

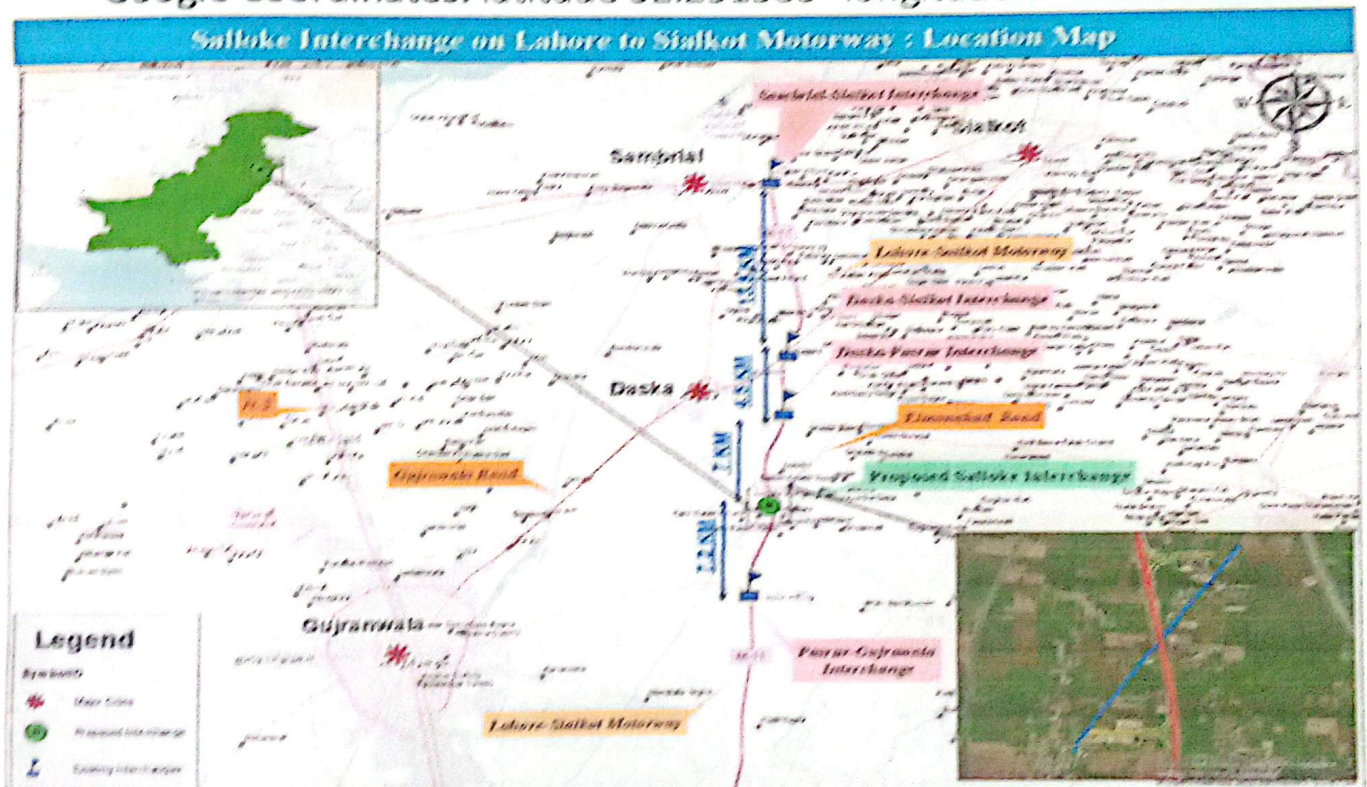
ENVIRONMENTAL IMPACT ASSESSMENT

REPORT (AUGUST-2023)

"SALLOKE INTERCHANGE AT LAHORE-SIALKOT MOTORWAY"

Eimanabad Road Salloke District Sialkot.

Google Coordinates: latitude 32.251583° longitude 74.391552°



DR. RUBINA KAUSAR
DEPUTY DIRECTOR (ENVIRONMENT)
(NATIONAL HIGHWAY AUTHORITY)
(PROPONENT)p
PREPARED BY:

M/S "Prime Engineering & Testing Consultants (Pvt.) Ltd."

Joint Venture with

M/S "GREEN GLOBE ASSOCIATES"

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LIST OF ANNEXES

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EXECUTIVE SUMMARY

Title of the Project:

The project under review is the "Environmental Impact Assessment (EIA) of an Interchange Named as Salloke Interchange at Lahore-Sialkot Motorway" District Sialkot.

Name of proponent and total cost of the project:

Mr. Rubina Kausar Deputy Director (Environment) NHA is a proponent of this project. The total cost is estimated as 1600.76 million Rupees.

Location of the project

The site of the project is located at Salloke Interchange at Lahore-Sialkot Motorway District Sialkot. If we talk about on GT road then it will be on Eiman Abad road at Salloke district Sialkot.

Name of the organization preparing the report:

The proposed site of the project was surveyed, keenly studied & EIA report prepared by M/s "Prime Engineering and Testing Consultant" joint venture with M/S "Green Globe Associates".

Purpose of Report:

The purpose of Report is to conduct Environmental Impact Assessment (EIA) for "Salloke Interchange at Lahore-Sialkot motorway" district Sialkot. The EIA is conducted under the Legal framework of Punjab Environmental Protection Act, 1997 & Review of IEE/EIA Regulations, 2000 to seek the Environmental Approval. In compliance with the applicable Environmental Regulations Establishment of any project, National Highway Authority (NHA) through Dr. Rubina Kausar, decided to get the Environmental Examination of the project. In order to fulfill the legal requirement of Punjab Environmental Protection (Amendment) Act 2012, Section 12; for obtaining No Objection Certificate from Environmental Protection Agency (EPA), Government of Punjab, Lahore, this Environmental Impact Assessment (EIA) Report is being submitted to the said agency. The EIA Report, as desired by EPA, has been prepared according to the prescribed by the "Guidelines for the preparation of Environmental Reports, 1997" and "Review of IEE/EIA Regulations, 2000"

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Outline of Project:

Proponent Name	Dr. Rubina Kausar Deputy Director (Environment) National Highway Authority 27-Mauve Area, Sector G-9/1, Islamabad. R/O Street#01, Area Samar Zaar Colony, Adyala Road Rawalpindi. (Proponent) "Salloke Interchange at Lahore-Sialkot Motorway" District Sialkot. CNIC# 37405-0554729-4
Project Title	"Salloke Interchange at Lahore-Sialkot Motorway"
Project Location	Lahore – Sialkot Motorway at Salloke District Sialkot.
Google Coordinates	latitude 32.251583° longitude 74.391552°
Consulting Firm	M/s "Prime Engineering and Testing Consultant" joint venture with M/s "Green Globe Associates".
Head Office	1 st floor Suite No. 23 Jamshaid Plaza, 100 Ferozepur Road Ichhra Lahore.
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Email id.	Greenglobeassociate@gmail.com
Category Falls in/Schedule	The project fall in Schedule II (List of projects requiring an EIA) D (5) Flyover, Underpass & bridges having total length of more than 500 meters.
Labor Required	Almost 500
Total time period required to construct an interchange	Almost 12 Months
Source of water	Ground Water
Nature of Area	Agricultural
State of Project	Lahore-Sialkot Motorway

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Overview

NHA aims to construct an interchange near Salloke connecting with Lahore-Sialkot Motorway or Eimanabad-Sialkot Road. Salloke & surrounding areas have to travel significant distances along either North to Daska Pasrur Interchange or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway M-11. This is because no direct link exists that connects the residents of Salloke and surrounding populated areas with LSM within close vicinity.

No interchange exists to cater to the village of Salloke and adjacent areas. Users commute via broken Eimanabad road and access Lahore Sialkot Motorway via Pasrur and Daska Interchanges. This direct route and interchange shall grant the locals direct and shorter access and in turn generate benefits in vehicle operating costs by reduction in wear and tear of tires and car maintenance costs due to better riding quality and shorter distances that these roads will offer to the commuters.

The Lahore-Sialkot Motorway, also known as M-11, is a critical transportation artery in Pakistan, linking the cities of Lahore and Sialkot. The motorway has significantly reduced the travel time between the two cities, boosting trade and economic activities in the region. However, with the increasing traffic volume on the motorway, there is a need for additional interchanges to improve the connectivity and as well as benefit the surrounding areas.

To address this need, a new interchange is being designed on the Eimanabad road near Salloke area. The location has been chosen strategically to provide convenient access to the motorway for the residents of near by towns and villages. The new interchange will not only reduce the traffic load on the existing interchange but

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also improve the overall traffic flow on the motorway. The project is an initiative of the Pakistan National Highway Authority (NHA). The construction of the interchange will create employment opportunities for the local population, and it is expected to have a positive impact on the local economy. In conclusion, the new interchange on the Lahore-Sialkot Motorway is a much-needed development that will improve connectivity in the region and promote economic growth. The project is a significant step towards enhancing Pakistan's transportation infrastructure and providing better facilities for the citizens.

ation:

be planted by keep in view the seasonal suitability of the area. Green belts will also be

es Considered & Reasons for their Rejection:

nd surrounding areas have to travel significant distances along either North to Daska Pasrur
nge or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway M-11.
ecause no direct link exists that connects the residents of Salloke and surrounding populated
th LSM within close vicinity. So, no alternatives sites were feasible or possible.

ject will also facilitate the people of the area with increasing the opportunity of employment
ners related facilities. Keeping these requirements and their feasibility and other basic
uctural requirements at the site, the selected site is ideally suited for construction of an
ange.

Legal and Administrative Framework

vironmental Impact Assessment (EIA) of Project enacts with a number of national legislations.
roposed project has assessed in compliance of existing legal framework on the environment in
an as described henceforth.

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National Conservation Strategy (NCS)

Biodiversity Action Plan

Environment related National Laws and Policies

Pakistan Environmental Protection Act, 1997

Punjab Environmental Protection (Amendment) Act, 2012

Environmental Protection Agency Review of IEE and EIA Regulations, 2000

National Environmental Quality Standards (NEQS), 2000

The Antiquities Act, 1975

The Motor Vehicles Ordinance, 1965, and Rules, 1969

The Factories Act, 1934

The Pakistan Penal Code, 1860

The Explosives Act, 1884

The Explosives Act, 1884

National Resettlement Policy and Ordinance

The Forestry Act, 1927

The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act, 1972

The Telegraphy Act, 1910

The West Pakistan Water and Power Act, 1958

Safety Regulations

Outline of the Project

Salloke and surrounding areas have to travel significant distances along either North to Daska Pasrur Interchange or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway M-11. This is because no direct link exists that connects the residents of Salloke and surrounding populated areas with LSM within close vicinity.

National Highways play an important role from regional perspective as they carry transit traffic from Pakistan to China, Iran, Afghanistan and Central Asia States and provide access to almost all parts of the country. Under this project National Highway Authority (NHA) has planned Construction of an Interchange on Lahore-Sialkot Motorway (LSM) at Salloke. The project is expected to benefit more than 10 million populations. Implementation of the project is envisaged to have the following objectives:

- ✓ To provide ease of transportation to the inhabitants of the Salloke and surrounding towns.
- ✓ To meet international design standards
- ✓ To minimize adverse community and environmental impact

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- ✓ To reduce traffic congestion and delays.
- ✓ Provide employment opportunities for the residents.
- ✓ To reduce vehicle operating cost and save traveling time.
- ✓ To provide easy access to the villages, local markets, and agricultural products of the area
- ✓ Increase economic activity in the area by improving its link to the trade route and consequently markets, industries, and products from across the country-ride.
- ✓ Integrate cities such as Gujranwala, Kartarpur, Sialkot, Daska & Wazirabad bringing more population in the stream of benefits.
- ✓ To reduce the rate of crime on this road

NHA aims to construct an interchange near Salloke connecting with Lahore-Sialkot Motorway to Eiman Abad-Sialkot Road. The project includes all the customary requirements of the NHA standard interchange of loops, ramps, toll plaza and weigh stations along with other facilities.

The materials to be used in construction of this Interchange would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are mostly locally available along the alignment.

The project once completed will provide a good link to the towns and villages along the alignment as well as prove to be advantageous for the freight traffic moving goods, products and material within cities

Land Acquisition & resettlement:

The Project alignment land is already belonging to the NHA, no land acquisition and resettlement is involved in this case, minor were observed during reconnaissance survey.

Environmental Monitoring:

Environmental monitoring along the project area has been conducted. The following scope was comprising of collection and analysis of Air quality, Noise Level, Ground water.

Air Quality:

After detail base line environmental survey on four locations air monitoring station were installed on project alignment to determine the concentration of particulates matter, heavy metal in the environment.

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Results of air quality monitoring shows that all parameter values are below the applicable NEQs limits.

Noise Quality:

The Noise Level was measured from the location where air monitoring station were installed and the results show that all parameter values are below the applicable NEQs limits.

Analysis of Alternatives

No alternates were feasible.

Environment Baselines Conditions

Drainage Feature: Water and Sanitation Agency (WASA) is an agency of Lahore Development Authority (LDA) engaged engineers and consultants for Preparation of Strategic Master Plan of storm drainage and sewerage system.

Air Quality: The degradation of air quality in all the large cities is a major environmental concern these days. Air pollution levels in urban centers have either crossed safe limits given in the NEQS or have reached the threshold values. About 60 to 70 % of the deterioration in the air quality is due to the vehicular emissions.

Biological Environment of City

A survey of the local biological environment was conducted which includes the study of flora and fauna of the project area. Preservation of biodiversity is of global concern, but the causes of loss and their solutions are very often local in scale. Trees of Shisham, Kikar, Siris, Jamolan, Lasura, Amaltas, Pipal, Banyan or Bohar, Mulberry and Aam are spread at most of the places in the city, where there is no vegetation, there is no significant wild life found in Sialkot because of huge agglomeration of human settlements. While some animals like Wild boar, Hog deer (rarely found), Wolf, Hare and Jackal are seen round the outskirts and nearby wilderness.

Consultation Participation and Disclosure

The overall objective of the consultation with the stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are unique to the Project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-developmental phase, goes a long way in updating the knowledge and understanding.

Consultative Aspects

The proposed Project "Salloke Interchange at Lahore-Sialkot Motorway" involves stakeholders from various segments of the area, who have direct or indirect interest in the developmental activity. The consultant team has endeavored to hold consultative sessions with a number of prominent stakeholders to evince their views on the proposed Project, inter-alia, their opinions, suggestions, understanding on various issues and concerns.

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Environmental & Social Impact Assessment & Mitigation Measures

Good engineering practices will be used at quarry areas to minimize the impact of dust emissions.

The NEQS applicable to gaseous emissions generated by the construction vehicles, equipment and machinery will be enforced during the construction works. Contractor should make sure that all equipment and vehicles are tested for emissions. Regular maintenance of equipment and vehicles will also control the incomplete combustion.

Socio Economic and Cultural Environment

The area's surrounding communities will be affected during the construction phase as follows:

During the construction phase the general mobility of the local residents in and around the project area is likely to be hindered. Unmonitored construction activities, e.g. excavation, equipment movement etc. may create accident risks.

Major Impact

Based on the preliminary plans, environmental and social field surveys, and impacts assessment of the proposed project, it may be concluded that there are insignificant, short term and reversible impacts of the Project. The major impacts of the Project are summarized as under:

- ✓ All the other impacts like soil erosion, soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature and can be controlled and mitigated.
- ✓ It is estimated that the implementation of project activities will not cause cutting of any forest trees/fruit trees.
- ✓ No protected forest area or wildlife sanctuary or any other environmentally sensitive site exists along the Project corridor, which may be affected by the Project.
- ✓ No indigenous people and women headed households have been identified in the Project.
- ✓ The other social issues like safety of general public and workers, security problems, risk of communicable diseases, vector borne diseases etc. are of temporary nature.
- ✓ Most of the above impacts are of temporary nature and manageable through good engineering practices and none of these are irreversible.
- ✓ A comprehensive EMP has been developed identifying the impacts, mitigation measures, agencies responsible for implementation and monitoring of the proposed measures.

In the light of the above discussions, it may be concluded that the proposed preliminary Project route is environment friendly and will cause the least effects on the area's existing social and environmental settings.

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Mitigation Measures

Although comprehensive mitigation measures have been proposed in the report to minimize the negative impacts and to enhance the positive impacts of the Project, however, major recommended mitigation measures are summarized as under:

- Temporary labor camps should be developed near the project and should be facilitated with proper drainage facilities.
- Soil erosion and contamination, water contamination, air pollution and high noise levels should be controlled with the use of good engineering practices.
- Contractor should develop plan such as traffic management, Solid waste management, and material management etc. before starting the construction activities.
- The Contractor will have to adopt some suitable timing for the construction activities so as to cause the least disturbance to the local community particularly women considering their peak movement hours.
- EMP proposed should be implemented in the true letter and spirit.

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CHAPTER#01

INTRODUCTION

1. Overview

Salloke and surrounding areas have to travel significant distances along either North to Daska Pasrur Interchange or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway M-11. This is because no direct link exists that connects the residents of Salloke and surrounding populated areas with LSM within close vicinity.

NHA aims to construct an interchange near Salloke connecting with Lahore-Sialkot Motorway to Eminabad-Sialkot Road. The project includes all the customary requirements of the NHA standard interchange of loops, ramps, toll plaza and weigh stations along with other facilities.

The materials to be used in construction of this Interchange would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are mostly locally available along the alignment.

The project once completed will provide a good link to the towns & villages along the alignment as well as prove to be advantageous for the freight traffic moving goods, products & material within cities.

