms through which developmental problems and needs are investigated and solved. Consultation was used as a tool to inform and educate stakeholders about the proposed action both before and after the development decisions were made. It assisted in identification of the problems associated with the project as well as the needs of the population likely to be impacted. This participatory process enabled the participation of the local people in the decision making process. The involvement of the various stakeholders ensured that the affected population and other stakeholders are informed, consulted and allowed to participate at various stages of project preparation
48. Public consultation has been carried out in this Project with the objectives of minimising probable adverse impacts of the project through alternate design solutions (alignment and cross-sectional) and to achieve speedy implementation of the project through bringing awareness amongst the community on the benefits of the project. The public consultation has been taken up as an integral part of social and environmental assessment process for this project.

The purpose of the public consultation includes the following:


- To ascertain the public views on various environmental issues related to road improvement
- To encourage and provide for people's participation in project design and development
- To obtain new insight and site specific information, and to appropriating possible mitigation measures based on local knowledge of the communities



The public consultation results are briefly described in a tabular form under Structured Consultation and are presented at the end of this section:

## Information Disclosure

49. Environmental assessment reports for ADB funded projects are intended to be accessible to the interested parties and the public. As per the requirements for Category B Project (deemed to be not environmentally sensitive), the environmental analysis is to be posted on ADB website as part of RRP. The full IEE report is also to be made available to the interested parties upon request.

**Table-1: Structured Consultation**

19th September 2007	Venue : MoPW Staff and Locals in Near Beharak Attendance: Total 14 local farmers, shopkeepers and one teacher were attended this consultation	Public Consultation about the Road improvement
Issue Discuss	<ul style="list-style-type: none"> <li>• Acquisition of grape cultivated land should be kept minimum</li> <li>• Local people may be engaged for unskilled works during construction</li> <li>• Sourcing borrow material from fertile land may be avoided</li> <li>• Dust control measures may be implemented during construction</li> <li>• Employment of local people</li> <li>• Migrant labor may be housed in proper labor camp to minimize interaction with local people</li> <li>• Compensation for prosperities</li> </ul>	
Suggestion	<p>Suggestions given:</p> <ul style="list-style-type: none"> <li>• Compensation should be given for small patches of land left or they should be acquired.</li> <li>• Compensation should be given for the tube wells, pipelines that are affected in the process or they should be built again by the govt.</li> <li>• Local unskilled and skilled labour will be engaged by the contractor on the basis of their requirements</li> <li>• Dust will be kept minimum by the contractor during construction</li> <li>• Borrow material will be taken from the unfertile land by the contractor (Other suggestions are incorporated in EMP)</li> </ul>	
Important Finding Future course of Action	<ul style="list-style-type: none"> <li>• Land acquisition should be minimized</li> <li>• Proper compensation of public and private properties should be given</li> <li>• Local people should be employed during construction</li> <li>• Dust generation should be minimum</li> </ul>	

<p><b>Date: 19th September 2007</b></p>	<p><b>Venue : Project Director Mr. Q. Salik and MoPW Staff in Fayzabad Consultation</b>  <b>Attendance: Total 19 local farmers and shopkeepers and an engineers were attended this consultation</b></p>	<p><b>Public Consultation about the Road improvement</b></p>
<p><b>Issue Discuss</b></p>	<ul style="list-style-type: none"> <li>• Acquisition of grape cultivated land should be kept minimum</li> <li>• Local people may be engaged for unskilled works during construction</li> <li>• Sourcing borrow material from fertile land may be avoided</li> <li>• Dust control measures may be implemented during construction</li> <li>• Employment of local people</li> <li>• Migrant labor may be housed in proper labor camp to minimize interaction with local people</li> <li>• Compensation for prosperities</li> <li>• Village is in the periphery</li> <li>• Houses may come in the way</li> <li>• Land would be divided</li> </ul>	
<p><b>Suggestion</b></p>	<p>Suggestions given:</p> <ul style="list-style-type: none"> <li>• Compensation should be given for small patches of land left or they should be acquired.</li> <li>• Compensation should be given for the tube wells, pipelines that are affected in the process or they should be built again by the govt.</li> <li>• Local unskilled and skilled labor will be engaged by the contractor on the basis of their requirements</li> <li>• Dust will be kept minimum by the contractor during construction</li> <li>• Borrow material will be taken from the unfertile land by the contractor</li> <li>• Other suggestions are incorporated in EMP</li> </ul>	
<p><b>Important Finding Future course of Action</b></p>	<ul style="list-style-type: none"> <li>• Proper compensation should be given if any private land and properties will acquire and local people should be employed during construction</li> </ul>	

