

Initial Environmental Examination

March 2012

PAK: Flood Emergency Reconstruction Project

Prepared by National Highways Authority for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 31 March 2012)

Currency unit	–	Pakistani Rupees (PRs)
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ABBREVIATIONS

ADB	Asian Development Bank
AOI	Area of Influence
BOD	Biological Oxygen Demand
CMS	Conservation of Migratory Species
COD	Chemical Oxygen Demand
COSHH	Control of Substances Hazardous to Health
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EALS	Environment Afforestation Land and Social
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPA's	Environmental Protection Agencies
ESIA	Environmental & Social Impact Assessment
FAO	Food and Agriculture Organization
CA	Cultivated Area
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
M&E	Monitoring and Evaluation
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NOC	No-Objection Certificate
O&M	Operation and Maintenance
NCBP	New Chakdara Bridge Project
NHA	National Highway Authority
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protections Council
PHS	Public Health and Safety
PMU	Project Management Unit
PPE	Personal Protective Equipment
RSC	Residual Sodium Carbonate
SAR	Sodium Adsorption Ratio
SFA	Social Frame Work Agreement
SMO	SCARPS Monitoring Organization
SOP	Survey of Pakistan
SOP	Soil Survey of Pakistan
TDS	Total Dissolved Solids
US-EPA	United States Environmental Protection Agency
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WWF	Worldwide Fund for Nature

NOTES

- (i) The fiscal year (FY) of the Government of the Islamic Republic of Pakistan and its agencies ends on 30 June.
- (ii) In this report, "\$" refers to US dollars.

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NEW ROAD CONSTRUCTION PROJECT (N-15)

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

IEE REPORT

March 2012

Submitted to



ASIAN DEVELOPMENT BANK

Submitted by



NATIONAL HIGHWAY AUTHORITY (NHA)

NHA HQ, 27, Mauve Area, G-9/1, Islamabad

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LIST OF ABBREVIATION

ADB	Asian Development Bank
AOI	Area of Influence
BOD	Biological Oxygen Demand
CMS	Conservation of Migratory Species
COD	Chemical Oxygen Demand
COSHH	Control of Substances Hazardous to Health
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EALS	Environment Afforestation Land and Social
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
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ESIA	Environmental & Social Impact Assessment
FAO	Food and Agriculture Organization
CA	Cultivated Area
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
M&E	Monitoring and Evaluation
NCS	National Conservation Strategy
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NOC	No-Objection Certificate
O&M	Operation and Maintenance
NCBP	New Chakdara Bridge Project
NHA	National Highway Authority
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protections Council
PHS	Public Health and Safety
PMU	Project Management Unit
PPE	Personal Protective Equipment
RSC	Residual Sodium Carbonate
SAR	Sodium Adsorption Ratio
SFA	Social Frame Work Agreement
SMO	SCARPS Monitoring Organization
SOP	Survey of Pakistan
SOP	Soil Survey of Pakistan
TDS	Total Dissolved Solids

US-EPA	United States Environmental Protection Agency
WAPDA	Water and Power Development Authority
WHO	World Health Organization WWF Worldwide Fund for Nature

EXECUTIVE SUMMARY

THE PROJECT

1. New Road Construction will be 240 Km long and will be located Mansehra-Naran-Jalkhad-Chilas on N-15. It is an important road which serves the entire area from Manshera to Chilas. Due to unprecedented floods of August 2010 and earthquake on 2005, road has been badly damaged all along over River Kunhar.

2. All the Northern Pakistan including project area of Manshera, Naran, Kaghan, Jalkhad and Chilas is tectonically a part of Himalayan range. The region is weak and flexible portion of earth cut and a series of folds, faults and thrusts, as a result of which the whole area in the region have high dips. Himalayas have tectonic origin and has been divided in to three regions.

3. Therefore, NHA has planned New Road Construction of N-15 with improved specifications to withstand future mega floods and earthquakes.

4. The Project activity will consist of the following:

- Construction of the new road
- Rehabilitation of old bridge
- Construction of new bridges
- Construction activities
- Labour Camps
- Construction waste disposal

5. For the purpose of the above an Initial Environmental Examination (IEE) Report has been prepared to ensure the following objectives:

- Apply ADB's Environment safeguards
- The applicable environmental administrative and legal frame work on the project
- Environmental & social base line data of the project area of influence (AOI)
- Assessment of potential environmental impacts and determining mitigation measures of expected adverse impacts

6. Develop a basic Environmental Management Plan (EMP) Framework (inclusive of all major environmental aspects and risk bases assessment plan) and envisaged EMP implementation cost.

7. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

8. The “no project” option is considered inappropriate. In view of the long term and wide spread benefits of safe and a long term from New Road Construction of N-15.

Legal and Administration Framework Policy

9. According to ADB Safeguard Policy Statement (SPS) 2009, projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigable, temporary, nature and localized. Also there is no environmentally sensitive or archeological site falling within project area of influence; therefore the project is classified as Category B.

10. The nature and scope of work and the environmental setting of the AOI (established through REA Checklist) indicates that there will neither be any significant adverse impact to the environment nor there would be any irreversible ecological damage due to the project activities. All the adverse impacts either would be temporary or would be easily mitigable. The projects benefits on the other hand would easily outweigh any small and temporary adverse impacts. The project will have significant positive environmental and social benefits by uplifting the aesthetics of the area and also through providing better efficiency.

Description of the Environment

11. The project area of influence (AOI) is the area likely to be effected by the project, including all its ancillary aspects such as power transmission corridors, pipelines, canals and access roads, borrow & waste disposal sites, batching plant and labor camp as well as unplanned development induced by the project. The populated areas near the proposed projects are as follows:

Atar sheesha	Balakot
Bali	Bari
Basiya	Basti kalandar abad
Bhuncha	Chata bata
Damagla	Dhari
Darah abad Lambi dhari	Fareed abad
Feroz abad	Hassam abad
Jaba	Kamal bin
Khania	Khariyan
Kholian	Malkandi
Mansehra	Oochri
Paghla	Paras
Rajwal naran	Safa
Sahwal najaf	Sangar
Sehwai	Sheenu
Usman abad	

12. River Kunhar is the main source of surface water. There is existence of small water spring from uphill's which are ultimately falling into river Kunhar. These springs are source of drinking water for the locals.

13. The socio-economic structure of project area is primarily business community based of tourism. The Community economy depends upon season earning from tourism. 100 % populations are Muslims. The ratio of female population is lower than male i.e. male 60%: female 40%. Average family size is about 10 members with a range between 4 – 15 members per household. Mostly the families are used to live in a joint family system. The age of around 50% of the farmers engaged in farming fell between 20 – 60 years. General trend in the younger age groups is to diversify away from agriculture.

14. Social consultations were carried out with officials and local communities. The aim was to solicit views on the proposed project and incorporate their concerns, demands and needs into Environmental Management Plan (EMP) and Social Framework Agreement (SFA). Indirect women consultations were carried out to incorporate gender issues in the social assessment. The idea of New Road Construction of N-15 was hailed by almost all the interviewees. The flora of the project area can be divided into two parts i.e. riverian Flora and inland Flora.

Environmental Impacts and Mitigation Measures

15. Most of the adverse environmental and social impacts of the Project will be associated with the construction phase. Except for resettlement issues which would need to be addressed carefully, the remaining impacts associated with the construction phase will be temporary, reversible, phased over a period of time, localized and manageable.

16. The air quality was analysed and found reasonably clean and no any obvious source of air pollution was located in the vicinity of the project area of influence. However there are kacha paths and may cause dust pollution during traffic movement. Air quality shall be controlled by regular spraying of water on kacha paths. All vehicles, machinery, equipment and generators used during construction activities will be kept in good working conditions to minimize the exhaust emissions. Cutting & burning trees and shrubs as a fuel shall be prohibited and clean source of energy should be provided at the contractor's camp e.g. gas cylinders etc. Noise, air quality and water sources shall be monitored periodically, as specified in IEE report. All the work activities should be restricted within the allowed working hours.

17. There is not any designated environmentally protected or archaeological site falling within the direct project area of influence. The Project will not have any significant impacts on fish, fishermen communities, wildlife and wildlife habitat. However, monitoring measures have been recommended to ensure that any unforeseen impacts can be identified, compared with baseline and mitigated during the implementation stage. All forest, wildlife and fisheries laws should be fully respected and abided by the contractor and his work force. No fire arms should be carried out by the contractor's work force.

18. During construction, the Contactor's work force is expected to be largely available from the local population, which will enhance the economic opportunities for the

locals of working age group. Socioeconomic conditions of the project area will generally have positive impacts due to the project implementation i.e. availability of jobs during construction phase.

19. The Project will also improve some of the social infrastructure as part of the repair and rehabilitation. The representation of women and other vulnerable groups will be ensured in the Project benefits.

20. It is very important to protect the water sources during the construction phase from accidental spills of diesel or any chemical, as any spill could percolate to the groundwater through the sandy stratum at site. All the solid waste and wastewater generated from the project activities and contractor camp shall be disposed-off according to the waste disposal plan, which would be a component of the EMP.

21. The proposed project will bring about a net-positive benefit in terms of improvement of the area. Continuous environmental monitoring will be carried out for the entire construction phase, to ensure due diligence of environmental performance. The EMP will also ensure reporting of all non-conformances and their rectification within a specified period of time along with safety, health and environment (SHE) audits

CONCLUSION

22. It is anticipated that all environmental and social issues involved during the construction and operational phase of the project are manageable, therefore it is concluded that the project is environmentally friendly, financially viable, economically sustainable, generally neutral and pro-poverty alleviation.

1. INTRODUCTION

1.1 GENERAL

23. The National Highway 15 or N-15 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It is often used as a bypass for the N-35 and connects the cities of Mansehra and Chilas. It is also popular among tourist who visit Naran and the surrounding areas. N-15 mainly covers the area of Mansehra, Naran, Jalkhad and Chilas. N-15 passes from Mansehra-Naran-Jalkhad-Chilas having total length of about 240 km in which NWFP covers 175 km and 65 km lies in Gilgit-Baltistan .

24. Khyber Pakhtunkhwa (KP) locally Pakhtunkhwa formerly known as the North-West Frontier Province (N.W.F.P) and various other names, is one of the four provinces of Pakistan, located in the north-west of the country. It borders Afghanistan to the north-west, Gilgit-Baltistan to the north-east, Azad Kashmir to the east, the Federally Administered Tribal Areas (FATA) to the west and south, Balochistan to the south and Punjab and the Islamabad Capital Territory to the south-east.

25. The main ethnic group in the province is the Pashtuns; other smaller ethnic groups include most notably the Hazarewals and Chitralis. The principal languages are Pashto, locally referred to as *Pukhto*.

26. Asian Development Bank (ADB) is providing financial assistance for the following activity:

- Construction of the N-15 road passes from Mansehra-Naran-Jalkhad-Chilas.

27. National Highway Authority (NHA) will execute and supervise the construction work of the Road.

1.2 PROJECT DETAILS

28. NHA has planned to construct the existing N-15 passes from Mansehra-Naran-Jalkhad-Chilas having total length of about 240 km in which NWFP covers 175 km and 65 km Gilgit-Baltistan .

29. This report comprises the Initial Environmental Examination (IEE) study of the National Highway N-15. The IEE study takes into account the natural environment (air, water, land, flora & fauna), human health and safety. This study evaluates the project's potential environmental risks and impacts in its areas of influence and outlines planning, designing and implementation by preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts

throughout project implementation. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures

30. The Social Assessment (SA) has been conducted to evaluate the project's potential positive and adverse effects on the affected people and to examine project alternatives where adverse effects may be significant. The breadth, depth and type of analysis in the social assessment are proportional to the nature of the project and scale of its potential effects, positive or adverse, on the affected people.

1.3 BACKGROUND

31. The N-15 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It is often used as a bypass for the N-35 and connects the cities of Mansehra and Chilas. It is also popular among tourists who visit Naran and the surrounding areas. Chilas is surrounded by wonderful Petroglyphs, which are easy to access, though be prepared for high temperatures and take plenty of water. There is a sign to the 'Chilas II' site near the KKH police checkpoint. Less than 1km down a jeep track there is a huge rock covered with hunting and battle scenes and Buddhist stupas. A common image is the long-horned ibex, ancient symbol of fertility and abundance, and an elusive trophy animal even now.

32. On a rocky knoll facing the river are the oldest inscriptions, from the 1st century AD: scenes of conquest and stories of the Buddha's life. Four kilometres east beside the jeep bridge to Thalpan is the 'Chilas I' site, with art found on both sides of the Highway and the river. The most striking pictures are of a large stupa with banners flying, close to the Highway; and mythical animals, battle scenes, royal lineages and Buddhist tales, across the river on dozens of rocks west of the track.

33. There are a number of important and historical places in Mansehra. Kaghan is famous for its pleasant climate in summer when tourists come to watch its beautiful views. Then comes Balakot, which has a great significance in the history of Hazara with special reference of Syed Ahmed Shaheed's movement. The other well-known villages and towns are Mansehra, Baffa, Shinkiari, Dhodial, Battal, Bhogarmang, Phulra (chief village of the former Phulra state), Oghi, Shergarh (the summer headquarters of the former Nawab of Amb), Darband (former centre of Amb state), Gulibagh (capital of former Pakhli Sarkar), Ghari, Habibullah, Jabori, Chutter, Dadar, Khaki and Kaladhaka.

Ashoka, a great king of Mourya dynasty, used various Medias to communicate his message to his subject. The rock inscription is one of them. These lie at Lohar Banda (Mansehra) on both sides of Karakorum Highway. There are thirteen edicts on three rocks which contain his code of conduct and proposed behavior of his subjects. These inscriptions were incised in beautifully cut letters but were exposed to centuries of wind, sun and rain and now are barely visible. Recently Archaeology department sheltered them by tin sheets for preservations.

34. The Barreri hills are a regular and interesting feature of Mansehra landscape but its historical importance is far greater than the geographical one. Barreri, Kashmir Durga or Bhattarika Devi is a female deity in the Hindu mythological pantheon. Here the Bareri Mata is a combination of rocks situated on top of hill. There are two main rocks, one of them of 30-40 feet. One of them takes the shape of basin which collects rain water when the water is poured from the rocks fissure; it was treated as Holy milk by the believers. The other rock lays supine and jutting outward. A fair Durga Ashtami was held twice a year, once in chat (March-April) and the other in Assu (October). This practice is cut down after the creation of Pakistan.

35. Gulibagh was a beautiful and lively city of Medieval age and was a cantonment and capital of "Pakhly Sarkar". It was a planned city and constructed by wood work. There were double and storey buildings in this ancient city. When swati lashkar attacked this state in 1703, they burnt the whole city into ashes. There are some relics of the city but no authentic and informative thing about that period is available except the tomb of Diwan Raja Baba. This is a squared shaped Mausoleum with a round dome and was in this premise of firoza fort. There is an emerald green well called Bara Dab which was a source of water and now considered as a peninsula for many skin diseases. A fair is held near the shrine on both Eids.

36. Balakot is not a new name for the students of history. It has a great significance in many respects. It was the former headquarter of Mujahideen Movement and Syed Ahmed Shaheed along with his three hundred lieutenants bravely sacrifice their lives near this village. The shrines of Syed Badshah and his chief lieutenant Shah Ismail Shaheed lies in the heart of this village. There is another shrine, the origin of which is not clear but according to Hindus it was the sitting place of Bhai Bala, a disciple of Grunantik, while the Muslim derived its origin from Hazrat Hayat-ul-Amir, a saint of old times. The nearby spring is considered as a treatment for Leprosy. A leprosy hospital is also established by the government. Beside its historical importance, Balakot is a beautiful tourist resort on the left bank of Kunhar. It is a gateway to far famed Kaghan Valley. There is a stone weighing about 240 pounds in the rest house of Balakot,

according to folk story (lorey) a Gujari Maryan used to swim through Kunhar river with this stone. Inevitable she drowned into river. Besides these places there are many spots in this District which can be of archaeological importance but have remained unexplored so far. Recently research is started near Shinkiari in some old relics. Similar results can be obtained in other areas in the District.

1.4 PROJECT LOCATION

37. N-15 passes from Mansehra-Naran-Jalkhad-Chilas having total length of about 240 km in which NWFP covers 175 km and 65 km Gilgit-Baltistan . It connects the cities of Mansehra and Chilas. It is also popular among tourist who visit Naran and the surrounding areas. It is proposed to construct a new road on N-15.



Figure-1.1: Location Map of the Proposed Project on N-15

1.5 PROJECT CATEGORIZATION

38. According to ADB Safeguard Policy Statement (SPS) 2009, projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigable, temporary, nature and localized. Also there is no environmentally sensitive or archeological site falling within project area of influence; therefore the project is classified as Category B. This report comprises the Initial Environmental Examination (IEE) of the proposed project to fulfill the requirements according to ADB's guidelines.

1.6 OBJECTIVES OF THE REPORT

39. The main objectives of the report are as follows:

- The application of environmental administrative and legal frame work on the project
- Develop Environmental Baseline Data for the project Area of Influence (AOI); derive land use and environmental maps.
- Assessment of potential environmental Impacts and development of mitigation measures to cater for adverse impacts.
- Preparation of framework of Environmental Management Plan (EMP) and envisaged EMP implementation cost for this project.
- Environmental approval from government agency; Environmental Approval for the construction of National Highway (N-15).

1.7 METHODOLOGY OF PERFORMING THE STUDY

40. The environmental and social data were collected and analyzed for the overall environmental study area. Data was collected during site visits and stake holder consultation works. The concerned departments and institutions are Wildlife, Forestry & Fishery Department, Water Management Office, Irrigation, NHA and Land Revenue etc.

41. The base line data was developed and analyzed to identify potential environmental impacts of the Project. A risk based methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures. Public consultations were also undertaken including a gender study to take into account the public point of view about the project.

1.8 ENVIRONMENTAL AND RESETTLEMENT ISSUES

42. The project activities include construction of National highway N-15. This will cause some disturbance due to construction activities on the main site and the allied sites involving borrow material, camping grounds, material dump, machinery yard, and necessary facilities for the staff and labor to be engaged for the construction of the project. The materials and labor shall have to be carried from the Depot/camp to the work sites. There is no such irreversible adverse environmental impact of the project but the construction-related impacts such as air pollution, noise and use of community

resources can be well mitigated through the proper implementation of the mitigation measures, which have been identified in this report. The construction of road is within the Govt. land, so no private land or property acquisition will be involved anywhere during construction.

1.9 STRUCTURE OF THE REPORT

43. This report is divided into following chapters:

Chapter No.1:	Introduction
Chapter No. 2:	Policy, Law and Administrative Framework
Chapter No. 3:	The Project Description
Chapter No. 4:	Environmental Baseline Conditions
Chapter No. 5:	Study of Alternatives
Chapter No. 6:	Public Consultation
Chapter No. 7:	Impact Assessment, Mitigation and Enhancement Measures
Chapter No. 8:	Outline of Environmental Management Plan
Chapter No. 9:	Grievance Redress Mechanism
Annexures:	

2. LEGAL AND ADMINISTRATIVE FRAMEWORK POLICY

44. This chapter provides an overview of the policy framework and national legislation that applies to the proposed Project. The Project is expected to comply with all national legislations and Asian Bank Guidelines relating to environmental and social issues, and all the required regulatory clearances will be obtained.

45. The environmental study includes primarily Pakistan Environmental Protection Act 1997 (PEPA 1997), Pakistan IEE and EIA review regulations (2000) and Asian Development Bank SPS. All other laws and guidelines relevant to the project have also been reviewed. Synopses of relevant laws and guidelines are provided in this chapter.

2.1 REGULATORY REQUIREMENTS IN PAKISTAN

46. Under section 12 (with subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule I (SRO 339(1)/2000), requires the proponent to file an IEE with concerned federal agency (Pak-EPA). Projects falling under any category specified in schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the lodging of IEE or EIA, the federal agency will confirm that the document submitted is complete for the purpose of review.

2.2 NATIONAL CONSERVATION STRATEGY

47. The Pakistan National Conservation Strategy (NCS) was approved by federal cabinet in March 1992 and is the principal policy document on environmental issues in the country. The NCS outlines the country's primary approaches towards encouraging sustainable development, conserving natural resources and managing resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed Project are pollution prevention and abatement, conserving biodiversity and preservation of cultural heritage.

2.3 NATIONAL ENVIRONMENT POLICY

48. The National Environmental Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh

water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives directions for addressing the cross sectoral issues elaborating the underlying causes of environmental degradation and international obligations. The policy provides broad guidelines to the Federal Government, Provincial Government, Federally Administrated Territories and Local Government for addressing environmental concerns and ensuring effective management of their environmental resources.

2.4 GUIDELINES FOR ENVIRONMENTAL ASSESSMENT

49. The Pak-EPA has published set of environmental guideline for conducting environmental assessment and the environmental management of different types of development projects. The guidelines relevant to the proposed Project are listed below.

2.4.1 Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997

50. The guidelines, targeted at project proponents, specify:

- The nature of the information to be included in environmental reports
- The minimum qualification of the EIA conductors appointed
- The need to incorporate suitable mitigation measures during project implementation
- The need to specify monitoring procedures

51. The report must contain baseline data relating to the project area, an interpretation of the data and mitigation measures.

2.4.2 Guidelines of Public Consultation, Pakistan Environmental Protection Agency, May, 1997

52. These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensure that their concerns are incorporated in any impact assessment study.

2.5 ENVIRONMENTAL INSTITUTIONS AND THEIR RESPONSIBILITIES

2.5.1 Provincial EPA

53. National Highway Authority (NHA) will be responsible for providing the complete environmental documentation required by the provincial EPA and remain committed to the approved project design. No deviation is permitted during project implementation without the prior and explicit permission of the EPA.