1.1 Background:

The Lahore-Sialkot Motorway, also known as M-11, is a critical transportation artery in Pakistan, linking the cities of Lahore and Sialkot. The motorway has significantly reduced the travel time between the two cities, boosting trade and economic activities in the region. However, with the increasing traffic volume on the motorway, there is a need for additional interchanges to improve the connectivity and as well as benefit the surrounding areas. To address this need, a new interchange is being designed on the Eimanabad road near Salloke. The location has been chosen strategically to provide convenient access to the motorway for the residents of nearby towns and villages. The new interchange will not only reduce the traffic load on the existing interchanges but also improve the overall traffic flow on the motorway. The project is an initiative of the Pakistan National Highway Authority (NHA). The construction of the interchange will create employment opportunities for the local population, and it

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is expected to have a positive impact on the local economy. In conclusion, the new interchange on the Lahore-Sialkot Motorway is a much-needed development that will improve connectivity in the region and promote economic growth. The project is a significant step towards enhancing Pakistan's transportation infrastructure and providing better facilities for the citizens

1.1.1 Purpose of the report:

The purpose of Report is to conduct Environmental Impact Assessment (EIA) for "Salloke Interchange at Lahore-Sialkot Motorway" district Sialkot. The EIA is conducted under the Legal framework of Punjab Environmental Protection Act, 1997 & Review of IEE/EIA Regulations, 2000 to seek the Environmental Approval. In compliance with the applicable Environmental Regulations Establishment of any project, Dr. Rubina Kausar, decided to get the Environmental Examination of the project, conducted through consultants. In order to fulfill the legal requirement of Punjab Environmental Protection (Amendment) Act 2012, Section 12; for obtaining No Objection Certificate from Environmental Protection Agency (EPA), Government of Punjab, Lahore, this Environmental Impact Assessment (EIA) Report is being submitted to the said agency. The EIA Report, as desired by EPA, has been prepared according to the prescribed by the "Guidelines for the preparation of Environmental Reports, 1997" and "Review of EE/EIA Regulations, 2000"

The purpose of conducting Environmental Impact Assessment (EIA) is to evaluate the environmental impacts arising due to proposed project Commencement /Activities. The specific objectives of the EIA study of "Construction of Salloke Interchange at Lahore-Sialkot Motorway District Sialkot".

Collection and synchronization of data related to physical, biological and socioeconomic environments of the project area and to prepare baseline environmental profile

Identification, prediction and evaluation of environmental impacts to be identified, predict and evaluation to be carried out from the proposed project activities.

Implementation of mitigation measures to minimize the adverse impacts.

Preparation of an Environmental Management and Monitoring Plan.

1.2 Identification of Project

The proposed project is going to construct on Salloke Interchange at Lahore-Sialkot Motorway District Sialkot.

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1.3 Need for Environmental Impact Assessment (EIA) Study

The development projects bring about changes, both positive and negative, in the environmental and social settings of the project area. The intensity and level of change, however, depends upon the nature of the project and the baseline environmental conditions of the area. For the last four decades, this aspect has gained a momentum both at official and public level. As a result of this, official regulations and laws have been promulgated for the protection and conservation of the physical, biological and social environment. The law makes it mandatory to carry out environmental assessment studies before commencement of construction activities of any project.

Section 12 of Punjab Environmental Protection Act, 2012 states that "No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof." Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 provided the guidelines for categorizing the projects. Schedule II of IEE/EIA regulation, D(5) states that Flyover, Underpass & Bridges Having Total length more than 500 meters will require an EIA report. Therefore, this project falls in schedule II and thus an EIA has been prepared.

1.4 Scope of Services and Approach to Carry Out the Study

The Terms of references stipulated following major objectives of this study i.e.

- ✓ Identify adverse environmental and social impacts associated with various project components and phases of project implementation.
- ✓ Describe baseline environmental and social conditions of the whole project corridor.
- ✓ Identification of environmental and social impact of the project and suggest mitigation measures.
- ✓ To assess and establish the existing environmental and socio-economic conditions in the Project area.
- ✓ To implement and execute environmental safeguards considering the harmful effects due to the Project.
- ✓ To propose mitigation and monitoring measures that can be incorporated into the design of the Project to remove or reduce the damaging effects of various factors, as far as possible, and to control and monitor, residual factors. To facilitate environmental decision making.
- ✓ To facilitate an appropriate follow up process with requirements for monitoring, management, audit and evaluation.
- ✓ To assess the proposed activities and to ensure that they comply with the relevant environmental and social regulations and standards.
- ✓ Describe the governing national and international laws & regulatory framework on environment and institutional arrangements.
- ✓ Prepare Environmental Management Plan (EMP) and Environmental Costs etc.

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- ✓ To prepare an EIA report as per the relevant guidelines for submittal to the Provincial Environment Protection Department.

1.1 Specific Tasks for the Study Team

Based upon the available information, a set of tasks has been conceptualized for the Project viz.

- Task 1: Examination and analysis of relevant environmental regulations
- Task 2: Initial consultations with the relevant agencies and stakeholders
- Task 3: Description of the Project and alternatives
- Task 4: Description of the Environment
- Task 5: Prediction and Evaluation of the impacts
- Task 6: Institutional and legal aspects
- Task 7: Environmental Management Action Plan
- Task 8: Consultation with stakeholders
- Task 9: Institutional capacity building and training

1.2 Detail of Consultant

For timely completion of the EIA study, the field activities were planned. Careful planning ensured effective resource management and timely completion of tasks throughout the period of association. Work assignment was done according to the expertise and experience. In this context, the consultant engaged a team of competent experts for conducting EIA study, which included the following persons:

Table: EIA Study Team

EIA Study Consultant Team		
Name	Designation	Qualification
M.A. Samdani	Chairperson	Ph.D (Env.), PGD (Env. Laws)
r. Umer Farooq	Senior Environmentalist	BS Hons. Environmental Sciences (UOL) LLB (In Process)
r. Talha Javed	Senior Environmentalist	MPhil Environmental Sciences (PU)
r. Basit Farooq	Environmentalist	MPhil Environmental Sciences (In Process) Punjab University Bs (Hons) Environmental Sciences (UOL)
Miss. Mahreen Khan	Marketing Expert	BS (Management Science) (PU)
r. Shakeel Ahmad Wahla (Advocate High Court)	Legal Advisor	M.A, L.L.B.

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Resource Requirements

Obtaining all available data regarding the "Salloke Interchange at Lahore-Sialkot Motorway" a number of meetings were held with the officials of different government and non-government organizations i.e., Forest Department, Agriculture Department, etc. The credibility of this EIA study depends on the quality and reliability of the baseline information, which was used to evaluate the impacts on existing environment. In addition, the impacts of the future development plan on the area's environment will also be determined. The published and unpublished data were collected for assessing environmental conditions besides direct data collection from the field.

Field Visits

Consultant team visited the Project site and adjoining areas frequently to collect baseline data and investigate physical, biological, and socioeconomic resources. In addition, meetings were held with the landholders and community members in the Project area to collect primary information about the project and record their views and concerns regarding the proposed transmission line project.

Appropriate Social Appraisal methodology was applied to discover the facts (empirically verifiable variations or verifying the old facts) on the prevailing socio-economic and cultural conditions of the project area. Various aspects of the physical environment probed during the survey include the following:

Physical Environment

includes a wide range of aspects viz.

Physical characteristics of the site

Geological/ seismological information soil (Particularly degree of salinity and water logging) Topography and natural drainage climate (temperature, winds, precipitation and relative humidity) Presence of flood surface and ground water quality ambient air quality / Sewage effluents solid waste Drainage (quantity and proposed disposal management)"

Soil levels

Biological Environment

(Existing Trees and other plants)

Flora (animals, birds, reptiles, commonly found)

Socio-economic Environment

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me level

ployment/ occupation

ness/commercial (Ownership status, Encroachments) Education (Literacy level; Schools)

gion/sect

ulation/density

der ratio

of women

ic health (availability of sanitation, medical facilities)

hetic values

aeological/ Historical entities

ural values

Review of Legal and Administrative Framework

The objective of the review of legal and administrative framework is to obtain information on all legislation pertaining to the Project development. The Consultant Experts reviewed the environmental policies, national, international and provincial laws and guidelines relevant to the Project. A synopsis of relevant laws is included in the Report.

1 Identification of Impacts

Impacts have been identified for the methodical consideration of likely or possible significant impacts on the environment because of an interchange. The aim of this task was to assess the associated risks with these impacts. The identification of impacts is a key activity in the environmental assessment process, which is based on the professional judgment of team's experience supported by national and international guidelines.

2 Evaluation of Impacts

Each impact identified has been evaluated against its significance in the terms of its severity and likelihood of its occurrence. The impact evaluation process was carried out to prioritize each potential impact and screen out insignificant or inconsequential impacts. The significance of the impacts has been assessed in terms of the effects on the natural ecosystem, level of public concern and conformity with legislative or statutory requirements. The assessment of the severity was to consider the nature, magnitude, extent and location, timing and duration and reversibility of the potential impact. The

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evaluation of the significant impacts will outline the basis for development of environmental mitigation and monitoring program.

1.6 SCOPING

The key activities of this phase include:

1.6.1 Project Data Compilation:

A generic description of the activities relevant to environmental assessment is compiled with the help of the proponent.

1.6.2 Published Literature Review:

Secondary data on weather, water resources and vegetation, and other relevant environmental features of the project area and the similar projects, is reviewed and compiled.

1.6.3 Legislative Review:

Information on relevant legislations, regulations, guidelines, and standards is reviewed and compiled.

1.6.4 Selection of Alternatives:

Based on the potential impacts and the cost required to mitigate them, the most crucial project employing the best available technology at the most feasible site is selected.

1.6.5 Scoping Meeting:

A scoping meeting was held to share this basic level of project information with all the project stakeholders before the information is incorporated into the report, so that some improvement can be sought out in the data as may be necessary, better or more friendly alternatives can be selected, and better and more practicable mitigation measures can be suggested.

1.6.6 Baseline data collection:

A considerable amount of baseline information on the project area was available from the environmental studies previously conducted in the region of other projects. A field visit was conducted to collect primary data on the water quality, ambient air quality, noise level, and ecological species surviving in the area and the ecosystems prevalent, and the lifestyle, socio-cultural setup, income and

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sources of income and the facilities available for the residents in the areas around the unit. For ambient air and water quality, tests were conducted by an EPA- certified laboratory, noise level was measured using noise meter, and for socioeconomic profile, people around the site were interviewed.

6.7 Screening

As per directions of PEPA Act 2012, the Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) Regulations, 2000, the establishment of **"Salloke Interchange at Lahore-Sialkot Motorway"** falls in the category of D (V) Flyovers, underpass & bridges having total length of more than 100 meters, of the project requiring Environmental Impact Assessment (EIA), of Schedule-II of PEPA Regulation 2000.

6.8 Impact Assessment:

The environmental and socio-economic features and other project information collected, is used to assess the potential impacts of the activities. The issues studied include potential project impacts on:

- ✓ Geomorphology
- ✓ Meteorology
- ✓ Groundwater and surface water quality
- ✓ Ambient air quality & noise level
- ✓ The ecology of the area, including flora and fauna
- ✓ Local communities

Wherever possible and applicable, the discussion covers the following aspects:

- ✓ The potential change(s) in environmental parameters likely to be affected by project related activities
- ✓ The identification of potential impacts
- ✓ The evaluation of the likelihood and significance of potential impacts

and defining of mitigation measures to reduce impacts to as low as practicable.

- ✓ The prediction of any residual impacts, including all long-term and short-term, direct and indirect, and beneficial and adverse impacts
- ✓ The drafting of monitoring arrangements of residual impacts.

7 Documentation:

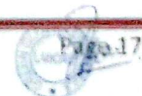
The Environmental Impact Assessment (EIA) Report is prepared according to the relevant guidelines prescribed by the Punjab Environmental Protection Agency at the end of assessment. It includes

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the phases of the assessment process. Before preparation of the final report for submittal, a draft report was presented to the Proponent for review and comments.

Identification of Mitigation Measures

The objective of identification of mitigation measures is to identify practices, technologies or activities that will prevent or minimize all significant negative environmental impacts and propose physical and administrative controls to ensure that mitigation is effective. On the basis of the impact evaluation, changes or improved practices have been suggested, where practical, in the planned project to prevent and control unacceptable adverse impacts resulting from normal or extreme operating requirements have been defined and institutional arrangements for monitoring and management have been suggested.

Development of Environmental Management Plan and Environmental Monitoring Plan

An Environmental Management Plan (EMP) has been developed for effective implementation of the identified mitigation measures. The EMP includes controls to minimize the identified impacts, and a program to monitor residual impacts, if any, during the operation. The EMP also describes the measures to be followed during the operation of the Project and identify roles and responsibilities of project personnel, including reporting in the operational phase. Together with Environmental Management Plan, an Environmental Monitoring Plan has been framed to ensure that all the corrective measures under the adverse environmental impacts have been taken.

Structure of the Report

The Environmental Impact Assessment Report comprises of nine chapters and annexes.

Chapter 1: Introduction; gives an introduction of the Project, scope of work for Environmental Impact Assessment, Approach and methodology, the study team etc.

Chapter 2: Legislative and regulatory requirements; provides an overview of the policy framework and legislation that applies to the proposed project. The project is expected to comply with all provincial legislation relating to environment in Pakistan, and to obtain all the required clearances. It also deals with the requirements of international agencies and other protocols for protection of biodiversity for which Pakistan has firm commitment.

Chapter 3: Description of the Project; gives a rather detailed account of the Project particularly those project components which are of importance in relation with environmental and social impacts.

Chapter 4: Description of the Environment; provides information about the environmental and social conditions of the project area, geology, climate, flora, fauna, water resources, socioeconomic conditions

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ter 5, Analysis of Alternatives

ter 6, Stakeholders and Public Consultations; deals with the outcome of the consultation carried with the local communities, knowledgeable people, public representatives, etc. It discusses the ern of various tires of the people and provides an outline how these have been addressed within IA of the project.

ter 7, Potential Environmental and Social Impacts and Mitigation Measures; identifies the tial impacts due to the Construction of an Interchange on the physical, biological and social onment of the Project Area.

ter 8, Environmental Management and Monitoring Plans; outlines the environmental agement plan, identifies the roles and responsibilities to implement EMP, suggest monitoring encies of various parameters, environmental costs etc.

ter 9, Conclusions and Recommendations; sums up the report and conclusions and nmendations resulting from the study.

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CHAPTER 02

POLICY, LEGAL & ADINISTRATIVE FRAMEWORK

ment of comprehensive legislation on the environment, covering multiple areas of concern, vely new and ongoing phenomenon in Pakistan. However, a basic policy and legislative k for the protection of the environment and overall biodiversity in the country are now in e Project is expected to comply with all legislations relating to environment in vogue in

on discusses the related policy, legal and administrative outline/structure applicable in Punjab ng out the EIA of an Interchange. Since the project is located in Punjab, therefore its EIA e will be governed by the existing policies, legislation and administrative framework in place

Highway Authority (NHA), the project proponent is under obligation to carry out the EIA in y with the policy, legal and administrative framework in Punjab.

Nal Conservation Strategy (NCS)

nal Conservation Strategy (NCS) is the first policy document (approved by the federal cabinet 1992) that pledged to balance Pakistan economic development with the conservation of sources. Underlying goal of this document is that all economic and statutory development in ry should be such that it does not conflict with the interests of nature conservation. The NCS he country's primary approach towards encouraging sustainable development, conserving sources, and improving efficiency in the use and management of resources. The NCS has 68 rograms in 14 core areas in which policy intervention is considered crucial for the ion of Pakistan's natural and physical environment. The core areas that are relevant in the f the proposed project are pollution prevention and abatement, restoration of rangelands, g energy efficiency, conserving biodiversity, supporting forestry and plantations, and the ion of cultural heritage. The Pakistan Environmental Protection Act, 1997 is the basic e tool empowering the government to frame regulations for the protection of the

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ment. The policy, laws, regulations and standards relevant to the project, in the context of environmental protection are described in the following sections.

Biodiversity Action Plan

Pakistan is a signatory to the Convention on Biological Diversity, and is thereby obligated to develop a strategy for the conservation of biodiversity. The Government of Pakistan has constituted a biodiversity working group under the auspices of the Ministry of Environment, Local Government and Urban Development to develop a Biodiversity Action Plan for the country. After an extensive consultative exercise, a draft Action Plan has been developed. The plan which has been designed to complement the NCS and the proposed provincial conservation strategies identifies the causes of biodiversity loss in Pakistan and suggests a series of proposals for action to conserve biodiversity in the

Wildlife Management:

The Wildlife (Protection, Preservation, Conservation & management) Act 1974 and rules 1974 empower the government to declare certain areas reserved for the protection of wildlife and to control hunting within these areas. It also provides protection to wild life species declared endangered / vulnerable and rare. With a view to the protection and preservation of flora and fauna in natural state, the government may declare any area to be a national park and may demarcate in a manner as prescribed.

Prohibition of Trees (Prohibition Act), 1975

This Act prohibits cutting and chopping of trees without permission of the Forest Department. Section 3 states "No person shall, without prior approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage tree".

Environment Related National Laws/ Policies

There is a number of laws concerned with the management and protection of the environment. The existing laws on environmental issues were enforced over an extended period of time, and are not site-specific. These laws are old and do not cover all the environmental issues. The penalties under these laws are very small, that becomes ineffective to control the environmental degradation. The enactment of comprehensive legislation on the environment, in the form of an act of environmental protection has been promulgated as PEPA, 1997.