## VIII. FINDINGS AND RECOMMENDATIONS

50. On the basis of study conducted for the Initial Environmental Examination, the major issues and recommendation for the proposed project have been summarized herewith.
- The project will not cause major environmental problems, resulting from its implementation,
  - At few locations project road section will be built along the corridor that currently does not have a proper road and traffic largely moves along the earthen land covered by large number of braided tracks,
  - Braided tracks are also getting converted into drains creating problems to the passing vehicles and increased soil erosion,
  - These braided tracks pose significant negative impacts on the environment that can be eliminated by the development of a proper road with environmentally friendly construction,
  - About 30 % of the project area passes through desert area and soil of the area is degraded. The area is being deforested by local communities for fuel requirements for domestic purposes,
  - The drainage along the road will be considerably improved because of provision of side drains and additional culverts being put-up,
  - The maximum portion of project road has a paved road in poor condition generally dusty. This problem will be solved with the proposed rehabilitation work,
  - The proposed project improvement / rehabilitation work will result in lesser air pollution than “No - built” alternatives, due to anticipated reduced average vehicle operating speed,
  - The project road does not run through protected / sensitive natural territories viz. natural habitats, reserve forests, ecological sensitive areas, nor will it negatively influence any wild life or endangered species,
  - There are no archaeological monuments reported in the project area,
  - Water scarcity is a major issue along the project road. The water requirement for construction will be met through the construction of project specific bore wells and perennial water bodies,
  - Project specific haulage roads will be required and this will be reinstated after the completion of haulage operation of works. During the hauling operation, measures will be enforced to ensure environmental protection namely regular sprinkling of water to suppress dust, spillage proof vehicle for hauling, regular maintenance of vehicles etc.
  - Contractor will be required to maintain the construction sites, keep it clean and provide appropriate facilities for the storage of all waste until it is disposed,
  - Work force for the project will be provided with adequate water supply, septic tanks with soak pits, health care facilities and rationing of LPG to reduce dependence on fuel wood,

- MPW will manage and monitor the implementation of recommendations made in the IEE. The environment specialist of the construction supervision will supervise the implementation of the mitigation measures by the contractors,
- The monitor program will follow the environmental protection norms and rules and reduce environmental risks, which might result from the construction, and operation of the project road,
- Intensive discussions regarding construction / rehabilitation of the road were carried out during the field visits in 2008 by the environment and social specialists. The people consulted, have generally welcomed the proposed project,
- Provision has been made in the project cost estimate for the environmental monitoring of the mitigation measures during construction.

## **IX. CONCLUSIONS**

51. On the basis of the available information, a field visit of the entire length of the project roads, discussion with the project sponsors, their engineering consultants, NGOs, local people and various governmental officials, it was concluded that the road rehabilitation project will not adversely affect the environment of the region, if project specific mitigation measures are taken.
52. This IEE concludes that the adverse environmental impacts arising from the project will be minimised to acceptable levels through the implementation of clearly identified mitigation measures. Therefore IEE is considered to be an adequate environmental assessment for the project. A monitoring program for the environment impacts and corresponding mitigation measures will be undertaken to ensure proper implementation of the project.
53. Improvement of the project road will positively help in improving the existing environment conditions of the areas
54. There will not be caused any comprehensive, broad, a diverse or irreversible adverse environmental impact by the project and hence no additional study is required. However, during construction period appointment of an environment specialist is required to look after the implementation of the recommendations made in IEE, so that construction work becomes environmentally sustainable. Suggestions are made in this IEE for mitigation measures, which should be incorporated into the design and construction process.
55. In nutshell, the project will have an overall beneficial impact after completion in terms of reducing transport cost and fuel consumption of vehicles and also improving socio-economic conditions along the project road. It will have insignificant negative impact on air quality, noise level, watercourses and soil during civil works, which will be appropriately monitored and adequately mitigated. At present, this report has not identified any comprehensive, broad, diverse or irreversible adverse impacts caused by the proposed road project.

