Initial Environmental Examination

Revised IEE Report
Improvement and Widening of Qila Saifullah–Loralai-Waghum Rud Section of N-70
May 2014

PAK: National Highway Network Development in Balochistan Project

Prepared by the National Highway Authority, Islamic Republic of Pakistan for the Asian Development Bank (ADB). This is an updated version of the draft originally posted in January 2014 on http://www.adb.org/projects/47281-001/documents.

ABBREVIATIONS USED IN THE STUDY

ADT	Average Daily Traffic
BEPA	Balochistan Environmental Protection Act
CCBOs:	Community Citizen Board Organizations.
EIA:	Environmental Impact Assessment.
EMP:	Environment Management Plan.
EMAP:	Environmental Management Assessment Plan.
IEE:	Initial Environmental Examination.
IUCN:	International Union for Conservation of Nature. (IUCN).
NEQS:	National Environmental Quality Standards
NHA:	National Highway Authority.
PAPs:	Project Affected People
PD/PC:	Project Director/Project Coordinator
PEPA:	Pakistan Environmental Protection Agency.
PMU:	Project Management Unit
ROW:	Right of Way
VOC:	Vehicle Operating Costs

IMPROVEMENT AND WIDENING OF QILA SAIFULLAH-LORALAI-WAIGUM RUD SECTION OF N-70

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

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1. INTRODUCTION

1.1 General

National Highways Authority (NHA) intends to carry out the "Improvement and Widening of the Existing Qila Saifullah-Loralai-Waigum Rud Section of National Highway N-70 (128Km).

This report presents the Initial Environmental Examination (IEE) of the above mentioned project. Originally the length of the proposed Project road was 128 km, including an 11 km bypass around the Loralai city through a new alignment. The current project however, comprises of the rehabilitation and reconstruction of the existing road, and all construction activities are confined within the existing ROW limits. The total length of the project road is now 117 km, and the project now does not include the Loralai bypass. The construction works also include replacement of the superstructure of 5 existing bridges, construction of 9 new bridges at different locations, and the reconstruction of 264 culverts for cross-drainage of water at all known water passages.

1.2 Proponent of the Project

National Highway Authority (NHA) is the proponent of the proposed project with the address given below:

National Highway Authority
27, Mauve Area, G-9/1,
Islamabad.
Ph: 051-9032911

1.3 Overview of the Project

The length of section is 117 km. The Project includes the Improvement and widening of the existing Qila Saifullah-Loralai-Waigum Rud section of N-70.

1.4 Objective of the Study

The Project will improve transport efficiency, support growth in trade by improving regional connectivity - thereby contributing to economic growth, poverty reduction and enhancing the efficacy of the existing road. This project consists of widening, rehabilitation and improvement of N-70 starting from Qila Saifullah through Loralai to Waigum Rud.

Following are the legal requirements of Government of Pakistan to address the environmental issues in development projects:

- Pakistan Environmental Protection Act (PEPA), 1997 amended under 18th Constitutional Amendment as Balochistan Environmental Protection Act (2012) requires that no development project shall be commenced without prior approval of IEE/EIA from Balochistan Environmental Protection Agency (BEPA).
- Pakistan Environmental Protection Agency (EPA) Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.
- Pakistan EPA Guidelines and procedures for Environmental Assessment of new projects.
- The Pakistan National Environmental Quality Standards (NEQS) for gaseous, liquid and vehicle emissions.

1.5 Scope of the Study

The scope of study is:

- To establish and identify the Corridor of Impact (COI).

- To identify the potential environmental impacts and to establish the significance of the potential environmental impacts on Project surroundings in the short and long term.

- To establish and propose mitigation measures on the basis of the nature and the level of severity of potential environmental impacts after their identification.

The firm "Environmental Management Consultant (EMC)" was appointed to conduct air, water and noise tests and compile primary and secondary data collected from the relevant publications. Site visits were also made to collect first hand environmental, geological and social features of project area.

The physical, biological and social environments have been defined by data collected using a variety of methods described below:

- Literature review of all available and relevant physical and biological environmental information.
- Collection of biodiversity information through a survey of fauna and flora in habitats found within a 500 meter radius of the Project Road. Information was collected through direct observations and from relevant published literature. (Please see Annexure II Biotic Information Profile)
- Collection of socio-economic data through a short survey of sources, such as statistics available on the World Wide Web and local community based organizations (CBOs).
- Collection of all other relevant data such as impact of the Project on land use, water quality, air and noise pollution, health of the people etc through surveys within 500 meter radius of the Project Road.

These survey results are attached as **Annexure II** to this report.

1.6 Environmental Categorization of the Project

The degree and scope of the environmental assessment requirements depends on the environmental impacts the project will have. According to Asian Development Bank's Safeguard Policy Statement (SPS) 2009, the categorization of the Project is to be based upon the most environmentally sensitive component.

Pakistan Environment Protection Agency (Review of IEE/EIA) Regulations 2000, Schedule II, lists down the projects requiring an EIA study. Schedule-II describes the requirements of EIA for transportation projects as 'Federal or Provincial Highways or major roads greater than 50 Million Rupees in value'. Maintenance (rebuilding or reconstruction of existing roads), as in the case of the subject project, is exempted from the requirement of an IEE or an EIA. However, since the cost of the project is above Rs. 50 million rupees, an IEE will be submitted to BEPA for review and approval.

Asian Development Bank (ADB) process classifies projects requiring an IEE in environmental Category B i.e. if the project's 'potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can by designed more readily than for Category A projects.'

The Project works involve the widening, rehabilitation and upgrading of the existing road, as well as the construction of new bridges and culverts. The Project road has been in use by traffic but since there have been encroachments in the form of small hutments and roadside shops along the right of way, the widening of road road will require removal of these, involving compensation and resettlement.

Some adverse environmental impacts are anticipated during construction which are expected to be short term in nature and can easily be mitigated. No changes in the water courses, wildlife habitat etc. are projected.

The Project has been assigned "Category B" in accordance with ADB's *'Safeguard Policy Statement (SPS) 2009',* and *therefore an IEE is to be carried out.*

1.7 Regulations/Legislation to be followed

Following environmental regulations and legislations will be followed:

Environmental Protection	**:**	Balochistan Environmental Protection Act (2012); The Pakistan Penal Code (1860); Pakistan Environmental Protection Act (1997); IEE/EIA regulations 2000
Pollution Control	**:**	National Environmental Quality Standards (NEQS) for gaseous, liquid (water), vehicular emissions and noise.
Public Health and Safety	**:**	The Pakistan Penal Code (1860).

1.8 Components of the Report

This IEE Report has been prepared to fulfill the requirements of ADB's Safeguard Policy Statement (SPS) 2009. The report format comprises of the following components:

Chapter 1: Introduction
This section presents an overview of the entire IEE report. It provides information about the Project location and its benefits to the public; discusses the scope of study and overview of the Project. The section also discusses the Project categorization as per EPA and ADB criteria. Besides, it provides information about the standards and guidelines that have to be followed.

Chapter 2: Policy, Legal and Administrative Framework
This section 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 relating to environment in Pakistan, and to obtain all the regulatory clearances required.

Chapter 3: Description of the Project
In this section salient features of the Project are presented. It provides information about the following:

a) General;
b) Location of the Project;
c) Villages connected by the Project Road
c) Key components of the Project;
d) Project Implementation Schedule;
e) Sources of construction material;
f) Schedule of construction;
g) Construction camps; and work force;
h) Machinery requirements.

Chapter 4: Description of the Environment
It provides an overview of the present environment of the Project area/site. It discusses the following:

a) Physical environment of Project area of influence;
b) Geology and seismology of the Project area;
c) Hydrology and drainage;
d) Ecological resources;
e) Socio-economic environment.

Chapter 5: Anticipated Environmental Impacts and Mitigation Measures
This section provides the information on the anticipated environmental impacts and mitigation measures. It discusses the following:

a) Project corridor;
b) Pre construction/design phase;
c) Construction phase; and
d) Operation phase.

Chapter 6: Environmental Management and Monitoring Plan
This section describes the measures suggested for executing the Environmental Management Plan (EMP) at the Project site. It elaborates the following in detail:

a) Objectives of EMP;
b) Key Environmental and social components;
c) Institutional Requirements;
d) Role of Functionaries;
e) Environmental Training.

Chapter 7: Public Participation and Consultation
This section consists of the information based on public consultation and information disclosure to them about the Project. It comprises of the following:

a) Identification of main stakeholder;
b) Approach for public consultations;
c) Meetings and Conclusions;

Chapter 8: Grievance Redress Mechanism

Chapter 9: Conclusions and Recommendations

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 General

This section 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 legislation relating to environment in Pakistan, and to obtain all the regulatory clearances required.

2.2 National Policy and Legal Framework

The Climate Change Division is the responsible authority for environmental protection policy making in Pakistan.

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of 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, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

Prior to the adoption of the 18th Constitutional Amendment, the Pakistan Environmental Protection Act (PEPA) 1997 was the governing law for environmental conservation in the country. Under PEPA 1997 the Pakistan Environmental Protection Council (PEPC) and Pak EPA were primarily responsible for administering PEPA 1997. Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.

2.3 Regulations for Environmental Assessment, Pakistan EPA

Under Section 12 (and subsequent amendment) of the PEPA (1997), a project falling under any category specified in Schedule I of the IEE/EIA Regulations (SRO 339 (I0/2000), requires the proponent of the project to file an IEE with the concerned provincial EPA. Projects falling under any category specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accordance of approval or request any additional information deemed necessary.

2.4 Regulatory Clearances, Balochistan EPA

In accordance with provincial regulatory requirements, an IEE/EIA satisfying the requirements of the Balochistan Environmental Protection Act (2012) is to be submitted to Balochistan environmental protection agency (BEPA) for review and approval, and subsequent issuance of NOC before the commencement of construction.

2.5 Guidelines for Environmental Assessment, Pakistan EPA

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the proposed project are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA 1997;
- Guidelines for Public Consultations; Pakistan EPA May 1997;

2.6 National Environmental Quality Standards (NEQS) 2000

The National Environmental Quality Standards (NEQS), 2000, specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
- Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles;
- Maximum allowable noise levels from vehicles;

These standards apply to the gaseous emissions and liquid effluents discharged by batching plants, campsites and construction machinery. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for air quality have not been prescribed as yet.

2.7 ADB's Safeguard Policy Statement (SPS), 2009

The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 requires that environmental considerations be incorporated into 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 8.

All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, 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 the following environmental categories:

Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affet an area lager than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.

Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.

Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

Category FI: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

2.8 Interaction with other Agencies

NHA is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns of highway construction and operation, and that all preconstruction requisites, such as permits and clearances are met. This section describes the nature of the relationship between the NHA and concerned departments.

2.9 Provincial EPAs

NHA will be responsible for providing the complete environmental documentation required by the BEPA and remain committed to the approved project design. No deviation is permitted during project implementation without prior and explicit permission of the BEPA.

2.10 Provincial Departments of Forests and Wildlife

The clearing and grubbing for the Project road will involve clearing and uprooting of trees falling under construction limits (60-65 ft.) within the right of way. However, any removed trees of vegetation under private ownership will be compensated as per provision of the there is some disruption to vegetation or trees the project contractor will be responsible for acquiring a 'No-Objection Certificate' (NOC) from the concerned federal or provincial forest department. The application for an NOC will need to be endorsed by the NHA.

2.11 Provincial Governments

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

2.12 Other Environment Related Legislations

Following Table gives a summary of all legislations, guidelines, conventions and corporate requirements:

Table 2-1: Environmental Guidelines and Legislations

Sr. No.	Legislation/guideline	Description
1	Balochistan Environmental Protection Act, 2012	**Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.**

2	Pakistan Environmental Protection Act (PEPA) 1997	**Basic legislative tool empowering the Government of Pakistan to frame and enforce regulations for the protection of environment. The PEPA 1997 is broadly applicable to air, water, soil, marine and noise pollution, and handling of hazardous wastes. Penalties have been prescribed for those contravening provisions of the Act. Under section 12 of the PEPA 1997, no project involving construction activities or any change in the physical environment can be undertaken unless an IEE or EIA is conducted and a report submitted to the federal or provincial EPA.**
3	Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, (2000)	**The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule II lists projects of potentially significant environmental impacts requiring preparation of an EIA. The Regulations also require that all projects located in environmentally sensitive areas require preparation of an EIA. It also lists Projects not requiring either an EIA or an IEE.**
4	National Environmental Quality Standards (1993 and 2000)	**The NEQS specify standards for industrial and municipal effluents, gaseous emissions, ambient air requirements and emission levels for Sulfur dioxide and Nitrogen oxide, vehicular emissions and noise levels. The PEPA specifies the imposition of a pollution charge in case of non-compliance with the NEQS. The standards were last revised in 2000.**
5	National Environmental Policy (2005) (NEP)	**NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, "to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development. It also suggests various policy instruments to overcome the environmental problems throughout the country:**
6	Land Acquisition Act, 1894 Including Later Amendments	**The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately. The land needed for the construction of road will be acquired under normal conditions based on prevailing market prices or negotiated prices between NHA and the owners of land. Section 17(4) of the LAA will not be used in the absence of**

		an emergency. Instead, the land will be purchased under willing-seller willing-buyer deal at agreed upon market rates and the seller will have the option not to sell the land, in case an acceptable deal for both the parties is not reached.
7	The Forest Act (1927)	**The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. No protected forest is situated in the Project Area.**
8	Canal and Drainage Act (1873)	**This Act prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.**
9	Pakistan Penal Code (1860)	**It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.**
10	Protection of Trees and Brushwood Act, 1949	**This Act prohibits cutting or lopping of trees and brushwood without permission of the Forest Department. The Forest Department will be approached for permission to cut trees along the road alignment.**
NATIONAL ENVIRONMENTAL AND CONSERVATION STRATEGIES		
11	National Conservation Strategy	**Before the approval of NEP the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation and preservation of cultural heritage and recommends immediate attention to these core areas.**
12	Biodiversity Action Plan	**The plan recognizes EIA as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity**
INSTITUTIONAL FRAMEWORK		
13	Environment and Conservation	**There is a well-established framework for environmental management in Pakistan. The Ministry of Environment deals with environment and biological resources. Within the ministry, the NCS unit established in 1992 is responsible for overseeing the implementation of the strategy. Two organizations, The Pakistan Environmental Protection Council (PEPC) and the Pak EPA are primarily responsible for administering the provisions of the PEPA, 1997. The PEPC oversees the functioning of the Pak EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak EPA is required to ensure compliance with the NEQS, establish monitoring and evaluation**

		systems, and both identify the need to and institution of legislations whenever necessary. It is thus the primary implementing agency in the hierarchy. The Provincial Environmental Protection Agencies are formed by the respective provinces.
INTERNATIONAL CONVENTIONS		
14	The Convention on Conservation of Migratory Species of Wild Animals, (1979)	**The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no endangered species of plant life or animal life in the vicinity of the Project.**
15	Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	**The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.**
16	International Union for Conservation of Nature and Natural Resources Red List (2000)	**Lists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Larkana**
INTERNATIONAL ENVIRONMENTAL GUIDELINES		
17	**ADB's Safeguard Policy Statement (SPS), 2009**	**ADB's Safeguard Policy Statement (SPS), 2009 provides guidelines for environmental assessments of development projects. These guidelines help prospective projects identify impacts they will have on various environmental receptors. The guidelines call for carrying out EIAs or IEEs of projects based on severity of their impacts.**

3. DESCRIPTION OF THE PROJECT

3.1 Location of the Project

Qila Saifullah-Loralai-Waigum Rud Section of National Highway N-70 is about 117 km long, situated in Qila Saifullah and Loralai Districts of northern Balochistan.

National Highway N-70 is a direct and only link between Balochistan and Punjab provinces. It starts at Qila Saifullah on N-50 and terminates at Multan on N-5. The total length is about 441 km. Out of this total length, approximately 256 km is situated in Balochistan Province i.e. from Qila Saifullah to Bewata and the remaining 182 km i.e. from Bewata to Multan is situated in Punjab Province. The Project part of the National Highway N-70 starts at Qila Saifullah on N-50, and terminates at Waigum Rud with a total length of 117 km. For construction activities the project has been divided into two sections: one is from RD 0+000 to 67+200 (before entering into Loralai city), and second component starts after crossing Loralai city at RD 78+500 to 128+000.

3.2 Objectives of the Project

The existing 2 lane road is insufficient for the inter-provincial transport needs of present population of the Project Area. To meet the requirements of increasing traffic volume, NHA plans to upgrade the existing road. Length of the road section from Qila Saifullah to Loralai is 117 km.

Prime objectives of the proposed Project are as follows:

- Improved inter-provincial connectivity.
- Increase the access of the rural and urban population to social services and markets, leading to improved quality of travel/livelihood.
- Enhance the efficiency of road network to minimize transportation cost through improvement and vehicle operating cost.
- Reduce the number of accidents.
- Improve inter-provincial trade among Punjab, Balochistan and Sindh.

3.3 Key Components of the Project

The length of the proposed project is 117 km, which is divided into two components: one is from RD 0+000 to 67+200 (before entering into Loralai city), and second component starts after crossing Loralai city at RD 78+500 to 128+000.

Following are thus the key components of the Project Road after final survey and design:

Rehabilitation of existing Road	117 km
New construction of bridges	9
Rehabilitation of bridges (replacement of superstructure)	5
Rehabilitation/ new Construction of Culverts	264

Following is the geometric design criteria of the Project Road

- Road width (Travel Lanes) : Two lanes of 7.3 m with each lane of 3.65m
- Shoulder (outer) : 2.5m wide, with 50cm rounding
- Formation width : 13.30 m wide
- Minimum passing sight distance
  - Plain areas : 615m
  - Hilly Areas : 410m

- Minimum Stopping Sight Distance
  - Plain Areas : 160m
  - Hilly Areas : 85m
- Maximum super elevation
  - Plain Areas : 6.0%
  - Hilly Areas : 6.0%
- Minimum Radius of horizontal Curve (Plain Areas) : 336m
  - Hilly Areas : 123m
- Minimum radius without Super Elevation (Plain Areas) : 2880m
  - Hilly Areas : 1440m
- Minimum 'K' Value "Crest" based on Passing sight distance
  - Plain Areas : 39m
  - Hilly Areas : 11m
- Minimum 'K' Value "Sag" based on stopping sight distance
  - Plain areas : 38m
  - Hilly Areas : 18m
- Minimum Curve Length
  - Plain Areas : 54m
  - Hilly Areas : 36 m
- Maximum Gradient
  - Level topography : 2.55 to 2.0% (1300m to unlimited)
  - Rolling topography : 4.0% to 4.0% (580m to 1400m)
  - Mountainous Topography : 6.0% to 6.0% (3000m to 720m)
- Embankment side slopes : 2:1
- Design speed
  - Plain Areas : 90km/hr
  - Hilly Areas : 60km/hr

Road pavement design is based on latest traffic counts converted into Equivalent Standard Axle load (ESALs) projected for design period, results of soil investigation (CBR) taking into account local climatic condition.

3.4 Project Implementation Schedule

It has been assumed that the implementation of the Project shall take 30 months after start.

3.5 Sources of Construction Material

From Qila Saifullah to Loralai and Waigum Rud construction materials is available easily along the existing road as follows:

- Borrow material for construction of embankment is easily available all along the existing alignment;

- Material for sub-base, base and aggregates can be obtained from adjacent mountains, from river/nullah beds and can be used after screening and crushing as the case maybe. There are three crushers located along the roadway which can provide aggregate for base, concrete and asphalt;

- Fine aggregates are also available in river and nullah beds.

3.1.1. Embankment Fill

Soils along the alignment of the existing road have been classified as A-1-a, A-1-b and A-4 as per AASHTO Classification. These soils may be used as embankment fill for embankment construction. These soils are available along the length of the Project Road.

3.6 Sub-base / Base

Sub-base, base material is available near the alignment of the Project Road. The sub-base material has to be carried from the borrow pits in the vicinity of the road. Base material is available in Loralai River (2.0km from Loralai towards Qila Saifullah) and Sehwan River (60km from Loralai towards Waigum Rud). The boulders from these rivers will have to be crushed to make aggregate base.

There are crushing plants along the road and good quality material for sub base, base and aggregates for concrete and asphalt is easily available. A crusher plant is located at Km 23+000; two crusher plants are located at km 75+000 immediately after the town of Loralai.

3.7 Aggregate for Concrete and Asphalt

Boulders carried from Loralai River and Sehwan River as detailed above will have to be crushed to make aggregate for concrete and asphalt.

3.8 Sand for Concrete

Sand is available in the Loralai River, Sehwan River and Zhob River. Distance of these rivers from Loralai is 2km, 60km and 9km respectively.

3.9 Traffic

Three day, 24 hr. traffic counts were conducted for the Project at three different locations. The traffic count was conducted for both directions. This 3-day both directional traffic count was averaged to arrive at the average daily traffic given in the following table:

Table 3-1: Summarized average daily traffic volume

Station Name	ADT (vehicles per day)
At P.S.O. Petrol Pump	1790
At Check Post	1720
At Shell Petrol Pump	2420

These ADT were then projected using variable growth rates as given in the following table:

Table 3-2: Annual Growth Rates

Vehicle Type	*Year (2009-10)*	*Year (2011-15)*	*Year (2016-20)*	*Year (2021-25)*	*Year (2026-30)*
Passenger Vehicle	7.8%	6.15%	5.14%	4.40%	3.78%
Freight Vehicle	8.47%	7.37%	6.61%	5.90%	5.28%

Following tables give the annual average daily traffic up to the year 2030:

Table 3-3: Average Annual Traffic

Year	Cars/Motor Cycles (PCU)	Buses	Mini Buses	Total trucks	Total Traffic
			Shell Petrol Pump Station # 1		
2012	**1219**	**27**	**196**	**884**	4187
2020	**1873**	**42**	**302**	**1508**	3725
2025	**2323**	**52**	**374**	**2008**	4758
2030	**2809**	**63**	**453**	**2597**	5922
			Levies Check Post Station # 2		
2012	**1199**	**27**	**178**	**774**	2108
2020	**1842**	**44**	**290**	**1417**	3594
2025	**2285**	**55**	**359**	**1888**	4587
2030	**2762**	**66**	**435**	**2442**	5705
			Shell Petrol Pump station # 3		
2012	**1499**	**33**	**262**	**1104**	2898
2020	**2304**	**50**	**402**	**1882**	4639
2025	**2857**	**62**	**499**	**2507**	5926
2030	3455	75	603	3242	7376

3.10 Construction Camps and Work Force

Campsites will be selected keeping in view the availability of an adequate area for establishing campsites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity; final locations will be selected by the contractor. The Contractor shall comply with clause SS-5 'Contractors camps and depots' of the Tender Documents.

It is estimated that the Contractor shall supply following minimum work force for the Project:

- ⇨ Project Manager 1
- ⇨ Site Engineer 2
- ⇨ Assistant Engineer 2
- ⇨ Material Engineer 2
- ⇨ Laboratory Technician 6
- ⇨ Surveyors 8
- ⇨ Quantity Surveyor 2
- ⇨ Manager Administration 2
- ⇨ Foreman 4
- ⇨ Mechanic 4
- ⇨ Clerk 2
- ⇨ Operator/Drivers 150
- ⇨ Masons 8
- ⇨ Carpenter 4
- ⇨ **Total Skilled Labor** **197**
- ⇨ Machine helpers 452
- ⇨ Unskilled labor As per requirement at site

3.11 Machinery Requirement

The Project is located in remote, partly hilly, partly rolling and partly plain terrain. First 15km length is winding through high hills with hard rock, then upto Loralai passes through rolling terrain with mixed hard to medium rocky low hills. From Loralai the Road passes through partly

rolling hills and partly plain areas with granular materials in river/nullah beds, and clayey/silty materials. The altitude along the alignment of the existing road varies from a maximum of 2,294 feet on Qila Saifullah side, 1,446 feet at Loralai and 1,880 feet above sea level at Waigum Rud. There are two main rivers/streams namely Loralai and Sehan River. The logistics for supply of spare parts, fuel and other lubricants are poor and the Contractor will have to make his own arrangements from Karachi. The working conditions have been rated as difficult, hard and this requires additional effort and inputs for running and maintenance of plant, equipment and machinery. Following is a summary of type of equipment and machinery required:

Earth Moving Equipment of various types and capacity	99 in Nos.
Jaw Crushers with Secondary Cone Crushers, Vibrating Deck Screen complete 250 tons/hr	2 Nos.
Grizzlies for sub base, screenings over size materials	2 Nos.
Asphalt mixes Equipment of various types	19 Nos.
Concrete work machinery	12 Nos.
Miscellaneous Equipment like Diesel generator, farm tractors Fork lifts, maintenance truck/ lubricating truck	16 Nos.

4. DESCRIPTION OF THE ENVIRONMENT

4.1 General

Physical, ecological, cultural and socio-economic environmental aspects have been studied around the proposed project.

As project (N-70) road already exists and traffic is plying through N-70, therefore human induced impacts such as traffic noise vehicular emission and other associated impacts already exists. The study of already existing impacts will allow establishing baseline conditions.

The impact as discussed above may not restrict only to road corridor, however, the direct corridor of impact (COI) due to construction of highway is restricted between ROW limits.

4.2 Methodology

To establish the baseline condition of project area, the information/data have been collected from different sources including, Government Departments / Agencies. The secondary data have been taken from other sources such as Statistical Bulletin, District Census reports of Districts Qila Saifullah and Loralai, information available on the internet etc.

Site visits were also carried out in order to obtain information about the social, environmental and economic conditions of the Project area.

To establish baseline ambient air, noise and water conditions a program of environmental monitoring has been prepared, and air and water samples have been collected from the selected locations. Noise levels have also been measured at site at selected locations. As the population along the project corridor is sparsely distributed, therefore locations selected for air and water sampling and noise tests were based on the proximity of local habitation. The location of sites selected for environmental tests are given as under:

Site No –I: Qila Saifullah (near Burhan Petroleum Service)
Latitude: 30.68885 N
Longitude: 68.37798 E

Site No –II: Loralai by pass (near FC training centre)
Latitude: 30.34658 N
Longitude: 68.61204 E

Site No –III: Near Community (Killi Chappali)
Latitude: 30.38096 N
Longitude: 68.65820 E

The firm Environmental Management Consultants (EMC) was engaged to carry out sampling, lab and sites testing to establish baseline environmental conditions.

4.3 Physical Environment of Project Area

4.3.1 Climate and Meteorology

Generally the project area is classified as semi arid and warm, characterized by mild summers and cold winters. The summer season usually starts from end of April and lasts till the end of September. June and July are the hottest months. Due to scarcity of vegetation and surface water bodies, relative humidity of the area is low.

No meteorological station is established in District Loralai and Qila Saifullah. Zhob is the nearest meteorological station, with similar climatic condition therefore, meteorological data for Zhob is the only available data within the project area. Yearly mean minimum and maximum temperature for a ten year period (1998-2007) are obtained from the Statistical Year Book 2008, and is given in the following table:

Table 4-1: Yearly Average Temperature

Year	* Yearly Average Temperature (^{0}C)	
	Mean Maximum	Mean Minimum
1998	27.4	11.8
1999	30.1	13.7
2000	27.9	13.4
2001	28.1	13.0
2002	27.6	10.2
2003	26.8	15.4
2004	28.6	11.9

2005	26.0	10.8
2006	27.0	10.4
2007	24.3	8.0

Source: * Pakistan Statistical Publications, year Book 2008

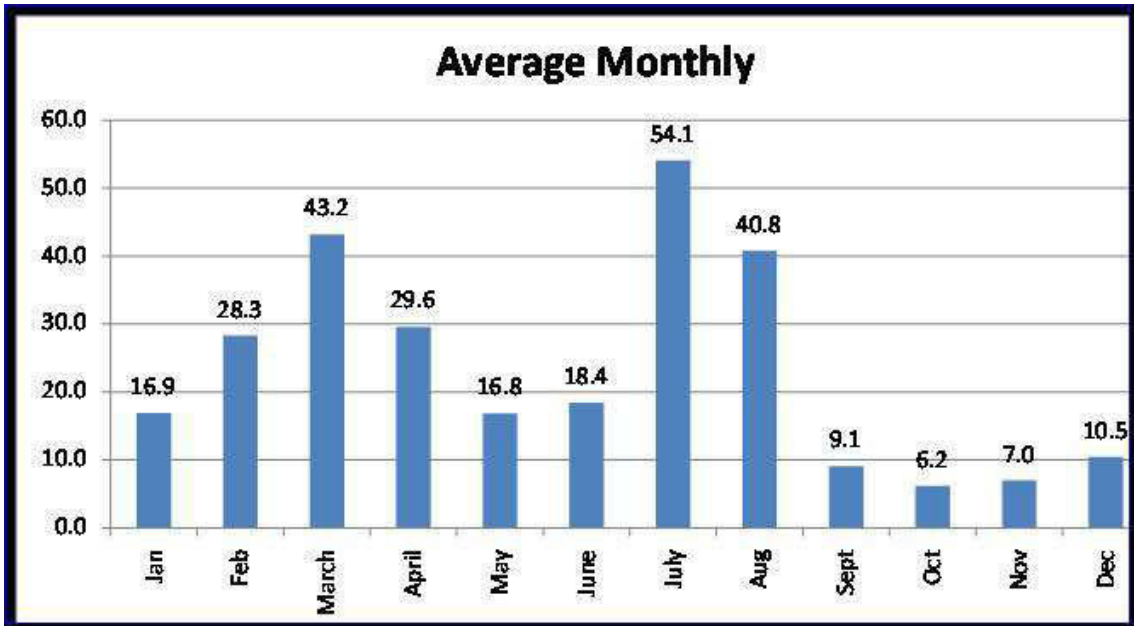
Within the project area, winter rains are significant and range between 250 to 500mm. The rainfall data of Zhob has been obtained from Pakistan Meteorological Department (PMD), Karachi. The rainfall data of 30 years (1978-2007) is obtained from PMD. Monthly average of rainfall record of 30 years is given in the table below and is also represented in the form of a bar chart.

Table 4-2: Rainfall Data of Zhob

Month	Precipitation (mm)	Precipitation (inches)
January	16.9	8
February	28.3	13
March	43.2	19
April	29.6	13
May	16.8	7
June	18.4	8
July	54.1	24
August	40.8	18
September	9.1	4
October	6.2	3
November	7.0	3
December	10.5	5

Figure 5-1: Rainfall Data of Zhob

Source: Rainfall Data obtained from PMD for Zhob



The mean maximum rainfall occurred in July. However, winter rainfall is significant and takes place from January to April. The yearly average of rainfall (30 years) is 23.4 mm.

4.1.2 Air Quality

Both districts lack industrial activity and in absence of major industrial activity air pollution is mainly due to vehicle emissions along the road corridor. The main air quality issue is the suspended particulate matter. To a certain extent, the high level of particulate matter is a natural consequence of the dry atmosphere, lack of vegetation cover, and winds. Nevertheless, this condition is exacerbated by such human activities as vehicles driving on unpaved shoulders or poorly maintained roads. Moreover, many trucks, buses, and passenger vehicles are diesel fueled and poorly maintained. Some use a fuel that is a mixture of kerosene and diesel which results in both a cheaper fuel mix and in exhaust smoke that is high in PM10. The Ambient air monitoring methods employed are given in table below:

Table 4-3: Ambient Air Monitoring Methods

Pollutants	Title of US EPA 40 CFR	Methods
NOx	Reference Method in Appendix F of 40 CFR Part 50	Chemiluminescence's
SO_2 /H2S	Ambient Monitoring Reference & Equivalent Method of 40CFR Part 52	Fluorescence Method
CO	Method in Appendix C of 40 CFR Part 50	IR Gas Filter Correlation
CO_2	Method in Appendix C of 40 CFR Part 50	IR Gas Filter Correlation
TSP	Reference Method in Appendix B of 40 CFR Part 50	Beta Gauge
PM10	Reference Method in Appendix J of 40 CFR Part 50	-do-
Noise level	Ambient Monitoring Reference & Equivalent Method 40CFR part 205	Preamplifier detector with the help of microphone
VOC		Gas Chromatograph Method

The ambient air quality levels for each selected sites are as under:

Qila Saifullah (near Burhan Petroleum Service)

	SO_2 (ppb)	NO_X (ppb)	CO (ppm)	PM10 ($\mu g/m^3$)	w/s (m/s)
Min	24.1	25.9	3.1	120.0	0.4
Max	32.5	36.5	5.4	169.0	2.3
Average	27.8	30.3	3.9	145.3	1.1

The average observed levels of Total Suspended Particulate PM10 was 145 $\mu g/m^3$. These concentrations were well within the prescribed limits for PM10 (150 $\mu g/m^3$) of USEPA. The measured mean concentrations of gaseous pollutants were, 3.9 ppm for CO, 27.8 ppb for SO_2 and 30.3 ppb for NOx. All these levels of gaseous pollutants were well also within limits of USEPA and the prescribed International Standards for ambient air quality like USEPA, WHO and World Bank.

Loralai by pass (near FC training centre)

	SO_2 (ppb)	NO_X (ppb)	CO (ppm)	PM10 ($\mu g/m^3$)	w/s (m/s)
Min	10.2	12.3	1.9	120.0	0.1
Max	14.2	16.3	3.2	129.0	1.0
Average	12.0	14.2	2.5	124.1	0.3

The average observed levels of Total Suspended Particulate PM10 was 124.0 µg/m^3. These concentrations were well within the prescribed limits for PM10 (150 µg/m^3) of USEPA. The measured mean concentrations of gaseous pollutants were, 2.5 ppm for CO, 12.0 ppb for SO_2 and 14.2 ppb for NOx. All these levels of gaseous pollutants were well also within limits of USEPA and the prescribed limits of International Standards for ambient air quality like USEPA, WHO and World Bank.

Near Community (Killi Chappali)

	SO_2 (ppb)	NO_X (ppb)	CO (ppm)	PM10 (ug/m^3)	w/s (m/s)
Min	8.1	12.6	1.2	103.0	0.1
Max	12.8	16.9	1.9	125.0	2.1
Average	10.2	15.3	1.4	115.0	0.9

The average observed levels of Total Suspended Particulate PM10 was 115 µg/m^3.These concentrations were well within the prescribed limits for PM10 (150 µg/m^3) of USEPA. The measured mean concentrations of gaseous pollutants were, 1.4 ppm for CO, 10.1 ppb for SO_2 0.5 ppb and 15.3 ppb for NOx. All these levels of gaseous pollutants were also within limits of USEPA and the prescribed limits of International Standards for ambient air quality like USEPA, WHO and World Bank.

