

Government of Pakistan  
Ministry of Communications  
National Highway Authority

## FEASIBILITY STUDIES AND DETAILED DESIGN FOR CONSTRUCTION OF LUNDIANWALA INTERCHANGE ON LAHORE-ABDUL HAKEEM MOTORWAY (M-3)



## ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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## **LIST OF ABBREVIATIONS**

<b><u>Abbreviation</u></b>	<b><u>Description</u></b>
APHA	American Public Health Association
ASR	Air Sensitive Receivers
ASTM	American Society of Testing Materials
BDL	Below Detection Limit
BOD <sub>5</sub>	Bio-chemical Oxygen Demand
CC	Construction Contractor
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
COP	Conference of Parties
DCR	District Census Report
DO	Dissolved Oxygen
EALS	Environment, Afforestation, Land and Social Section
EC	Environmental Committee
EE	Environmental Engineer
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EPA	Environment Protection Agency
EPC	Engineering Procurement Construction
EPD	Environment Protection Department
EPHE	Environment & Public Health Engineering
ESALs	Equivalent Single Axle Load's
FGDs	Focused Group Discussions
gm	Gram
GOP	Government of Pakistan
GRM	Grievance Redressal Mechanism
GRC	Grievance Redressal Committee
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
LGO	Local Government Ordinance
MCC	Manual Classified Count Survey
mg/L	Milligrams per liter
MSL	Mean Sea Level
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NESPAK	National Engineering Services Pakistan
NHA	National Highway Authority
NO <sub>2</sub>	Nitrogen Dioxide
NSR	Noise Sensitive Receivers

°C	Degree Centigrade
OH&S	Occupation Health and Safety
OH & SAS	Occupation Health and Safety Assessment Series
PAPs	Project Affected Persons
PD	Project Director
PEGO	Project Environmental Grievance Officer
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PGA	Peak Ground Acceleration
PM <sub>10</sub>	Particulate Matter
PPC	Pakistan Penal Code
PPP	Public Private Partnership
RAP	Resettlement Action Plan
SC	Supervision Consultant
SO <sub>2</sub>	Sulfur Dioxide
SOP	Standard Operating Procedures
SWM	Solid Waste Management
TA	Technical Assistance
TSS	Total Suspended Solids
UC	Union Council
UNDP	Nation Development Program
UNFCCC	United Nation Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VEC	Valued Environmental Components
VSC	Valued Social Components

## Executive Summary

### Background

Communication networks play an important role in the economies of countries. The development of new roads and upgradation of existing road infrastructure to facilitate the general public with easy access to all parts of Pakistan for trade, tourism, etc. is of top priority of the Government of Pakistan. For this purpose, apart from developing the existing intercity highway and motorway network, the National Highway Authority (NHA) also lends support at provincial and local levels for uplift of arterial road network in the underdeveloped areas.

The NHA has recently conceived a number of projects to improve the local transportation system of the District of Faisalabad, Punjab to facilitate the local public with better quality roads through upgradation of the existing kutcha road. The idea is to increase connectivity in trade and communication and to improve general economic well-being of the population. Such projects will thereby serve as a tool towards a better economy and reducing poverty in the District of Faisalabad.

For this purpose, National Highway Authority (NHA) (herein referred to as "Client"), has engaged JV of M/s Asif Ali and Associates (Pvt) Ltd, and M/s Concept Planning and Engineering Services (herein referred to as "Design Consultants" or "JV") in December 2022 to carry out the task of Feasibility Study & Detailed Design of a service road along recently completed Motorway M-3 in Jaranwala area through following assignment:

*“Feasibility Studies and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)”*

### General

This Report presents the findings of the Environmental Impact Assessment (EIA) Study. It aims at the identification of the possible environmental and social impacts of the proposed project on its surroundings on both short- and long-term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures.

The residents of Lundianwala district, chaku morr and surrounding areas have no direct access to motorway. The available access of these residents to M-3 is through two different interchanges i.e.

- Jaranwala Interchange (M-3)
- Nankana Sahib Interchange (M-3)

From proposed interchange the Jaranwala Interchange is 14.9KM away and Nankana sahib Interchange is 23 KM. Since these two Interchanges are almost 37.9KM far away from each other, there is a dire need for the proposed interchange to serve the

people of adjoining areas for improvement in trade and overall economic efficiency of the nearby areas.

The scope of the EIA Study includes environmental assessment of the project including collection and securitization of data related to physical, biological and socio-economic environment, assessment of impacts which may be caused by the project activities and mitigation measures for the abatement of potential environmental impacts along with the estimate of mitigation cost.

The submission of EIA and its approval from Environmental Protection Agency (EPA) is mandatory according to Punjab Environmental Protection (Amendment) Act. 1997. Section 12 (1) of the PEPA. 1997 states that:

*"No proponent of a Project shall commence construction or operation unless he has filed with the Federal 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 Federal Agency approval in respect thereof."*

The study has been conducted in accordance with Environmental Protection Agency (EPA) and Government of Pakistan (GoP) Guidelines. The study is based on both primary and secondary data and information. Discussions were held with stakeholders including government officials and community representatives. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

To accomplish the job in time and to produce a quality report, a proper methodology was established as follows:

- Meetings and discussions were held among the members of the EIA consulting team, design engineers and proponent. This activity was aimed at achieving a common ground of understanding of various issues of the study.
- Planning was carried out to assess data requirements and their sources; time schedules and responsibilities for their collection; logistics and facilitation needs for the execution of the data acquisition plan.
- Primary and secondary data were collected through observations during the field survey, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic environmental conditions.
- The impacts of the project on the physical, biological and socio-economic environment prevalent in the project area were visualized at the design, construction and operational phases.
- The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase.

## **Legal and Administrative Frameworks for EIA**

The Government of Pakistan (GOP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In our current studies the applicable environmental policies are National Environment Policy, 2005;

National Sanitation Policy, 2006; National Climate Change Policy, 2012 and National Resettlement Policy, 2002. The relevant laws, regulations and acts to the proposed project are: Pakistan Environmental Protection Act, 1997; IEE/EIA Regulations, 2000; Pakistan Environmental Assessment Procedures, 1997; Punjab Environmental Protection Act (Amended) 2012; National Environmental Quality Standard (NEQs) 2010; Punjab Local Government Ordinance, 2001; Canal and Drainage Act, 1873; Pakistan Penal Code, 1860; Guidelines for Solid Waste Management (2005); Sectorial Guidelines (1997); The Punjab Wildlife (Protection, Preservation, Conservation & Management Act, 1974); Protection of Tress and Brushwood Act, 1949; Cutting of Tress (Prohibition) Act 1975; Disaster Management Act, 2010; The Motor Vehicles Rules, 2000; National Clean Air Act, 2000; Land Acquisition Act, 1984; Seismic Building Code of Pakistan, 2007; Toxic or Hazardous Waste and Preservation of Cultural Heritage.

The Client / Implementing Agency of the proposed project is National Highway Authority (NHA). The management of NHA will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

## **Project Description**

The proposed project site is administratively located in Faisalabad District. The proposed project includes the construction of Interchange at Motorway M-3. The total loop length of the proposed interchange is 3.5 Km.

The project is expected to be completed within Twelve (12) months with an estimated capital cost of Rs. 1.706 billion.

The construction materials of the proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement and cement etc. Estimated water demand and wastewater generation for the proposed project are 12,600 Liter/day and 10,080 Liter/day respectively during the construction phase. The manpower requirements during construction and operation of the project will be about 70 personnel including managerial staff, skilled and unskilled labor.

## **Description of the Environment**

The existing environment in and around the project area has been studied with respect to the physical, biological and socio-economic conditions.

### ***Physical Environment***

The topography of the project area is flat and Ravi River is flowing parallel on the Eastern side. The general height of the area is approximately 187 meters above the Mean Sea Level (MSL). The soil deposits at the project site belong to Chung Fun formation indicating the last glacial cycle. The presence of old channels of Ravi River indicates conformity of the stream oscillation to terrestrial rotation in the deflection of streams. These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with inter-beds of clay and layers or lenses of sand.

The project lies in the District Faisalabad. The climate of the district has extremes of climate. The summer season starts from the month of April and continues till October. May and June are the hottest months with day temperature usually ranging from 39 to 41 degree centigrade. The winter season begins from the month of November and continues till March. January is the coldest month with a mean minimum temperature of 5 degree centigrade. Dust storms occur occasionally during the hot season relieving temporarily the intensity of heat. Towards the end of June monsoon conditions appear and during the following two and half months spell of rainy season alternates with intervals of sultry weather.

Land use of the project area is fertile and suitable for crop cultivations. Majority of the adjoining areas of project earn their livelihood, directly or indirectly, from agricultural activities e.g., crop cultivation, livestock rearing, labor in agriculture, agriculture input supply, transportation of agricultural output to the market etc.

For the baseline studies, air, noise and water quality monitoring was conducted by Sustainable Environmental services & Laboratory (SES&L)- Tti Testing Laboratories within the project area and its surroundings. Ambient Air Quality was monitored at selected locations and results observed were within limits set in Punjab Environmental Quality Standards. Air quality monitoring was conducted at selected locations and assessed the parameters; O<sub>3</sub>, CO, HF, HNO<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, TSP, PM<sub>10</sub> & PM<sub>2.5</sub> PM<sub>10</sub>.

The results show that the concentrations of O<sub>3</sub>, CO, HF, HNO<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, TSP, PM<sub>10</sub> & PM<sub>2.5</sub> PM<sub>10</sub> are within the permissible limits specified by the Punjab Environmental Quality Standards.

Noise level monitoring was carried out at the same locations where ambient air quality was monitored. Noise levels measured at selected site at were within compliance.

For the assessment of ground water quality, the samples were taken from designated point Lundianwala Area Ground Water source.

Comparison of the results obtained showed that Ground Water obtained from Lundianwala Area had values within permissible limits as per Punjab Environmental Quality Standards except Total Dissolved Solids (TDS), Total Hardness & Conductivity due to the saline soils in the monitoring area. Water can vary greatly in quality depending upon type and quantity of dissolved salts. Salts are present in water in relatively small but significant amounts. These salts originate from dissolution of weathering of the rocks and soil, including dissolution of lime, gypsum and other slowly dissolved soil minerals. The suitability of water is determined not only by the total amount of salts present but also by the kind of salts.

Water quality or suitability for use is judged on the severity of problems that can be expected to develop during long-term use. The problems that result vary in both kind and degree and are modified by soil, climate and crop, as well as by the skill and knowledge of water user. The soil problems most commonly encountered and used as a basis to evaluate water quality relate to salinity, water infiltration rate, specific ion toxicity and a group of other miscellaneous problems. Among analysis of the heavy metals, all metals were also within limits defined by PEQS

### ***Ecological Environment***

The ecological survey of the project site revealed that about 36 trees will be cut by the construction of the proposed project

In the area common mammals are dogs, cats, house rats and bats. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheep, and donkeys that are used by the local residents for their living and mobilization purposes. House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) and lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in the proposed project site.

### ***Socioeconomic Environment***

According to District Census Report (DCR), Faisalabad; 2017. The total population of Faisalabad district was 1,354,986 as enumerated in March, 2017 with an intercensal percentage increase of 29.6 since March, 1998 when it was 1,044,865 souls. The average annual growth rate was 1.4 percent during this period. The total area of district is 2,216 square kilometers which gives population density of 611.5 per square kilometer observed in 2017.

Punjabi is the predominant language being spoken by majority (98.83 percent) of the population of the district. The economically active population as enumerated in the latest census (i.e., 1998 census) was 22.2 percent of the total population i.e. the population exposed to the risk of entering the economically active life at any time.

A socio-economic survey was carried out in the project area to get the response about the perceived impacts and preferences towards the project implementation. A sample of 50 respondents was taken on the basis of random sampling technique, which included shop keepers, residents, pedestrians, drivers and students etc. Majority of the respondents (94%) favored the Project, keeping in view its importance and only 6% cases/ responses were against the construction of the proposed project.

## **Impacts and Mitigation Measures**

To get one sight overview of the nature of the impacts, their scale and significance; an Environmental Impact Matrix have also been developed for construction and operation phases.