2.5.2 Provincial Departments of Forestry and Wildlife

54. Wildlife department nominates any sensitive wildlife area as game reserve or highly sensitive area as wildlife sanctuary. A competent person should manage the work activities in wildlife sensitive areas to minimize any adverse impacts on wildlife habitat. However no environmentally sensitive area has been identified within the direct influence of the project activities.

2.5.3 Local Government and Municipalities

55. The NHA and its contractors must ensure that the project meets the criteria of district governments as related to the establishment of construction camps and plants, and the safe disposal of wastewater, solid waste and toxic materials. The NHA will coordinate and monitor environment-related issues.

2.5.4 Environment Afforestation Land and Social (EALS)

56. National Highway Authority (NHA) has established an Environment Afforestation Land and Social unit to address the environmental and social issues in a timely and effective manner during operation, maintenance, rehabilitation, and construction activities. EALS has developed checklists for rehabilitation and construction works. EALS may also be involved as an independent environmental monitoring organization during construction phase of this Project.

2.5.5 Environment-Related Statutes

57. This section outlines statutes apart from the Pakistan Environmental Protection Act, 1997, which are relevant to the project.

- **The Forest Act, 1927 (and Provincial Acts and Rules)**

58. The Act, inter alia, deals with the matters related with protection and conservation of natural vegetation/habitats. It empowers the concerned agency to declare protected and reserved forest areas and their maintaining. In spite of the fact that it recognizes the right of people for access to the natural resources for their household use, it prohibits unlawful cutting of trees and other vegetation from forest reserve area. The permission is required prior to undertake any tree cutting from the Forest Department. No tree cutting is envisaged during the project activities.

- **Provincial Wildlife (Protection, Preservation, Conservation and Management) Act, Ordinances and Rules**

59. In addition to empowering provincial wildlife department to establish game reserves, parks, and wildlife sanctuaries, these acts regulate the hunting and disturbance of wildlife. This law will help in eliminating any trespassing into protected areas.

- **Antiquities Act, 1975**

60. The Antiquities Act relates to the protection, preservation and conservation of archaeological/historical sites and monuments. There are no archeological site(s) or cultural heritage site inside or in the AOI of the project. Nevertheless if there is chance find during the construction phase this law would provide due guidance.

- **Provincial Local Government Ordinances, 2001**

61. These ordinances, issued following the devolution process, establish regulations for land use, conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

- **Factories Act, 1934**

62. The clauses relevant to the project are those that are related with the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public property. The Factories Act also provides regulations for handling and disposing of toxic and hazardous materials. There are no factories / industries inside the project area.

- **Land Acquisition Act 1894**

63. Land Acquisition Act (LAA), 1894 is the primary law governing land acquisition in Pakistan. For the acquisition of land, the above-mentioned Act, rules and regulations are followed. No land acquisition is required for the project.

2.6 ASIAN DEVELOPMENT BANK GUIDELINES

64. The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 require that environmental considerations be incorporated in to ADB's funded project to ensure that the project will have minimal environmental impact and be environmentally sound. Occupational health & safety of the local population should also be addressed as well as the project workers as stated in SPS. A Grievance Redress Mechanism to receive application and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance is also established and provided in chapter 9.

- **Environment Categorization**

65. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA), consisting of questions relating to (i) the sensitivity and vulnerability of environmental resources in project area, and (ii) the potential for the project to cause significant adverse environmental impacts. Projects are classified into one of:

Category A: Projects with potential for significant adverse environmental impacts. An Environmental Impact Assessment (EIA) is required to address significant impacts.

Category B: Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An initial environmental examination (IEE) is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

Category C: Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

Category FI: Projects are classified as category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary.

The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

2.7 NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)

66. The NEQS specify the following standards:

- Maximum allowable concentration of the Pollutants, (32 parameters) in emission and liquid industrial effluents discharged to inland water.
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emission.
- Maximum allowable exhaust emissions and noise emission from vehicles.
- Maximum allowable noise level from vehicles
- Maximum allowable limits for Drinking Water
- Maximum allowable limit for Ambient Air Quality

Table - 2.1: Effluent Discharge Standards (NEQS 2000) Applicable to the Works

Sr. No.	Determinant	NEQS
1	Temperature	40 °C \leq 3 deg.
2	pH	6 – 9
3	BOD5	80 mg/l
4	Chemical Oxygen Demand (COD)	150 mg/l
5	Total Suspended Solid (TSS)	200 mg/l
6	Total Dissolved Solids	3500 mg/l
7	Grease and Oil	10 mg/l
8	Phenolic compounds (as phenol)	0.1 mg/l
9	Ammonia	40 mg/l
10	Chlorine	1.0 mg/l
11	Chloride	1000.0 mg/l
12	Sulphate	600 mg/l
13	Manganese	1.5 mg/l
14	Fluoride	10 mg/l
15	Cyanide (as CN') total	1.0 mg/l
16	An-ionic detergents (as MB As)	20 mg/l
17	Sulphide (S-2)	1.0 mg/l
18	Pesticides	0.15 mg/l
19	Cadmium	0.1 mg/l
20	Chromium trivalent and hexavalent	1.0 mg/l
21	Copper	1.0 mg/l

Sr. No.	Determinant	NEQS
22	Lead	0.5 mg/l
23	Mercury	0.01 mg/l
24	Selenium	0.5 mg/l
25	Nickel	1.0 mg/l
26	Silver	1.0 mg/l
27	Total Toxic metals	2.0 mg/l
28	Zinc	5.0 mg/l
29	Arsenic	1.0 mg/l
30	Barium	1.5 mg/l
31	Iron	8.0 mg/l
32	Boron	6.0 mg/l

Table – 2.2: National Environmental Quality Standards for Gaseous Emission (mg/Nm³, Unless Otherwise Defined)

Sr. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke Opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate Matter (I)	(a) Boilers and Furnaces (i) Oil fired (ii) Coal fired (iii) Cement Kilns (b) Grinding, crushing, clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	300 500 200 500	300 500 200 500
3.	Hydrogen Chloride	Any	400	400
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen	Any	10	10

	Sulphide			
7.	Sulphur Oxide (2) (3)	Sulfuric acid/ Sulphonic acid plants Other plants except power plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen (3)	Nitric acid manufacturing unit. Other plants except power plants operating on oil or coal: Gas fired Oil fired Coal fired	400 - -	400 600 1200

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent sulphur content in fuel. Higher content of Sulphur will case standards to be pro-rated.
3. In respect of emissions of sulphur dioxide Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards.

Table - 2.3: NEQS, 2009 for Vehicular Emission

Sr. No.	Parameter	Standard (Maximum permissible Limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide (CO)	6%	Under idling condition: Non-dispersive infrared detection through gas analyzer.	
3	Noise	85 dB(A)	Sound Meter at 7.5 meters from the source	

Table - 2.4: National Environmental Quality Standards (NEQS, 2010) for Noise

Sr. No.	Category of Area / Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2013	
		Limit in dB (A) Leq*			
		Daytime	Night-time	Daytime	Night-time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Daytime hours: 6:00 a.m. to 10:00 p.m.
2. Night-time hours: 10:00 p.m. to 6:00 a.m.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters round hospitals, educational institutions and courts.
4. Mixed categories of areas may be decided as one of the four above mentioned categories by the competent authority.

*dB (A) Leq: Time weighted average of the level of sound in scale "A" which is relatable to human hearing.

Table – 2.5: National Environmental Quality Standards (NEQS, 2010) for Drinking Water

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
BACTERIAL				
1	All water is intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
2	Treated water entering the distribution system (E.Coli or Thermotolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
3	Treated water entering the distribution system (E.Coli or Thermotolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Most Asian Countries also follow WHO Standards
PHYSICAL				
4	Colour	≤15 TCU	≤15 TCU	
5	Taste	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
6	Odour	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable	
7	Turbidity	<5 NTU	<5 NTU	
8	Total hardness as CaCO ₃	<500mg/l	---	
9	TDS	<1000	<1000	
10	pH	6.5-8.5	6.5-8.5	
RADIOACTIVE				
11	Alpha Emitters bq/L or pCi	0.1	0.1	
12	Beta Emitters	01	01	

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
CHEMICAL				
Essential Inorganics		mg/litre	mg/litre	
13	Aluminum (Al) mg/l	≤0.2	0.02	
14	Antimony (Sb)	≤0.005	0.02	
15	Arsenic (As)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
16	Barium (Ba)	0.7	0.7	
17	Boron (B)	0.3	0.3	
18	Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing Countries
19	Chloride (Cl)	<250	250	
20	Chromium (Cr)	≤0.05	0.05	
21	Copper (Cu)	2	2	
Toxic Inorganics		mg/litre	mg/litre	
22	Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to most Asian developing Countries
23	Fluoride (F)	≤1.5	1.5	
24	Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
25	Manganese (Mn)	≤0.5	0.5	
26	Mercury (Hg)	≤0.001	0.001	
27	Nickel (Ni)	≤0.02	0.02	
28	Nitrate (NO ₃)	≤50	50	
29	Nitrite (NO ₂)	≤3	3	
30	Selenium (Se)	0.01	0.01	
31	Residual Chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	---	
32	Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing Countries
Organics				
33	Pesticides mg/L	---	PSQCA No. 4629-2004, Page No.4, Table No. 3, Serial	Annex-II

Sr. No.	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
			No. 20-58 may be consulted	
34	Phenolic Compounds (as Phenols) mg/L	---	≤0.002	
35	Poly nuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	

***PSQCA: Pakistan Standards Quality Control Authority

Table – 2.6: National Environmental Quality Standards (NEQS, 2010) for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of Measurement
		Effective from 1st July 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO ₂)	Annual Average*	80µg/m ³	80µg/m ³	Ultraviolet Fluorescence Method
	24 hours**	120µg/m ³	120µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40µg/m ³	40µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40µg/m ³	40µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40µg/m ³	40µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80µg/m ³	80µg/m ³	
Ozone (O ₃)	1 hour	180µg/m ³	130µg/m ³	Non disperse UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m ³	360µg/m ³	High Volume Sampling, (Average flow rate not less than 1.1m ³ /minute)
	24 hours**	550µg/m ³	500µg/m ³	
Respire able Particulate Matter (PM ₁₀)	Annual Average*	200µg/m ³	120µg/m ³	β-Ray Absorption Method
	24 hours**	250µg/m ³	150µg/m ³	
Respire able Particulate Matter (PM ₂₅)	Annual Average*	25µg/m ³	15µg/m ³	β-Ray Absorption Method
	24 hours**	40µg/m ³	35µg/m ³	
	1 hour	25µg/m ³	15µg/m ³	

Lead (Pb)	Annual Average*	1.5µg/m ³	1µg/m ³	AAS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2µg/m ³	1.5µg/m ³	
Carbon Monoxide (CO)	8 hours**	5µg/m ³	5µg/m ³	Non Dispersive Infrared (NDIR) method
	1 hour	10µg/m ³	10µg/m ³	
*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform intervals.				
**24 hourly/8 hourly values should be met 98% in a year. 2% of the time, it may exceed but not on two consecutive days.				

2.8 INTERNATIONAL CONVENTIONS

67. Pakistan is signatory to a number of International Conventions, Protocols and Understandings relating to the environment. Those relevant to the project are described in the following paragraphs.

- **Convention on Biological Diversity**

68. The Convention of Biological Diversity was the outcome of the “Earth Summit” held in Rio-de-Janeiro in 1992. The Convention binds the signatories to respect, protect and conserve the earth environment and bio-diversity through sustainable use of natural resources. In all development projects in Pakistan the protocols of this convention are respected in letter and spirit.

- **Ramsar Convention**

69. The Convention on Wetland of International Importance, especially on Waterfowl Habitats held in Iran in 1972 at village Ramsar in Iran, places an obligation on the signatories to protect habitats of migratory waterfowl. There is no notified Ramsar site within the AOI of the project.

- **Bonn Convention**

70. The Convention on the conservation of migratory species of wild animals was held in Bonn in 1979. The Convention broadens the scope of Ramsar to include migratory species other than water fowl. Not being a Ramsar site, this protocol is not obligatory for N-15 Road Project. But it will be respected during construction phase to the extent that no damage is caused to habitat of any species.

3. THE PROJECT

3.1 GENERAL

71. The National Highway 15 or N-15 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It is often used as a bypass for the N-35 and connects the cities of Mansehra and Chilas. It is also popular among tourist who visit Naran and the surrounding areas

72. The project area of influence (AOI) is the area likely to be effected by the project, including all its ancillary aspects such as power transmission corridors, pipelines, canals and access roads, borrow & waste disposal sites, batching plant and labor camp as well as unplanned development induced by the project.

73. The populated areas near the proposed projects are as follows:

- | | |
|-----------------------|----------------|
| • Mansehra | • Hasaham abad |
| • Darah abad | • Safa |
| • Lambi dhari | • Sangar |
| • Chata bata | • Dhari |
| • Feroz abad | • Kholian |
| • Basti kalandar abad | • Sehwai |
| • Usman abad | • Paras |
| • Atar sheesha | • Malkandi |
| • Paghla | • Fareed abad |
| • Jaba | • Bhuncha |
| • Damagla | • Sheenu |
| • Basiya | • Oochri |
| • Sahwal najaf | • Kamal bin |
| • Balakot | • Bari |
| • Bali | • Khandia |
| • Khariyan | • Rajwal naran |

74. River Kunhar is the main source of surface water. People mostly rely on water springs of mountains for drinking purposes & others, which are ultimately falling into river kunhar.

3.2 OBJECTIVES OF THE PROJECT

75. Main objectives of the N-15 Road Project are as follows:

- Construction of the N-15 passes from Mansehra-Naran-Jalkhad-Chilas.

3.3 DESCRIPTION OF THE PROJECT

76. NHA has planned to construct the existing N-15 passes from Mansehra-Naran-Jalkhad-Chilas having total length of about 240 km in which NWFP covers 175 km and 65 km Gilgit-Baltistan. The N-15 is a highway located in the Khyber Pakhtunkhwa province of Pakistan. It connects the cities of Mansehra and Chilas. It is also popular among tourists who visit Naran and the surrounding areas.



Figure – 3.1: Location Map of the Proposed Project

3.3.1 Project Activities

77. The Project activity will consist of the following:

- Construction of the N-15 road
- Construction activities
- Labor Camps
- Construction waste disposal

3.3.2 Environmental Assessment

78. The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

79. According to ADB Safeguard Policy Statement (SPS) 2009, projects are to be categorized into three environmental categories; A, B, or C. All the anticipated adverse environmental impacts of the project are mitigate able, temporary, nature and localized. Also there is no environmentally sensitive or archeological site falling within project area of influence; therefore the project is classified as Category B.

4. ENVIRONMENTAL AND SOCIAL BASELINE

4.1 GENERAL

80. The Purpose of this chapter is to establish the baseline conditions for the physical, biological and the social aspects of environment of the project area. The data were collected regarding the physical environment, biological environment and social aspects of the study area during stake holder consultation and technical visits conducted by the environment team.

4.2 AREA OF INFLUENCE

81. This Chapter describes the environmental, social and biological baseline conditions of the project area. The baseline conditions have been established on the basis of the data collected from the field, and through unstructured interaction with the local communities as well as the officials from various departments. In addition, the published data (secondary data) was also used to provide background information about the project area.

82. Locations such as the Manshera, Balakot, Chata Bata, Kaghan Valley, Naran, Babusar, Jalkhad and Chilas are the major areas of influence.

83. The project area of influence (AOI) is referred to all those areas which may be affected directly or indirectly by the project activities. The populated areas as area of influence of proposed projects are as follows:

Atar sheesha	Balakot
Bali	Bari
Basiya	Basti kalandar abad
Bhuncha	Chata bata
Damagla	Dhari
Darah abad Lambi dhari	Fareed abad
Feroz abad	Hassam abad
Jaba	Kamal bin
Khania	Khariyan
Kholian	Malkandi
Mansehra	Oochri
Paghla	Paras
Rajwal naran	Safa
Sahwal najaf	Sangar

Sehwai	Sheenu
Usman abad	

84. River Kunhar is the main source of surface water in the proposed project jurisdiction. There is existence of small water springs, which are also ultimately falling into river kunhar as source of drinking water for the locals.

4.3 PHYSICAL ENVIRONMENT

4.3.1 Geology

85. The geotectonic of the whole region is related to the collision of the Indian tectonic plate with Eurasian plate and subsequent formation process of the Himalayan Ranges. This intercontinental collision has resulted in intense deformation with complex folding involving strike – slip and thrust faulting and crustal thickening expressed as a series of thrust faults accompanied by a continental subduction process. This tectonic process is the origin of the seismicity along the Himalayas and in particular where northern Pakistan and Kashmir are located.

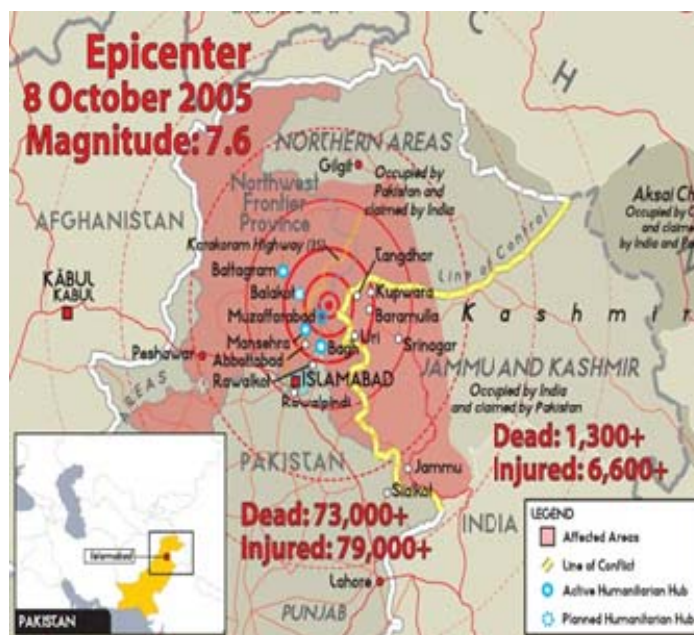


Fig- 4.1: Geological layout of Gilgit Baltistan.

86. All the Northern Pakistan including project area of Jalkhad - Chilas is tectonically a part of Himalayan range. The region is weak and flexible portion of earth cut and a series of folds, faults and thrusts, as a result of which the whole area in the region

have high dips. Himalayas have tectonic origin and has been divided in to three regions:

- i) The great Himalayas
- ii) The Lesser Himalayas
- iii) The outer Himalayas

87. In the Naran region of the Pakistan Himalayas, a regionally distributed second generation of folds results from northward-directed shear deformation. These folds are collapse structures associated with back sliding of the hanging wall, namely the Kohistan paleo-island arc. They are explained by a geometrical model that combines coeval vertical and horizontal shortening. Accordingly, they are synconvergence collapse features that indicate at least 5 km of vertical shortening of the imbricate thrust slices derived from the Indian continent in the northwest Himalayas.

4.3.2 Physiography

88. The leading distinctive features of Gilgit Baltistan are its mountain ranges, the plains, the valleys and the lakes. The area has been blessed with the rich and harmonious combination of tall and stately fine trees, high mountains, plains, beautiful valleys and lakes which make it a heaven of peace. The mountain ranges which enter Mansehra district from Kashmir are the offshoots of the great Himalayan system. In Kaghan valley the mountain system is the highest of the area including the Babusar top. This range flanks the right bank of the Kunhar, contains a peak (Malika-e-Parbat) of over 17,000 feet, the highest in the district. On the mountains the grasslands are also found where Gujars and other nomads migrate during summer for grazing their sheep, goats and other animals. On the northern side there are mountains which are the extension of the same mountain system as that of Kaghan Mountains. This range diverges from the eastern side at Musa-ka-Musalla a peak (13,378 feet), which skirt the northern end of the Bhogarmang and Konsh valleys, and sends down a spur to divide the two. Here also, like Kaghan, thick forests are found especially on the higher slopes. Due to extensive exploitation only in unapproachable areas the thick forests are found.

4.3.3 Soil Type

89. The Soil formation is the result of disintegration of rocks and the type of soil yielded is dependent upon the composition of rock and their impurities. The main agents of transportation are wind and water. The region is geologically young and the

rivers and streams in the area are still in early stage of their development. Rapid streams with deep gorges cut through valleys in the process of deepening their beds. As a result of which they transport enough quantity of eroded heterogeneous mass. Mansehra, The geology of the area may be described as a section of Earth's Crust coming well within the area of Himalayan disturbance. The project area is a part of land formations developed at the foothills of Himalayan Range through tectonic events subsequent to those that caused building of Himalaya.

90. The texture of the primary soils varies from moderately fine to moderately coarse depending upon the rock type from which these have developed. The soils of the raised terraces in floodplains are generally devoid of the stony material whereas the soils of lower terraces generally contain varied quantities of pebbles, cobbles and boulders. However, within the flood plains where slopes are milder to nearly level, deposits of secondary soils are met with.

4.3.4 Surface Water & Ground Water of the Vicinity Area

91. Surface water sources include the streams, nallahs, canals and rivers which provide water for irrigation and other utilities. Ground Water refers to the water obtains from aquifers, hand pumps, tube wells or other deep well injections. Ground water is a source of drinking water for the communities.

- **Surface Water**

92. The main source of the surface water in the vicinity of proposed project area is Kunhar River which is running along with the N-15 proposed project. This source of water is used for irrigating the crops, orchids and other agriculture lands. Communities are utilizing this source of surface water for other utilities e.g., Bathing, Washing etc.