4.1.3 Noise

Low traffic volume is plying on N-70 owing to low population density, lack of industrial and significant mining activities, limited agro-based economic activities etc. Noise along the existing N-70 highway particularly between Qila Saifullah and Loralai is not a serious issue. Road side noise levels have been measured at the selected locations at a distance of about 4 to 6 m from road edge.

The mean noise level along the corridor is 44.80 db(A) peak noise level observed at Qila Saifullah which is 59.0 db(A). Average values of noise level of project corridor are well within WHO limits of 55 db(A) and NEQS limits of 85 db(A). However average noise levels are close to (slightly higher) to WHO standard values.

During construction these values are likely to increase due to operations of earth moving equipment / machinery.

The noise level is directly proportional to traffic, therefore with the increase of traffic the noise level is also likely to increase.

Noise levels at different locations are given in table below:

Noise Level at Qila Saifullah (near Burhan Petroleum Service)

	Noise (dB)	WHO Standards	NEQS Standards
Min	43.0		
Max	59.0		
Average	48.1		

Noise Level at Near Community (Killi Chappali)

	Noise (dB)	WHO Standards	NEQS Standards
Min	41.0		
Max	49.0		
Average	44.8		

4.1.3 Water Sources and Quality

Nari River and its tributaries including Loralai River are the major water sources in Loralai District whereas Zhob River and its tributaries are the main sources of surface water for Qila Saifullah district. Since all these sources of surface water are ephemeral in nature therefore ground water is another source which is extracted with the help of wells and tube wells both electric and diesel operated.

In order to evaluate the water quality, water samples both from surface and ground water have been collected from the representative locations described as below:

1. Surface water sample at Qila Saifullah
2. Drinking water sample taken from pumps near Killi Chappali near Loralai
3. Surface water from Pathan kot Lake

The summary of the chemical tests of the water samples taken from the location as stated above are given in table below:

Table 4-9: The summary of the Chemical tests of the water samples

S. No.	Parameters	Units	NSDWQ	Concentration			Method
				Qila Saifullah	Killi Chappali	Pathankot Lake	
1.	pH Value	……	6.5-8.5	7.14	7.62	7.62	pH Meter
2.	Total Dissolved Solids	mg/l	<1000	780	690	430	Evaporation
3.	Total Suspended Solids	mg/l	<5	<5	<5	<5	Hach Method 8006
4.	Chloride	mg/l	<250	51.12	124.96	22.7	Hach Titration
5.	Total Hardness	mg/l	<500	200	190	115	Hach Titration (EDTA)
6.	Nitrate	mg/l	<50	5.3	6.8	4.7	Hach

S. No.	Parameters	Units	NSDWQ	Concentration			Method
				Qila Saifullah	Killi Chappali	Pathankot Lake	
							Method 8039
7.	Nitrite	mg/l	<3	0.009	0.020	0.016	Hach Method 8507
8.	Fluoride	mg/l	<1.5	0.55	0.48	0.82	Hach Method 8029
9.	Sulphate	mg/l	……..	240	164	47	Hach Method 8051
10.	Residual Chloride	mg/l	0.5	BDL	BDL	BDL	Hach Method 8021
11.	Bicarbonate	mg/l	……..	BDL	BDL	BDL	Hach Titration (H_2SO_4)
NSDWQ = National Standards for Water Quality BDL = Below Detection Limit							

The summary of the microbiological tests of the water samples taken from the location as stated above are given in table below:

Table 4-10: The summary of the Microbiological tests of the water samples

S. No.	Parameters	Recommended Value	Results		
			Qila Saifullah	Killi Chappali	Pathankot Lake
1.	Total Colony Count	<500 cfu/ml	$2x10^3$ cfu/ml	$3.6x10^4$ cfu / ml	2.5×10^3 cfu/ml
2.	Total Coliform	0 cfu / 100 ml	13/100 ml	300 / 100 ml	260/100 ml
3.	Total Faecal Coliform	0 cfu / 100 ml	0 / 100 ml	94 / 100 ml	09 / 100 ml
4.	Faecal Streptococci	0 cfu / 100 ml	0 / 100 ml	0 / 100 ml	0 / 100 ml

* Recommended Values as per WHO / USEPA for Drinking Water.

In order to re-assess the groundwater potential of Pishin, Nari, Zhob, Porali, Hamun-e-Lora and Kachhi Plain basins, a study was sponsored by the Asian Development Bank and undertaken by Halcrow in 1996. It revealed that available groundwater in Pishin Lora, Nari and Zhob basins is limited and that groundwater mining is taking place from aquifer storage in Quetta, Mastung, Mangochar, Pishin, Loralai and Qila Saifullah sub-basins. Following table 3.2 shows the water balance in these sub-basins.

Table 4-11: Groundwater balance in basins of Balochistan

Basin	Sub-basin	Recharge (cusecs)	Extractions (cusecs)	Drawn out of storage (cusecs)
Pishin Lora	Quetta-North	38.4	67.2	28.8
Pishin-Lora	Mastung	21.8	31.7	9.8
Pishin-Lora	Mangochar	10.0	24.7	14.7
Pishin-Lora	Pishin	28.5	84.0	55.5

Water quality: various sources

Source	Salinity (ppm)	pH	Cations (me/l)			Total	Anions (me/l)				Total	SAR	RSC* (me/l)
			Ca^{++} + Mg^{++}	Na^{+}	K^{+}		CO_3 -	HCO_3	Cl	SO_4			
Karezes	512 (385 - 662)	7.8	7.1	2.14	0.07	9.31	0.17	4.62	1.46	3.04	9.29	1.14	-
Springs	491	8.2	14.7	2.15	0.07	16.92	0.80	3.70	1.25	11.17	16.92	0.79	-
Shallow wells	370 (415 – 2 771)	7.7	9.63	4.60	0.075	14.31	0.16	4.64	2.36	7.16	14.32	1.92	-
Deep wells (WAPDA wells)	588	-	5.06	1.75	-	6.81	-	4.57	1.18	1.05	6.80	1.10	-
Flood water	116 (97 – 138)	7.4	2.9	0.18	0.25	3.33	-	2.49	0.51	0.29	3.29	0.14	-

* Residual sodium carbonate
Source: Government of Baluchistan (1986).

Basin	Sub-basin	Recharge (cusecs)	Extractions (cusecs)	Drawn out of storage (cusecs)
Nari	Loralai	63.2	74.8	11.6
Zhob	Qilla Saifullah - West	41.3	59.4	80.1

Source: ADB. Halcrow: *Baluchistan groundwater assessment* (1996).

A review of the above table shows that both districts are water deficient i.e. extraction of water is more than its recharge. The ground water quality is generally defined in table given below:
[1]

4.1.4 Topography

Topography of the project area is predominantly mountainous. The distinct topographic features of the districts Loralai and Qila Saifullah (project area) are defined as under:

Qila Saifullah District

The greater part of the district Qila Saifullah is covered with hills and rocks, intersected on the south by the Zhob valley, which is a alluvial plain extending from Kan Mehterzai pass onward to the Gomal River in the form of a crescent. Qila Saifullah is at an elevation of 1,550 meter above mean sea level (masl). The hills of the district belong mainly to the Toba Kákar range. The Toba Kakar range is a semi-arid mountainous range with an average elevation of 2,400 meters (at an altitude of about 8,700 feet above mean sea level (masl).

The district consists mainly of rock outcrops and very patchy cover of heterogeneous soil material of the western mountainous regions. In some parts of Muslim Bagh tehsil of the district the soil is mainly loamy, part gravely valley-fill with some rock outcrops and some sand dunes (Camborthids and some Lithic Camborthids). Soil in all the remaining area of the district is made of rock outcrops and is loamy, very shallow steep high mountain soils of mainly arid and semi-arid zone (rock outcrops and Lithic Camborthids).

Loralai District

The district belongs to the north east Zhob – Loralai basin and is surrounded by mountains on all sides. It consists of mountainous areas and valleys running through various ranges. The valleys contain alluvial accumulations while the formation of various hill ranges consists of earth, sand and limestone. Some portions are rocky. The hill ranges consist of rugged mountains varying in elevation from 924 to 3100 m. The main range is the Sulaiman range which runs from the Gomal River in the north to the Indus in the south. It stretches through the district on the east in one continuous chain of mountain peaks. The other prominent ranges are Kerasar range in the west

[1] Source: Pakistan – Development of a Research programme in Irrigation and drainage

of the district, Murdarghar on the north of Sinjawi, Sialu which forms the south-west boundary of the Thal plain, Dubbai on the northwest corner of the same plain, Kru in the centre of the district and Gadabar which forms the boundary of the Bori valley. The Bori valley formed by the Damanghar and Kru ranges lie in the north of the district running east to west. The next important valley is the Thal Chotiali valley which is so low and flat that when viewed from the neighboring hills, it looks like an inland sea.

The valleys consist of alluvial soil, favorable for agriculture purposes.

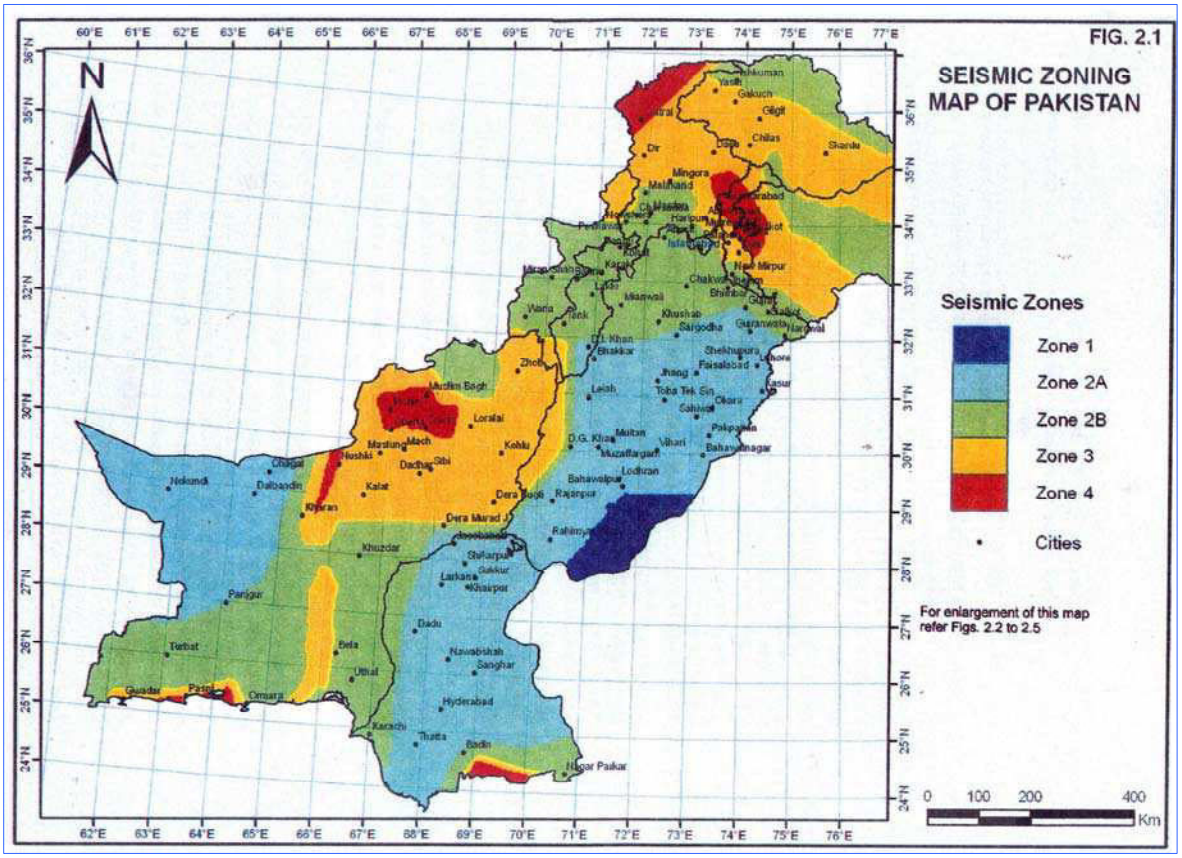
4.1.5 Geology and Seismology of the Project Area

Balochistan is the only province where three major tectonic plates, viz Indo-Pakistani, Afghan portion of Eurasian, and Ormarian plate meet together to produce the triple plate junction within the county. Ormarian plate is a newly discovered triangular piece broken off from the Arabian oceanic plate. The mountain ranges of Balochistan consist chiefly of Cretaceous and Tertiary beds, which are thrown into a series of folds running approximately parallel to the mountain ridges.

The Project area lies in the Chaman Fold which is a major left-lateral strike-slip fault that accommodates a significant amount of the slip across the plate boundary. The area comes under zone 3 and zone 4 of the seismic zone map of Pakistan as shown in the map below. The zone 3 and zone 4 are high risk zones with major tectonic faults.

Figure 4-1 Seismic Zone Map of Pakistan

The sedimentary and volcanic rocks of the Project Area belong to Mesozoic age and the



ophiolites and mélange rocks or zones (found mainly in Qila Saifullah district) belong to late

Mesozoic and tertiary age. Wulgai Formation in Muslim Bagh Qila Saifullah is made up of shale and limestone and belongs to early to late Triassic age. The Nisai Formation composed of limestone, shale and marl belongs to Eocene to Oligocene age. The Dungan formation in Loralai district is composed of limestone and marl conglomerate of Paleocene to Eocene age as shown by final evidence.

4.2 Ecological Resources

The project is located in Koh-e-Sulaiman Range area, which is rich in biodiversity due to wide variations in physical features and climate. Among the faunal species endemic to Koh-e-Sulaiman/Balochistan, the most dominant are Markhor, Chinkara, Black Bear, leopard and Afghan Urial, which are mostly found on the hill tops. But none of the said species has been encountered in the project's area of influence. The most prominent species of trees in the district are Acacia, Prosois, Olive and Tamarix. The flora and fauna of two districts of Loralai and Qila Saifullah of the project area are tabulated as below:

Table 4-12: Description of Project Area Flora

Sr. No	Qila Saifullah		Loralai	
	Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
1	Showan	Olivea cusedata	Juniper	
	Shung	Wild ash	Pistachio	
	Ghaz	Tamarix galica		Acacia Modesta
	Willow	Salix alba	Khinjak	
	Wild Pistachio	Pistacia khinjuk		Glidetovbia Tricanthois
	Juniper	Junipers macropoda or excelsa	Alder	Ulnus Pennataramosa
	Wild Olives	Olea ferruginea	Phulai	Acacia Modesta
	Ash	Fraxinus xanthoxyloides	Tamarisk	Tamarix
	Tamarisk	Tamarix sp.	Chilghoza	Pinus gerardiana
	Babul	Acacia sp.	Kail	Pinus wallichiana
	Khar	Haloxylon sp.		
	Small Rose	Rosa sp.		
	Wild tulips	Liriodendron tulipifera		
	Wild Rhubarb	*Rheum* sp.,		
	Irrigated Plantation			
	Lachi	Eucalyptus		
	Sufaida	Poplar		
	*Toot (*mulberry)	*Morus macroura*		
	Bakain	Melia azedarach Linn		
	More pankhi	*Thuja orientalis*		
	Quetta pines	Pinus sylvestris		
	Bushes			
	Peesh	Pheonix	Gangu	Orthonopsis Intermedia
	Kaka mush	Artemisia sp.	Gandenae	Nerium Ordorum
			Leghunae	Daphne Oleoides
			Tirkha	Artemisia
			Makhae	Caragana
			Oman	Ephedra
			Khabal	Cynodon Dactylom
			Dab	Desmostachya Bipinata
			Harnal, Spand	Peganum Barmala
			Lana	Haloxylon Griffithi
			Surai	Rosa Beggeriana
			Mazari	Nannborbops Ritehiana

Table 4-13: Description of Project Area Fauna

Sr. No	Qila Saifullah		Loralai	
	Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
	MAMMALS			
1.	Suleiman Markhor	Capra falconeri	Wolf	Canis lupus
2.	Afghan Urial	Ovis orientalis cycloceros	Jackal	Canis aureus
3.	Asiatic black bear	Ursus thebetanus	Hyena	Hyaena hyaena
4.	Wolf	Canis lupus	Fox	Vulpes vulpes and V. cana
5.	Hyena	Hyaena hyaena		
6.	Fox	Vulpes vulpes and V. cana	Markhor	Capra falconeri
7.	Pallas Cat	Felis manul		
8.	Steppe wild cat	F. sylvestris		
9.	Ornate and stone martin	Martes foina		
10.	Porcupines	Hystrix indica		
11.	Leopard	Panthera Pardus (now extinct)		
12.	Pika	Ochotona rufescens		
13.	Afghan mole vole	Ellobius fuscocapillus		
14.	Jackal	Canis aureus		
	Reptiles			
15.	Horned viper			
16.	Leafnosed viper			
	Birds (over 80 species of birds are found in Torghar conservation Area.)			
17.	Chikur		Chikur	
18.	See partridge		Partridges	
19.	Houbara Bustard		See see	
20.	Falcon		Sand grouse	
21.	Cranes		Kharghat	
			Geese	
			Ducks	
			Eurasian cranes	
			Demoiselle cranes	

4.2.1 Protected Areas

There are no state owned protected areas in Qila Saifullah and Loralai Districts but Torghar Conservation Area is a community owned conservation area located on the western side of Loralai city at a distance of about 75 km. This is a sanctuary to straight horned Markhor and Afghan Urial and other wildlife. This sanctuary is not situated within 500m of the Project area and hence will not be affected by construction activities.

4.2.2 Hydrology and Drainage

Although floods caused by the hill torrents are not very common in Loralai district, sometimes with heavy rains hill torrents take up formidable size, causing loss of cattle and property. Necessary cross drainage provision have been made in project during the design stage to

ensure the drainage without effecting the safety and functional durability of the project road and to avoid flooding of the road adjoining areas up and down stream.

Sufficient embankment protection for erosion are considered and provided in design in order to meet the requirement of cross drainage without effecting road traffic.

4.2.3 Agriculture and Horticulture

The two districts under the influence of the Project are basically rural and agriculture and livestock breeding is the major occupation of the people of the districts. Following table gives the list of all agriculture and horticulture crops of the two districts of area of influence of the Project:

Table 4-14: List of agricultural and horticultural crops of two districts

Sr. No.	Season	crops	
		Qila Saifullah District	**Loralai District**
1	Rabi Season	Wheat, barley, cumin	Wheat, barley, vegetables and fodder.
2	Kharif Season	Potato, onions, tobacco, maize, onions, melons, chilies, jowar and pulses.	Fruits, chilies, onions, fodder, maize, jowar. Potato and other vegetables.
3.	Cash Crops	Tomatoes, almonds, cherries, grapes, apricots, pomegranate, pulses and sunflower.	Apples, Apricots, almonds, pomegranate, peach and grapes.

A lot of land in both districts is range land; this facilitates livestock breeding and development. In livestock farming areas about 80 percent of the households make a living out of raising small ruminants. These livestock farmers own tiny plots of irrigated land. Children and men are livestock grazers. However, women are involved in a variety of livestock activities. They feed the animals and care for them by traditional methods. They keep their areas clean and prepare dung cakes which are used as fuel.

Spate irrigation is major source of water for irrigation purposes and includes both flood irrigation system (*Sailaba spate irrigation*) and rain-fed irrigation (*Khuskaba spate irrigation*). Total area under the two types of irrigation in both districts is given in the following table:

Table 4-15: Land Irrigated by Spate Irrigation

Sr. No.	District	Sailaba Irrigation	Khuskaba irrigation
1	Qila Saifullah	7,047.1HA	9,265HA
2	Loralai	13,250HA	39,503HA

4,2,4 Sociocultural Environment

The Project road connects two districts of Balochistan province---the Qila Saifullah and Loralai district. Both districts are basically rural with only 13.1% of population of Qila Saifullah and 11.8% of population of Loralai district being urban. Qila Saifullah district has four tehsils----- Baddini, Qilla Saifullah, Loiband and Muslim Bagh. There are a total of 15 union councils in Qila Saifullah district. Loralai district is divided into 3 tehsils---- Duki, and Bori and 20 union councils. Following table gives the socio-economic indicators of the both districts:

Table 4-16: Socioeconomic Indicators

Sr. No	Indicator	Qila Saifullah District	Loralai District
1	Area	10,609 sq km	9,933 sq km
2	Population	193,553 (as per 1998 census)	295,555 (as per 1998 census)

3	Total black topped road	220 km	330km, (138km Provincial highways, 142km National Highways, 50km farm to Market roads.
4	Shingle roads	186km	209km
5	Household size	7.0 persons	7.4 persons
6	Houses with piped water	13.5%	54.2%
7	Houses with electricity	41.2%	60.6%
8	No. of industrial units	none	None
9	Major tribes	Pashtoon belonging to Kakar Tribe, Kakars, Jogezai	Jogezai, Naser, Tareen, Buzdar, Dumar and Kakars

The Project Road will provide better communication facilities for people living in the districts of Qila Saifullah and Loralai and all the small villages and human settlements along the Road alignment will be benefited the most. The Project Road will help in socio-economic development.

4.2.5 Ethnicity and Tribes

The Pushtuns constitute an overwhelming proportion of the population in the **Qila Saifullah District** while the remaining include Punjabis, Balochs, Brahvis, Sindhis, Hindko, Saraiki and others. Pushto is spoken in 98.9 percent of the households in the district. Most of the Pushtun population belongs to the Kakar tribe. Kakars living in Qila Saifullah district are divided into two major sub-tribes: Sanzarkhels and Santia. The major branches of Sanzarkhel Kakars in the district include Jogizai, Rahatzai, Sargarhi, Mehterzai, Jalalzai, Musazai, Malaizai, Mardanzai, Akhtarzai, Faqirzai and Allozai while the major branches of Santia Kakars include Mehterzai, Sultanzai, Mullazai and Bakalzai.

Muslims constitute the majority of the population in **Qila Saifullah District** while the remaining population includes Christians, Ahmadis, Hindus, Parsis, Sikhs, Buddhists and others. In Qila Saifullah, sectarian violence is minimal as most of the people belong to the *Sunni* sect of Islam and believe in the *Hanfi* interpretation of the *Shariah*. Generally, the people have a religious attitude and practice Islam according to its fundamental principles. Inheritance is divided according to the Islamic principles and daughters are given their property rights accordingly.

The population of **Loralai District** consists of heterogeneous tribes, but their language, customs and tradition are more or less the same. The major tribes are, Kakar, Luni, Tareen, Nasir, and Nasar, the other tribes are Shadozai, Dumer, Humzazai, Utmankhail, Sarghah, Zakhpal, Jogazai, Jalazai, Vanchi, and Peechi.

90% of the population is Pashtu speaking, 5% speak Balochi and the remaining 5% are other languages including Urdu.

The majority of the people are Muslim, with the exception of a few Christians and Hindus. Wrestling, egg striking, target shooting, folk dances, are arranged to celebrate festivals such as Eid.

4.2.6 Occupations

Agriculture and its allied livestock farming is major occupation of the population of both districts. In **Qila Saifullah** district, mineral mining is also an important economic activity. Major minerals found in the district include Chromite, magnesite, asbestos, granite, marble and gabro. Some semi precious gemstones have also been discovered in the district. There are indications of presence of coal, salt, saltpeter, soapstone, limestone and calcite deposits in the district.

Nearly 75% of population of **Loralai** district is engaged in agriculture and livestock farming. Mineral mining plays a major role in the economy of Loralai district. Major minerals being mined in the district are coal, gypsum, calcite and marble, whereas oil is being explored in the district.

4.2.7 Health Care Facilities

The district administration of health services is headed by a District Health Officer. In its supervising capacity, the DHO Office can play an important role in the effective and efficient functioning of hospitals and dispensaries. Following table gives the number of health facilities available in the district:

Table 4-17: Health Care Facilities

Health Facilities	Qila Saifullah	Loralai
	Number	Number
Hospitals	02	02
Dispensary	16	03
RHC	01	03
BHU	09	27
MCH Centre	01	05
TB Clinic	0	-
Family Welfare centers	03	07
Sub Health centers	03	0

4.2.8 Educational Facilities

Formal schooling in Pakistan has three stages: primary, middle and secondary or high school, and runs for a total period of 10 years. Following table gives the number of schools in the district (1995 figures)

Table 4-18: Educational Facilities

Educational facilities (1995)	Qila Saifullah for boys/girls	Loralai for boys/girls
Mosque	71	Data not available.
Primary	222/54	416/73
Middle	16/4	38
High	8/3	11
College	1	1/1
Vocational Institutes	0	0

4.2.9 Archeological Sites

Qila Saifullah is a fort built by the founder of Qila Saifullah District (Saifullah Khan), it is an important archaeological remain of the area. The district has some archaeological sites mainly attributed to the Mughals. The ruins of an old fort called Mughalo Qila or “the fort of the Mughals” were found to the west of the Karezgai village, about 3.25 km from Muslim Bagh, below which there is a spring of water which was reopened about 125 years ago. Fragments of ancient pottery were found in these ruins and it is said that old silver and copper coins were also found. The ruins of a fort called Khanki lie near Shina Khura about 25 kilometres east of Muslim Bagh. Local tradition asserts that the fort was held by Miro, a Mughal governor, who was miraculously overthrown by Sanzar Nika, the progenitor of the Sanzarkhel Kakars. There are also ruins of an old fort called the Mughalo Brunj in Murgha Faqirzai. Similar ruins occur near Toiwar, Sharan, Ismailzai and on the Zhar hill near Akhtarzai. There also exist ancient karezes, said to have been made in Mughal times, which may be considered as relics of archaeological interest. These include Karez Akhtarzai, Karez Soghai and Mustafa Karez in Qila Saifullah sub-division and 2 karezes in Sra Khulla, about 6.5 km from Muslim Bagh.

Khan Mehtarzai Railway station the highest railway station in the world is another local attraction.

Rana Ghundai is located 16 km north of Loralai Town on the road to D. G. Khan. Discovered and excavated in 1927 is a cultural heritage site. Sur Jungal is located 8 km northeast of Sinjawi Town in Baghave Valley on the road to Duki. Discovered and excavated in 1927. Dabar Kot located 18 km northeast of Duki Town at the plain, on the right side of the road to Kohlu. Chinjan located 68 km southwest of Loralai are all prehistoric caves of the district.

Mughal Qila, Tordheri site, Tordheri, Loralai, high cound Dabarkot, Loralai and prehistoric mound Harian Haider Zai Loralai are protected cultural heritage sites of the Loralai district.

5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Introduction

This chapter deals with the anticipated environmental impacts of the Project Road and their mitigation measures to prevent or alleviate the environmental impacts to maximum possible level during design, construction and operational phases of the Project.

5.2 Project Corridor

The proposed Project corridor is defined on the basis of Corridor of Impact i.e. the width of the corridor that will be impacted, directly or indirectly by the proposed Project during construction and operational phases.

5.3 Project Right of Way

The Proposed Project will have a Right of Way (ROW) of 55ft exist from Km 0+00 Qilla Saifullah to Km 24+200 and 110 ft ROW is available from Km 24+200 to Km 67+300. It has been proposed that the ROW may be restricted where the alignment passes through built up areas. This has been done to minimize land acquisition and resettlement problems.

5.4 Corridor of Impact

Corridor of Impact (CoI) was delineated as the extent, which has direct or indirect impact of Project. Direct impacts of the Project, caused by relocation, are envisioned within the ROW and construction limits. Indirect impacts caused by noise, dust emissions, location of camp sites, and source of construction material construction material storage areas etc.

5.5 Potential Impacts and Mitigation Measures during Design Phase

5.5.1 Topography

The topography along the Project Area will change to some extent because of construction of Project related structures such as embankments, culverts etc. Visual changes to the topography will be of permanent and minor in nature and do not require any mitigation measures, except that the Project design should consider aesthetic concerns.

5.5.2 Formation Width in Built-up Areas

Impact

The formation width in built-up areas may result in creating hindrance to market opportunities, loading and vending activities for the locals. This impact is temporary and minor negative in nature. The severe impact of formation width on built-up area with respect to effects as discussed above may be in the area where the alignment is passing through Loralai city which is the main hub of economic activities of the area.

Mitigation Measures

Mitigation measures will include:

- Flexibility in design is adopted in built-up area to avoid resettlement and to avoid hindrance in local market activities.

- The separate cross sections have been prepared and adopted for the section of the road passing through built-up area.

5.5.3 Land Acquisition and Resettlement for ROW

Impact
As the proposed project's alignment follows the alignment of the existing road with adequate ROW available, hence no land acquisition is envisaged. The Project Road alignment terrain in Qila Saifullah is mountainous with average altitude ranging between 2294 to 1146 m above mean sea level. In Loralai District it is plain with scattered agricultural activity (crop cultivation and orchards), where the adjoining landowners have encroached upon the existing ROW limits. Similarly, near settlements the ROW has been encroached upon for residential/commercial structures. Clearance of ROW in encroached sections will have resettlement impacts for encroachers that need to be mitigated for the smooth implementation of the project.

Mitigation Measures
All losses will be compensated in accordance with the involuntary resettlement safeguard requirements of ADB's SPS (2009).

5.5.4 Change in Hydrologic Regime

Impact
The proposed road runs in east west direction and the natural fall of the area is also towards Indus River in east. Therefore the direction of the natural follow of the area is along the road. Due to variation in ground elevation and natural direction of fall, chances of flooding around the road embankment are minimum. However, necessary embankment protections are required to avoid the erosion of road embankment and washout of road surface.

Mitigation Measures
At the detailed design stage the safety of proposed road against the damage due to hydraulic regime has been considered and ensured that the design has been checked for maximum probable flood and there damaging effects due to higher velocity etc. Necessary erosion protection and cross drainage structure including culvers and bridges have been incorporated in design.

5.5.5 Seismicity

Impact
As stated earlier, the Project Road falls under zone 3 and zone four of the seismic zone map of Pakistan. This means that the Road will suffer heavy damage if it is designed without consideration of seismic activity. This would be permanent and major negative impact.

Mitigation Measures
At the detailed design stage, the safety of the proposed Road against the damages due to seismic activity has been ensured. The design has been checked against expected seismic factors in view of the seismic and geological record of the area. However Zone 3 and zone 4 parameters were adopted for the design of all structures and road.

5.5.6 Flora and Fauna

Impact
The Road alignment mostly passes through barren mountainous lands without too many trees and no tree will be cut. The alignment of the existing road passes very near to some fruit orchards, cultivated areas and green fields. The road does not pass through or near to any wild life habitats and hence will have no impact on the fauna.

Mitigation Measures

A sum of Rs. 15 million for tree plantation near human settlements has been earmarked.

5.5.7 Road Safety

Impact
The increased vehicular traffic and speed on the rehabilitated road may result in road safety issues like traffic accidents. The accidents may also be due to tiredness of the drivers. This impact will be major and negative in nature.

Mitigation Measures
These impacts will be mitigated by providing traffic signs to facilitate road users about speed limits for light and heavy vehicles. All lanes and sharp bends will be reflectorized to facilitate travelers at night. Phone numbers to be contacted in an emergency shall be displayed at intervals. Necessary highway safety features have been incorporated in design to address safety issues. Provisions have been made for rest areas to be provided every 60 to 70 km; a total of three rest areas shall be provided. In addition bus stops shall also be provided to cater for the needs of the buses and their passengers.

5.5.8 Historical/ Archeological Sites

Although there are a few historical and archeological sites located in Loralai District (as discussed in section 4.2.9), however no such sites are located within 200 m of the proposed construction activity.

5.6 Potential Impact and their Mitigation during Construction

5.6.1 Clearing of Right of Way

Impact
Clearing of ground for ROW, cutting and filling and rehabilitation of existing pavements will be a major construction activity. The topography along the Project road will change to some extent because of filling and cutting of hills, filling and construction of project related structures.

In the hilly terrain of the project area, the widening of the carriageway will necessitate cutting of hillsides, which will destabilize the slopes. If not managed properly, the unstable slopes will be a continuous hazard (landslides, rockfalls) for road users. Visual changes to the landscape will have no mitigation measures, but the project design should consider aesthetic concerns. In plain areas of the project area, the construction limit/ROW clearing near roadside settlements and agricultural farms will have adverse impacts on the privately owned properties established by encroaching upon the ROW.

Mitigation Measures
In the hilly terrain of the project area, in order to avoid landslides, land stabilization in form of retaining walls has been included in the project design. In order to ensure slope stabilization, hill cutting will be done in steps (bench cutting).

In plain areas, all losses to private property (if any) will be compensated in accordance with SPS (2009).

5.6.2 Public Utilities

Impact
NIL.

5.6.3 Location of Construction Camps and Other Facilities

Impact
It is anticipated that construction will require a minimum period of 30 months or more. The location of construction camps and other facilities such as workshops, equipment washing yards, asphalt plants, batching plants and construction material storage areas and the workers and their associated impacts and changes can have significant impacts on the local communities and social infrastructure if established nearby or adjoining existing settlements. This may also include social disruption due to the presence of outside workers in the contractos staff. Water supply and discharges, solid waste generated, and storage of plant and materials for the construction camps may interfere with local residents and their ecosystems.

Mitigation Measures
FIDIC based contract documentation include provisions for the safe provision of construction camps, restoration of natural conditions upon completion of the Project, secondary water treatment facilities, proper disposal of solid waste, minimum interactions with local communities, deep well boring to provide water for their own use and at the end handing those wells over to the local residents, and other matters. Wherever possible, local communities must be involved and/or hired by the contractors for identifying camp locations and sharing resources with construction workers. In addition, it is suggested to have meetings with local elders for smooth working throughout the construction activities. In this way, a sense of ownership will be developed in local residents to encourage their protecting the highway assets and looking after their interests and related resources.

Non local workers may not be aware of local customs, traditions, and history. Awareness about the local culture and observances (particularly with regard to women, religious concepts and sectoral background, political affiliations, and the cultural system) is required to avoid incidents. Sites of social, religious, or historical significance should be marked and information disseminated to the staff to avoid damage or desecration. Graveyards in the area must be identified to ensure due care and diligence to ensure they are given consideration and respect.

All dangerous materials (fuel, chemicals, and welding materials) used and stored on site should be placed in secured and safe premises. Loading and transferring of fuels, solvents, and lubricants should be carried out in a way to control all possible potential spills. Storage areas shall be equipped with warning signs displaying potential impacts, such as fire and other hazards.

5.6.4 Soil erosion and Contamination

Impact
Since the terrain of the Project is mountainous and consists mostly of hard rock hence soil erosion and contamination will be a very minor consideration.