The construction of the proposed project will have both positive and negative impacts during the construction and operational phases, for which proper mitigation measures are prepared. During the field survey, significant efforts were made to identify the main social, cultural and environmental issues related to the construction of the proposed project. Following is the list of main issues and concerns which have been considered in the study report:

- About 62 acres of land (both Northern and Southern side) would be acquired for the execution of the project which is adverse impact of the project as the adjacent agricultural area will also be affected;
- Traffic congestion and time delays will occur during the construction phase of the project, which is temporary adverse impact as these time delays will be reduced during operational phase;
- Access to the cultural and religious resources (mosques and shrines) will be another problem during construction phase;
- About 36 trees/plants will be directly affected for the Construction of Lundianwala Interchange on Motorway M-3 which is moderate impact of the project
- Air quality will also be deteriorated by the dust generation and from the asphalt and batching plant during the construction phase, however, this impact will be positive during the operational phase as the main objective of the project is to ease the traffic which will be resultant to reduce the air deterioration;
- Noise levels will also be high during the construction phase however, this impact will also be temporary in nature;
- During the construction phase of the proposed project, improper traffic management may result in traffic jams and cause inconvenience to the people passing due to movement of vehicles carrying construction materials and different construction activities. This impact is temporary and moderate negative in nature;
- Soil erosion is another major problem of the proposed project area which may arise during construction phase of the project;

- Disturbance to the public movement during construction especially the students and the residents residing at the proposed site, which is a temporary but moderate adverse impact during the construction phase;
- Disruption of existing public utilities during construction phase;
- Oil spillages from construction machinery, resulting in soil and drinking/spring water contamination; and
- Health and safety problems of the workers may also arise during the construction and operational phases of the proposed project.

All the adverse impacts of the proposed project have properly been mitigated and a comprehensive Environmental Management Plan (EMP) has been formulated. The implementation of EMP will help to reduce the adverse impacts of the proposed project.

After the completion of the proposed project, the road users will get the following benefits:

- Reduced accidents caused by poor condition of road;
- Reduced travelling time;
- Reduced the fuel consumption and transportation cost caused poor condition of road;
- Create job opportunities for laborer's and semi-skilled staff during constructional phase; and
- Reduced air emissions from vehicular exhaust especially in case of traffic congestion

Results of the EIA Study have shown that overall, the project is environmentally feasible. Most of the environmental impacts are moderate adverse in nature except land acquisition, tree cutting, business loss of the direct affectees, nuisance for the residents during construction phase, which are major adverse impacts of the project.

However, these impacts can be mitigated by the implementation of Environmental Management Plan (EMP).

Overall, the impacts related to construction phase could be minimized by the implementation of the proper mitigation measures. The total cost of Environmental Mitigation and Monitoring Plan including the Tree Plantation cost is **Rs. 8,435,650.**

### **Proposed Monitoring**

The project has negative and positive impacts on biological, physical, socioeconomic and ecological fronts which will be mitigated through the proper preventive and control measures. To evaluate the efficacy of the preventive control measures regular monitoring of the project activities will be carried out during construction and operation phase of the project. The Punjab Environmental Quality standards of

ambient air, noise, water and motor vehicle exhaust will be complied with, their monitoring will be carried out quarterly, biannually and annually depending upon the magnitude of the impact. The CO, NO<sup>2</sup>, O<sup>3</sup>, SO<sup>2</sup> and PM<sup>10</sup> in ambient air will be monitored at site. Noise will be monitored especially in front of sensitive receptors. Water quality of the surface water bodies crossing the road will be monitored on bi-annual basis. Detail discussion is made on the issue in Section 7 of the Main Report.

## SECTION - 1

### INTRODUCTION

#### 1.0 Project Background

The project includes the construction of Interchange at Motorway M-3. The residents of Lundianwala district, chaku morr and surrounding areas have no direct access to motorway. The available access of these residents to M-3 is through two different interchanges i.e.

- Jaranwala Interchange (M-3)
- Nankana Sahib Interchange (M-3)

From proposed interchange the Jaranwala Interchange is 14.9KM away and Nankana sahib Interchange is 23 KM. Since these two Interchanges are almost 37.9KM far away from each other, there is a dire need for the proposed interchange to serve the people of adjoining areas for improvement in trade and overall economic efficiency of the nearby

Keeping in view above mentioned facts, National Highway Authority (NHA) have taken initiative for Construction of interchange on Motorway M-3 at Lundianwala along with Motorway M-3 for easement to traffic. This assignment's primary objective is to design an interchange on M-3 in Lundianwala. This new interchange has the potential to significantly contribute to the economic development of the surrounding areas. This would also have the additional benefits of opening up the hinterland, fostering economic growth, and altering the transportation pattern. The construction of the project interchange will result in a significant reduction in travel times and improved access to the highway, which will be of great assistance in minimizing travel distance.

To comply with IEE/EIA regulations 2000 as per Punjab Environmental Protection (Amendment) Act (PEPA) 2012, M/s Asif Ali and Associates (Pvt) Ltd was entrusted with the assignment of carrying out an Environmental Impact Assessment (EIA) Study for “Feasibility Studies and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)”

Subsequently the Joint Venture of M/s Asif Ali & Associates (Pvt.) Ltd, Concept Planning and Engineering Services has been assigned by the NHA, the task of submission of the EIA Report to the EPA.

The EIA will ensure that environmental consequences are considered at all stages of the project. In addition, the EIA will assist the proponent to minimize the potential adverse impacts of the project. The EIA methodology promotes a practical and dynamic process of environmental protection that allows significant adverse impacts to be avoided or mitigated throughout the entire planning and design process.

### **1.1 Scope of Study**

The scope of this EIA Study aims at collection and scrutinization of data related to physical, biological and socio-economic environment of the project area and to prepare the baseline environmental profile. It also aims at the identification, prediction and evaluation of the possible environmental impacts of the proposed project on its immediate surroundings on both short and long-term basis. Based on the nature and levels of those impacts, appropriate mitigation measures are proposed in this EIA Report

### **1.2 Study Objectives**

The specific objective of the EIA Study for “Feasibility Studies and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)”. Includes the following:

- Collection and scrutinization of data related to physical, biological and socio-economic environment of the project area and to prepare baseline environmental profile;
- Identification, prediction and evaluation of potential environmental impacts of the proposed project;
- Suggesting mitigation measures to minimize the adverse impacts of the project; and
- Preparation of an Environmental Management Plan (EMP).

### **1.3 Need of EIA Study for the Proposed Project**

EIA is mandatory according to the Punjab Environmental Protection Act (Amended), 2012. Section 12 (1) of the Punjab PEPA (Amended), 2012 states that

*"No proponent of a project shall commence construction or operation unless he has filed with the Federal 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 Federal Agency approval in respect thereof. "*

According to the Pakistan Environmental Protection Agency (Pak-EPA) (Review of IEE and EIA) Regulations 2000, the proposed project falls under category D (Transportation) of Schedule II, which requires EIA before commencement of construction.

#### **1.4 The Proponent and Consultant**

The proponent of the project is National Highway Authority (NHA) while the Consultant is the Joint Venture of M/s Asif Ali & Associates (Pvt.) Ltd., Concept Planning and Engineering Services

The contact details are given as under:

##### **a) Proponent Contact Address**

The General Manager (Planning)  
National Highway Authority (NHA),  
27 Mauve Area, G-9/1, Islamabad  
**Tel: +92 51 9032705**

##### **b) Lead Consultant Contact Address**

M/s Asif Ali & Associates (Pvt.) Ltd.  
139, G-Block, First Floor, Commercial Area, Phase 1,  
Defence Housing Authority, Lahore  
**Tel: 042-35690824-5**

#### **1.5 Study Team**

A multidisciplinary team was formulated to conduct the EIA study. The team comprised the following professionals:

Usman Riaz	Director / Team Leader
Dr. Kiran Farhan	Senior Environmentalist
Salman Akhtar	Senior Environment Engineer
Muhammad Maaz	Environmental Engineer
Hassan Tariq	Environmentalist
Muhammad Hamza	Sociologist

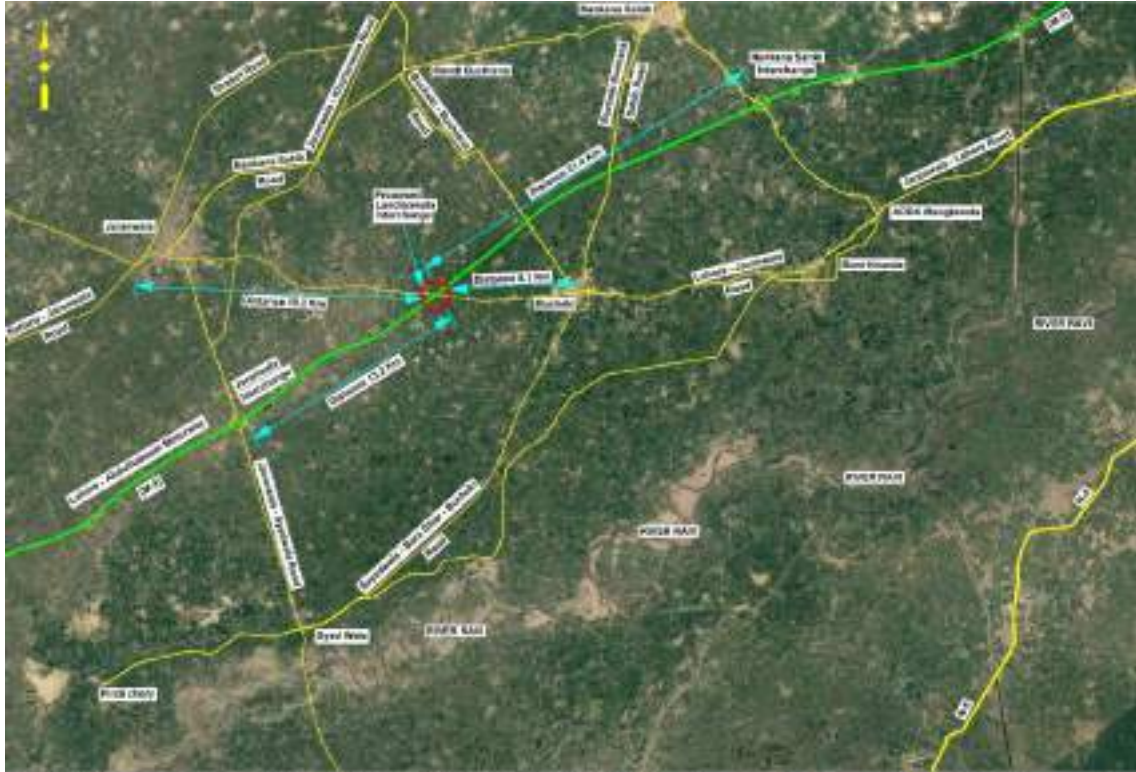
## 1.6 Brief Description of the Project

The proposed interchange is 14.9 kilometres from the Jaranwala interchange and 23 kilometres from the Nankana Sahib interchange (37.9Km approach). The detailed location map is attached herewith.

It is planned to build an interchange to connect the M-3 Motorway to the surrounding settlements of Monigianwala, Thandiawala, Rajanpura, and Chaku Morr, allowing people of these areas to more easily reach other cities in Punjab Province through M-3. Jaranwala Interchange and Nankana Sahib Interchange are the two closest existing interchange accesses. Lundianwala residents, as well as those in neighbouring villages, will benefit from the subject interchange once it is built. Since this is the case, the proposed interchange will certainly cut down significantly on travel times and distances.

### PROJECT LAYOUT

This newly proposed interchange is set to be located in Faisalabad district. It involves construction of interchange in Lundianwala area along M-3 Motorway. Location of the interchange is shown in **Figure 1.1**.



**Figure 1.1 Project Location Map**

### **KEY FEATURE OF ROAD**

Following key features will be considered for conducting “Feasibility Study and Detail Design for Construction of Lundianwala Interchange on Lahore - Abdul Hakeem Motorway (M-3)”

Key features of the project road are given below:

Location	:	Punjab
No. of lanes	:	2-Lanes
Carriageway Width	:	7.3 m (Loop)
Design Speed	:	40 km/hr

## **1.7 Study Approach & Methodology**

### **1.7.1 Study Approach**

The study was conducted in accordance with Environmental Protection Agency

(EPA), Government of Pakistan (GOP) Guidelines, 2000. The study was based on both primary and secondary data and information. Discussions were held with stakeholders including government officials, community representatives and a wide range of local residents. The main purpose of this approach is to obtain a fair impression on the people's perceptions of the project and its environmental impacts.

### **1.7.2 Methodology**

The following methodology was adopted for carrying out the EIA study of the proposed Project:

#### **a) Orientation**

Meetings and discussions were held among the members of the EIA Consulting Team. This activity is aimed at achieving a common ground of understanding of various issues of the study.

#### **b) Planning for Data Collection**

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the EIA Consulting Team. The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection; and indication of the logistics and other supporting needs for the execution of the data acquisition plan.