Table - 4.1: Summary Parameters of Surface Water Quality Analysis

Sr. No.	Parameters	Units	WHO Guide lines	River kunhar
1	Temperature	°C	....	8.0
2	pH Value	....	6.5-8.5	7.8
3	Arsenic	mg/l	0.00	0.0
4	Chloride	mg/l	250	10
5	Fluoride	mg/l	1.5	BDL
6	Sulphate	mg/l	250	5
7	Sulphide	mg/l	--	BDL
8	Sodium	mg/l	200	2.1
9	Potassium	mg/l	--	0.8
10	TSS	mg/l	--	37
11	TDS	mg/l	1000	170
12	Chromium Total	mg/l	0.05	BDL
13	Lead	Mg/l	0.05	BDL
14	Iron	mg/l	0.3	0.07
15	Nitrate	mg/l	50	0.1
16	Total Colony count	Cfu/ml	< 500	80

- Ground Water**

93. The snow melt and rain water seeps into the ground to recharge the local aquifer of the mountains but reappears at places in the form of springs. The domestic water requirement of the communities is generally met from the spring water. It has been observed that the settlements are located where spring water is available in addition to the availability of level ground for housing and cultivation. The quality of spring water is reported by locals to be good. The water is free from contamination because of filtrating action of the strata through which it is passing.

Table – 4.2: Summary parameters of Ground Water Quality

Sr. No.	Parameters	Units	WHO Guide lines	Spring water
1	Temperature	°C	....	10
2	pH Value	....	6.5-8.5	7.1
3	Arsenic	mg/l	0.01	0.00
4	Chloride	mg/l	250	15
5	Fluoride	mg/l	1.5	BDL
6	Sulphate	mg/l	250	10
7	Sulphide	mg/l	--	BDL
8	Sodium	mg/l	200	4.0
9	Potassium	mg/l	--	0.6
10	TSS	mg/l	--	25
11	TDS	mg/l	1000	125
12	Chromium Total	mg/l	0.05	BDL
13	Lead	Mg/l	0.05	BDL
14	Iron	mg/l	0.3	0.09
15	Nitrate	mg/l	50	1.23
16	Total Colony count	Cfu/ml	< 500	75

4.3.5 Climate

94. The climate of the Gilgit Baltistan is greatly influenced by the presence of high mountain systems which create rain shadows in some places and high precipitation in others. In the eastern part of the area is found a moist temperate zone of the western Himalayas but moving northwestward the Karakoram and the Hindukush ranges present a much drier environment. Within the proposed project area, climate varies between the lowlands and valleys and the mountains. The valleys are dry with annual precipitation around 200 mm but totals can go up as high as 600 mm at elevations of 13,000 ft. Glacial studies above 16,000 ft suggest precipitation in the order of 2000 mm annually there, mostly in the form of snow. Thus the valleys present desert-like conditions with no possibility for barani (rain-fed) agriculture while numerous glaciers form and accumulate in the higher reaches of the mountains.

- **Temperature**

95. Gilgit Baltistan are at its best in the summer months (May to September). In May the temperature is: maximum 11 °C and the minimum 3 °C. From the middle of July up to the end of September, the road beyond Naran, snow-bound throughout the winter, is open right up to Babusar Pass. Due to lower temperature in summer, proposed project areas becomes the hub of tourist as summer temperature got its peak in other parts of the country.

- **Relative Humidity**

96. The atmosphere and lands are very dry in Gilgit Baltistan of Pakistan. This region claims some of the world's highest mountain peaks like K-2, Nanga Parbat and Raka Posh. There is a big difference in temperature between exposure in the sunshine and in the shade. Nights are very cold and days are comparatively warm. Summer rainfall or cloudiness is most appropriate reason for rising trend of humidity and decreasing trend of maximum temperatures in Gilgit Baltistan.

- **Precipitation**

97. Precipitation is the basic-input to the hydrological cycle, making a direct contribution through rainfall or a delayed contribution as snow. Precipitation is also a factor in the occurrence of mass-movement, though freeze-thaw action and mechanical weathering, as a medium for conveyance of debris-flows, etc., and as a lubricating agent for mass-movement with slipping and sliding mechanisms. For the Greater Himalayas, snowfall (total snow/water equivalent) increased linearly through the range of altitude from 2000 m to 4325 m, reaching a maximum of 650 mm. At higher elevations the number of snowy days increases, but the intensity of snowfall decreases. Annual rainfall decreases with elevation as the proportion of snow to rain increases. Total precipitation is of the order of 700 to 850 mm from 3000 m to 4325 m.

4.3.6 Ambient Quality of Environment

- **Ambient Air Quality**

98. The primary factors that determine the air quality of a region are the possible sources of air pollution, the type and intensity of pollutant emissions, existing levels of air emissions, and the local meteorological conditions. Air Quality of Project Area is fine due to absence of any Industry in the project zone. No significant sources of pollution like Industrial emissions, vehicle exhaust, were observed.

99. Anthropogenic air pollution originates from a variety of sources, including vehicles. Air pollutants have a lot of adverse effects like they contribute to the

acidification and global climate change, which have impacts on crop productivity, forest growth, biodiversity, buildings and cultural monuments. The emissions like Nox (NO_x), Volatile Organic Carbon (VOC's) and Carbon Monoxide (CO) have an adverse impact on the air quality and health of human beings especially those which are directly exposed to this polluted air. The health effects associated with the most common pollutants include respiratory effects ranging from minor symptoms (cough) to more serious (chest congestion and asthma).

100. Kick of dust suspension of fine particles from the ground will be the major source of atmospheric pollutant together with smoke particles arising from wood fires used for cooking and heating. Carbon monoxide and oxides of sulfur and nitrogen will be derived from powered vehicles and from burning domestic fuels, Asphalt Plants, etc. (See Table – 4.3 for Ambient Air Quality).

- Carbon Monoxide (CO)
- Carbon Dioxide (CO₂)
- Sulfur Dioxide (SO₂)
- Nitrogen Dioxide (NO₂)
- Oxygen (O₂)
- Respirable Particulate Matter (PM₁₀)
- Noise Level

Table – 4.3: Summary of Ambient Air Quality & Noise Level

Sr. No.	Locations (GPS Reading)	CO	CO ₂	NO ₂	SO ₂	O ₂	PM ₁₀	Noise Level
		ppm	ppm	µg/m ³	µg/m ³	%	µg/m ³	dB(A)
1	In Attar Shisha near Phagla	3	420	35.1	24.6	23.3	210.1	76.1
2	In Balakot near Bali	2	400	37.2	28.1	22.1	198.5	75.2
3	In Kaghan near Khanian	3	390	32.3	23.4	21.2	172.1	57.2
4	In Naran near Batal village	1	380	30.5	21.5	20.8	168.4	60.5

All determinants were within the values defined in the Pak-EPA, NEQS air quality standards.

- **Noise Level**

101. The noise level presently never exceeds 70.8 dB (A). Even after the construction of proposed project, the noise level will not exceed 80 dB (A). However during construction due to construction machinery temporarily higher noise levels shall be experience. Just

for comparison safe absolute values of various noise levels are given in Table - 4.4 and base data analysis results are shown in Table - 4.3.

Table - 4.4: Some Sources and Effects of Noise

Sr. No.	Source	Sound pressure (dynes/cm ²)	Decibels (db)	Power at ear	Effects
1	Shot gun blast (1m)	4000	300	10 ⁻¹	Instant damage-complete loss of hearing
2	Stereo headphone (full volume)	2000	150	10 ⁻¹	Hearing damage in 30 seconds
3	50- hp siren (at 100m)	1000	130	10 ⁻³	Pain thresh hold
4	Jet take off (200m)	200	120	10 ⁻⁴	Hearing damage in 7.5 minutes
5	Heavy metal rock band	100	110	10 ⁻⁵	Hearing damage in 30 minutes
6	Bus, truck, 6-10 wheels	20	100	10 ⁻⁵	Hearing damage in 2 hours
7	Railway train	20	100	10 ⁻⁵	Hearing damage in 2 hours
8	Power mover, motorcycle	20	85	10 ⁻⁵	Hearing damage in 2 hours
9	Heavy city traffic	20	85	10 ⁻⁶	Hearing damage in 2 hours
10	Pick ups	18	80	10 ⁻⁷	Hearing damage in 8 hours
11	Small cars	10	60	10 ⁻⁹	Hearing damage in 8 hours
12	Lord classical music	2	60	10 ⁻⁹	Hearing damage in 8 hours
13	Vacum cleaner	01	60	10 ⁻⁹	Hearing damage in 8 hours
14	Normal conversation	0.02	60	10 ⁻⁹	Concentration disrupted
15	Bedroom	0.02	40	10 ⁻¹¹	Speech disrupted
16	Library	0.01	30	10 ⁻¹³	Quiet
17	Soft whisper	0.002	20	10 ⁻¹⁴	Very Quiet
18	Leaves rustling in the wind	0.001	10	10 ⁻¹⁵	Barely audible
19	Mosquito wing at 4m	0.0002	0	10 ⁻¹⁵	Hearing threshold youth 1000-4000 Hz

Source: Urbanization and Sustainable Cities 100: Environmental Science, International Science, 5th edition (1991) Cunningham Saigo.

- Natural History Event**

102. The area has history of serious damages due to earthquakes which take place on 8th October 2005 which cause death of about 73,000 and injured about 79,000.

- Seismic Monitoring**

103. National Seismic Monitoring Centre of Pakistan issued the seismic zone map for Pakistan, as shown in Figure 4.3. Project area falls in potential hazard area and high risk associated with the infrastructure found in this area. Project area lies in Zone 4 under the influence of Indian and Eurasian tectonic plates. Disaster took place in 2005 resulted in devastating earthquake due to convergence of these plates. Casualties & injuries in millions.

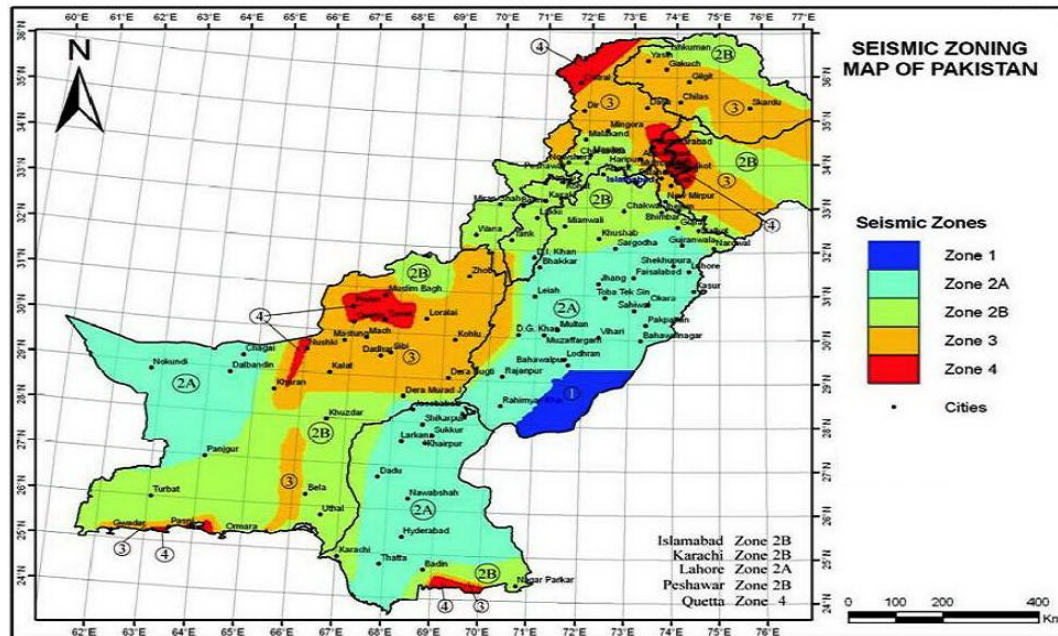


Figure 4.2: Seismic Hazard Zones of Pakistan

- Floods**

104. The 2010 Pakistan floods began in late July 2010, resulting from heavy monsoon rains in the Khyber Pakhtunkhwa, Sindh, Punjab and Balochistan regions of Pakistan and affected the Indus River basin. Approximately one-fifth of Pakistan's total land area was underwater, approximately 796,095 square kilometres (307,374 sq mi). According to Pakistani government data the floods directly affected about 20 million people, mostly by destruction of property, livelihood and infrastructure, with a death toll of close to 2,000. The flood of 2010 also effected areas of Pakistan causing serious damage to people and their belongings. In the province of Khyber pakhtonkhwān it cause death of near about 1096 and injured about 982 people and 173,500 houses were destroyed, total number of affected people were 4365909.

- **Archaeological Sites / Chance Finds**

105. Pakistan has a rich culture and history steeped back in Persian, Arab, Islamic and Indian roots so it also has some of the most extravagant archaeological sites. Chilas, Chitral and Shatial are home of ancient graffiti, you can also found Buddhist rock carving icons, symbols and idles.

106. Chilas is surrounded by wonderful Petroglyphs, which are easy to access, though be prepared for high temperatures and take plenty of water. There is a sign to the 'Chilas II' site near the KKH police checkpoint. Less than 1km down a jeep track there is a huge rock covered with hunting and battle scenes and Buddhist stupas. A common image is the long-horned ibex, ancient symbol of fertility and abundance, and an elusive trophy animal even now.

107. On a rocky knoll facing the river are the oldest inscriptions, from the 1st century AD: scenes of conquest and stories of the Buddha's life. Four kilometres east beside the jeep bridge to Thalpan is the 'Chilas I' site, with art found on both sides of the Highway and the river. The most striking pictures are of a large stupa with banners flying, close to the Highway; and mythical animals, battle scenes, royal lineages and Buddhist tales, across the river on dozens of rocks west of the track. There are a number of important and historical places in Mansehra. Kaghan is famous for its pleasant climate in summer when tourists come to watch its beautiful views. Then comes Balakot, which has a great significance in the history of Hazara with special reference of Syed Ahmed Shaheed's movement. The other well-known villages and towns are Mansehra, Baffa, Shinkiari, Dhodial, Battal, Bhogarmang, Phulra (chief village of the former Phulra state), Oghi, Shergarh (the summer headquarters of the former Nawab of Amb), Darband (former centre of Amb state), Gulibagh (capital of former Pakhli Sarkar), Ghari, Habibullah, Jabori, Chutter, Dadar, Khaki and Kaladhaka.

Ashoka, a great king of Mourya dynasty, used various Medias to communicate his message to his subject. The rock inscription is one of them. These lie at Lohar Banda (Mansehra) on both sides of Karakorum Highway. There are thirteen edicts on three rocks which contain his code of conduct and proposed behavior of his subjects. These inscriptions were incised in beautifully cut letters but were exposed to centuries of wind, sun and rain and now are barely visible. Recently Archaeology department sheltered them by tin sheets for preservations.

4.4 BIOLOGICAL ENVIRONMENT

4.4.1 Ecological Resources

108. Gilgit Baltistan is rich in natural vegetation. Besides the scattered vegetation in almost entire area, the hills are covered with forests of broad leaf and pine trees in accordance with the altitude. Fruit trees are rare, these are generally found in the courtyards of the farming communities. Most common trees are Drawa, Deodar, Shisham, Pine, Poplar, Chir, Draic and Bakain. Trees of Apricot, Pear, Peaches, and Apple also exist

109. According to standard classification of forest types of Pakistan (Champion, Seth and Khattak 1965) the forests fall under the major type "Montane temperate forests". These forests are predominately coniferous with some broad-leaved species. Chir (*Pinus roxburghii*) forests form transitional stage between the Montane temperate and Dry tropical vegetation around about the elevation of 763 and 1830 m. "Chir" covers small area and is confined to lower limits. On upper limits Chir pine is mixed with blue pine (*Pinus wallichiana*.) The dominating species are few forming pure or mixed associations. The occurrence of species depends upon the aspect, altitude and local habitat conditions. *Abies pindrow* in northern aspects or moist slopes, *Pinus wallichiana* with *Taxus wallichiana* as an under storey and occasional *Cedrus deodara* on dryer hotter slopes.

110. The general vegetation is of the shrub type which includes the shrubs or medium size trees. The common shrubs and herbs of the area are sanatha, grund, phulah, wild indigo, valerian, peony, sorrel, timar, phitni, hawthorn, oleaster, wayfaring, barberry, bamboo, kamila and others. In the upper area as the snow melts by the approach of the spring followed by summer, the whole area gives the appearance of a vast flower bed, dominated by the number of annual and perennial herbs. Apple, apricot, plum, fig, pear, wild pear, mango, orange, damson, litchi, and persimmon are worth mentioning fruit trees of the area. Sunflower, rose, jasmine, jasmine-zambak, narcissus, tulip, lily, dog violet, brush flax, iris and must-rose are included in the flora of Gilgit Baltistan.

Table 4.5: Flora of Gilgit Baltistan

Sr. No.	Scientific Name	Vernacular Name
1	Pinusroxberghii	Pine
2	Dalbergiasisso	Shisham
3	Cedrusdeodara	Deodar
4	Meleaazedarie	Bakain
5	Punicagranatum	Daroon
6	Zyziphusjajuba	Beri
7	Meliaazedarach	Bakain
8	Olea cuspidate	Kahu
9	Liriodendron tulipifera	Poplar
10	Diospyrosdigyna	Persimmon
11	Robiniapseudoacacia	Rubania
12	Malusdomestica	Apple
13	Prunuspersica	Peach
14	Pyrusboissieriana	Pear
15	Prunusarmeniaca	Apricot
16	Sect. Juglans.	Walnut
17	Acacia nilotica	Kikar
18	Malusdomestica	Apple

4.4.2 Flora of Project Area

111. A number of trees are present over the project area. In so called plain areas shade trees and shrubs are present. Among shade trees Shisham, Deodar and Drawa are common. While in fruit trees Peach, Pear and Apricot trees have been observed. Detail of flora in project area is given in table below.

Table 4.6: Flora of Project Area

Sr. No.	Shade Trees	%
1	Shisham	10
2	Deodar	17
3	Drawa	29
4	Pine	30
5	Beerli	5
6	Kikar	3
7	Poplar	10
8	Rubania	5
9	Bakain	12

Sr. No.	Fruit Trees	%
1	Apple	2
2	Walnut	11
3	Peach	28
4	Pear	24
5	Persimmon	1
6	Apricot	34

4.4.3 Fauna of the area

112. Most of the fauna in the Project area is local or domestic. The birds such a Himalayan jungle crow, kite and common sparrow, King Fisher, Monal, Little brown dove can be seen. The bird population is thin in project area.

- **Fisheries**

113. The fresh water fauna is directly or indirectly dependent on the local rainfall, natural springs, and mostly the Kunhar and Siran rivers. The Kunhar River abounds in trout fish, a hot favourite for amateur fishing zeal. A trout fish hatchery has been established at Shinu (Kaghan) to supplement the fish numbers. China corp. gold fish, mullah, chukar and eel are found in the Siran.

- **Birds**

114. In avian fauna are included several species of Herons, Teals, Doves, Cuckoos, Bee Eaters, Wood Peckers, Larks, Shrikes, Bulbuls, Finches and Wagtails are widely dispersed in gardens, Cultivated Fields, Streams and Hill Slopes. Swallows, Parrots, Mainas, Pigeon, Sparrows, Hoopoe, Kingfishers and Crows are also found, while western horned tragopan, imperial monal pheasant, and kokla pheasant are found only in hilly areas, whereas black and grey partridges as well as quails are also common. The birds of prey are shikra, sparrow hawk, owl and several species of vulture.

- **Mammals**

115. Gilgit Baltistan still has varied mammalian fauna despite the fact that the mammals had the hardest time directly or indirectly through man's persecution. The rhesus monkeys and the common lungur are dwelling in large numbers.

- **Carnivorous & Endangered Species**

116. Lion and cheetah became extinct while the snow leopard and leopard are endangered species. The snow leopard moves up and down the mountains with its favourite prey like markhor. The other animals found in Mansehra are Wolf, Red Fox, Black and Brown Bears, Jackal, Leopard, Leopard Cat, Himalayan Lynx, Mongoose, Musk Deer, Grey Goral and Ibex. The pet animals are Camel, Buffalo, Cow, Horse, Donkey, Sheep and Goat.

Table 4.7: Fauna of Project Area

Sr. No.	Scientific Name	Local Name
1	Caprefalconeri	Markhur
2	Porous impejanus	Monal
3	OvisOrientalis	Urial
4	Selenaretos,thibetanus	Himalyanbear
5	Pantherapardus	Leopard
6	S.senegalensis	Little brown dove
7	Canis lupus pallipes	Wolf
8	Rhesus Monkey	Maacamulatta
9	Vulpesbengalensis	Fox
10	Streptopeliachinensis	Spotted dove
11	Coraciiformes	King fisher
12	Felissilvestris	Wild cat
13	Sylvilagusbrasiliensis	Forest rabbit
14	Musk ox	Ovibos moschatus

Table 4.8: Domestic Fauna of Project Area

Sr. No.	Scientific Name	Local Name
1	Anoaspp	Buffalo
2	Caprahircus	Goat
3	Equusasinus	Donkey
4	EquusCahallus	Horse
5	Equusspp	Mule
6	Canisspp	Dog
7	Gallus domesticus	Domestic Chicken
8	Columbia livia	Pigeon
9	Himalayan jungle crow	Corvus macrorhynchos

4.4.4 Forests and Flora

117. In the Gilgit Baltistan, forests are typically found in parts of the districts of Diamer, Gilgit, Skardu and Ghizer. Chilas, Darel and Tangir has 217,088 ha (848 sq.mi), Astore area has 30,720 ha (120 sq. mi), Gilgit, Punial and Nagar have 24,576 (96 sq.mi), Baltistan has 9,216 ha (36 sq.mi) for a total of 281,600 ha (1,100 sq.mi).