Mitigation Measures

Good engineering design will ensure erosion protection of the embankment. Effective mitigation measures and sound environmental management practices will be specified in the contracts to ensure minimum soil erosion and degradation if and where required.

5.6.5 Borrow Areas and Open Pits

Impact
Construction material for the Road is easily available along entire length of road. Material for sub-base, base and aggregates can be obtained from adjacent mountains, from river/nullah beds and can be used after screening and crushing as the case maybe. There are three crushers located along the roadway which can provide aggregate for base, concrete and asphalt. Fine aggregates are also available in river and nullah beds.

Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments. Borrow/ open pits may also become potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the Project Area. This impact is permanent and moderately adverse in nature.

Mitigation Measures
The material obtained from cutting of rock and other excavations should be used in construction as much as possible. Only approved, licensed quarries to be used and the site for borrow areas should be selected on the basis of type of soil strata, depth of water table, ground topography, prevalent vegetation state etc.

5.6.6 Top Soil Conservation

Impact
For constructing roads on new alignments and/or for new borrow pits or quarries, it is a normal practice to strip off the fertile surface layers of soil, if present, and to store this material until construction is complete. This "top fertile layer" is then used to help restore borrow pit areas. This practice of stripping and storing this fertile material will be done in areas where the highway is built and/or expanded on fertile lands. The requirement to store this material for reuse can result in agricultural land being used unnecessarily. If the material dries up, it will be blown away as dust and thereby damage crops.

Mitigation Measures
The storage areas will be carefully selected to minimize crop damage and precautions (i.e., constant watering of this layer) will be taken to avoid the material's drying out and being blown away.

5.6.7 Obstruction of Drainage System in Project Corridor

Impact
Following impacts will need mitigation measures:

- The natural streams and irrigation channels may become sited by borrow material (earth) in the runoff from construction areas, workshops and equipment washing yards.
- Highway embankments tend to restrict cross-country drainage, causing the land on either side of the embankment to flood in case of heavy rains.
- Surface run-off from impervious surface of carriageway can further aggravate the flooding of embankment sides.

Mitigation Measures

- Cross drainage structures should be adequately maintained otherwise, culverts and water channels tend to choke with debris and corroded soil, adversely affecting agricultural lands.
- New cross drainage have been provided at appropriate locations at highway embankments, intersecting rivers, natural streams and canals to protect nearby agricultural lands and settlements from flooding.
- Embankment slops have been protected through either stone pitching or vegetation.
- Median drains with outlets leading into either natural streambeds or open areas when no natural stream beds are available nearby.

5.6.8 Air Quality

Impact

Air quality in the Project site and the surrounding area could be affected by dust generated during excavation, by movement of vehicles, or by gaseous emissions of vehicles and construction equipment.

Impact of air emission may be carried over long distances depending upon the wind speed, direction, the temperature of the surrounding air and atmospheric stability.

Emissions from crushers and quarry sites can cause health impacts, i.e. coughing, flu, difficulty in inhaling, irritation in eyes and reduction in visibility. This impact is temporary and minor negative in nature.

Mitigation Measures

Effective mitigation measures and sound environmental management practices will be specified in the contracts to ensure minimum air pollution. There are very few human settlements near the Project alignment and these too are sparsely populated. The residual impacts on these communities would be very little.

Spraying with water and covering the stockpiles are efficient means of controlling dust. Water is eventually to be added to fill material during construction of the road base. Watering of road surface under construction and compaction of other soil surfaces, and particularly in the vicinity of villages and haul roads, shall be undertaken regularly.

Other precautions to reduce impacts on air quality include to (i) properly cover trucks carrying spoil or construction materials to prevent spills and materials being blown away; (ii) fit stone crushers, asphalt mix plants, and diesel generators with dust suppression equipment or emission control devices; (iii) locate stone crushers, asphalt mix plants, and diesel generators away from residential areas; and (iv) limit construction works that create noise only to daytimes.

The existing air quality of the Project Road alignment will only be disturbed during construction phase; once construction is complete the air quality will revert to its original condition. Due to construction of a bypass the air quality of Loralai City will not be disturbed at all.

5.6.9 Noise and Vibration

Impact

Noise producing activities include compaction using vibratory rollers, formation of sub-base, road base surfacing and associated drainage works, operation of concrete batching plants, asphalt plants, quarry areas, generators etc. Vibration may be caused by tire-road interaction of heavy

vehicles. Traffic vibration is an issue where accessibility routes are in close proximity to sensitive buildings such as hospitals and schools. Vibration can also result in damage to buildings and to well being of neighboring population. Since the Project area is mostly barren with few human settlements and wildlife habitats noise and vibration will have very little negative impact. Tables showing the noise levels and their effect on human life and general noise levels of various types of machinery and different construction equipment are given below:

Table 5-1: Maximum Limits of Noise Levels

Sr. No	Noise Level db(A)	Situation
1	194	Lung damage
2	180	Ear drum rupture
3	150	Absolute limit with ears protected
4	150	Maximum of instantaneous noise
5	135	Absolute maximum with ears unprotected
6	100	Prolonged noise causing permanent damage
7	90	Factory work for an 8-hour day, 5 days a week
8	*85	Ear protection should be worn
9	80	Noise on building or construction sites
10	70	Normal road traffic near residential areas

Source: *"Environmental Degradation"* by Engr. Col. Mumtaz Hussain

*Above 85 dB(A) ear protection devices should be worn.

Table 5-2: General noise levels of machinery

Sr No	Equipment	Noise Level in db(A)
1	Earth Moving Machinery	75-85
2	Material Handling Equipment	75
3	Stationary Equipment	75
4	Tools, Hammers and Drivers	80-95

Source: The General Services Administration, Construction Noise Specification, USEPA 1972

Table 5-3: Construction Equipment Noise Levels

Sr. No	Equipment	Observation Point to the Source (meters)	Noise dB(A)
1	Wheeled loading	5	90
2	Grader	5	90
3	Vibration pavement roller	5	86
4	2-wheel vibration pavement roller	5	81
5	3-Wheel Pavement roller	5	81
6	Tire Pavement roller	5	76
7	Bull Dozer	5	86
8	Wheeled pneumatic dredger	5	84
9	Sprayer	5	87
10	Power generator	5	98
11	Impact Drill	5	87
12	Impact pile driver	5	112
13	Trucks	5	92
14	Concrete mixer	5	91
15	Concrete pump	5	85
16	Mobile lift	5	96

Sr. No	Equipment	Observation Point to the Source (meters)	Noise dB(A)
17	Pneumatic hammer and rock crusher	5	98
18	Breaker	5	84
19	Pneumatic spanner	5	95

Source: Guangzhou City Center Inner Ring Road Project, Environmental Assessment Report (1997)

Mitigation Measures

The Contractor shall use plant and equipment conforming to the international standards and directives on noise and vibration. Noise will be kept to a minimum by avoiding construction during night time and by minimizing the use of noisy equipment. As most of the human settlements are more than 500m away from the existing road alignment, the residual noise impacts on the community will not be significant.

5.6.10 Water Quality

Impact

Loralai stream flows very near to the Project Road from Darazanda village from where the Project alignment starts going away from the River. The average distance of the River from the Project road is nearly 11m with 30m being the longest and 3m the shortest distance from the road. The stream/river is not perennial and is deficient in groundwater. Any stream flowing along the River bed run near the foot of the hills which is more than 300m from Road. Hence there will be no negative impact on the surface water. There are several sources which have the potential to contaminate local soil and water. These includes waste oil, run-off from vehicles/equipment, maintenance yards containing fuel and lubricants, accidental spills of fuel/lubricants/chemicals, and run-off from material stock piles that contain particulate matter.

Mitigation Measures

The fuel and chemical storage areas shall be located on an impervious base within an embanked area and secured by fencing. The area shall be big enough to house all lubricants and other liquid chemicals and the walls of the enclosure shall be impermeable.

Wastewater/effluent from contractor's workshop and equipment washing yards would be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams

The solid waste will be disposed off in designated landfill sites to sustain the water quality for domestic requirements. Water quality shall be regularly monitored according to determined sampling schedule.

Following additional measures are proposed:

- The contractor should ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged;
- To maintain the surface water flow/drainage, proper mitigation measures will be taken along the road, like drainage structures in urban areas;
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond;
- Construction work close to the streams or other water bodies will be avoided, especially during monsoon period;

- Construct temporary or permanent devices to prevent water pollution due to increased siltation; and
- Wastes must be collected, stored and taken to approve disposal site.

5.6.11 Solid and Liquid Wastes

Impact
There will be several sources from which solid and liquid waste will be generated, namely; (a) worker camps, (b) construction site and (c) vehicle/equipment serving and maintenance yards. In the absence of proper waste management on site the impact of disposal of untreated waste to the environment will be significant.

Mitigation Measures

Solid waste
The contractor shall prepare a comprehensive solid waste management plan to collect, treat and properly dispose of the solid and liquid wastes generated from different construction activities

The Contractor shall collect and dispose off all solid waste in officially approved dumping sites and waste water from construction camps shall not be thrown in fields but shall be collected and disposed off in an environmental-friendly manner.

Aggregate waste material of existing road will be reused in up-gradation of road.

Liquid Waste
Sanitary wastes generating from staff and labor camps must be disposed off in environment friendly manner, i.e. provision of septic tank etc. for toilet wastes.

Different kinds of lubricants are used for oiling greasing and fueling of machinery and equipment. The most appropriate way to dispose of used lubricants is to send them back to suppliers. Apart from this the spillages from fuel and chemical storages also pollute the land. All fuel and chemical storages shall be located on an impervious base within an earmarked area and secured by fencing.

5.6.12 Traffic Management

Impact
Traffic management will be an issue during construction due to increased traffic volume caused by movement of vehicles carrying construction materials. It will also increase the traffic load on the existing highway, thus deteriorating the existing condition of the highway. Since, during construction, existing highway will be operational for the traffic movement, therefore the traffic management will not be a major problem. This impact is temporary and minor negative in nature.

Mitigation Measures
Proper alternate traffic management plan should be prepared during rehabilitation of existing road which should be upgraded in phases. Proper traffic management with marking should be done on the existing road.

5.7 Potential Impact and their Mitigation during Operation

5.7.1 Air Quality and Noise

Impact

Improvement in road condition will help reduce traffic related emissions in the short term by allowing a smoother traffic flow. However, in the longer run, increased traffic levels may lead to higher values of emissions. This impact is permanent and two-fold. It is positive, in case of improvement of road conditions; and minor negative, when traffic volume increases also due to increase in traffic volume noise is expected to increase. This impact is permanent and minor negative.

Mitigation Measures

Air quality should be monitored along the Project Area in accordance with acceptable International standards. This can be done by monitoring emissions of vehicles as per NEQS and helping the owners and occupants of the affected premises to identify and implement special measures such as hedges and vegetation to reduce air pollution. Noise pollution shall not be an issue since the project Road mostly passes through barren uninhabited areas. The following table shows the NEQS for Motor vehicle exhaust and noise:

Table 5-4: National Environmental Quality Standards for Motor Vehicle Exhaust and Noise

Sr. No	Parameter	Standard (Maximum permissible limit	Measuring Method
1	Smoke	40% or 2 on the Ringelmann scale during engine acceleration mode	To be compared with Ringelmann Chart at distance of 6 meters or more
2	Carbon Mono-oxide	Emission Standard New vehicles 4.6% Used vehicles 6%	Under idling conditions: Non dispersive in infrared detection through gas analyzer
3	Noise	85dB(A)	Sound meter at 7.5 meter from the source

Source: National Environmental Quality Standards (SRO 742(1), 29th August 1993

5.7.2 Safety and Security

Impact

Improved carriageway will improve safety conditions and will reduce accidents and loss of lives due to better traffic movements. This impact is permanent and major positive in nature. In addition construction of rest houses and bus stops along the length of Road shall be an additional safety measure.

5.7.3 Deterioration of Vehicles

Impact

Improved road condition will result in less wear and tear to vehicles; it will also result in less fuel consumption. This impact is permanent and major positive in nature.

5.7.4 Community Development/ Commercial Activities

Impact

Improved road condition will promote better business opportunities such as new petrol pumps and hotels. In addition, such an activity will also increase the land value that will benefit the local residents. This impact is permanent and major positive in nature.

5.7.5 Time Saving

Impact
Due to increase in speed and undisturbed flow of traffic, traveling time will be reduced to go from one place to another. Trade will improve due to better transport opportunities. This impact is permanent and major positive in nature.

5.7.6 Avenue Plantation

Trees shall be planted as per NHA policy along the road alignment passing near human settlements or wherever the topography and terrain permit. Any tree that need be cut shall be replaced by planting two trees in its place. The Choice of trees and plantation patterns shall be according to NHA policy. Planting of trees shall be a major positive impact.

Following trees and shrubs can be planted to conserve water sheds:

Trees

Usmani (Ailanthus Alticima)
Singit (Elaeagnus angustifolia)
Mulberry (Murus Alba)
Shina (pistacia Khinjak)
Bakain (Melia azadirachta)
Farash (Tamarix Gallia)
Mesquite (Prosopis Juli flora)
Iranian Kikar (ceasal pinnae)

Shrubs

Quel salt bush (Atriplex lentiformis)
Four wing salt bush (Atrplex cana scens)

5.8 Potential Impacts on Socioeconomic Condition

5.8.1 Social and Cultural Problems

Impact
People will face minor exit/entry problems during the construction activities. This impact is temporary and minor negative in nature.

Mitigation Measures
Timely completion of the construction work and provision of alternate routes during the construction will effectively offset this impact.

5.8.2 Changes in nearby Land Values

Like every roads project the proposed project is likely to increase the land value due to improvement works of the road. The opportunity for land owner for higher prices of land in a result of project is very much there. The new road improves the accessibility of the area and attracts even the local development authorities to take the advantage of improved accessibility with the provision of the road. This scenario will result in increased economic activity, increase land value, etc.

Impact
The proposed Project is expected to increase the land values, especially in areas near the human settlements. Landowners will have an opportunity to utilize their land to its full potential or sell their land on increased prices and start a new business. This impact will be positive in nature.

5.8.3 Lifestyle and Culture

Change in local lifestyle and culture may occur when the local and migrant workers will come in contact during the construction works. With improvement in driving conditions and increase in land values, the local community will have the opportunity to travel to the more developed areas in Punjab and other parts of the country. Furthermore, improved connectivity will also promote the influx of immigrants to the project area from other parts of the province and country. Both these factors will bring new cultural values and economic opportunity to the Project area. This impact is permanent and minor positive.

5.8.4 Induced Ribbon Development

Impact
The areas near human settlements will be especially vulnerable to ribbon development, which causes road safety and infrastructure servicing problems and is usually associated with visual degradation. New industry tends to locate where land is available and infrastructure exists; highway corridors are natural choices. Road side commercial development takes place in response to speculation that improved access and greater visibility will bring more customers. Being, totally unplanned induced development proceeds without comprehensive consideration of impacts. Other infrastructure, especially that needed for waste management may not exist, social services may become overloaded, individual induced developments generates traffic, possibly overloading the very roads and highways which led to their existence in the first place. This impact is major negative in nature.

Mitigation Measures
Laws regarding ribbon development e.g. Highways Safety Ordinance 2000, this ordinance includes provisions for the licensing and registration of vehicles and construction equipment; maintenance of road vehicles; traffic control, offences, penalties and procedures; and the establishment of a police force for motorways and national highways charged with regulating and controlling traffic on the national highways, and keeping the highways clear of encroachments. This impact can also be mitigated by reducing templates near human settlements and vigilant monitoring to stop growth of any such development.

Detailed Environmental Management Plan is attached at Annexure IV of this Report.

6. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

6.1 General

The Environmental Management Plan (EMP) is developed to eliminate and / or mitigate the impacts envisaged at the design, construction and the operation stages and provide specific guidelines for long-term monitoring by identifying the roles and responsibilities of the Proponent, Supervision Consultant, and Contractor(s).

Detailed Environmental Management Plan (EMP) attached as Annexure IV which ensures that the Project has no detrimental effect on the surrounding environment. The Plan shall act as a guideline for incorporating environmental measures to be carried out by NHA and contractors, as well as for other parties concerned for mitigating possible impacts associated with the Project and will form part of the Contract documents to be considered alongside the specifications. This Plan shall act as the Environmental Monitoring Plan during construction and operational phase of the Project, and will allow for prompt implementation of effective corrective measures.

6.2 Environmental Management Plan (EMP)

The EMP attached with this report ensures the following:

- Delivery of the prescribed environmental outcomes during all phases of the Project;
- Formulating a system for compliance with applicable legislative and non-legislative
- requirements and obligations and commitments for the Project including;
    - Relevant Legislative Requirements;
    - Licenses and Approvals;
    - Obligations and commitments from the IEE process (IEE and Submissions Report);
- Ensure that project design process incorporate best practice environmental design and sustainability principles to minimize potential impacts of construction and operation on the environment and community.
- Ensure that the construction work procedures minimize potential impacts on the environment and community.
- Develop, implement and monitor measures that minimize pollution and optimize resource use.

6.3 Objectives of the EMP

The EMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to outline standardized good practice to be adopted for all project works. The EMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponents for the implementation of EMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project;

- Outlining mitigation measures required for avoiding or minimizing potential negative impacts assessed by the environmental study;

- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the study;

- Defining the requirements for communication, documentation, training and monitoring, and management and implementation of the mitigation measures.

6.4 Monitoring Parameters

Following environmental parameters will be monitored at locations to be identified during the construction phase (e.g. location of asphalt plants, construction camps etc.):

- Ambient Air Quality mainly PM_{10};
- Asphalt Plant emissions (smoke, dust etc.);
- Ambient noise levels;
- Water quality;
- Avenue plantation

A monitoring plan for the Project indicating environmental parameters, frequency, locations and applicable standards is attached with this report. Standards set under the NEQS and WHO for various categories of receptors to be used as reference points is attached at **Annexure VI.**

Table 6-1: Environmental Monitoring Plan

Project Stage	Parameters	Details	Standards to be applied	location	Frequency	Duration
Air Quality						
Pre-Construction	PM_{10}, NO_X, CO	15m from the edge of pavement downwind	EPA Ambient Air Quality Standards NEQS	Four selected locations	baseline once prior to construction	Continuous 24hrs
Construction	PM_{10}	40m from hot mix plant downwind direction	EPA Ambient Air Quality Standards NEQS	Where ever Contractor decides to locate hot mix plant	once every four months during construction	Over one full working day
	PM_{10}	15m from the edge of pavement downwind	EPA Ambient Air Quality Standards NEQS	Stretch of Road where construction is in progress	once every four months during construction	over one full working day

Project Stage	Parameters	Details	Standards to be applied	location	Frequency	Duration
Operation	SPM, RPM, NO_X,CO	15m from the edge of pavement downwind Background concentration near a residential area At a sensitive location e.g. hospital or school	EPA Ambient Air Quality Standards NEQS	Four selected locations	3 samples in a week once a year for three years	Continuous 24hrs
Water Quality						
Construction	pH, Nail, BOD, COD, TDS, Dissolved O_2, Coliforms hydrocarbons	Community ground water sources near edge of ROW	WHO and NEQS	Two selected locations	once in the middle and once at end of construction	
Operation	Ph, NaCl, BOD, COD, TDS, coliforms Dissolved O_2,	Community ground water sources near edge of ROW	WHO and NEQS	Two selected locations	Once a year in summer, just before monsoon season	
Noise Level						
Pre-Construction	Noise levels on dB(A) scale	four locations: 15m from edge of pavement, background noise a sensitive location residential / commercial area	EPA Ambient Noise Standards.	four selected locations as specified	once, one or two weeks before start of work	24 hr reading taken at 15sec intervals over 15min every hr. and then averaged

Project Stage	Parameters	Details	Standards to be applied	location	Frequency	Duration
Construction	Noise levels on dB(A) scale	7m from equipment whose noise level is to be determined	PEPA NEQS (noise) 1993	At equipment yard and road construction site	As and when necessary or as instructed by NHA	readings taken at 15sec intervals over 15min every hr. and then averaged
Operation	Noise levels on dB(A) scale	four locations: 15m from edge of pavement, background noise a sensitive location residential/commercial area	PEPA NEQS (noise) 1993	Four selected locations	Once a year	24 hr reading taken at 15sec intervals over 15min every hr. and then averaged
SOIL						
Construction	Heavy metal Contamination	At reported sites with spillage and contamination	NEQS	Five selected locations in Contractors equipment yard	As per occurrence of spill	
Operation	oil, metals and chemicals	Parameters to be analyzed according to nature of spill	NEQS	Spill locations involving vehicles carrying fuel and hazardous material.	As per occurrence of spill	
VEGETATION COVER						
Pre-construction	Number of trees felled	only marked trees to be felled	as per detailed design	All along Project Corridor		
Operation	Survival rates of trees and re-vegetation	On each visit number of surviving trees to be	Survival rate to be 75% or above, below which re-	plantation sites	every year for three years	

Project Stage	Parameters	Details	Standards to be applied	location	Frequency	Duration
		compared to the number of saplings planted	plantation will be done			

6.5 Institutional Requirements

The proposed project environmental management plan will need involvement of the following organization for its implementation:

- The Project Management Unit (PMU), which will be established at NHA, this PMU will be the project proponent and owners of the EMP;
- Project Contractors as the executors of the EMP; and
- Project Environment Officer (PEO) as environmental monitor of the execution of the EMP.

6.5.1 Role of NHA

Being the proponent of the Project, NHA will be responsible for implementation of the EMP. The NHA will be responsible for ensuring the implementation of the EMP and for overall environmental performance during construction operations, also for ensuring implementation of the EMP by the project contractors.

6.5.2 Role of GM (EALS) (Environment/Afforestation/ Land/Social)

- The key responsibility of the GM (land/Environment/Afforestation) will be to liaise closely with environmental agencies (PEPA, SEPA), all concerned Government Departments e.g. Forest and Wildlife Department, Department of Archaeology and Museums, NGOs, CCBOs and research institutions;
- He will be responsible for approval of the EIA;
- Overall responsibility of ensuring that EMP is properly implemented;
- Responsible for all environmental coordination and reporting;
- Provide technical support for compliance and monitoring of EMP;
- Responsible for resettlement plan;
- Provide guidance to Manager Lands for land acquisition;
- The Deputy Director for Environment, with the assistance of the supervision consultant, will be responsible for directly supervising the contractor in implementing the EMP;

6.5.3 Role of Project Contractor

- The contractors will be responsible for implementation of, or adherence to, all provisions of the EIA and the EMP.
- Overall responsibility for the contractor's environmental performance will rest with the person holding the highest management position within the contractor's organization.

Reporting to their management the contractor's site managers' will be responsible for the effective implementation of the EMP.

6.5.4 Institutional Arrangement

General

This sub-section describes institutional framework and defines roles and responsibilities of different role players in the implementation of the proposed mitigation measures during the design, constructional and operational phases.

The executing agency of the proposed Project will be NHA. General Manager (Environment, Aforestation, Land and Social) of NHA will be the overall in-charge of the Project. He will delegate the supervisory responsibilities of the Project to the Project Director.

The General Manager (EALS) will have team of qualified environmentalists and Environmental Monitoring Specialists/Consultants. Figure below shows the institutional arrangement of NHA.

Environmental Protection Agency (EPA), Balochistan will act as the overall regulatory body. The specific roles of key functionaries are described hereunder.

6.5.5 National Highway Authority (NHA)

a) Project Director

The Project Director will be responsible for successful implementation of the proposed Project. He will be assisted by the Supervision Consultant.

b) Director (Environment & Afforestation)

The Director (E&A) will be the overall in-charge for handling the NHA's obligations with respect to the EMP. The Director (Environment) will be responsible for ensuring that the provisions of the EMP are effectively implemented. They will also coordinate with the EPA, Balochistan, provincial Agricultural, NGOs/CBOs and other public/private sector organizations. He will be assisted by the Deputy and Assistant Directors (Environment) for the execution of the EMP.

Design Consultant

The Design Consultant will ensure that all the mitigation measures proposed for the design phase are incorporated in the final design and included in the contract documents.

Supervision Consultant

The Supervision Consultant appointed by NHA will be headed by a "Project Manager", who will be a qualified engineer. He, along with his team, will supervise the proposed Project Contractor(s) to ensure quality of work and fulfilment of contractual obligations. He will recruit one Environmental Specialist / Monitoring Consultant (MC) who will:

- Ensure that all the environmental provisions comply with the applicable standards;
- Ensure that day-to-day construction activities are carried out in environment friendly manner;
- Organize periodic environmental training programmes and workshops for the Contractors' staff and NHA site staff in consultation with the NHA; and

- Develop “good practices” construction guidelines to assist Contractors and NHA staff in implementing the EMP.

Site Specific Environmental Management Plans (SSEMP)

The contractor will prepare SSEMPs to manage the environmental impacts along various section of the road and will address site specific environmental issues, e.g. issues relating to camp management, bridge construction and specific sections of the road.

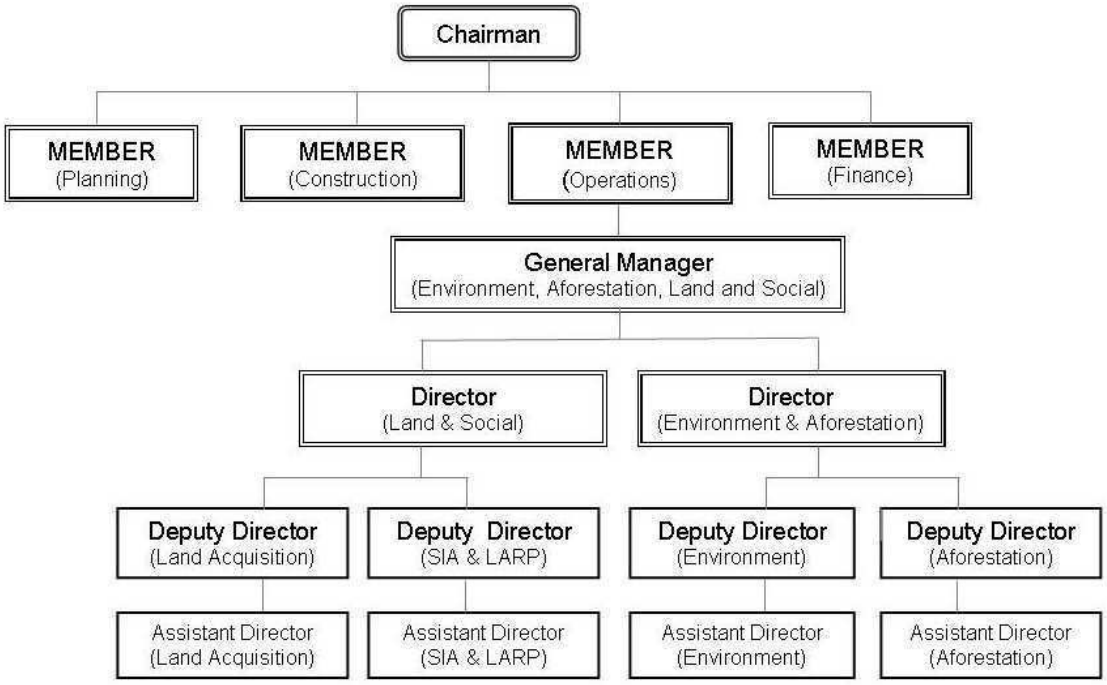


Figure 6.1 Organogram of NHA to present the institutional arrangement for implementation of EMP of proposed project

Construction Contractor

The EMP will be made a part of the contract agreement and the Contractor(s) will ensure that all the proposed Project activities are in compliance with the EMP and NEQS.

Specific Implementation Responsibilities

This section describes the implementation and supervision responsibilities of the personnel involved at different phases of the proposed Project.

Design Phase / Pre-Construction Phase

The Director (Environment, Social and Land) and his staff with the assistance of EIA Consultant will be responsible for ensuring that the proposed Project design and specifications adequately reflect the EMP. He will ensure the Project’s compliance with environmental regulations and ADB requirements; and ensure stakeholders participation in the Project design.

The responsibilities of the Director (Environment) may be briefly described as follows:

- To coordinate with regulatory agencies including EPAs, EIA Consultant, local NGOs, that could assist NHA in independent reviews of environmental compliance;

- To supervise environmental assessment reports, and provide substantial inputs and guidance to EIA Consultant;

- To get approval of EIA from the EPA (Balochistan); 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.

Construction Phase

NHA will appoint Supervision Consultant, who along with the Environment Specialists and Director (Environment) will oversee the working of the Contractor in accordance with the EMP.

- Supervision Consultant will liaise with the Project staff and staff of the Director Environment of NHA to monitor environmental compliance during construction;

- He will supervise the construction activities and get technical support, where necessary, from Director Environment of NHA to ensure compliance with the EMP;

- He will monitor the progress of work and adherence of the Contractor to the EMP; and report to Directorate of Environment.

- He will direct the Contractor to work in such a manner that all the proposed Project activities are in compliance with the EMP.

- Director Environment will over all look after the assignments of supervision consultant.

Operation Phase

The Environment Specialist with the help of Director (Environment) and Assistant Directors will

be responsible for the following:

- Coordinating with the operational staff working under the Regional General Manager (Operations) to monitor environmental compliance during the proposed Expressway operation;
- Assessing the long-term environmental impacts of proposed Expressway operation;
- Sustaining a working partnership among NHA, EPA (Baloshistan), Agricultural, Forest and Wildlife Departments, NGOs and other related public-private sector organizations;
- Reporting to the General Manager (Land and Environment) about progress of the work; and
- Reporting on environmental performance monitoring and compliance to the Baloshistan EPD and District Environment Offices in the area.

6.6 Environmental Training

Capacity Building and Training

Capacity building and training programs are necessary for NHA staff in order to control negative impacts of road construction, maintenance and operation. They also need training for monitoring and inspecting road projects for environmental impacts and for implementation of mitigation measures.

The details of this capacity building and training program are presented in the Table below

Table 6-2: Capacity Development and Training Programme

Provided By	Organized By	Contents	No of Trainees	Duration	Cost (Rs.)
Pre-Construction Phase Monitoring consultants/ Organizations offering	Director (Environment)	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring	Three seminars for NHA project staff	3 days	150,000/

specialized services in environmental management and monitoring		Plan			
Construction Phase Monitoring consultants/ organizations offering specialized services in social management and monitoring	Director (Environment)	Short seminars and courses on: Environmental Risks associated with construction phase Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Three seminars for NHA Project staff dealing in social/land matters	3 days	150,000/
Operational Phase Monitoring consultants/ organizations offering specialized services in Occupational Health and Safety (OHS) issues	Director (Environment)	Short lectures relating to Road Safety (Policy measures/implementation) Development of Green Belt and Environment Up gradation	Two seminars for Contractor's staff	2 days	100,000/
TOTAL			400,000 (Rs. 0.4 million)		

Director (Environment) will have at least two visits beside the training schedule at each stage of the project. Supervision consultant will be bound to submit the Monthly Environmental Reports or the Quarterly Environmental Reports to the office of Director (Environment) for further verification and submission to ADB.

6.7 Environmental Performance Indicators

Environmental performance indicators will be chosen to quantify that whether the targets of environmental policy safeguard are met as desired in the environmental management plan within specified time period. The quantitative data against following attributes as performance indicator will be collected and reported in the quarterly Environmental Monitoring Reports.

- **Land Use**

Indicators of land use should measure the quality of land resources, changes in the capability of land to produce desired goods and services, and the existence of negative external impacts due to project implementation.

- **Water quality and related issues**

Indicator of water quality must quantify water contamination or pollution and any changes in the water composition and chemistry whether surface or ground water in terms of water quality parameters and there pattern of existence.

- **Air & Noise Pollution**

Magnitude of air and noise quality changes due to project activities.

- **Flora & Fauna**

Any quantifiable changes in the population of fauna and flora and in their habitats pattern will be recorded.

- **Traffic and Transportation**

Dislocation of traffic during construction and adequate planning for the operation

- **Socio-Economic**

Impact on the local/regional economy
Changes in cultural pattern
Dislocation of population

- **Health &Safety**

New disease pathway
Number of injuries or casualties

6.8 Environmental Management Costs

Following Table gives cost estimates for monitoring air quality, water quality and noise monitoring:

Table 6-3: Cost Estimates for Environmental Monitoring

Sr. No	MONITORING COMPONENT	PARAMETERS	QUANTITY	AMOUNT Rs.	DETAILS
1	**AIR QUALITY**				
	Ambient Air Quality	PM_{10}	12	300,000	12 samples @ Rs. 25,000/sample

	Asphalt Plant stack emissions	SO_2, NO_X, CO, HC, O_3	40	400,000	40 samples @ Rs. 10,000/sample
2	**Water quality**				
	Surface Water	Common ions, TDS, TSS, etc	25	575,000	Fortnightly testing of water samples drawn from streams and water courses during construction along their banks @ Rs. 23,000/ per sample
	Drinking Water	Common ions, TDS, BOD, Coliforms, etc	6	48,000.00	6 samples @ Rs. 8,000/ sample
3	**Noise Levels**	dB(A)	24	96,000	24 readings @ Rs. 4,000/per reading
4	Contingencies			70,950	5% of monitoring cost
	SUB TOTAL			**1,489,950**	
	Equipment required				Provision for a camera, lap top, GPS, noise meter and a computer has already been made in the EMP Budget
	TOTAL COST OF MONITORING			**1,439,550**	

7. PUBLIC PARTICIPATION AND CONSULTATION

7.1 Introduction

General public, elected representatives, local councilors and informal community leaders including members of non-government organizations (NGOs) were asked to state their current perceptions of priorities for improvements to the urban environmental infrastructure in their areas and about the likely impacts of the Project during construction and operation phases. Due to social constraints women's groups could not be contacted. The main objectives of the public information campaign and public consultation were as follows:

- To share the information about the proposed project, its components and activities with affected people;
- To obtain cooperation and participation of the general public in Project planning and implementation processes;
- To establish accessible and effective grievance redress procedures; and
- Create a sense of ownership among the stake holders regarding the Project.

7.2 Identification of Main Stakeholders

Stakeholders identified include local representatives, government officials, NGOs and general public. All these stakeholders have different types of stakes according to their interests and professions.

7.3 Approach for Public Consultation

The approach adopted towards public participation was to disseminate information, soliciting inputs and getting consensus on issues and propose mitigation measures. This approach was put into practice through consultation with NHA and public meetings, meetings with influential people of the districts, workshops and roadside consultations with pedestrians, vehicle drivers, roadside vendors etc were held. The first consultation process was held in 2008-2009 during the preparation of this environmental assessment report. Subsequently, further consultations were held in September 2013 during the updation of this report.