#### **c) Data Collection**

In this step, primary and secondary data was collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socio-economic conditions. These activities were as under:

- Site Reconnaissance;
- Analysis of Maps and Plans;
- Literature Review;
- Desk Research;
- Public Consultations;

- Field Observations & Studies; and
- Laboratory Analyses.

### ***j) Physical Environment***

Information was gathered on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise in the project area.

#### Geology, Topography, Soils

A review of relevant literature on the geology, topography and soils in the Project Area was conducted.

#### Hydrology and Drainage

A literature review was conducted to identify the components of the hydrological cycle that are likely to impact on the project and the possible impacts that the project could have on the hydrologic cycle. Field assessments included a determination and verification of all the existing inflows into the drain (if any) along the proposed site, assessment of drainage issues, interviews with local community members, and round-table discussions with stakeholders.

#### Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions. Ambient air quality was continuously monitored for Carbon Monoxide (CO), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxides (NO<sub>2</sub>), Particulate Matter (PM<sub>10</sub>), for 24 hours by a certified testing laboratory.

#### Noise

Noise level readings were monitored at two sampling point for 24 hours on continuous basics by a certified environmental lab.

### Water Quality

The objective of the water quality monitoring is to determine water quality situation before construction. It has been observed that the surface water and air quality are the most important environmental variables to be affected in this project. The extent of surface water and groundwater contamination in the project area was assessed based on the test results of chemical and microbiological parameters for surface and groundwater. Dissolved oxygen (DO), pH and conductivity measurements were taken in situ at all sampling stations. Analyses were performed in certified environmental laboratory.

### ***ii) Biological Environment***

The status of the flora and fauna of the study area was determined by an ecological survey, a review of literature relevant to the study area, and an assessment of terrestrial environments.

#### Flora

The vegetative communities in the project area were identified and classified into community types. Identification was carried out of dominant tree species, assessment of stage of growth (mature or sapling) and assessment of canopy cover.

#### Fauna

Information on fauna was gathered from existing literature on reported species as well as observations in the field.

### ***iii) Socio-Cultural Environment***

The consultants utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impact of the construction of the proposed project. Data were gathered on the following aspects of the social environment:

- Land use and Municipal Status

- Traffic, Transportation and Access Roads
- Demographics
- Livelihoods
- Poverty
- Education
- Health
- Social Setup
- Community Facilities
- Solid Waste Management
- Proposed Developments

**d) Identification and Evaluation of Environmental Impacts**

The impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the project area were visualized at the design, construction and operational phases.

**e) Mitigation Measures and Implementation Arrangements**

The adequate mitigation measures and implementation mechanisms were proposed so that the proponent could incorporate them beforehand in the design phase

## **1.8 Structure of the Report**

Section 1: **Introduction** briefly presents the project background, objectives, methodology and need of the EIA study.

Section 2: **Policy, Legal and Administrative Framework** comprise policy guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed Project.

Section 3: **Description of the Project** furnishes information about the location of the proposed Project, cost and size of the project, its major components and alternatives considered for the proposed project to select at the preferred alternative for detailed environmental assessment.

Section 4: **Environmental Baseline Profile** establishes baseline conditions for physical, biological and socio-economic conditions prevalent in the project area.

Section 5: **Public Consultation** identifies the main stakeholders and their concerns rose through scoping sessions, and deals with the measures to mitigate the social impacts.

Section 6: **Anticipated Environmental Impacts and Mitigation Measures** identifies, predicts and evaluates impacts of the project activities during the construction and operation stages and deals with the measures proposed to mitigate potential environmental impacts of the proposed project.

Section 7: **Environmental Management and Monitoring Plan** outlines institutional arrangements for the implementation of the proposed mitigation measures, training needs of the staff for implementation of the mitigation measures, monitoring requirements and monitoring cost.

Section 8: **Conclusions and Recommendations** provide the outcome of the study and major observations of EIA and suggestions for environmental management and pollution control.

## SECTION – 2

### POLICY, LEGAL & ADMINISTRATIVE FRAMEWORKS

#### 2.0 General

This section deals with the existing environmental policy as well as legal and administrative framework interrelated to carrying out the Environmental Impact Assessment (EIA) of “Feasibility Studies and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)”. All the pertinent environmental policies and guidelines of Pak-EPA and legal frameworks have been duly conferred in this section. In addition, the roles and responsibility of the proponent as well as the Environmental Protection Agency (EPA) Punjab have been discussed in this section.

The proposed project requires an EIA in accordance with the Punjab Environmental Protection (Amendment) Act (PEPA), 1997 and IEE/EIA Regulation, 2000.

#### 2.1 Policy Framework

The ministry of environment is the responsible authority for policy making on environmental protection in Pakistan.

##### 2.1.1 National Environment Policy, 2005

In March 2005, Government of Pakistan (GOP) presented its National Environmental Policy, which comprises a predominant framework for addressing the environmental issues. Section 5 of the policy obligates for amalgamation of environment into development planning as instrument for succeeding the objectives of National Environmental Policy. It further states in clause (b) of subsection 5.1 that EIA related provisions of Punjab Environmental Protection (Amendment) Act, 1997, will be conscientiously enforced for all development projects. It also provides wide-ranging guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental assets.

### **2.1.2 National Sanitation Policy, 2006**

The National Sanitation Policy of Pakistan provides a broad framework and policy guidance to the Federal Government, Provincial Governments, federally Administrated Territories and the local governments, to enhance and support sanitation coverage in the country through formulation of their sanitation strategies plans and programs at all respective levels for improving the quality of life of the people of Pakistan and the physical environment necessary for healthy life.

### **2.1.3 National Climate Change Policy, 2012**

The National Climate Change Policy was approved by the Federal Cabinet on 26 September 2012. With an overall goal, to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development, the Policy puts forward comprehensive policy objectives of sustained economic growth, integration of climate change into inter-related national policies, pro-poor gender sensitive adaptation and cost-effective mitigation, water, food and energy security, DRR, effective decision making and coordination, creating awareness, building capacities, and conservation of natural resources and long term sustainability. It also seeks effective use of financial opportunities, and public and private sector investment in adaptation measures.

### **2.1.4 National Resettlement Policy, 2002**

In March, 2002 Pakistan Environmental Protection Agency (Pak-EPA), GOP has issued its National Resettlement Policy, which explains the basis for compensation, rehabilitation and relocation of the affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

## **2.2 Legal Framework**

GOP has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing

developmental projects. Following are the excerpts of these laws and procedures relevant to the proposed project.

### **2.2.1 Punjab Environmental Protection Act (Amended), 1997**

Pakistan Environmental Protection Act (PEPA) was propagated on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance of 1983. Section 12 of the Punjab Environmental Protection Act Amended (2012) states that "No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an Initial Environmental Examination Study or, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA) Study, and has obtained Environmental Approval from provincial Agency.

### **2.2.2 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000**

These regulations provide lists of the projects requiring IEE and EIA. They also briefly describe the preparation and review of environmental reports. These regulations are attached as Annexure-1 and are also accessible at official website of EPD, Punjab.

### **2.2.3 Pakistan Environmental Assessment Procedures, 1997**

Pakistan Environmental Assessment Procedures (1997) is, in fact, a compendium, which contains the following, sets of statistics and information significant to the proposed project.

#### **a) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports**

It refers to environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and authorization by the concerned environmental protection agencies.

#### **b) Guidelines for the Preparation and Review of Environmental Reports**

These guidelines are developed to facilitate both the proponents and decision makers to formulate reports (inclusive of all the information

contained therein) and carry out their review so as to take cognizant decisions

#### **2.2.4 National Environmental Quality Standards (NEQS), 2010**

Pakistan Environmental Protection Council (PEPC) first approved these standards in 1993. They were later revised in 1995, 2000 and 2010. They endow information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to regulate environmental pollution. Results of environmental monitoring (ambient air, water and noise) conceded out at different locations in study area are compared with NEQS values and are conversed in later chapter of the report. The National Environmental Quality Standards (NEQS), 2010 are openly available at official website of EPA, Punjab.

The ambient air, noise and drinking water quality standards are attached as **Annexure-IV**.

#### **2.2.5 Other Relevant Laws/Policies/Guidelines**

##### **a) Punjab Local Government Ordinance, 2001**

Environmental protection is federalized subject under Punjab Local Government Ordinance (LGO), 2001. Despite any specific provisions, every local government may execute functions conferred by or under the Punjab LGO, 2001 and in performance of such functions may implement such powers, which are necessary and appropriate. Until different provisions, rules, regulations or bylaws are made, the local governments may exercise such powers as are specified in the Sixth Schedule of Punjab LGO, 2001. Environmental protection is sequential at 48 of the Sixth Schedule.

##### **b) Guidelines for Solid Waste Management (2005)**

Guidelines for Solid Waste Management have been issued as a draft by the Pakistan Environmental Protection Agency in coordination with JICA and UNDP. These guidelines explain the waste generation, discharge and composition.

**c) Canal and Drainage Act, 1873**

This Act entails provisions for the prevention of pollution of natural or man-made water bodies.

**d) Sectorial Guidelines (1997)**

Pakistan Environmental Assessment procedure deals with general guidelines as well as the sectorial guideline for the Environmental Assessment Studies. The sectorial guidelines have been given for different categories of the projects and deals with the procedure requirements of Environmental Assessment.

**e) Pakistan Penal Code, 1860**

This states the penalties for violations concerning pollution of air, water bodies and land.

**f) The Punjab Wildlife (Protection, Preservation, Conservation & Management) Act, 1974**

This Act provides for the protection, preservation, conservation and management of wildlife in the Province of Punjab. This act defines the wildlife sanctuary, game reserves, protected areas and national parks. It also defines the rules and responsibilities of the relevant authorities and the relevant personnel to protect the ecological resources. It also describes the penalties and punishments on offenses against the sections given in the act.

**g) Protection of Trees and Brushwood Act, 1949**

This Act prohibits cutting or chopping of trees and brushwood without permission of the Forest Department.

**h) Cutting of Trees (Prohibition) Act, 1975**

This act forbids cutting of trees without acquiescence of the Forest Department.

**i) Disaster Management Act, 2010**

The Disaster Management Act, 2010 to offer an effective National Disaster Management System and for matters associated therewith or

incidental thereto and to overawed unforeseen situations. The act is administered by federal government which provides guidelines for the provision of disaster management plans, offer necessary technical assistance to the Provincial Governments and Provincial Authorities as well for preparing their disaster management plans in case of any mishap. This Act is valid to the subject project in case of any unseen situation.

**j) The Motor Vehicles Rules, 2000**

Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards customary under clause (g) of sub-section (I) of section 6.

**k) National Clean Air Act, 2000**

The Clean Air Act legislation aims to control vehicular emissions, pollution from industry and indoor air pollution in rural areas.

**l) Land Acquisition Act, 1894**

This act deals with the procurement of private properties for public purposes. There are 55 sections in this act mainly dealing with area notifications, surveys, acquisition, compensation, appointment awards, dispute resolution, penalties and exemptions.

**m) Seismic Building Code of Pakistan 2007**

This code stipulates the minimum requirements for seismic safety of building and structures and the provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.

Construction of buildings in defilement of the Building Code shall be considered as violation of professional engineering work specified under clause (XXV) of section 2 of the Act. This Code is applicable to the subject project as it includes the formation of structures.

### **2.3 Occupational Health & Safety**

Construction and operational activities can distress the occupational health of the workers. Quantitative national standards with respect to the above aspect are yet to be developed in Pakistan. However, guidance in qualitative terms can be obtained from the Labor Laws (Amended) Ordinance, 1972 and Pakistan Factories Act (1934).

### **2.4 ISO 18001 Occupation Health and Safety Assessment Series (OHSAS)**

OHSAS 18001 is an Occupation Health and Safety Assessment Series for health and safety management systems to help organizations to control occupational health and safety risks. The OHSAS specifications are applicable to any institute that desires to establish an OH&S management system to eradicate or reduce risk to employees and other interested parties who may be exposed to the risks allied with the project activities. As the subject project is a construction of bus terminal cum commercial complex and involves various health and safety issues to construction labor, therefore these ISO 18001 guidelines will be applicable and pertinent.

### **2.5 Labor and Health and Safety Legislation**

The Constitution of Pakistan contains a range of provisions with regards to labor rights, in particular:

- Article 11 of the Constitution prohibits all forms of slavery, forced labor and child labor;
- Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; and
- Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

Labor law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labor laws. There are various laws containing health and safety requirements including: Mines Act 1923; Factories Act 1934; Factories Rules; Hazardous Occupations Rules 1963; Provincial Employees Social Security Ordinance 1965; and Workmen's Compensation Act 1923.