Based on ecological zonation five main types of forests exist in Gilgit Baltistan, namely, Montane Sub-Tropical Scrub, Montane Dry Temperate Coniferous, Montane Dry Temperate Broadleaved, Sub-Alpine and Northern Dry Scrub. Proposed project zone contains dry deodar (*Cedrus deodara*), blue pine (*Pinus wallichiana*), fir (*Abies spectabilis*), spruce (*Picea smithiana*), chilgoza (*Pinus gerardiana*) and juniper (*Juniperus spp*), both in pure or mixed stands. All the important coniferous forests are found in this zone. These are mostly found in district Diamer, some parts of districts Gilgit, Skardu and two villages (Sherquilla and Singul) in Ghizer district. These forests are frequently found all along with the proposed project jurisdiction also.

4.4.5 Agriculture

118. The lack of irrigation facilities in the proposed project vicinity has affected the productivity of the soil in spite of its fertility. Total area of the district is 10, 67,291 acres out of which 2, 58, 999 acres is cultivated and 8, 08,292 acres is uncultivated. Irrigated land is 48, 571 acres only. Thus the land proves not much productive. Cultivation mainly depends on seasonal rainfall. The soil of Pakhli plain is very fertile and productive due to irrigation facilities. The mentionable crops of Mansehra are wheat, maize, rice, tobacco rapeseed and mustard, barley and fodder, vegetables, soybeans and pulses. Tea growing experiments have also been made at Shinkiari, Baffa and Ichrian due to a suitable climate and congenial condition. These experiments have proved successful. Fruit orchards are also a source of income. Large number of people earns their livelihood through agriculture. Contour farming has been seen to be practiced in the most parts of proposed project vicinities.

4.5 SOCIO-ECONOMIC AND CULTURAL ASPECTS

119. This section provides an overview of the socioeconomic conditions and cultural mores in the project area. Socio economic conditions of the area depend upon the population, employment level, trade and businesses, customs, religion, social activities, occasions, and their social cohesion.

120. Social impacts can be defined as the consequences to people of any proposed action that changes the way they live, work, relate to one another, organize themselves and function as individuals and members of society. This definition includes social-psychological changes, for example to people's values, attitudes and perceptions of themselves and their community and environment. (Narayan 2005)

121. The Social Assessment (SA) has been conducted to evaluate the project's

potential positive and adverse effects on the affected people and to examine project alternatives where adverse effects may be significant. The breadth, depth and type of analysis in the social assessment are proportional to the nature of the project and scale of its potential effects, positive or adverse, on the affected people. People of proposed project are not financially sound. Their income based on the summer season tourism. They are involved in hoteling, tourist guide, transporters and labor sectors of earning sources. People are poor enough to meet their daily life utilities. They are heavily relying on the ecosystem to meet their needs of drinking water from spring and burning wood from the forests. Despite of all these dilemmas people are innocent, hardworking, hospitable and take care of their guest up to maximum extent.

4.5.1 Population and Community Structure

122. According to the Population Census 1998, the total population of Gilgit Baltistan was 883,799 and growing annually at an estimated rate of 2.56%. The rural population was 85.7% whereas 14.3% lived in urban areas. Currently Gilgit Baltistan Administration is projecting Population of Gilgit Baltistan to 1 million. There are 30 villages with population between 2000-4999 and 10 villages with population more than 5000 round about alongside the proposed project line. As the flood and Earthquake has cause massive destruction in these proposed project, NGO's and other international organizations like Red Cross Pakistan, SRSP, UNDP, UNIDO, PPAF, European Union, UNFPA, IFRC, ERRRA, UNICEF are working for the restoration & rehabilitation of the areas. . Urdu is the lingua franca of the region, understood by most inhabitants. The Shina language (with several dialects) is the language of 40% of the population, spoken mainly in Gilgit, throughout Diamer, and some parts of Ghizer. The Balti language with a similar accent, is spoken or understood most of the population of Baltistan. Minor languages spoken in the area include Wakhi spoken in upper Hunza and some villages in Ghizer, while Khowar is the major language of Ghizer. Burushaski is an isolated language spoken in Hunza, Nagir, Yasin (where Khowar is also spoken), some parts of Gilgit, and some villages of Punyal.

123. Another attention-grabbing language is Domaaki, spoken by the musician clans of the region. Small pockets of Pashto speakers are found along the border with the North West Frontier Province and Afghanistan. Gujar (herder) families you'll see along the way bringing their animals up to the summer pastures.

4.5.2 Poverty Status

124. About 80% of the population in the immediate as well as the project area is under poverty line for their food and basic necessities and their income is less than Rs. 3,000/-

per month per family of 6-8 persons. The population below poverty line falls in various categories like drivers, labor in hotel industry, loss of tourism, small landowners etc. Poverty has increased in flood affected areas because of the loss of livelihoods misguided economic policies have widened inequalities and forced mountainous people to exploit biodiversity at rates that are no longer sustainable. As a result, processes such as deforestation, overgrazing and soil erosion have become major threats to the remaining biodiversity of high lands in Pakistan. Poverty, lack of planning and appropriate policies have contributed to disproportionate pressures on resources resulting in degradation in uplands that ultimately cause more and more degradation at lowlands.

4.5.3 Land Tenure System

125. Women are not encouraged to inherit land. According to Sunni Mohammadan Law the females inherit $\frac{1}{2}$ share while males receive a full share. And according to Shia Law the male and female inherit equal share. But in both the sects the sisters, out of their love for their material linkage, do not claim their share. Land ownership, acquisition and management are governed by land laws. Land Acquisition Act 1894 is the basic land law. Land Revenue is a Rent and not a Tax.

4.5.4 Land Value

126. Agricultural land is treated differently from a piece of land in a town city or a village. Urban land has higher value. According productivity the total land mass of a country/province is divided into 8 broad classes as shown in the following sketch:

Table - 4.9: Land Capability Class

I	II	III	IV	V	VI	VII	VIII
Agriculture Land				Forests	Range Lands	Stony Hills	Snow Clad Peaks

127. The value of land is kept at its productivity. Usually the value is assessed at 20 years produce or latest sale price of a similar peace of property, whichever is higher. Agriculture land is divided into 4 classes, the best being class I and least productive being class IV. At the time of land consolidation these classes are interchanged mutually and proportionately.

4.5.5 Social Equity

128. Social equity does not exist in the area now-a-days. Old systems of equity and social security such as Jirga, Punchayat, Bradri, village community, have collapsed and the new system such as NGO's, Union councils and professional organizations have not yet fully taken roots. But with the passage of time, social norms are getting strength due to mass awareness due to education.

4.5.6 Social Cohesion

129. The human society in project area is Muslim by 97 percent and others by 3 percent. The village population is mostly Pathans.

4.5.7 Gender Issues and Status of Women

130. The number of women in the households is more than male members (women 40% and men 60%). Sixty five percent populations, male and female together are under 30 years of age. In rest of 35% the age groups taper off as they go towards high age. Due to ethnic and social reasons most of the times only male population appears in streets and bazars.

131. There is a tendency to marry early (men 21 – 25 years, women 18 – 21 years). There are no teen age marriages. Because of family bonds social values and caste pressures the rate of divorce is rather low.

132. The role of women is crucial for any sustainable development process. The women situation survey shows that 32% respondent is literate while 68% respondent is illiterate. The most impressing need of the women of the area is the basic health facilities and the educational facilities for the girls of the project area. The construction of proposed project will definitely promote the above mentioned needs and also other social development works.

133. Average age for men is 60 years, within a range of 35 – 89 years. Average are of women is 65 years within a range of 25 – 100 years. Infant mortality is 35% because of lack of gynecological and antenatal facilities in BHU's People cooperate with Polio drops campaign every year. Courses of vaccines against small pox, cholera, typhoid and hepatitis are offered but are ignored by many village households. NGO,s and other organizations are working on providing maternity facilities in the areas. BHU's are working efficiently in this context.

4.5.8 Services and Facilities in the area

- **Educational level**

134. The literacy rate in Gilgit Baltistan is 24.17% with female literacy rate at 13.71%. Above 80% of the population, including females, possess basic primary pass (5 Classes) certificate. About 10% of the males as well as females is middle school pass, while 10% males and females are matriculates. Almost 10% of the matriculates go for technician level jobs, traders, shop keepers and factory workers. For those who join FA/FSc, there are adequate numbers of education institutions in Manshera. After FA / FSc, the inlets are colleges/universities, Engineering colleges/universities, Armed forces as officers and other Govt, Department in the middle level careers in Manshera and Abbottabad. About 5% of the FA/FSc pass candidates join regular BA/BSc classes, and less than 2% reaches Master level studies. Only 1-2 persons per year go to Lahore or Islamabad for their Ph.D. studies. In overall pursuits the qualitative as well as quantitative performance of female students is superior to that of male students.

Mansehra is located in a province with a literacy rate of 35.41%. With the passage of time, education getting worth and people have shown their eager in educating their childrens. Human Rights Commission of Pakistan (HRCP) reported has reported that the Gilgit Baltistan are facing a huge shortage in schools and colleges, particularly for girls. Lack of education can, no doubt, makes these areas more vulnerable to the trends of extremism and it could have degenerative effects for socio-political fiber of the region.

Table 4.10: Education Facilities in Project Area

Education Facilities	2004-2005
Hazara University	1
Post Graduate Colleges	2
Degree Colleges for Boys	3
Degree Colleges for Girls	1
Higher Secondary Schools for Boys	14
Higher Secondary Schools for Girls	02
High Schools for Boys	79
High Schools for Girls	26
Middle Schools for Boys	122
Middle Schools for Girls	57
Primary Schools for Boys	883
Primary Schools for Girls	3

Source: www.erra.gov.pk

- **Telephone and Internet**

135. Over past few years the urban as well as the rural parts of the project area have experienced a dramatic change in personal communication. No PTCL connection lies onwards Mansehra city. All the mobile networks are working efficiently in the proposed project area. Internet facilities are available in Manshera City.

- **Transportation and Accessibility**

136. The transportation in the proposed project area comprises on 4x4 jeep and vans and other vehicles. These transportation sources are frequently used in the propose project area. These transports are also used for the carriage purposes. Heavy vehicles are used to transport construction material in far going areas. Mules are also been used for carriage purposes where other transport sources do not have any access or convenience.

- **Electricity, Sui-Gas Supply and energy use**

137. There is no supply of Sui gas onwards Mansehra. Electricity has got the reach upto maximum area in hilly areas of proposed project. Coal and wood from the forests have been used for burning purposes. Sui Gas supply projects are in pipeline. The average household size for the Gilgit Baltistan as a whole is 8 persons in 1998. The main source of lighting is electricity which is used by 61 % of households. The second main source of lighting is kerosene oil which is used by 35 % of the households. The remaining 4 % use other sources for lighting. About 90% of the households use wood for cooking.

- **Health Facilities in the Project Area**

138. Though the health facility in the immediate Project area is insufficient. Mansehra city has number of hospitals and basic health units. The people near the project area have to go to Shinkiari, Mansehra and Dadar for medical treatment. The Baseline Survey conducted for the Northern Health Program in 1999 showed the infant mortality rate (IMR) 70/1000 live births. BHU's are working in the vicinities of proposed project.

Table 4.11: Type & number of health facilities in Project Area

Type of health facilities	Total No. (2004)
Combined Military Hospital CMH/ HQH 1 01	01
Hospitals	12
Dispensaries	24

Rural Health Centers	08
Basic Health Units	58
Civil Dispensaries	21
M.C.H. Centers	03
T.B. / Leprosy Centers	04

Source : www.erra.gov.pk

- **Employment**

139. Increasing education and multiplying population create more and more hands to be employed. The agriculture alongwith tourism industry has the capacity to absorb at least 50% of the fresh educated male and female youth. The rest of the 50% has to find their way out by going to middle east countries, seeking employment in Armed Forces or Police or other Government offices, hunt jobs in other regions of Khyber Pakhtunkhwa (KP) or simply sit at home as unpaid-unemployed youth. Making about 20-30% of the total youth force, the employed ones make a sizeable unutilized human resource. Of these at least half are males.

- **Income**

140. Prevalent daily wage in proposed project area is Rs. 250/- for the labour employed in construction work. For softer jobs and carriage labour a reduction of Rs. 25 – 50 is common. The artisan, electricians, blacksmiths, carpenters, cobblers, barbers, tailors (oilmen) and potters etc. charge according to the services they render. In towns and cities the services are paid for individual assignments. In rural areas there is service contract (sape) for a year in lieu of which the payment is done in kind i.e. a contracted quantity of Wheat at the time of harvest. Farm labour is also contracted for season or month and can be paid in cash or kind, the value of which is nearly equal to the minimum wage in the town.

141. The big landlords make almost Rs. 6,000/- per acre as their net earning. Most of them live in big cities and they visit their lands only to get a self reassurance that they are the landlords. They mostly run their management through their employed. Managers called “Munshis” or “Muneems”

- **Vulnerable Groups**

142. Less than two percent of the population truly fell in vulnerable groups. These groups mainly consisted of widows, handicapped, landless shelterless and religious minority. The vulnerable groups had an even distribution all over the project area.

- **Indigenous Peoples Safeguards**

143. During the field survey it was especially focused to screen out Indigenous Peoples. People living in project areas belong to various caste patterns and have homogeneous culture. People have different caste systems but their culture pattern and living habits are same as those of people of Khyber Pakhtunkhwa (KP) province. There is no community that meets the criteria of ADB definition of Indigenous People. As such the ADB policy on Indigenous peoples will not be triggered by the project.

- **Tourism and Recreational Facilities**

144. Gilgit Baltistan is one of the prime tourist attractions of Pakistan. These are abounding with snow-clad mountains, flowery meadows, enchanting lakes, and dense forests. With so much to offer, it provides an exhilarating experience; sought after by thousands of tourists who flock the kaghan valley each year. The valley is reachable from Abbottabad and Mansehra via the Karakoram Highway until it forks off to the Kaghan Road. The Kaghan road passes through the splendid forests of Jaaba Pass, with the Kunar river snaking deep below all the way to Balakot. Balakot is the first and most important stop on the way to Kaghan valley. It is located roughly 50 km from Mansehra and is settled on both sides of the Kunar. The site has been venue to a famed battle between Muslims and Sikhs in 1831, where Syed Ahmed Barelvi and Shah Ismail attained martyrdom. Balakot is the supply line to the whole of Kaghan valley and one can find plenty of hotels to stay. The town was completely ravaged in the October 2005 earthquake but is now mostly rebuilt on modern lines. The devastation caused by the earthquake is still visible in many spots. Gilgit Baltistan are hub of recreational facilities. People come frequently in summer season for recreational facilities and hustle & bustle all around then can be seen. Economics and livelihood of the Gilgit Baltistan depends upon tourists visits here. Esthetic value of Gilgit Baltistan is exclusive and natural beauty attracts you for appreciation of Allah's blessings upon us.

4.5.9 Resettlement

145. There is no need of land acquisition so resettlement is not required.

5. ANALYSIS OF ALTERNATIVES

146. The key function of the analysis is to compare feasible alternatives to the proposed project components including the 'No project' situation. The potential environmental impacts of each alternatives and feasibility of mitigation of these impacts along with their suitability under local conditions are also compared. The following options/alternatives were analyzed for the assessment of strengths and weaknesses of the proposed project:

- No project option/worst scenario option
- Option of constructing a road on a new alignment
- Option of rehabilitating the existing road

5.1 NO PROJECT OPTION/WORST SCENARIO OPTION

(a) Analysis

- **Strength and opportunities**

147. If the Project is not taken up at all, then all the efforts and investments shall be saved and these will become available for another project. Furthermore, the recurring cost of the new project and its operational expenses would be avoided.

- **Weaknesses and Threats**

148. If the project is not taken up, the route will remain tedious and will inhibit easy travel to the further north. It will also mean losing opportunity of tourism to the area of vital aesthetic beauty of Pakistan from the rest of the country (through land route).

(b) Conclusion

149. For this proposal, the weaknesses and threats outweigh the strengths and opportunities. Therefore, No Project option, possessing the potentials of worst scenario is not recommended.

5.2 OPTION OF CONSTRUCTING ROAD ON A NEW ALIGNMENT

(a) Analysis

- **Strengths and Opportunities**

150. A new road construction is a very good option. It will not only provide better

accessibility to commute from Mansehra to Chilas but will also have better engineered aspects to combat floods.

- **Weaknesses and Threats**

151. Although a new road would serve very well, however on both side private land has to be acquired for the access/approach roads and would have major resettlements and land acquisition issues.

(b) Conclusion

152. Although apparently appealing, construction of a new road has more weaknesses and threats than the strengths and opportunities. This option, therefore, is not recommendable.

5.3 OPTION OF REHABILITATION OF EXISTING ROAD (N-15)

(b) Analysis

- **Strength and opportunities**

153. The most part of the N-15 has been maintained by FWO along with NHA maintenance unit. However the most problematic area of N-15 lies between Mahandri to Naran needs to be immediately rehabilitated. The project will remove this problem.

The existing structures can be rehabilitated and strengthen. It will require less expense, shorter time and will cause least disturbances to environment including adjacent and nearby communities. There shall be no negative impact on flora or fauna or any other component of the ecosystem since the road will be repaired on the existing alignment.

- **Weaknesses and Threats**

154. Not taking up the project will save the cost, which can be diverted to another project.

(c) Conclusion

155. The strengths and opportunities of this option are overwhelmingly more than its weaknesses and threats.

5.4 SUMMARY OF ALTERNATIVES

1. No project option/worst scenario option is not recommended
2. Option of construction of new road is not recommendable.
3. Option of rehabilitation of the existing road being the most suitable, viable and environment friendly is recommended

6. PUBLIC CONSULTATION AND DISCLOSURE

156. This section describes the outcome of the public consultation sessions held with different stakeholders/groups that may be impacted by the project. The consultation process was carried out in accordance with the Asian Development Bank's Safe Guard Policy Statement (SPS) 2009. The process of the public consultation proceeded as follows: -

- Meetings with regional and local officers of NHA Government of Khyber Pakhtunkhwa.
- Semi-structured interaction held with communities on construction of new road.
- Public Hearing through EPA Khyber Pakhtunkhwa to get the maximum participating role for the members of public. (To be done at the convenience of EPA Khyber Pakhtunkhwa after submission of the drafts IEE report).

6.1 CONSULTATION PROCESS

157. Information disclosure and public consultation and discussion with the people of the area have been done. This process was intensified during the IEE studies, and separate rounds of public consultations were held. Before and during the project execution, this process will be continued, particularly during the implementation of the EMP implementation.

158. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate area of influence of the project. Primary data collection included:

- Land demarcation, measurement and land record collection.
- Pretesting of socioeconomic survey tools in the field.
- Physical measurement of structures falling in the ROW.

159. The semi structured meeting with community representatives held in 2011 in and around the project have the following objectives:-

:

- Share information with stakeholders on New National Highway N-15 Project and expected impacts on aspects of affectees of the Project.
- Understand stakeholders' concerns regarding various aspects of the Project, including the existing condition of the upgrading requirements, and the likely impact of construction related activities and operation activities;

- Provide an opportunity to the public to influence Project design in a positive manner;
- Obtain local and traditional knowledge, before decision making;
- Increase public confidence about the proponent, reviewers and decision makers;
- Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions;
- Create a sense of ownership of the proposal in the mind of the stakeholders; and
- Develop the proposals that are truly sustainable.

6.2 IDENTIFICATION OF STAKEHOLDERS

160. During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. During the field survey different stakeholders identified were the villagers, local residents, government officials, shop owners, public representative, NGO's and general public. All those stakeholders had different types of stakes according to their professions.

161. Public consultations were carried out in two steps. The first step employed for the consultations carried out during the Environmental and Social Assessment studies was the identification and categorization of the stakeholders. Two types of the stakeholders were identified: the primary stakeholders, who would be directly affected by the project; and the secondary stakeholders, who would be indirectly affected by the project (or who could indirectly affect the project).

162. Subsequent to the stakeholder identification, guidelines and questionnaires were prepared for conducting the focus group discussions/meetings, which were arranged through contacting the key persons from the community, such as, village heads, and patwaris.

163. After completing the preparatory steps described above, the consultations were carried out in the nearby communities. During the IEE study, stakeholder meetings and focus group discussions were held around Project area. To meaningfully include the women of the area in the consultation process, separate focus group discussions were arranged during the IEE study.

164. The consultations with the secondary stakeholders were carried out in parallel to the community meetings. These consultations were held with officials and representatives of public and private departments/institutions.

6.3 CONSULTATION FINDINGS

Stakeholder Concerns

165. The major fears of the people of the project area included closure of road during the construction of the construction of the road ; reduction in number of fish at Kunhar river and downstream due to high level of construction activity and noise level generated during construction; chance to increase the accidents. But in spite of all these, people are in the favor of construction of new national Highway N-15 road project as it will facilitate them in smooth transportation across the river.

166. All of the above concerns and expectations have been adequately incorporated in the project design in the form of the mitigation measures included in the Environmental Management Plan and the communities were so informed during the consultation meetings.

6.4 GENDER COMPONENT

167. A total of 80 men from the project area were interviewed by the consultant staff, as per level of awareness on the project, most men were not aware of the construction of N-15 highway. 45% had access to school, 15% had to college level education and only 5% ladies had access to university level education. This reveals that they were free in getting education if they were willing and educational facilities were available in their main cities nearby areas. On the other hand, 30% women had access to lady health visitor, 32% consult government doctor, 15% consult private doctor and 20% consult quacks in case of sickness/ailments.

6.5 SOCIAL FRAMEWORK AGREEMENT

168. It is the commitment by the project proponent and the local community to work together for the successful completion of the project. It establishes bindings for both parties to minimize possible conflicts. SFA shall be considered as a “follow up” of the public consultation and public hearing and indicates that NHA and the communities are mutually facilitating the construction process of national highway N-15.

6.5.1 Parties to Agreement

169. SFA will be signed through mutual open consent between the local village leaders and the project proponent. At least two leaders/elders will be chosen from each of the villages situated adjacent to the area where construction activity will be based. These

leaders/elders will constitute a villagers committee, which will choose a Chairman among themselves. SFA shall be signed by Project Director representing the project proponent and by the Chairman of villagers' which are on the way of project area representing the local community before two month start of the construction work.