**Table-2: Environmental Impacts, Mitigation Measures and Responsibility**

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision/ Monitoring Agency	
<b>PRE-CONSTRUCTION PHASE</b>					
<ul style="list-style-type: none"> <li>• Site clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of trees and vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Obtain permission from concerned authority before commence of tree cutting</li> <li>• Restrict tree cutting to bare minimum</li> <li>• Compensatory tree plantation</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> </ul>	<ul style="list-style-type: none"> <li>• NEPA / concern authority</li> <li>• Contractor,SC</li> </ul>	Engineering cost
<ul style="list-style-type: none"> <li>• Clearance of UXOs</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of injury or death as a result of unexploded ordnance (UXO)</li> </ul>	<ul style="list-style-type: none"> <li>• Clearance of UXOs is the responsibility of the Government, which must certify areas have been cleared of UXOs before any construction activities take place.</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> </ul>	<ul style="list-style-type: none"> <li>• MPW</li> </ul>	Under MPW routine Cost
<ul style="list-style-type: none"> <li>• Seismic Hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on Construction of Structures</li> </ul>	<ul style="list-style-type: none"> <li>• Considered in deigning of all major structures like bridges, culverts and pavements</li> <li>• In 2006 the Federal Highway Administration (FHWA) published a major revision to the 'Seismic Retrofitting Manual for Highway Bridges, it will followed during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Design Consultant</li> </ul>	<ul style="list-style-type: none"> <li>• MPW</li> </ul>	Engineering Cost
<b>CONSTRUCTION PHASE</b>					
<ul style="list-style-type: none"> <li>• Formation cutting, embankment / subgrade / pavement construction</li> </ul>	<ul style="list-style-type: none"> <li>• Dust generation due to loading and unloading of earth material; earth work operation i.e. excavation, backfilling etc.</li> <li>• Soil erosion from excavated area, stockpile of earthen material</li> <li>• Localized flooding / ponding at excavated area</li> </ul>	<ul style="list-style-type: none"> <li>• Dust control – delineating construction zone, necessary water sprinkling</li> <li>• Covering friable material transported by track, tippers, dumpers etc.</li> <li>• Providing temporary drainage, catchpit, sedimentation tank / silt trap etc., wherever possible, for minimizing soil erosion and preventing downstream siltation</li> <li>• Providing temporary bypass drain wherever possible, pumping out the water, proper construction planning to avoid prolonged excavation</li> <li>• Design to prevent soil erosion and maintain slope stability.</li> <li>• Construction in the dry season.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Engineering Cost

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
	<ul style="list-style-type: none"> <li>• Disruption of access to abutting shops and houses</li> <li>• Disruption of traffic</li> <li>• Disruption of services during shifting utilities i.e. water supply pipe, power cable, telephone cable.</li> <li>• Impact on occupational health and safety</li> </ul>	<ul style="list-style-type: none"> <li>• Protection of soil surfaces during construction.</li> <li>• Physical stabilization of erodable surfaces through turfing, planting a wide range of vegetation, and creating slope breaks</li> <li>• Providing / maintaining necessary temporary access</li> <li>• Planning traffic detour, delineating working zones from traffic zones, providing and maintaining necessary signage for warning and guiding traffic etc.</li> <li>• Early identification of presence of utilities and providing advance notice to utility agencies for shifting of the same with minimum disruption of services</li> <li>• Proper construction planning and site operation, delineating construction zones especially deep excavation, keeping local people away from operating construction equipment, conducting pre-construction information dissemination and awareness campaign with the local community about various construction activities and soliciting their cooperation besides introducing site supervisors, engineers to the community</li> <li>• Providing necessary personal protective equipment to all workers and enforcing their use</li> </ul>			
<ul style="list-style-type: none"> <li>• Transportati on of construction material</li> </ul>	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Spill of material on road</li> </ul>	<ul style="list-style-type: none"> <li>• Providing necessary water sprinkling on earthen haul road</li> <li>• All tippers / dumpers carrying earth, sand or stone will be always fitted with tailboards to prevent spilling</li> <li>• Materials shall not be loaded to a higher level than the side and tail boards and shall be covered with a</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Referred Table-4 of B.1