No single comprehensive piece of legislation deals with occupational or community safety and health.

## **2.6 Toxic or Hazardous Waste**

Protection of the environment with regards to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the Provincial limits.

## **2.7 Preservation of Cultural Heritage**

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage, destruction, damage or defacement of antiquities is an offence under the act.

## **2.8 Administrative Framework**

### **2.8.1 National Highway Authority (NHA)**

The client of the proposed project is National Highway Authority (NHA). The management of NHA will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages of the project.

### **2.8.2 Environmental Protection Agency, Punjab**

Pakistan Environmental Protection Council is the apex inter-ministerial and multi-stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is meant for the putting into

practice of environmental laws in Pakistan. They have vicarious powers to provincial environmental protection agencies for review, approval and monitoring of environmental examination/assessment projects. EPA Punjab will be liable for reviewing the report, issuing Environmental Approval and overall/broad based monitoring of the proposed project actions.

### **2.8.3 Rules of Business for District Environment Office under Punjab LGO, 2001**

National Reconstruction Bureau has formulated the following rules of business for District environment offices:

- To regulate motor vehicles subject to the provisions of the Pakistan Environmental Protection Act, 1997 and the rules and regulations made there-under;
- To ensure, guide and assist the proponents of new projects in submission of Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA) to Director General, EPA for approval;
- To ensure implementation of environmental protection and preservation measures in all development projects at the district level and to sensitize government agencies on environmental issues;
- To identify the needs for legislation in various sectors of the environmental matters;
- To provide information and guidance to the public on environment;
- To encourage the formation and working of non-governmental organizations, to prevent and combat pollution and promote sustainable development; To undertake regular monitoring of projects and to submit progress reports to Director General, EPA for publication in the annual report.

## SECTION – 3

### DESCRIPTION OF THE PROJECT

#### 3.0 Rationale of the Project

Faisalabad is located in the north east of Punjab. It is the third largest city of Pakistan after Karachi and Lahore. The area of Faisalabad district is 5,857 km<sup>2</sup>.

The Proposed project i.e. Lundianwala Interchange is a part of Faisalabad district. The proposed interchange is 14.9 kilometres from the Jaranwala interchange and 23 kilometres from the Nankana Sahib interchange (37.9Km approach).

It is planned to build an interchange to connect the M-3 Motorway to the surrounding settlements of Monigianwala, Thandiawala, Rajanpura, and Chaku Morr, allowing people of these areas to more easily reach other cities in Punjab Province through M-3. Jaranwala Interchange and Nankana Sahib Interchange are the two closest existing interchange accesses. Lundianwala residents, as well as those in neighboring villages, will benefit from the subject interchange once it is built. Since this is the case, the proposed interchange will certainly cut down significantly on travel times and distances.

#### *Traffic Survey Analysis*

Traffic studies are intended to provide necessary input data for determination of the magnitude and pattern of the traffic for the proposed project through the design period.

In order to assess the vehicle-wise traffic volume expected to use the proposed project road, traffic count survey were undertaken in 2022. The traffic count survey was conducted at three (03) locations; the details of these locations with type / duration of surveys conducted are given in **Table 3.1**.

**Table 3.1 Traffic Count Survey Details**

Sr No.	Location	Survey Type	Duration
1.	Bucheki	MCC*	24 Hours
2.	Adda Lundianwala	MCC	24 Hours
3.	Service Road Intersection	MCC	24 Hours

\*MCC: Manual Classified Count Survey

The traffic categories noted during the count survey were: animal drawn vehicles, cycles, motorcycles, rickshaws, cars, trucks, buses, tractors trolleys and car carriers. The vehicle wise summary of traffic counts at above mentioned locations are given in **Table 3.2**.

The traffic forecasts of the proposed interchange (Lundianwala) have been made for twenty (20) years i.e. 2025-2044. Other factors like Vehicles on Roads in Pakistan, Registered Vehicles in Pakistan, Population and Gross Domestic Production (GDP) etc. have also been considered. The estimated growth in accumulated yearly traffic for various types of vehicles is given in **Table 3.3**.

**Table 3.2 Summary of Classified Daily Traffic Counts**

<b>Sr. No</b>	<b>Location</b>	<b>Animal Drawn Vehicles &amp; Bicycles</b>	<b>Motorcycles &amp; Rickshaws</b>	<b>Cars &amp; Pickups</b>	<b>Mini Buses &amp; Wagons</b>	<b>Buses &amp; Flying Coaches</b>	<b>Trucks</b>	<b>Tractors</b>	<b>Total Traffic</b>
1	Bucheki	918	6704	2075	1020	566	1298	924	13505
2	Adda Lundianwala	459	5960	2314	1144	614	1364	943	12798
3	Service Road Intersection	615	4783	1866	723	134	419	302	8842

**Table 3.3 Estimated Accumulated Yearly Traffic Growth**

Sr. No.	Year Description	Year	Car & Pickups	Mini Buses & Wagons	Buses & Flying Coaches	Trucks		Trailer Units		Total
						Trucks (2 Axle)	Trucks (3 Axle)	4-Axle	5-Axle & above	
1	Base Year	2023	-	-	-	-	-	-	-	-
2	Cons. Year	2024	-	-	-	-	-	-	-	-
3	Op Year 1	2025	1,231	89	34	29	14	6	4	1,407
4	Op Year 2	2026	1,282	92	35	30	14	6	4	1,463
5	Op Year 3	2027	1,335	96	36	31	15	6	4	1,523
6	Op Year 4	2028	1,390	100	37	32	15	7	4	1,585
7	Op Year 5	2029	1,448	104	38	33	16	7	5	1,651
8	Op Year 6	2030	1,508	108	39	34	16	7	5	1,717
9	Op Year 7	2031	1,570	112	40	35	17	7	5	1,786
10	Op Year 8	2032	1,635	116	41	36	17	7	5	1,857
11	Op Year 9	2033	1,703	120	42	37	18	8	5	1,933
12	Op Year 10	2034	1,774	125	44	38	18	8	5	2,012
13	Op Year 11	2035	1,847	130	45	39	19	8	5	2,093
14	Op Year 12	2036	1,923	135	46	40	19	8	6	2,177
15	Op Year 13	2037	2,003	140	47	41	20	9	6	2,266
16	Op Year 14	2038	2,086	145	49	43	21	9	6	2,359
17	Op Year 15	2039	2,172	151	50	44	21	9	6	2,453
18	Op Year 16	2040	2,262	157	52	45	22	9	6	2,553
19	Op Year 17	2041	2,356	163	53	46	22	10	6	2,656
20	Op Year 18	2042	2,454	169	54	48	23	10	7	2,765
21	Op Year 19	2043	2,556	176	56	49	24	10	7	2,878
22	Op Year 20	2044	2,662	183	58	51	25	11	7	2,997
<b>ADT (2025-2044)</b>			<b>37,197</b>	<b>2,611</b>	<b>896</b>	<b>781</b>	<b>376</b>	<b>162</b>	<b>108</b>	<b>42,131</b>
<b>TOTAL AAT (2025-2044)</b>			<b>13,576,905</b>	<b>953,015</b>	<b>327,040</b>	<b>285,065</b>	<b>137,240</b>	<b>59,130</b>	<b>39,420</b>	<b>15,377,815</b>

### **3.1 Type and Category of the Project**

This project is construction of interchange on Motorway M-3 at Lundianwala with an estimated cost of PKR 1.706 Billion. Hence, it lies in Schedule II at classification D (2) of IEE/EIA Regulations that requires an Environmental Impact Assessment (EIA) to be submitted to EPA and get its approval under section 12 of Pakistan Environmental Protection Act 1997 (amended 2012).

### **3.2 Benefits of the Proposed Project**

By construction of interchange on Motorway M-3 at Lundianwala, following project benefits will be achieved:

- The residents of the adjoining areas would have direct access to motorway.
- Economic and Social Progress.
- Encourage regional cooperation by removing and reducing physical, institutional, and other impediments to improved transit and enhanced trade.
- Employment opportunities will be provided to locals.
- Reducing the Fuel consumption of Heavy vehicles which will directly reduce the prices of goods.

### **3.3 Project Alternatives**

#### **3.3.1 General**

Punjab EPD requires project proponents to consider alternative options and strategies with lesser or minimal adverse impacts on environment but able to meet the objectives of the project for which the EIA is being prepared. This document pertains to EIA of construction of interchange on Motorway M-3 at Lundianwala. As a result, alternative options have been considered in the context of the overall project. The exercise is based on developing a list of alternatives and shortlisting based on objectives and project requirements, required to develop a reasonable number of options for consideration followed by evaluation of alternatives leading to the selection of the preferred alternative.

The report identifies potential environmental impacts of each alternative, develops comparative analysis matrix with respect to transportation objectives and environmental impacts to suggest the most feasible alternative that can be taken up for development.

### **3.3.2 Alignment options**

Consultants arranged site visit to find best possible options of the alignment in view of economic, social and technical factors. Consultants' team of Engineers and Surveyors explored four options which are given below:

#### **3.3.3 Option I:**

This alignment consists of two ramps. First ramp starts from Lahore – Jaranwala Road near Rangpura and connects Lahore – Abdul Hakeem Motorway (M-3) near Chak 644 GB. Second ramp starts from Lahore – Jaranwala road near Jamia Masjid Ismail and joins Lahore – Abdul Hakeem Motorway (M-3) near Chak 629. The alignment is shown in the Fig. 3.1.

The Design Consultants observed that there is no existing track from Rangpura to M-3. Same is the case for the second ramp as there is no existing road or track from Jamia Masjid Ismail at Lahore – Jaranwala road to Lahore – Abdul Hakeem Motorway (M-3). This alignment option having two ramps lies within the private land, which is basically plain and generally used for agriculture. So, the acquisition of private land is needed for construction of subject interchange.

The total length of the alignment for first ramp from Lahore – Jaranwala road near Rangpura to Lahore – Abdul Hakeem Motorway (M-3) is approx. 2.7 km with requiring construction of complete road structure. The total length of the alignment for second ramp from Lahore – Jaranwala Road near Jamia Masjid Ismail to Lahore – Abdul Hakeem Motorway (M-3) is 1.7 km with requiring construction of complete road structure. The total length of construction of complete road structure for this alignment option is 4.4 km.



**Figure 3.1: Map of Alignment Option I**

### 3.3.4 Option II:

The alignment option II also consists of two ramps. First ramp starts from Lahore – Jaranwala Road near Lakran Wala Pul Bus Stop and connects Lahore – Abdul Hakeem Motorway (M-3) opposite to the Lundianwala Adda. Second ramp starts from Lahore – Jaranwala road between Canal and Lundianwala Adda and joins Lahore – Abdul Hakeem Motorway (M-3) near Lundianwala Town. The alignment is shown in the Fig. 3.2.

The Design Consultants observed that there is no existing road track for first ramp which is from LakranWala Pul Bus Stop to M-3. Same is the case for the second ramp as there is no existing road or track from Lundianwala Adda at Lahore – Jaranwala road to Lahore – Abdul Hakeem Motorway (M-3).

This alignment option having two ramps lies within the private land, which is basically plain and generally used for agriculture. So, the acquisition of private land is needed for construction of subject interchange.

The total length of the alignment for first ramp from Lahore – Jaranwala road near Lakranwala Pul Bus Stop to Lahore – Abdul Hakeem Motorway (M-3) is approx. 2.5 km with requiring construction of complete road structure.

The total length of the alignment for second ramp from Lahore – Jaranwala Road near Lundianwala Adda to Lahore – Abdul Hakeem Motorway (M-3) is 2.6 km with requiring construction of complete road structure. The total length of construction of complete road structure for this alignment option is 5.1 km.