Pakistan Environmental Protection Act, 1997

The Environmental Protection Act, 1997 (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The Act is applicable to a

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range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) established by the Pakistan Environmental Protection Agency (Pak-EPA) has been prohibited under the Act. Penalties have been prescribed for those contravening the provisions of the Act. The powers of the Federal and Provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983, have also been considerably enhanced under this Act and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, no project involving construction activities or any change in the physical environment can be undertaken unless an Initial Environmental Examination (IEE) or an Environmental Impact Assessment is conducted, and approval is accorded by the Federal or Provincial EPAs. The section 12(6) of the Act states that this provision is applicable only to such categories of projects as Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the Regulations); and are discussed later.

Punjab Environmental Protection (Amendment) Act, 2012

With the 18th Constitutional Amendment in the Constitution of Pakistan, the Federal Ministry of Environment has been dissolved and subject of environment has been handed over to provinces. EPA has formulated its own act. The major content of the act is same as of PEPA, 1997. Minor amendments/changes have been made viz.

The word of Act has been changed into "Punjab Environmental Protection (Amendment) Act, 2012". The words "Federal Government", wherever occur, the word "Government" shall be substituted; the words "Federal Agency", wherever occur, the words "Provincial Agency" shall be substituted; the word "National", wherever occurs, the word "Punjab" shall be substituted. Other clauses, sub-clauses, sections and sub-sections are almost same.

Pakistan Environmental Protection Agency Review of IEE & EIA Regulations, 2000

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the Regulations) prepared by the Pakistan Environmental Protection Agency (Pak-EPA) under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified on the basis of expected degree of adverse environmental

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impacts. Project types listed in Schedule-I are designated as potentially less damaging to the environment and those listed in Schedule-II as having potentially serious adverse effects. Schedule-I projects require a IEE to be conducted, provided they are not located in environmentally sensitive areas. For the schedule-II projects, conducting an EIA is necessary. The Project falls in the schedule-II Section-A Energy, hence an EIA has been conducted. Since the project is located in Punjab, therefore it falls in the jurisdiction of Punjab-EPA. Salient features of the regulation, relevant to the proposed project are listed below:

Categories of projects requiring IEE and EIA are issued through two schedules attached with the Regulations.

A fee, depending on the cost of the project, has been imposed for review of EIA and IEE.

The submittal is to be accompanied by an application in prescribed format included as schedule IV of the Regulations.

The EPA is bound to conduct a preliminary scrutiny and reply within 10 days of submittal of report

- a) confirming completeness,
- b) asking for additional information, or
- c) requiring additional studies.

The EPA is required to make every effort to complete the review process for 45 days and of the EIA within 90 days, of issue of confirmation of completeness.

EPAs accord their approval subject to following conditions:

- ✓ Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- ✓ Before commencing operation of the Project, the proponent is required to obtain from EPA a written confirmation of compliance with approved conditions and requirements of the EIA.

An EMP is required to be submitted with the request for obtaining confirmation of compliance.

The EPAs are required to issue confirmation of compliance within 15 days of receipt of request and complete documentation.

The EIA approval will be valid for three years from the date of accord.

A monitoring report is required to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operations.

2 National Environmental Quality Standards (NEQS), 2000

National Environmental Quality Standards (NEQS), promulgated under the PEPA 1997, specify the following standards:

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- ✓ 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.
- ✓ 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. The standards are attached as Annex.

4.3 The Antiquities Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the project proponents are obligated to:

Ensure that no activity is undertaken in the proximity of a protected antiquity, and

If during the course of the Project an archaeological discovery is made, it should be reported to the Department of Archaeology, Government of Pakistan.

4.4 The Motor Vehicles Ordinance, 1965, and Rules, 1969

The Motor Vehicles Ordinance, 1965, has been extended with effect from March 05, 1978, to the whole of Pakistan. It deals with the licensing requirement for driving; powers of licensing authority, National Transport Authority and those of Court *vis-à-vis* disqualification for license and registration requirements to control road transport; compensations for the death of or injury to a passenger of a public carrier; powers of Road Transport Corporation; traffic rules, power to limit speed, weight, use of vehicles; power to erect traffic signs; specific duties of drivers in case of accident and powers of police officers to check and penalize traffic offenders.

5 The Factories Act, 1934

The pertinent clauses of the Act are those that deal with health, safety and welfare of the workers, disposal of solid waste and effluent, and damage to private and public property. It also deals with the

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regulations for handling and disposing of toxic and hazardous materials. As the construction activity has also been classified as an 'industry', the regulations will be applicable to the Contractors.

2.4.6 The Pakistan Penal Code, 1860

The Act deals with the offences where public or private properties and human lives are affected due to intentional or accidental misconduct of an individual or a mass of people. It also addresses violation to any law of the country.

2.4.7 The Explosives Act, 1884

It provides regulations for handling, transportation and use of explosives. The contractors have to abide by the regulation during quarrying, blasting and for other purposes.

2.4.8 National Resettlement Policy and Ordinance

At this point, the only legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA is, however, limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of their livelihoods.

Experience with large-scale infrastructure development projects implemented by institutions such as the Pakistan Water and Power Development Authority (WAPDA) and National Highway Authority (NHA) has demonstrated the need for a cohesive national policy for resettlement. In spite of the fact that a National Resettlement Policy and related legislation has been drafted, it has not been officially notified.

The Forestry Act, 1927

The Forestry Act, 1927; empowers the government to declare certain areas reserved forest. As no reserved forest exists in the vicinity of the proposed subproject, this law will not affect to the proposed subproject.

2.4.9 The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act, 1972

The Punjab Wildlife Protection Ordinance, 1972; empowers the government to declare certain areas reserved for the protection of wildlife and control activities within in these areas. It also provides protection to endangered species of wildlife. As no activities are planned in these areas, no provision of this law is applicable to the proposed subproject.

Highway Safety Ordinance, 2000

This law provides legal basis for establishing National Highway & Motorway Police for regulating and controlling traffic on the national highways and strict enforcement of traffic laws. The law also provides

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load limits for commercial vehicles and legal framework for its enforcement and includes provisions for licensing and registration of vehicles and construction equipment, offences and penalties for violations.

Safety Regulations

Many laws and regulations directly or indirectly govern the occupational health and safety issues in the currently studied production activities:

Occupational Safety and Health Act, 1980

Labor Laws

Electricity Rules, 1937

Occupational Health and Safety Regulations

Comprehensive national standards with respect to the occupational health and safety of workers have yet not been developed in Pakistan, however, following laws and regulations directly or indirectly govern the occupational health and safety issues during construction and operations of the project:

- ✓ Factories Act, 1934 (Pakistan Factories Rules 1962)
- ✓ Labor laws Amended, 1972
- ✓ Mines Act, 1923
- ✓ Natural Gas Safety Rules, 1960.
- ✓ Gas Cylinder Rules, 1940.
- ✓ Law of Explosives, 1940
- ✓ Explosive Rules, 1944
- ✓ Electricity Rules, 1937

Land Drainage Act, 1873

The Land Drainage Act, 1873 is the main legislation relating to the management of irrigation system in Punjab. Under the act almost all the irrigation network has been entrusted to the provincial government through its officers.

Regulations

Regulations which could be relevant to this project include:

Forest Act 1927.

East Pakistan Land Reform Rules, 1959.

East Pakistan Land Reforms Regulation, 1959, MLR No. 64.

East Pakistan Wildlife Protection Ordinance 1959.

Wildlife Protection Rules 1960.

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- ✓ The Land Acquisition Act 1984.
- ✓ Wild Birds and Animals Protection Act 1992.

Environmental Guidelines

2.4.11 Guide lines of Pakistan EPA

Sets of environmental guidelines to facilitate environmental assessment studies have been developed under the statutory cover of the Pakistan Environmental Protection Act, 1997. The following guidelines have been developed through a consultative process:

- ✓ Guidelines for the preparation and review of environmental reports
- ✓ Guidelines for Public Consultations
- ✓ Guidelines for sensitive and critical areas
- ✓ Sectoral Guidelines

International Protocols and Obligations

As Pakistan is a member of a number of international organizations like United Nations Organization (UNO), Organization of Islamic Countries (OIC), South Asian Association for Regional Corporation (SAARC), Economic Corporation Organization (ECO), etc., so it has to follow the international protocols and obligations related to the environmental perspective. The protocols and obligations related to the proposed project are as under:

2.4.12 The Convention on Conservation of Migratory Species of Wild Animals, 1979

The Convention requires the countries to take action to avoid endangering migratory species. Species covered in the Convention should be given special attention during EIA and monitoring, and any impacts identified should be mitigated to acceptable levels.

2.4.13 The Rio Declaration, 1992

The Rio Declaration comprises twenty-seven principles which address such important issues as; sustainable development to integrate environmental protection into the development process; common but differentiated responsibilities to conserve, protect and restore the earth's ecosystems; public participation and information access at the national level, reduce and eliminate unsustainable patterns of production and consumption.

2.4.14 Convention on Wetlands (Ramsar Convention), 1971

The broad aim of the Convention on Wetlands (Ramsar, Iran, 1971) is to halt the worldwide loss of wetlands and to conserve those that remain through wise use and technology transfer. Contracting Parties have made commitments to:

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at least one site that meets the Ramsar criteria for inclusion in the list of Wetlands of International Importance.

the ecological character of listed sites.

Wetlands conservation within their national land-use planning.

Nature reserves on wetlands and promote wetland training.

Policy Framework:

There are many laws exist in Pakistan containing a number of clauses concerning protection of the environment. However, the first legislation on environmental protection was issued in 1983. The Environmental Protection Ordinance, 1983 was the first legislation promulgated for the protection of environment.

Pakistan Environmental Protection Agency was established in 1984. No significant environmental policy, guidelines and regulations were made till early 1990s. The National Conservation Strategy was developed and approved by the federal cabinet in 1992. Provincial Environmental Protection Agencies were also established in 1992-

1993. National Environmental Quality Standards (NEQS) were established in 1993. Detailed environmental guidelines were issued in 1996. The National Assembly and the Senate conferred Pakistan Environmental Protection Act in 1997.

In 2012, Punjab enacted Punjab Environmental Protection Act 1997 (amended 2012), adopting Pakistan Environmental Protection Act 1997, a federal legislation, to the framework of the Punjab. The newly enacted legislation allowed the Provincial Government to frame its own Environmental protection tribunal and appoint its members. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. Section 12 of the Act deals with the Environmental Impact Assessment / Initial Environmental Examination which states;

Section-12(1): "No proponent of a project shall commence construction or operation unless he has filed with the Environmental Protection Agency (EPD in case of Punjab) an Initial Environmental Examination (IEE) or, where the project is likely to cause adverse environmental

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ect, an Environmental Impact Assessment (EIA), and has obtained the approval in respect thereof.

National Highway Authority (Ministry of Communications), GOP

Implementing agency of the proposed Project is National Highway Authority (NHA) Ministry of Communications, Government of Pakistan (GOP). The management of NHA will ensure that all the measures are effectively implemented at the design, construction and operational stages of the project.

1.8.1 District Officers Environment

District Officers (Environment) were established under the Provincial Local Government Ordinance 2001 with the aim to perform environmental control, including control of air, water and soil in accordance with federal and provincial laws and standards at the district level. District Officers (Environment) are currently functioning as the arm of the Director General, Punjab Environmental Protection Agency for the enforcement of the Punjab Environmental Protection Act (amended 2012) in their respective Districts.

District Officer (Environment) provides guidance and assistance to the proponent of the projects in relation to the EIA Report to Director General, Punjab EPA. Subsequently, Environmental Impact Reports submitted to the DG for the issuance of No Objection certificates (NOC) are forwarded to respective District Officer (Environment) for scrutiny and verification of the project details mentioned in the report.

The District Officer (Environment) is also responsible for the environmental monitoring of the projects under execution in the district and regular submission of progress reports to the Director General, Punjab EPA. In case of the initiation of construction of the projects in the district without prior issuance of IEE/ EIA as the case may be, District Officer (Environment) issues notices to the violators for complying with the provisions of the Punjab Environmental Protection Act 1997 (amended 2012).

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CHAPTER 03

DESCRIPTION OF THE PROJECT

General

Chapter provides an overview of the project including an Interchange, project components, design considerations, construction procedures, operation and maintenance activities. The safety parameters followed during construction and operation stages as well as construction arrangements and measures to be adopted for interchange have been discussed in detail in this section.

Project Type & Category of project:

According to environmental laws of the country development projects have to undergo the process of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) in order to predict and mitigate the impacts of the development at an early stage. Based on nature, size, cost and anticipated impacts, the project under consideration has been categorized for EIA Study according to Regulation 3 of Statutory Notification issued on June 13, 2000 (S.R.O.339 (1) /2001). The Project falls under Schedule II (list of projects requiring EIA), of the IEE / EIA Regulations 2000 made under Section 12 of Pakistan Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

Objective of the Project

Salloke and surrounding areas have to travel significant distances along either North to Daska Pasrur Interchange or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway M-11. This is because no direct link exists that connects the residents of Salloke and surrounding populated areas with LSM within close vicinity.

National Highways play an important role from regional perspective as they carry transit traffic from Pakistan to China, Iran, Afghanistan and Central Asia States and provide access to almost all parts of the country. Under this project National Highway Authority (NHA) has planned Construction of an Interchange on Lahore-Sialkot Motorway (LSM) at Salloke. The project is expected to benefit more than 10 million populations. Implementation of the project is envisaged to have the following objectives:

- ✓ To provide ease of transportation to the inhabitants of the Salloke and surrounding towns.
- ✓ To meet international design standards
- ✓ To minimize adverse community and environmental impact
- ✓ Develop an effective road network in Salloke
- ✓ Provide employment opportunities for the residents.

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to reduce vehicle operating cost and save traveling time.

to provide easy access to the villages, local markets, and agricultural products of the area

to increase economic activity in the area by improving its link to the trade route and consequently markets, industries, and products from across the country-side.

to integrate cities such as Gujranwala, Kartarpur, Sialkot, Daska & Wazirabad bringing more population in the stream of benefits.

to reduce the rate of crime on this road

to construct an interchange near Salloke connecting with Lahore-Sialkot Motorway to Sialkot Road. The project includes all the customary requirements of the NHA standard design of loops, ramps, toll plaza and weigh stations along with other facilities.

Materials to be used in construction of this Interchange would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are locally available along the alignment.

Project once completed will provide a good link to the towns and villages along the alignment as it will prove to be advantageous for the freight traffic moving goods, products and material within



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Google Coordinates: 32.251583, 74.391552

"Salloke Interchange at Lahore-Sialkot Motorway District Sialkot"



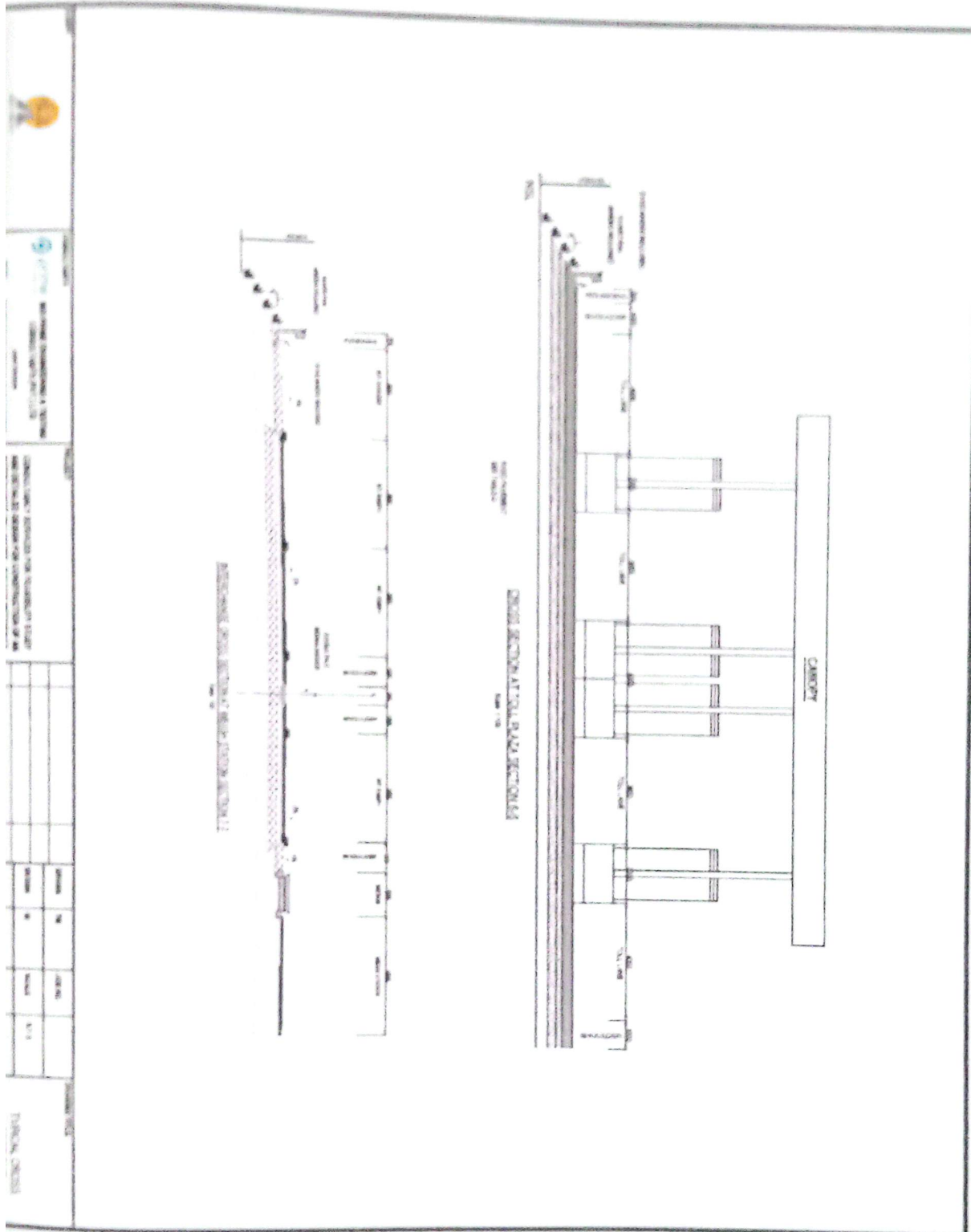
Salloke Interchange on Lahore to Sialkot Motorway : Layout Map