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
		clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend atleast 300mm over the edges of the side and tail boards			
<ul style="list-style-type: none"> <li>Operating construction vehicle and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Increased noise level due to operation of construction equipment</li> </ul>	<ul style="list-style-type: none"> <li>All construction equipment with adequate silencers, and regular maintenance of plant and machinery, avoid noise generating activities during particular periods (such as times of prayers, school hours, etc. adjacent to such areas), discontinue all operations during night as far as possible, provide ear plugs / ear muff to construction workers working in the vicinity of noisy equipment</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Engineering Cost
<ul style="list-style-type: none"> <li>Construction camp and operation of plants</li> </ul>	<ul style="list-style-type: none"> <li>Air pollution</li> <li>Water pollution</li> <li>Land pollution</li> </ul>	<ul style="list-style-type: none"> <li>Locating hot mix plant, concrete batching plant and crushers away from urban area</li> <li>Providing sedimentation tank for water scrubber of HMP (if used as dust control device)</li> <li>Prefer baghouse filter as pollution control devices for HMP</li> <li>Provide dust control and suppression measures for crusher such as installing water sprinkling system, covering conveyors etc.</li> <li>Carrying out routine maintenance and or replacement of dust control devices</li> <li>Carrying out regular maintenance of plant, equipment and vehicles</li> <li>Providing impervious platform and oil and grease trap for collection of spillage from construction equipment vehicle maintenance platform</li> <li>Collection of oil and lubes drips in container during repairing construction equipment vehicles</li> <li>Providing impervious platform and collection tank</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/ Engineering Cost

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
		<p>for spillage of liquid fuel and lubes at storage area</p> <ul style="list-style-type: none"> <li>• Strictly enforcement of not cleaning / washing construction equipment vehicles within any surface water body</li> <li>• Providing sewage collection and disposal system for all toilets and bathrooms</li> <li>• Providing surface water drain all around the camp and facilitating seepage into the ground through intermittent percolation chambers along the drain</li> <li>• Preventing disposal of wastewater into water bodies</li> </ul>			
<ul style="list-style-type: none"> <li>• Workers' camp</li> </ul>	<ul style="list-style-type: none"> <li>• Land pollution</li> <li>• Impact on health of workers</li> </ul>	<ul style="list-style-type: none"> <li>• Providing necessary water supply, sanitation, drainage and medical health facilities at campsite</li> <li>• Using working reverse horn for all construction equipment and construction vehicles such as tippers, dumpers, rollers.</li> <li>• Providing earth link circuit breaker (ELCB) for all electrical connections</li> <li>• Maintaining first aid at construction sites</li> <li>• Maintaining emergency response system</li> <li>• Conducting induction and periodic training for all workers and supervisors</li> <li>• Conducting periodic mock drilling on critical accident prone activities</li> <li>• Conducting periodic training for all personnel working at plant site</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Construction/Engineering Cost
	<ul style="list-style-type: none"> <li>• Personal Safety Measures for Labour</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor will provide:</li> <li>• Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cement, lime, mortars &amp; concrete etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Contractors Obligatory Requirements

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
		<ul style="list-style-type: none"> <li>Welder's protective eye-shields to workers who are engaged in welding works</li> <li>Protective goggles and clothing to workers engaged in stone breaking activities and workers will be seated at sufficiently safe intervals</li> <li>Earplugs to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.</li> <li>Adequate safety measures for workers during handling of materials.</li> <li>The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.</li> </ul>			
	<ul style="list-style-type: none"> <li>First Aid</li> </ul>	<p>The contractor will arrange for –</p> <ul style="list-style-type: none"> <li>a readily available first aid unit including an adequate supply of sterilized dressing materials</li> <li>availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital</li> <li>Equipment and trained nursing staff at construction camp.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Contractors Obligatory Requirements
<ul style="list-style-type: none"> <li>Borrow area identification and operation</li> </ul>	<ul style="list-style-type: none"> <li>Change of land use</li> <li>Converting usable land into waste land (land potential)</li> <li>Air pollution</li> <li>Change surface water hydrology</li> <li>Contaminate</li> </ul>	<ul style="list-style-type: none"> <li>Maximize use of cut material for filling / embankment</li> <li>Select borrow areas away from human habitation, water bodies, ecologically sensitive locations, sensitive areas (school, hospital)</li> <li>Avoid use of agriculture land, as far as possible</li> <li>Prefer river bed material</li> <li>Prepare operation and redevelopment plan based terrain, existing land use and local needs, as will be</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/Engineering Cost