**Figure 3.2: Map of Alignment Option II**

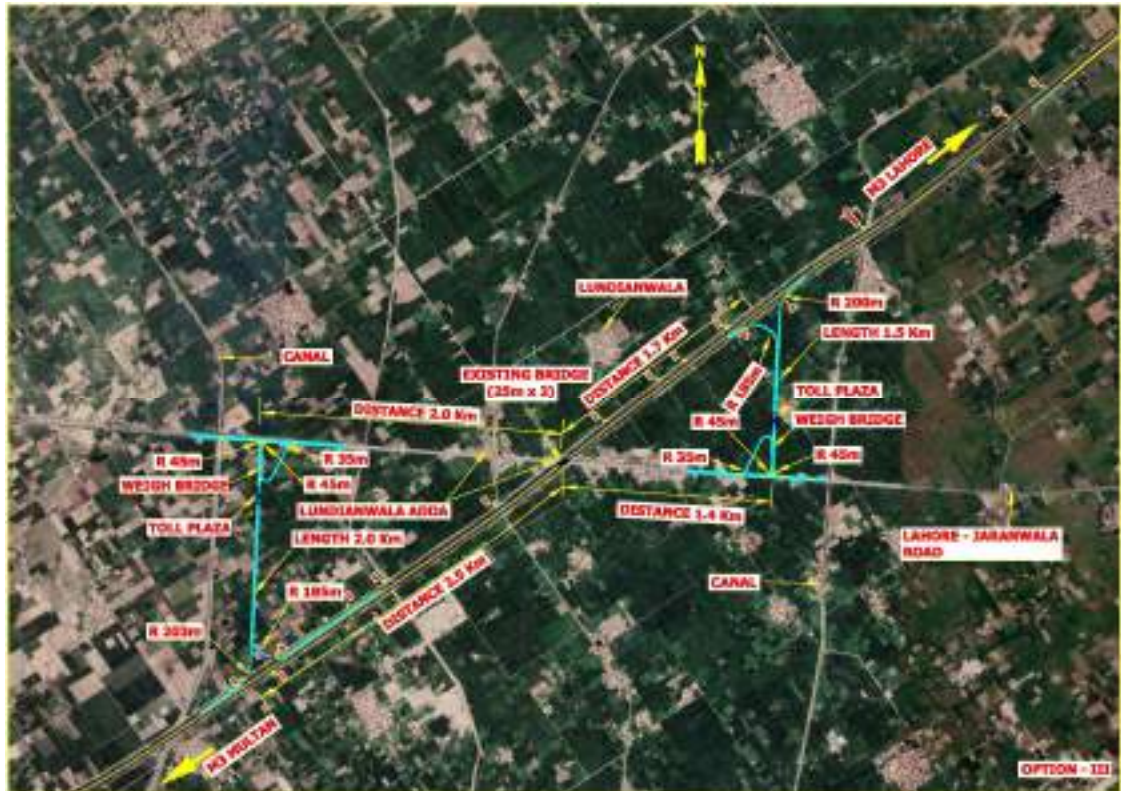
### 3.3.5 Option III:

This alignment option consists of two straight ramps. The first 1.5 km long ramp starts at 1.7 kms from the Lundianwala Bridge on Motorway M-3 towards Lahore side and connects Lahore – Jaranwala Road at approx. 1.4 kms from the said Bridge.

The second 2.0 km long ramp starts at 2.5 kms from the Lundianwala Bridge on Motorway M-3 towards Multan side and connects Lahore – Jaranwala Road at approx. 2.0 kms from the said Bridge near Jamia Masjid Ismail. The total length of construction of the new road for this alignment option is approx. 3.5 km. The alignment is shown in the Fig. 3.3.

This alignment option having two ramps lies within private land, which is basically plain and generally used for agriculture. While the Alignment

Option largely avoids any built-up areas or existing structures, acquisition of private land is will be needed for construction of this alignment option.



**Figure 3.3: Map of Alignment Option III**

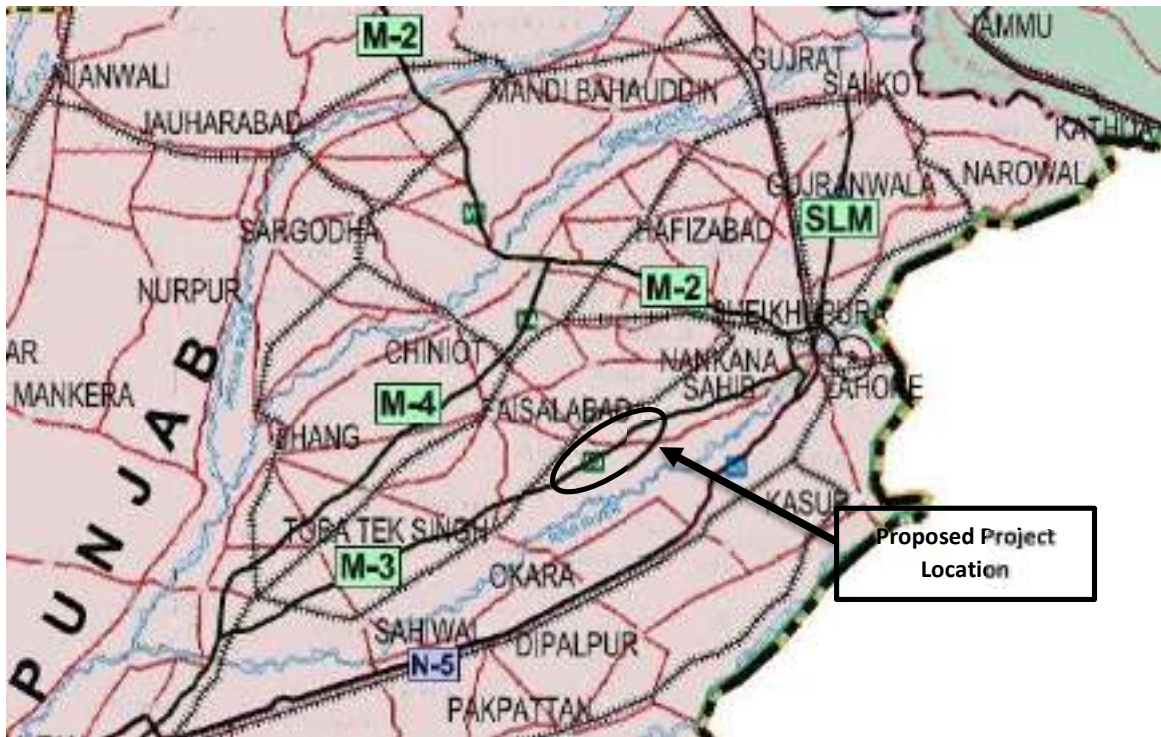
### 3.3.6 Consultants' Recommendation

Considering advantages/disadvantages of above three proposed options for alignment, the Consultants recommend Option III because:

- Alignment Option – III has been selected as it provides maximum connectivity in minimum cost
- It provides more connectivity at major intersections & nearby road network.
- Its estimated construction cost is lesser than that of other alignment options

### 3.4 Location of the Project Area

The proposed project site is administratively located in Faisalabad District. The proposed project includes construction of interchange on Motorway M-3 at Lundianwala in District Faisalabad. **Figure 3.4** shows the location map of the proposed project Site.



**Figure 3.4 Location Map of the proposed Project**

### 3.5 Vegetation Features

As climate of Faisalabad is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per phyto-geographical classification of the area.

The proposed project will require acquisition of agricultural land for the construction of connecting roads. The present vegetation features of the project site are agriculture fields which will be cleared before construction of roads. Detailed ecological features of the site are discussed in Section-4.

### 3.6 Project Administrative Jurisdiction

The proposed project lies in the Faisalabad District in Punjab Province. The project site falls in administrative jurisdictions of the Faisalabad.

### 3.7 Road Access

The project interchange can be accessed from Lahore-Jaranwala Road & Motorway M-3 at Lundianwala.

### 3.8 Government Approvals

It is 3.5 km long road interchange project which involves the interaction with other government agencies/departments at planning as well as construction stages. The approval from following agencies/departments is needed for the following:

**a. Deputy Commissioner**

The acquisition of the land for this project is to be done through Deputy Commissioner of the respective districts under Land Acquisition Act 1894, Land Acquisition Rules 1983 and other prevalent rules and regulations.

**b. Environmental Protection Department**

Environmental approval under section 12 of Pakistan Environmental Protection Act 1997 (amended in 2012) and IEE/EIA Regulations 2000 is required from EPA Punjab.

**c. WAPDA**

This project will involve relocation of the electricity transmission lines for which Faisalabad Electric Supply Company (FESCO) is required to issue the necessary approvals.

**d. PTCL**

This project will involve relocation of the telecom transmission lines for which PTCL is required to issue the necessary approvals.

**e. Forest Department**

This project will involve in cutting of trees for which Forest Department is required to issue the necessary approvals.

**f. Sui Northern Gas (Pvt.) Ltd. (SNGPL)**

This project will involve relocation of the gas pipelines for which SNGPL is required to issue the necessary approvals.

**3.9 Project Implementation Schedule**

The project is expected to be completed within Twelve (12) months. Project Schedule is shown in **Figure 3.5**.

**3.10 Cost of the Project**

The estimated capital cost of the proposed project is Rs. 1.706 Billion.

**3.11 Economic Benefits of the Project**

Economic benefits of the project are summarized below:

Economic Internal Rate of Return	:	13.75%
Benefit Cost Ratio	:	1.12
Net Present Worth	:	141.03 Million

**3.12 Land Acquisition**

The proposed project will require acquisition of agricultural land for the construction of connecting roads. The land Acquisition areas and utilities prepared based on the proposed alignment are attached as **Annexure VI**.

### 3.13 Restoration & Rehabilitation Plans

One of the major impacts of the project arises out of the acquisition of land from the land owners and the resulting displacement of their families and disturbances in the livelihoods of the affected persons (AP) in the project area. Affected persons (AP) will be compensated according to land use i.e., agriculture land will be paid according to respective schedule of rates while built up area will be compensated accordingly. Utilities which will be affected during construction will be restored to their original state. The said impact is negative and permanent and its mitigation measures are explained in Section-6 in detail.

### 3.14 Components of the Project

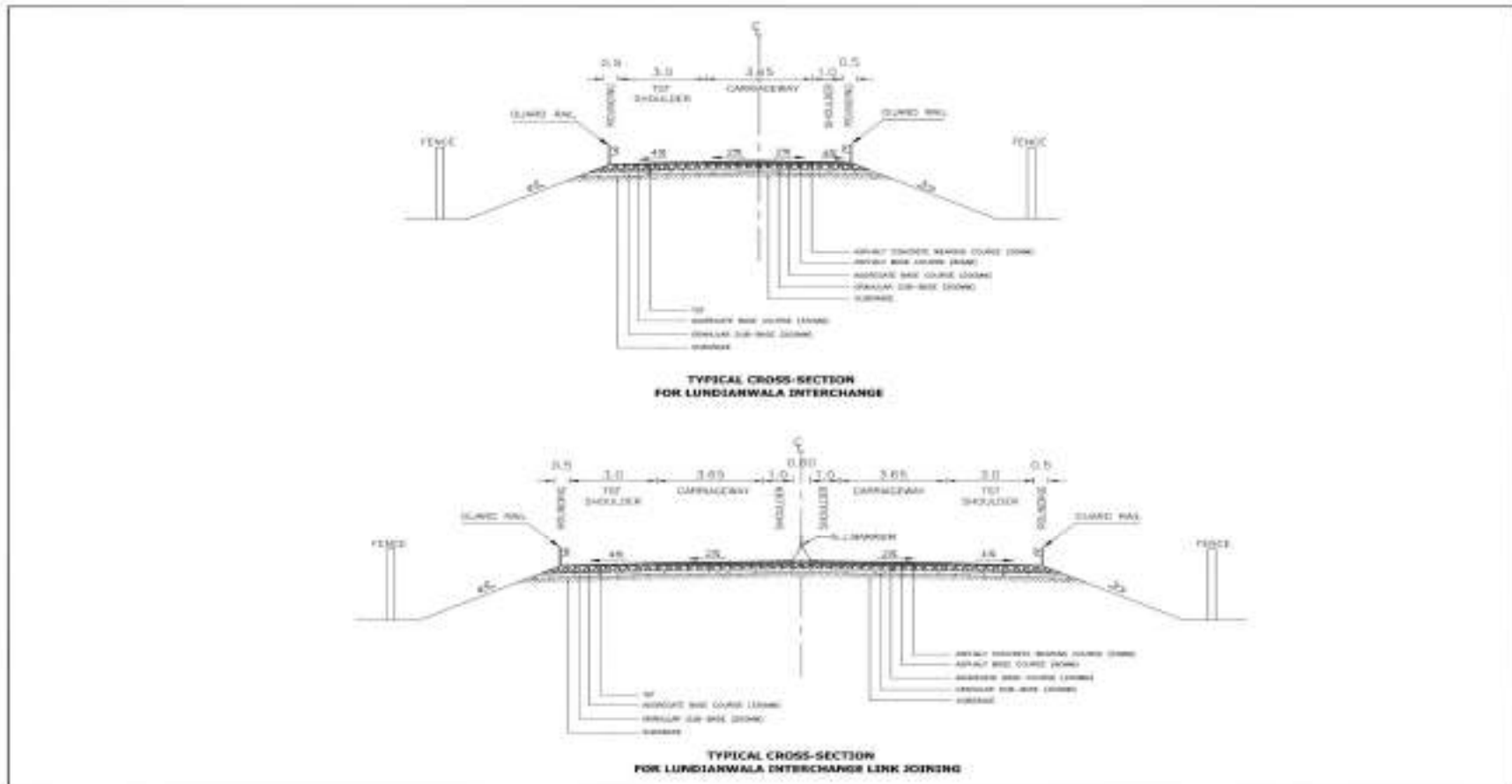
The various project components include construction of interchange on Motorway M-3 at Lundianwala in District Faisalabad. **Figure 3.6** shows the typical cross-sectional plan of the proposed project.