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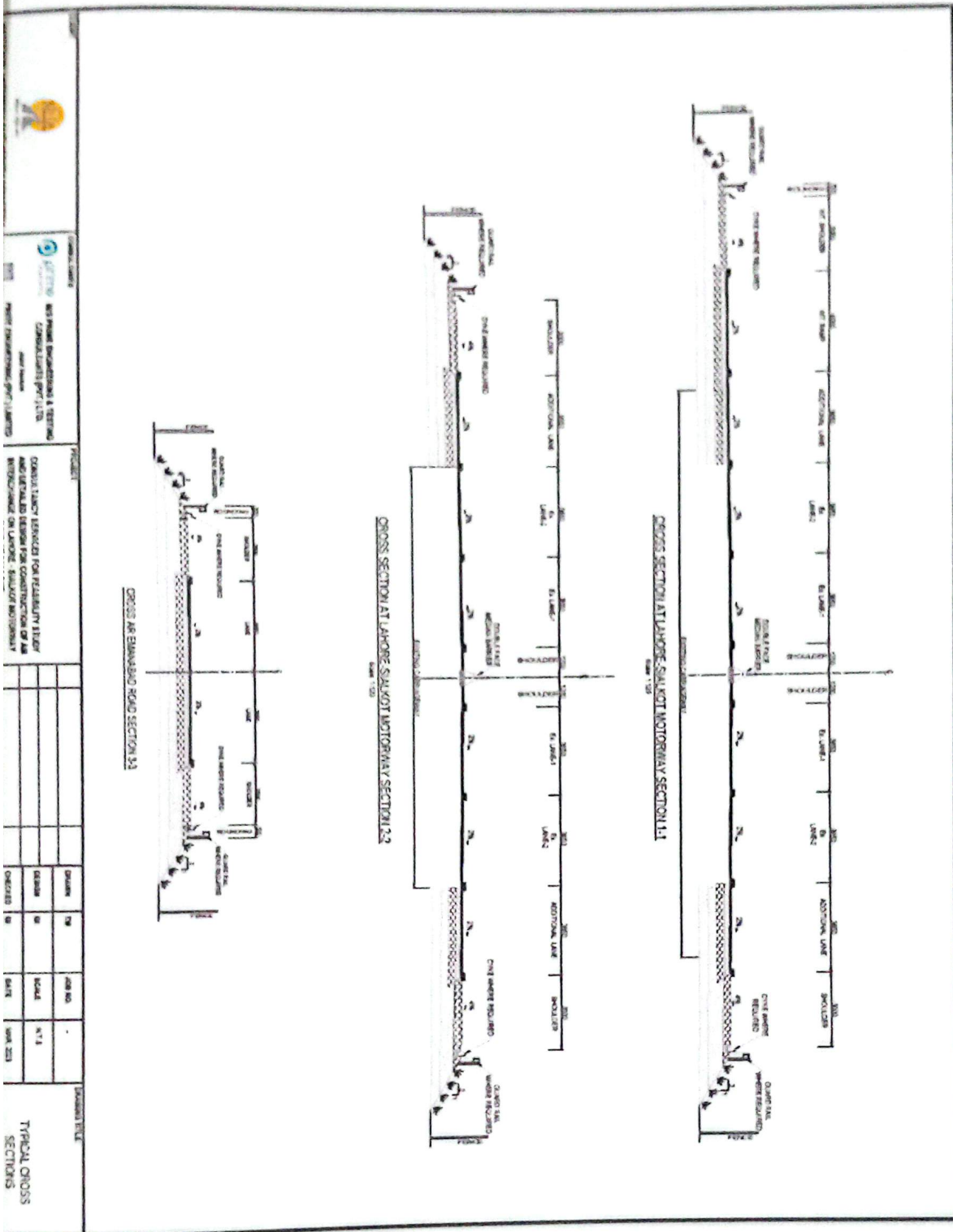
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PAVEMENT LAYER THICKNESS INTERCHANGE (Carriage way) Table-I		
Sr.No	Layer Description	Layer Thickness (mm)
1	Asphalt Wearing Course (CWS-8)	50
2	Asphalt Base Course (CBS-8)	120
3	Aggregate base course	250
4	Granular Sub-Base	250
5	Sub Grade	Top 300mm of Embankment should have CBR > 12%
6	Embankment Fill	See Note - 3
PAVEMENT LAYER THICKNESS BUTCHAMGE (Outer Shoulder) Table-II		
Sr.No	Layer Description	Top 1
		Layer Thickness (mm)
1	Top layer Wearing Treatment	-
2	Aggregate base course	250
3	Granular Sub-Base	Varies
5	Sub Grade	Top 300mm of Embankment should have CBR > 12%
6	Embankment Fill	See Note - 3
PAVEMENT LAYER THICKNESS TOLL Plaza (Rigid Pavement) Table-III		
Sr.No	Layer Description	Layer Thickness (mm)
1	Rigid Pavement (15 & 25)	300
2	Asphalt Sub-Base	150
3	Granular Sub-Base	250
5	Sub Grade	Top 300mm of Embankment should have CBR > 12%
6	Embankment Fill	See Note - 3

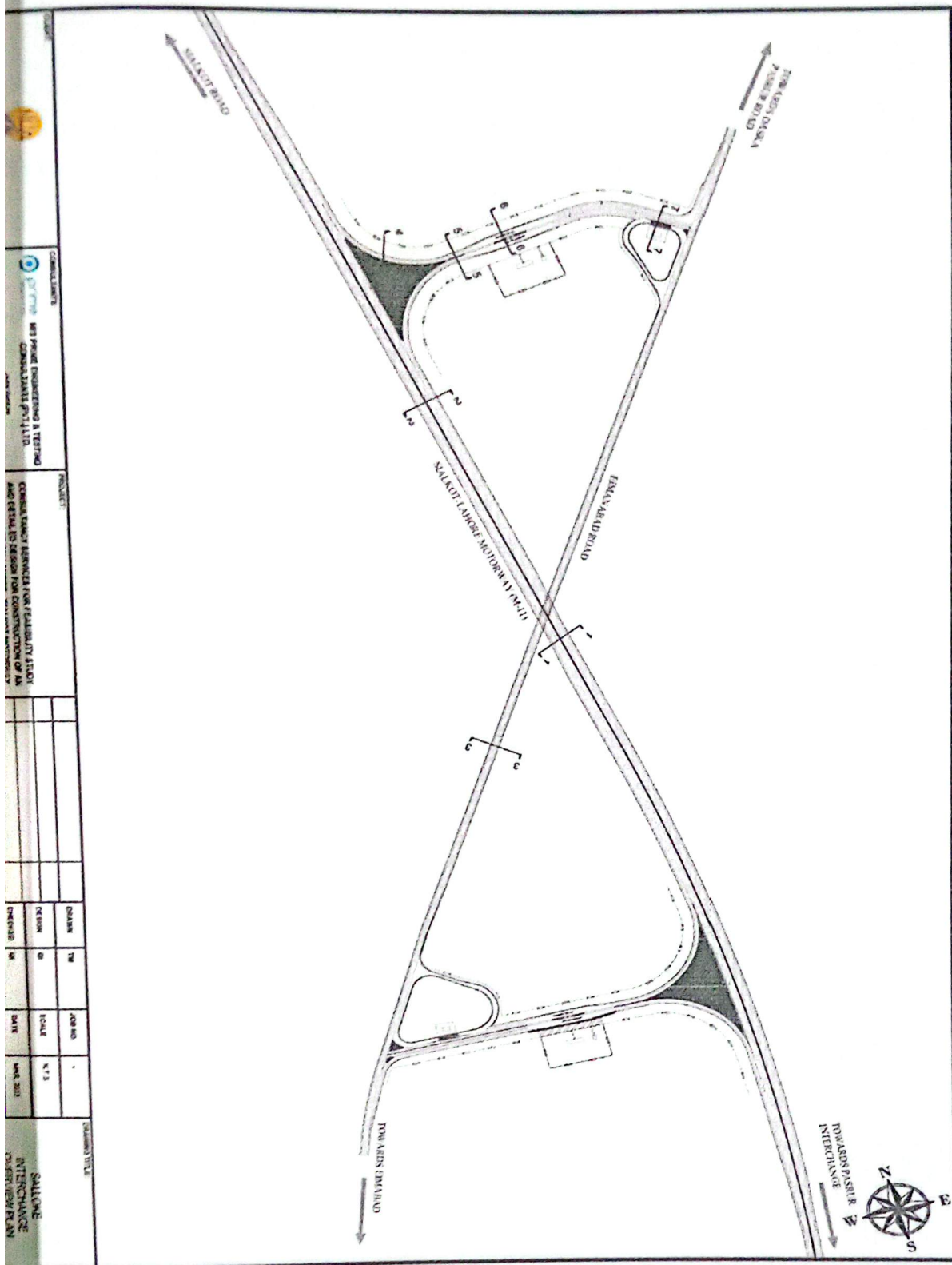
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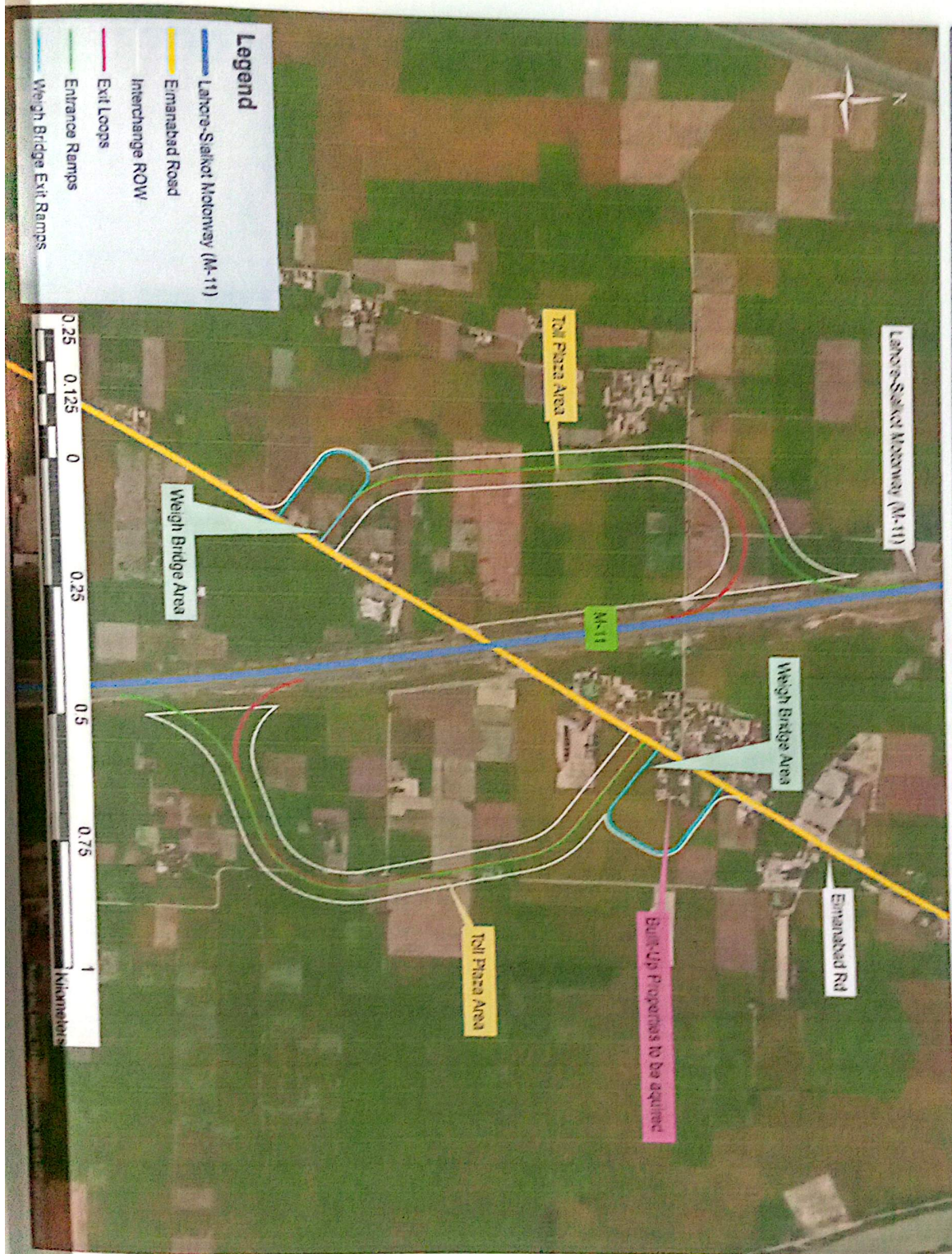
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Interchange Layout Option 2



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Requirement during Execution Plan:
Staff

Sr.#	Designation	BPS	NO. of Posts
01	Project Director/Director Engineer	19	1
02	Deputy Director (Engineer)	18	1
03	Assistant Director (Engineer)	17	2
04	Surveyor	16	1
05	Account/Superintendent	16	1
06	Computer Operator	16	1
07	Office Assistant	16	3
08	Auto CAD Operator	11	1
09	Qanoongo	11	1
10	Patwari	5	1
11	UDC	9	1
12	LDC	7	2
13	Photocopy Machine Operator	5	1
14	Driver	4	2
15	Naib Qasid	1	2
16	Chowkidar	1	1
17	Sweeper	1	1
Sub Total NHA Staff			23

Consultant Staff:

Designation	No of Posts	Months	Man Months
Resident Engineer	1	14	14
Highway Engineer	1	12	12
Structural Engineer	1	12	12
Material Engineer	1	12	12
Material Inspectors	1	12	12
Site Inspectors	2	12	24
Surveyors	1	12	12
Survey Helpers	4	12	48
Quantity Surveyors	1	14	14
Cad Operators	2	14	28
Computer Operators	2	12	24
Trainee Engineer	1	12	12

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Admin	1	12	12
Office Boy	02	14	28
Others (Cook, Drivers, Security Guard)	11	12	132
Sub Total Consultant Staff			396

Power Requirement of the Contractor

Sr.#	Designation	Min.Nos
01	General Manager	1
02	Project Manager	1
03	Deputy Project Manager/Construction Manager (Highway)	1
04	Deputy Project Manager/Construction Manager (Structure)	1
05	Environmental Engineer	1
06	Assistant Environmental Engineer	1
07	Site Engineer (Structure)	1
08	Site Engineer (Highway)	1
09	Structure Engineer	1
10	Highway Engineer	1
11	Cad Operators (Structure)	2
12	Cad Operators (Highway)	2
13	Planning Engineer	1
14	Quantity Surveyor	1
15	Assistant Quantity Surveyor	1
16	Chief Surveyor	1
17	Surveyor	2
18	Assistant Surveyor	4
19	Accountant	1
20	Assistant Accountant	1
21	Admin officer	1
22	Assistant Admin	1
23	Camp-in charge	1
24	Material Engineer	1
25	Lab Engineer	1
26	Lab. Technician	2
27	Assistant Lab Technician	4
28	Computer Operators	1
29	Mechanical in charge	1
30	Assistant Mechanical in charge	2
31	Foreman all types	10

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	Site Supervisor all types	5
	Mechanic	4
	Dispenser Doctor	1
	Store keeper	2
	Assistant Store Keeper	4
	Trainee Engineer	4
	Trainee Sub Engineer	2
	Welder	5
	Carpenter	10
	Electricians	4
	Steel fixer	10
	Assistant Electrician	8
	Excavator Operator	4
	Road Roller Operator	8
	Loader Operator	4
	Grader Operator	6
	Drilling Operator	2
	Batching Plant Operator	1
	Assistant Batching Plant Operator	2
	Concrete pump Operator	2
	Cook staff	4
	HTV Driver	29
	LTV Driver	13
	Helpers all Types	100
	Unskilled Labour	150
	Sub Total Consultant Staff	435

tentative, the contractor may deploy his staff as per the actual work requirement.
Maintenance Phase Requirement

Sr.#	Designation	BPS	No. of Posts
01	Deputy Director (Engineer)	18	1
02	Assistant Director (Engineer)	17	1
03	Computer Operator	16	1
04	LDC/UDC	7/9	2
05	Driver	4	2
06	Naib Qasid	1	2
	Sub Total – Provincial Staff during operation		09

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Description	Amount (Rs)
Earth Work	
Sub Base & Base	97,166,926
Surface Course & Pavement	318,627,799
Structures (Pipe Culverts)	115,023,491
Structures (Box Culverts)	13,362,283
Structures (Cattle Creeps)	11,588,768
Structures (Subways)	8,419,987
Structures (Under passes)	25,801,419
Drainage And Erosion Works	30,719,950
Ancillary Works	16,548,542
General Items	58,195,939
Road Side Facilities (Toll Plaza, Weigh Station)	140,844,000
Electrical Works (External)	190,412,874
	287,782,342
Total Construction Cost (PKR)	1,314,494,319
Contingencies at 3% of A	39434
Environmental Charges	13,144,943
NHA Establishment Charges at 1% of A	13,144,943
Consultancy Fee Design Review & supervision at 2% of A	39,434,830
Shifting of Utilities and Trees compensation	14,232,269
NH & MP building	5,684,395
	1,439,570,529
SUBTOTAL PKR	1,439,570,529
vii Land acquisition & crops compensation	166,873,351
Grand Total (PKR)	1,606,443,880

Machinery & Equipment Details

<u>Road Work</u>		
Sr.#	Description	Min.#
01	Bulldozer	4
02	Motor Grader	6
03	Front End Loader	4
04	Dump Truck	20
05	Water Tanker 12000Ltrs	2
06	Water Tanker 4000Ltrs	4
07	Road Rollers	8
08	Asphalt Plant (80 t/Hr)	1
09	Asphalt Paver (Full Width)	1
10	Excavator	4

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11	Tractor with Trolley	3
12	Bitumen Dist. Tow Type 2000 Ltr	4
13	Power Broom	4
14	Compressor	4
15	Concrete Batching Plant 30 Cum/hr	1
16	Concrete Transit Mixer 6 Cum	2
17	Concrete Vibrator (Poker 1.5 ")	2
18	Concrete Static Mixer	2
19	Plate Compactor	1
20	Concrete Drilling Machine	2
21	Concrete Pump	2
22	Crane 20 Ton	1
23	Welding Plant	1
24	Road Marking Machine	2
25	Generator (250 KVA)	2
26	Bulldozer	4

Criteria:

Design Speed of Ramps/Loops	60 Km/hr.
Embankment	50 Years
Structures	75 Years
Road Pavement	10 Years

ation & the Site Layout of the Project

3.3.1 Site Layout

Proposed project is located at Salloke Interchange on Lahore-Sialkot motorway at District Sialkot. Layout is attached as Annexure to this Report)

Table O-1 Project Coordinates

Project Coordinates

Settings

East Front

Eimanabad Road

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West back

Eimanabad Road

South

Passing Road

North

Open

nt Land Use

ct site is Lahore - Sialkot Motorway (LSM) M-11 currently having no direct link access for the of Salloke & surrounding populated areas within close vicinity.