7.4 Meetings with Stakeholders

During the first round of consultations meetings were held with the local communities and Engineers of Communication and Works (C&W) Department, Balochistan and the district Coordination Officer Loralai in March 2008. During discussions with residents and site visits, it has been revealed that local people are generally aware of the Project and are in favor of its construction. In February 2009 a meeting was also held with the General Manager, ADB Projects in Quetta.

In the second round of consultation held in 2013, meetings were held with the Director General BEPA, Deputy Director (Technical) BEPA, Deputy Commissioner, Loralai, Executive Engineer (Buildings and Revenue), Loralai, Deputy Director (Agriculture) Loralai, and Deputy Director (Maintenance) Loralai. NHA staff with whom consultations were held included General Manager Balochistan, Director Maintenance Quetta, Deputy Director Maintenance Loralai, and Deputy Director Land/ Legal Quetta.

Consultations were also held with community members of villages along the road alignment. Since the Project road alignment generally follows the existing alignment and only widening/improvement in the road geometry is being done, the Project is generally accepted and people want this Project to be taken up.

7.5 Stake Holders Concern

The most common concerns noticed during the public meeting are listed as under:

a. Highway Design
   - The design of road should be least disturbing the local agriculture and economic activity. For example the provision of bypass at north of the city may severely interfere with the agriculture of the area and hence locally unaccepted.
   - Sufficient cross drainage structures should be provided to avoid flooding of the area.
   - The Highway alignment should minimum effect the local settings and to avoid the severance of the area while passing through the populated area.
   - The respectful local customs should be taken in account in a design and should be maintained during construction.

b. Highway Construction
   - Avoid undue delays in construction to limit the inconvenience to the public cause by the road construction.
   - Adopt majors to minimize dust, smoke and noise pollution during construction.
   - Avoid dumping of the materials during the construction and to carry out proper site clearance after completion of the construction activities.
   - Provision of properly formed and maintained diversions during construction.
   - Inclusion of local labour and workforce up to the maximum possible extent in project construction activities.

c. Highway Operations
   - Erection of informatory regulatory and cautionary signs to eliminate operational hazards
   - Control over speeding and the use of loud pressure horns near populated area.
   - Specify speed limits particularly in populated area.
   - Proper maintenance of cross drainage structure to avoid flooding of road and adjacent area.

These concerns will be addressed through the proper implementation of the EMP. The list of consulted persons during both rounds of consultations (2008-09 and 2013) is attached as Annexure V.

7.6 Socioeconomic survey

A socio-economic survey form was designed and distributed amongst the participants of various meetings held with the locals for dissemination of information and to gauge their reaction towards the implementation of the Project. The filled forms were received and analyzed. The analysis showed that most of the respondents were engaged in agriculture as their main occupation, followed by small private business (shop keeping) and services. The respondents needed adequate compensation if their land or business were required by the Project.

The trees planted along the road consist of eucalyptus, pine trees and Sanober (another type of pine tree). In addition there are cherry, apricot, mulberry and apple orchards along the existing road.

8. GRIEVANCE REDRESS MECHANISM

8.1 General

In order to receive and facilitate the resolution of affected peoples' (AP) concerns, complaints and grievances about the Project's environmental performance, a Grievance Redress Mechanism (GRM) will be established at the Project. The GRM will address the APs' concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the APs at no costs and without retribution. The mechanism will not impede access to the country's judicial or administrative remedies.

8.2 Grievance Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring

NHA will facilitate the establishment of the Grievance Redress Committee (GRC) at the project location prior to the Contractor's mobilization to site. The GRC will be headed by the Project Director, and members will include Deputy/ Assistant Director Env of NHA's Environment, Afforestation, Land and Social (EALS) Unit., Asst. Director Land, the Environment Specialist of the Supervision Consultant and the contractor's Environment, Health and Safety (EHS) officer. The role of the GRC is to address the Project related grievances of the affected parties that are not resolved satisfactorily through the initial stages of the GRM.

NHA will assist the project affected communities/villages identify local representatives to act as Grievance Focal Persons (GFPs). The GFPs will be responsible for i) acting as community representatives in formal meetings between the project team and the local community he/she represents; ii) communicating the community members' grievances and concerns to the contractor during project implementation.

A pre-mobilization public consultation meeting will be convened by NHA's EALS Unit and attended by the GFPs, Supervision Consultant, contractor, Project representative and other interested parties (e.g. district level representatives, NGOs). The objectives of the meeting will be as follows:

i. Introduction of key personnel of each stakeholder including roles and responsibilities;

ii. Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP - its purpose and implementation arrangements;

iii. Establishment and clarification of the GRM to be implemented during project implementation including proactive public relations activities proposed by the project team, Supervision Consultant and contractor to ensure that communities are continually advised of project progress and associated constraints throughout project implementation period;

iv. Elicit and address the immediate concerns of the community based on information provided above

Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below:

i. Individuals will lodge their environmental complaint/grievance with their respective community's nominated GFP.

ii. The GFP will bring the individual's complaint to the attention of the contractor.

iii. The contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.

iv. The GFP will discuss the complaint with the contractor and have it resolved.

v. If the contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the Supervision Consultant's Environmental Specialist. The SC's Environment Specialist will then be responsible for coordinating with the contractor in solving the issue.

vi. If the complaint is not resolved within two weeks the GFP will present the complaint to the Grievance Redress Committee (GRC).

vii. The GRC will have to resolve the complaint within a period of two weeks and the resolved complaint will have to be communicated back to the community. The contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.

viii. Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.

ix. In parallel to the ECR placed with the contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.

x. NHA's project office will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the contractor to the SC and will ensure that they are resolved in a timely manner.

9. CONCLUSIONS AND RECOMMENDATIONS

The proposed Project has been conceived to help in socio-economic development of Balochistan and to provide better access between Punjab and Balochistan. The National Highway N-70 connects the districts of Qila Saifullah-Loralai-Musa Khel and Barkhan before joining Bewata in Dera Dhazi Khan District of Punjab. In Punjab Province the N-70 passes through D.G.Khan District, Muzaffagarh District and passing through Multan District ends at N-5. This is a very important highway as it provides the most direct route between southern Punjab, northern Balochistan, southern Afghanistan and Iran. It will also serve as a sub-regional route between India, Afghanistan, and Iran in the future. N-70 passes through several important intermediate cities and towns, including Muzaffargarh, D.G. Khan, Bewata, and Loralai.

National Highway N-70 takes a role in the shipment of mining products, such as coal, and agricultural products. The section of N-70 targeted by this project goes through mountainous areas with narrow, steep and sharp curves, hindering traffic of large vehicles such as trailers, tankers and large-scale buses and forcing them to detour to other routes. Furthermore, traffic blockage caused by accidents involving trucks rolling over and landslide disasters often make it hard for even cars and other ordinary passenger vehicles to pass through.

The National Highway Authority (NHA) plans to strengthen the transportation capacity of N-70, especially by improving the section that runs through the mountainous areas, and through urban localities like Loralai City, in order for N-70 to serve as the shortest and highly safe east-west crossway.

Primary and secondary data was used to assess the environmental impacts of the Project. This report highlights all potential environmental impacts associated with the Project and recommends mitigation measures. All environmental impacts associated with the Project need to be properly mitigated, through the existing institutional arrangements highlighted in this report.

Most of the environmental impacts will be felt during construction phase. Implementation of mitigation measures during this period will be the responsibility of the Contractors, who has to be made aware of the perception and understanding of environmental problems. Hence, the required environmental mitigation measures will have to be clearly defined in the Contract Documents, and an Environmental Consultant must supervise the implementation process. PEC Tender Documents which are founded on FIDIC based Tender Documents sufficiently cover this aspect of the construction contract.

The Project area is generally mountainous, rolling and plain. Some areas near human settlements are agriculture lands with many fruit orchards. Implementation of proposed mitigation measures will not only reduce negative impacts, but improve the road environment. The institutional development and building a better environmental perception and understanding through training, NHA and other related agencies will be better equipped for future environmental management and monitoring. The Contractor shall include the cost of all mitigation measures in his Bid and shall be responsible for their implementation.

The EIA reveals that no major negative environmental impacts are likely to occur due to construction and normal operations of the proposed Project, provided mitigation measures are implemented and the proposed monitoring program is adequately carried out. The EMP includes measures to minimize project impacts due to soil erosion, air and noise pollution, waste generation, and vegetation clearing. Cumulative impacts of this Project should be viewed with a

"corridor" and regional perspective, and mitigation or response programs formulated at the policy, cross-sectoral level. The project is recommended for implementation, with adequate consideration of the EMP and cumulative impacts.

This report has thoroughly assessed all the potential environmental impacts associated with the Project. The environmental impacts identified by the study are manageable, which will be mitigated at various stages, as suggested in the report.

The Project has therefore, been assigned "Category B" in accordance with the 'ADB *Environmental Guidelines, 2003 read in conjunction with 'Safeguard Policy Statement 2009',* and Schedule II as per PEPA, *IEE and EIA Gazette Notification, 2000'. Environmental Impact Assessment (EIA) is therefore to be carried out for the project.*

ANNEXURE – I

RAPID ENVIRONEMNTAL ASSESSMENT CHECKLIST

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Instructions:

 This checklist is to be prepared to support the environmental classification of a project. It is to be
attached to the environmental categorization form that is to be prepared and submitted to the Chief
Compliance Officer of the Regional and Sustainable Development Department.
 This checklist is to be completed with the assistance of an Environment Specialist in a Regional
Department.
 This checklist focuses on environmental issues and concerns. To ensure that social dimensions are
adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement,
(ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
 Answer the questions assuming the "without mitigation" case. The purpose is to identify potential
impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Improvement & Widening of Qila Saifullah-Loralai-Waighum Rud Section of National Highway N-70

Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site			
Protected Area			
Wetland			
Mangrove			
Estuarine			
Buffer zone of protected area			
Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?			
ROADS AND HIGHWAYS			
encroachment on precious ecology (e.g. sensitive or protected areas)?			

□ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?			
□ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			
□ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?			
□ noise and vibration due to blasting and other civil works?			
□ dislocation or involuntary resettlement of people			
□ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?			
□ hazardous driving conditions where construction interferes with pre-existing roads?			
□ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?			
□ creation of temporary breeding habitats for mosquito vectors of disease?			
□ dislocation and compulsory resettlement of people living in right-of-way?			
□ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life?			
□ increased noise and air pollution resulting from traffic volume?			
□ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?			

ANNEXURE – II

BIOTIC INFORMATION PROFILE

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 0- 15 (Starting at N-50 Qila Saifullah)

BIOTIC INFORMATION PROFILE	
Topography	Mountainous
Soil type / Land use	Mostly barren lands
Drainage & Watercourses	10 water courses cross the Road over which culverts have been provided
Flora & Fauna	None
Road side trees	None
Existing traffic category	All types and category of vehicles use this facility

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population		✓			
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps			✓		
Land clearing		✓			
Alter local drainage		✓			
Change soil character		✓			
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water		✓			
Ecological balance		✓			
Air & Noise Pollution					
Air Pollution / Dust			✓		
Noise pollution			✓		
Flora & Fauna					
Adverse impact on wildlife		✓			
Traffic and Transportation					
Dislocation of traffic during construction			✓		
Adequate planning for safe operation			✓		
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns			✓		
Dislocation of population		✓			
Health					
New disease pathway e.g., Malaria		✓			
Changing natural environmental		✓			
General					
Adverse effect on culture		✓			

View of Qila Saifullah-Loralai road Left side from Intersection point at start of project .

View of Loralai road towards Loralai at Ch: 1+000

Controversial impacts		✓			
Amenity impacts		✓			

View of Bridge at Garang Nala towards down stream
Ch: 2+500

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 15-30 km

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes through barren mountainous land
Soil type / Land use	Strongly calcareous, gravely and stony loams.
Drainage & Watercourses	61 small water courses cross the Road over which culverts have been provided there are two nullahs over which bridges have been provided
Flora & Fauna	No road side plantation
Road side trees	none
Existing traffic category	All types of traffic use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust		✓			
Noise pollution		✓			
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					

View of Loralai road with Culvert towards Loralai at
Ch: 15+000

Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental					
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of Loralai road and bridge on Nala at Ch: 13+500

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 30-45

BIOTIC INFORMATION PROFILE	
Topography	The road passes through mountainous terrain goes through Drazanda village with agricultural lands
Soil type / Land use	Strongly calcareous, gravely and stony loams.
Drainage & Watercourses	A number of water courses cross the road over which culverts have been provided. One bridge is being constructed over a nullah
Flora & Fauna	Some agricultural lands and fruit orchards very little road side plantation can be seen, wildlife nearly non existent.
Road side trees	Eucalyptus
Existing traffic category	All types of vehicles use the road

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit siting		✓			
Water Quality and					

View of Loralai road towards Left side at Ch: 36+000

related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy			✓		
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of Loralai road towards Right side at Ch:39+500

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 45-60

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and human settlement with orchards and agricultural lands on both side of road
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided. Lon Yang Nullah crosses the road at two locations bridges have been provided over these crossing points.
Flora & Fauna	Lush green cultivated fields on both sides of the road. Very little wildlife.
Road side trees	Eucalyptus trees on both sides of the road
Existing traffic category	All types of vehicles use the road.

Attributes	**Environmental Impacts**				
	Nil	**Low**	**Med**	**High**	**Unknown**
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			

Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of Loralai road towards Qilla Saifullah at Ch: 50+000

View of Bridge on Lungyang Nala at Ch: 50+000

View of Loralai road towards Left Side at Ch: 51+000

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 60-75

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and Loralai city with orchards and agricultural lands on both side of road
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided. Lon Yang Nullah crosses the road at two locations bridges have been provided over these crossing points.
Flora & Fauna	Lush green cultivated fields on both sides of the road. Very little wildlife.
Road side trees	Eucalyptus trees on both sides of the road

Existing traffic category	All types of vehicles use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of Loralai road towards Right Side at Ch: 60+500

View of New alignment for Loralai Bypass
Showing Intersection at end of bypass with Qilla Saifullah-Loralai road

View of New alignment for Loralai Bypass
Showing End point of bypass towards Waigum Rud side at Qilla Saifullah-Loralai road

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 75-90

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and human settlement Shakarez village) with orchards and agricultural lands on both side of road,

	water ponds etc on both sides of the road
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided. Durgai Nullah crosses the Road over which a bridge has been provided.
Flora & Fauna	Lush green cultivated fields on both sides of the road. Very little wildlife.
Road side trees	Eucalyptus trees on both sides of the road
Existing traffic category	All types of vehicles use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of New alignment for Loralai Bypass
Showing towards Sanjawi from Sanjawi road befor 100m from River

Loralai city viewing towards Qilla Saifullah

View of Bridge on Chapli River at Ch: 77+000

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

Environmental Survey Results Km 90-105

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and human settlement with orchards and agricultural lands on both side of road
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided. Lon Yang Nullah crosses the road at two locations bridges have been provided over these crossing points.
Flora & Fauna	Lush green cultivated fields on both sides of the road. Very little wildlife.
Road side trees	Eucalyptus trees on both sides of the road
Existing traffic category	All types of vehicles use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		

View of Loralai road towards Qila Saifullah at Ch: 82+000

View of Loralai road towards Loralai at Ch: 92+500

Health					
New diseases e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70

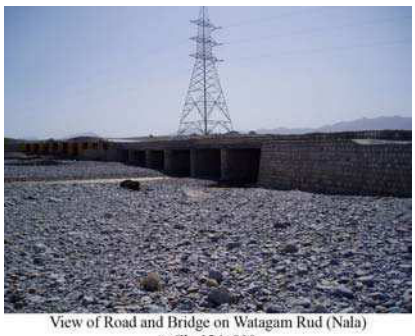
Environmental Survey Results Km 105-end of Project

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and human settlement with orchards and agricultural lands on both side of road
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided. One Nullah cross the road over which a bridge has been Provided. Mara river cross the road at RD 113 near Samzop village.
Flora & Fauna	Lush green cultivated fields near human settlements. Very little wildlife.
Road side trees	Only near human settlements.
Existing traffic category	All types of vehicles use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				

View of Causeway in Loralai road on Sihab River at Ch: 106+000

Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				



View of Road and Bridge on Watagam Rud (Nala) at Ch: 124+000

Improvement and Widening of Qila Saifullah-Loralai-Waigum-Rud of N-70 Including Loralai Bypass

Environmental Survey Results Loralai bypass

BIOTIC INFORMATION PROFILE	
Topography	The alignment passes rolling terrain and
Soil type / Land use	Strongly calcareous, gravely and stony loams
Drainage & Watercourses	A large number of water courses over which culverts have been provided.
Flora & Fauna	Lush green cultivated fields on both sides of the road. Very little wildlife.
Road side trees	Eucalyptus trees on both sides of the road
Existing traffic category	All types of vehicles use the road.

Attributes	Environmental Impacts				
	Nil	Low	Med	High	Unknown
Land Use					
Increase population			✓		
Adverse use of natural resources		✓			
Encourage strip development		✓			
Induced impact on natural resources		✓			
Affect existing beneficial use			✓		
Construction camps		✓			
Land clearing		✓			
Alter local drainage	✓				
Change soil character	✓				
Borrow pit sitting		✓			
Water Quality and					

View of New alignment for Loralai Bypass Showing towards Loralai River

related issues					
Contamination from accidental spills		✓			
Alter Physical / chemical / biological state of water	✓				
Ecological balance	✓				
Air & Noise Pollution					
Air Pollution / Dust	✓				
Noise pollution	✓				
Flora & Fauna					
Adverse impact on wildlife	✓				
Traffic and Transportation					
Dislocation of traffic during construction		✓			
Adequate planning for safe operation		✓			
Socio-Economic					
Impacts on the local/regional economy				✓	
Changes in cultural patterns		✓			
Dislocation of population			✓		
Health					
New disease pathway e.g., Malaria	✓				
Changing natural environmental	✓				
General					
Adverse effect on culture	✓				
Controversial impacts	✓				
Amenity impacts	✓				

View of New alignment for Loralai Bypass
Showing towards Sanjawi from Sanjawi road befor 100m from River

View of New alignment for Loralai Bypass
Showing towards Loralai river from Sanjawi road befor 100m from River

ANNEXURE – III

NEQS GUIDELINES AND WHO STANDARDS

National Environmental Quality Standards for Gaseous Emission

Parameter	Source of Emission	Existing Standards	Revised Standards
Smoke	Smoke Opacity not to exceed	40% or 2 on Ringlemann scale	40% or 2 on Ringlemann scale or equivalent number
Particulate matter	a) Boilers and furnaces Oil fired Coal fired Cement Kilns b) Grinding crushing, clinker, coolers and related processes, metallurgical processes, converter, blast furnaces and cupolas	 300 500 200 500	 300 500 300 500
Hydrogen Chloride	Any	400	400
Chlorine	Any	150	150
Hydrogen Flouride	Any	150	150
Hydrogen Sulphide	Any	10	10
Sulphur oxides	Sulfuric acids/sulfuric acid plants Other plants	400 400	5000 1700
Lead	Any	50	50
Mercury	Any	10	10
Cadmium	Any	20	20
Arsenic	Any	20	20
Copper	Any	50	50
Antimony	20	20	20
Zinc	Any	200	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit Gas Fired Oil Fired Coal Fired	400 400	400 400 600 1200

WHO Guideline Values for Community Noise in Specific Environment

Specific Environment	LA eq (dB)	LAmax Fast (db)
Out door living area	55	
School class rooms and pre-schools (indoor)	35	
School Playground (outdoors)	35	
Hospitals Ward rooms (indoor	30 30	40
Hospital Treatment rooms (indoors)	#1	
Industrial, commercial, shopping and traffic areas (indoors and out doors)	70	110

#1= as low as Possible

WHO Drinking Water Quality Standards

Sr. No.	Constituent, mg/L	Recommended limit (1961 European)
1	Ammonia	0.5
2	Chlorides	350
3	Copper	0.05[a]
4	Flourides	1.5
5	Iron	0.1
6	Magnesium [b]	125[b]
7	Nitrates	50
8	Oxygen	5.0
9	Phenols	0.001
10	Sulphates	250
11	Zinc	5.0

a Maybe higher for new piping
b if 250mg/L SO_4 is present, Mg not to exceed 30mg/L

ANNEXURE – IV

ENVIRONMENTAL MANAGEMENT PLAN

ENVIRONMENTAL MANAGEMENT PLAN

IMPROVEMENT AND WIDENING OF QILA SAIFULLAH-LORALAI-WIGUM RUD SECTION OF N-70 INCLUDING LORALAI BYPASS

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Location Issues							
Structural Excavation	Maximum usage in embankments & fill areas Safe disposal at pre-selected sites by covered haulage trucks in waste lands, Site to be selected with approval of local residents. No spoil to be disposed near residential areas, lands, forests, streams and other water bodies	To be added in the relevant parts of contract documents (Clause 8.1 and 8.2 of FIDIC document 1992 edition)	Alignment of road	During Construction	To be included in project cost	Design Consultants and NHA	NHA
Borrow materials	Only licensed and pre approved quarries to be used Borrow areas away from habitats and not visible from road. Refilling of excavated areas. Areas that cannot be refilled should be cordoned off with barbed wire fence with warning signs.	To form part of general specifications	Alignment of road	During Construction	To be included in project cost	Design Consultants and NHA	NHA
Ribbon developments	Enforcement of Laws Reduced template widths in built-up areas. Vigilant monitoring and timely action to prevent any such development.	To be added in the relevant parts of To form part of general specification policy of NHA	Alignment of road	During design, contract and Bidding stage	To be included in project cost	Design Consultants NHA	NHA
Flora and Fauna	Detailed tree/vegetation plantation plan. No Tree to be removed without prior approval of FD. Safe storage & re-application of any scarified top earth Enforcement of wildlife protection laws. General public and road users to be educated through graphic signboards. Warning signs for presence and crossing areas of wildlife.	NHA Plantation Pattern guide to be followed.	Road alignment	During design, contract and Bidding stage	To be included in project cost	Design Consultants NHA	NHA

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Design / pre-construction Stage							
1. Alignment							
Land and Property Losses	All land and property to be acquired for the Project should be equitably and amicably acquired with proper compensation as per the Land Acquisition Act 1894 including later amendments.	Clause 19.1 FIDIC 1992 edition	Road alignment	During design, contract & tendering stage	Included as part of Project Cost under sub head Land acquisition.	Design Consultants NHA	NHA
	Adopting suitable cross-sections and adjustment of median width near human settlements and agricultural lands	Land Acquisition Act 1894 including later amendments.	Reduced median width within populated area				
	Any existing utilities to be properly relocated		Retaining walls will be provided where required.				
2. Land							
Embankment Slopes	All critical slopes along the roadsides to be provided with, turf in order to protect the slopes as per the recommended practice for treatment of embankment slopes for erosion control.	This remedial measure to form part of general specifications.	Road alignment	During design, contract & Bidding stage	Included in project cost	Design Consultants and NHA	NHA
Road Inundation	Proper drainage, erosion and training structures to be provided, also suitable structures such as culverts to be provided where necessary	General specifications	Road alignment	During design, contract and Bidding	To be included in project cost	Design consultants and NHA	NHA
Quarries and Borrow Areas	Existing licensed quarries have been recommended.	General Specifications	All selected borrow pits and quarries	During design, contract and Bidding	To be included in project cost	Design Consultants and NHA	NHA
	Non-productive barren lands, raised lands, riverbeds, and wastelands have been recommended to be used as borrow areas for earth materials; no fertile land to be used for this purpose.						
	Low lying areas and wastelands that can be developed into fish ponds are recommended to be used for borrow areas.						
	Any land that the landlord wishes to be cut for any purpose						

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
3. Water							
Water Sources	Balochistan is an arid province and depends upon ground water for its agricultural and other uses. The two districts depend mostly on rainfall. River Zhob provides drainage to Qila Saifullah whereas Nari River and its tributaries	General Specification	All water resources of the area will be affected.	During design and Bid stage	To be included in project cost	Design Consultants and NHA	NHA
	Water ponds, fish ponds in construction sphere to be relocated.						
	Proper training works to be provided and maintained. No major change is foreseen in the existing water resources of the area.		Very little adverse impact foreseen.				
	Ground Water		Road alignment	During Design and Bid stage	To be included in the Project cost	Design Consultant and NHA	NHA
	All construction plants and machinery should be kept well maintained and all fuel, lubricants and other chemicals should be stored in						
Drainage	Natural drains will be modified to avoid obstructions		Road alignment	During design and Contract	To be included in project cost	Design Consultants NHA	NHA
	Provision of adequate size and number of cross drainage structures.						
	Sections of the road that are flooded during rains shall be raised and cross drainage structures and adequate side drains shall be provided.						
4. Flora & Fauna							
Roadside Plantations	Trees to be removed only after approval of FD.		Along road within Right of way.	During design, Contract,	To be included in project cost	Design Consultants NHA	NHA
	Compensatory forestation will be adopted. Two trees will be planted for each tree cut as per NHA policy.						
	Trees to be planted in linear plantation along the approach roads.						

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementatio	Supervision
5. NEQ's							
Air Quality	Improving road geometry, curves, slopes, etc and widening of road to smoothen traffic flow. Trees will be planted on both sides of the road and in the median verges shrubs of suitable species will be planted this will reduce air pollutant concentrations and reduce noise.	Major Pakistan Environmental Legislations to be followed	Along road, especially at sensitive locations	During designs, contract.	To be included in project preparation cost.	Design Consultants NHA	EPA, NHA, FD
Solid Waste	Solid waste disposal sites will be properly designed and must be at least 250 m away from the right-of way of all roads	Same as above	Near construction sites	During design and construction	To be included in project cost	Design consultants and NHA	NHA
Noise levels	Removal of slumps & bottlenecks in built-up areas. Proper design of all junctions & intersections. Segregation of slow and fast moving traffic Roadside plantations of different species of trees, shrubs etc will act as sound barrier and absorbers. Places that are highly sensitive, such as schools and hospitals, shall be protected as follows: Shrubs to be planted 3m from the edge of the pavement. More noise barriers will be provided at 4m.	Same as above	Near construction sites	During design and construction.	To be included in project cost	Design consultants and NHA	NHA
6. Utilities							
Public Utilities	All public utilities such as gas/water pipes, power/phone lines etc likely to be affected, must be relocated, after consulting the responsible agency.	General Specifications	Near Human settlements and along Road alignment	During design, contract	To be included in project cost	Design consultants and NHA	NHA

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementatio	Supervision
7. Cultural heritage							
Cultural Properties	There is no cultural heritage site within 500m of the Project Road. There are a few mosques and one shrine in the ROW of the Project Road these will be relocated as per the desire of the local communities affected.	Land Acquisition Act 1894 and later amendments will be followed.	At various locations all along the project corridor	During design, contract	To be included in project cost	Design Consultants and NHA	NHA
Construction Stage							
1. Soil							
Soil Erosion	Steep embankments will be protected with one or more of the following: - Drains and chutes to minimize soil erosion - Stone pitching - Masonry retaining structures - Vegetative turfs at embankments, i.e. planting of grass and shrubs etc. - Borrow pit depths will be such that no side is steeper than 25% - Formation of sediment basins and slope drains - Bench terracing for high cut areas.	General Specifications	Borrow areas	During design contract	To be included in his cost by the contractor.	Contractor's Environment Engineer	EPA, NHA, Supervising Consultant.
Loss of Top Soil	Agricultural areas will not be used for borrowing of materials, unless requested by the landowner for making ponds or for lowering the land for making it irrigable	General specifications	Borrow areas	During design contract.	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and Supervising Consultant.
Borrow Soils	No earth will be borrowed from within the Right of way of roads. Non-productive lands, barren lands, raised lands, riverbeds and waste lands may be used for borrowing earth. If new borrow areas are to be selected, then measures will be taken so that there will be no loss of productive soil, and all environmental Unpaved surfaces used for the haulage of borrow materials will be maintained properly. Precautionary measures such as covering vehicles will be taken to avoid spilling of borrow materials. To avoid any embankment slippage, borrow areas will not be dug continuously. In borrow areas; two trees will be replaced for one tree cut.	General specifications	In all proposed borrow areas	During design, contract	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA Supervising Consultant.

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementatio	Supervision
Quarry Areas	The quarry material will be obtained from licensed sites with proper environmental clearances. New quarries will only be opened with prior permission from Local authorities.		All proposed quarry sites	During construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and Supervising Consultant
Contamination of Soils	Construction equipment will be maintained & refuelled ensuring no spillage contaminates the soil All spoils and waste material will be disposed of in wastelands, with approval of local communities Scarified bituminous wastes will be disposed of at approved sites with impervious linings.		Throughout project corridor, all borrow areas and construction sites	During Construction	To be included in Bid Cost by the Contractor/	Contractor's Environment Engineer	EPA, NHA and Supervising Consultant.
2. Water							
Water Bodies and other Water Sources	Immediate rehabilitation & compensation of damaged or adversely affected water sources. Advance measures to be taken to prevent any damage to water bodies. Any community water source, such as well etc., damaged accidentally will be replaced with alternate sources.		At water bodies or cross drainage	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and Supervising Consultant.
Drainage & Runoff	At cross drainage structures, the earth, stone or any other construction material will be properly disposed off, so as to avoid blocking the flow of water		Throughout proje ct corridor	During construction	To be included in Bid cost by the Contractor	Contractor's Environment Engineer	EPA, NHA, SC.
Water Contamination	All necessary precautions will be taken to construct temporary or permanent devices to prevent water pollution due to increased siltation and turbidity. All necessary measures will be taken to prevent earthworks and stone works from impeding rivers, streams, water canals, or drainage system. Wastes must be collected, stored, and taken to approve disposal site. To avoid contamination from fuel and lubricants, the vehicles and equipment will be properly maintained and refuelled. Oil and grease traps will be provided at fuelling locations. The slopes of embankments leading to water bodies will be modified and screened so that contaminants do not enter water body. Side drains provided in the settlement areas will discharge through primary settling tank Waste petroleum products will be collected, stored, and disposed of at the approved sites. Water quality will be monitored.		Throughout proje ct corridor	During Construction	To be included in bid cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and SC.

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Sanitation and Waste disposal in construction camps	The Construction camps will be located away from the habitation. The sewage system for such camps will be properly designed and built so that no water pollution takes place, If necessary, temporary effluent treatment plants will be installed in the construction camps. The workplace will have proper medical facilities.		Various construction camps throughout project corridor.	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and Supervising Consultant.
Water used during Construction	The contractor will arrange for water for construction such that nearby communities remain unaffected. Water will not be wasted during construction.		All project roads	During construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer.	EPA, NHA and SC
3. Air							
Emission from Construction Vehicles & Equipments	All machinery and plant storage yards will be constructed downwind of human settlements. The pollution emission levels of all vehicles, equipment and machinery used for construction will conform to the NEQs. Air pollutant parameters will be monitored regularly during construction, as envisaged in the EMP. The Asphalt plants, crushers and the batching plants will be at least 1 km in the downwind of the nearest human settlement.		All construction sites	During construction	To be included ion bid cost by the contractor	Contractor's Environment Engineer	
Dust and its treatment	All precautions will be taken to reduce the level of dust emissions from hot mix plants, crushers and batching plants The hot-mix plants, crushers and batching plants will be at least 1 km downwind from the nearest habitation. The hot mix plant will be fitted with dust extraction units. Water will be sprayed in the lime, cement, and earth mixing sites asphalt mixing site and temporary service and access roads. After compaction of Works, water will be sprayed regularly on the earthwork to prevent dust. Delivery vehicles will be covered. Mixing equipment will be well sealed and equipped as per existing standards		All construction sites throughout project corridor	During construction	To be included in bid cost by the contractor	Contractor's Environment Engineer	EPA, NHA and SC

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
4. Noise Levels							
Noise from Vehicles, Asphalt Plant & Equipment	The Plants and equipment used for construction will strictly conform to NEQs noise standards. Vehicles and equipment used will be fitted with silencer and maintained accordingly. Noise standards for industrial enterprises will be strictly enforced to protect construction workers from severe noise impacts. Workers will be provided with appropriate ear muffs/plugs. The noise level will be monitored during the construction, as per the EMP. Noise barriers/trees will be placed in urban locations.		All construction sites throughout the project corridor	During construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and SC.
Noise Barriers	Vegetation and high walls with insulation against sound will be installed at locations with high noise levels exceeding NEQs.		Sensitive locations such as near educational institutions, hospitals etc.	During Construction	To be included in bid cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and SC.
5. Flora							
Loss or damage to vegetation	Areas from where trees are removed will be marked and all trees will be replaced according to "Roadside Plantation Program". Trees requiring removal will be paint-marked		Throughout project corridor.	Just before start of construction work	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	EPA, NHA and SC.
Vegetation and soil Compaction	All construction machinery & equipment will be parked in designated areas to prevent vegetation compaction outside right of way. Any incidental damages like, soil trampling & damage to herbs, shrubs & grasses will be kept to the minimum						

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						n	Supervision
6. Fauna							
Loss, damage or disruption to fauna	Providing education to construction workers to avoid disruption or damage to wildlife. Wildlife Protection laws to be strictly followed. All construction vehicles will use specified routes to avoid accidents with cattle or wildlife.		Throughout project corridor	During Construction	To be included in Bid Cost by the Contractor.	Contractor's Environment Engineer	EPA, NHA, SC, Wildlife Department
7. Safety & Accident Risks							
Construction Activities & Accident Risks	Safety signals will be installed on all temporary routes during construction. Strict enforcement of traffic rules & regulations. Workers will be provided helmets, masks & safety goggles etc. A readily available first aid unit, dressing materials, ambulance & nursing staff will be ensured at critical locations. Road safety education will be imparted to drivers of construction vehicles. Traffic management will be ensured during construction periods. Information dissemination through newspaper, audio/TV & banners etc about project time frame, activities causing disruption & temporary arrangements for public relief must be ensured.		Throughout project corridor	During Construction	To be included in bid cost by the Contractor	Contractor's Environment Engineer	Police, NHA and SC.