The components of the proposed project are as follows:

#### 3.14.1 Geometrics

No. of lanes	:	2-Lane
Design Speed	:	40 KPH
Carriageway Width	:	7.3m (loop)
Shoulder cross slope	:	4%
Cross slopes traveled way	:	2%
Fill slopes	:	2:1 Horizontal: Vertical
Design life of road	:	10 years





**Figure 3.6 Typical Cross-sectional plan of the proposed project**

### 3.14.2 Codes and Standards

The following codes and standards have been considered and adopted for the design of the project road:

- Geometric Design      AASHTO
- Material & Testing      AASHTO-ASTM
- Pavement Design      AASHTO

### 3.14.3 Civil Works

Design of civil work is as under:

#### *Pavement Design*

Design Life:    10 Years

Design CBR:    A design CBR value of 7% is adopted at sub-grade level in widening / new construction

#### *Tentative Pavement Thickness*

Based on 791,253 ESALs calculated from the traffic data, the proposed pavement thickness for construction road subject to enforcement of load restrictions is given as:

Based on AASHTO Design:

- Asphaltic Wearing Course      50 mm
- Asphaltic Base Course          80 mm
- Aggregate Base Course        200 mm
- Granular Subbase                200 mm

Pavement thickness calculated for Shoulders:

- Triple Surface Treatment
- Aggregate Base Course          330 mm
- Granular Subbase                200 mm

### 3.15 Manpower Requirements

The manpower requirement during construction of the project will be Seventy (70) including managerial staff, skilled and unskilled labour which will be arranged by Engineering Procurement Construction (EPC) Contractor.

### 3.16 Traffic Management Plan

Road will be constructed in various sections and stages and there will be no blockage of road for locals. However, alternate routes shall be provided along the road for locals by the proponent where necessary.

Small to medium size population centers in the vicinity of the proposed alignment may face problem due to movement of vehicles carrying construction materials. The increased traffic load may cause further deterioration of the existing condition of the road. The movement of vehicles along the haulage routes may cause soil compaction and alteration of percolation, vegetation pattern and damage to properties and utilities. The Traffic Management Plan is shown in **Annex-IX**.

### 3.17 Water Consumption

Calculation for Water Consumption

Water Requirement = 180 L/day/Capta

Total Water Requirement = No. of persons X 180 L/day

As no of persons required for subject project are 70

So, Total Water Requirement = 70 X 180 L/day

= 12,600 L/day

The water consumption during the construction phase of the project is estimated to be **12,600 Liter/day**. A water balance sheet showing hierarchy of total water requirement is shown in Figure 3.8.

### 3.18 Waste Water Generation

$$\begin{aligned}\text{Wastewater Generation Rate} &= \text{Total Water Consumption} \times 0.8 \\ &= 12,600 \times 0.8\end{aligned}$$

$$\text{Wastewater Generation Rate} = 10,080 \text{ L/day}$$

The waste water generation is estimated to be **10,080 Liter/day** during the construction phase of the project. Portable toilets with septic tanks will be proposed as various and temporary labor camps will be established as per requirement. The design of septic tank is shown in Figure 3.9.

### 3.19 Solid Water Generation

The solid waste generation comprises of two parts: labor and raw materials.

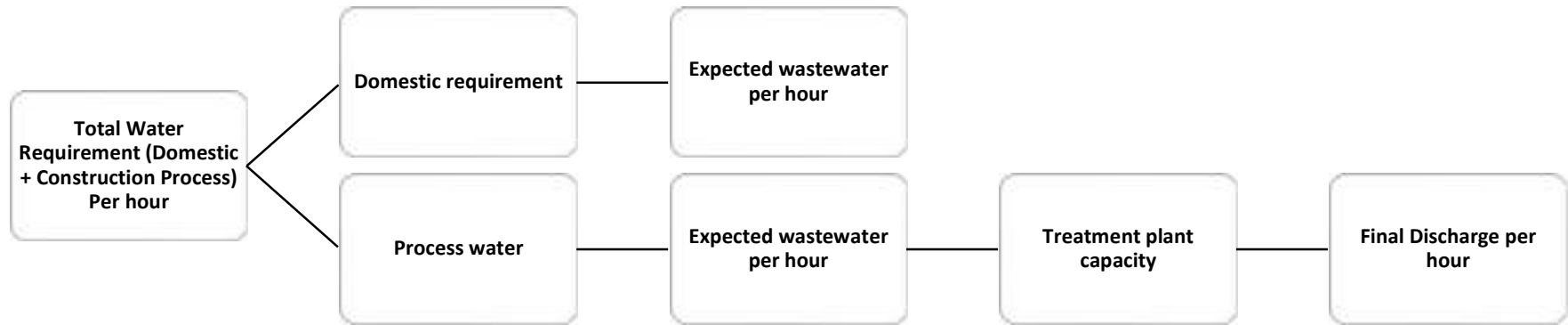
For calculation of labors

$$= \text{No of persons} \times 0.5 \text{ Kg/day/Capta}$$

$$= 70 \times 0.5$$

$$= 35 \text{ Kg/day}$$

For calculation of raw materials please find in attached **Annex-VII**



**Figure 3.8 Water Balance Sheet**

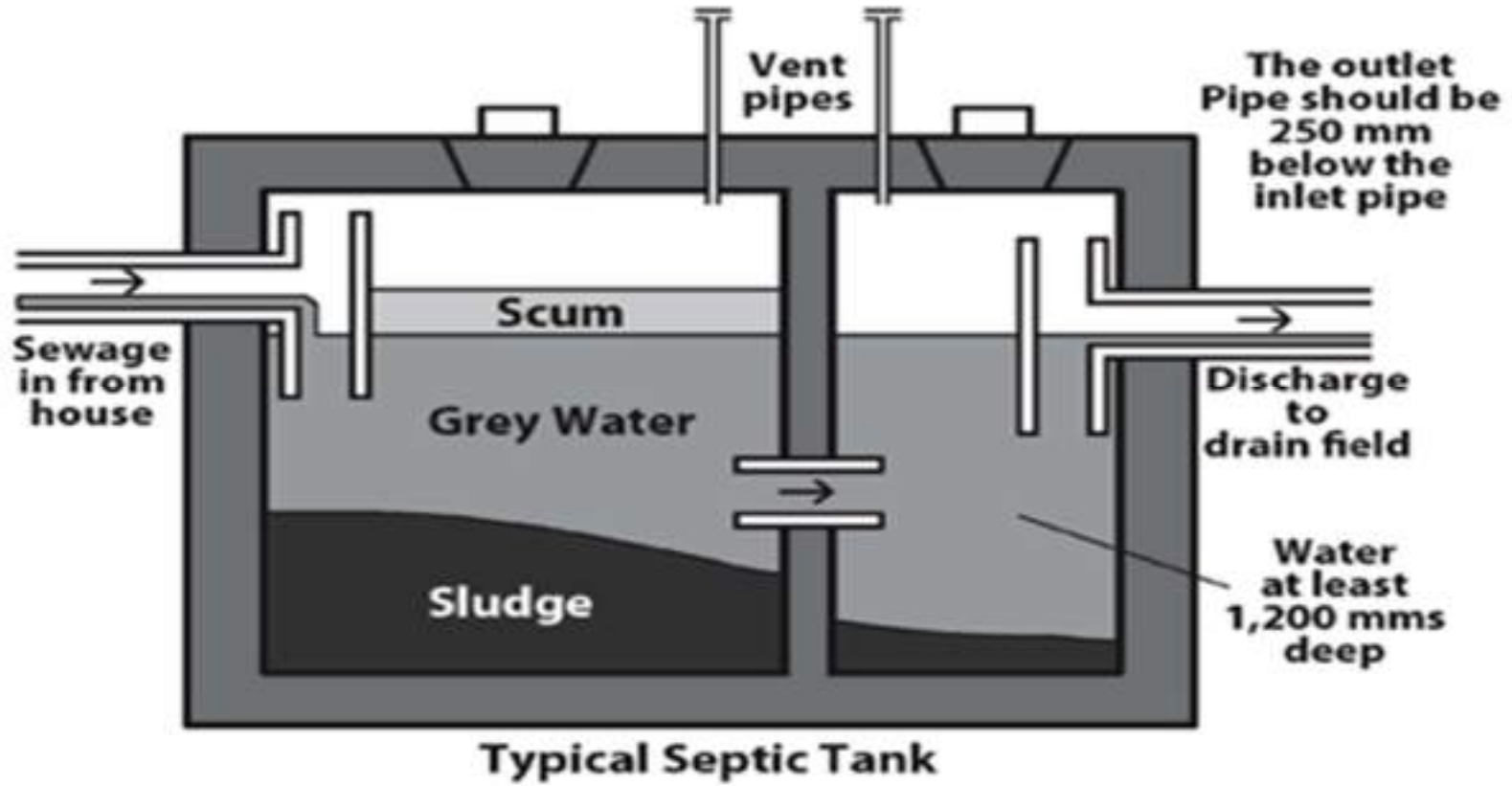


Figure 3.9 Septic Tank

### 3.20 Energy Sources

Currently, the project site and surrounding areas face an issue with the electric power supply as there is no source of hydropower and other energy sources located in major towns/villages. Other energy sources in the Project area are kerosene and LPG, obtained from Petrol stations and LPG dealers in the District.

### 3.21 Construction Materials

The materials used in construction of the road for the proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement, cement etc.

### 3.22 Construction Camps

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the contractor in consent with supervision consultant after approval from NHA.

### 3.23 Expected Equipment's for Construction

The list of the machinery and the equipment expected to be used for the proposed project is provided in **Table 3.4**.

**Table 3.4 Machinery and Equipment Requirement for the Proposed Project**

Type of Machinery and Equipment	Type of Machinery and Equipment
Dump Truck	Self-Propelled Pneumatic Roller
Front End Loader	Asphalt Distributor
Dozer	Batching Plant
Grader	Concrete Transit Truck
Vibratory Roller	Concrete Pump
Water Tankers	Excavator
Aggregate Spreader	Water Pumps
Three Wheel Rollers	Cranes

Tandem Roller	Vibrators
Asphalt Plant	Generators
Paver	-

## SECTION-4

### ENVIRONMENTAL BASELINE PROFILE

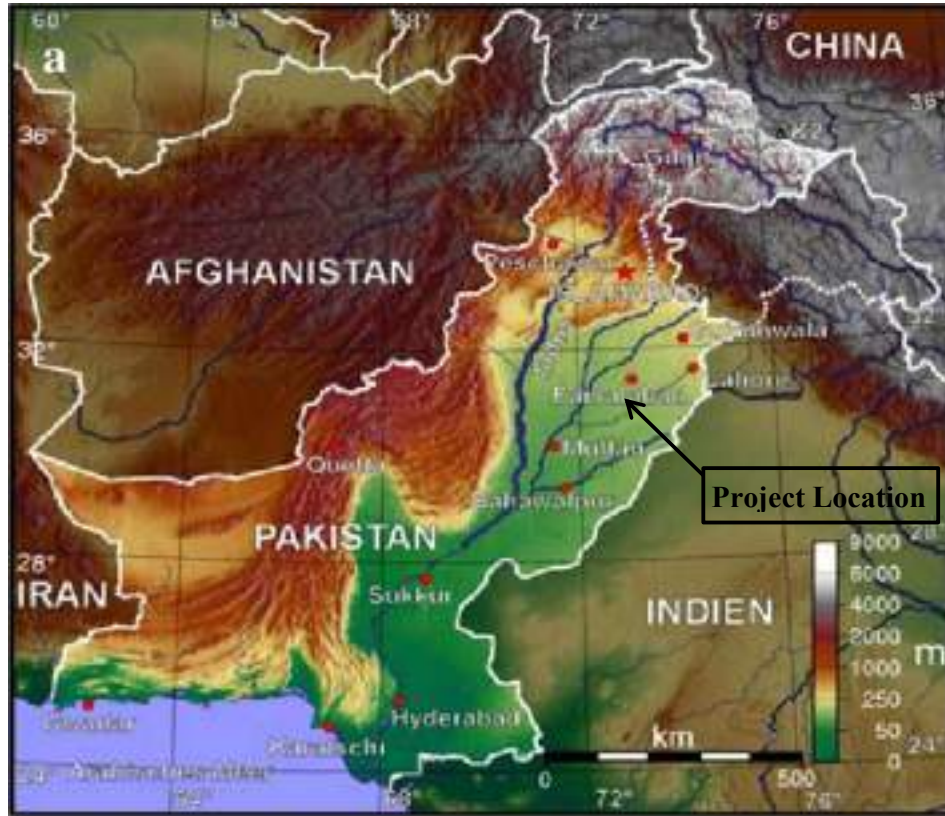
#### 4.0 General

The environmental baseline study is intended to establish a data base against which potential project impacts can be predicted and managed later. The EIA of the proposed project “Feasibility Studies and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)” covers a comprehensive description of the project area; including regional resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the proposed Project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, interviews were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. Various Government Departments were also visited for the collection of relevant data and obtaining their views on the proposed project.