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
	surface water	<p>agreed by the land owner and approved by the supervising Engineer</p> <ul style="list-style-type: none"> <li>Restrict operation as per agreed plan</li> <li>Rehabilitation of borrow area as per agreed plan</li> </ul>			
<ul style="list-style-type: none"> <li>Stone and sand quarry operation</li> </ul>	<ul style="list-style-type: none"> <li>Change of land use</li> <li>Creating environmental hotspot</li> </ul>	<ul style="list-style-type: none"> <li>Use licenced quarry only (as permitted by Ministry of Mines)</li> <li>Prefer river bed material, without affecting water flow</li> <li>Redevelop stone quarry area</li> <li>Adopt safety measures during blasting</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>PD&amp;C</li> <li>PST</li> <li>PMU/TSU</li> </ul>	Construction/Engineering Cost
<ul style="list-style-type: none"> <li>All onsite and off site operation</li> </ul>	<ul style="list-style-type: none"> <li>Impact on occupational health and safety</li> </ul>	<ul style="list-style-type: none"> <li>Providing and enforcing use of necessary PPEs.</li> <li>Using working reverse horn for all construction equipment and construction vehicles such as tippers, dumpers, roller.</li> <li>Providing earth link circuit breaker (ELCB) for all electrical connections</li> <li>Maintaining first aid at construction site, construction camp and workers' camp</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/Engineering Cost
<ul style="list-style-type: none"> <li>All construction activity at site</li> </ul>	<ul style="list-style-type: none"> <li>Impairment of public health and road safety</li> </ul>	<ul style="list-style-type: none"> <li>Providing and maintaining traffic management comprising diversion; warning, guiding and regulatory signage; channelisers and delineators; lighting, flagmen; dust control system as specified in the contract.</li> <li>Providing adequate light at construction zone if working during night time is permitted by the Engineer</li> <li>Consultation with local traffic police and soliciting their assistance in controlling traffic during construction, as will be necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/Engineering Cost

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
	<ul style="list-style-type: none"> <li>• Preservation of Trees</li> </ul>	<ul style="list-style-type: none"> <li>• Care should be taken to avoid felling of trees</li> <li>• All efforts will be made to preserve trees including evaluation of minor design adjustments/ alternatives to save trees.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Contractors obligatory requirement
	<ul style="list-style-type: none"> <li>• Water Pollution from Construction and Construction Wastes</li> </ul>	<ul style="list-style-type: none"> <li>• The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. Contractor will avoid construction works close to the streams or water bodies during monsoon.</li> <li>• All waste arising from the project is to be disposed off in the eco-friendly</li> <li>• The contractor will ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites will be located at least 500 m from rivers and irrigation canal/ponds</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Contractors obligatory requirement
<ul style="list-style-type: none"> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Air and Noise Quality</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels and comply with the relevant Standards</li> <li>• All plants and equipment used in construction shall strictly conform to the noise standards.</li> <li>• All vehicles and equipment used in construction will be fitted with exhaust silencers.</li> <li>• Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Contractors obligatory requirement
<ul style="list-style-type: none"> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Natural Vegetation and Wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• MPW-PIU</li> <li>• SC</li> </ul>	Contractors obligatory requirement

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
		fishing in any water body and hunting of any animal.			
<ul style="list-style-type: none"> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Chance Found Archaeological Property</li> </ul>	<ul style="list-style-type: none"> <li>All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</li> <li>The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Environmental Expert (EE) of SC of such discovery and carry out the EE instructions for dealing with the same, waiting which all work shall be stopped</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Contractors obligatory requirement
<ul style="list-style-type: none"> <li>Pedestrian Safety</li> </ul>	<ul style="list-style-type: none"> <li>Accident</li> </ul>	<ul style="list-style-type: none"> <li>This road is proposed in rural areas /barren areas and we have proposed pedestrian road only in Fayzabad along with all required road furniture's</li> <li>The contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the 'EO' or 'Resident Engineer' for the information and protection of traffic approaching or passing through the section of any existing cross roads.</li> <li>The contractor will ensure that all signs, barricades, pavement markings are provided as per the specifications.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/ Engineering Cost
<ul style="list-style-type: none"> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Accessibility</li> </ul>	<ul style="list-style-type: none"> <li>The contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Contractores Obligatory