Access

Salloke Motorway at Salloke District Sialkot on GT Road to Eimanabad Road.

(is annexed)

of the Project and Magnitude of Operation:

st of the Interchange is approximately Rs. 1600.76 million Rupees. 400-500 labors will be for construction.

l works, Equipment, Machinery and other Physical Facilities Required for the Project

vil Works and Other Facilities

Infrastructure facilities including civil work foundations for installation of equipment, control buildings & other etc. will be required, for which necessary provision has been made in the cost

aterials used in construction and up-gradation of the Motorway would include coarse aggregates, fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw als are locally available in the country.

Proposed schedule of implementation:

ne required for the construction of an Interchange is Approximately 01 year. Breakdown time for construction phase is given below in Table:

Table: Timeline for Construction of Project

	3 Months	3 Months	4 Months	2Months
--	----------	----------	----------	---------

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Activities	4W	4W	4W	3W	5W	4W	4W	4W	4W	4W	3W	1W
ed Designing												
ization of actors												
Construction												
d												
Construction												
d												
oration of Site												

itic Consideration

atic conditions, i.e., the temperature, wind velocity, thunder storm levels, relative humidity, ol the selection of materials to be used. The following climate parameters were considered ign criteria.

- ✓ Maximum average Temperature
- ✓ Minimum average Temperature
- ✓ Average Rainfall
- ✓ Annual Relative Humidity

struction Aspects

or's Arrangement

planned to implement the Project through contractor as per Construction Schedule processing goes on as per the schedule, the construction of the Interchange will likely be iced last of 2023 and completed by the next year of 2024.

nstruction Camps

tes will be located keeping in view the availability of an adequate area for establishing camps, g parking areas for machinery, stores and workshops, access to communication. Although / of labor will come from local sources, some semi-skilled and skilled labor will have to be from outside by the contractor. Final locations will be selected by the contractor with the al of site Engineer's in-charge.

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actor can be contractually bound to employ maximum local people except on the job for expertise is not available.

Activities during Planning and Design Phase

and Design activities will be related to design which includes a detailed survey of the ge.

requirements during planning and design phase include clearing areas that may cover the the row by selective clearing, and tree topping etc. Access kutcha tracks if required, will be mp sites for the workers will be located keeping in view the availability of an adequate area lishing camps, including parking areas for the machinery, stores and workshops, access to ication and local markets, and an appropriate distance from the sensitive areas in the vicinity. ations will be selected by the contractor with the approval of site in-charge.

Activities during Construction Phase

tractor will also be responsible for addressing any changes during construction and reclamation s following the completion of construction activities. The procurement of equipment will be accordance with the procedure.

to Construction Sites: Since the work base will be established, so the workers shall have an easy to that. Within the campus internal small roads and paths shall have to be provided to facilitate ment of vehicles and workers.

Offices: Adjacent to work base and material depot, the contractor will be allowed to set up a office to run his day-to-day field affairs.

Cost of the project

total cost of the project has been estimated at PKR 1600.76 Million Rupees.

Analysis of Alternatives

Chapter deals with an analytical overview of the different alternatives that have been considered e project. The analysis has been carried out critically so as to justify the need of the Project. Besides economic viability, environmental sustenance and social soundness of the proposed project should be considered when analyzing various alternatives. The various alternatives which have been idered during the conduct of the study are as under:

- ✓ No project options

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ie Route Alignment selection and

ve Construction Methods

ive Geometry

is of Location

is:

is was feasible or possible.

ion & Rehabilitation Plan:

ocals or residents is being moved from the site. None of significant vegetation features therefore, the proposed project does not require any restoration or rehabilitation plan.

; all possible precaution will be taken to prevent an untoward incident in terms of life and ses.

ition of the project, the debris will be removed from the site in order to maintain aesthetics ect. All measures will be undertaken for ensuring occupational safety, security and clean nt in the project area. Ornamental trees and flower plants will be planted on inside of the unit premises to restore the land.

vernment Approvals

I Aamir Ghori S/o Abdul Jabbar Ghori Proponent of the project "Salloke Interchange at Lahore otorway" District Sialkot has applied which are being kept pending till the NOC from EPA issued.

ique of Methodologies:

the more important techniques and methodologies of utility for assessing the impacts opment activities on the environment in the developing countries are:

Checklists

Matrices

Networks

Overlays

ronmental index using factor analysis.

enefit analysis

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doing workshops.

to understand their drawbacks in order to determine which methods are most

general are strong in impact identification and are capable of bringing the impacts to the awareness of their audiences.

id descriptive checklists merely identify the possible potential impacts without any sort of their relative magnitudes. As a result, they are most applicable at the EIA stage of an

method goes a step further and provides an idea of the nature of the impact by means a textual rating of the impact as long-term, direct, etc. Nevertheless, this approach is not impact measurement and does not aid much in the decision-making process. Rather, it ie impacts and leaves the interpretation to the decision makers.

it of scaling and weighting type of checklists makes decision making easier. Such checklists, n being strong in impact identification, also incorporate the functions of impact ent and to a certain degree those of interpretation and evaluation, and it is those aspects them more amenable for decision-making analysis.

provide cause effect relationships between the various project activities & their impact on rous environmentally important sectors or components. Matrices provide a graphic tool for impacts to their audience in a manner that can be easily comprehended.

matrices, while able to identify first-order effects, cannot show higher interactive effects impacts. Simple interaction matrices largely overcome this limitation. But such matrices rally useful for depicting ecological interactions only and for the sake of documentation. While f of the interaction is identified, individual actions of the project are not correlated with their impacts on the environmental components.

and quantitative matrices offer that element of rating and weighting that is lacking in the interaction matrices and through this offer a criterion for decision-making analysis.

is are strong in identifying impact and, unlike checklists, can also represent higher-order effects eraction. Some of the dynamic nature of impacts can also be identified. They can also provide ctions of impact measurement, interpretation and evaluation and can communicate the results

format to their audiences. But they cannot compare alternatives in a single alternatives to be assessed and presented separately.

of identifying direct and indirect impacts, higher order effects and interactions, hence, are able to identify and incorporate mitigation and management planning stages of a project. They are suitable for expressing ecological impacts not considering social, human and aesthetic aspects. This is because weightings and not features of network analysis.

consider only adverse impacts on entire environment and hence decision-making in and benefit of a development project to a region is not amenable to network considerations are not properly accounted for and short-term and long-term differentiated to the extent required for easy understanding.

consider only adverse impacts on entire environment and hence decision-making and benefit of a development project to a region is not amenable to network considerations are not properly accounted for and short-term and long-term differentiated to the extent required for easy understanding.

when addressing questions of site and route selection. They provide a suitable and presentation and display to audiences. But overlay analysis cannot be the sole environmental impact assessment.

subjective in that they rely on the judgment of the analyst to evaluate and assess compatibility relating to the existing land use patterns and the prospects of the activity. In practice, overlays are self-limiting because of type finite number of that can be overlaid.

very useful in transport project EIAs for comparing land capabilities, existing and uses, road route alternatives and other similar parameters.

CHAPTER# 04

DESCRIPTION OF THE ENVIRONMENT

Baseline data (physical, biological and socio-economic parameters) related to the project area. The information has been compiled by using primary and secondary data. This chapter also refers to the theoretical analysis of the methodology adopted for the collection of data. The underlying principles and practices adopted in this regard are also discussed.

Location

Geography

Sialkot is located at 31°16'N latitude and 73°59'3.49"E longitude. The city is well connected with its surrounding urban centers like Gujrat (25 km), Gujranwala (54 km) and Narowal. Sialkot is also a District. Sialkot is spread over an area of 3,241 km² and comprises 5 tehsil such as; Sialkot, Sambrial, and Sialkot Cantonment.

Sialkot is located in the Rachna Doab, and consists of some recent sediment brought by spill channel from the river Ravi. There are some old channel levee remnants and old basins filled up with clay materials. The geology of the area is Late Pleistocene Age derived from mixed calcareous, sedimentary and metamorphic rocks of the Lower Himalayas.

Sialkot City is flat. The area is a part of Rachna Doab and consists of sub-recent sediment brought by spill channel from the river Chanab. There are some old channel levees remnants and old basins filled up with clay materials. The material is probably of Late Pleistocene Age derived from mixed calcareous sedimentary and metamorphic rocks of Lower Himalayas. The area of the city is comprised of the fluvial deposits of River Chanab.

The topography of the project area is flat and surrounded by fertile agricultural land. It is 0.5 km away from Toll Plaza and is well connected to the other cities.

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Sialkot has extreme climate conditions and summer season starts from April and continues during the summer season, temperature ranges from 30°C to 48°C. The winter season starts from November and continues till March. December and January are the coldest months with a minimum temperature of about 3-5°C. The dust storms occur occasionally during the hot season, May to August.

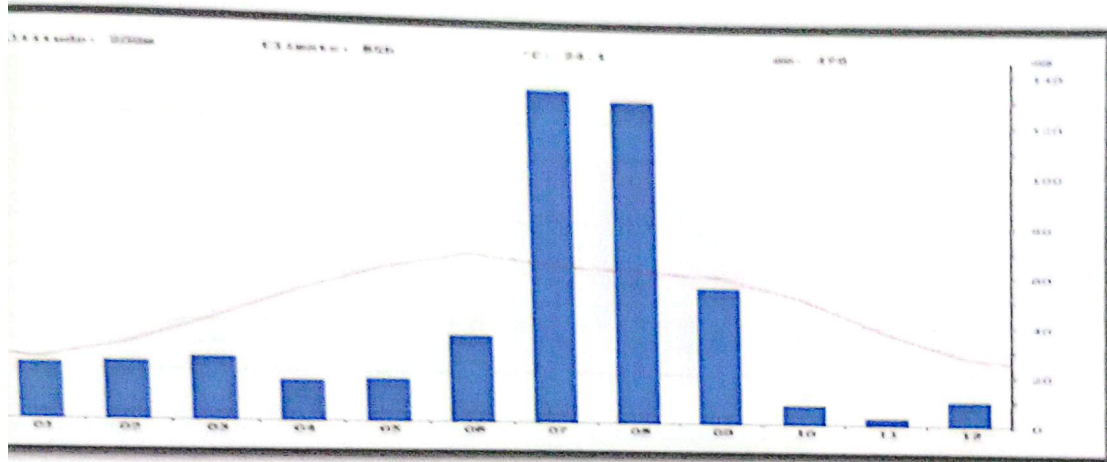
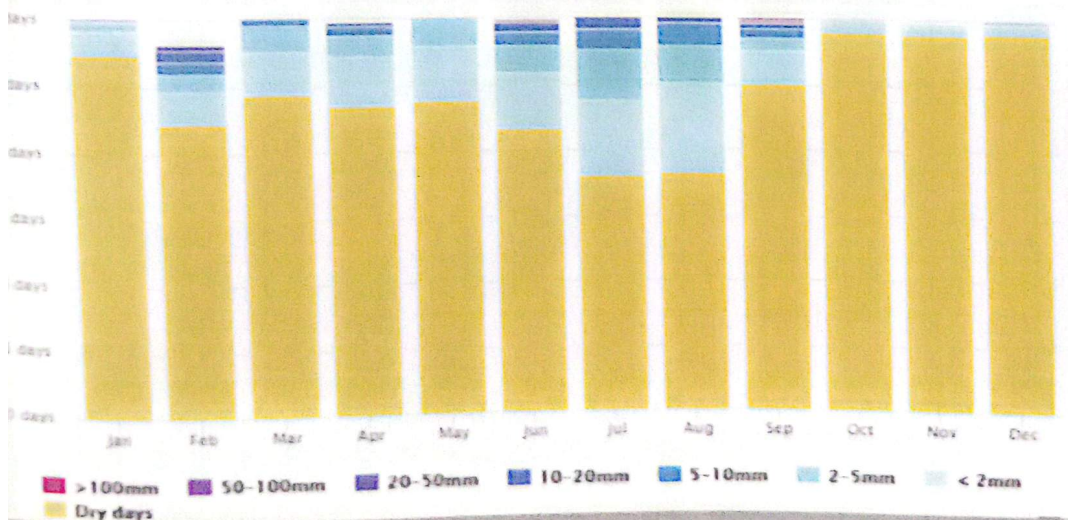


Figure 1: Annual Mean Temperature

Summer alternates with oppressive weather. The rainfall is 500 mm per annum. In the recent past, the maximum average precipitation occurred in September and it was around 50-100mm.



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Figure 2: Average Annual Precipitation

Wind speed was highest in July which was 38 km/h. In recent years, the maximum wind speed has reached 38 km/h. The diagram shows how many days within one month can reach certain wind speeds. Monsoons create steady strong winds on the Tibetan Plateau from November to April, but calm winds from June to October.

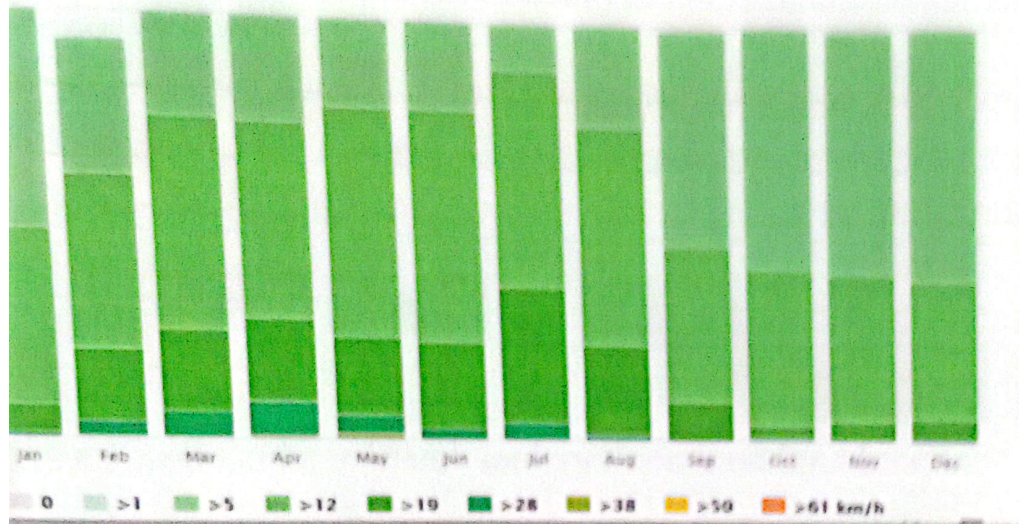


Figure: Average Wind Speed

city:

Seismic Zoning of Pakistan, the project area lies in Zone 2A and represents minor to moderate damage due to earthquakes.

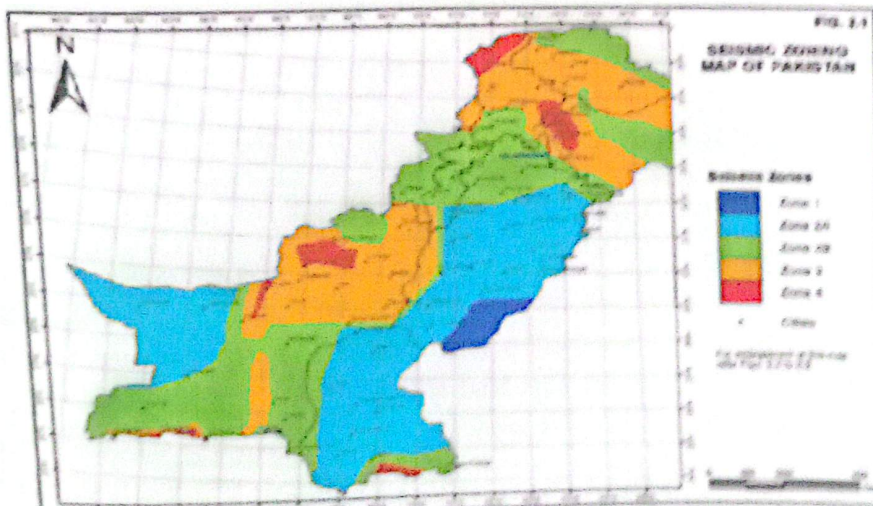


Figure: Seismic zoning of Pakistan

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Ecological Environment:

Sialkot is not rich with biological and ecological resources. However, the flora and fauna of the area includes; shrubs, herbs, mammals, birds, reptiles, amphibians and insects are found. They are listed in detail below:

Aquatic Flora and Fauna

The canal present in the study area which is being used for the irrigation purpose is Upper Chaneb Canal. No aquatic life is reported in Upper Chaneb Canal that can be at the verge of damage and disturbance. Moreover, no aquatic ecosystem (i.e., stream, river or pond) observed within or around the study area, which omits the possibility of any kind of aquatic species that may be harmed due to establishment of metal refinery unit.