6.5.2 Agreement Contents

170. SFA shall be prepared in the form of a legal agreement in Urdu language on a stamp paper to be provided by authorized person at the project cost. Three copies of the agreement shall be signed by both parties. All the mitigation measures described in EMP which are relevant to SFA shall be included in the agreement. The obligations of the National Highway Authority (NHA) and those of the community shall be listed clearly. Signed copies of SFA shall be kept by both parties and the Executive Engineer in charge of the Road.



Fig- 1: Socio-Economic survey from local shopkeeper



Fig-2: Social issues consultation from the local resident



Fig -3: Interview from the project area community member.

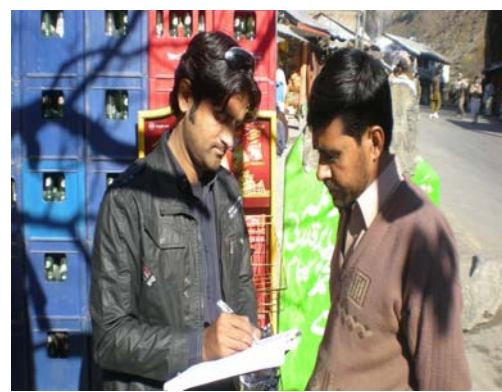


Fig- 4: Interview from the project area inhabitant near Naran bazar.



Fig- 5: Interview from the local resident of Naran area.



Fig- 6: Interview from the project area inhabitant of Kaghan.



Fig- 7: Socio-Economic survey from local resident of Kaghan.



Fig- 8: Social issues consultation with community member of Kaghan.

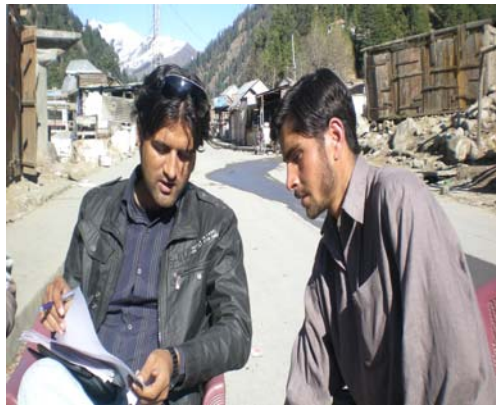


Fig- 9: Interview from the project area inhabitant near Kaghan bazar.



Fig- 10: Interview from the project area inhabitant near Kaghan bazar.



Fig- 11: Interview from the hotel employee in Naran bazar.



Fig- 12: Interview from the project area inhabitant in Naran bazar.

7. ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

171. This chapter categorizes the potential impacts of the construction of National Highway N-15 on the physical, biological and social environment of the project area.

7.1 METHODOLOGY

172. In order to assess the type and intensity of impacts of the project, a check list of potential impacts was developed on basis of the literature review, field surveys, investigations, and stakeholders consultations. The matrix charts the relations between the project components, and the various aspects of the physical, biological and social environment, and on the basis of this identifies the potential impacts associated with each project activity. The check list also characterizes the impacts with respect to their severity, in addition to determining whether the potential impact can be avoided through better project design and planning, or mitigated with the help of appropriate measures to be taken during the project execution.

173. The check list of potential impacts is presented in Table 7.1. The potential impacts thus identified are discussed in the following sections.

7.2 IMPACT ASSESSMENT - OVERVIEW

174. The Initial Environmental Examination (IEE) study has disclosed that the project is not likely to have any severe negative impacts on the environment and people of the area. All the potential impacts which have been identified during the present assessment are associated with the construction stage of the project, and mild to moderate in severity; and can easily be avoided (through good design and construction planning) or mitigated (through proper implementation of the EMP as shown in Table 7.1.

175. On the other hand, the project will be beneficial; job opportunities particularly for the local population during construction stage. In addition, the social assistance activities at the road will greatly enhance the project benefits for the local communities. Significant social indicators of the project benefits are mentioned below:

- Improvement in infrastructure pertaining to the roads, bridge, communication and other social amenities.
- Significant changes in sustainable development;
- Permanent health care services;

- Improvement in educational facilities;
- Improvement in market access;
- Emergency preparedness
- Enhancement in agricultural/livestock/fisheries produce.

Table - 7.1: Check list of potential impacts for Construction and Operational Phases

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
1. Land Resources										
1.1	Borrow area for extraction of materials from borrowing site.							✓		
1.2	Site for disposal of waste generation and disposal of waste material				✓					
1.3	Location of labor camps, material camps, equipment yards and approach roads				✓					
1.4	Access tracks				✓					
1.6	Land contamination due to spill of lubricates, fuel, chemicals and other waste materials.							✓		
1.7	Contamination from diesel and other spills from construction machinery				✓					
1.8	Drainages paths roads crossed. Damages by moving machinery				✓					
1.9	Installation of batching plants				✓					
1.10	Waste disposal Management							✓		
1.11	Agriculture land and crop Damage					✓				
1.12	Any discharge or diversion of water to a graveyard or archaeological site	✓								
1.13	Electrical and mechanical works	✓								
1.14	Construction of road							✓		
2. Hydrology and Water Resources										
2.1	Impact on source of construction water				✓					

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
2.2	Contamination of surface water due to diesel and other fluids spilling over to river water from machinery.	✓								
2.3	Protection of construction work from floods								✓	
2.4	Obstruction of flow of water down stream								✓	
2.5	Impact of dismantling of Old road							✓		
3. Air Quality and Noise Pollution										
3.1	Dust and smoke and other pollutants from plants and equipment's.								✓	
3.2	Dust or other pollutant from stored materials and spoil heaps	✓								
3.3	Smoke from burning of waste materials or burning fire wood					✓				
3.4	Noise control from use of old or outdated machinery					✓				
4. Biological Resource										
4.1	Damage to biological resource flora, fauna, biota								✓	
4.2	Impact of construction and dismantling of coffer dam on aquatic life					✓				
5. Socioeconomic and Cultural Issues										
5.1	Existing services; education health, electricity, and water supply	✓								
5.2	Land ownership and land acquisition if required						✓			
5.3	Access to other construction materials					✓				
5.4	Effects on sites of archeological, historical, cultural or religious significance	✓								
5.5	Public safety at construction sites								✓	
5.6	Health and safety of labor and					✓				

Environmental Aspects (Construction Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
	employees on construction site									
5.7	Employment					✓				
5.8	HIV/AIDS and other communicable diseases.		✓			✓				
5.9	Aesthetic / scenic value					✓				
Key:										
		* Avoidable through design (Preventive)								
		** Mitigation through contractor's obligation or through SFA								
		*** Non-reversible permanent change.								

7.3 EXPLANATION OF THE IMPACT ASSESSMENT

176. Table 7.1 above provides a schematic presentation of the degree, significance and mitigability of various environmental and social factors at construction and operational phases. This section provides a brief explanation of each factor, also suggesting a line of action towards mitigation measures for the adverse impacts.

7.3.1 Construction Phase

7.3.1.1 Land Resources

I. Site for disposal for waste construction material

177. There is hardly any cutting involved. Most of the work comprised of steel and concrete materials for the construction of new bridges on the proposed project replacing belly bridges. There would, therefore, shall not be much waste material for disposal or burial. If any such material does need disposal, enough land for that is available on either bank of the river Kunhar. The waste material disposal is moderately significant but mitigable factor.

Mitigation

178. To be made contractor's responsibility through contract document to dispose off the construction waste material appropriately.

II. Location of Labour Camps, Material Depots, Equipment yards and approach roads

179. Because of availability of ample area belonging to government, location of labour camps, material depots, equipment yards and approach roads will not cause any serious problem. So this is a matter of slight significance and is easily mitigable and manageable.

Mitigation

180. The contractor will, in consultation with project director (NHA), resolve the exact location of all these facilities within the government land.

III. Contamination from Diesel and other oil spills from Construction machinery

181. At places it may be inevitable and may exceed the maximum permissible limit. This is mitigable through effective application of the maximum spill regulations.

182. "Guide Lines for Oil Spill Waste Minimization and Management issued by International Petroleum Industry Environmental Conservation Associate are as follows:-

- **Soil contaminated by minor spills/leakages** (defined as leaks from vehicles, machinery, equipment or storage containers such that the area and depth of soil contaminated is less than 10 sq ft and 3 inches respectively) is to be scraped and burnt in a burn pit.
- **Moderate spills** defined as spills of volume less than or equal to 200 liters is to be contained and controlled using shovels, sands and native soil. These equipments and materials are to be made available at camp sites during the operation. The contaminated soil is to be excavated and stored in a burn area lined with an impermeable base. Depending on the volume, the contaminated soil is either disposed-off through by specialized treatment such as bioremediation or through approved contractor.
- **Major spills** (defined as spills of volume much greater than 200 liters) require initiation of Emergency Response Procedures and Oil Spill Contingency Plan. These spills are to be handled and controlled

according to the Plan and require special treatment such as bioremediation and through approved contractors.

Mitigation

183. Contractor's contractual obligation to impose strict rules on his workers and labour and ensures that no spill are caused. If it the spills, do take place, it must be followed by the treatment prescribed above as per the degree of spill.

IV. Damage to, roads, cross drainages by machinery

184. Such a situation can arise through carelessness of the heavy machinery drivers/operators. Such carelessness can cause considerable damage to paths, roads and drainages if the drivers/operators are not made aware, trained and bound to be careful. An effective signage can reinforce the instructions to drivers. It is a concern of moderate significance but is mitigable through care and regulation.

Mitigation

185. Contractor's contractual obligations to impose strict control over operators and drivers of all types of vehicles. Should the damage take place, the contractor must be bound to carry out repair immediately.

V. Earthen Embankments or Concrete work, Edge Scouring

186. Must be dealt at design stage. Wherever such a situation is anticipated, aprons should be provided to secure edges and specifications must be kept of high standards. Moderately significant but is a mitigable aspect.

Mitigation

187. Design stage and strict application of Operational Manual.

VI. Discharge from unstable slope or leakage on construction

188. Such an impact can destroy the structure leading to unprecedented damage. Though significant, it can be set aside through a careful planning of the work. If such a situation does appear, it becomes highly significant though a mitigable impact.

Mitigation

189. Contractor's contractual obligation to not to let such leakage develop. Should such leakage develop, the contractor must remain fully prepared to

immediately control the discharge.

VII. Any discharge spill or dumping onto any building or houses (private land) on river bank

190. No such situation has been noticed during surveys. Should a situation present itself during project implementation it will be a moderately significant but a mitigable problem. Should a situation to such an effect present itself during project implementation, the owner may be compensated by the contractor.

Mitigation

191. Contractor's contractual obligation to compensate such losses.

VIII. Any discharge spill or dumping out to any graveyard or burial

192. No such situation has been noticed during surveys. Should a situation present itself during project construction, it will be moderately significant but a mitigable problem. Should a situation to such an effect, present itself it will be a moderately significant but mitigable problem. The contractor shall be duty bound to restore the protection wall of graveyard through appropriate rip-rap work or pay damages to the community.

Mitigation

193. Contractor's contractual obligation to compensate the community either by getting the graveyard protection wall repaired and covered with rip rap work or paying the community an amount as compensation with which the community can get the repair done.

IX. Impact of taking borrow material from earth borrow site

194. Excavation and cutting activities could place adverse environmental impacts including sliding, soil erosion and drainage on the surrounding areas.

Mitigation

195. No private land is acquired for the borrow areas:

- The Contractor will ensure that selected borrow areas are clearly demarcated including the allowed depth of the excavation before starting excavation.
- The borrow areas will be leveled. The Contractor will not leave the borrow pits in such a condition that they are unsuitably filled with rain water and cause the problem for the community.

- If the borrow area is near to the settlements then it should be fenced completely.
- If agriculture land needs to be used as borrowing area then the Contractor will adopt the following methods during the digging process.
 - Fix the location of excavation.
 - Remove thirty centimeters of the top soil and keep it on reserved site for re-spreading in the field.
 - Excavate up to one meter depth.
 - Maintain the slope as far as possible.
 - Place the top soil back during the restoration process.
 - Pay compensation for any crop losses.

X. Impact on roads used for transport of construction materials

196. Main roads on either side of the river to convey men and material to the construction sites. This will cause additional wear and tear and raise considerable dust. It will be a moderately significant but mitigable impact.

Mitigation

197. Contractor's contractual obligation to use the roads and paths carefully and in case of any damage, repair the damaged paths. On Kacha roads water shall be sprinkled daily.

XI. Impact of stone quarrying

198. Stones shall be procured from nearby quarries. This will not cause any impact on the immediate project area except that the vehicles carrying the stone shall exert additional traffic load on the roads leading to the project area. By keeping the roads dust free and repaired, only a slight influence is expected on the immediate project area.

Mitigation

199. Contractor's contractual obligation to use the road network carefully and repair any damages immediately.

7.3.1.2 Hydrology and Water Resources

I. Source of construction water

200. Ordinarily the river water is suitable for the construction work. If obtained from elsewhere, it must be compensated.

Mitigation

201. Contractor's contractual obligation to pay for water obtained from source other than the river.

II. Source of surface water

202. Contractor's labour will use river water, like other people living or working near the river banks, for washing, bathing and at time for sewage. The contractor may however, arrange to pump water from the river and supply running tap water to his workers. Using some water from river by the contractor's labour shall cause only a slight but reversible effect on the river. The contractor shall ensure a system of pit latrines or a set of temporary flush system latrines. All sewerages to be treated through septic tanks linked with soak pits.

Mitigation

203. Contractor's contractual obligation to supply running tap water, pit latrines/ flush latrines in the land near the camp. All sewerages to be treated through septic tanks linked with soak pits.

III. Source of drinking water

204. Communities along river banks are sufficiently advanced to install tube wells and hand pumps for obtaining good quality drinking water. Similar arrangements can be made by the contractor for his labour camps. Drawing water for drinking from aquifer shall neither cause any significant change in the under water reservoir, nor the river which recharges it. This impact can be considered as slight.

Mitigation

205. The contractor should tap the underground reservoir and install hand pumps or tube well with overhead tank to supply drinking water to the labour and workers. The quality of drinking water should be monitored periodically.

IV. Diesel and other fluids spilling over the River from construction machinery

206. Contamination from Diesel and other fluids spilling from construction machinery over river waters, river bed or river banks, as per description of oil spills given under land.

Mitigation

207. Contractor's contractual obligation to not to let it happen. Should it cross the permissible limits, ways and mean should be adapted to effectively control it according to the standard specifications for limits on spills.

V. Protection of construction work from floods

208. A suitable flood warning system and full arrangements to save the New Construction from floods shall be in position. Flood impact is of high significance and is mitigable.

Mitigation

209. Contractor's contractual obligation to make fool proof arrangements in advance to protect the on going construction works from floods. However the construction is aimed to complete within low flow season.

VI. Effect of surface flow conditions

210. Must be addressed mainly at Design Stage. The impact is significant and mitigable.

Mitigation

211. Design Engineer to accommodate this factor in the design so as to avoid negative impacts. Contractor to follow the Design Specifications meticulously.

7.3.1.3 Air Quality and Noise Pollution**I. Dust and smoke and other pollutants from construction machinery**

212. This impact is inevitable, moderately significant but mitigable.

Mitigation

213. Contractor's contractual obligation to keep the dust and smoke low by using machinery which is well maintenance and is almost noiseless. And all Kacha roads and paths are sprinkled with water many times a day.

II. Dust or other pollutions from stored material

214. This is also inevitable, moderately significant and mitigable.

Mitigation

215. Contractor's contractual obligation to keep the dust and smoke by carefully

storing and distributing the construction material so as to cause minimum dust which again will be within the acceptable limits.

III. Smoke from burning of waste material or burning firewood

216. A large number of big and small fires in the labour camp can produce smoke and smog which can cut off visibility, reduce trafficability and cause suffocation alongwith causing diseases of the respiratory tract.

Mitigation

217. Contractor's contractual obligation to use clean and smoke free fuel in the labour camp. Cutting and burning trees/shrubs for fuel shall be prohibited. Instead Gas Cylinders should be used in the labour camp for cooking purposes.

IV. Noise from use of old or outdated machinery

218. Old and poorly maintained machinery generates higher decibels of noise. If the machinery is new and well maintained, its noise is far too less and is within tolerable limits. Also noise controlling gadgets (ear plugs) can be used to cuts off the noise for those who work in the close vicinity of heavy machinery.

Mitigation

219. Contractor's contractual obligation to use new, well maintained and low noise machinery preferably during day time. The drivers, operators and workers working on or near the heavy machinery must be provided ear plugs.

V. Noise due to blasting

220. Blasting will become necessary to blow up some big rock or an embankment; it will generate noise and particulate matter, all time high shock waves and loud level of spot noise. It can adversely affect the aquatic, terrestrial and aerial life by a sudden release of high level sound and echo.

Mitigation

221. Contractor's contractual obligation not to cause blasts as envisaged in project design. But should it become necessary, it should be done with the permission of Project Director (NHA) and all measure should be adapted so as to minimize the impact of one time blast. All explosions must be performed under specialist supervision.

VI. Soil Compaction due to labour camps, and machinery yards

222. The human and mechanical activity normally compacts the soil and turns it nonproductive.

Mitigation

223. Contractor's contractual obligation to mitigate the impact of compaction and leave the site almost in the same state in which it is occupied. Pictures of the area should be taken before handing it over to contractor which will help the Project Director (NHA) to ensure an acceptable state of soil while getting the area back from the contractor.

7.3.1.4 Biological Resources**I. Damage to biological resources Flora, Fauna (Biota)**

224. Major change is expected in the habitat of the natural flora or fauna of river due to construction activities i.e., piling up of waste materials on natural flow of river. Aquatic life will be disturbed if Contractor deviates from following the EMP.

Mitigation

225. Contractor's obligation not to cause any additional destruction to Flora and Fauna of the area by respecting the limits of construction site and not to enter other territories. No unauthorized tree or bush cutting should be allowed. Should it be necessary, it should not be done without an express permission of the Project Director (NHA). It is contractor's responsibility to maintain the integrity of habitats of fisheries and there should be no loss of sediments into river in this context.

II. Damage to Fisheries

226. The new construction may cause obstruction for fish migration if operation are carrying out carelessly i.e. spoil disposal into river, loss of sediments into river, discharges into river, etc.

Mitigation

227. Easily mitigable during construction phase through implementation of EMP.

III. Impact on migratory birds

228. Kunhar River at the point of the project does not fall on the recognized route of globally recognized migratory water fowl or ducks. However a number

of migratory birds do pass this way and stay for wintering in the project area. Since the water: land ratio is not going to change, there shall be no or slight influence of the new road on the temporary habitat of the migratory water birds.

Mitigation

229. Contractor's contractual responsibility to facilities a regular inspection by the Wildlife Department to ensure that the process of construction does not cause any hindrance to the migratory birds.

7.3.1.5 Socioeconomic, Cultural and Archaeological Issues

230. The socioeconomic cultural and archaeological impacts can be:-

- I. Disturbance to existing services: education, health, electricity, water supply or signboards.
- II. Aggravation of any disputes on land ownership.
- III. Aggravation of any tribal tensions and local rivalries on disputes on river water on aquatic life.
- IV. Access to other construction materials.
- V. Adverse effects on known archaeological sites.
- VI. Chance finds
- VII. Dealing with chance finds.
- VIII. Dealing with graveyards or burials.
- IX. Problems to Health and Safety of labour and employees on construction work and provision of safety equipment to workers on site.
- X. Employment of locals on the project.
- XI. Rise in prices of essential commodities.
- XII. Social reunion over the new road construction..
- XIII. Gender Issues.
- XIV. Recreational facilities for public.
- XV. Any spots of religious significance e.g. Mosques, Tombs and Shrines etc.

Mitigation

1. For matters pertaining to social obligation and benefits of the communities, a social Framework Agreement shall be signed by the Project Director (NHA) with communities to ensure their participation and full satisfaction in matters pertaining to them. SFA shall be signed when the construction work is about to start.
2. Grievance Redress System will facilitate any complainant

3. All matters where contractor is involved, these should be made as his contractual obligations.

8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

8.1 BACKGROUND

231. This chapter describes the potential impacts of the Project on the environmental and social setting of the Project area. The chapter also deals with the proposed actions for mitigation of environmental hazards and resettlement/compensation requirements of the Project.

232. Initial Environmental Examination has been carried out in line with ADB SPS 2009. The assessment has generally been based on the factual site condition in the light of experience gained from similar projects and discussions held with the local communities and knowledgeable people.

233. Impact is any change in environment whether adverse or beneficial wholly or partly resulting from an organizational activity, product or services.

Environmental impact is the repercussions of an activity or specific land use on the physical/social environment as a consequence of emissions, waste disposal, water and power usage, etc.

234. The proposed project locates on Manshera-Naran-Jalkhad-Chilas on N-15.

8.2 ENVIRONMENT MANAGEMENT PLAN (EMP)

235. Environmental Management Plan (EMP) is aimed at mitigating the possible adverse impact of a development project and for ensuring to maintain the existing environmental quality. The EMP addresses all aspects of planning, construction and operation of project, which are relevant to environment. It is essential to implement the EMP right from the planning stage and then continuing it throughout the construction and operation stage. Therefore the main objective of the EMP is to identify the project specific activities that would have to be considered for investigation of the significant adverse impacts and the mitigation measures required. An EMP is actually that part of an overall management plan that includes policy development, organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the environmental program and achieving environmental goals.