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
		<p>and from roadsides and property accesses connecting the project expressway, providing temporary connecting road.</p> <ul style="list-style-type: none"> <li>The Contractor will take care that Schools and religious places are accessible to Public. The contractor will also ensure that the work on / at existing accesses will not be undertaken without providing adequate provisions and to the prior satisfaction of Environmental Expert of SC.</li> <li>The contractor will take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up one after one so that traffic movement in any given area not get affected much.</li> </ul>			Requirement
<ul style="list-style-type: none"> <li>Plantation</li> </ul>	<ul style="list-style-type: none"> <li>To improve the aesthetic beauty of the areas.</li> </ul>	<ul style="list-style-type: none"> <li>Due to water scarcity and problems of protecting the saplings against grazing, tree plantation along the road is not feasible at all the locations; however, plantation of 5000/ sapling are recommended only along the urban areas, like Fayzabad city and Beharak town to improve the aesthetic beauty of the areas.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Referred Table-4 of A.1
<ul style="list-style-type: none"> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Drainage</li> </ul>	<ul style="list-style-type: none"> <li>Contractor will ensure that no construction materials like earth, stone, ash or appendage is disposed off in a manner that blocks the flow of water of any water course and cross drainage channels. Contractor will take all-necessary measures to prevent any blockage to water flow. In addition to the design requirements, the contractor will take all required measures as directed by the 'EE-SC' and the 'Resident Engineer' to prevent temporary or permanent flooding of the site or any adjacent area.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Contractores Obligatory Requirement
<ul style="list-style-type: none"> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Disposal of debris from dismantling</li> </ul>	<ul style="list-style-type: none"> <li>The contractor shall identify disposal sites. The identified locations will be reported to the</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	Construction/Engineering

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
	structures and road surface	<p>Environmental Expert of SC. These locations will be checked on site and accordingly approved by Environmental Expert of SC prior to any disposal of waste materials.</p> <ul style="list-style-type: none"> <li>All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, will be considered incidental to the work and will be planned and implemented by the contractor as approved and directed by the Environmental Expert of SC.</li> <li>The pre-designed disposal locations will be a part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation and with approval of Environmental Expert of SC.</li> <li>Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area.</li> </ul>			Cost
<b>OPERATION AND MAINTENACE PHASE</b>					
<ul style="list-style-type: none"> <li>Increased vehicular volume and speed</li> </ul>	<ul style="list-style-type: none"> <li>Increased chances of accident</li> <li>Increase noise level</li> </ul>	<ul style="list-style-type: none"> <li>Prepare and implement plan for minimizing vehicular accident i.e. providing necessary traffic signage, pavement marking, speed breaker etc.</li> <li>Prohibiting use of air horn in populated and sensitive areas</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> <li>SC</li> </ul>	MPW routine monitoing Budget
<ul style="list-style-type: none"> <li>Seismic Hazards/ Flood/ Land Slide/ Drain / Culvert</li> </ul>	<ul style="list-style-type: none"> <li>Road Blockage/ Traffic Congestion</li> </ul>	<ul style="list-style-type: none"> <li>Periodic monitoring of PIU/MPW</li> <li>Periodic cleaning of culverts/ drain/ land slide area (if found during operation)</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> </ul>	<ul style="list-style-type: none"> <li>MPW</li> </ul>	MPW routine monitoing Budget

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities		Cost Estimate (in US\$)
			Implementing Agency	Supervision / Monitoring Agency	
<ul style="list-style-type: none"> <li>Monitoring and Management of Plated Trees</li> </ul>	<ul style="list-style-type: none"> <li>Survival Rate</li> </ul>	<ul style="list-style-type: none"> <li>Water/Weeding/Training/Pruning/ Replanting/</li> </ul>	<ul style="list-style-type: none"> <li>MPW-PIU</li> </ul>	<ul style="list-style-type: none"> <li>MPW</li> </ul>	<p>Referred Table-4 of A.1, After 2 years of plantation it will cover under MPW routine monitoring Budget</p>