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementatio	Supervision
Traffic bottlenecks and diversions	Temporary access roads will be provided at all interchanges, bridges and culverts, especially in high population areas. Such diversions shall have proper drainage facilities.		Along settlements and at major intersections	During construction	To be included in Bid Cost by the Contractor.	Contractor's Environment Engineer	EPA, NHA, SC, Wildlife Department
Health issues	Drainage, sanitation, & waste disposal facilities will be provided at work places. Drainage will be maintained and water will not be allowed to stagnate to avoid breeding mosquitoes & spread of other diseases. Suitable sanitation & waste disposal facilities will be provided at camps by construction of septic tanks & soak pit etc. Sufficient water supply will be maintained at camps to secure workers hygiene. Health education & preventive medical care will be provided to workers. Routine medical check up of workers to avoid spread of communicable disease.		Throughout project corridor	During Construction	To be included in bid cost by the Contractor	Contractor's Environment Engineer	Police, NHA and SC.
Cultural Properties							
Care of Archaeological, Religious, & Cultural properties	If any valuable articles such as fabric, coins, artefacts, structures, or other archaeological relics are discovered, the excavation will be stopped & the archaeology departments will be informed. Construction camps, blasting sites, and all allied construction activities will be well away from cultural property.		Along project corridor	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	NHA, SC, Archaeology Department
Traffic bottlenecks and diversions	Temporary access roads will be provided at all interchanges, bridges and culverts, especially in high population areas. Such diversions shall have proper drainage facilities.		Along settlements and at major intersections	During construction	To be included in Bid Cost by the Contractor.	Contractor's Environment Engineer	EPA, NHA, SC, Wildlife Department

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Health issues	Drainage, sanitation, & waste disposal facilities will be provided at work places. Drainage will be maintained and water will not be allowed to stagnate to avoid breeding mosquitoes & spread of other diseases. Suitable sanitation & waste disposal facilities will be provided at camps by construction of septic tanks & soak pit etc. Sufficient water supply will be maintained at camps to secure workers hygiene. Health education & preventive medical care will be provided to workers. Routine medical check up of workers to avoid spread of communicable disease.		Throughout project corridor	During Construction	To be included in bid cost by the Contractor	Contractor's Environment Engineer	Police, NHA and SC.
8 Cultural Properties							
Care of Archaeological, Religious, & Cultural properties	If any valuable articles such as fabric, coins, artefacts, structures, or other archaeological relics are discovered, the excavation will be stopped & the archaeology departments will be informed. Construction camps, blasting sites, and all allied construction activities will be well away from cultural property.		Along project corridor	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	NHA, SC, Archaeology Department
9 Environmental Enhancement							
Roadside Landscape Development	Avenue plantation of mixed species of aesthetically pleasing trees, shrubs & aromatic plants will be carried out.		Throughout project corridor	During Construction	To be included in Bid Cost by the	Contractor's Environment Engineer	NHA, SC
Roadside Amenities	Provision of bus shelters, bus bays, petrol pump, restaurants, recovery areas & 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		Throughout project corridor	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	NHA, SC.
Cultural Properties	All cultural properties will be protected and access roads will be provided, wherever required.		Various construction sites throughout project corridor	During Construction	To be included in Bid Cost by the Contractor	Contractor's Environment Engineer	NHA, SC

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Operational stage							
Contamination from oil and other spills	Any site of accidental oil or any other spill shall be cleared immediately. Soiled earth will be scraped and deposited in small lined confined pits nearby, within the ROW		Throughout project corridor	During road operations	To be included in engineering cost	NHA and Local Administration	EPA, NHA
Dust Generation	Roadside tree plantations will be maintained. Forestation will be taken up at new sites near the road		Throughout project corridor	During road operations	To be included in engineering cost	NHA, Local Administration	EPA, NHA
Air Pollution	Vehicular emissions of critical pollutant parameters (SPM, RSPM, CO, SO2, NO2 and Pb) will monitored as per the NEQs. Roadside tree plantation will be maintained. Vehicular air pollution will be managed and monitored. The road will be regularly maintained to ensure good surface conditions.		Along Project road alignment	During Road operations	To be included in Engineering costs	NHA, Local Administration	NHA, Traffic Police
Noise Pollution	Noise will be monitored. According to monitoring results, use of sound barriers/trees will be considered where necessary. Road signs for sensitive zones (hospitals, educational institutions etc.) will be put up to stop blowing of horns and to regulate traffic speed. Public awareness program will be launched.		Throughout project corridor	During road operations	Added in the EMP	NHA, Local Administration	EPA, NHA

Environmental Issues / Component	Remedial Measure	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Cost	Institutional Responsibility	
						Implementation	Supervision
Water	The drainages system will be cleaned periodically. Water quality will be monitored as per the monitoring plan.		Throughout project corridor	During road operations	Added in the EMP	NHA, local Administrations	EPA, NHA
Flora & Fauna	Roadside tree plantation will be strictly monitored & maintained Efforts will be made to educate villagers on the use of specified areas for cattle grazing.		Throughout project corridor.	During Road operations	Rs. 15 million	NHA local Administrations	EPA, NHA, FD & Wildlife Department
Soils	Soil quality for lead, chromium, cadmium to be monitored regularly.		Throughout project corridor	During Road operations	Added in the EMP	NHA Local Administrations	EPA, NHA
Accidents	New roads tempt people to drive at high speeds and thus become more prone to accidents, this must be controlled through; - Enforcement of traffic laws - Speed restrictions - Safety measures at critical spots - Under/over-passes & zebra crossings - Contingency plans for accident recovery		Throughout project corridor	During Road operations	To be included in engineering costs	NHA, local Administrations	NHA, Traffic Police.
Transportation of Explosives and other dangerous Materials	Delivery of any dangerous substances must be done with prior approval of concerned Such vehicles must be marked with appropriate signs in capital letters in red paint and should run during lean traffic hours. Any spill will be reported to concerned agency, which will be responsible for the contingency measures of cleaning the spill within shortest		Throughout project corridor	During Road operations	To be included in engineering costs	NHA, Local Administrations	NHA, Traffic Police
Safety Measures	Development of coordinated traffic management plan especially along highly populated and critical locations. Traffic Control measures, including speed limits, will be enforced strictly. Further growth of encroachments, ribbon developments and squatting settlements within right of way will be discouraged. No schools, hospital, mosques, grave yards or houses will be allowed within 200m of the roads.		Throughout project corridor	During Road operations	To be included in engineering costs	NHA, local Administrations	NHA, Traffic Police

Note: FD = Forest Department, EIA – Environmental Impact Assessment, EMP = Environmental Management Plan, EPA = Environmental Protection agency, NHA= National Highways Authority
Km = Kilometres, m = meters, SC = Supervision Consultants, SPM = Suspended Particulate Matter, HC = Hydrocarbon, RPM – Respirable Particulate Matter

ANNEXURE – V

LIST OF PARTICIPANTS OF CONSULTATIONS

I. **Public Consultations held in 2008-2009**

Executive Chief Engineer C&W Department, Loralai (Mr. Qazi Amanullah Khan)
He was of the view that the project will bring a number of direct and indirect benefits of development and job opportunities for communities living in the area. He shared that Government of Balochistan will allocate alternative sites for all mosques, shrine and graveyards, although illegally built on the RoW of the project.

DCO Loralai (Mr. Mohammad Ikhtiar)
The DCO Loralai provided great help in finalizing the alignment of Loralai bypass towards south of the Loralai city.

Taraqee Foundation (Mr. Amjad Rashid, Chief Executive)
Taraqee Foundation is a National level NGO working for poverty alleviation since the last 14 years. Currently it is serving in 13 districts of Balochistan and NWFP through its 35 offices with the support of 625 staff members. Its core program includes environment and infra-structure.

Mr. Amjad Rashid was also found to be in favor of the Project due to its strategic importance and also since the implementation of the Project will help in poverty alleviation.

II. Public Consultations held in 2013

Meetings with Public Office Holders		
Name	**Designation**	**Department**
Quetta		
Nasir Khan Kashani	Director General	Balochistan Environment Protection Agency Quetta
Muhammad Khan	Dy. Director Technical	Balochistan Environment Protection Agency Quetta
Daood Khan	Assistant	Balochistan Environment Protection Agency Quetta
Mr. Noor-ul-Hassan	GM Balochistan	National Highway Authority, Quetta, Balochistan
Mr. Anayat Ullah	Director Maintenance	National Highway Authority, Quetta, Balochistan
Mr. Abdul Manan	Dy. Director Land/Legal	National Highway Authority, Quetta, Balochistan
Mr. Shah Muhammad	Dy. Director Maintenance	National Highaway Authority, Loralai. Balochistan
Loralai		
Abdul Wahid Kakar,	Deputy Commissionar	Deputy Commissionar Offcie Loralai
Abdul Razzaq,	Executive Engineer (B&R)	Buildings Departmemt Loralai
Latif Raza Changezi,	DD (Agri),	Agricultural Department Loralai

Consultation Meetings with Community along the projcect

Qila Saifullah - Loralai - Wagum Rud (N - 70) Project

S#		Mouza/ Venue	Name of Participants	Concerns Raised (if any)
1	19/9/2013	Drazinda	Abdul Matin	Increase in road Accidents
2			Juma Khan	No
3			Nasib Khan	No
4			Salim	Loss of Structures
5			M. Khan	No
6		Zar Karez	Abdul Baqi	No
7			Zafarullah	Loss of Assets
8			Hameedullah	Loss of Business
9	20/09/2013	Shah Karez	Shahbaz	Loss of Trees
10			Abdul Rehman	No
11			Gul Dad	No
12			Mulla Abdullah	No
13			Nazar Khan	Loss of Land
14			Hassan	No
15			Raz. M	No
16			H. Umar	No
17			Mehrab Khan	
18			Rafiulah	
19			Waheed Ullah	
20		Lasti + AsgharLon	Khudaidad	Increase in road Accidents
21			Haji Juma	Loss of Property
22		Orad Shabozai	H. Zarghoon	Loss of Land
23			Asmatullah	No
24			Abdul Zahir	Loss of Property
25			Master Mian Khan	
26	21/09/2013	Martat Kalan + Lahore + Dargai Kadezai	Khan Bedaar	No
27			Hashim	No
28			M. Nawaz	Loss of Trees
29			Malik Yameen	No
30			Abdul Bari	No
31			M . Jan	Loss of Structures
32			Laloon	No
33			Noor. M Shah	No
34			Molvi Khaliq Dad	Loss of Business
35			Sahibjan	No
36			Abdul Razaq	No
37			Yaqoob	Loss of Structures
38			Bismillah	No
39		Dalezai Shabozai	Haji Kala Khan	Increase in road Accidents
40			Dusmaal	No
41			H. Katai	No
42			Musa Gul	Loss of Business
43			Nasrullah	Loss of Land
44			Wajib	No
45			Pashuk	No
46			Rahim Jan	Loss of Land
47		Bori Viyala + Saghrai	Ayaz Khan	No
48			Jalal Khan	No
49			Abdul Hakim	No
50			Abdul Aleem	Loss of Property
51		Nawab Karez	Abdul Khaliq	No
52			Zia ul Haq	No
53		Vehar Kala	Sher Khan	Loss of Assets
54			Ahsanullah	No

Total No of APs Consulted = 54

Initial Environmental Examination

Revised IEE Report
Improvement and Widening of Zhob–Mughal Kot Section of N-50
May 2014

PAK: National Highway Network Development in Balochistan Project

Prepared by the National Highway Authority, Islamic Republic of Pakistan for the Asian Development Bank (ADB). This is an updated version of the draft originally posted in January 2014 on http://www.adb.org/projects/47281-001/documents.

ABBREVIATIONS

ADT	Average Daily Traffic
BEPA	Balochistan Environmental Protection Act
EMP	Environment Management Plan.
IEE	Initial Environmental Examination.
FATA	Federally Administered Tribal Areas
NEQS	National Environmental Quality Standards
NHA	National Highway Authority.
PD	Project Director/Project Coordinator
PEPA	Pakistan Environmental Protection Act
PMU	Project Management Unit
ROW	Right of Way
SPS	Safeguard Policy Statement
VOC	Vehicle Operating Costs

TABLE OF CONTENTS

Annexures

1. Introduction

1.1 Project Background

The Government of Pakistan has placed great emphasis on the construction of new highways/motorways and upgradation of single roads to dual carriageways with paved shoulders. The objective is to improve connectivity across the country, reduce traveling time and economize on operating costs to facilitate and accelerate the pace of development. As part of the National Highway Development Sector Improvement Program (NHDSIP), the National Highway Authority (NHA) rehabilitated and upgraded the Muslim Bagh to Zhob section (200 km) of N-50. The financial assistance was provided by the Asian Development Bank through a Multi-tranche Financing Facility (MFF).

Originally the Zhob-Mughalkot section of N-50 was included in the MFF as a subproject but due to delayed finalization and processing of the project it could not be implemented within the MFF timeframe. Resultantly the project is now being processed for implementation as a stand alone loan arrangement with ADB as National Highway Network Development Project.

The major alignment of the project road lies in the Balochistan Province with a small portion extending into the Federally Administered Tribal Area (FATA). The project road starts outside the city premises of Zhob in Balochistan and terminates at Mughalkot in FATA. However, the administrative control of Mughalkot lies with the Dera Ismail Khan district government of the Khyber Pakhtunkhwa province. The total length of the project road is 81 km, of which 72 km is located in the districts of Zhob and Shirani of Balochistan province, while the remaining 9 km falls in the uninhabited and steep hilly regions of FATA. Figure 1.1 depicts the general location of the project road in the map of Pakistan whereas Figure 1.2 shows the specific project location.

The existing Zhob-Mughalkot (N-50) is a single lane carriageway 3.65m wide. The proposed civil works include the widening, upgradation and improvement of the road with ancillary infrastructure including the construction of bridges, box and pipe culverts. Under the project the road will be widened to a 7.3m wide two-lane carriageway with 2.5m shoulders on each side to accommodate heavy traffic. However, in hilly terrain including the 9km stretch falling in FATA, the road will be developed as a 7.3m carriageway with 1m inner and 2.5m outer shoulders, and protection works along the river bank. The rehabilitation and reconstruction activities will include:

- Road width (travel lanes) — two lanes of 3.65m each; total width 7.3m
- Shoulder (outer/inner) plain areas — 2.5m each
- Shoulder (outer/inner) hilly areas — 2.5m and 1m
- Total formation width — 13.3m
- New bridges — 08 numbers
- Rehabilitation/construction of culverts — 120 numbers

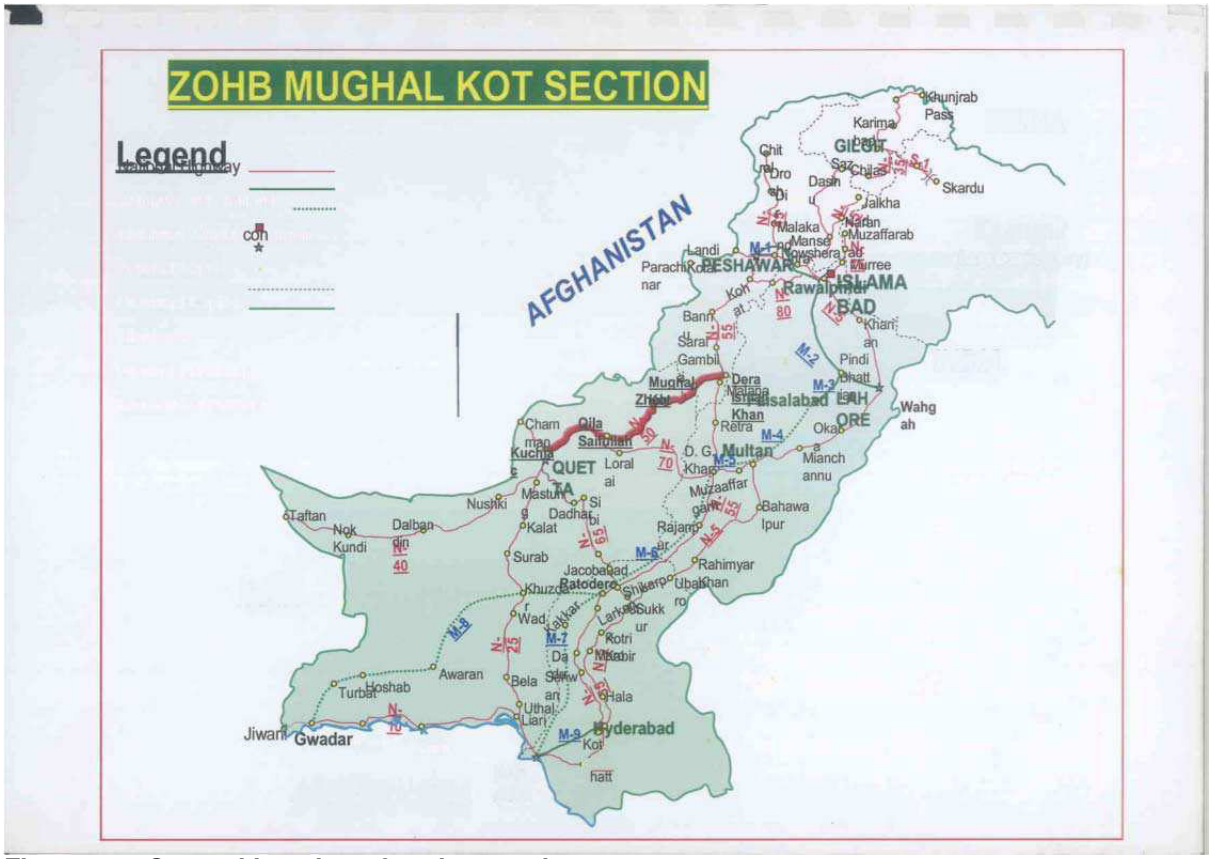


Figure 1.1: General location of project road

The National Highway Authority (NHA) will be the Executing Agency (EA) for the project. The Project will rehabilitate and improve this section of National Highway to provide a dependable road transport network to promote interprovincial connectivity, reduce transportation time to economize the costs, provide all weather road to the community, and improve the developmental pace in the area.

This Initial Environmental Examination (IEE) Report presents the screening of potential environmental impacts of the proposed Project road and contains the mitigation measures in order to eliminate or reduce the negative impacts to an acceptable level, describes the institutional requirements and provides an environmental management plan.

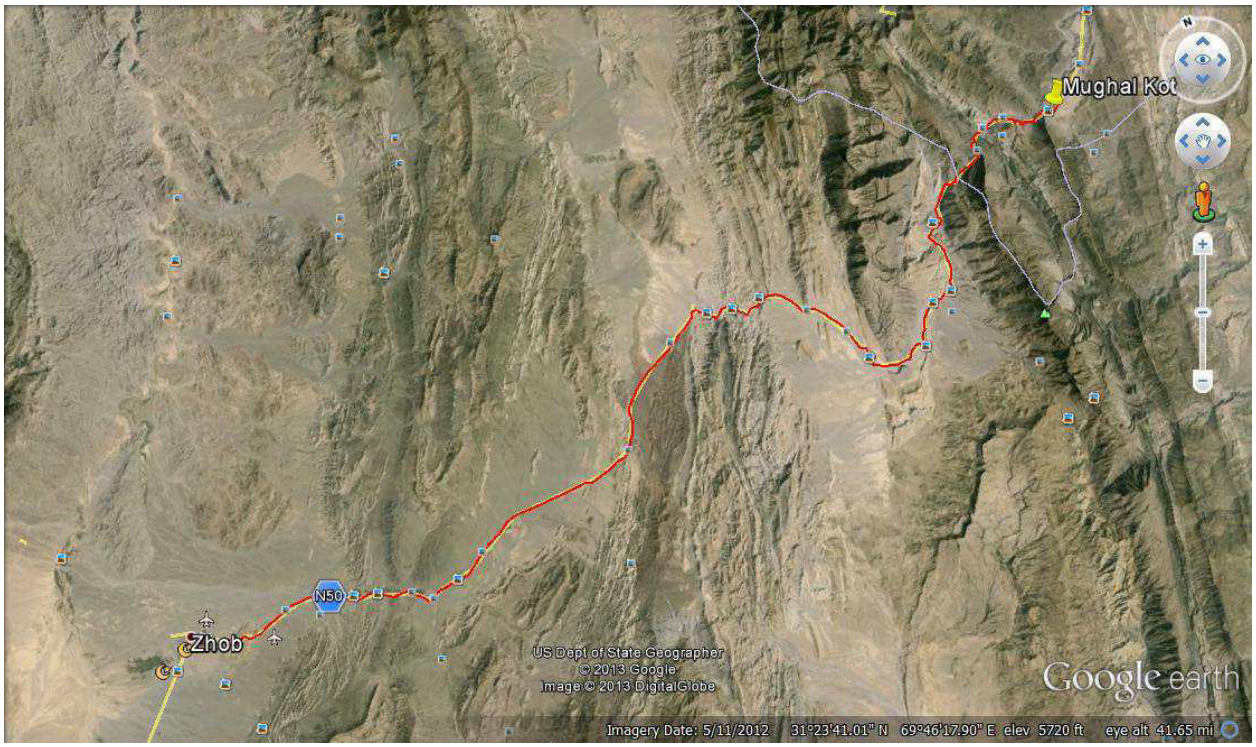


Figure 1.2: Specific location of project road

1.2 Existing Situation

The 79 km length of the Project road is in poor condition. The metalled part of the road is 4 to 5m wide with about 2m wide shoulders on either side and is in a highly deteriorated condition requiring upgradation. Top formation width of the road varies from 9m to 12m in plain areas, and 8m to 11m in hilly areas. The embankment height varies from 1.5m to 2.5m in plain areas. The road passes along several small villages/settlements; a list of structures/assets along the road is provided in Table 1.1.

1.3 Environmental Category of the Project.

According to ADB's Safeguard Policy Statement (SPS) 2009, a Rapid Environmental Assessment (REA) Checklist was prepared (Annexure-I). The Pakistan Environmental Protection Agency's "Guidelines for the Preparation and Review of Environmental Reports (2000) were also consulted. Based on the initial findings it was ascertained that only insignificant adverse environmental impacts are expected due to upgradation and improvement of the existing road, and thus the subject project is considered environmentally "B" category. Therefore an IEE has been conducted.

Table 1.1: List of Structures and assets along project road

Location Chainage start to end	Description
0+000 TO 0+200	Plants
0+025 TO 0+120	Building
0+250 TO 0+600	Building
5+625 TO 5+725	Graveyard
5+820 TO 5+860	Building
7+650 TO 7+700	Building
9+365 TO 9+700	Garden
10+400TO 10+655	Garden
10+800 TO 10+830	Graveyard
10+510	Building
13+100 TO 13+270	Garden
13+1 00	Building
13+360	Building
20+000 TO 20+120	Building & Petrol Pump
21 +960 TO 22+050	Graveyard
25+000 TO 25+200	Building
25+275 TO 25+300	Graveyard
25+700	Building
29+750	Building
29+900 TO 30+100	Graveyard
37+400 TO 37+575	Graveyard
37+800	Building
37+960 TO 38+010	Building &Graveyagd
39+450	Building
38+100 TO 38+225	School & Hospital building
39+625	Building
43+1 00	Hotel building
46+725 TO 46+750	Hotel building
47+900 TO 48+025	Graveyard &Petrol Pump & building
48+950 TO 49+100	Building
49+825 TO 49+925	Building
50+025	Graveyard
50+225 TO 50+350	Building
51 +575 TO 51+610	Building
51 +730 TO 51+900	Building
52+1 00	Building
54+490 TO 54+575	Graveyard
54+900 TO 55+050	Building
57+710 TO 57+750	Building
60+310 TO 60+360	Graveyard
64+950 TO 65+100	Graveyard
68+160 TO 68+190	Check Post Building
68+640 TO 68+740	Graveyard
69+975	Hotel building

2. Policy and Legal Framework

2.1 General

This section 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 legislation relating to environment in Pakistan, and to obtain all the regulatory clearances required.

2.2 National Policy and Legal Framework

The Climate Change Division is the responsible authority for environmental protection policy making in Pakistan.

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of 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, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

Prior to the adoption of the 18th Constitutional Amendment, the Pakistan Environmental Protection Act (PEPA) 1997 was the governing law for environmental conservation in the country. Under PEPA 1997 the Pakistan Environmental Protection Council (PEPC) and Pak EPA were primarily responsible for administering PEPA 1997. Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.

2.3 Regulations for Environmental Assessment, Pakistan EPA

Under Section 12 (and subsequent amendment) of the PEPA (1997), a project falling under any category specified in Schedule I of the IEE/EIA Regulations (SRO 339 (I0/2000), requires the proponent of the project to file an IEE with the concerned provincial EPA. Projects falling under any category specified in Schedule II require the proponent to file an EIA with the provincial agency, which is responsible for its review and accordance of approval or request any additional information deemed necessary.

2.4 Regulatory Clearances, Balochistan EPA

In accordance with provincial regulatory requirements, an IEE/EIA satisfying the requirements of the Balochistan Environmental Protection Act (2012) is to be submitted to Balochistan environmental protection agency (BEPA) for review and approval, and subsequent issuance of NOC before the commencement of construction.

2.5 Guidelines for Environmental Assessment, Pakistan EPA

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the proposed project are listed below:

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan, EPA 1997;
- Guidelines for Public Consultations; Pakistan EPA May 1997;

2.6 National Environmental Quality Standards (NEQS) 2000

The National Environmental Quality Standards (NEQS), 2000, specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
- Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles;
- Maximum allowable noise levels from vehicles;

These standards apply to the gaseous emissions and liquid effluents discharged by batching plants, campsites and construction machinery. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for ambient air quality have also been prescribed.

2.7 ADB's Safeguard Policy Statement (SPS), 2009

The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 requires that environmental considerations be incorporated into 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 8.

All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, 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 the following environmental categories:

Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affet an area lager than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.

Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.

Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

Category FI: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

2.8 Interaction with other Agencies

NHA is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns of highway construction and operation, and that all preconstruction requisites, such as permits and clearances are met. This section describes the nature of the relationship between the NHA and concerned departments.

2.9 Provincial EPAs

NHA will be responsible for providing the complete environmental documentation required by the BEPA and remain committed to the approved project design. No deviation is permitted during project implementation without prior and explicit permission of the BEPA.

2.10 Provincial Departments of Forests and Wildlife

The clearing and grubbing for the Project road will involve clearing and uprooting of trees falling under construction limits (60-65 ft.) within the right of way. However, any removed trees of vegetation under private ownership will be compensated as per provision of the there is some disruption to vegetation or trees the project contractor will be responsible for acquiring a 'No-Objection Certificate' (NOC) from the concerned federal or provincial forest department. The application for an NOC will need to be endorsed by the NHA.

2.11 Provincial Governments

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

2.12 Other Environment Related Legislations

Table 2.1 gives a summary of all legislations, guidelines, conventions and corporate requirements:

Table 2.1: Environmental Guidelines and Legislations

Sr. No.	Legislation/guideline	Description
1	**Balochistan Environmental Protection Act, 2012**	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved and the provinces have been empowered for environmental protection and conservation. Subsequently, the Balochistan government amended PEPA 1997 as Balochistan Environmental Protection Act 2012, and Balochistan EPA (BEPA) is responsible for ensuring the implementation of provisions of the Act in Balochistan's territorial jurisdiction. BEPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems.
2	**Pakistan Environmental Protection Act (PEPA) 1997**	Basic legislative tool empowering the Government of Pakistan to frame and enforce regulations for the protection of environment. The PEPA 1997 is broadly applicable to air, water, soil, marine and noise pollution, and handling of hazardous wastes. Penalties have been prescribed for those contravening provisions of the Act. Under section 12 of the PEPA 1997, no project involving construction activities or any change in the physical environment can be undertaken unless an IEE or EIA is conducted and a report submitted to the federal or provincial EPA.
3	**Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, (2000)**	The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule II lists projects of potentially significant environmental impacts requiring preparation of an EIA. The Regulations also require that all projects located in environmentally sensitive areas require preparation of an EIA. It also lists Projects not requiring either an EIA or an IEE.
4	**National Environmental Quality Standards (1993 and 2000)**	The NEQS specify standards for industrial and municipal effluents, gaseous emissions, ambient air requirements and emission levels for Sulfur dioxide and Nitrogen oxide, vehicular emissions and noise levels. The PEPA specifies the imposition of a pollution charge in case of non-compliance with the NEQS. The standards were last revised in 2000.
5	**National Environmental Policy (2005) (NEP)**	NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, "to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development. It also suggests various policy instruments to overcome the environmental problems throughout the country:

6	**Land Acquisition Act, 1894 Including Later Amendments**	The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately. The land needed for the construction of road will be acquired under normal conditions based on prevailing market prices or negotiated prices between NHA and the owners of land. Section 17(4) of the LAA will not be used in the absence of an emergency. Instead, the land will be purchased under willing-seller willing-buyer deal at agreed upon market rates and the seller will have the option not to sell the land, in case an acceptable deal for both the parties is not reached.
7	**The Forest Act (1927)**	The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. No protected forest is situated in the Project Area.
8	**Canal and Drainage Act (1873)**	This Act prohibits corruption or fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage.
9	**Pakistan Penal Code (1860)**	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.
10	**Protection of Trees and Brushwood Act, 1949**	This Act prohibits cutting or lopping of trees and brushwood without permission of the Forest Department. The Forest Department will be approached for permission to cut trees along the road alignment.
NATIONAL ENVIRONMENTAL AND CONSERVATION STRATEGIES		
11	**National Conservation Strategy**	Before the approval of NEP the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation and preservation of cultural heritage and recommends immediate attention to these core areas.
12	**Biodiversity Action Plan**	The plan recognizes EIA as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity

INSTITUTIONAL FRAMEWORK

13	**Environment and Conservation**	There is a well-established framework for environmental management in Pakistan. The Ministry of Environment deals with environment and biological resources. Within the ministry, the NCS unit established in 1992 is responsible for overseeing the implementation of the strategy. Two organizations, The Pakistan Environmental Protection Council (PEPC) and the Pak EPA are primarily responsible for administering the provisions of the PEPA, 1997. The PEPC oversees the functioning of the Pak EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak EPA is required to ensure compliance with the NEQS, establish monitoring and evaluation systems, and both identify the need to and institution of legislations whenever necessary. It is thus the primary implementing agency in the hierarchy. The Provincial Environmental Protection Agencies are formed by the respective provinces.

INTERNATIONAL CONVENTIONS

14	**The Convention on Conservation of Migratory Species of Wild Animals, (1981.21)**	The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no endangered species of plant life or animal life in the vicinity of the Project.
15	**Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)**	The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.
16	**International Union for Conservation of Nature and Natural Resources Red List (2000)**	Lists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Larkana

INTERNATIONAL ENVIRONMENTAL GUIDELINES

17	**ADB's Safeguard Policy Statement (SPS), 2009**	ADB's Safeguard Policy Statement (SPS), 2009 provides guidelines for environmental assessments of development projects. These guidelines help prospective projects identify impacts they will have on various environmental receptors. The guidelines call for carrying out EIAs or IEEs of projects based on severity of their impacts.

3. Description of the Project

3.1 Justification and Need for the Project

The N-50 significantly contributes towards the overall goal of facilitating north-south bound transitional and regional traffic with improved direct link between the Khyber Pakhtunkhwa and Balochistan provinces. Currently, N-50 from Kuchlak to Zhob section in Balochistan and Mughalkot to D.I. Khan in Khyber Pakhtunkhwa is improved as 7.3m wide carriageway with 2.5m paved shoulders on each side. The section from Zhob to Mughalkot (81 km) is the only bottleneck that hinders to foster the perceived development benefits.

Inadequate connectivity and access continue to pose a major problem to the regional economy and development, which particularly affects the poor who live predominantly (80%) in rural areas along the project road. This project will contribute to the GOP's overall goal to develop an effective national road network with improved interprovincial connectivity. The newly improved highway will reduce the transport costs in the project area and facilitate more efficient and cost effective movement of passengers and goods.

3.2 Need for Project

The alignment passes over vast stretches through rugged rocky plains where the present height of embankment and the existing cross-drainage structures are insufficient to cope with the hydraulic impacts resulting from sheet flows across these gently sloping plains. The pavement width varies between 3.0 and 4.5 m only, being particularly narrow in hilly areas. Shoulders are generally narrow, earthen and degraded. In areas with water regularly flowing to the embankment, deep cracks often extend into the surface layer. Cross drainage structures include concrete slab structures which are in poor condition and need replacement/ rehabilitation while during rains the sheet flow from nearby hills causes traffic interruption due to flooding of the nullahs without bridges. The compound effects of the poor road condition without bridges result in augmented vehicle operation costs, increased accident risks, economic and other losses or constraints due to lengthy travel times.

3.3 Objectives of the Project

Due to improvements in most of the sections of N-50, especially improvement as a two-lane carriageway from Kuchlak to Zhob (300 km), the traffic flux has considerably increased in the project section as well. The existing single lane Zhob to Mughalkot section of N-50 is a bottleneck for improved inter-provincial transport needs and socio-economic development of en-route population around project road. Hence to foster perceived development benefits, NHA planned to upgrade the project section of N-50 (81 km) into an all weather road as two lane carriageway with treated shoulders and causeways replaced with bridges as per standards.

The prime objectives of the proposed Project are as follows:

- Improved inter-provincial connectivity.
- Increase the access of the rural and urban population to social services and markets, leading to improved quality of travel/livelihood.
- Enhance the efficiency of road network to minimize transportation cost through improvement and vehicle operating cost.
- Reduce the number of accidents.
- Improve regional as well as inter-provincial trade.

3.4 Proposed Project Activities

This project is a civil works project, to be carried out by contractors recruited on an international bidding process. It will comprise the following main activities:

- To meet traffic flow requirements, the bulk of the rehabilitation works (81 km total length) will include widening of pavement of the single carriageway to a standard width of 7.3 meter two lane carriage way, with 2.5 m shoulders on each side in the open terrain. If required (e.g. in the vicinity of retention walls protecting orchards etc.), the shoulder width will be kept flexible. The embankments will be widened and filled up at vertical level in accordance to the adjacent terrain and hydraulic impacts, with special protective measures against erosion as and where required.
- The horizontal curvature will be corrected, i.e. sharp curves will be smoothed as per standards required.
- To meet both the traffic flow requirements and safe driving standards[1], both the horizontal and the vertical geometry will be improved.
- To meet the hydrological requirements, Substantial structure rehabilitation works are designed for reconstruction/re-dimensioning/adding bridges and other cross-drainage structures in accordance with newly calculated hydraulic impact modifications. All existing slab concrete culverts will be replaced by box culverts and causeways will be replaced by new bridges to ensure all weather safe driving.
- To meet estimated axle loading, the existing road will not be dismantled but used as compacted sub-base for a newly improved embankment. The rehabilitated surface will receive strengthened asphalt pavement.
- To meet national highway safety standards, Road furniture, markings and traffic signs are further elements to improve the overall standard of this highway section.