236. Environmental mitigation, compensatory mitigation, or more often simply called "mitigation", are terms for systems put in place by the government whereby known impacts to a natural resource are made less severe through performing some type of

environmental work. To "mitigate" means to make less harsh or hostile. It involves Environmental Management Plan. The purpose of the Environment Management Plan is to provide an environmental policy framework to achieve

8.2.1 Objectives of Environmental Management Plan (EMP)

237. The EMP will help the NHA; address the upcoming adverse environmental impacts of the proposed repairing/maintenance of Highways. It will enhance the Project's overall benefits and introduce standards of good environmental practices.

238. The primary objectives of the EMP are to:

- Define the responsibilities of the Project proponents (institutional and organizational arrangements) in accordance with the three Project phases (design, construction and operation);
- Facilitate the implementation of the mitigation measures by providing the technical details of each Project impact, and proposing an implementation schedule of the proposed mitigation measures;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
- Identify training requirements at various levels and provide a plan for the implementation of training sessions;
- Identify the resources required to implement the EMP and outline corresponding financing arrangements; and
- Providing a cost estimate for all proposed EMP actions.

8.2.2 Framework of Environmental Management Plan

239. The Framework of Environmental Management Plan includes identifying and evaluating environmental risk, organizing and managing environmental responsibilities, evaluating the quality of the environment and determining how it is affected by the organizational mission and conducting a self-evaluation of the effectiveness of the EMP in achieving desired levels of environmental performance.

240. Depending on project/development, the scope of EMP encompasses the following areas of concern:

- Civil work for the proposed project
- Operational activities

- Discharges: Effluent and Emissions
- Personal Protective Equipment
- Waste Management
- Waste Water Management
- Biological Hazards
- Emergency Response Plans
- Conservation of Flora and Fauna
- Spill
- Noise Control
- Litter and Solid Waste Management
- House keeping
- Air Quality
- Transportation Management
- Environmental Management
- Environmental Monitoring
- Environmental Audit

8.3 KEY ENVIRONMENTAL AND SOCIAL COMPONENTS

241. The key environmental and social issues associated with this Project are as follows:

- Appropriately locating temporary construction camps, asphalt plants, and waste disposal sites and the environmental impact of operating these facilities;
- Minimizing discharges from construction equipment and inducing pollution abatement controls (vibration and noise etc.)
- Regulating the procurement of borrow material and topsoil erosion during construction;
- Avoiding the obstruction of drainage system during construction and operation;
- Enhancing and maintaining avenue tree plantation along the entire length of the project corridor;
- Minimizing the impact on cultural sites or structures and community-owned assets during construction and operation; and
- Ensuring pedestrian and traffic safety during construction and operation

8.4. ROLE OF FUNCTIONARIES FOR IMPLEMENTATION OF EMP

8.4.1 General

- 242. This sub section describes the methodology required for the implementation of EMP in conjunction with the NHA, and Contractors. The executing agency of the Project will be National Highway Authority (NHA). General Manager NHA (FERP) will be the overall In charge of the Project. The GM NHA (FERP) will delegate the supervisory responsibilities of the Project to the Project Director who will have professional staff supported by a team of consultants including Environmental Monitoring Specialists/Consultants.
- 243. Relevant provincial Environmental Protection Agency (EPA) will act as the overall regulatory body. The specific roles of key functionaries are described hereafter.

8.4.2 National Highway Authority (NHA)

- Project Director
244. The Project Director (NHA) will be responsible for the successful implementation of the Project. He will be assisted by the Supervision Consultants.
- Project Director
245. The project director will ensure that all the mitigation measures committed for the design phase are incorporated in the design and included in the contract documents.
- Project Director
246. Project Director shall ensure that EMP be made a part of the contract agreement
- Director Environment Afforestation, Land and Social (EALS)
247. The Director (EALS) will be the overall Incharge for handling the NHA's obligations with respect to the EMP. The Director (Environment, Social and Land/Resettlement) will depute one environment specialist for the Project, who will be responsible for ensuring that the provisions of the EMP are implemented. In addition, the Environment Specialist will also coordinate with the relevant EPA, provincial Agriculture, Forest and Wildlife departments, NGOs and other public private sector organizations if required.
- 248. Environment Specialist will assist the project director for the execution of Environmental Management Plan (EMP) for each Package of the Project. In

addition, the Environment Specialist will also train the stationed staff on environment related issues.

- 249. Director (EALS) will be responsible for the land acquisition and resettlement related issues (if required).
- 250. EIA/IEE Consultants will prepare a comprehensive EIA and EMP of the Project in compliance with Pakistan Environmental Protection Act (PEPA 1997) and ADB Guidelines (Safeguard Policy Statement 2009).
- 251. Supervision Consultants appointed by the GM NHA (FERP) will be headed by a "Project Manager", who will be an Engineer. He along with his team will supervise the Project contractors to ensure quality of work and fulfillment of contractual obligations. The Supervision Consultants (SC) will provide one Environmental Specialist/officer who will:
 - Ensure that all the environmental and social parameters/provisions comply with the applicable standards;
 - Ensure that day-to-day construction activities are carried out in an environmentally sound and sustainable manner;
 - Organize periodic environmental training programs and workshops for the Contractors' staff and NHA site staff in consultation with the NHA; and
 - Develop "good practices" construction guidelines to assist the Contractors and NHA staff in implementing the EMP.

8.4.3 Construction Contractor

252. EMP shall be made a part of the contract agreement and the contractor will ensure that all Project activities are in compliance with the EMP and NEQS. Construction Contractor shall ensure the following:

- Safe Working conditions; provisions of PPE's to workers
- Traffic signage and control
- Avoid conflicts with locals
- Reporting of every incident/accident to NHA
- Regular monitoring and reporting of compliance with contractual environmental mitigation measures as per EMP.

8.5 SPECIFIC IMPLEMENTATION RESPONSIBILITIES

253. This section describes the implementation and supervision responsibilities for the different phases of the Project:

8.5.1 Design Phase

254. The Director (EALS), NHA and his staff with the assistance of EIA consultant/Environment Specialist are responsible for ensuring that the Project design and specifications adequately reflect the EMP and the Resettlement Policy Framework (RPF). He will ensure the Project's compliance with environmental regulations and donor requirements; and ensure stakeholder participation in the Project design.

255. The responsibilities of Director (EALS) are described as follows:

- To coordinate with regulatory agencies including EPAs, EIA consultant, local NGOs, that could assist the NHA in independent reviews of environmental and social compliance;
- To supervise environmental and social assessment reports, and provide substantial inputs and guidance to the EIA consultants;
- To get the approval of EIA from the relevant provincial EPA; and
- To ensure that the design consultant has incorporated all the mitigation measures proposed for the design phase in the design and included in the contract documents.

256. The NHA's Deputy Director (EALS) will ensure that the following activities are carried out in a transparent manner and according to the acceptable standards:

- Identifying and verifying Project affected persons (PAPs) on the basis of specified documents;
- Identifying alternative resettlement sites for PAPs outside the RoW;
- Carrying out a consultation and dissemination campaign with regard to compensation procedures, entitlement packages, and proposed alternative resettlement sites;
- Preparing individual entitlement files;
- Preparing and approving compensation budgets;
- Ensuring that an adequate notice period is given to PAPs before shifting; and
- Providing shifting assistance to displaced squatters and to assist squatter owners to salvage their facilities as per ADB guidelines (SPS 2009).

8.5.2 Construction Phase

257. The NHA will appoint Supervision Consultants, who along with the Deputy Director (EALS) and Environment Specialist will oversee the working of contractor in accordance with the EMP:

- The Supervision Consultant will liaise with the Project staff to monitor environmental compliance during the construction
- He will supervise the construction and provide technical support to help ensure compliance with the EMP
- The Supervision Consultants will assess the environmental impact of road/bridge construction
- He will monitor the progress of work and adherence of the contractor to the EMP and Resettlement Action Plan and
- He will direct the Contractor to work in such a manner that all Project activities are in compliance with the EMP and NEQS.

8.5.3 Operation Phase

258. The Deputy Director (EALS) and the staff will be responsible for the following:

- Coordinating with the operational staff working under the Project Director to monitor environmental compliance during Motorway operation;
- Advising on, and monitoring tree plantations along the Highway;
- Reporting on the progress of environmental compliance to the federal and relevant provincial EPA (if required);
- Assessing the long-term environmental impacts of highway operation;
- Sustaining a working partnership among the NHA, Relevant provincial EPA, relevant Agriculture, Forest and Wildlife department, NGOs and other related public private sector organizations; and
- Reporting to Director (EALS) about progress of the work, who will report to GM NHA (FERP)

8.6 ENVIRONMENTAL ASPECTS

8.6.1 Civil Work

259. National Highway Authority (NHA) during civil work will ensure:

- Reconcile environmental and safety conflicts
- Communicate responsibilities to the individuals
- Communicate safety procedures to the relevant staff and contractor
- Develop mechanism of interaction between NHA managers and Contractors
- Handle all materials safely
- Enforce the use of PPEs
- Provide information related to fire extinguishers
- Provide information related to first Aid

8.6.2 Construction Operations

260. The following measures should be adopted by NHA during construction operations:

- Gaseous Emission

261. The gaseous emissions from the Mixing plant, Compressors, Generators and other machinery involved in road construction will be monitored as per the legal requirement of the country and the contractor should be forced to keep the gaseous emission within the limits set by NEQS.

- Vehicle Operation

262. National Highway Authority (NHA) has to develop a procedure for the safe movement of vehicles within the site. Mostly, cars, four-wheel drive pickups, fork lifters and trucks will be used for transporting people and equipment around the proposed project area. The control measures given below will apply to the transportation:

- Limit vehicle speed to avoid accidents.
- Allow vehicles which are properly tuned and which do not emit abnormal exhausts.
- Allow vehicles with proper exhaust mufflers (silencers).
- Ensure that the vehicles are not washed or repaired in the proposed facility. In case it is unavoidable, ensure that the effluents/washings are not released before treatment.
- Periodic checks for leaks under all operating vehicles; contaminated soil should be removed by proper disposal.

8.7 EMERGENCY PLAN

263. National Highway Authority (NHA) will develop an Emergency Preparedness and Response Procedure to handle any emergency arising during any operational activity:

- Large scale leakage oil and any other hazardous material (over 200 liters).
- Uncontrolled fire in diesel or oil tanks etc.
- Accidents related to health; falling, cuts, broken bones etc.

8.8 ENVIRONMENTAL MANAGEMENT

264. NHA shall ensure that Contractor demonstrates high environmental performance by controlling the impacts of the activities especially those affect the environment. The contractor control the hazards identified by the risk assessment in alignment with the environmental policy & objectives.

8.9 MONITORING

265. The success of any environmental management plan depends upon effective monitoring. NHA will ensure strict adherence to the environmental control measures and disciplines through monitoring. Monitoring activity will also provide a record of all incidents of environmental significance and related actions and mitigation measures. In addition, it will facilitate the evaluation of effectiveness of the control measures and the identification of any additional mitigation measures needed. NHA shall also ensure that all activities are carried out in accordance with ADB's SPS 2009. NHA shall submit quarterly environment performance report to ADB.

8.9.1 Monitoring Approach

266. The following types of monitoring will be conducted during the construction activity by NHA:

- Confirmation through Rapid Environment Assessment (REA) Checklist and Pakistan Environmental Protection Act (PEPA) 1997, regarding the indication of the monitoring category in which the proposed construction project will fall.
- Environmental monitoring will be carried through a certified environmental laboratory as per country's requirement.
- NHA will conduct monitoring of gaseous Emission, dust and Effluents (if required) as per the regulatory requirements.

8.10 ENVIRONMENTAL MITIGATION PLAN

267. The Environmental Mitigation Plan based on the mitigation measures is presented in Table below:

Table - 8.1 Environmental Mitigation Plan (EMP)

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
PRE CONSTRUCTION ACTIVITIES								
Cultural properties	Impact on Mosques, madrasas, graveyards and archeological sites	Social Impacts	To be checked all along the project corridor	At planning Stage	Low (existing alignment)	<ul style="list-style-type: none">• Construction activities avoid any interference with cultural heritage sites.• In case of unavoidable interference prior notification and consultation needed for consensus on options e.g. relocation/rebuilding) or any other form of agreed compensation	NHA in bid documents for contractor, Environment Specialist	NHA / Environment Specialist/supervision consultant
Planning Material Balance	Avoidable loss of agricultural land for dump sites, borrow area Avoid dumping spoiled materials on		To be checked all along the project corridor	At planning Stage	Low	<ul style="list-style-type: none">• Prepare material plan	Contractor	NHA/supervision consultant

	nearby water Bodies							
Planning site activities	Construction causes danger to workers, locals	Health & Safety	To be checked all along the project corridor	At planning Stage	Low	<ul style="list-style-type: none"> • Prepare healthy and safety plan 	Contractor	NHA/supervision consultant
Flora	Cutting of trees of different species	Botanical / Ecological Impacts	Within the ROW	At planning stage	Low (existing alignment)	<ul style="list-style-type: none"> • The sufficient amount of planting will be done on the both sides. • If a tree of rare species is growing within the ROW and is required to be removed. It will be uprooted and transplanted in close consultation with the forest department. 	Contractor	NHA/supervision consultant

CONSTRUCTION PHASE								
CAMP SITE AND CONSTRUCTION WORKS								
Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
1. Grievance Redress								
Grievances	Social Impact	Social Disputes	Valid for entire construction area throughout construction period	Throughout Project Corridor	low if recommendations are followed	Official in charge of people's Grievance will be designated. A leaflet outlining environmental protection measures and listing grievance contact points will be Distributed. Community leaders will be given detailed information on the grievance management process NGOs will be informed in the same manner as the community leaders.	PMU, Contractor	NHA, supervision consultant, Contractor, Grievance Specialist

Construction Camps	Physical	<p>Damage of topsoil</p> <p>Contamination related to fuel storage and fuelling operations</p> <p>Sewerage related contamination</p> <p>Waste Management</p>	Valid for entire construction area throughout construction period	Throughout Construction	Low if recommendations are followed	<p>Proper construction camp management in compliance with Construction Camp Management Plan</p> <p>Proper waste management in compliance with Waste Management Plan</p> <p>Proper spill management in compliance with Spill Management Plan</p>	Design Engineer, Contractor	NHA, , supervision consultant Environment Specialist, Contractor
Utilities								
Public Utilities	Social Impact	<p>Damage to gas or water pipelines.</p> <p>Disconnection & distortion of phone line</p>	All along the construction site	During Construction	Medium	All public utilities likely to be impacted, such as gas and/or water pipes, power and/or phone lines etc. must be relocated to suitable places, in consultations with respective agencies	Contractor	NHA, Environment Specialist, Contractor
Site selection and operation of construction camp.	Socio-cultural Environmental Acceptability to public/owner; Friction with	Sanitary waste disposal, solid waste (Kitchen waste) disposal, fuel leakage. Noise	Several sites along roadside for construction camp sites	Throughout construction period	Low if recommendations are followed.	<ul style="list-style-type: none"> Prior consultation with local Contractor need to obtain NOC for sitting work camps & workshop, or agreement made with the landowner 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Store materials Human activities on site Travel to / from construction camp	residents	and additional traffic. Water usage of pollution				<ul style="list-style-type: none"> Site construction to be supervised Proper storage and fencing/locking of storage rooms containing hazardous material Setting up of complaints office, advertising ways to voice complaints 		
Site restoration after the contract completion	Loss of roadside vegetation/assets and plantations if any in an area of scarce biodiversity and dissatisfaction on rehabilitation measures after completion	Loss of Plants in an area with already scarce biodiversity, and loss of functional benefits from roadsides plants	All along route, campsites	Long lasting	Medium	<ul style="list-style-type: none"> Manage design to minimize removal of roadside plantation Apply flexibility in decision in reducing locally the shoulder with. Plan for compensatory planting for each felled 10 plants of similar / local flora species Contractor will provide plan for removal & rehabilitation of site upon completion Photographical and botanical inventory of vegetation before clearing the site Disallow introduction of exotic species or species with known environmental setbacks (eg Eucalyptus etc.) 	Design Engineer, Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of	Potential	Where the	When the	Magnitude	Mitigation Measures	Institutional Responsibility
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	Impact	Impacts on Environment	Impact is likely to happen	Impact is likely to Occur	of Impacts		Implementation	Supervision
Creation and burning of wastes at or near camp sites	Solid liquid waste generated and air pollution associated with burning garbage	Air pollution associated with burning garbage	Along campsites	throughout construction and after math	Medium	<ul style="list-style-type: none"> • Incorporate technical design features for refuse collection containers at sites that would minimized burning impacts • Devise plan for safe handling, storage and disposal of harmful materials • Disallow burning 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
Safety & Accident Risks								
Construction Activities and Accident Risks through transportation of material through labor	Health & Safety	Minor And major injuries, can even lead to fatalities in case of ignoring safety practices	Various construction sites throughout project corridor	During construction	low	<p>Safety signals will be installed on all temporary routes During construction. Strict enforcement of traffic rules and regulations.</p> <p>Workers will be provided safety equipment such as helmets, masks, and safety goggles.</p> <p>A readily available first aid unit, dressing</p>	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

						<p>Materials, ambulance, and nursing staff will be ensured at critical locations.</p> <p>Road safety education will be imparted to drivers of construction vehicles.</p> <p>Traffic management will be ensured during Construction periods.</p> <p>Information dissemination through newspaper, radio and/or TV and banners etc. about project time frame, activities causing disruption and temporary arrangements for public relief must be ensured.</p>		
Loss of Access	Traffic congestion	Air pollution & fatigue	Various construction sites throughout project corridor	During construction	Minor if properly mitigated	<p>Alternatives and temporary accesses will be provided at all interchanges, bridges, and culverts in congested areas. Such diversions will have proper drainage facilities. A comprehensive</p>	Contractor	NHA, Environment Specialist, Contractor
Health and	Health risks if		Valid for	At	High	Drainage, sanitation, and waste	Contractor	NHA,

safety at work place	work conditions provide unsafe and/or unfavorable work conditions		entire construction area throughout construction period	establishment of camp sites and construction period		<p>disposal facilities will be provided at work places.</p> <p>Drainage will be maintained to avoid waterlogging, which leads to mosquitoes and disease.</p> <p>Suitable sanitation and waste disposal facilities will be provided at camps by means of septic tanks and soakage pits, etc. Sufficient water supply will be maintained at camps to avoid water-related diseases and to secure workers' health.</p> <p>Health education & preventive medical care will be provided to workers.</p> <p>Routine medical checkup of workers to avoid Communicable disease</p> <p>Provide basic medical training to specified work staff, and basic medical services and supplies to workers</p>		Environment Specialist, Contractor
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						<ul style="list-style-type: none">• Layout plan for camp site indicating safety measures taken by the contractor, e.g. fire fighting equipment, safe storage of hazardous material, first aid, security, fencing and contingency measures in case of accidents• Work safety measures and good workmanship practices to ensure no health risks for laborers• Protection devices (ear muffs) be provide to the workers operating in high noise generating machines, blasting• Proper maintenance of facilities for workers• Regular pest control measures in dormitories• Obligatory warning of work staff if pest hazard is imminent or detected• Awareness campaigns for protection from AIDS / HIV / Hepatitis		
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Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
Digging borrow pit areas	Physical environment	Borrow pit collect water, material mosquitoes	The entire length will require fill to raise the level of the carriageway	Early in construction	Low	<ul style="list-style-type: none"> Inspection of sites The work will take place on existing alignment, therefore not much borrow material will be required Borrow pits shall be dewatered and fences should be provided as appropriate, to minimize health and safety risks. 	Digging borrow pit areas	NHA, , supervision consultant Environment Specialist, Contractor
Excavation of earth from borrow areas, Embankment works, cutting operation, embanking, clearing of vegetations	Change of topographic characteristic, loss of topsoil, impact on agriculture, Soil Erosion, loss of vegetation and habitat	Aesthetics, water storage, w seepage, Agricultural impacts, soil erosion, interrupting pathways	Borrow areas at/near agriculture and irrigation area / elsewhere, At all sites where high embankments are required, e.g. near bridges	During construction	Medium	<ul style="list-style-type: none"> Agricultural areas be avoided for borrowing of materials Contractor needs to obtain approval from NHA for excavation and for plan of rehabilitating site after excavation Take off top soil, & reintroduce after returning to nature Areas with strong flash flow, high embankments be provided to minimize soil erosion. Stone pitching / retaining wall at high embankments in critical areas As applicable and needed, 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

						plantation of grasses and shrubs will be done for slope protection <ul style="list-style-type: none"> • Soil erosion check measures such as the formation of sediment basins, slope drains, etc adopted • Soil erosion along the road be visually checked as in EMP • Ensure adequate crossings • Construction of bridges or underpasses where required 		
--	--	--	--	--	--	---	--	--

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
Quarrying materials	Physical environment	Cuts scar natural hillsides	In mountain section	During construction	Low fill should be available	<ul style="list-style-type: none"> • Use existing quarry sites 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Acquisition of sub base material procurement of construction materials	Degradation of existing river beds, alternation of surface and groundwater regime, land-use conflicts, Soil erosion, change of hydraulic patterns and landscape degradation by use of quarries & borrow area	Some erosion may occur	At agricultural sites and at demarcated areas quarries and borrow areas	Long lasting effects	Medium	<ul style="list-style-type: none"> Excavation in farmlands and at river beds be prohibited, unless authorized by local irrigation departments responsible for river works Maximum use of existing quarries from approved and in use quarry sites Selection through community consultation, which could subsequently be developed into fishponds or other productive purposes River excavation be executed in close cooperation and upon approval from relevant authority No productive land or land adjacent to agricultural / irrigated land will be used Non-productive, barren lands in broken terrain, nullahs and publically recognized waste lands should be given preference as been recommended for borrowing materials Aggregate required for road construction procured from quarries need approval from relevant authority. 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
--	--	------------------------	---	----------------------	--------	---	------------	--