**Table 3: Environmental Monitoring Plan**

Environmental Features / Attributes	Aspects to be monitored	Time and Frequency of Monitoring	Location	Responsibility	Cost Estimate (in US\$)
Air quality	Dust generation <ul style="list-style-type: none"> <li>▪ Is it impairing visibility?</li> <li>▪ Is it affecting vegetation?</li> <li>▪ Is the dust at construction zone such that vehicle can ply with open window?</li> <li>▪ Is any complaint on dust generation received?</li> </ul>	Daily during construction	All construction sites, plants location, borrow and quarry area	Contractor/ SC/MPW	Referred Table-4 of F.1
Noise level	Noise level <ul style="list-style-type: none"> <li>▪ Can two people communicate at a distance of 5m with without voice, at construction zone?</li> <li>▪ Is there any complaint from local community on noise?</li> <li>▪ Is construction activity generating high noise restricted near habitation during night time?</li> <li>▪ Are all equipment / vehicle having silencers / acoustic enclosure?</li> </ul>	Daily during construction	All construction sites, plants location, borrow and quarry area	Contractor/ SC/MPW	
Water quality	<ul style="list-style-type: none"> <li>▪ Is run-off from construction sites is allowed to enter water bodies directly without any silt-trap/catch-basin?</li> <li>▪ Is sediment deposit in receiving water bodies visible?</li> <li>▪ Is there any complaint on water contamination due to construction?</li> </ul>	Daily during construction	Water bodies located near to construction sites, plants location, borrow and quarry area	Contractor/ SC/MPW	
Vegetation / Trees	<ul style="list-style-type: none"> <li>▪ No. of trees exist before construction</li> <li>▪ No. of trees cut due to construction</li> <li>▪ Is fuel wood being used for fire?</li> <li>▪ No of trees planted and their survival rate</li> <li>▪ Is the vegetation clearance limited within construction zone only?</li> </ul>	During construction	Roadside, and all ancillary sites	Contractor/ SC/MPW	Referred Table-4 of A.1
Wild animal	<ul style="list-style-type: none"> <li>▪ Is any wild animal sighted at construction sites and camp sites?</li> <li>▪ Is any poaching of wild animal by workers reported?</li> </ul>	During construction	Roadside, and all ancillary sites	Contractor/ SC/MPW	Contractor obligatory requirements

<b>Environmental Features / Attributes</b>	<b>Aspects to be monitored</b>	<b>Time and Frequency of Monitoring</b>	<b>Location</b>	<b>Responsibility</b>	<b>Cost Estimate (in US\$)</b>
Occupation health & safety	<ul style="list-style-type: none"> <li>▪ No. of road accidents taken plan at construction sites</li> <li>▪ No. of accidents / mishap occurred amongst workers</li> <li>▪ Is there any outbreak of disease occurred at construction camp?</li> </ul>	During construction	Construction sites and all ancillary sites	Contractor/ SC/MPW	Contractor obligatory requirements
<b>Expenses of appointment of Environmental Officer/Expert for implementation of the EMP</b>					
Environmental Officer/ Expert - 1 No.	Expenses of appointment of Environmental Officer/Expert for implementation of the EMP	During Construction	-	-	91,200 (referred Table 4 of D)

**Table-4: Environmental Budget**

SL. NO.	ITEM DESCRIPTION	QUANTITY	UNIT	RATE (US\$)	AMOUNT (US\$)
A	<b>Tree Plantation</b>				
A.1	Plantation of trees as an enhancement including providing trees guard, plant will be planted in urban areas to improve the landscape (including maintenance for two years)	5000	No.	20	100,000
B	<b>Dust Suppression</b>				
B.1	Water sprinkling for dust suppression at construction zone. The frequency and period of water shall be as per the need to effectively suppress dust and as shall be instructed by the Engineer.	150	km	600	90,000
C	<b>Environmental Training</b>				
C.1	Training		Lump sum		5,000
D	<b>Environmental Officer</b>				
	A qualified Environmental Officer having international experience, as part of supervision consultant				
D.1	Remuneration	6	month	10000	60,000
D.2	Travelling (air fare)	6	RT	1000	6,000
D.3	Transportation at site	180	day	40	7,200
D.4	Per-diem (including boarding and lodging)	180	day	100	18,000
	Total				<b>91,200</b>
F	<b>Monitoring</b>				
F.1	Monitoring of Air, Water and Noise at Construction Camp-twice a year	6	No.	200	1,200
				<b>Total</b>	<b>287,400</b>