3.5 Key Components of the Project

Following are the key components of the Project Road after final survey and design:

Rehabilitation of existing Road	81 km
Construction of new bridges	09
Rehabilitation/ construction of Culverts	120

Following is the geometric design criteria of the Project Road

- Road width (Travel Lanes)	: Two lanes of 7.3 m with each lane of 3.65m
- Shoulder (outer)	: 2.5m wide, with 0.5 m rounding
- Formation width	: 13.30 m wide
- Minimum passing sight distance	
Plain areas	: 615m
Hilly Areas	: 410m

Minimum Stopping Sight Distance	
Plain Areas	: 160m
Hilly Areas	: 85m

[1] The highway is designed for a travel speed of 100 km/hr in the open, non-urban terrain.

Maximum super elevation
Plain Areas : 6.0%
Hilly Areas : 6.0%

Minimum Radius of horizontal
Curve (Plain Areas) : 335m
Hilly Areas : 22.5m

Minimum 'K' Value "Crest" based on Passing sight distance
Plain Areas : 39m
Hilly Areas : 11m

Minimum 'K' Value "Sag" based on stopping sight distance
Plain areas : 38m
Hilly Areas : 18m
-
Minimum Curve Length
Plain Areas : 100m
Hilly Areas : 70 m

Maximum Gradient
Desirable max. gradient
Plain Areas : 2.5%
Hilly Areas : 3.0%

Absolute max. gradient
Plain Areas : 4.0%
Hilly Areas : 6.4%

Absolute min. gradient
Plain Areas : 0.3%
Hilly Areas : 0.3%

Embankment side slopes : 2:1
-
Design speed
Plain Areas : 90km/hr
Hilly Areas : 60km/hr

Road pavement design is based on latest traffic counts converted into Equivalent Standard Axle load (ESALs) projected for design period, results of soil investigation (CBR) taking into account local climatic condition.

3.6 Project Implementation Schedule

It has been assumed that the implementation of the Project shall take 30 months after start.

3.7 Sources of Construction Material

The project area is located in northern part of Balochistan. The existing road passes through flat

terrain and partly through mountainous terrain. The surrounding mountains comprises mainly of slate, shale at some locations, conglomerate, dolomite, lime stone, sand stone, gypsum, glacial till and hard rock. These rocks are jointed, folded and slightly faulted. Near the existing road mostly gravel, boulders embedded in silt, sand and clay deposits are observed.

Borrow material for construction of embankment is easily available all along the existing alignment. Material for sub-base, base and aggregates can be obtained from adjacent mountains, from river/nullah beds and can be used after screening and crushing as the case may be. Fine aggregates are also available in river and nullah beds.

Along the existing road from Zhob to D.I.Khan different borrow areas on both sides of the road were explored. 7 borrow areas were identified and samples were collected and tested for suitability of road construction.

COARSE AGGREGATES
Huge deposits of limestone are exposed all along roadside. The limestone is dark grey to grey, massive, hard and compact. During the road widening activity, blasting to these deposits will produce sufficient quantity of limestone boulders and cobbles, which may be process for concrete aggregates.

FILL MATERIAL
Different types of fill materials are exposed in the area. Alluvium deposits along with gravitational regime forms fill materials in the area. Theses fill materials composed of gravels and cobbles with clayey and sandy matrix. Gravels ranges from Gap graded to well graded.

SAND
No appreciable sand deposits are seen along the roadside however; the bed of Zhob River may be a potential source of sand, while 2-3 km off road from Mughal Kot to Dera Ismael Khan thick to massive beds of friable sandstone are present. Numbers of hill torrents cut these sandstone beds therefore; sand deposits are expected downstream areas. However, detail investigation regard availability and quality for sand may be done recommended during construction phase.

IMPERVIOUS MATERIALS
Dark grey to greenish grey, medium to highly plastic shale are present as impervious material, which are exposed at different locations throughout the project area

3.8 Traffic

In order to assess the existing/normal traffic volume presently using the subject road, AAA & RDC undertook classified 24 hours continuous traffic count surveys in the months of July and September 2006 at Narwarsak Post at existing road counting various types of vehicles plying in each of the two directions. In order to have a fair estimate of traffic likely to use the proposed bypass, an origin and destination survey was also undertaken.

Table 3.1: Summarized average daily traffic volume of July & September 2006

SUMMARY OF AVERAGE DAILY TRAFFIC (ADT)			
ROAD : ZHOB - MUGHALKOT COUNT STATION : NARWARSK POST			
TYPE OF VEHICLES	ZHOB TO MUGHALKOT	MUGHALKOT TO ZHOB	ADT TOTAL
MOTORIZED TRAFFIC			
CAR/JEEP/PEJERO/PICK - UP	12	12	24
HIACE WAGON	161	156	317
MINI BUSES/BUSES	1	1	2
TRACTOR/TROLLY	5	4	9
TRUCKS 2 XL	263	187	450
TRUCKS 3 XL	38	28	65
TOTAL	480	388	868

AVERAGE ANNUAL DAILY TRAFFIC(AADT)			
ROAD : ZHOB - MUGHALKOT COUNT STATION : NARWARSK POST			
TYPE OF VEHICLES	ZHOB TO MUGHALKOT	MUGHALKOT TO ZHOB	AADT TOTAL
MOTORIZED TRAFFIC			
CAR/JEEP/PEJERO/PICK - UP	15	17	33
HIACE WAGON	58	63	121
MINI BUSES/BUSES	2	2	3
TRACTOR/TROLLY	6	9	15
TRUCKS 2 XL	100	111	211
TRUCKS 3 XL	16	18	34
TOTAL	197	220	417

These ADT were then projected using variable growth rates as given in the following table:

Table 3.2: Annual Growth Rates

TYPE OF VEHICLE	PERIOD				
	2007-2011	2012-2016	2017-2021	2022-2026	2027-2031
CAR/JEEP/PEJERO/PICK - UP	3.04	2.80	2.63	2.49	2.38
HIACE WAGON	3.91	3.62	3.40	3.24	3.10
MINI BUSES/BUSES	3.80	3.54	3.34	3.19	3.07
TRACTOR/TROLLEY	4.90	4.72	4.59	4.48	4.39
TRUCKS 2- XL	3.74	3.59	3.47	3.38	3.30
TRUCKS 3- XL	3.74	3.59	3.47	3.38	3.30

3.9 Construction Camps and Work Force

Campsites will be selected keeping in view the availability of an adequate area for establishing campsites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity; final locations will be selected by the contractor. The Contractor shall comply with clause SS-5 'Contractors camps and depots' of the Tender Documents. Contractor will provide staff for the execution of the project. NHA will supervise and monitor the project through Consultants. No shortage of man power is apprehended as all kind of staff required for the job will be locally available.

	Client/Contractor	**Consultant**
Professional/Technical Staff	**77**	**55**
Administrative Staff	**96**	**90**
Service	**120**	**90**
Skilled	**480**	**20**
Semi-Skilled	**720**	**-**
Unskilled	**1400**	**-**
Others	**-**	**-**

3.10 Machinery Requirement

The Project is located in remote, partly hilly, partly rolling and partly plain terrain. The working conditions have been rated as difficult, hard and this requires additional effort and inputs for running and maintenance of plant, equipment and machinery. The estimation of the requirement of has been made for each package. Following is a summary of type of equipment and machinery required:

No.	Equipment Type and Characteristics	Min. Number Required
1	Asphalt Plant	1
2	Asphalt Paver	2
3	Concrete Batching Plant	2
4	Crane 20 Ton	1
5	Concrete Transit Mixer	10
6	Asphalt Mix ready carrying dumpers	12
7	Concrete Pumps	4

4. Description of the Environment

4.1 General

Zhob derives its name from the Zhob River, which flows near Zhob town. The district, as well as the town, acquired the name Zhob in 1975. Previously it was known as Fort Sandeman, in deference to Sir Robert Sandeman, then Agent to the Governor General in Balochistan, who extended the British rule in the region.

The district lies between 30° 30' to 32° 05' north latitudes and 67° 26' to 70° 00' east longitudes. It is bounded on the north by Afghanistan and South Wazirestan agency of FATA, on the east by the tribal area adjoining Dera- Ismail -Khan District of NWFP and Musakhel district, on the south and south-west by Loralai and Killa Saifullah districts. Total area of district is 20297 square kilometers.

The description of various features of Project area environment including the climate, topography, surface/ groundwater and ecological resources etc. are presented in the following sub-sections.

4.2 Physical Resources

4.1.1 Topography

Topographically, the Zhob district is covered with mountains and hills intersected by the broad valley of Zhob and its tributaries. The Toba- Kakar range covers the western half of the district extending from the boundary of Afghanistan up to the Zhob River. The Suleman Range, locally called as the Kas-e-Ghar, lies on the eastern boundary of the district. The famous Takht-e-Sulaiman or Solomon's Throne is the highest peak of this range with a height of about 3441m above sea level. The general elevation of the district is 1500 to 3000 meters above mean sea level. The topography of the Project area varies considerably from rolling in valley areas to very steep slopes in mountain ranges. The slope of the existing road varies from 1.5% to 2.5% in plain area and 3% to 6.5% in hilly area following the topography of the surrounding area.

4.1.2 Climate

The climate of Zhob District is hot and dry in summer and cold in winter. June is the hottest month with mean maximum and minimum temperatures of about 37°C and 23°C respectively. January is the coldest month with mean maximum and minimum temperatures of about 13°C and -1°C degree respectively. Dust storms occur in summer from July to September accompanied by thunderstorms. In winters the wind blows from the west and is very cold. The winds from the southwest and east are also common, the latter invariably brings rain. The wind from the north occasionally blows during September to April and brings drought and damages standing crops. Rainfall is scanty and varies with the altitude. Most of the rainfall is received during the winter season. The average annual rainfall in the district is 288 mm.

4.1.3 Geology and Soils

The greater part of the Zhob district, beyond the left bank of river Zhob consists almost entirely of an extensive series of calcareous sandstone and shale. The general soil conditions along and adjacent to the road alignment is alluvial in plain/ valley areas and sandstone and shale in hilly areas. No substantive mineral extraction activity exists in the district.

4.1.4 Siesmology

According to the seismic zoning map of Balochistan, the Project area in district Zhob area falls in seismic Zone 0 i.e. negligible damage zone.

4.1.5 Surface and Groundwater

The two principal drainage channels of the district are the Zhob and the Kundar Rivers, both flowing into the Gomal River. The general direction of the rivers is from southwest to northeast. A number of seasonal streams/nullahs exist across and along the existing road. Data about the quality and quantity of groundwater is not available for the area. Field observations show the absence of any tube-wells and hand pumps in the area. Some springs exist in the area from where water is extracted for drinking purposes.

4.2 Ecological Resources

4.2.1 Flora

The principal trees and plants found in Zhob district are wild olive (shinay), pistachio, chilgoza or edible pine and wild almond in high lands. Other trees include willow, tamarisk (along the streams), pastawana (grewia oppostifolio) and spalnai (calotropis gigantea). No significant flora exists along the existing road alignment except some linear plantation of Eucalyptus and some grape orchards along certain reaches of the road. Shrubs are also found on both sides of the road. No reserve/protected forests or any endangered species of trees, grasses or shrubs have been reported in the Project area

4.2.2 Fauna

Wild animal in the Zhob district include wolves, jackal, hyena, fox, deer and porcupine. Leopards and black bear are occasionally found in the high hills in the Suleman range. Wild pigs are seen along the Zhob River while straight horned markhor, wild sheep are present in moderate numbers in the Shinghar Mountains, at a distance of about 5km from the project road.

Among the game bird chakor, partridge and pigeon are numerous in higher altitudes. Sand grouse, quail and the Houbara bustard are found in plains. Other birds are dove, hoopoe, starling and vegetal. Jay black bird, wood pigeon, cuckoo and thrush live in high ranges while wild duck and pelican are seen along the Zhob River in winter.

Snake and scorpion are common everywhere in Zhob. Fish (Mahsir) are found in every running stream and in Zhob River, some of which weigh up to 8 lbs. The road passes through the area, where no forest/ game reserve, wild life sanctuary or any protected areas are present. No endangered species of animals and mammals, birds and reptiles have been reported in the area.

4.3 Human and Economic Development

4.3.1 General

Most parts of District Zhob are hilly and barren with very limited water resources for agriculture purposes. However, during recent years tube wells have become quite abundant with the result that agricultural activity has registered a rise. But most of the agricultural area of district is “Barani" i.e. rain-fed. There are two cropping seasons, Kharif and Rabi. Rabi crops are sown between October and mid February and harvested in June. Kharif crops are sown from April to July and harvested by the end of October. Grapes are grown in abundance on the foothills of the mountains. Other fruit trees include almond, apricot and apple.

The land along the road is mostly barren without significant agricultural activity. Some grape and olive orchards are present along the road at a few places. The inadequacy of urban services, especially sewerage, drainage and solid waste management have worsened the quality of life of the people.

4.3.2. Irrigation

Only 16,206 acres of land is irrigated throughout the district. The majority of the area in the district is irrigated by springs. The poor quality of rural roads hinders access from farm to the market affecting the earnings of the local population.

4.3.3 Transportation and Communication

Zhob is linked by air with major cities of the country. A Fokker flight operates from Quetta linking Zhob with Multan, Dera Ismail Khan, Peshawar and Islamabad. Zhob is 320 km from Quetta, and 225 km from Dera Ismail Khan. However, the road link with Dera Ismail Khan is for most part a dirt track passing through water streams. The poor condition of the road acts as a deterrent for an increase in inter-provincial transportation and commercial exploitation of the route. The narrow railway linking Quetta with Zhob became moribund in 1984 and the service is no longer available.

4.3.4 Trade and Industry

Trade and trading activity in the district is largely in the informal sector because of proximity with Afghanistan. Regular formal trade is relatively limited and mostly confined to consumable items.

4.3.5 Health Facilities

Apart from district headquarters hospital at Zhob, there are 15 basic health units, and 2 rural health centers in the district. Some private clinics, dispensaries, traditional medicine and homeopathic dispensaries are also functioning in various parts of the district.

4.3.6 Historical and Archeological Sites

A number of mounds, ruins, and caves exist in Zhob district, which have historical and archeological importance. However, no historical and archeological sites exist in the near vicinity of the road.

5. Potential Environmental Impacts and Mitigation Measures

Environmental impacts related to design, construction, operation and maintenance phases of the Project have been identified. Following is a brief description of the environmental impacts and the proposed mitigation measures to minimize the negative impacts if any.

5.1 Design/Pre-Construction Phase

5.1.1 Land Acquisition and Resettlement

Since the Project road will be constructed and improved within the available Right of Way (ROW), no negative impacts are anticipated related to land acquisition and resettlement.

5.1.2 Soil Erosion and Landslides

Soil erosion and landslide can be a potential environmental issue during the widening and improvement of the road. The intensity of this impact will vary at different locations depending on the type of soil / rock, drainage and hydrological pattern of the concerned area. Sediment transport to natural streams flowing downhill may increase considerably if not properly mitigated. This phenomenon may cause serious environmental impacts like landslides, slumps, slips and other mass movements in the road cuts.

Erosion mitigation measures will be a part of the road design including measures both physical and biological such as slope stabilization, embankment reinforcement and use of stepping to maintain the angle of repose and vegetation and plantation. Similarly the designer will adopt following mitigation measures to control land slide:

- Provision of masonry breast walls.
- Provision of ditch type drains along the toe.
- Provision of small toe walls against adversely dipping rock beds.

5.1.3 Flooding

A number of non perennial streams and nullah cross the road at various locations which are subject to flash floods from the hills during rains. There is a great variation of rainfall pattern in the project area and the flow variation is tremendous during different seasons of the year. Heavy and intensive rains in the hilly areas often results in quick and high velocity flows. Properly designed drains along the road and cross drainage structures across the road will be required to minimize serious negative impacts during construction and operation stages of the Project.

The designer will check the adequacy of all the culverts / bridges against the expected flash floods and suggest improvements or new construction for catering the design flows. An adequate number of new culverts and bridges will be provided to carry the design flows without causing any flooding.

5.1.4 Plantation and Vegetation

The area on both sides of the road is mostly devoid of any vegetation and plantation. Also some of the trees/ orchards presently existing along the road are clear of the proposed improvement; hence no tree cutting will be required.

The designer will, however, include in the design road side plantation of additional trees to enhance the environmental aesthetic all along the route. During the construction stage 5000 new trees will be planted on both sides of the road.

5.2 Construction Stage

5.2.1 Soil Erosion

Embankment works such as excavation of earth, cutting operations, embanking, clearing of vegetations may result in soil erosion, loss of vegetation and habitat. During rainy season soil erosion may occur damaging the earthen shoulders and the road structure. The mitigation measures will include:

- Pitching at high embankments in critical areas; and
- Plantation of grasses and shrubs for slope protection.
- Trimming down of slopes.
- Proper removal of all the loose material lying within the right of way.

5.2.2 Disposal of Spoil

Disposal of spoil / surplus material may be another issue likely to cause negative environmental impacts, if not properly mitigated during construction of the road. Negative impacts may be caused on the receiving lands due to improper disposal of spoil including silt runoff, change of land use, sedimentation of receiving water bodies and loss of aesthetic values.

To mitigate the negative impacts, the spoil will be disposed of in an environmentally acceptable manner by transporting in enclosed containers and dumping at sites approved by the executing agency. Contractors will be made responsible through necessary provisions in the contract documents for proper disposal of the spoil.

5.2.3 Air Pollution Control

Vehicular movement and running of construction machineries may result in emission and dust generation from construction causing public health risks, nuisance and other impacts on the bio-physical environment. Mitigation measures will include:

- Regular maintenance of vehicles, equipment and machinery used for construction to ensure that the emission levels conform to the NEQS;
- Monitoring of air quality parameters;
- Spraying water at the earth mixing sites and along the Katcha road sides. The frequency of water spraying will be at least two times a day but it will be variable depending upon climatic conditions on a particular day ; and
- Work safety measures like dust masks will be used to ensure no health risks for operators.

5.2.4 Noise Control

Running of construction machinery may result in noise from vehicles and equipment. Mitigation measures will include:

- The plants and equipment used for construction will strictly conform to noise standards;
- Selection of up-to-date equipment and plant, with reduced noise levels ensured by suitable and inbuilt damping techniques and appropriate muffling devices;
- Providing the construction workers with suitable hearing protection like ear cap, ear muff etc.
- Regular monitoring of noise levels.

5.2.5 Flora

Although linear plantation done by NHA along the project road will be affected from RD 0 to 11, the number of trees affected will be replaced as per NHA's policy. Plantation of indigenous species of trees (5000 nos.) will be carried out at selected locations, depending upon soil characteristics and availability of water.

5.2.6 Camp Site Related Impacts

Location of camp site may result in loss of vegetation and assets on the selected land, and dissatisfaction on rehabilitation measures after completion. Also improper sanitation & waste disposal facilities at camps may pose health risks to work force and public if not properly managed. Mitigation measures will include:

- Minimizing the removal of existing plants at camp sites;
- Plan for rehabilitation of camp site upon completion;
- Provide pit latrines or, as required, septic tanks to receive all sanitary wastewaters.

5.2.7 Borrow Pit Excavation Activities

Although the road will be constructed using the existing embankment, yet borrow soil will be needed for widening of formation width. Borrow pit excavation activities may cause soil erosion, damage to road embankment and public health risks. Mitigation measures will include:

- No excavations will be allowed within distance of 100 m to ROW ;
- Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and
- In case borrow pits fill with water, measures will be taken to prevent the creation of mosquito-breeding sites.

5.2.8 Wages and Work Regulations

Inequities in wages, underpayment and gender-biased wages may result in non-conducive work environment for the work force during construction works. Mitigation measures will include:

- Ensuring pre-defined minimum wages;
- Ensuring women receive wages equal to the wage paid to men for equal works;
- Child labour will be strictly ruled out.

5.2.9 Health and Safety of Workers and Public

The proposed construction activities are of such nature, which can impose severe impacts on health & safety of the workers and the public. The rock cutting operations and blasting works at high mountains can pose serious health and safety risks for the workers and the public. Health and safety of the workers and the public during the construction phase will be ensured by implementing the following measures:

- The contractor will ensure that construction labour is trained in safety procedures for all relevant aspects of construction.
- The executing agency will make regular checks that the contractor is following safe practices.
- In order to ensure that all work is carried out safely, every team employed by the contractor will be headed by a fully trained supervisor with easy access to emergency services.
- Proper First Aid facility will be established by the contractor and an appropriate number of site personnel will be trained in the use of First Aid equipment.

- Formal emergency procedures will be developed for each construction site in the event of an accident.
- Advance warnings shall be given to the people likely to be affected or at risk due to the fall of debris because of construction operations
- The safety of the public at all stages of the construction will be ensured by appropriate public education and safety measures such as use of barriers and flags.

5.2.10 Social Balance and Public Relations

Local residents may resist contractor's attitudes; cultural clashes may affect the public relation of the contractor with the local population. Mitigation measures will include:

- Establishment of formal links with local communities and grievance redress mechanisms including community leaders; and
- Employ local community (unskilled) labour for construction works.

5.3 Operation Phase

5.3.1 Soil Erosion

The newly constructed embankment may be damaged due to soil erosion during rainy season causing silt runoff to surrounding areas during operation phase of the Project. Mitigation measure will include a regular programme for visual inspection for erosion damages on embankment and structures and immediate repair works.

5.3.2 Plantation and Vegetation

The trees planted on road side and grass during construction stage may die if not adequately looked after during the operation stage of the Project. The mitigation measures will include a regular programme of visual inspection of plant species' survival rate and status of maintenance during the operation stage.

5.3.3 Ambient Air Quality and Noise Levels

The project road is an existing road with very small traffic loads. The present traffic volume in year 2006 is approximately 500 vehicles per day hence affect of vehicular emissions on ambient air quality is not very significant. Also due to this increase in traffic volume, no negative impacts are envisaged on ambient air quality and noise levels of the area during operation stage of the Project due to improvement in riding quality, reduction in travel time and by avoiding unnecessary stoppages and road blockages.

5.3.4 Socio-Economic Impacts

The construction activities for the road will generate jobs for the local people. In addition indirect economic activities will increase i.e. hotels, shops, petrol pumps may come up along the highway during the operation stage.

A large number of non-locals will come for working on various jobs; therefore there is a possibility of social or cultural conflict. It is recommended that the services of local skilled or unskilled local labour may be utilized as far as possible. The influx of non-locals may however have some positive impacts also, including the possibility of bringing awareness and cultural uplift of the Project Area.

Business and trade activity will increase significantly providing economic benefits to the people living in the area. The improvement in existing transportation facilities will boost tourism in the area. The Project may impart different skills to the local residents and training on the Project will

help them in their future life and hence human resource development will take place for future progress of the area. Level of basic necessities like health, education and transportation are expected to be enhanced benefiting the people residing in the area.

The overall socioeconomic benefits of the Project being more than the negative impacts will result in raising the standard of living and alleviation of poverty in the project area.

6. Environmental Management and Monitoring Plan

6.1 Introduction

The Environmental Management and Monitoring Plan provides an overall approach for managing and monitoring environment and social related impacts and describes the institutional framework and resources required to implement it.

Chapter 5 of this provides the details about the environment screening process, impacts on environmental components with proposed remedial measures to avoid/minimize the adverse environmental impacts of the project. Accordingly the Environmental Management Plan (EMP) has been developed to effectively implement the monitoring and mitigation measures identified in the IEE to ensure that adverse environmental impacts are minimized and acieve desired economic benefits without compromising the environmental resource base of the project area.

6.2 Objective of Environmental Management Plan

The Environmental Management Plan provides a mechanism to address the adverse environmental impact of a project during its design, construction, and operation phases to accelerate project benefits, and to introduce standards of good practice to be adopted for all project works.

The objectives of the EMP are to:

- Define the responsibilities of the project proponents, contractors, construction, supervision consultants and environmental monitors;
- Facilitate the implementation of the mitigation measures identified in the EIA;
- Define a monitoring mechanism and identify monitoring parameters;
- Provide a procedure for timely action in the face of unanticipated environmental situation; and

6.3 Environmental Management/ Monitoring and Reporting

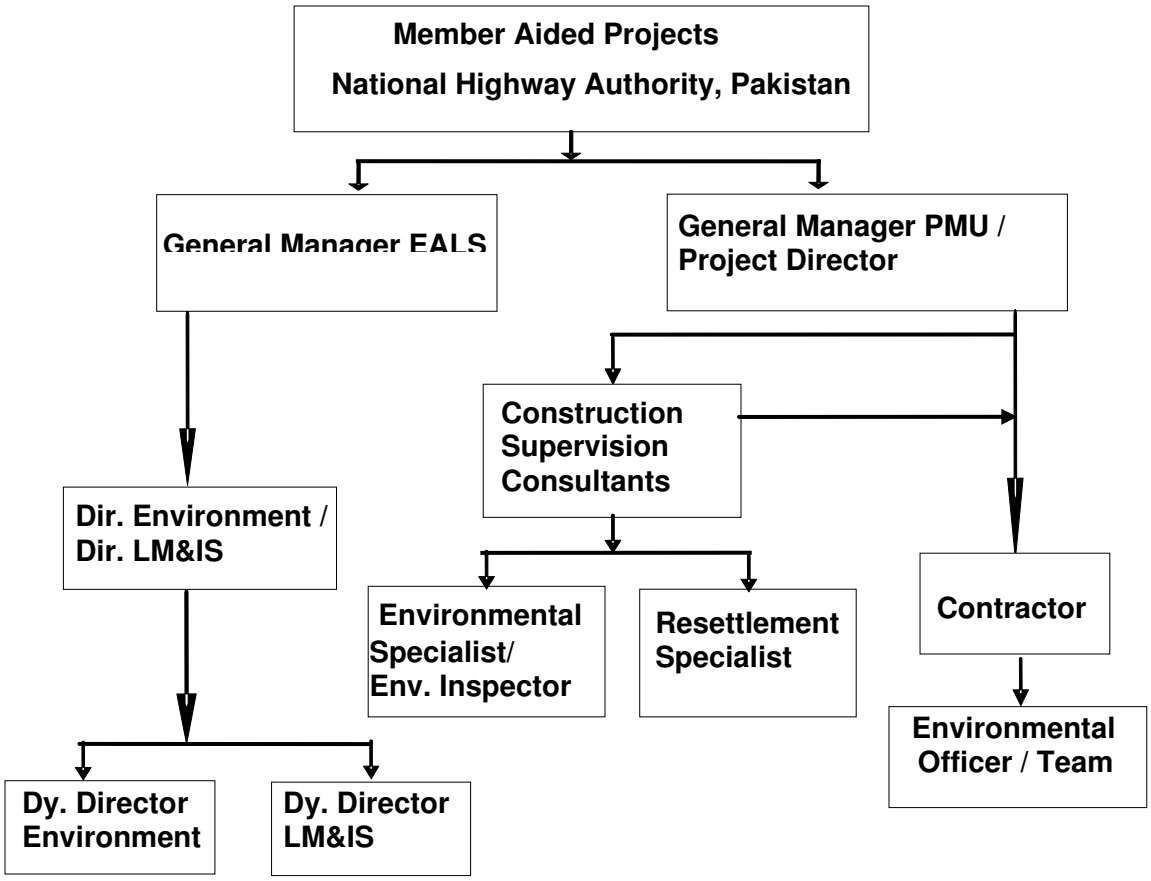
During the construction phase the overall responsibility for the implementation and monitoring of Environmental Management Plan rests with the General Manager (GM) Project and Project Director (PD). The GM Project/PD through assistance from the Supervision Consultants Environmental Staff and the Environment Team of the Environment, Afforestation, Land and Social (EALS) Unit of NHA will supervise the implementation of the proposed mitigation measures and monitor the implementation progress in field. Monthly Environmental Monitoring data/reports will be incorporated in the project implementation progress reports to be shared with ADB and such monthly reports will be consolidated into bi-annual monitoring reports and submitted to ADB for review and clearance. Upon clearance all such reports will be uploaded on NHA and ADB websites.

Site Specific Environmental Management Plans (SSEMP)

The contractor will prepare SSEMPs as required in the attached Environmental Management Plan (EMP). In addition to these, the contractor will also prepare a separate SSEMP for the 9km section of the road in FATA. All SSEMPs will be submitted to the Supervision Consultant for approval. The contractor will not be given access to the site before the approval of SSEMPs is granted.

The organizational structure for the Environmental Management / Monitoring implementation is shown in Figure 6.1

Figure 6.1 Organization Chart for Environment Management / Monitoring implementation



6.4 Impact Screening and Detailed Impact Analysis

During the IEE process a detailed impact analysis was carried out with respect to interface of project actions with the biophysical and social environment along the project corridor. For this purpose the direct corridor of impact was determined for project civil works to assess the project's impacts on environmental parameters. Accordingly, the mitigation measures to be implemented and monitored during different stages of the project have been proposed to minimize the adverse impacts.

6.5 Corridor of Impact

Except for the establishment of contractor's camp site with equipment/material storage yards and construction material, and borrow sites, all construction activities will remain on the existing alignment within available ROW, and no new road (bypass) is considered. Thus the vast majority of the impact corridor will be restricted on the existing RoW. However, there are a few situations where the impact corridor goes beyond the limits of the carriageway, shoulders and embankments, which will be included in this IEE. These include:

- Areas where campsites, asphalt mixing plant, crushers, material stacks and storages will be established on temporarily leased land
- Borrow sites for sub-base construction material

- Quarry material
- Haulage tracks and temporary diversion lanes

As for the limit of traffic-related gaseous and noise emissions, an impact zone of 100 m from the CL has been considered. Section below provide brief about the project impacts due to project location/site, design, construction and operation. While activity wise environmental issues, mitigation measures with implementation mechanism and institutional responsibility are provided in the Environmental Management Matrix below.

a. Environmental Impacts due to Project Location

Negative Impacts: Taking into account the sparsely populated area, the absence of marked agriculture activities and vegetation, and the limited availability of surface waters with low groundwater table, the absence of ecological sensitive areas in the immediate vicinity of the project corridor, no major impacts were identified since the entire project will use the existing alignment. Widening to standard width will in most cases only involve a physical interference up to 3 meters from the existing shoulder. In no cases valuable or planted vegetation would be affected along the entire road corridor. The use of dynamite may be required at few occasions where the horizontal geometry needs to be corrected in hilly stretches cutting through rocky sediments.

Potential sources of project location impacts may include borrow material excavation that may result in marred landscapes if not properly managed. However, given the vast abundance of suitable sub-grade material along the project road, as the soil of Zhob and Shirani Districts consists prevailingly of gravely soils, shingle gravel, hard soil and rock with very poor fertility there is little likelihood of such impacts.

Beneficial Impacts: Most beneficial impacts associated with the improved connectivity and road conditions are of long-term in nature. They are fully appreciated once the project enters the operation phase and are therefore discussed below under section d.

b. Environmental Impacts due to Project Design and Specifications

During Design, improper design solutions may lead to increased safety risks, damage to public amenities and landscape issues. Proper design solutions are particularly important in the field of controlling noise and air pollution associated with increased traffic conditions. Of special concern is, even at this early stage, the selection of borrow sites and a number of planning issues related to the establishment of camp sites. However, these latter two aspects are treated in detail in the subsequent section.
Specific environmental problems associated with the selected design solutions, and those being addressed in the EMP, could include:

- Loss of homesteads, assets and agricultural / horticultural land [A.1.2]
- Interference with public life, local economics [A.1.1] [2], and due to siting of project works near settlements, and traffic congestions [A.2.1]
- Disturbance of the surface and groundwater regime due to under-dimensioning of cross-drainage structures [A.3.1];

[2] **[Brackets] refer to the respective remedial mitigation measures described in the EMP, Matrix below**

- Inadequately designed structures with respect to ambient environmental conditions, e.g. flash floods, or seismic risks [A.3.2], or to cause drainage problems in built-up areas [A.3.1];
- Loss of roadside vegetation and plantation [A.4.1]; disturbance to ecological resource base of the area [A 4.2]
- The Project design could deteriorate or aggravate the ambient air quality or noise levels [A.5.1];
- Disposal of harmful construction materials and waste management [A.5.2];
- Loss of productive land for borrow pits and/or undesired excavation practices [A.6.1];
- The acquisition of borrow material could interfere with existing land-uses and result in impacts on local water resources [A.6.2];
- Interruption of public amenities and services by affecting utilities [A.7.1],
- Cultural heritage sites could be affected [A.8.1].

c. Environmental Impacts Resulting from Construction Activities

During this project phase the majority of anticipated impacts are of adverse but temporary in nature – most if not all can be minimized by appropriate mitigation measures. In all cases, the identified impacts are localized on a small corridor adjacent to construction and haulage sites. The EMP indicates that all identified impacts and respective mitigation measures are duly incorporated in the tender and contract documents, while the core of the Supervision Consultant's task is to monitor the Contractor's compliance with these clauses.

At this project stage the most common problems to address with choice of location are those associated with the **siting of work camps** [B.1.1], vehicle park and material stacks. Contractor camps, particularly if located in close vicinity to existing settlements, may become a source of environmental impacts, social tensions and disputes over a number of conflicting issues such as:

- Risks that the construction works and influx of migrant/outside laborers may result in social severance, changes of traditional lifestyles and employment patterns [B.1.1];
- Imbalance in job opportunities with locally recruited labour [B.1.1];
- Loss of vegetation and assets on the land chosen as preferred site [B.1.2];
- Workers living, health safety, security and sanitation facilities, including camp site security [B.1.4. and B.1.5];
- Risks and nuisances with the creation of waste and sewage [B.1.3, B.3.2 and B.8.2];
- consumption of local water [B.3.1], and fuel wood resources [B.8.2];
- Public health and hygiene problems [B.8.2];
- Competition for natural resources, e.g. drinking water, range land and local products [B.8.2 and B.8.4];
- Acerbating the fuel wood shortage in the region, and/or conflicts with other users [B.8.2];
- Cultural clashes and security problems with migrant laborers, including trafficking, smuggling and prostitution [B.8.1 and B.8.2];
- Poaching of local wildlife by workers [B.6.1];
- Increase of crimes associated with road improvement [B.8.3];
- Dissatisfaction over the status of clearing the work camps after completion. [B.1.2];
- Locations of temporary construction resources like buildings and huts etc, if not properly removed in accordance to initial plan, may contribute towards accelerated ribbon development and encroachment [B.1.2.].

It is therefore advisable to start the process of site selection for work camps and heavy equipment at an early stage before construction commences. The contractor shall be responsible to prepare and submit Site Specific Environmental Management Plan with Camp/equipment and material yard layout plan including site restoration plan after decommissioning of camp site. The SC will approve the lay out plan and SSEMP and monitor the implementation progress through out project construction phase.