The project is located in sparsely populated rural area which has a variety of the trees. For the construction of this project few trees of different species will be removed. The dominant tree species in the project area include; Eucalyptus, Neem, and Kikar. The nomenclature including common, English, and botanical names of the flora found in the study area are presented in Table 12:

Inventory of the Trees Present in Sialkot District

S#	Common Name	Scientific Name
1	Neem	<i>Azadirachta indica</i>
2	Kikar	<i>Vachellia nilotica</i>
3	Safeda	<i>Eucalyptus globulus</i>

Fauna

For study of fauna in the project area, field guides and books were consulted. On the other hand field observations were conducted along with the interviews of local community members about the fauna of the area. The equipment used in field included cameras, binoculars and GPS device (wherever required). It is important to note that there is a number of factors which can change the findings of such survey. It may be pointed out that the pattern of seasonal migration of small birds varies depending upon each specie. The proposed site has no fresh water aquatic body except upper

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Canal (3.7km) having no life, hence there is no freshwater aquatic life in the study area. During construction activity in project area, no important biological feature will be damaged or disturbed.

Commonly found birds in District Sialkot includes; Hares, Falcon, Eagle, Quail, Starling, Jungle Russian Sparrow, Doves, King Fisher, Parrot, Crow and Local Sparrow.

Commonly found mammals in the area include; dogs, cats, horses, house-rats, squirrels, porcupines etc. However, Small Indian Mongoose and Indian Palm Squirrel are also found in the District

Table 2: Mammals in the Study Area

S#	Common Name	Scientific Name
1	Rat	<i>Rattus</i>
2	Bat	<i>Chiroptera</i>
3	Small Indian Mongoose	<i>Herpestes javanicus</i>
4	Indian Palm Squirrel	<i>Funambulus palmarum</i>
5	Porcupines	<i>Erethizon dorsatum</i>
6	Squirrels	<i>Sciuridae</i>

Commonly found birds species include; House Sparrow, Crow and some of them are mentioned with scientific names:

Table 3: Birds in the Study Area

S#	Common Name	Scientific Name
1	House Sparrow	<i>Passer domesticus</i>
2	House Crow	<i>Corvus splendens</i>
3	Pigeon	<i>Columbidae</i>
4	Bulbul	<i>Pycno notidae</i>
5	Teetar	<i>Francolinus francolinus</i>
6	Parrot	<i>Psittaci forms</i>
7	Titodi	<i>Vanellus indicus</i>

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strict Sialkot reptiles such as Snakes (Cobra and Kraits), Spiny Tailed Lizard and Fringed Toed Lizard common in the tract, but cases of snake bites are very rare, as these reptiles have been either by expanding urbanization or they have moved away.

Table 4: Reptiles in the Study Area

S#	Common Name	Scientific Name
1	Snake	<i>Serpentes</i>
2	Spiny Tailed Lizard	<i>Uromastix hardwickii</i>
3	Fingered Toed Lizard	<i>Acanthodactylus cantoris</i>
4	Earthworm	<i>Lumbricina</i>

amphibians commonly seen around the project area, especially during the rainy season includes;

Table 5: Amphibians in the Study Area

S#	Common Name	Scientific Name
1	Common Frog	<i>Rana temporaria</i>
2	Indus Valley Toad	<i>Bufo stomaticus</i>

large number of insects are present due to open fields in the project site. Few of these insects are known to cause diseases in local population. Following is a list of commonly observed insects at the

Table 6: Insects in Study Area

S#	Common Name	Scientific Name
1	Black Ants	<i>Paratracheaioignicornis</i>
2	Dragon Fly	<i>Dragon Fly</i>
3	House Flies	<i>Musca domestica</i>
4	Butter Flies	<i>Parnassiusbalucha</i>
5	Honey Bees	<i>Apis mellifera</i>
6	wasps	<i>Anagyrus pseudococci</i>

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7	Grasshopper	<i>Melanoplus differentialis</i>
8	Mosquito	<i>Anophele sp.</i>

gered species are found at the site. The area has not been identified as ecologically sensitive wildlife department.

Water Resource

source of the water consumption is the ground water which is being pumped from 200-250ft being used in the study area for domestic purposes. To check the quality of the water in the ground water was collected and analyzed. The ground water was collected from bore hole to the project area. The detail of the water quality of the project area is given below:

Water Quality Results

Sr#	Parameters	Units	Concentrations	WHO Standards
1	pH value	----	7.69	6.5-8.5
2	TDS	mg/l	337	<1000
3	Turbidity	NTU	0.277	<5NTU
4	Chloride	mg/l	30.6	Max 250
5	Alkalinity	mg/l	271	---
6	Color	---	Complies	Non-Objectionable
7	Odor	---	Complies	Non-Objectionable
8	Taste	---	Complies	Non-Objectionable

results of the groundwater analysis showed that all the parameters were within the limits as described in WHO guidelines.

Socio-Economic Environment

section provides collective information about the existing socio-economic and environmental situation of the project area within the AOI. The different types of socio-economic aspects were considered such as demographic profile, occupation, education and health facilities. This data helped in

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Identifying major interventions for the development of Environmental Management and Monitoring (EMMP). The study also helped to assess the positive or adverse impacts on local community. The occupation of the people in the study area is agriculture and the detail of crops, being sown in specific area is given below:

Cultivated Crops

The main crops that are being cultivated in the study area includes; Rice, Wheat, Sugarcane, Onion, Tomato and Potatoes as well as fodder crops. The area is famous for best Basmati rice production in the world.

2.1 Livestock

People in the study area have common livestock which include; Cows, Buffalos, Sheep, Goats and Hens. However, there is no proper cattle or poultry farm observed within the study area.

2.2 Demographic Information of Study Area

The establishment scrap melting unit will be located in the sparsely populated area at Sialkot Processing Zone, District Sialkot. The demographic features include the information on population, family system and size, occupation, income and other social amenities available, etc.

The Hariya Tibbi Village is at approximately 0.85 km distance away from the project site. The total population, of village is approximately 4520 having ratio of 44% males and 56% females.

2.3 Social and Public Amenities Available

The social and public amenities present in the area are given below:

a. Physical structures

There is no population living in the project area but the study area is semi populated. The land use on the project site is residential in nature. The people in this area are deprived of basic facilities like health, proper sewerage and sanitation facility, medical facilities, provision of safe drinking water, etc.

b. Religious Structure

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There is a mosque located at 0.9km from the project area. There is no shrine, structure or any other religious infrastructure present in the proposed project site that could be damaged and dislocated due to the proposed project establishment.

c. Protected Structures

There is no protected site, structure or any other social infrastructure present in the proposed project site.

d. Cultural Heritage and Community Structure

As stated earlier that the project area has no population and physical structure that may be damaged due to the establishment scrap melting unit. Survey team also visited the study area but did not find any cultural heritage and community structure within the study area that could be impacted due to the proposed project.

4.4 Quality of Life Values

Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the survey team to collect desired information. Graphical representation of results of Socio-Economic Survey is given below:

4.4.1 Occupation of Respondents

Majority of the respondents (20%) belongs to the labor class, 33% have their own business, 13% daily wagers, 13% attached with agriculture, 7% shopkeepers and remaining 7% are private employees. During survey, efforts were made to interact with people representing all walks of life. The detailed graphic representation of occupational status is given below:

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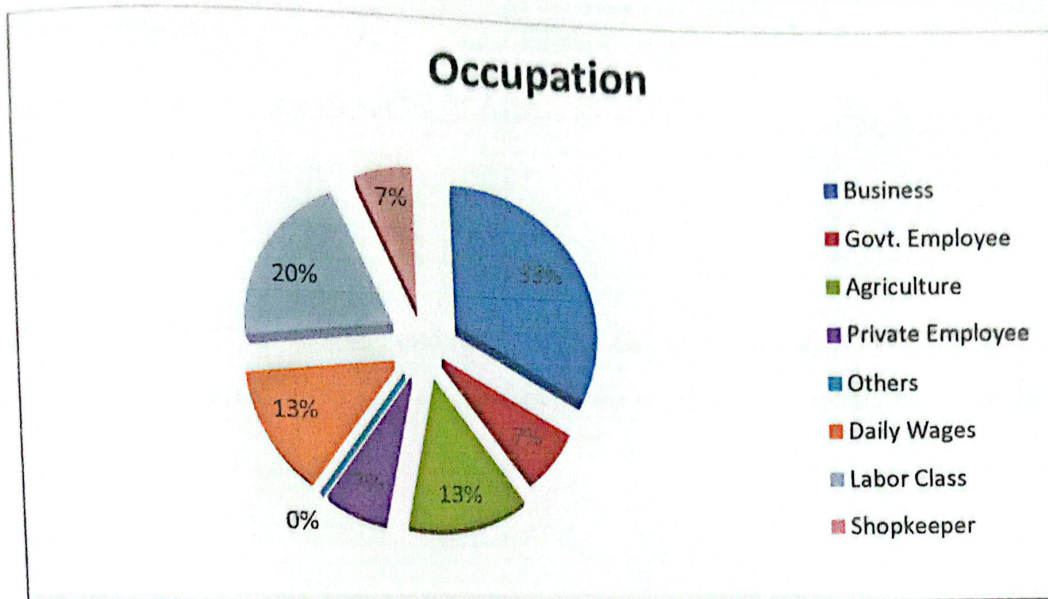


Figure 3: Occupation of Respondents

Personal Income

Based on the sample survey results, as the figure shows that nobody was earning less than 20,000 rupees, 69% of respondents fall within the income range of 20,000 – 25,000, 23% respondents earn 30,001 – 40,000 while only 8% of the respondents earn within the range of 40,001 – 45,000.

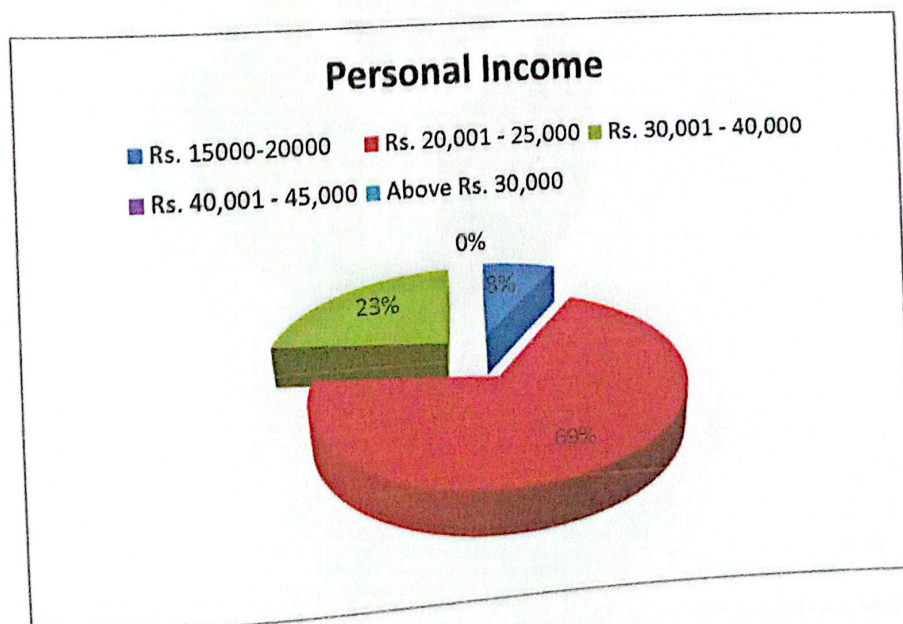


Figure 4: Personal Income

Educational Institutes

is one primary school, secondary school and Government & Private Colleges present in the study

Facilities Available

Facilities available at the houses, shops and factories are depicted here. It shows that electricity, water supply, telecommunication, sewerage, gas supply and every other routine facility is available in study

Literacy Rate

From survey results, it was found that 14% of the studied population was illiterate, 36% was up to primary level, 43% studied up to middle level and only 7% of the respondents studied up to higher secondary level.

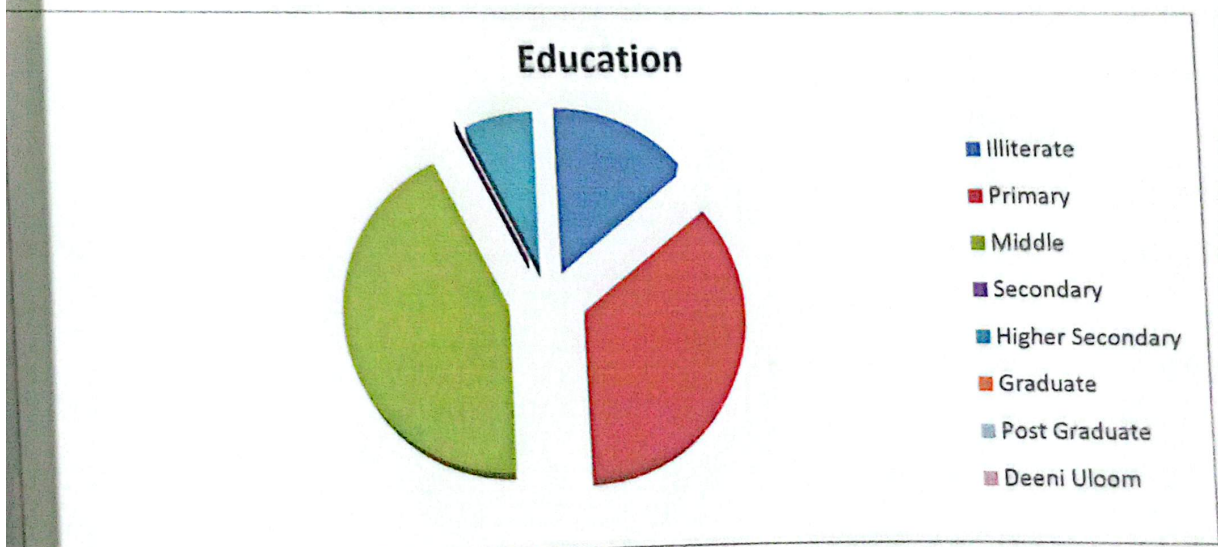


Figure 5: Literacy Rate

Common Diseases

According to the survey the common diseases recorded in the project area were, Diabetes, Fever, Hepatitis, Hypertension, stomach problems, Malaria, Typhoid, Nephritis and Diarrhea

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for the Project

ts were inquired about their views regarding the proposed project. Out of total 14
ts 70% of the respondents knew about the project whereas, rest of the respondents doesn't
knowledge of the project planning and commencement. Almost 85% respondents of were
the establishment of metal refinery unit in their vicinity as this will increase the employment
es and raise the overall socio-economic status of the area.

Table 8: Concerns and Solutions

ne	Concerns	Solutions
ent	The hiring during construction and operational phase, local should be considered realistically	The proponent will try to engage local people on priority basis
ental	Air pollution, improper handling of wastewater and mitigation of noise impacts	• Based on the result of ambient air and noise sampling, necessary mitigation measures will be adopted • To mitigate the impact of the contamination from the generation of wastewater, waste will be handled properly • To control the air pollution suction hood consisting of bag-house filters and ID fans will be installed • Tree plantation will be carried out in the designated green space
Impact	Public nuisances' issues may arise due to the spread of diseases in the case of improper disposal of the solid	• Proper handling of the waste such as segregation and composting of the solid waste will be carried out to

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	waste and the air emission may cause issues	reduce the public nuisance and to improve the public health • To control the air pollution suction hood consisting of bag-house filters and ID fans will be installed • A registered will be maintained to registered the complaints of the local community
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Community Issues

Community was asked about the burning issues they are facing. The majority of respondents complained about lack of sewerage system, solid waste management system, lack of safe drinking water supply, proper health and educational facilities.

4.5 Suitability of the Site

The site does not fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not impact by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of proposed project.

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CHAPTER# 05

ANALYSIS OF ALTERNATIVES

General

This chapter deals with an analytical overview of the different alternatives that have been considered in the project. The analysis has been carried out critically so as to justify the need of the project. Beside the economic viability, environmental sustenance and social soundness of the proposed project should also be considered when analyzing various alternatives. The various alternatives which have been considered during the conduct of the study are as under:

1. No Project Option
2. Alternative Construction Methods
3. Alternative Geometry

5.1 No Project Option

Salloke and surrounding areas have to travel significant distances along either North to Daska Pasrur Interchange or South to Pasrur Interchange in order to have access to Lahore Sialkot Motorway (LSM) M-11. This is because no direct link exists that connects the residents of Salloke and surrounding populated areas with Lahore - Sialkot Motorway within close vicinity. Therefore, no option other than this project is considered.

- ❖ Alternatives of location
- ❖ Development of Environmental Site Selection Criteria:

The site selection criteria were based on a number of parameters as indicated below:

- a) Land Availability
- b) Environmental Issues
- c) Social Issues

a. Land Availability

Proponent is going to construct an Interchange at Salloke on Lahore-Sialkot Motorway.