						<ul style="list-style-type: none"> Extraction of sand and gravel in river beds shall be prohibited except (I) where feasible alternative, and (II) provided specific mitigation measures are implemented to minimize impacts on river morphology, water quality (e.g. turbidity), and ecosystems (e.g. reduced extraction during fish spawning period). 		
Constructing pavement Laying base course Clearing surplus	Physical Environment Runoff of hydrocarbons during "curing" period	Noise and dust, water	All along road surface	During construction	Low if adequate precautions taken	<ul style="list-style-type: none"> Supervision of construction to ensure proper techniques Lay asphalt during dry periods only 	Contractor	NHA,, supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
Laying of asphalt	Physical Environment	Emission of dust and fumes from asphalt plat; Runoff of hydrocarbons during "curing" period	In asphalt batching and plant area One length of road where surface laying is taking place	In latter stages of construction Within 48 hours of laying of asphalt	Low Low if laying of asphalt does not occur in rain	<ul style="list-style-type: none"> Ensure Workers use appropriate clothing Lay asphalt during dry periods 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
Construction of structures, bridges / culverts.	Socio-cultural	Severance to local population	At points where road crosses established tracks	During construction	Low if provision for crossings is gives	<ul style="list-style-type: none"> Ensure provision of adequate crossing points Work on irrigation canals shall be kept to a minimum to avoid disrupting water supplies to crop lands. Damaged irrigation canals shall be repaired immediately. 	Contractor	NHA, Environment Specialist, Contractor
Planting trees	Ecological	Introduction of appropriate species	Alongside new road	After Construction	Medium	<ul style="list-style-type: none"> Use Forest Departments to select appropriate plats. Require approved plan to be prepared and used Planting scheme to include shrubs close to road as barrier 	Forestry Department	NHA, , supervision consultant Environment Specialist, Contractor
	Socio-cultural	Trees create safety hazard	Where tress are planted	Once trees have matured	Medium			
Removal of Construction Camp	Socio-cultural	Adverse effects on residents	At camps	After completion of construction	Low if correct closure plan implemented	<ul style="list-style-type: none"> Supervise and enforce closure plan Monitor 	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
Closure plan								
Clearing site	Damage not restored on departure					<ul style="list-style-type: none">Borrow roads made good on completion of the contractSupervise and enforce closure plan. Monitor	Contractor	NHA, , supervision consultant Environment Specialist, Contractor
Discharge Control								
Drinking water	Water born disease	Workers/labor health	Const camp	Throughout construction period	medium	<ul style="list-style-type: none">Contractor will ensure the Provision of safe drinking water to all the workers/ labourWater quality should conform WHO standardsShould be reconfirmed once during construction phase	Contractor	NHA,, supervision consultant Environment Specialist, Contractor
Waste water discharges	Water pollution	Contamination of water sources	Contractor Camp sites	Throughout construction period	Low	<ul style="list-style-type: none">Suitable sanitation and waste disposal facilities will be provided at camp by means of septic tank linked with soaking pits.All discharges should be in compliance with NEQS through a certified laboratoryShould be verified on monthly basis	Contractor	NHA, , supervision consultant Environment Specialist, Contractor

Vehicular movement and operation of machineries	Emission from construction vehicles and machinery, causing public health risks, nuisance and other impacts on the bio-physical environment	Dust and other emissions	Workshops at Contractor Camp sites	Throughout construction period	Low	<ul style="list-style-type: none"> All temporary service and access roads be regularly to minimize the dust generation: Haul roads to be dust controlled, all vehicles carrying loose friable material to be covered All machinery and plants will be placed at min. 1 km at downwind direction to human settlements All vehicles, equipment and machinery used for construction be regularly maintained to ensure that the pollution emission levels conform to the NEQS Air quality parameters be monitored at determined sites on monthly basis Incorporate design features enabling continuation traffic flow and traffic jams Water will be sprinkled to avoid kick off dust. 	Contractor Approved Labs	NHA,, supervision consultant Environment Specialist, Contractor
Operation of asphalt mix plants, crushers, etc	Dust generation from construction machineries	Dust emissions from crusher and screening plant Emission of dust and	At sites of plants, crushers	Throughout construction period	High	<ul style="list-style-type: none"> Ensure precautions to reduce the level of dust emissions from, mixers, plants, crushers and batching plants, eg providing with dust extraction 	Contractor	NHA, supervision consultant, Environment Specialist,

	causing health risks to operating workers, impact on biophysical environment	fumes from asphalt plant				units. Crushers to be fitted with dust suppression equipment. Plant to have suppression equipment. <ul style="list-style-type: none"> • Water will be sprayed in lime / cement and earth mixing sites • Work safety measures like dust masks and appropriate clothing be used to ensure no health risks for operators • Equipment be well maintained • Asphalt plants be located 1 km away from populated areas (downwind) and may have wet scrubber 		Contractor
Transportation of materials, and other construction activities that create dust and emissions	Dust and emissions from machineries causing health risks to operators impacts on the bio-physical environment		Throughout Project Road Construction sites near the major settlements	During construction	Low	<ul style="list-style-type: none"> • Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on existing road. • Ambient air quality monitoring be carried out in accordance to the EMP • If monitored parameters are above the prescribed NEQS-limits suitable control measures must be taken 	Contractor	NHA, supervision consultant, Environment Specialist, Contractor

Project Activities	Type of Impact	Potential Impacts on Environment	Where the Impact is likely to happen	When the Impact is likely to Occur	Magnitude of Impacts	Mitigation Measures	Institutional Responsibility	
							Implementation	Supervision
FAUNA AND FLORA; Wildlife & adjacent ecological sensitive areas								
Access to sensitive areas fragile ecosystem	Poaching on wildlife plants, disturbance of river habitats	Disturbance to ecological sensitive area adjacent or near t roads	Near river banks	Throughout construction period	Low	<ul style="list-style-type: none">• The use of fire wood for cooking and execution of works be prohibited• No open fires be allowed• Restoration of vegetated areas• Strict instruction from the Contractor to work staff (particularly the cooks) with respect to poaching local wildlife• Signage for wildlife crossing to raise attention• Assist in public awareness programs• Special bushes / plants for sandy areas along road way• Patrolling and enforcement	Contractor	NHA, supervision consultant, Environment Specialist, Contractor
Use of local resource and products	Competition for natural resources, e.g. with farmers,		Agricultural area with tube well and canal irrigation	Throughout construction period	Low	<ul style="list-style-type: none">• Water supply / sanitation facilities labor not exacerbate the existing shortages and environmental hazard;	Contractor	NHA, Environment Specialist, Contractor

	livestock raisers and nomads for range land & water		limited water availability			<p>Contractors should primarily seek its own sources of water by deep well boring at 4-5 locations in due distance (min. 1 km) from local user's wells.</p> <ul style="list-style-type: none"> • Ensure labor do not exploit adjacent forest resources is ban on tree cutting 		
Archeological Sites								
Encountering archaeological sites during earth works and construction	Impacts of historically important sites and damage to fossils, artifacts, tombs, structure etc, as defined in 1975 Antiques Act.	If Sites of Special interest not identified and flagged the contractors may inadvertently cause damage	Throughout entire project area, including borrow sites	Throughout construction period	Low	<ul style="list-style-type: none"> • Carrying archaeological inspection identifying all sensitive areas prior to construction. • In case of finding any archaeological artifact, structure, tomb etc the Contractor needs halt all works at once and contact Archaeological Department. • Contractor has the duty to secure the sites against and intrusion until the archeological expert will decide on further action 	Contractor	NHA, supervision consultant, Environment Specialist, Contractor

Environmental Enhancements								
Roadside Landscape Development			Various construction sites throughout project corridor	During construction	Low	Avenue plantation of mixed specie aesthetics trees, shrubs, and aromatic plants will be carried out.	Contractor	NHA, Supervision consultant, Environment Specialist, Contractor
Roadside Amenities			Various construction sites throughout project corridor	During construction	Low	Provision of bus shelters, bus bays, petrol pumps, restaurants, recovery areas and truck stops as per detailed design will be carried out. Road furniture including footpaths, railings, traffic signs, speed zone signs, wildlife warning boards, etc. will be erected at suitable places	Contractor	NHA, supervision consultant, Environment Specialist, Contractor
Cultural Properties	Socio economic /cultural		Various construction sites throughout project corridor	During construction	Low	All cultural properties will be enhanced and the access roads will be provided, wherever required	Contractor	NHA, supervision consultant, Environment Specialist, Contractor

Table - 8.2 Cost Estimates for Environmental Management

Sr. #	Item	Rs.
1	Water sampling & testing	58,000.00
2	Vehicular Emission testing	200,000.00
3	Air Quality Monitoring	650,000.00
4	Purchase of PPEs	350,000.00
5	Maintenance of equipment	600,000.00
6	Traffic Management	350,000.00
7	Water Sprinkling	400,000.00
8	Waste Disposal	500,000.00
9	Waste Water Treatment	500,000.00
10	Environment Compliance (Expert visit)	100,000.00
11	EHS Training	50,000.00
TOTAL		3,758,000.00

9. GRIEVANCE REDRESSAL SYSTEM

9.1 INTRODUCTION

- ADB maintains Social Safeguard Standards in its all funded projects.
- NHA will maintain these Safe Guard Standards at FERP works.
- The Grievance Redressal Unit is set up to assist members of the community, contractors, vulnerable groups and especially women seeking to redress their grievances, if any.
- The grievances redressal process is outlined in the Grievance Redressal System. GRS serves as a systematic mechanism to address grievances and provides an investigatory function for complaints that may arise during development work.

9.2 GRIEVANCE REDRESSAL UNIT

268. The GRUs will examine complaints received from community, vulnerable groups & women against grievances caused due to project work.

9.2.1 Expected types of Complaints:

269. Scope of the grievances handled through GRU is not limited to but includes the following

- Damage to environment,
- Damage/access to natural reservoirs,
- Impact on livelihoods,
- Violation of rights,
- Damage to property,
- Any other inconvenience caused by project work.

9.2.2 Types of Complaints which cannot be addressed.

- Grievances clearly not related to the project
- Complaints constituting criminal activity & violence
- Labor related issues
- Issues related to governmental policy & governmental institutions

9.3 GRIEVANCES REDRESSAL PROCESS

9.3.1 What can be a grievance?

- 270. A grievance as concern or complaint can be raised by an individual or a group within communities affected by project work. Concerns and complaints result from either real or perceived impacts of project work, these may be raised in the same manner.

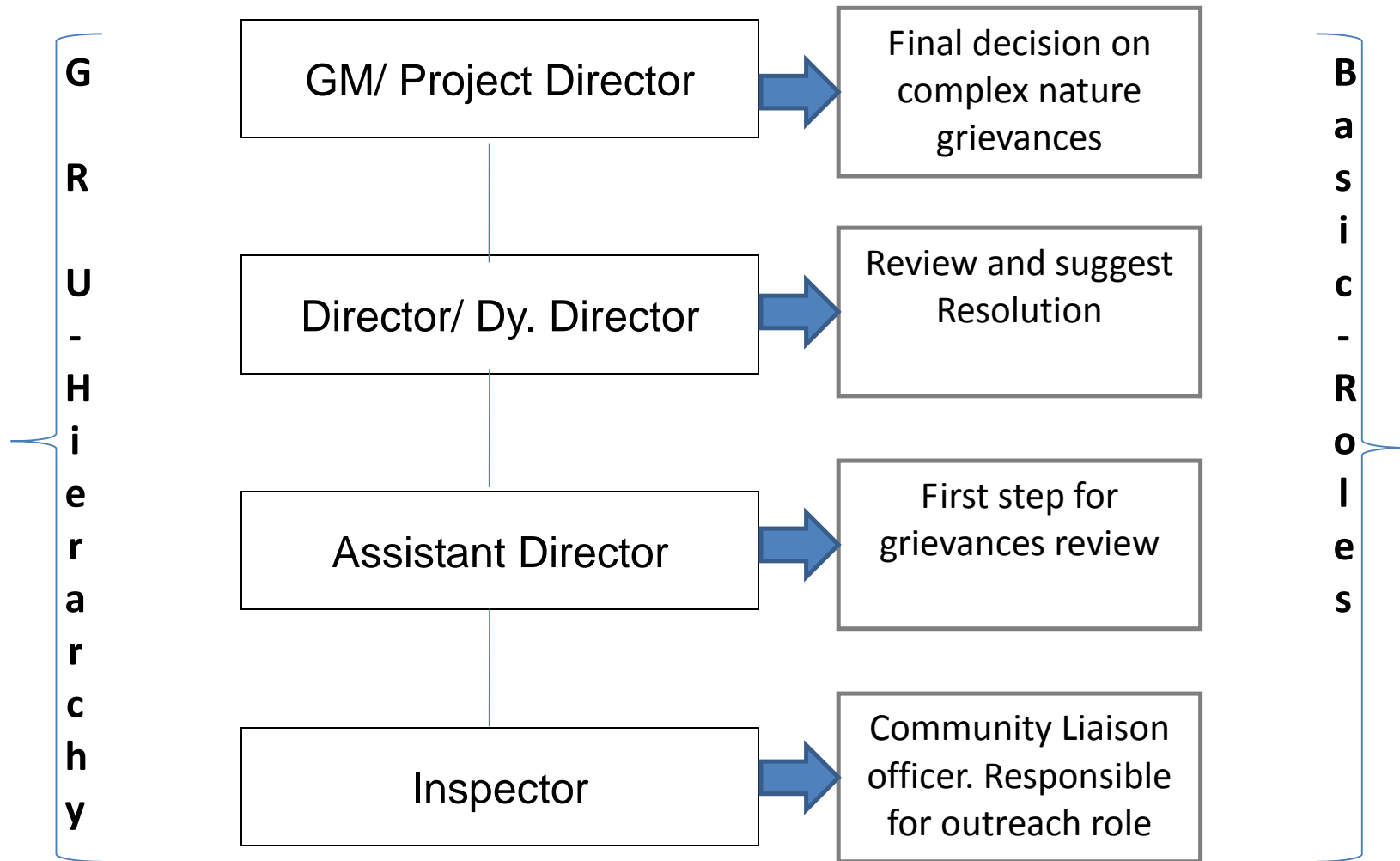
9.3.2 Grievance Resolution Process (Figure 1, 2 & 3)

- Receive & register the complaint, take contact details of the complainant
- Issue acknowledgment receipt
- Thereafter call for the opinion of concerned “Dy. Director in consultation of Director”. Raise complex issues to the level of GM/ Project Director
- After receiving comments, Asst. Director briefs the complainant about solution to the problem and communicates timelines

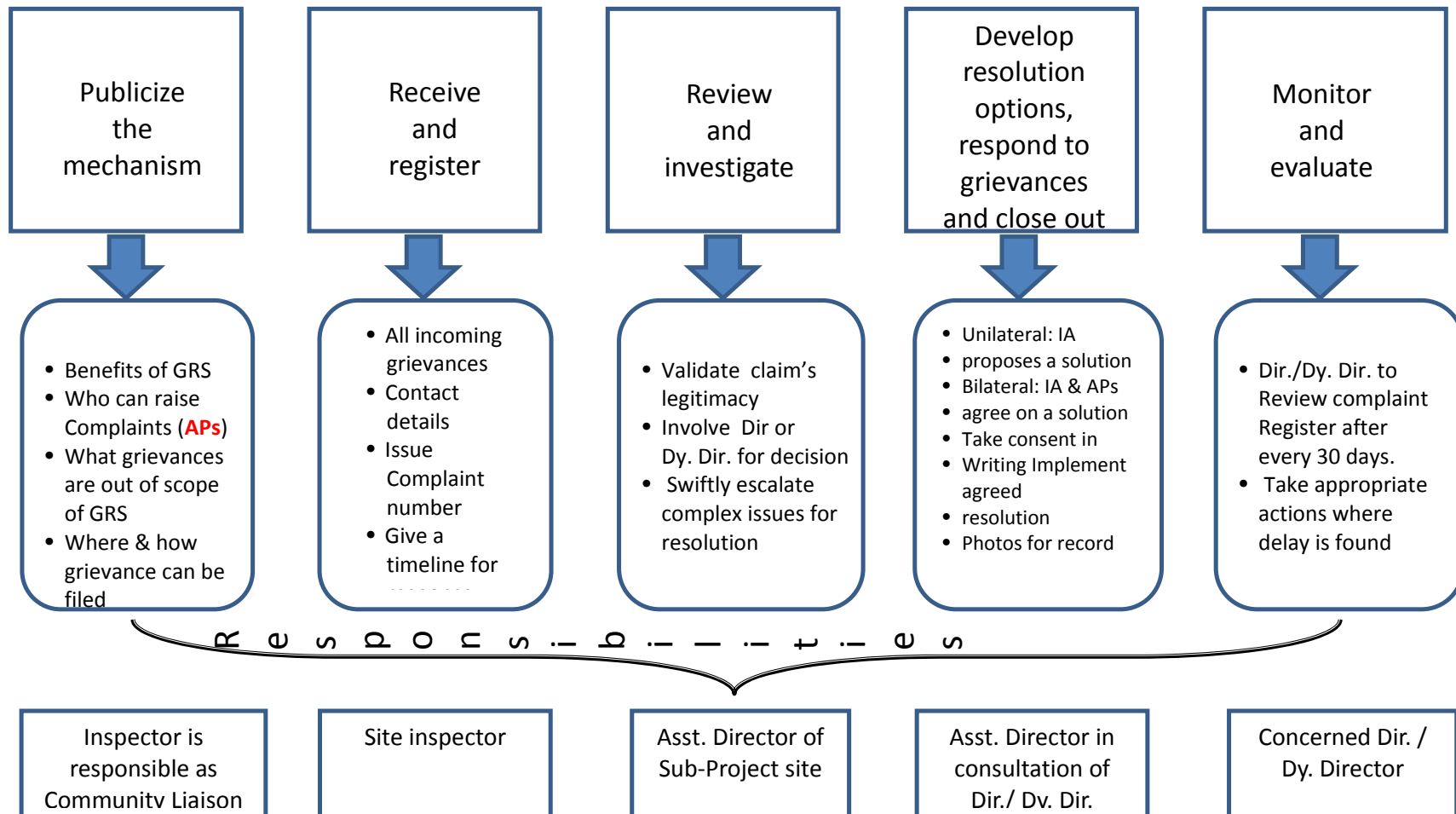
9.3.3 Timelines

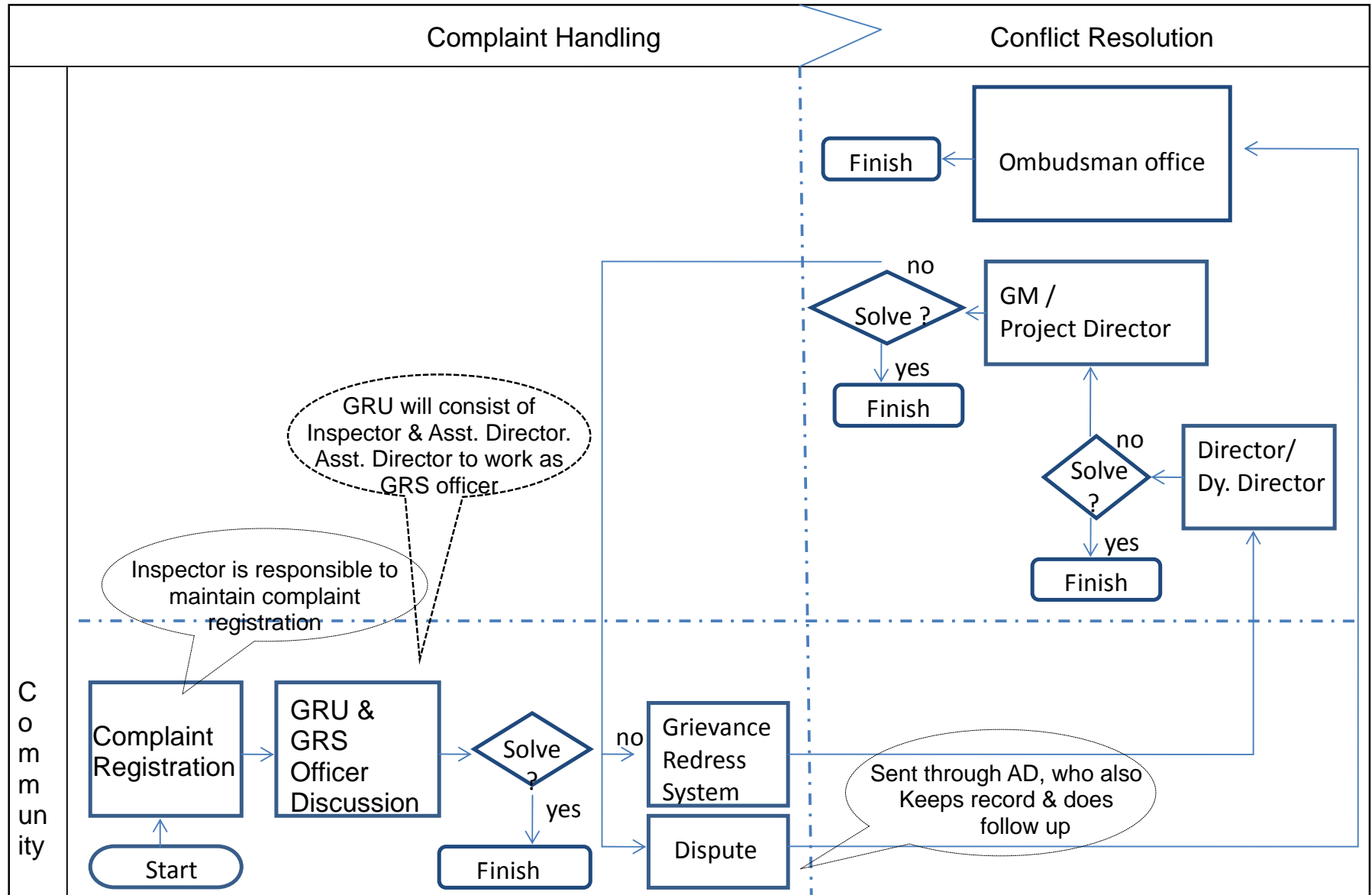
Day One	Day 1 -4	Day 5	Day 7
Grievance Registration	Consultation with Director / Dy. Director	Solution to grievance	Communicate solution to grievance with final date for resolution.