Construction activities encompass a number of **issues and risks for both the workers and the public general** that need to be addressed, such as:

- Labour wages including insurances, medical precautions safety installations, protective clothing, etc [B.2.1];
- Child Labour, inequities in wages and gender-bias payment may create dissatisfaction among labourers [B.2.2];
- Waste material and run-off from sanitation facilities may cause environmental problems and nuisance to the public if not addressed with a waste management plan [B.1.3]
- Hazardous materials may create several adverse impacts if not handled with proper protective measures [B.2.3];
- Production of construction waste/surplus materials including waste materials (e.g. bituminous scrapes) from construction activities could be harmful to human health or the bio-physical environment [B.2.4];
- Soil compaction and changes in the edaphic properties of soil may affect local groundwater resources and land-use options [B.2.5];
- Fuel and lubricants used in construction works and vehicle operation may contaminate soil and water resources [B.2.6];
- Soil Erosion, Loss of vegetation and habitat due to excavation of earth, clearing of vegetations etc [B. 2.7]
- Spoil material (e.g. from dismantling the existing road) could, if not properly re-used as sub-base material, pose environmental problems when not dumped in assigned locations. Improper disposal of bituminous substances may contaminate ground water resources and create landscape nuisance. [B.2.4 & B.2.7]

Borrow areas require special attention, as they can inflict a number of issues such as:

- Procurement of borrow material may cause conflicts with other land-uses, change soil and hydraulic properties in the borrow area, and can attribute to landscape deterioration and loss of vegetation and habitats [B 2.8 and B.2.9];
- Exploitation of borrow areas can eventuate in land disputes and marred landscapes if not properly rehabilitated after completion [B.2.9 and B.2.11];
- Unsuitable excavation methods in close vicinity of the embankment will result in erosion problems and generation of stagnant water ditches prone to become breeding grounds for water-borne disease vectors [B.2.10 and B.2.11].

The contractor shall avoid to barrow material from any unapproved borrow site and shall be responsible to submit Site Specific Environmental Management Plan including material transportation and Borrow sites restoration measures before abandoning the borrow sites. The SC will approve the SSEMP and monitor the implementation progress through out project construction phase.

In addition to above Construction works may conflict with local resources, land-uses and quality of life, such as:

- Extraction of water by the contractor can lead to conflicts with local water users, for example, the water abstraction from local sources may result in competition for water with local residents and farmers (e.g. in case of drought or during cropping time); [B.3.1];
- Contamination of surface waters by increase of dissolved particles, spillage or harmful substances (e.g. washing of trucks, loaders and other equipment in local rivers) [B.3.2];
- Contamination of soil groundwater water arising from sanitary and other liquid waste spillage; [B.3.2];
- Blocking local drainage structures [B.3.2];
- Construction activities and wastes can pollute surface and groundwater [B.3.2 and B.3.3];
- The ambient air quality with subsequent public health risks, is subject to temporary deterioration due to vehicular emissions and dust development [B.4.1 and B.4.3];
- Asphalt mix plants, batching plants and crushers are particular detrimental air polluters that need special attention [B.4.2];
- Ambient noise levels and vibrations are equally increased by the operation of construction equipment that need a number of stringent remedial measures, including the construction of noise barriers in sensitive locations [B.5.1];
- Night working practices exacerbate the discomfort and health impacts of the affected local communities [B.5.1];
- Accessibility and mobility constraints in built-up areas are likely to cause disruption of social cohesion and household economies if traffic diversions are not properly selected and managed [B.7.1];
- Increased accident risk at construction and/or temporary traffic diversion sites, especially when located within or adjacent to settlements [B.7.1];
- Children are especially at high accident risk wherever construction and heavy vehicular movement takes place [B.7.2];
- Safety concerns regarding construction-related accidents also concern the work force that need provided with adequate protective measures [B.7.2], including the elaboration of a contingency plan in case of major accidents;
- Blasting can trigger landslides and changes in the hydraulic regime if not carried out in a controlled manner and relying on a professional hydro-geological assessment [B.3.4];
- Blasting for construction and quarrying purposes is likely to cause safety hazards for the workers, local residents and passers-by [B.3.5];
- Surplus hill cut rocks, if not properly disposed, can block or alter waterways and contribute to gully erosion [B.3.6].
- Un-announced mobilizing of construction workers and heavy construction machinery may cause topographic changes, affect local land-uses and provoke dispute with the local residents, especially when sensitive sites are affected such as schools, hospitals, madrasas and mosques. [B.8.1];
- Internationally recruited constructing firms can become sources of social conflicts when employing staffs who are unfamiliar with local customs, restrictions and way of life [B.8.1 and B.8.2]. This refers particularly to the rigid customs of *chadar* and *purdah*.

Among the **beneficial impacts** generated during this project phase are increased prospects for the local (prevailingly poor) population to find up to 5,000 temporary jobs. Given the low population density and the scarcity of finding additional sources of income this will particularly benefit the local economy. Nomadic migrants may equally become particularly interested in finding seasonal income opportunities. Relatively labour-intensive methods of construction will be

adopted which maximises employment opportunities for the local people, and to make a positive contribution to rural poverty alleviation and the development of new skills which can be used on future projects. In addition, local shop keepers and restaurants will find increased economic return based on the needs by construction workers and supplementary services.

d. Environmental Impacts during Project Operation

Negative Impacts: After completion of the construction works, the improved highway may cause several adverse impacts that need to be addressed. The design is made to generate high operating speeds and higher vehicular densities which will invariably lead to over-speeding. Increased traffic volume will affect public health and quality of life. Such adverse impacts, if not properly addressed, will include (i) deterioration of ambient air[3] quality [C.2.1], (ii) increase in noise levels and vibrations [C.3.1], (iii) increase of accidents and spills/contamination with hazardous materials (e.g. oil spills) [C..5.1.and C.5.2.], and (iv) creation of hazardous and undesired habitats like abandoned borrow pits [B.2.11.], Other concerns relate to accidents due to wildlife collisions and exploitation [C.4.1 and C.4.2], and flash floods. [A.3.1]

Road and highway development brings increased economic opportunities for locals, however, it can it lead at the same time towards negative changes in the socio-economic setting, for example price increase for amenities and land, acceleration of communicable diseases or other undesired development.

Beneficial Impacts: Tree plantations proposed as prime measure for environmental enhancement within the ROW will serve multiple functions such as adding to landscape aesthetics, emission absorbents, timber, fodder and habitat enrichment. Embankment plantations will contain soil erosion and act as primary buffers and absorbents in case of accidents resulting in oil and other spills.

The highway will also benefit the local poor residents, many of them small farmers of shepherd who need to bring their products safely and without losses to the net market outlets. The road improvement projects have on the long run a confirmed positive impact on alleviating poverty and enhancing the local socio-economic conditions. For example, the proposed project will directly reduce poverty by lowering the costs of transport for the poor traveling to labor and produce markets, to health and to education facilities. The public general, in particular the nomadic groups, will benefit from the road safety awareness programs proposed to be incorporated in the project design.

More and substantial benefits are to be expected once the 81.21 km connection between Zhob and Mughalkot will be improved and will enable heavy traffic to travel safely to D.I. Khan and the central economic regions of the country, including the metropolis. It is expected that with the complete improvement of the missing section the N-50 will become both a strategic and economic significant road for inter-provincial traffic.

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[3] The scope of this IEE did not make provision for first hand measuring air quality and noise level parameters; therefore, secondary information and tests are cited to assess comparable situations.

6.6 Environmental Training

6.6.1 Capacity Building and Training

Capacity building and training programs are necessary for NHA staff in order to control negative impacts of road construction, maintenance and operation. They also need training for monitoring and inspecting road projects for environmental impacts and for implementation of mitigation measures.

The details of this capacity building and training program are presented in the Table below:

Table 6.1: Capacity Development and Training Programme

Provided by	Organized by	Contents	No. of trainees	Duration	Cost (Rs.)
Pre-Construction Phase Monitoring consultants/ Organizations offering specialized services in environmental management and monitoring	Director (E&A)	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan	Three seminars for NHA project staff	3 days	150,000/
Construction Phase Monitoring consultants/ organizations offering specialized services in social management and monitoring	Director (E&A)	Short seminars and courses on: Environmental Risks associated with construction phase Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Three seminars for NHA Project staff dealing in social/land matters	3 days	150,000/
Operational Phase Monitoring consultants/ organizations offering specialized services in Occupational Health and	Director (E&A)	Short lectures relating to Road Safety (Policy measures/implementation) Development of Green Belt and Environment Up gradation	Two seminars for Contractor's staff	2 days	100,000/

Safety (OHS) issues					
TOTAL			**400,000 (Rs. 0.4 million)**		

6.6.2 Environmental Monitoring Costs

The following table gives cost estimates for monitoring air quality, water quality and noise monitoring:

Table 6.2: Cost Estimates for Environmental Monitoring

Sr. No	Monitoring Component	Parameters	Quantity	Amount (Rs.)	Details
1	**Air Quality**				
	Ambient Air Quality	PM_{10}	12	300,000	12 samples @ Rs. 25,000/sample
	Asphalt Plant stack emissions	SO_2, NO_X, CO, HC, O_3	40	400,000	40 samples @ Rs. 10,000/sample
2	**Water Quality**				
	Surface Water	Common ions, TDS, TSS, etc	25	575,000	Fortnightly testing of water samples drawn from streams and water courses during construction along their banks @ Rs. 23,000/ per sample
	Drinking Water	Common ions, TDS, BOD, Coliforms, etc	6	48,000.00	6 samples @ Rs. 8,000/ sample
3	**Noise Levels**	**dB(A)**	**24**	**96,000**	**24 readings @ Rs. 4,000/per reading**
4	**Contingencies**			**70,950**	**5% of monitoring cost**
	Sub Total			**1,489,950**	
	Equipment required				Provision for a camera, lap top, GPS, noise meter and a computer has already been made in the EMP Budget
	Total Cost of Monitoring			**1,439,550**	

7. Public Participation and Consultation

7.1 Introduction

General public, elected representatives, local councilors and informal community leaders including members of non-government organizations (NGOs) were asked to state their current perceptions of priorities for improvements to the urban environmental infrastructure in their areas and about the likely impacts of the Project during construction and operation phases. The main objectives of the public information campaign and public consultation were as follows:

- To share the information about the proposed project, its components and activities with affected people;
- To obtain cooperation and participation of the general public in Project planning and implementation processes;
- To establish accessible and effective grievance redress procedures; and
- Create a sense of ownership among the stake holders regarding the Project.

7.2 Identification of Main Stakeholders

Stakeholders identified include local representatives, government officials, NGOs and general public. All these stakeholders have different types of stakes according to their interests and professions.

7.3 Approach for Public Consultation

The approach adopted towards public participation was to disseminate information, soliciting inputs and getting consensus on issues and propose mitigation measures. This approach was put into practice through consultation with NHA and public meetings, meetings with influential people of the districts, workshops and roadside consultations with pedestrians, vehicle drivers, roadside vendors etc were held. The first consultation process was held in 2008-2009 during the preparation of this environmental assessment report. Subsequently, further consultations were held in September 2013 and April 2014 during the updation of this report.

7.4 Meetings with Stakeholders

During the first round of consultations meetings were held with the local communities and Engineers of Communication and Works (C&W) Department, Balochistan and the district Coordination Officer Loralai in March 2008. During discussions with residents and site visits, it has been revealed that local people are generally aware of the Project and are in favor of its construction. In February 2009 a meeting was also held with the General Manager, ADB Projects in Quetta.

In the second round of consultation held in 2013, meetings were held with the Director General BEPA, Deputy Director (Technical) BEPA, Deputy Commissioner, Loralai, Executive Engineer (Buildings and Revenue), Loralai, Deputy Director (Agriculture) Loralai, and Deputy Director (Maintenance) Loralai. NHA staff with whom consultations were held included General Manager Balochistan, Director Maintenance Quetta, Deputy Director Maintenance Loralai, and Deputy Director Land/ Legal Quetta. Consultations were also held with community members (both men and women) of villages along the road alignment.

The third consultation was held in April 2014 and focused on the project section that falls in FATA. The Political Agent/ Deputy Commissioner of District Dera Ismail Khan (under whose

administrative jurisdiction the FATA road section falls) and members of the local administration and community participated in the meeting.

The most common concerns noticed during the public meetings are listed as under:

Highway Design

- The design of road should be least disturbing the local agriculture and economic activity. For example the provision of bypass at north of the city may severely interfere with the agriculture of the area and hence locally unaccepted.
- Sufficient cross drainage structures should be provided to avoid flooding of the area.
- The Highway alignment should minimum effect the local settings and to avoid the severance of the area while passing through the populated area.
- The respectful local customs should be taken in account in a design and should be maintained during construction.

Highway Construction

- Avoid undue delays in construction to limit the inconvenience to the public cause by the road construction.
- Adopt majors to minimize dust, smoke and noise pollution during construction.
- Avoid dumping of the materials during the construction and to carry out proper site clearance after completion of the construction activities.
- Provision of properly formed and maintained diversions during construction.
- Inclusion of local labour and workforce up to the maximum possible extent in project construction activities.

Highway Operations

- Erection of informatory regulatory and cautionary signs to eliminate operational hazards
- Control over speeding and the use of loud pressure horns near populated area.
- Specify speed limits particularly in populated area.
- Proper maintenance of cross drainage structure to avoid flooding of road and adjacent area.

These concerns will be addressed through the proper implementation of the EMP. The list of consulted persons during consultations held in 2013 and 2014 are attached as Annexure V. Since the Project road alignment generally follows the existing alignment and only widening/improvement in the road geometry is being done, the Project is generally accepted and people want this Project to be taken up.

7.5 Gender Sensitive Consultations

The women consulted through Focus Group Discussions (FGDs) reported that due to the local social and cultural traditions, they are not involved in outdoor productive activities and their roles are limited to their households. They have limited mobility and social interaction with their relatives in nearby villages and cities. There exist very limited opportunities for primary education and healthcare. As per the findings of the FGD, the perceived benefits of the project are as follows:

- Improved access to social facilities like health care, education e.g. better access for their children to nearby schools and colleges as well as teachers usually coming from nearby towns.
- Increased frequency of health workers, extension workers visits.

- Increase in income generating activities of their male family members with improved access to markets.
- Improved community relations and timely management of emergency situation

7.7 Consultation with FATA Entities

Consultative sessions were held on 2-3 April 2014 with the local administration and tribal community of the 9km section of the Project road that is located in FATA. The purpose was to share project related information including project design, nature of works to be implemented, schedule and environment management plan applicable to the contractor. The consultative meetings were held with local administration of Frontier Region (FR) Dera Ismail Khan and tribal elders of the area as well as with the local community in close proximity of the Project road. The meetings were held in the office of the Deputy Commissioner Dera Ismail Khan and the list of participants is attached as Annex-V.

NHA's engineering, land and social staff briefed the participants about the project and its implementation period and arrangements. It was clarified to the participants that the project works include rehabilitation and improvements of the existing deteriorated single lane carriage way a 7.3m dual carriageway with paved inner and outer shoulders and protection works along river side to improve connectivity and ensure the safety of road users as well as local community from accidental hazards.

Issues like setting up of contractor's camp, social disruption due to unnecessary interaction of outside workforce with locals and livelihood opportunities for local community were discussed. The participants were assured that the contractor's camp will be located at a distance of at least 500m from any local settlement. The contractor will ensure that, the workforce should not interact with local community unnecessarily; exploitation of water and fuel wood resources being used by local community will be avoided; local customs will be adhered to and wherever possible job opportunities will be provided to the local community as per their skill and ability. All such issues are substantively addressed in environmental management plan that will be applicable to the contractor as part of civil works contract and its compliance will be monitored strictly by the NHA through supervision consultants.

During consultations the local community indicated that in the tribal system all activities are undertaken through a consultative process with the consent of the council of village elders called the 'Jirga'. In this context, they appreciated the consultation, and indicated that the consultative process should be continued during the implementation phase of the project as well. The local community favoured the rehabilitation and improvement works of project road in general and particularly in the difficult terrain of FATA.

Apart from the prior said efforts any issue encountered or grievance raised by the local community during implementation of the project will be addressed in accordance with local customs and legal framework applicable in FATA area through involvement of local administration and the tribal elders. Accordingly, a Grievance Redress Mechanism conforming to the local legal framework and tribal customs was agreed upon with the local administration and local community.

8. Grievance Redress Mechanism

8.1 General

In order to receive and facilitate the resolution of affected people's (AP) concerns, complaints and grievances about the Project's environmental performance, a Grievance Redress Mechanism (GRM) will be established at the Project. The GRM will address the APs' concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the APs at no costs and without retribution. The mechanism will not impede access to the country's judicial or administrative remedies.

The APs will be fully informed of their rights and of the procedures for addressing complaints verbally and in writing during consultations. A mechanism will be established to address/resolve the project related issues including the APs concerns or grievances including those related to the environment.

A Grievance Redress Committee (GRC) at the project level has been notified vide office order No. A.D(L&S)-1/EALS/HQ/NHA/13/320, dated 01/10/2013 and will be placed at the Project Director's Camp Office at Zhob. Although the GRC will be the focal unit for grievance redress at the sub-project (local) level, however to facilitate the APs to resolve their issues at local level an informal mechanism will be put in place.

8.2 Grievance Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring

NHA will assist the project affected communities/villages identify local representatives to act as Grievance Focal Persons (GFPs). The GFPs will be responsible for i) acting as community representatives in formal meetings between the project team and the local community he/she represents; ii) communicating the community members' grievances and concerns to the contractor during project implementation.

A pre-mobilization public consultation meeting will be convened by NHA's EALS Unit and attended by the GFPs, Supervision Consultant, contractor, Project representative and other interested parties (e.g. district level representatives, NGOs). The objectives of the meeting will be as follows:

- Introduction of key personnel of each stakeholder including roles and responsibilities;
- Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP - its purpose and implementation arrangements;
- Establishment and clarification of the GRM to be implemented during project implementation including proactive public relations activities proposed by the project team, Supervision Consultant and contractor to ensure that communities are continually advised of project progress and associated constraints throughout project implementation period;
- Elicit and address the immediate concerns of the community based on information provided above

Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below:

- Individuals will lodge their environmental complaint/grievance with their respective

community's nominated GFP.

- The GFP will bring the individual's complaint to the attention of the contractor.
- The contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.
- The GFP will discuss the complaint with the contractor and have it resolved.
- If the contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the Supervision Consultant's Environmental Specialist. The SC's Environment Specialist will then be responsible for coordinating with the contractor in solving the issue.
- If the complaint is not resolved within two weeks the GFP will present the complaint to the Grievance Redress Committee (GRC).

The GRC will be headed by the Project Director, Zhob-Mughalkot (N-50) with NHA's DD/AD (land) or DD/AD (environment) – depending upon the nature of the complaint - as member and focal person. Besides, the GRC will include the environment staff of the Project Management Unit/Supervision Consultants, environment staff of the contractor and representative of the local community (preferably the relevant GFP).

The GRC will have to resolve the complaint within a period of two weeks and the resolved complaint will have to be communicated back to the community. The contractor will then record the complaint as resolved and closed in the Environmental Complaints Register. This represents the first level of the GRM.

If the complaint is not satisfactorily resolved at this level, it will be referred by the GRC to the second level of GRM i.e. to the Environment, Afforestation, Land and Social (EALS) at NHA Headquarters, within 07 days after communicating its decision to the complainant. The EALS will communicate to the complainant immediately regarding the receipt of his complaint, will, scrutinize the record of the GRC, investigate the remedies available and request the complainant to produce any record in favour of his claim. After thorough review and scrutiny of the available record on the complaint, EALS staff shall visit the field to meet the complainant, collect additional information and evidence if required. Once the investigations are completed EALS shall get its recommendations approved by Member Aided Projects and forward them to the Project Director and the complainant accordingly within 30 days of receipt of the complaint. Should the complaint not be resolved through the GRM, the issue will be adjudicated through local legal processes.

In parallel to the ECR placed with the contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.

NHA's project office will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the contractor to the SC and will ensure that they are resolved in a timely manner.

8.3 Grievance Redress Committee for FATA Section

Since British Rule in India the Federally Administered Tribal Areas (FATA) have been accorded distinctive administrative arrangements and legal and judicial systems. The systems applicable to the rest of the country are not applicable in the FATA. All administrative and legal issues/disputes are resolved through a consultative process involving tribal leaders or 'Maliks' through a 'Jirga' or Council of Tribal Elders under the applicable legal and administrative framework known as Frontier Regulation of 1901 as amended in 2011. Hence, in addition to GRM proposed for the project in the previous section, a GRM fully commensurate with local customs and legal framework has been agreed upon with the local administration and a GRC (Tribal) headed by the Assistant Political Agent and including members from NHA, FR Administration and concerned Tribal Maliks has been notified by the Deputy Commissioner/Political Agent (administrative head of Frontier Region D.I. Khan). This GRM will be applicable to the extent of the 9km road section falling in FATA and will only be invoked if the dispute is not resolved by the project GRC (as described in the previous section). For environment related issues the GRC will also include the Project Director, Zhob-Mughalkot (N-50); DD/AD (environment) NHA EALS; environment specialist of Project Management Unit/Supervision Consultants; and environment staff of the contractor.

The scope of work of Tribal GRC is as follows:

a) The GRC (Tribal) shall record all grievances received, either through NHA project team/project GRC or from affected tribal persons/groups, in a register maintained for this purpose by the Political Moharrir (who is a member of the notified Tribal GRC) concerned.
b) The Convener of GRC will inform the complainant, NHA project team and other GRC members about the complaint; ask for record (if any) from project GRC and a joint field investigation report through GRC members from NHA, local administration and Tribal elder/Malik concerned. He will schedule meetings of the GRC to investigate, discuss and resolve the issues following local Jirga custom and applicable legal framework.
c) The DD/AD (Env.) of NHA will coordinate between the local administration, NHA's project team and EALS; assist GRC members in field investigations, documentation of GRC's meeting proceedings and maintaining record of grievances received and resolved; and facilitate implementation of GRC (Tribal) decisions by maintaining a close liaison with NHA project executing team.
d) The Tribal Elder/Malik will be responsible to facilitate the GRC in field investigation, consultations with local community (tribe/tribal group concerned) and resolution of grievance in accordance with local tribal customs; support local administration in implementation of GRC decisions and maintain law and order for smooth implementation of project works.
e) In case of disagreement by AP with GRC's recommendations/decision the GRC shall send the complaint with its record to Deputy Commissioner/Political Agent, FR D.I. Khan for his review and decision if AP opts to do so.
f) GRC (Tribal) shall communicate decisions / recommendations to the complainant and project directorate; and by executing its decision shall close the complaint file.

Initially the grievance raised by the local tribal community/group will be addressed at local village level through involvement of local elders (Jirga) by the project GRC (as described in the previous section) ensuring that local customs are adhered to. If the grievance is not resolved at project level, the project GRC will elevate the grievance to the Grievance Redress Committee specially constituted for the tribal area under chairmanship of the Assistant Political Agent

(APA). The Tribal Area GRC will review the record and proceedings of project GRC, investigate the nature of grievance and adjudicate it in consultation with the aggrieved person/tribal groups in accordance with local Jirga customs and applicable legal framework preferably within 45 days of receipt of the complaint. However, if aggrieved person/tribal group is unsatisfied with the decision of tribal GRC, he will have a right to elevate his grievance to the Deputy Commissioner/ Political Agent of FR DI Khan.

If the Tribal GRC fails to come to a conclusion and resolve the grievance, it will forward the issue to the Deputy Commissioner/ Political Agent for his decision. The PA/DC after hearing both parties will decide the matter or if required will refer the matter to Council of Tribal Elders under regulation 8 of FCR 1091. The Council of Tribal Elders will investigate the issues and send its recommendations to the Political Agent /Deputy Commissioner who will consider recommendations of Council of Tribal Elders while adjudicating the issue.

9. Conclusions and Recommendations

The upgradation and widening of the Zhob-Mughalkot section of N-50 highway will contribute towards the economic and social development of the region. The benefits from the Project are primarily due to reduced transport costs, shorter travel time, and positive environmental impacts including a reduction in dust levels through paving of the road shoulder. Potential negative environmental impacts will be minimized by implementing the EMP and the environmental monitoring plan. This project is the only option which fulfils political, security, financial, and environment requirements of the inhabitants of the area. In the long term the provision of an all year access facility could offer enormous development potential for the people and area.

Secondary data has been used to assess the environmental impacts of the Project. This IEE report highlights all potential environmental impacts associated with the Project and recommends mitigation measures. All environmental impacts associated with the Project need to be properly mitigated, through the existing institutional arrangements described in this report.

The majority of the environmental impacts are associated with the construction phase of the Project. The implementation of mitigation measures during this period will be the responsibility of the Contractor. Therefore, the required environmental mitigation measures will have to be clearly defined in the bidding and contract documents, and appropriately qualified environmental staff retained by the Contractor to supervise the implementation process.

This IEE concludes that no major negative environmental impacts are likely to occur due to construction and normal operations of the proposed Project, provided mitigation measures are implemented and the proposed monitoring program is adequately carried out. The EMP includes measures to minimize project impacts due to soil erosion, air and noise pollution, waste generation etc. Cumulative impacts of this Project should be viewed with a “corridor” and regional.

The Project has been assigned environmental category B in accordance with the ADB’s Safeguard Policy Statement (SPS) 2009, and Schedule II as per PEPA, IEE and EIA Gazette Notification, 2000’

ANNEXURE – I

Rapid Environmental Assessment Checklist (REA)

Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES), for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

Sector Division:

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the project area adjacent to or within any of the following environmentally sensitive areas?**			
▪ **Cultural heritage site**			
▪ **Protected Area**			
▪ **Wetland**			
▪ **Mangrove**			
▪ **Estuarine**			
▪ **Buffer zone of protected area**			
▪ **Special area for protecting biodiversity**			
B. Potential Environmental Impacts **Will the Project cause…**			
▪ **encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?**			
▪ **encroachment on precious ecology (e.g. sensitive or protected areas)?**			
▪ **alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?**			

Screening Questions	Yes	No	Remarks
▪ **deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?**			
▪ **increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?**			
▪ **risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?**			
▪ **noise and vibration due to blasting and other civil works?**			
▪ **dislocation or involuntary resettlement of people?**			
▪ **dislocation and compulsory resettlement of people living in right-of-way?**			
▪ **disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?**			
▪ **other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?**			
▪ **hazardous driving conditions where construction interferes with pre-existing roads?**			
▪ **poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?**			
▪ **creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?**			
▪ **accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?**			
▪ **increased noise and air pollution resulting from traffic volume?**			
▪ **increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?**			
▪ **social conflicts if workers from other regions or countries are hired?**			
▪ **large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?**			

Screening Questions	Yes	No	Remarks
▪ **risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?**			
▪ **community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.**			

Climate Change and Disaster Risk Questions **The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.**	Yes	No	REMARKS
• **Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)**			
▪ **Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (eg., increased erosion or landslides could increase maintenance costs, permafrost melting or increased soil moisture content could affect sub0-grade).**			
▪ **Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (eg., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?**			
▪ **Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by encouraging settlement in areas that will be more affected by floods in the future, or encouraging settlement in earthquake zones)?**			

Note: Hazards are potentially damaging physical events.

ANNEXURE – II

NEQS GUIDELINES AND WHO STANDARDS

National Environmental Quality Standards for Gaseous Emission

Parameter	Source of Emission	Existing Standards	Revised Standards
Smoke	Smoke Opacity not to exceed	40% or 2 on Ringlemann scale	40% or 2 on Ringlemann scale or equivalent number
Particulate matter	Boilers and furnaces Oil fired Coal fired Cement Kilns b) Grinding crushing, clinker, coolers and related processes, metallurgical processes, converter, blast furnaces and cupolas	 300 500 200 500	 300 500 300 500
Hydrogen Chloride	Any	400	400
Chlorine	Any	150	150
Hydrogen Flouride	Any	150	150
Hydrogen Sulphide	Any	10	10
Sulphur oxides	Sulfuric acids/sulfuric acid plants Other plants	400 400	5000 1700
Lead	Any	50	50
Mercury	Any	10	10
Cadmium	Any	20	20
Arsenic	Any	20	20
Copper	Any	50	50
Antimony	20	20	20
Zinc	Any	200	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit Gas Fired Oil Fired Coal Fired	400 400	400 400 600 1200

WHO Guideline Values for Community Noise in Specific Environment

Specific Environment	LA eq (dB)	LAmax Fast (db)
Out door living area	55	
School class rooms and pre-schools (indoor)	35	
School Playground (outdoors)	35	
Hospitals Ward rooms (indoor	30 30	40
Hospital Treatment rooms (indoors)	#1	
Industrial, commercial, shopping and traffic areas (indoors and out doors)	70	110

#1= as low as Possible

WHO Drinking Water Quality Standards

Sr. No.	Constituent, mg/L	Recommended limit (1961 European)
1	Ammonia	0.5
2	Chlorides	350
3	Copper	0.05[a]
4	Flourides	1.5
5	Iron	0.1
6	Magnesium [b]	125[b]
7	Nitrates	50
8	Oxygen	5.0
9	Phenols	0.001
10	Sulphates	250
11	Zinc	5.0

a Maybe higher for new piping
b if 250mg/L SO_4 is present, Mg not to exceed 30mg/L

ANNEXURE – III

ENVIRONMENTAL MANAGEMENT PLAN

ENVIRONMENTAL MANAGEMENT PLAN for Zhob-Mughalkot N-50 Section

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A DESIGN AND PRE-CONSTRUCTION PHASE								
A.1 ALIGNMENT AND SHOULDER WIDTH OPTIONS								
A.1.1 Formation width in built-up areas	Hindrance of market opportunities, loading and vending activities	In built-up areas, consider widening on either side with minimum impacts on the built-up properties, Incorporate technical design features that allows flexible shoulder width near settlements, Explore the incorporation of additional parking lots and bus bays in market areas		Possibly only in few built-up areas; in towns - ditto -	throughout project life		Technical Design Engineer	
A.1.2 Land acquisition	Loss of homes, assets and land	Follow the existing road alignment with all construction activities confined within available ROW limits to fully avoid land acquisition. For clearance of encroachments prepare Resettlement Plan and provide compensation for all affected assets.		In built-up & crop lands	observe prescribed notification		Designer Resettlement Expert	
A.2 SAFETY								

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.2.1. Design highway to standards with special reference to local dangers	Uneasy traffic flow, Hazardous driving conditions due to slope instability/ rock fall in hilly areas, congestion and accident hazards nearby settlements and livestock crossing points along the project route.	Provide markings for centre and edge lines and stop lines at junctions, bus stops, Include bus, taxi and rickshaw bays in built-up areas Warning signage where landslide/rock fall occur Give due consideration (traffic signage) to areas where livestock / camels are crossing		Applies particularly for areas in settlements on entire alignment and the hilly tracts	throughout project life		Technical Design Engineer	
A.3 STRUCTURES								
A.3.1. Location in area with strong sheet and flash flow risks	Flash flows may damage structures or cause drainage problems in urban areas	Adequately design cross-sections of drainage structures based on hydraulic studies, taking regional/local lessons learned into consideration Protective measures against scour problems at bridges and culverts (gabions at abutments, retaining- and wingwalls, aprons for culverts); In built-up areas, provide sufficient sizing of drains with control measures to reduce flow velocity. All structures will be constructed with reasonable safety against seismic acceleration		throughout Project Corridor	throughout project life		Technical Design Engineer - ditto - - ditto - - ditto -	

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.3.2. Location in area with strong seismicity	Seismic activities may damage structures	Adequately design all structures based on material/construction studies that take into account activities up to the seismic scales indicated in the seismicity maps. Seismic loads for bridges to be computed in accordance to Draft Seismic Code of Pakistan. In consultation with local authorities, contingency planning measures for rapid remedial reconstruction of structures in case of seismic or other natural disasters (e.g. earthquake or extraordinary floods).		throughout Project Corridor	throughout project life		Technical Design Engineer NHA/ Maintenance and Local Authorities	
A.4 ROADSIDE VEGTATION AND ECOLOGICAL RESOURCE BASE OF THE AREA								
A.4.1. Loss of roadside vegetation due to widening formation	Loss of plants in an area with already scarce biodiversity, and loss of functional benefits from roadside plants	Incorporate technical design to minimize removal of roadside plantation Apply flexibility in decision as which side to be widened, or in reducing locally the shoulder width Plan for compensatory planting for each felled, 2 plants of similar floral function Disallow introduction of exotic species or species with known environmental setbacks.		entire alignment *in situ* planning decision - ditto – all along alignment	throughout project life	NHA roadside plantation budget	Technical Design Engineer NHA / Planning and Design - ditto - - ditto -	

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.4.2. Distur-bance to ecological sensitive areas near highway	Traffic accidents with wildlife, particularly mi-gratory birds and night-active predatory mammals	Incorporate cautionary signage to raise attention of road users for wildlife crossing in areas at risk Assist in public awareness programs where applicable, e.g. planning of wildlife information signboards		All along alignment, specifically near sections or areas of Wild life crossing.	throughout project life	Included in the O&M budget of the EMP	Technical Design Engineer	
A.5 MAINTAINING AIR QUALITY AND NOISE LEVELS								
A.5.1. Increase of traffic intensity	Increase of air and noise pollution and associated health risks for roadside residents	Incorporate technical design features that enable continual traffic flux and avoid congestions (e.g. signboards, speed limits, speed bumpers, bays); Include design measures to prevent blockage of carriageways by road side vendors, particularly in the vicinity of local market places. Consider noise barriers in sensitive areas		at towns and villages - ditto - mosques, schools	throughout project life		Technical Design Engineer - ditto - - ditto -	
A.5.2. Creation and burning of wastes at or near camp site	Air pollution associated with burning garbage	Planning for burning sites in due distance to human settlements Disallow siting for work camps, including waste dump sites, in distances closer than 1 km to any inhabited areas; Incorporate technical design features for refuse collection containers at sites that would minimize burning impacts; Devise plan for safe handling, storage and disposal of harmful materials.	include include include	Pertaining to settlement areas only at prospective campsite - ditto -	During construc-tion		NHA , in bid documents NHA , in bid documents Design Consultant - ditto ´-	NHA/ Env. Dept. - ditto - - ditto - - ditto -
A.6 SOIL AND BORROW MATERIAL								
A.6.1. Excavation of earth from borrow areas	Change of edaphic characteristics; loss of topsoil; impact on agriculture	Agricultural areas will be avoided for borrowing of materials, unless requested by the landowner for lowering the land to create new irrigation polders Contractor needs to obtain approval from SC/ENV for excavation and for plan of rehabilitating the site after excavation.	include include	Borrow areas at/near agriculture and irrigation areas	Long-lasting conse-quences		NHA , in bid documents NHA , in bid documents	NHA/ Env. Dept. - ditto -