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Environmental Issues

Consideration has to be given to the sensitive issues related to the environment, forest, wet lands, reserves, agricultural land etc. while assessing the alternative sites for the development of this

Social Issues

These form an important element in the assessment criteria. Different socially sensitive elements like schools, mosques, playgrounds, which can create social issues have to be given due consideration while assessing the different sites.

Alternative Construction Methods

The feasibility and constructability of the project is well good. The process basically includes the transportation of equipment to the site and the assembly of pre-fabricated unit. Thus, the impacts from the construction activities are very manageable from the environmental point of view.

Alternative Geometry

The alignment is as short as it can be and avoids the local, villages and all settlements.

CHAPTER 06 PUBLIC CONSULTATION

Objectives of Consultation

Public consultation plays a vital role in studying the effects of any development project on stakeholders and successful implementation and execution. It affords an opportunity to exchange knowledge with public, directly or remotely. Referring particularly to a project related to environmental assessment, involvement of public is all the more essential, as it leads to better and more acceptable decision-making. Overall objective of the consultation with the stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known and are unique to the Project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-developmental phase, goes a long way in updating the knowledge and understanding.

Responsible Authority

The proposed Project "Salloke Interchange on Lahore-Sialkot Motorway" District Sialkot, involves stakeholders from various segments of the area, who have direct or indirect interest in the developmental activity. The consultant team has endeavored to hold consultative sessions with a number of prominent stakeholders to evince their views on the proposed Project, inter-alia, their opinions, suggestions, and understanding on various issues and concerns.

The consultations aimed specifically at:

- ✓ Exchange of information related to the Project and its possible utilization in the Project planning and execution.
- ✓ Dissemination of information through discussions, education and liaison.
- ✓ Collaboratively solving the problems.
- ✓ Eliciting the comments and feedback on the proposed Project.
- ✓ Documentation of information narrated by the stakeholders.
- ✓ Documentation of mitigation measures proposed by the stakeholders.
- ✓ Incorporation of public concerns and their redresses in the EIA.

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Stakeholder's Consultations

There are two types of stakeholders, i.e. primary and secondary stakeholders. The primary stakeholders are the initial stakeholders, such as affected persons, general public including women and children in villages in the vicinity of the project area. Accordingly, the consultations were made with all primary stakeholders for sharing the information regarding the sub-project components, i.e. construction of an Interchange and community feedback regarding the project. However, the consultative meetings were also held with the secondary stakeholders including the officials/ staff involved in planning & design, and management.

Public Consultations:

Consultations were made with the affected and other local community to share the information about the project and record their concerns/ feedback associated with this project.

Individuals and organizations consulted are given in Annexure. List of public consultations carried out in the surrounding of the proposed project is given in the Table.



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Table 6.3: List of Participants during the Public Consultations& Concerns

Sr. No.	Location/ Venue	Names of main Participants	Feedback/ Concerns (Positive)	Feedback/ Concerns (Negative)
1	Khaira Kallan	Mr. Shabbir Ali S/o Bashir Ahmad CNIC.NO. 355010405082-7	People are mostly satisfied with the project. On overall basis, this is a good project because it will help to improve economic conditions of area.	Little bit Dust will blow during arrival of construction material.
2	Meisipur	Mr. M Ijaz S/o M Ali CNIC.No.35501-0404932-5	Construction of the project will create labour opportunities for locals Very Beneficial	No change
3	Within the vicinity of the project	Mr. Hammad Sajjad S/o M Sajjad CNIC.No. 38201-7842458-3	In favour because it will help in reduction unemployment	None
4	Near motorway	Mr. Waqas Iqbal S/o Iqbal Hussain Residence of Kikkar Kallan CNIC.No. 35303-1072349-7	No issue regarding project rather it will create job opportunities and improve the living standard of local community	Noise Dust
5	MeishPur	Mr. Abi Ali S/o Shihadat Ali CNIC.No. 35501-0431324-5	This project is highly recommended and supported as unskilled persons will get the labor opportunities	None

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		during construction phase.	
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INGS WITH STAKEHOLDERS

and focus group discussions were held with government authorities, nearby networks and rs. During conversations with occupants and nearby locals of the area, it was uncovered that knew about the project and majority were in favor for its development.

Illoke Interchange	Occupation	Organization	Response
aqas Ali	Business	Business	In favour
ammad Sajad			In favour
yed Abrar Hussain	Retired Govt Employee	Govt	In favour
l. Ijaz	Shop owner	Business	In favour
Malik Sabir	-	-	In favour
ilal Hashim	-	-	In favour
Qazi Shakeel Ahmed	-	-	In favour
Mustafa	Fruit Vendor	Business	In favour
Ghulam Murtaza	Shop owner	Business	In favour
Arshad Mehmood	Shop owner	Business	In favour
M.Safdar	Shop owner	Business	In favour
Bilal Khan	Business	Business	In favour
Zahid Khan	Employee	Employee	In favour
M.Abid	Shop owner	Business	In favour
M. Usman	Shop Owner	Business	In Favour

Public Response Regarding Project

Interviewed individuals for interchange were in favor of the project and wanted work to start as possible.

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Public Response against Proposed Project Development

Saloke Interchange	
Ad Ali	- Highly in favour of project - Avoid delays in construction to limit the inconvenience to the public caused by road construction - Avoid dumping of construction material and carry out proper site clearance after completion of construction activities
Abrar Hussain	- In favour of project
Sabir	- In favour of project
Hashim	- In favour of project - proper traffic plan should be provided
Shakeel	- In favour of project - Avoid delays in construction to limit the inconvenience to the public caused by eimanabad road construction - Avoid dumping of construction material and carry out proper site clearance after completion of construction activities
Shakeel	- Govt should involve locals in construction/Operational phase to increase employment
Shakeel	- Highly in favour of project - Requested Construction design for Interchange so that traffic management plan can be made accordingly

Stakeholder Concerns

Common concerns regarding the project are listed below

- Stakeholders were in favor of the project and want it to be started without delay
- Take on measure to limit residue, smoke and clamor contamination during development
- Avoid dumping of development material and do legitimate site leeway after consummation of development exercises
- Avoid delays in construction to limit the inconvenience to the public caused by road construction.
- Appropriately planned redirections during development/construction phase

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uction to be done on time without delay

ent and Instruments Maintenance Details

proponent will create their own system, i.e. equipment for monitoring of air, water and the services of a private laboratory for the monitoring and analysis.

mental Budget

ital budget for the Interchange is approximately 10 Million rupees.

al Training Programs

raise the level of professional and managerial staff, they need to upgrade their knowledge ed areas. The EMC will play a key role in this context.

r's environmental awareness and appropriate knowledge of environmental protection is the successful implementation of the EMP because without appropriate environmental s, knowledge and skills required for the implementation of the mitigation measures, it would ult for the contractor(s) to implement effective environmental protection measures. A training program is proposed to train the staff that will be involved in the construction and al stage on environmental protection and management.

Chapter#07

Screening of potential Environmental Impacts & Mitigation Measures

ter identifies the potential impacts due to the implementation of an Interchange on the biological and social environment of the Project Area. The chapter also identifies measures help mitigate the project's adverse environmental effects and enhances positive impacts.

ect Location:

ect site is located at Lahore-Sialkot Motorway at Salloke District Sialkot.

owing scale has been used for the evaluation of potential impacts on different environmental

ole/No Impact:

npact which has unapparent and negligible influence on natural and socio-economic nment.

dverse Impact:

npact which has a slight influence on the natural and socio- economic environment.

um Adverse Impact:

mpact which can be eliminated/mitigated after applying the appropriate mitigation measures.

n Adverse Impact:

e impact which can be partially but not fully mitigated by applying the mitigation measures.

ositive/Beneficial Impact:

ne impact which improves/enhance the natural and socio-economic environment

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of Environmentally Potential Impacts for Construction Phase "EIA of Construction of Salloke Interchange"

Impact Characteristics														
Direction		Duration		Location		Frequency		Extent		Significance			Reversibility	
Positive	Negative	Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Small	Rev.	Irrev.
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tion of Environmentally Potential Impacts for operation Phase "EIA of Construction of Salloke Interchange"

Impact Characteristics														
Direction		Duration		Location		Frequency		Extent		Significance			Reversibility	
Positive	Negative	Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Small	Rev.	Irrev.
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Legend: Negative Impact (●) Positive Impact (★)

3: Environmental Impacts Evaluation Matrix during the Construction Phase

Impacts Evaluation Matrix during the Construction Phase															
Physical Environment								Ecological Environment		Socioeconomic Environment					
Topography/Drainage	Soil Quality		Landscape	Surface Water Quality		Groundwater Quality	Air Quality	Noise & Vibration	Flora	Fauna/ Wildlife	Health & Safety	Disruption of Public Utilities	Employment	Population Disturbance	Traffic Management
	LA	LA	O	LA	LA	LA	L A	MA	MA	LA	L A	MB	LA	O	
	LA	LA	L A	LA	O	MA	L A	MA	LA	LA	L A	MB	LA	LA	
	O	LA	O	O	O	LA	M A	O	O	LA	O	LB	LA	LA	
	O	LA	O	LA	LA	LA	O	O	O	LA	O	O	O	LA	
on	LA	LA	L A	LA	LA	LA	O	LA	LA	LA	O	MB	LA	O	
	O	M A	O	LA	LA	LA	O	LA	LA	LA	O	LB	LA	O	
ns	M A	M A	M A	LA	O	LA	M A	LA	LA	MA	L A	MB	LA	LA	
ete	LA	LA	M A	LA	O	MA	M A	LA	LA	MA	L A	MB	LA	LA	
n	M A	M A	M A	MA	O	MA	M A	LA	LA	LA	L A	MB	LA	LA	
	O	LA	O	LA	O	LA	M A	LA	LA	LA	O	MB	LA	LA	
oads	LA	LA	L A	LA	LA	LA	L A	LA	LA	LA	M A	MB	LA	LA	

nsignificant / no impact, LA = Low Adverse, MA = Medium Adverse, HA = High Adverse, ollicable, LB= Low Beneficial, MB= Medium Beneficial, HB= High Beneficial

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Environmental Impacts Evaluation Matrix during the Operational Phase
 O = No impact, LA = Low Adverse, MA = Medium Adverse, HA = High Adverse,
 LB = Low Beneficial, MB = Medium Beneficial, HB = High beneficial

Physical Environment							Ecological Environment		Socioeconomic Environment				
Topography	Soil Quality	Landscape	Surface Water Quality	Groundwater Quality	Air Quality	Noise & Vibration	Flora	Fauna	Public Safety	Employment	Population Disturbance	Economic Activities	Traffic Management
O	O	O	LA	O	LA	LA	O	LA	LA	MB	O	MB	O
O	LA	LA	LA	LA	LA	O	O	LA	LA	LB	O	O	O
O	O	O	O	O	LA	O	O	O	O	MB	O	MB	HB
LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	MB	LA	MB	LB
O	LA	O	LA	O	LA	LA	O	LA	O	MB	O	O	MB
O	O	O	O	O	O	O	O	LA	LA	O	O	O	LA

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During Construction Stage

IMPACTS

Air Quality

will be affected a little bit by the fugitive dust and emissions from the construction and vehicular traffic during the construction phase. These air emissions may contain matter (PM), Smoke, Dust, CO, SO_x, NO₂.

sources of air pollution during the construction phase are listed below:

quarry areas that generate fugitive dust.

haulage trucks that generate dust, particularly during transportation, loading and unloading processes.

gaseous emission by Construction equipment and vehicles.

Measures

Good engineering practices will be used at quarry areas to minimize the impact of dust emissions.

Concrete batching plants will be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce the level of dust emissions.

The NEQS applicable to gaseous emissions generated by the construction vehicles, equipment and machinery will be enforced during the construction works. Contractor should make sure that all equipment and vehicles are tested for emissions. Regular maintenance of equipment and vehicles will also control the incomplete combustion.

Noise Level

It is anticipated that powered mechanical equipment and some local labor with hand tool methods will be used to construct the project works. No blasting is anticipated. Powered mechanical equipment can create significant noise and vibration. The cumulative effects from several machines can be significant.

Control Measures

To minimize such impacts, the contractor for project should be requested by the construction supervision consultants (engineer) to provide evidence and certification that all equipment to be used for construction is fitted with the necessary air pollution and noise dampening devices to meet EPA requirements.

Noise will be controlled by monitoring at a distance of 100m from the boundary wall while

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following the NEQS of 45dB (A).

Noise from construction of substations is not covered under any regulations however in order to keep in line with best international practice.

All noisy equipment should be far away from Sensitive receptors as possible to prevent nuisances to dwellings and other structures from operation. However, if the noise still exceeds NEQS then noise barriers will be installed around the equipment to reduce the effects of the noise. Mitigation measures such as barriers installation should be discussed with the local population if required.

Noise barriers should be installed for the workers working more than 8 hr/day during construction activities. Noise level from construction activity can be reduced by regular maintenance of machinery. Noise can be controlled through engineering control e.g. hammering actions can be substituted by hydraulic. Ensure that the workers are wearing PPE's (ear plugs, ear muffs etc.) where engineering control is not applicable to reduce the impact of noise.

Table 7.1: National Environmental Quality Standards for Noise

o.	Category of Area/Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2012	
		Limit in dB(A) Leq*			
		Day time	Night time	Day time	Night time
	Residential are (A)	65	50	55	45
	Commercial area (B)	70	60	65	55
	Industrial area (C)	80	75	75	65
	Silence zone (D)	55	45	50	45

re:

Time hours: 6 .00 am to 10.00 pm

ht Time hours: 10.00 pm to 6.00 am

ence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.

ed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.

A) Leq: time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

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4 Soil Erosion

There will be no soil erosion as land available is deeper as compared with road, so excavated land will be used for land filling.

Mitigation Measures

Mitigation measures required; regular water sprinkling will reduce the chances of soil erosion.

5 Drainage

Impact is anticipated on the natural drainage by the implementation of the project. However, a temporary drainage system for toilets and workshop effluents needs to be developed.

Mitigation Measures

A design engineer will ensure appropriately sized drainage to avoid negative impacts due to sewage effluent. During construction phase, temporary drains and embankments would be necessarily made to channel the runoff appropriately.

6 Soil Contamination

Soils may get contaminated from the spillage of chemicals like fuels, solvents, oils, paints and other construction chemicals and concrete. This normally happens when these materials are transported in open or loosely capped containers. Unmanaged sewage can also contribute to contamination of soil. Possible contamination of soil by oils and chemicals at camp sites, workshop areas, and equipment parking-yards may limit the future use of land for vegetation purposes.

Mitigation Measures

Spills are very rare and are preempted by routine maintenance. Good housekeeping techniques should be used to control oil spillage. Responsible authority should ensure that the maintenance schedule of each piece of hardware is adhered to.

Waste generated at the campsites will be properly treated and safely disposed of only in the designated waste disposal sites.

7 Cut and Fill and Waste Disposal

Disposal of surplus materials must also be negotiated through local authority approvals prior to the commencement of construction. The project work does not involve any significant cutting and filling.

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mitigation Measures

Project detailed designers have so far estimated that no substantial additional materials will be required subject to confirmation at the detailed design stage.

Socio Economic and Cultural Environment

This section describes the impact of the proposed Project on local communities, construction workers, and vulnerable people as well as on structures or sites of cultural and religious significance.

Impacts on Local Communities/Workforce

The area's surrounding communities will be affected during the construction phase as follows: Unmonitored construction activities, e.g. excavation, equipment movement etc. may create accident

and require strict construction controls by the contractor to avoid inconvenience to the locals due to noise, vibration and fugitive dust.

Good relations with the local communities will be promoted by encouraging contractors to provide opportunities for skilled and unskilled employment to the locals, as well as on-the-job training in construction for young people. Contractor will restrict his permanent staff to mix with the locals to avoid any social problems.

Disease Vectors

Wherever water is allowed to accumulate, in temporary drainage facilities, due to improper storm water management, or improper disposal of wastewater generated from the site, it can offer a breeding site for mosquitoes and other insects. Vectors such as mosquitoes may be encountered if standing water is allowed to accumulate at the construction camp site.

mitigation Measures

Regular removal of surface water from all areas and prevent the accumulation of surface water ponds.

3 Impacts during Operational Stages

Air Pollution and Noise from the Enhanced Operations

The project works will extend the power distribution lines. No houses, mosques or schools are close to the interchange. The operation of the facility is not likely to cause any appreciable increase in the noise level already generated by the existing equipment. However, it is recommended that an acoustical check be made on the detailed design to determine if any noise barriers are required. There is no source of atmospheric pollution from the project.

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Chapter#08

Environmental Management & Monitoring Plan

er provides an overall approach for managing and monitoring the environment related
nify the resources required to implement the EMP and outline the corresponding financing
ents.

Environment EMP

onmental protection and enhancement are achieved in various ways. These approaches
gin right at the embryonic stage, i.e.

ject location,

esign, specifications and tender/contract documents,

onstruction activities and

ost completion activities i.e., operation and maintenance stage.

ate environmental management measures are required to be exercised in each stage of the

way, it is envisaged that the Project will achieve maximum ongoing cost-effectiveness,
mental sustainability and social soundness, far beyond the end of implementation of the
: All the stages of the Project have to be managed by adopting the proposed environmental
ion measures, where, besides engineering aspects, due importance is to be accorded to
ion measures which make a perfect blending with the surrounding ecosystem.

Environmental and social issues, which have already been discussed in last Chapter are as

- Contamination of air, water and soil during the construction activities
- Borrowing of aggregate materials
- Soil erosion and soil contamination
- Impact of noise generated by vehicles, machinery and equipment during the construction activities
- Impact on community and work force safety as a result of accident hazards during the construction and operation of the project.