GRIEVANCE REDRESSAL UNIT COMPOSITION



FIVE PROCESS STEPS OF GRIEVANCE MECHANISM





9.3.4 Other options for Grievance Redressal

- Even if a grievance redressal system is offered, affected communities may still choose to opt for other dispute resolution mechanism.
- GRS will not negatively impact opportunities for complainants to seek any other source.
- In case of disagreement with NHA on grievance resolution, the affected person/community will be informed about the functions of Ombudsman office and how a grievance can be lodged.

9.5 REDRESSAL SYSTEM FOR CONTRACTORS

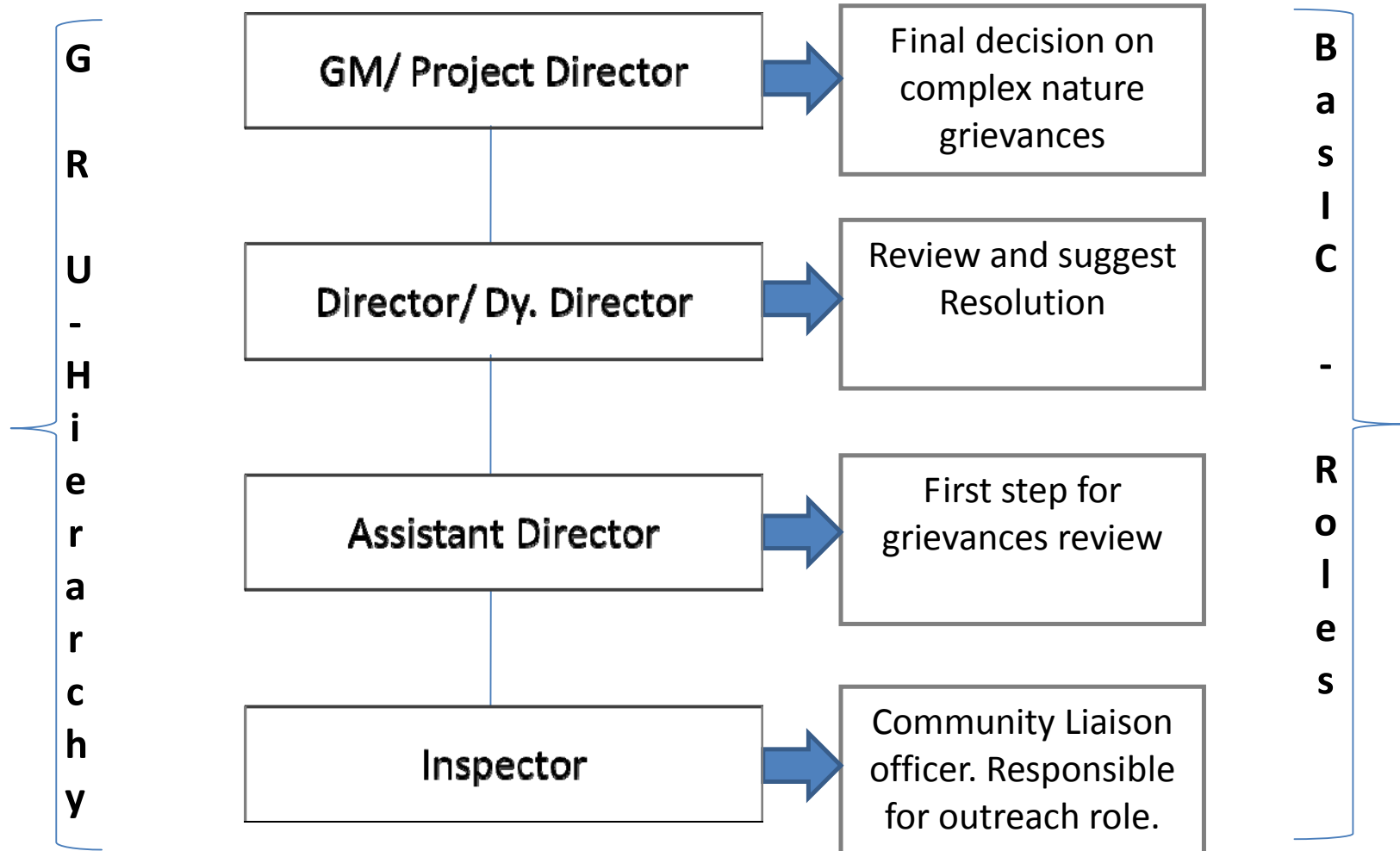
9.5.1 Features of the GRS

271. Implementation of GRS at sub-project level will offer locally tailored solutions and will cater to local needs and incorporate provisions to accommodate different groups within communities – especially the disadvantaged i.e. minorities, marginalized groups & especially women.

272. Following will be the features of GRS to make it effective and useful.

- Responsive to their customary ways of resolving grievances
- Simple & understandable
- Culturally appropriate
- Accessible
- No cost involved
- Transparent
 - They will know who in NHA is responsible for handling complaints
 - They will Possess sufficient information on how to access it
 - They will be informed about timelines & expected date of resolution

GRIEVANCE REDRESSAL FOR CONTRACTORS



10. ENVIRONMENTAL FINDINGS, RECOMMENDATIONS AND CONCLUSION

10.1 ENVIRONMENTAL FINDINGS AND RECOMMENDATIONS

273. Most of the adverse environmental and social impacts of the Project will be associated with the construction phase. Except for resettlement issues which would need to be addressed carefully, the remaining impacts associated with the construction phase will be temporary, reversible, phased over a period of time, localized and manageable.

274. The air quality was analysed and found reasonably clean and no any obvious source of air pollution was located in the vicinity of the project area of influence. However there are kacha paths and may cause dust pollution during traffic movement. Air quality shall be controlled by regular spraying of water on kacha paths. All vehicles, machinery, equipment and generators used during construction activities will be kept in good working conditions to minimize the exhaust emissions. Cutting & burning trees and shrubs as a fuel shall be prohibited and clean source of energy should be provided at the contractor's camp e.g. gas cylinders etc. Noise, air quality and water sources shall be monitored periodically, as specified in IEE report. All the work activities should be restricted within the allowed working hours.

275. There is not any designated environmentally protected, archaeological site or cultural heritage site falling within the direct project area of influence. The Project will not have any significant impacts on fish, fishermen communities, wildlife and wildlife habitat. However, monitoring measures have been recommended to ensure that any unforeseen impacts can be identified, compared with baseline and mitigated during the implementation stage. All forest, wildlife and fisheries laws should be fully respected and abided by the contractor and his work force.

276. During construction, the Contactor's work force is expected to be largely available from the local population, which will enhance the economic opportunities for the locals of working age group. Socioeconomic conditions of the project area will generally have positive impacts due to the project implementation i.e. availability of jobs during construction phase.

277. The Project will also improve some of the social infrastructure as part of the repair and rehabilitation. The representation of women and other vulnerable groups will be ensured in the Project benefits.

278. It is very important to protect the water sources during the construction phase from accidental spills of diesel or any chemical, as any spill could percolate to the groundwater through the sandy stratum at site. All the solid waste and wastewater generated from the project activities and contractor camp shall be disposed-off according to the waste disposal plan, which would be a component of the EMP.

279. The proposed project will bring about a net-positive benefit in terms of improvement of the area. Continuous environmental monitoring will be carried out for the entire construction phase, to ensure due diligence of environmental performance. The EMP will also ensure reporting of all non-conformances and their rectification within a specified period of time along with safety, health and environment (SHE) audits.

10.2 CONCLUSION

280. It is anticipated that all environmental and social issues involved during the construction and operational phase of the project are manageable, therefore it is concluded that the project is environmentally friendly, financially viable, economically sustainable, generally neutral and pro-poverty alleviation.

ANNEX A: FORMS AND QUESTIONNAIRES

Name of Interviewer: ----- Date: -----

(a) Settlement: ----- (b) Union Council: -----

(c) Tehsil: ----- (d) District: -----

1. Name of Respondent -----?

2. What is your father's name -----?

3. What is your age?

Age years 15 – 25 -----

25 – 35 -----

35 – 45 -----

Above 45 -----

4. Marital Status.

1. Married 2. Unmarried

5. What is your caste /ethnic group-----?

6. What is your language-----?

7. What is your educational qualification?

1. Illiterate 2. Primary 3. Middle

4. Metric 5. Intermediate 6. Above

8. What is your profession-----?

9. What is your average monthly income?

Income Rs.	Less than 5,000	-----
	5,000 – 10,000	-----
	10000 – 15000	-----
	15,000 – 20,000	-----
	Above 20,000	-----

10. What is type of your family system?

1. Joint 2. Nuclear

11. Do you marry outside your tribe?

1. Yes (Exogamy) 2. No (Endogamy)

12 What is employment status of your family members

1. Govt. Employee	2. Private Employee
3. Self Employed	4. Unemployed
5. Household	

13 What are your major sources of income

1. Agriculture	2. Cattle (meat, hides & wool)
3. Trade /Business	4. Poultry

- | | | | |
|----|---------------|----|--------------------|
| 5. | General Labor | 6. | Milk /Ghee Selling |
| 7. | Service | 8. | Any other |

14 How much is your average monthly expenditure

Expenditure Rs.	Less than 5000	-----
	5,000 – 10,000	-----
	10,000 – 15,000	-----
	Above 15,000	-----

15 What is type of ownership of your house

- | | | | |
|----|---------------------------|----|-----------------------|
| 1. | Self Owned | 2. | Rented |
| 3. | Free on Landlord property | 4. | Relative House (Free) |

16 What is nature of construction of your house

- | | | | | | |
|----|-------|----|-------|----|------------|
| 1. | Kacha | 2. | Pacca | 3. | Semi-pacca |
|----|-------|----|-------|----|------------|

17 Which of the following facilities are available in your house

- | | | | |
|----|-------------|----|--------------|
| 1. | Electricity | 2. | Water Supply |
| 3. | Gas | 4. | Telephone |
| 5. | Sewerage | | |

18 What are the sources of water for your domestic use

- | | | | |
|----|---------------------|----|------------|
| 1. | Public Water Supply | 2. | Hand Pumps |
| 3. | Channel | 4. | Any other |

19 What are the sources of water for your agriculture use

- | | |
|--------------|------------------------|
| 1. Canals | 2. Public Water Supply |
| 3. Channels | 4. Rain |
| 5. Any other | |

20 What is your Landholding

- | | |
|----------------------|-------|
| 1. Cultivated Land | ----- |
| 2. Uncultivated Land | ----- |
| 3. Cultivable Waste | ----- |
| 4. Orchards | ----- |

21 What is status of ownership of your land

- | | |
|-----------|---------------------|
| 1. Owner | 2. Owner-cum-tenant |
| 3. Tenant | |

22 What do you grow mostly in your agriculture land

- | | | |
|--------------------|--------------|--------------|
| 1. Wheat | 2. Cotton | 3. Sugarcane |
| 4. Fodder | 5. Vegetable | 6. Maize |
| 7. Fruits Orchards | 8. Any other | |

23 In your opinion, should this Project be implemented here

- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

If yes, then reasons

If no, then reasons

24 In your opinion, what will be possible impacts of this road

During Construction

After Construction

25 What protective measures do you suggest to safeguard your interests

ANNEX - B**FORMAT OF SFA**

1. This is a Social Frame Work Agreement between Project Director (PD) New Road Construction Project representing the National Highway Authority (NHA), Government of Pakistan and the villagers' committee of New Road Construction Area, whose names have been inscribed below in their presence and full consent.

Sr. No.	Village	Name	Father's Name
1			
2			
3			
4			
5			
6			

2. We, the committee of village leader/elders of New Road Construction area have agreed unanimously to nominate _____ as our chairman and authorize him to enter into a Social Framework Agreement with the New Road Construction Rehabilitation and Construction Project on our behalf and on his own behalf. We understand and pledge that this Social Framework Agreement will be a binding on us and the PD throughout the currency of the construction work as well as the operational phase.

3.

Signatures or	Village	Signature/Left	Signature/Left
1			
2			
3			
4			
5			
6			
7			
8			
9			

4. By mutual consent it is agreed the National Highway Authority
 - i. Shall not occupy any agricultural land or acquire any other land during the construction of this project.
 - ii. Shall not cause any damage or reduction in the water supply in the canals during the construction period of the project, except in case of force majeure e.g. high floods, strong storms or any other act of God.
 - iii. Shall not cause any disturbance to any public archaeological heritage or a place of worship.
 - iv. Shall not interfere in the social political or tribal balance of the area.
 - v. Shall/wherever possible leave local physical infrastructure in no worse condition than it was at the start of the project.
5. Also, by mutual consent it is agreed that all the villagers residing in the area in the vicinity of the project named in Clause 1 collectively and severally
 - i. Shall not interfere in the location of labor camps, material depots, equipment yards and all the approach roads to be used during project construction phase, all of which will be located on the land of National Highway Authority.
 - ii. Shall not interfere if the National Highway Authority decides to move the construction of the subsidiary Bridge elsewhere to a more suitable site as long as the activity remains on National Highway Authority's own land.
 - iii. Shall not receive any discharge of water, wastewater, wastewater sludge or oil spills to any graveyard or archaeological site
 - iv. Shall not cause any damage to wildlife or trees and no villagers will be involved in killing, poaching or hunting of any animal or birds.
 - v. Shall not allow reduction or official interference in existing services and facilities e.g. education, health, electricity, drinking water supplies, religious and social congregations.
 - vi. Shall not allow any interference in our tribal, commercial or social norms, and we understand that no land acquisition or involuntary resettlement is involved under the project.
 - vii. Agree to respect and observe the cautions on the sign boards displayed by project authorities and shall not remove or cause to be removed any signboards or installations put up by the Project Director.
 - viii. This SFA has been signed this < date > < month > <year > at _____

Signatures

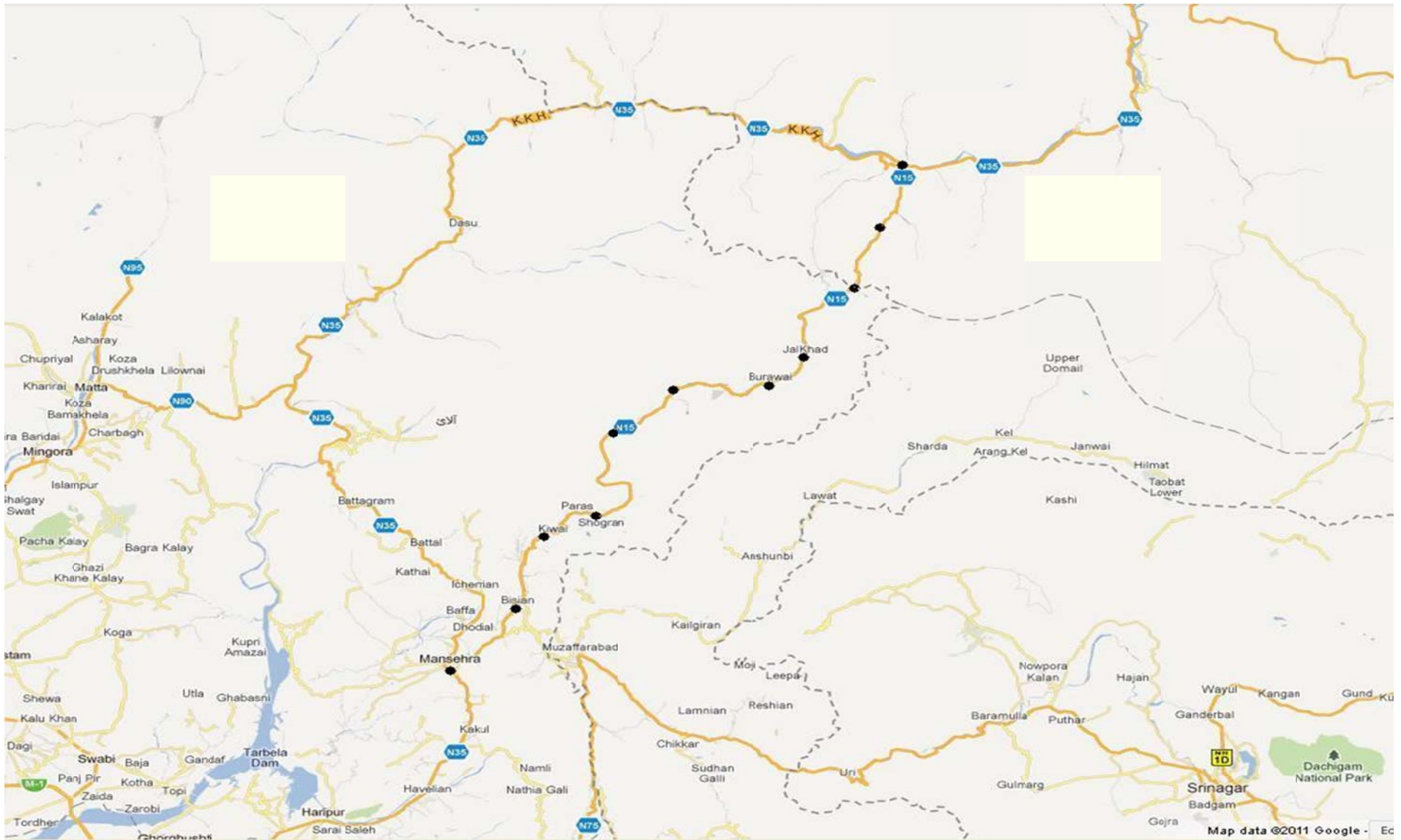
Project Director
Full name and address

Signatures

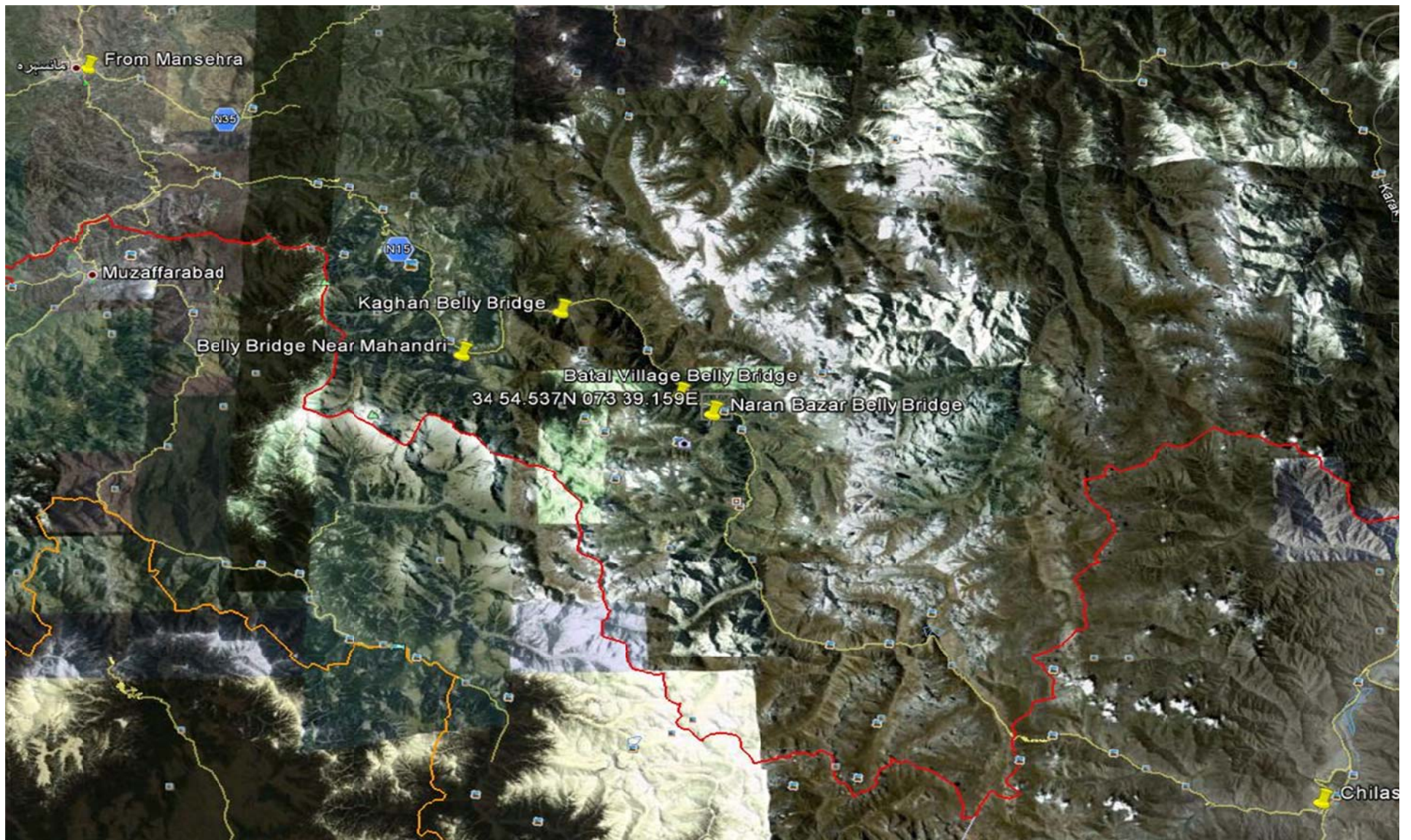
Chairman Villagers' Committee
Name and Address

Counter signed

Executive Engineer
(New Road Construction)
Full name and address



Annex-C (a): Terrain view of N-15



Annex-C (b): Belly Bridges positioned on N-15.