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
A.6.2. Acquisition of conglome-rate and rocky sub-base material	Degradation of existing river beds, alteration of surface and groundwater regime, land-use conflicts	Excavation in farmlands and at river sites close to settlements will be prohibited. Instead, explorations of nullahs in the uninhabited desert lands are recommended for sand borrow. Maximum use of existing quarries for conglomerates from approved and formerly used quarry sites Lands could also be selected through community consultation, which could subsequently be developed into fishponds or other productive purposes.	include include include	At all agri-cultural sites and Zhob River in close vicinity to Zhob t.b.d t.b.d.	Long-lasting consequen-ces		NHA , in bid documents NHA , in bid documents Design Consultant / Sociologist	NHA/ Env. Dept. - ditto - NHA/ Env. Dept.
A.7 UTILITIES								
A.7.1. Public utilities	Public utilities to be affected may create disrupt-ion of public services and economics	Timely notifications and consultations with respective agencies; All public utilities (e.g. water pipes, power/ telephone lines, OFC likely to be impacted by the carriageway widening need be re-located well ahead to works commencement.	include	To be checked all along the project corridor	None, if timely organized and implemen-ted	GOP	NHA to notify all concerned line agencies	Respective depart-ments of NHA
A.8 CULTURAL HERITAGE								
A.8.1. Cultural properties	Impacts on mosques, shrines, madrasas graveyards and archaeological sites	Widening activities avoid any interference with cultural heritage sites. In case of unavoidable interference prior notification and consultation for consensus on procedures and options (e.g. relocation/re-building) or any other form of agreed compensation.	include include	To be checked all along the project corridor	At planning stage	Included in Meeting Budget of EMP	NHA , in bid documents Design Consultant / Sociologist	NHA/EALS NHA/ EALS

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B CONSTRUCTION PHASE								
B.1 CAMP SITE								
B.1.1. Site selection	Acceptability to public/owner; interferences	Contractor need obtain clearance permit for siting work camps, stack yards & workshop, Contractor must present to RE a copy of the agreement made with the landowner, Layout plan for camp site, to be approved by the SC/ENV indicating space allocation for areas including, office, laboratories/workshops, residential, equipment/machinery and construction material yards and waste collection, treatment and disposal facilities	include include include		at selection stage for Camp Sites	at Contractor's cost	Contractor Contractor Contractor	SC and NHA/ EALS SC/ ENV SC / EVN NHA/ EALS
B.1.2. Site clearing and preparation, and re-installation works after contract completion	Loss of vegetation and assets on the selected land, and dissatisfaction on rehabilitation measures after completion	Site Specific Environmental Management plan for establishment and decommissioning of the camp site by contractor approved by SC/ENV Avoid removal of existing grown trees at camp sites, and contractor to furnish photographical and botanical inventory and plan for vegetation removal & rehabilitation at campsite Plantation of 2 new trees as compensatory plantation near end of construction works,	include include include	at prospective Camp Sites - ditto – - ditto –	while establishing Camp Sites	All at Contractor's cost	Contractor Contractor Contractor	SC/ENV/RE NHA/ EALS SC/ENV/RE NHA/ EALS SC/ENV/RE/ NHA/ EALS
B.1.3. Sanitation & waste disposal facilities at camps	Health risks to work force and public if not properly managed	The Contractor will provide a proper waste management plan for all solid and liquid wastes approved by SC/Env. Sewage treatment facility will be designed (pit latrines or, as required, septic tanks) and located to ensure that no water pollution takes place. Lined repair and maintenance areas/workshops and wash areas will be constructed within the camp site or at site approved by the SC/RE, for the receipt of waste oil/lubricant storage and control of pollution from wash waters from construction machinery.	include include include include	At all solid and liquid waste collection and latrine sites of camps	throughout operation of work camps	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV/RE SC/ENV RE

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.1.4. Camp site security	Security hazards and related conflicts	Proper storage and fencing/locking of storage rooms containing hazardous material Employment of guard for storage rooms. Provision of adequate security against sabotage, petrol pilfering and theft.	include include include	at Construction camp locations	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.1.5. Work safety and hygienic conditions	Health risks if living facilities provide unsafe and/or unfavorable conditions	Provision of adequate sanitation, washing, cooking. and dormitory facilities including light up to satisfaction approved by the SC; regular pest control measures in dormitories Obligatory warning of work staff if pest hazard is imminent or detected;		valid for entire construction area Throughout operation of work camps	throughout construction period - ditto -	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV
B.2 CONSTRUCTION WORKS								
B.2.1. Work safety and hygienic conditions	Health risks if work conditions provide unsafe and/or unfavorable work conditions	Obligatory insurance against accidents to work labourers Providing basic medical training to specified work staff, and basic medical service and supplies to workers Protection devices (ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines		valid for entire construction area Throughout operation of work camps	throughout construction period - ditto -	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV
B.2.2. Wages and Work Regulations	Inequities in wages, underpayment and gender-biased wages	The Contractors will agree to pre-defined minimum wages Women must receive wages equal to the wage paid to men for equal works Wages shall be made public to all labourers Child labour will be strictly ruled out; Contractor has to respect local festivals and religious customs that may interfere with work performance temporarily; Sub-Contractors have to adhere to the same wage principles	include include include include include include	at all Construction sites	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV SC/ENV/RE SC/ENV/RE SC/ENV

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.2.3. Storage, handling, transport of hazardous construction materials	Work safety and human health risks	Provision and ensuring use of protective clothing for labourers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.	include	at all Construction sites	throughout construction period	all to be borne by Contractor	Contractor Contractor	SC/ENV/RE SC/ENV/RE
B.2.4. Creation of construction waste material	Contamination of soil from construction wastes and quarry materials and landscape change	All spoils will be collected stored disposed off as approved by SC/ENV and landscape will be restored back near to its original conditions before handing over. Non-bituminous wastes from construction activities will be dumped in sites approved by the SC/ENV/RE, in line with the legal prescriptions for dumpsites, and covered with a layer of the conserved topsoil.	include include include	All construction sites and entire project area	During construction	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV
B.2.5. Movement of vehicles in the con-struction site and along the haulage routes	Soil compaction and alteration of percolation and vegetation pattern; Damage to properties and utilities	Construction vehicles, machinery and equipment will move, or be stationed in the designated ROW, to avoid unnecessary compaction of soil. Damages will be instantly repaired and/or compensated at Contractor's obligation Water and soil quality will be monitored as envisaged in the Environmental Monitoring Plan	include include	throughout Project Corridor	During construction at defined schedule	borne bv Contractor Monitoring budget of EMP	Contractor Contractor SC/ENV	SC/ENV/RE SC/ENV/RE EPA

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.2.6. Movement, maintenance and fuelling of construction vehicles	Contamination of soil and groundwater from fuel and lubricants	Construction vehicles and equipment will be properly maintained and refuelled in such way that oil/diesel spillage does not contaminate the soil. Fuel storage and refuelling sites will be kept away from drainage channels. Oil and grease traps will be provided at fuelling locations, to prevent contamination of water. Unusable debris shall be dumped in nearest landfill sites. Waste oil and oil soaked cotton/ cloth shall be sold off to authorized vendors Water quality will be monitored as envisaged in the Environmental Monitoring Plan	include include include include include	At all perennial river bed crossings at all work sites - ditto - - ditto -	During construction at defined schedule	Engineering Cost to be borne by Contractor - ditto - - ditto - - ditto -	Contractor Contractor Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV SC/ENV/RE SC/ENV SC/ENV
B.2.7. Embankment works: Excavation of earth, cutting operations, embanking, clearing of vegetations	Soil Erosion, Loss of vegetation and habitat	Stone pitching and retaining walls will be made at high embankments in critical areas (> 40% gradient) As applicable and needed, plantation of grasses and shrubs will be done for slope protection. Soil erosion checking measures such as the formation of sediment basins, slope drains, etc, will be carried out. Soil erosion along the road shall be visually checked as given in the environmental monitoring plan.	include include include include	At all sites where high embankments are required, e.g. near bridges	During construction - ditto . - ditto . Construction/ operation stage	Engineering Cost Engineering Cost Engineering Cost Engineering /Maintinanc e Cost	Contractor Contractor Contractor Contractor/ NHA maintenance	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.2.8. Procurement of construction materials	Soil erosion, change of hydraulic patterns and landscape degradation following unauthorized use of quarries & borrow areas	No productive land or land adjacent to agricultural / irrigated land will be used Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference as been recommended for borrowing materials; Aggregate required for road construction procured from quarries need approval from NHA.	include include include	Quarries and borrow areas	During the construction phase		Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.2.9. Borrow pit land lease agreement	Land disputes, Soil erosion, loss of potential crop land, loss of vegetation and landscape degradation	The Contractor must obtain any necessary permits for borrow pits from the competent authorities, including NHA The Contractor must present a copy of the agreement made with the landowner to the SC/ENV; The Contractor will Prepare Site Specific Environmental Management Plan including bio-physical inventory of the site with photographic documentation, and present it to the SC/ENV for review and approval; This documentation will be used as criteria for the rehabilitation obligations agreed.	include include include	All borrow sites in entire project area	During construction Before starting borrow excavation Upon com-pletion of excavation	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE EPA, SC/ENV
B.2.10. Borrow pit excavation activities	Soil Erosion, damage to road embankment and public health risks	No excavations are allowed within distance of 100 m to ROW In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1: 4. Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands. In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites.	include include include include	All borrow sites in entire project area	During borrow Upon com-pletion of excavation	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE EPA, SC/ENV
B.2.11. Provisions for	Soil Erosion, derelict land-uses,	Abandoning borrow areas without proper rehabilitation measures will be disallowed.	include	All borrow sites in entire	Upon com-pletion of	all to be	Contractor	SC/ENV/RE

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
rehabilitation of borrow pit	conflicts, visual sores in the landscape,	The Contractor's agreement with the landowner in case of privately owned land or state waste land must determine the options and appropriate measures for rehabilitation of the borrow pit as per approved SSEMP by the SC/ENV including replantation aiming at double amount of trees removed from the site.	include	project area	excavation - ditto -	borne by Contractor	Contractor	EPA, SC/ENV
B.3 WATER								
B.3.1. Use of water for construction and consumption	Conflict with local water demand	The contractor will make arrangements for water required for construction in such a way that the water availability and supply to nearby communities remain unaffected. For construction purposes, water shall be drawn from surface water bodies on priority and as available.	include include	Throughout Project Area	During construction	all to be borne by Contractor	Contractor Contractor	SC/ENV SC/ENV
B.3.2. Spillage of liquid wastes	Risk of polluting surface and groundwater from liquid waste spillage, drainage and run-off from construction sites	Application of good engineering and construction practice The contractor shall ensure that construction debris do not find their way into the minor drainage channels which may get clogged. Work on river banks will be kept to a minimum with retaining walls constructed Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond	include include include include	Throughout Project Road Near settlements throughout area with surface waters	During construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV SC/ENV SC/ENV/RE
B.3.3. Earth- and stone-work, other construction activities affecting water resources	Contamination of water due to construction waste	Construction work close to the streams or other water bodies will be avoided, especially during monsoon period. Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation Wastes must be collected, stored and taken to approved disposal site.	Include include include	Throughout Project Road	During construction At approved dump site	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.3.4. Earth- and stone-work, in hill cuts requiring blasting	Uncontrolled explosions can trigger landslides and affect hydraulic regime	Pre-blasting geological, geomorphologic and hydrological studies Application of good engineering and construction practice, particularly while defining doses for explosives with due consultation with experts Small iterative blasts at shorter distances instead of few massive loads, and blasting from top to bottom of hill. All conditions stipulated by concerned authorities in explosive use permits need to be complied with in toto.	include include include include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.3.5. Use of explosives for hill cuts	Safety hazards to workers, and passers-by; Uncontrolled triggering with accident consequences	Application of good engineering and construction practice, particularly while preparing for explosion, i.e. securing wider area, optical and acoustical warning signs; Provision of protective equipment for workers Elaboration of contingency plan, including the stand-by of first aid equipment and heavy dozers.	include include include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE
B.3.6. Surplus of hill cut rocks	Surplus hill cut rocks, can block or alter waterways and contribute to gully erosion	Contractor needs submit a plan for using and/or proper disposal of surplus material in a way to prevent contamination and blockage of surface waters as well as dumping of this excess material in river valleys or in designated forest areas. Site Specific Environmental management plan prepared by contractor, approved by SC/ENV will include rock cutting and slope stabilization methodologies, impact and mitigation measures and management/ disposal of the cut rock for subsequent monitoring by SC/ENV during construction phase.	include	At prospective blasting sites	as applicable, during construction	all to be borne by Contractor all to be borne by Contractor	Contractor	SC/ENV/RE
B.4 AIR POLLUTION CONTROL								

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.4.1. Vehicular movement and running of machineries	Emission from construction vehicles and machinery, causing public health risks, nuisance and other impacts on the bio-physical environment	To avoid congestions and traffic blockade Traffic Management Plan for both public traffic and construction machinery will be prepared by Contractor and approved by the SC/ENV and will be monitored during construction. All temporary service and access roads will be regularly water-sprayed to minimize the dust generation: Schedules will be adjust-ted to actual needs, determined by the SC All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the pollution emission levels conform to the NEQS. Air quality parameters will be monitored at determined sites and schedule determined by the SC/ENV, Vehicles delivering hot mix asphalt shall be covered to control emission of fumes along the road.	include include include include include	all diversions in populated areas at workshops of Contractor t.b.d. e.g. 5 locations	throughout construction period	to be borne by Contractor - ditto - - ditto - - ditto - - ditto - Monitoring budget of EMP	Contractor Contractor Contractor Contractor Contractor approved monitoring agency	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV SC/ENV
B.4.2. Running of asphalt mix plants, crushers, etc.,	Dust generation from construction machineries causing health risks to operating workers, impact on bio-physical environment	All machinery and plants will be placed at min. 1 km at downwind direction to human settlements. Ensure proper control measures to reduce the level of dust emissions from, hot mix plants, crushers and batching plants Work safety measures like dust masks shall be taken by the contractor to ensure no health risks for operators	include include include	at sites of hot mix plant	throughout construction period	All to be borne by Contractor	Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.4.3. 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	Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on existing road. Ambient air quality monitoring will be carried out in accordance to the Environmental Monitoring Plan; Once the monitored parameters are above the prescribed NEQS-limits suitable control measures must be taken.	include include include	Throughout Project Road Construction sites near the major settlements	During construction	Engineering Cost Monitoring budget of EMP	Contractor Contractor through approved monitoring agency	SC/ENV/RE SC/ENV SC/ENV
B.5 NOISE CONTROL								
B.5.1. Running of construction machinery	Noise from vehicles, asphalt plants and equipment	The plants and equipment used for construction will strictly conform to noise standards specified in the NEQS. Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained. Nearby settlements construction activities will be restricted between 6 a.m. and 08 p.m. Hedges as noise barriers in sensitive areas (in front of schools, hospitals, mosques etc). In accordance with the Environmental Monitoring Plan noise measurements will be carried out at locations and schedule specified by the SC/ENV to ensure the effectiveness of mitigation measures.	include include include include include	At hot mix plant, batching plants & Construction sites Built-up areas Schools along the length of project road Monitoring near villages/ settlements etc.	During construction	all to be borne by Contractor	Contractor Contractor Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV/RE SC/ENV/RE SC/ENV

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.6 FAUNA AND FLORA								
B.6.1. Access to sensitive areas and fragile ecosystem	Poaching on wildlife, collecting wild plants, disturbance of ecosystem	Felling of trees or plants for collection of fire wood for cooking and execution of works will be prohibited No open fires will be allowed Restoration of vegetated areas damaged Strict instructions from the Contractor to work staff (particularly the cooks) with respect to poaching local wildlife	include include include include	Near sensitive areas described in the IEE, e.g Takatu Mountain Range	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV SC/ENV SC/ENV
B.7 ROAD SAFETY AND COMMUNITY LIFE								
B.7.1. Vehicular movement at construction sites and access/service roads	Accident risks, particularly inflicting local communities who are not familiar with presence of heavy equip-ment	Timely public notification on planned construction works. Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity & social links as well as for road safety campaigns Provision of proper safety signage at sensitive/accident-prone spots. Setting up speed limits in close consultation with the local stakeholders	include include include include	Throughout Project Road, particularly near the settlements and sensitive locations (schools, health centres, etc)	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor Contractor	SC/ENV/RE SC/ENV/RE SC/ENV/RE SC/ENV/RE

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.7.2. Risks associated with construction activities	Accident and health risks	Ensure safety code for work staff is observed, ensuring the provision and wearing of safety equipment required for specific works.	include	at all Project work sites	throughout construction period	all to be borne by Contractor	Contractor	SC/ENV
		A readily available and updated first aid unit including an adequate supply of dressing materials and a staff with basic medical knowledge at every constructions site.	include				Contractor	SC/ENV
		Elaboration of a contingency planning in case of major accidents	include				Contractor	SC/ENV/RE
		Adequate signage, lightning devices, barriers and persons with flags during construction to manage traffic at construction sites, haulage and access roads.	include				Contractor	SC/ENV
		Road safety education will be divulged to drivers operating construction vehicles	include				Contractor	SC/ENV/RE
B.8 SOCIAL BALANCE AND PUBLIC RELATIONS								
B.8.1. Cultural differences between contractor and locals	Locals may resist Contractors attitudes; Cultural clashes particularly when international contractors are engaged	Timely and full public consultation and announcement of mobilizing equipment	include	entire Project Area	throughout construction period	all to be borne by Contractor	Contractor, in close consultation with Local Authorities	SC/ENV/RE
		Establishment of formal links with affected communities,	include					SC/ENV/RE
		Plan for social grievance redress mechanisms including the local administration and community leaders.	include					SC/ENV
B.8.2. Conflicts arising due to the mix of local & migratory job seekers	Social disturbance and dissatisfaction with employing outsiders	Familiarize outside labourers on local etiquettes (e.g. chadar and purdah)	Include,	town areas	From early construction period until operation commences	all to be borne by Contractor	Contractor	SC/ENV/RE
		Aim at obliging the contractors to employ local community (unskilled) labour for construction works;	include				Contractor	SC/ENV/RE
		An agreed minimum unskilled labour and employment rate for women, at equal pay like men, will be negotiated at early stage.	include					

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
B.8.3. Human Trafficking and HIV/AIDS	Conflicts related to smuggling, transmissible diseases and trafficking	Establish mechanisms to settle conflicts at early stage Enforce/support enforcement of drug control and anti smuggling laws Awareness and Training of contractor staff on HIV/AIDS and human trafficking. Assist to public awareness programs as applicable, by contacting/collaborating with locally community.	include include include	throughout entire project area, particularly at truck stops/hotels	throughout construction period	all to be borne by Contractor	BPG Police NGOs / CBOs	SC/ENV/RE SC/ENV SC/ENV
B.8.4. Use of local resources and products	Competition for natural resources e.g. with farmers livestock raisers and nomads for range lands	Water supply and sanitation facilities will not exacerbate the existing shortages and environmental hazards; Contractors should primarily seek their own sources of water in due distance (min. 1 km) from local user's wells. Ensure labour forces do not exploit adjacent forest resources without written permit from forest owners or local community leaders.	include include include	agricultural area with tubewell irrigation	throughout construction period	all to be borne by Contractor	Contractor Contractor Contractor	SC/ENV SC/ENV SC/ENV
B.9 ARCHAEOLOGICAL SITES								
B.9.1. Encountering archaeological sites during earth works	Impacts of historically important sites and damage to fossils, artefacts, tombs, structure etc, as defined in 1975 Antiques Act	In case of detecting any archaeological artefact, structure, tomb etc., the Contractor needs immediately halt all works at the find site and immediately inform the SC and EA of the fact. SC (ENV) through NHA will inform within shortest time to Archaeological Department in Quetta/Karachi. In the event of such finding, the Contractor has the duty to secure the site against any intrusion until the archaeological expert will decide on further action.	include Include, refer to Antiques Act 1975	throughout entire project area, including borrow sites	throughout construction period	all to be borne by Contractor	Contractor SC/ENV/ NHA Contractor	SC/ENV/RE MoC SC/ENV/RE
C OPERATION PHASE								
C.1 WATER AND SOILS								

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C.1.1. Drainage of runoff from roads into water bodies	Water Pollution from storm waters containing hazardous substances	All drainage channels/facilities kept clean and operational. Water quality monitoring of receiving water bodies will be carried out during operation phase at schedule approved by the SC/ENV If monitored parameters are above the prescribed limit, suitable control measures will be taken		Throughout Project Area	at schedule defined in the monitoring plan	Monitoring budget of EMP	SC/ENV[4] together with approved laboratory	NHA/ED
	Congestion of drainage structures near settlements	Ensure proper cleaning scheme for keeping drainage structures clear of debris and blockage		In all built-up areas	as required		Town Committee Local authorities	
C.1.2. Vehicular movement	Contamination from spills due to traffic and accidents	The spills at the accident sites will be cleared immediately and disposed off properly		throughout Project Area	as incident happening		NHA	NHA/ED
C.2 AMBIENT AIR QUALITY								
C.2.1. Vehicular movement	Emission from vehicular traffic causing public health risks, nuisance and other impacts on the bio-physical environment	Roadside tree plantations as applicable and feasible under harsh climatic conditions; plants should be selected in accordance to their ability to absorb emissions Regular road maintenance to ensure good surface condition Speed limits at sensitive locations Regular vehicle check to control/ensure compliance with NEQS Enforcement and penalties against traffic rules violators		Where applicable - ditto - Near Zhob sensitive spots	schedule as per NHA roadside plantation scheme at schedule defined in the monito-ring plan	included in Project Costs Monitoring budget of EMP	Afforestat-ion Wing/ NHA NHA Highway Police/EPA Highway Police/ NHA	EALS/NHA

[4] **responsible only until termination of Supervision Contract**

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C.3 NOISE LEVEL AND VIBRATIONS								
C.3.1. Vehicular movement	Traffic-related noise pollution and vibrations from engines, tires and use of (pressure) horns	Noise measurements will be carried out at locations and schedule specified by the EALS to ensure the effectiveness of mitigation measures, e.g speed limits and noise control plantations at sensitive spots. According to monitoring results, additional soft sound barriers in form of trees and hedges will be discussed with the affected pubic and planted if agreed Signs for sensitive zones (health centers / educational institutions etc.) will to disallow the use of pressure horns; Enforcement and penalties against traffic rules violators		Monitoring at specified location as applicable at sensitive spots - ditto - - ditto -	at schedule defined in the monitoring plan as needed as needed regularly	Monitoring budget of EMP	DD ENV NHA Afforestat-ion Wing/ NHA Highway Police/ NHA	EALS/NHA EALS/NHA
C.4 FAUNA AND FLORA								
C.4.1. Vehicular movement	Accidents with wildlife	Provision of proper safety signage and. display of signboards alerting drivers' attention on wildlife and environmental issues related to safe driving and wildlife encounters. Special awareness campaigns about wild life protection with help of concerned authorities and local community		Along the road near sensitive areas. Awareness Compaigns/workshop events	Operation Stage	O & M budget of EMP	SC/ENV/ NHA DD/ENV	EALS/NHA EALS/NHA

Activities and Actions	Environmental Issue/ Component	Proposed Mitigation Measures	Reference to Contract Document	Approximate Location	Timeframe	Mitigation Budget	Institutional Responsibility	
							Implementation	Supervision
C.4.2. Roadside Plantation	Maintenance of Flora	Monitoring of survival of trees at the rate of 75 % should be done in the first year of the operation phase and suitable mitigation measures should be taken to protect the trees Efforts will be made for proper maintenance of planted trees, shrubs and grasses to maintain greenery and aesthetics		Throughout Project Road	Operation Stage	O & M budget of EMP NHA roadside plantation	Afforestat-ion Wing/DD ENV/NHA NHA Maintenance	EALS/NHA
C.5 ROAD SAFETY								
C.5.1. Vehicular movement	Accidents involving hazardous materials	In case of spillage, the report to relevant departments will be made. Efforts will be made to clean the spills of oil, toxic chemicals etc. as early as possible.		at any location such accident occurs	Operation Stage	to be borne by perpetrator	NHA Maintenance Local Authorities	
C.5.2. Vehicular movement	General road safety issues	Traffic and ROW management to avoid encroachments adjacent to shoulders within safety zone along settlements Traffic control measures including speed limits will be enforced		throughout Project road	Operation stage	NHA budget	NHA Maintenance Highway Police/ NHA	
C.6 SOCIAL AND ECONOMIC DEVELOPMENT								
C.6.1. Increase in facilities, mobility, access, and shipment of goods	Impacts related to desired and undesired development following road sector projects	Control of encroachment and ribbon development along improved highway Control and enforcement against smuggling and other crimes		Throughout Project road	Operation stage	included in monitoring costs	NHA Maintenance Highway Police & Local law enforcing Agencies	

Abbreviations: NHA = National Highway Authority
EALS = Environment Afforestation Land and Social
SC = Supervision Consultant
ENV = Environmental Expert, contracted by Supervision Consultant
RE = Resident Engineer, contracted by SC.

ANNEXURE – IV

DETAILS OF PUBLIC CONSULTATIONS

Locations	# Participants		Issues Raised	Action Taken/Proposed
	Male	Female[5]		
Kiosks and road side vendors & Shopkeepers at Kili Hasan Zai.	10	0	- Big influx of transport, more economic opportunities. - Temporary Disruption of livelihoods due to road expansion. - Impacts on health during construction due to dust and pollution caused by construction machinery & visitors. - Social issue due to outside labour during construction.	- Loss of livelihood will be compensated and employment opportunities will be explored for local affected population. - During construction proper sprinkling of water will be carried out at construction sites to and construction machinery will be kept in good working condition to control pollution. - Awareness program being proposed.
Orchard Owners and local population at Kili Taki.	13		- Loss of assets and fruit trees due to widening of road. - Drainage issues during construction phase. - Resource (water) exploitation leading to limited supply to locals. - Increase in accidents due to increased number of construction vehicle and increased speed limits during operation.	- Due care will be ensured to avoid loss of assets and if any, it will be compensated adequately. - The natural drainage of the area will be ensured throughout construction phase and cross drainage structures are included in design. - Local water supplies will be ensured and contractor will make its own water arrangements away from community resources for construction purposes. - Measure like speed limits, traffic signage are included in design while during construction flag mans will be deputed near construction sites and haulage routes for traffic control to avoid accidents.
Truck Drivers at Manikhawa	05	0	- High rate of accidents in over-takings due to narrow road, sharp pavement edges & rough surface. - Excessively high return trip time	- The proposed improvement will cater the safety and security of road users with decreased number of accidents. - Improved road with improved speed limits is

[5] Due to Socio-cultural norms of project area the women did not participated in road side consultation.

Locations	# Participants		Issues Raised	Action Taken/Proposed
	Male	Female[5]		
			leading to loss of time. - High wear & tear and extra fuel consumption. - Interruption in traffic flow and inconvenience due to lack of traffic management & lack of alternative crossings during construction.	likely to reduce return trip timings, reduced cost of maintenance & fuel savings. - Better road surface will minimize the tier and weir of the vehicles. with and remove - Diversions will be provided and proper traffic management plan will be prepared prior to start of construction work.
Local population at Manikhawa and Narowask	07	0	- Loss of assets, livelihood sources and business opportunities. - Air pollution from including dust and emissions from asphalt plant and other construction machinery like haulage trucks other moving vehicles. - Disturbance due to traffic noise & vibrations. - Social conflicts due to presence of outside labour.	- Land acquisition will be avoided at all costs and the affected assets located within ROW will be fully compensated at replacement cost. - The Asphalt plant or any machinery producing pollution at source will be installed at a distance of 1 Km from any nearby settlement. While proper water sprinkling will be ensured on construction site and haulage routes. - During construction contractor will ensure that silencers are properly installed on construction machinery to minimize the noise levels and Night time work will be prohibited. - The camp sites will be established at a distance of 1 Km from nearby settlement and hiring of local labour will be promoted. - A prompt system for land compensation as per market rates in a transparent manner.

ANNEXURE – V

List of Participants of Consultations

FOCUS GROUP DISCUSSION (N-50) PROJECT AT KILLI HASAN ZAI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE/LOCATION**
1.	Gulab Khan	Lal Baig	Killi Hasan Zai, Zhob District.
2.	Khaliq Dad	Haji Jahan Dad	Killi Hasan Zai, Zhob District.
3.	Paindai	Haji Baik	Killi Hasan Zai, Zhob District.
4.	Sultan	Ghulam	Killi Hasan Zai, Zhob District.
5.	Muhammad Aiyaz	Mushoo	Killi Hasan Zai, Zhob District.
6.	Ghulam Rasool	Balo Khan	Killi Hasan Zai, Zhob District.
7.	Abdul Haleem	Abbas Khan	Killi Hasan Zai, Zhob District.
8.	Abdul Ghaffar	Haji Zareef	Killi Hasan Zai, Zhob District.
9.	Ghulam Shah	Sahib Jan	Killi Hasan Zai, Zhob District.
10.	Sharbat Khan	Muhammad Sadique	Killi Hasan Zai, Zhob District.

FOCUS GROUP DISCUSSION (N-50) PROJECT AT TAKAI KILLI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE**
1.	Dolat Khan	Lal Baig	Killi Takai, Zhob District
2.	Misal Khan	Asal Khan	Killi Takai, Zhob District
3.	Abdul Razzaq	Mulakhtol	Killi Takai, Zhob District
4.	Hashim Khan	Murrad Khan	Killi Takai, Zhob District
5.	Sallah Muhammad	Baz Muhammad	Killi Takai, Zhob District
6.	Daweood Khan	Janan	Killi Takai, Zhob District
7.	Sardar Muhammad	Sabir	Killi Takai, Zhob District
8.	Abdul Rasheed	Abdul Ghani	Killi Takai, Zhob District
9.	Azeem Khan	Alam Khan	Killi Takai, Zhob District
10.	Muhammad Ali	Haidar	Killi Takai, Zhob District
11.	Asmat Ullah	Baz Muhammad	Killi Takai, Zhob District
12.	Abdul Raheem	Haji Hazrat Khan	Killi Takai, Zhob District
13.	Kamal Khan	Murad Khan	Killi Takai, Zhob District

FOCUS GROUP DISCUSSION (N-50) PROJECT AT TAKAI KILLI DATED 06th OCTOBER, 2013			
S.#	**NAME**	**FATHER/HUSBAND'S NAME**	**VILLAGE**
1.	Dina Khan	Painda Khan	Asoo Band Manikhawa , Shirani District
2.	Malik Mark Khan	Tarveez Khan	Manikhawa , Shirani District
3.	Allaudin	Umar Draz	Asoo Band Manikhawa , Shirani District
4.	Nazar Muhammad	Afzal Hayat	Asoo Band Manikhawa , Shirani District
5.	Khan	Nazar Khan	Narwask, Shirani District
6.	Muhammad Din	Khair Din	Narwask, Shirani District
7.	Muhammad Amin	Sardar Khan	Asoo Band Manikhawa , Shirani District

Consultation with Road Users/Truck owners			
S.#	**Driver/Owner Name**	**Vehicle No and Make**	**Destination**
1.	Zaib Khan	QE -3542, Truck	Traveling from DI Khan to Quetta
2.	Haidyatullah	KF – 5281 Truck	Traveling from Loralai to Peshawar
3.	Mosa Khan	QT – 2527, Truck	Traveling from Kan Mahterzai to Islamabad.
4.	Naseebullah Khan	KF – 3284, Truck	Traveling from Quetta to Peshawar.
5.	Aftab Khan	QT – 3304, Truck	Traveling from Quetta to Rawalpindi.

Consultation Held in April 2014

Subject: **MINUTES OF THE MEETING REGARDING PROJECT OF MUGHAL KOT TO ZHOB (-50)**

A meeting was held in the office of the undersigned on 03.04.2014 at 12:00 hours regarding the project of Widening and Rehabilitation of Mughal Kot to Zhob road (N-50). The meeting was chaired by the undersigned and the following attended the meeting:

1.	Mr. Waqar Ali Khan	D.C/PA FR D.I.Khan.
2.	Malik Mansoor Qaiser	Secretary: to Commissioner, DI Khan
3.	Mr. Farid Khan Marwat	DD (LM&IS)KPK, Region.
4.	Mr. Syed Ahmad Kamal.	AD (LM)ADB Projects.

Mr. Farid Khan Marwat, DD (LM&IS) KPK, Region briefed the participants of the meeting about the project and stated that NHA intended to execute the above mentioned project with the assistance of Asian Development Bank. The overall project is from Mughal Kot to Zhob (Baluchistan) out of which 8.5 km of the road from Mughal Kot to Daresar falls in the Frontier Region area of D.I.Khan. The NHA needs the co-operation of the local administration in execution of the project.

The D.C/P.A FR D.I.Khan was requested to provide full support in view of the overall law & order situation in the country.

Decisions:

The following decisions were unanimously made after a detailed discussion.

1. A committee will be notified to deal with the land compensation cases. The Committee will be headed by Assistant Political Agent and will include members from NHA, FR Administration as well as concerned tribal Maliks.
2. The D.C/P.A FR D.I.Khan directed APA, FR D.I.Khan to provide all kind of administrative support to NHA and the contractor on the site regarding security & logistics.

Political Agent/ D.C,
Dera Ismail Khan

1584/DC(FR) Dated 03/04/2014

CC:

1. Additional Chief Secretary FATA, TATA Secretariat Peshawar.
2. Commissioner, DI Khan Division, DI Khan.
3. General Manager, National Highway Authority EALS Wing, Islamabad.
4. General Manager, National Highway Authority Khyber Pakhtunkhwa, Peshawar.
5. All participants.

Political Agent/ D.C,
Dera Ismail Khan

Annexure B/

NAMES OF THE PARTICIPANTS PRESENT DURING THE CONSULTATION MEETING AT MUGHAL KOT FOR THE PROJECT OF ZHOB – MUGHAL KOT (N-50).

1. Malik Ayatullah Khan.
2. Malik Haji Metha Khan.
3. Sahar Gul Khan.
4. Haji Fazal Hussain.
5. Zaram Din.
6. Ismail Khan.
7. Hathi Khan.
8. Talib Noor.
9. Haji Jalal Khan.
10. Malik Rahmatullah.