#### 4.1 Physical Resources

##### 4.1.1 Topography

The project site is located within an alluvial plain, naturally flat and level having no hills and valleys. The general height of the area is approximately 184 meters above the Mean Sea Level (MSL). **Figure 4.1** represents the topography of the Project area.



**Figure 4.1 Topography of the Study Area**

#### **4.1.2 Regional Geology**

The soil deposits at the project site belong to Chung Fun formation indicating the last glacial cycle. It was followed by the period of melting of glaciers, resulting in deposition of clay, silt and sand deposits in late Pleistocene to recent. With gradual withdrawal of the sea during the late tectonic time, shallow water and possibly deltaic deposits were laid down. It became a vast flood plain on which debris of numerous streams have mingled to load it with huge thickness of alluvial material derived from the Himalaya. Though, there is no evidence of any glaciations in the area, the series of great climatic changes during the Pleistocene period had impact on the sedimentation in physiography of this region.

The project area is located in Rachna Doab and trends south-western to a topographic relief difference of 69.2 m. The average slope is 0.3 m/Km. Due to relatively flat topography surface and sub-surface drainage conditions in the project area are poor which in the past gave rise to water table due to increased

recharge from the unlined irrigation channels and deep percolation from agriculture fields. In order to control the rise in water table, a network of drainage channels have been constructed to drain the area during monsoon. These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with interbeds of clay and layers or lenses of sand. The Project Area does not have any valuable minerals. Scientific in depth, investigations have failed to discover any minerals till to- date. These alluvial deposits comprise earthy brown to brown silt, clay and sand. The beds are largely hard, laminated and sandy with interbeds of clay and layers or lenses of sand. Project site is located in meander belt deposits.

#### 4.1.3 Soil

The soil in the Project Area is cohesion less and is of alluvial type deposited by Ravi River. Various soil layers below the ground level includes: silt, silty clay, silty sand, poorly graded sand with silt, lean clay etc. Soil Map of the Project Area is given in **Figure 4.2**.



**Figure 4.2 Soil Map of the Study area**

#### 4.1.4 Climate and Meteorology

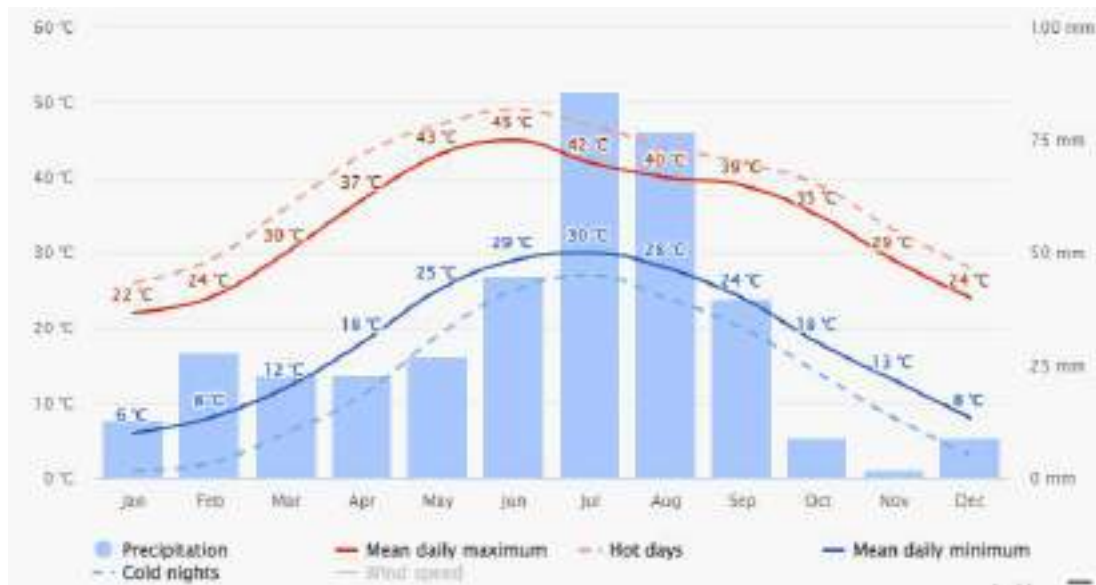
Seasonal climatic conditions must be considered for the design and execution of the Project. The climate including air, temperature, precipitation and humidity is an influencing factor, affecting the construction and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes and precipitation must be considered. The Project area has extreme climate: it has hot summer and cold winters. Faisalabad District belongs to the Rechna Doab area, which is a subtropical, continental lowland designated as a semi-arid area. The climate is characterized by large seasonal fluctuations of temperature and rainfall. Summers are long and hot, usually lasting from April through September with maximum temperatures ranging from 40 °C to 49 °C. The winter season lasts from December through February, with maximum temperature ranging from 22 °C to 29 °C during the day and sometimes falling below zero at night.

The annual average rainfall in the district is about 650 mm. **Table 4.1** summarizes month-wise temperature, precipitation and wind speed and while **Figure 4.3** and **4.4** show the graphical presentation of humidity, precipitation and temperature in the study area.

**Table 4.1 Meteorological data of the project area**

Month	Temperature (°C)			Precipitation (mm)	Wind Speed (Knots)
	Avg. High	Avg. Low	Daily Mean		
January	22	6	14	11	5
February	24	8	16	22	6
March	30	12	21	21	6
April	37	18	27.5	16	7
May	43	25	34	11	7

June	45	29	37	12	7
July	42	30	36	25	8
August	40	28	34	28	7
September	39	24	31.5	23	7
October	35	18	26.5	3	6
November	29	13	21	1	4
December	24	8	16	2	4
<b>Yearly</b>	<b>34.16</b>	<b>18.25</b>	<b>26.20</b>	<b>175</b>	<b>6</b>
	<b>(Avg)</b>	<b>(Avg)</b>	<b>(Avg)</b>		<b>(Avg)</b>



**Figure 4.3 Maximum and Minimum Temperature in the Project area**

**Table 4.2 Average Monthly Precipitation**

Month	Average Rainy days	Average Rainfall
January	3.2	11
February	5.6	22
March	7.2	21
April	8.4	16
May	4.5	11
June	5.6	12
July	8	25
August	8.9	28
September	5.1	23
October	1.3	3
November	1.2	1
December	0.9	2
<b>Total</b>	<b>60</b>	<b>175</b>

**Figure 4.4 Mean Rainfall in the Project Area**

Based on climatic elements, five seasons are recognized in the project area:

**i). Pre-monsoon Season**

Pre-monsoon refers to the period from April to June prior to the setting in of the monsoon. This is the hottest and the driest season, with persistent dry and hot winds. Day time temperature rises to 45°C. The water table falls to the maximum depth.

**ii). Monsoon Season**

Monsoon is the main rainy period, which starts at the beginning of July, reaches its climax in August and gradually, subsides in September. High intensity Rainfall causes soil erosion which is a function of erosivity and erodibility. The cool monsoon winds followed by heavy showers lower the temperature to great extent. The part of rain percolates into the soil and is conserved in the subsoil and part adds to the groundwater. The conserved moisture in the soils is generally sufficient to rejuvenate the vegetation. All plants grow rapidly and nature towards the end of the season. With the start of monsoon season, the rivers flow at their peak level. The groundwater level is improved toward the end of the season in September and October.

**iii). Post-monsoon Season**

Post monsoon season refers to autumn (October-November). The temperature starts falling but the extreme aridity prevents plants to flower early and set seed toward mid-seasons. Groundwater level rises as a result of infiltration from rainfall.

**iv). Winter Season**

Winter refers to the period from December to January. The lowest temperatures ( $< 2^{\circ}\text{C}$ ) and cold winds characterize this season. The plants become dormant and most of them dry out. Most of the trees shed their leaves and few remain green or partly green. Sometimes this season becomes severe due to cold Siberian winds. Groundwater level declines in this season due to low flows in the rivers and no or little rains which usually fall in light showers causing little soil erosion.

**v). Spring Season**

Spring refers to the period from February to March. Temperatures become pleasant. The mean maximum temperature is  $30^{\circ}\text{C}$  with the highest precipitation of 22 mm and relative humidity of 57.6 percent. Some light showers of rain may also fall without generating run off. The vegetation sprouts again because of conserved moisture from winter and spring rains, if any. The water table starts falling.

#### 4.1.5 Environmental Parameters for Monitoring

The environmental parameters like air quality, noise level surface water, wastewater and ground water were monitored at the Proposed Project Site on 15th and 16th August, 2023 for analyzing the quality of air, ground water, surface water, wastewater and level of noise at the Proposed Site, for establishing the baseline profile of the area.

**Table 4.3** represents the coordinates and monitoring points of environmental parameters taken at the Proposed Project Site.

**Table 4.3 Monitoring Points of Environmental Parameters taken at the Proposed Project Site**

Sr. No.	Monitoring	Monitoring Location	GPS Coordinates	Date
1.	Ambient Air Quality Monitoring	Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3).	31°18'26.60"N 73°33'29.76"E	15-08-2023 to 16-08- 2023
2.	Ambient Noise Quality Monitoring			
3.	Ground water Quality Analysis			

##### 4.1.1.1 *Air Quality*

Faisalabad district is mostly rural with 47.8% of its population living in urban areas (2017 Census). There is very little industrialization, due to which air quality is generally good. The only source of air pollution in the district is dust and emissions from vehicular traffic.

The sampling procedures were based on the methods equivalent of United State Environmental Protection Agency USEPA.

- The air quality monitoring was carried out at reference points with the help of Mobile Air Quality Monitoring Equipment. The Analyzers and technique of monitoring are equivalent with the requirement of USEPA and EU Standards.
- The exact sampling site was finalized during the site visit with consent of client.

- The ambient air quality was monitored by online analyzers continuously for 24 hours at individual sampling point.
- Dust monitoring which includes Particulate Matter (PM10 & PM2.5) was monitored using USEPA Equivalent Continuous Monitors.

In this section results of Ambient Air Monitoring (O3, CO, HF, HNO3, NO, NO2, SO2, TSP, PM10 & PM2.5) measured at identified project's site to get an overview of the ambient air quality are discussed.

As per Punjab Environmental Quality Standards, all values were monitored on 15-08-2023 to 16-08-2023 during 24-hours continuous analysis except Carbon Monoxide, which was analyzed for 08 hours. The average ambient air results obtained during 24 hours are stated as follows in Table 4-4:

The detailed air pollutant data has been given in **Annexure-I**, while the average concentrations of the air pollutants are given in **Table 4.4**. **Figure 4.5** shows, a view and sampling point of ambient air quality monitoring in the project area.



**Figure 4.5 A view of ambient air quality monitoring in the project area**

**Table 4.4 Ambient Air Quality Monitoring at Project area**

Parameter	Unit	Results
Air Temperature	°C	37
Air Humidity	% rH	43

Parameter	Unit	Monitoring Duration	PEQS	Results
Ozone	$\mu\text{g}/\text{m}^3$	01 Hours	130	8.2
Carbon Monoxide (CO)	$\text{mg}/\text{m}^3$	08 Hours	5	1.13
Nitrogen Oxide (NO)	$\mu\text{g}/\text{m}^3$	24 Hours	40	20.4
Nitrogen Dioxide (NO <sub>2</sub> )	$\mu\text{g}/\text{m}^3$	24 Hours	80	59.3
Sulfur Dioxide (SO <sub>2</sub> )	$\mu\text{g}/\text{m}^3$	24 Hours	120	29.3
Particulate Matter (PM <sub>2.5</sub> )	$\mu\text{g}/\text{m}^3$	24 Hours	35	30.7
Particulate Matter (PM <sub>10</sub> )	$\mu\text{g}/\text{m}^3$	24 Hours	150	123.2

\*Average of CO for 08 hours

Ambient Air Quality was monitored at Lundianwala Interchange, results observed were within limits set in Punjab Environmental Quality Standards.