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Management/Mitigation	Responsibility of Monitoring	Monitoring Frequency
PRE-CONSTRUCTION PHASE		
d In all instances, Registered Construction Firm, service providers, contractors and consultants must remain in compliance with relevant local and national legislation	All	Once at Design Stage and prior to moving onto site
& The design specification will be followed to withstand local standards regarding noise and vibration for high degree of structural competence, reliability and ease It will be ensured that necessary utilities (sewerage, electricity and drinking water supply) are not interrupted of adjacent buildings. However, where required temporary arrangement will be made available to avoid any interruption of utility services. Admitting ample natural light wherever feasible and using color-corrected lighting in interior spaces which closely approximates natural daylight	Design Engineer	Design Stage and prior to moving onto site
o site Access to site will be via existing roads. The Contractor will need to ascertain the existing condition of the roads and repair damage due to construction All roads for construction access must be planned and approved by the Engineer and its Environmental Expert No trees, shrubs or groundcover may be removed or vegetation stripped without the prior permission of the Engineer/ Environmental Expert Agreed turning areas for haulage vehicles are to be formalized and used by the	Design Engineer & Environmental Expert (EE)	Prior to moving onto site

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	Contractor. No turning maneuvers other than at the designated places shall be permitted The Local Traffic Police Department shall be involved in the planning stages of the road closure and detour and shall be available on site for the monitoring of traffic in the early stages of the operations during road closure The Local Traffic Department must be informed at least a week in advance if the traffic in the area will be affected.		
ing up of struction ps	1.Choice of site for the Contractor's camp requires the Engineer's permission and must take into account , place is available for the laborers if required, as already mentioned plant is in working condition only a minor changes required. 2.Bins and / or skips shall be provided at convenient intervals for disposal of waste within the construction camp.	Contractor, Design Engineer & EE	During Surveys, Preliminary investigation, site set-up and ongoing
ablishing quipment lay- own & Storage ea	1.Choice of location for equipment lay-down and storage areas must take into account. 2.Storage areas shall be secure so as to minimize the risk of crime. 3.It is very important that the proximity of residents, businesses, schools, etc. is taken into account when deciding on storage areas for hazardous substances or materials 4.Equipment lay-down and Storage areas must be designated, demarcated and fenced if appropriate 5.Fire prevention facilities must be present at all storage facilities 6.Material safety data sheets (MSDSs) shall be readily available on site for all chemicals	EE, Engineer & Contractor	During Set- up

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	and hazardous substances to be used on site. Where possible and available, MSDSs shall additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes 7. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures		
Construction/Replacement Phase			
olation of object area id existing ilities	1. Proper and safe isolation of the existing utilities 2. Main pathways will be avoided to part of an isolated area or alternates routes will be provided where needed 3. Safety of worker during isolation of utilities will be kept into consideration to avoid any accidents	Contractor	One time on completion of activity
ringing onstruction aterials, quipment/ ehicles to the ite	1. Use of properly maintained and tuned vehicles onsite to avoid air and soil pollution 2. Demarcation of proper area onsite for parking of construction vehicles 3. Caution should be taken during transportation to avoid any accidents. 4. Prohibit vehicles washing, servicing and repairing works onsite 5. Transportation during the peak traffic hours will be avoided to prevent traffic jams and congestion 6. Construction material should be covered while transporting to the site 7. Safe unloading of material to minimize dust emission. 8. Fugitive dust if generated will be minimized by wet suppression and	Contractor	Weekly monitoring of activity

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	controlled speed of vehicles. 9. Proper storage and yard will be prepared for construction material keeping in view the free space available. 10. The storage area should be adequately designed to protect from rains, run offs, and to be secured from any unauthorized access. 11. Use of water mist, covering sheets or windshields to avoid blowing of dust from soil stockpiles and other windblown materials. 12. Storage of material such as chemicals, fuels, and lubricants on impervious floor or use of spill prevention trays should be taken into consideration to prevent soil and groundwater contamination. Monitoring of containers should be carried out to identify any leakage		
tion	1. Dust emissions during the excavation will be suppressed by water sprinkling. 2. Safety of workers will be taken into consideration to avoid any injury and accidents. 3. Activity will be carried out during the day time to lessen the impact of noise on surrounding environment. 4. Littering by visitors and workers on excavated site will be strictly prohibited. 5. Excavated soil should be stockpiled at appropriate locations. Adequate enclosures to be provided for such storage, to avoid blowing away by wind and run off with storm water. 6. Use of security fences or hazard tapes to warn and control the access of	Engineer & EE	Weekly monitoring during excavation

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	unauthorized persons to the excavated site. Utilize as much as the excavated soil as possible onsite and dispose excess soil at approved municipal landfill sites with prior approval if required.		
Construction/ Rehabilitation	1. Construction/ rehabilitation activities should be limited to daytime to minimize the impacts on surrounding environment 2. Safe and secure movement of machinery or other facilities on the site 3. Dry dusty materials to be properly covered 4. Provision of PPEs like helmets, gloves, long work boots, ear muffs, masks, first aid and safety glasses to workers 5. Safe and secure up-gradation of sheds will be ensured. Environmental Expert will be deputed at the site to make sure that all H&S procedures and desired environmental conditions are achieved	Contractor/ EE	Weekly monitoring of the activity
Staff Conduct	The engineer must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed	Contractor & engineer	Ongoing monitoring
Dust & air pollution	1. Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive speed limits 2. Access and other cleared surfaces including backfilled trenches must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust 3. Where dust is unavoidable in residential or commercial areas, screening will be required utilizing wooden supports and	Contractor & engineer	Daily Monitoring

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pin/reconne n of isolated ties ctricity, ter pipelines, verage line, supply line)	1.Safe rejoining of all temporarily isolated utilities. 2.doption of measures to avoid any damages or disruption in ongoing operative utilities. 3.Adoption of safety measure to avoid any accident/ loss of human life.	Engineer/EE	On completion of activity
parance of e from extra / rplus material id nstruction quipment	1.Timely removal of waste from the site to avoid congestion at work place. 2.Construction waste should be collected and disposed separately from other waste. 3.Care will be taken during handling and disposal of waste. 4.Contaminated soil (if generated) due to accidental spills will be removed and transported to suitable site for disposal. 5.Avoid mixing of hazardous waste with non-hazardous waste. 6.Safe transportation of construction equipment from the site. 7.The contractor must ensure that all structure, equipment, materials and facilities used or created on site for/ or during construction activities are removed	Engineer/EE	On completion of activity
Workers Safety	1.Provision of Personal Protective Equipment to the workers 2.Safety training to the workers 3.Adequate safety signs on site 4.Provide training regarding proper handling and use of chemicals/ paints. 5.Provide safety training procedures etc. 6.Provide fire-fighting equipment during construction. 7.The contractor will arrange the life insurance of all his staff and labour against any accidents.	Contractor, Engineer & EE	Daily Monitoring

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	8. Any loss of public/ private property will be compensated by the contractor		
Restoration of disposal areas, construction areas, dump areas, rockpiles, working platforms and any areas temporarily occupied area) and landscaping of the site	1. Restoration of a site to a similar condition prior to the commencement of the work or to a condition agreed with the Registered Construction Firm management. 2. Empty/available space will be covered with grassy lawns. 3. Use of native vegetation as a part of landscape. Ornamental plant species like roses, jasmine, and seasonal flowers can be used in proposed landscaping, which is a common practice in this part of the world.	EE	On completion of activity
Operational Phase			
Operation and maintenance	1. Carry out periodic audits to identify conservation measures 2. Meeting is to be held on site between the Engineer, EE and the contractor to approve all remediation activities 3. The site should remain free from any garbage or rubbish. 4. Necessary manual shall be developed and trainings will be conducted.	Contractor, Engineer	On completion of project and followed by annual/ biannual audits
Air Quality	No Impact	EE	Quarterly
Noise	No significant impact from the project	EE	Quarterly
Water Quality	No significant impact from the project	Contractor/EE	Quarterly

Institutional Capacity of the unit:

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE/Project Manager
- In-Charge Administration
- Supervisor of project
- Environmental Engineer

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Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged. It will be imparted by a team of experienced trainers.

The organizational structure for the Environment Management Plan is outlined below:

8.3 Training of building contractor:

Training of building contractor & workers will be the part of the TORs regarding the construction of the interchange. The provisions given in EIA Report will be followed.

TORs will be including the training and submission of reports in the following area:

- ✓ Handling of Machineries in a safe way
- ✓ Use of PPE's
- ✓ Maintenance of vehicles and submission of Environmental Monitoring Reports
- ✓ Maintenance of Water Consumption records
- ✓ Testing of water and waste water and submission of Environmental Monitoring Reports
- ✓ Placement of safety signs/boards during construction
- ✓ Sprinkling of water on the roads and dusty tracks
- ✓ Monitoring of generator emissions

Training regarding all other aspects of HSE will be ensured by the contractor during the construction phase.

8.4 Environmental Training Schedule:

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

Table: Training Program:

Target audience	Trainers	Contents	Schedule
Selected management staff	Environmental Consultant	Key finding of mitigation measure	After every five months
All personnel	Owner	Mitigation measures	Monthly

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Technical Staff	Environmental Consultant	Waste disposal status, vehicle movement restriction and other mitigation measures	After every three month
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1.5 Responsibility of EMP:

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint an HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage the all HSE condition at the NEQS.

#	Concerned persons	Duties
1	The project Manager	Following will be the responsibilities of the Project Manager • Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment • Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s) • Monitor the implementation of the EMMP throughout the project by means of site inspections and meetings. This will be documented as part of the minutes of the site meeting documents • Ensuring project execution within defined budget and timelines • Conducting regular check of the project status and meetings with project team • Provide support and guidance to project team as and when needed Project Manager is expected to continually monitor and improve the overall performance of their operation
02	Site Engineer	Following will be the responsibilities of the Site Engineer during the construction & operational activities: • Be fully conversant with the EIA & conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance with NEQS • Have overall responsibility for the implementation of EMMP • Conduct audits to ensure compliance to the EMMP

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	• Liaise with the Project Manager or his delegate, the Environmental Officer and relevant discipline Engineers on matters concerning the environment • Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution on the site • Confirm activities to the demarcated construction site
Manager	In addition to the health and safety responsibilities held by staff, managers and supervisors must do whatever is reasonably practical to ensure that both the workplace and the work itself are safe. This includes: • Ensuring that staff are appropriately trained and supervised • Identifying, assessing and managing health and safety risks • Consulting with workers (including staff, affiliates and contractors): i. Health and safety risk assessments ii. Decisions are made about the measures to be taken to eliminate or control these risks iii. Health and safety risk assessments • Implementing health and safety risk management programs relevant to their operations, research and consulting functions and work environment • Reporting (to the Human Resources Unit), investigating and responding to all hazards, accidents, incidents and taking action to control the risk • Assisting with the development, implementation and maintenance of a return-to-work program for injured staff. • Be fully conversant with the EIA and conditions of its approval • Be fully conversant with the EMMP • Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance • Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor • Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP • Take appropriate action if the specifications contained in the EMMP are not followed • Monitor and verify that environmental impacts are kept to a minimum, as far as possible • Review and approve construction methods, with input from the Site Manager, where necessary • Ensure that activities on site comply with all relevant environmental legislation

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	• Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit • Liaise with the Site Manager regarding the monitoring of the site • Report any non-compliance or remedial measures that need to be applied • All environmental problems arising on the construction area will be reported to the Site Manager by the Environmental Manager. Reports on such problems will be submitted to the Project Manager by the Site Manager
4 Contractors & Service providers	• Environmental management is part of on-site quality management. Under the environmental management plan, the contractor • Shall propose measures to minimize environmental impacts during construction and submit them to the HSE Officer • Comply with the environmental management specifications • In case of having impacts on the environment, the contractor will inform them to the concerned person in time to get instructions and then take next step • Adhering to any instructions issued by the Engineer/Project Manager on the advice of the HSE Manager • Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting • Maintaining public complaints register • Arrange that all his employees and those of his subcontractors receive training before the commencement of construction

Training & Capacity Building Plan

Training & Capacity Building Plan	
Potential Impact	Construction Phase Due to construction phase, following issued will occur: Noise Pollution from Vehicles Fugitive Dust Emissions Solid Waste Air Emissions HSE First Aid Training
Mitigation	Operation Phase During operational phase, if present nearby society will face problems like: • Noise Pollution • By-products • HSE First Aid Training

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Management plan	Training and Capacity Building Plan Project will ensure in-house training for the project staff, labour and the supervisory staff of the Proponent/EA through the provision of one day basic training and one day advanced training, covering environmental and social aspects of the projects in general, and implementation requirements will emphasis on the development projects in general, and implementation requirements with emphasis on the roles and responsibilities of the staff and the labour while executing the environmental monitoring plan in particular. The training protocols will include the following aspects: • Procedures for monitoring the air quality parameters and measures to be adopted for avoiding or minimizing air pollution, particularly from the transportation, handling of the by-products, biological, chemical and physical hazards • Safe waste disposal practices • Safety measures against hazards for workforce and the local communities arising from the construction activities • Use of safety gadgets by the workforce • Training for the use of PPE's		
Monitoring	Responsibility Training of staff, vehicle operators and labour	Responsible Project Manager/ HSE Manager	Monitoring Duration 01 Day training once a year

Summary of Impacts & their mitigation Measures:

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the Environmental Management Plan in protecting the environment is measured.

Feedback provided by the environmental monitoring is instrumental in identifying any problem or in the system under implementation and planning corrective actions.

Main objectives of the environmental monitoring are:

- To provide a mechanism to determine whether the project construction contractors are carrying out the project in conformity with the EMP.
- To identify areas where the impacts of the project are exceeding the criteria of significance and, therefore, require corrective actions.
- To document the actual project impacts on physical, biological, and socio-economic receptors, quantitatively where possible, in order to design better

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and more effective mitigation measures.

Following environmental record should be maintained:

It inspection reports of the site audits reports.

It record of all moderate and major spills and other incidents and accidents.

Record will include:

- Location of spill or battery limit of the accident
- Estimated quantity or the amount of injury
- Spilled material or nature of injury or loss (temporary or permanent)
- Restoration measures
- Photographs Description of any damage to vegetation, water resource, or community asset. Corrective measures taken, if any Waste Tracking Register that will hold records of waste generated during the construction period. This will include quantities of waste disposed, recycled, or reused.

Records of water consumption with use wise breakdown

Reports, in particular, the following:

- Vehicle and equipment noise
- Ambient noise survey reports
- Ambient level of PM
- Vendor data—all vendors disturbed by the project and compensation paid public
- Infrastructure:
- Record of all damages and repair work undertaken
- Employment
- Total number of unskilled, semi-skilled, and skilled jobs offered during construction
- Name and domicile of the employed staff.
- Project and Community Interface
- Record of community complains and the measures taken to address them.
- Number of meetings held in various communities and data of persons who attended
- Environmental and social training records

Equipment Maintenance Details:

The proposed project is a Construction of an Interchange so regularly machinery will be used during operation and maintenance of machinery will be done as required.

- ✓ All the equipment must be kept clean.
- ✓ Proper lubrication of moving parts of machines should be according to schedule.
- ✓ Make maintenance and inspection schedule.
- ✓ Check oil level and specific gravity of lubricants must be checked according to schedule.
- ✓ Training workshops to staff about SOPs of equipment should be planned and implementation of such practices must be ensured.
- ✓ Good technical practice should be implemented during operations.

Maintenance of equipment will be done twice a year for the smooth operation.

Environmental Budget:

Environmental budget for Construction of an Interchange* is approximately 10 Million rupees.

Technical Training Program:

In order to raise the level of professional and managerial staff, they need to upgrade their knowledge in related areas. The EMC will play a key role in this context.

Contractor's environmental awareness and appropriate knowledge of environmental protection is essential for the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the contractor(s) to implement effective environmental protection measures. A technical training program is proposed to train the staff that will be involved in the construction and operational stage on environmental protection and management.

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Chapter#09

Conclusion & Recommendations:

Preliminary plans, environmental and social field surveys, and impacts assessment of the interchange, it may be concluded that there are insignificant, short term and reversible impacts. The major impacts of the Project are summarized as under:

Physical impacts like soil erosion, soil contamination, water contamination, air pollution, high noise, etc. are of temporary nature and can be controlled and mitigated.

It is stated that the implementation of project activities will not cause cutting of any tree.

Protected forest area or wildlife sanctuary or any other environmentally sensitive site exists outside the Project corridor, which may be affected by the Project.

Vulnerable people and women headed households have been identified in the Project area.

Other social issues like safety of general public and workers, security problems, risk of communicable diseases, vector borne diseases etc. are of temporary nature.

All the above impacts are of temporary nature and manageable through good engineering measures and none of these are irreversible.

A comprehensive EMP has been developed identifying the impacts, mitigation measures, and the responsible parties for implementation and monitoring of the proposed measures. EMP also defines the environmental and social monitoring responsibilities of ESIC.

From the above discussions, it may be concluded that the proposed preliminary Project route is environmentally friendly and will cause the least effects on the area's existing social and environmental conditions.

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ions:

prehensive mitigation measures have been proposed in the report to minimize the effects and to enhance the positive impacts of the Project, however, major recommended measures are summarized as under:

any labor camps should be developed inside the project boundary and should be equipped with proper drainage facilities.

ersion and contamination, water contamination, air pollution and high noise levels should be controlled with the use of good engineering practices.

ctor should develop plan such as traffic management, Solid waste management, and environmental management etc. before starting the construction activities.

ontractor will have to adopt some suitable timing for the construction activities so as to cause the least disturbance to the local community particularly women considering their peak working hours.

actor should take due care of the local community and its sensitivity towards local customs and traditions.

proposed should be implemented in its true letter and spirit.

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