#### 4.1.1.2 *Noise level*

A set of three readings was collected from identified point as average of which is reported, for noise measurement sound level meter was utilized, having level range from 15 dB to 235dB with minimum detection limit of 0.1 dB. Noise was monitored instantaneously at four boundaries and in the mid-section of the room and value was averaged to get representative reading. Class 01 Sound Level Meter with A weighting was utilized.

The hourly and average noise level results at specified location during day & night time are stated as follows in **Table 4.5**. The detailed noise level monitored results are attached as **Annexure II** respectively. **Figure 4.6** represents location point of noise level monitoring in the project area.

**Table 4.5 Average values of Noise Levels**

Sr. No	Time	Unit	Average Value	PEQS Standard for Commercial Area
1	10:00 AM	dB(A)	62.4	65
2	11:00 AM	dB(A)	64.1	65
3	12:00 PM	dB(A)	63.3	65
4	1:00 PM	dB(A)	64.7	65
5	2:00 PM	dB(A)	61.1	65
6	3:00 PM	dB(A)	65.5	65
7	4:00 PM	dB(A)	64.5	65
8	5:00 PM	dB(A)	66	65
9	6:00 PM	dB(A)	66.3	65
10	7:00 PM	dB(A)	67	65
11	8:00 PM	dB(A)	66.8	65
12	9:00 PM	dB(A)	67	65
13	10:00 PM	dB(A)	65.6	55
14	11:00 PM	dB(A)	64.2	55
15	12:00 AM	dB(A)	61.2	55
16	1:00 AM	dB(A)	59.8	55
17	2:00 AM	dB(A)	59.7	55
18	3:00 AM	dB(A)	57.7	55

19	4:00 AM	dB(A)	55.9	55
20	5:00 AM	dB(A)	56.4	65
21	6:00 AM	dB(A)	57.5	65
22	7:00 AM	dB(A)	60.8	65
23	8:00 AM	dB(A)	63.8	65
24	9:00 AM	dB(A)	66.9	65
<b>Average Day Time</b>			<b>64.23</b>	<b>65</b>

24-hours Noise Monitoring was conducted at selected site and compared with Punjab Environmental Quality Standards. Noise levels measured at selected site were within compliance.

#### 4.1.1.3 Ground Water Sampling

Ground water samples for chemical analysis was collected in new HDPE / Teflon Sampling containers. Separate sample was collected for microbiological aliquot, Heavy metal analysis sample aliquot and inorganic analysis sample aliquot. Major physical parameters were analyzed onsite such as pH, Turbidity, Color.

Microbiological Sampling was performed after sterilization of water source as per WHO & USEPA guidelines and sample was collected in Sterilized glass containers. Sample was transported using Ice boxes with temperature under 4oC to maintain sample integrity. Sample Chain of custody was maintained from sampling location to Laboratory to ensure sample integrity. Analysis was performed as per standard methods. The detailed ground water monitored results are attached as **Annexure III. Table 4.6** shows the results of groundwater analysis. **Figure 4.6** represents sampling location point of ground water monitoring in the project area



**Figure 4.6 A General View of Ground Water Sample Collection**

**Table 4.6 Drinking Water Analysis Of The Project Area**

Sr. No.	Parameter	Method	Unit	MDL	PEQS Limit	Results
1.	Taste	Sensory Evaluation	-	-	Not objectionable	Acceptable
2.	Odor	Sensory Evaluation	-	-	Not objectionable	Acceptable
3.	Color	APHA 2120 C	Pt/Co	.5	.15	5
4.	Turbidity	APHA 2130 B	NTU	.5	<5	<5
5.	pH Value @ 25 °C	APHA 4500 H+B	pH Unit	0.01	6.5-8.5	7.9
6.	Conductivity	APHA 2510 B	$\mu\text{S/cm}$	-	N.S	1904
7.	Total Dissolved Solids (TDS)	APHA 2540 C	mg/L	5	< 1000	1160
8.	Fluoride	APHA 4500 D	mg/L	0.02	.1.5	0.13
9.	Nitrates NO <sub>3</sub>	APHA 4500 NO <sub>3</sub> -E	mg/L	0.04	.50	0.65
10.	Nitrite, NO <sub>2</sub>	APHA 4500 NO <sub>2</sub> -B	mg/L	0.001	.3	0.004
11.	Residual Chlorine	APHA 4500 CI G	mg/L	0.01	N.S	N.D

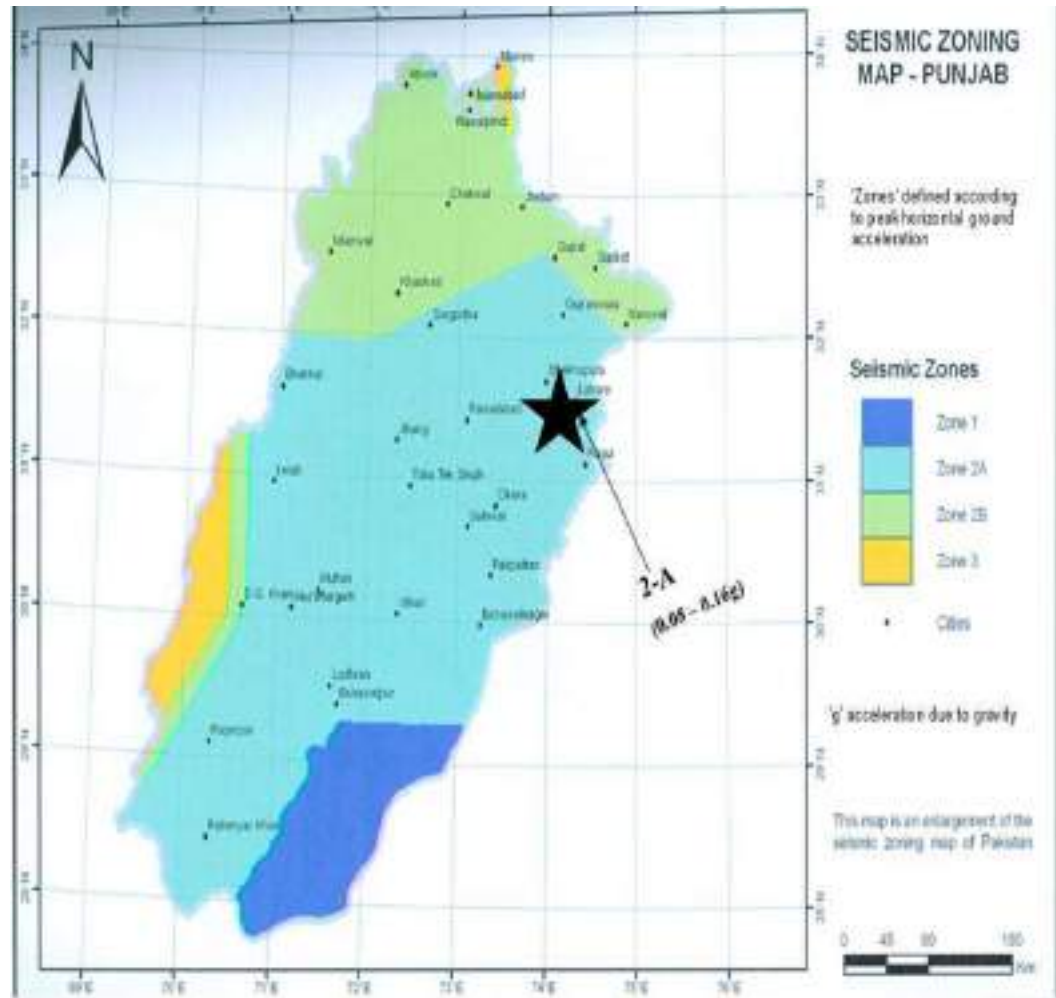
12.	Cyanide	APHA 4500 CN-E	mg/L	0.002	. 0.05	N.D
13.	Total Hardness (as CaCO <sub>3</sub> )	APHA 2340 C	mg/L	4	< 500	113
14.	Chloride	APHA 4500 CI B	mg/L	1	< 250	151
15.	Phenolic Compounds	APHA 5330 D	mg/L	0.05	N.S	N.D
16.	Aluminium (Al)	APHA 3111 / 3120 B	mg/L	0.1	. 0.2	N.D
17.	Antimony (Sb)	APHA 3111 / 3120 B	mg/L	0.005	. 0.005	N.D
18.	Arsenic (As)	APHA 3111 / 3120 B	mg/L	0.01	. 0.05	0.013
19.	Barium (Ba)	APHA 3111 / 3120 B	mg/L	0.1	0.7	N.D
20.	Boron (B)	APHA 3111 / 3120 B	mg/L	0.1	0.3	0.25
21.	Cadmium (Cd)	APHA 3111 / 3120 B	mg/L	0.003	0.01	N.D
22.	Chromium (Cr)	APHA 3111 / 3120 B	mg/L	0.01	. 0.05	N.D
23.	Copper (Cu)	APHA 3111 / 3120 B	mg/L	0.5	2	N.D
24.	Iron (Fe)	APHA 3111 / 3120 B	mg/L	0.1	8	0.13
25.	Lead (Pb)	APHA 3111 / 3120 B	mg/L	0.01	. 0.05	N.D
26.	Manganese (Mn)	APHA 3111 / 3120 B	mg/L	0.1	. 0.5	N.D
27.	Mercury (Hg)	APHA 3112 / 3120 B	mg/L	0.001	. 0.001	N.D
28.	Nickel (Ni)	APHA 3111 / 3120 B	mg/L	0.01	. 0.02	N.D
29.	Zinc (Zn)	APHA 3111 / 3120 B	mg/L	0.1	5	N.D
30.	Selenium (Se)	APHA 3111 / 3120 B	mg/L	0.005	0.01	N.D
31.	Sodium (Na)	APHA 3111 / 3120 B	mg/L	1	N.S	137.5
32.	Potassium (K)	APHA 3111 / 3120 B	mg/L	1	N.S	7.9
33.	Total Coliform	APHA 9222 B	Cfu/100ml	-	Absent	3
34.	Fecal E. coli	APHA 9222 D	Cfu/100ml	-	Absent	Absent
35.	Fecal Streptococci / Enterococci	APHA 9230 C	Cfu/100ml	-	Absent	Absent

Comparison of the results obtained showed that Ground Water obtained from Lundianwala Interchange had values within permissible limits as per Punjab Environmental Quality Standards except Total Dissolved Solids (TDS), Total Hardness & Conductivity due to the saline soils in the monitoring area. Water can vary greatly in quality depending upon type and quantity of dissolved salts. Salts are present in water in relatively small but significant amounts. These salts originate from dissolution of weathering of the rocks and soil, including dissolution of lime, gypsum and other slowly dissolved soil minerals. The suitability of water is determined not only by the total amount of salts present but also by the kind of salts.

Water quality or suitability for use is judged on the severity of problems that can be expected to develop during long-term use. The problems that result vary in both kind and degree and are modified by soil, climate and crop, as well as by the skill and knowledge of water user. The soil problems most commonly encountered and used as a basis to evaluate water quality relate to salinity, water infiltration rate, specific ion toxicity and a group of other miscellaneous problems. Among analysis of the heavy metals, all metals were also within limits defined by PEQS.

#### **4.1.6 Seismology**

According to Seismic Zoning Map of Pakistan included in the Pakistan Building Code Seismic Provisions (2007), the project site falls in Zone 2A (Lower limit of moderate damage). Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g.



**Figure 4.7: Seismic Zoning Map of Punjab**

#### 4.1.7 Solid Waste

The concerned district waste management company will be responsible in the proposed project site for the management of solid waste by ensuring efficient collection, transportation, recovery, treatment and disposal of waste generated at site.

#### 4.1.8 Land use Pattern

The land use along the road is lush green agriculture farms where rice, wheat, fodder and fruits are grown. Construction of road will require acquisition of the land on the alignment of the road. The major present land use of the project site is agricultural land, some area of mango farms, private property etc.

## 4.2 Ecological Resources

As climate of Faisalabad is semi-arid and subtropical, the vegetation of the area falls under scrub, dry, tropical thorn forest type as per phyto-geographical classification' of the area. The proposed project will require acquisition of agricultural land for the construction of connecting roads. The present vegetation features of the project site is agriculture fields which will be cleared before construction of roads.

### 4.2.1 Flora

#### a) Natural Shrubs and Herb

The project area has bushes and trees grown on the boundaries of the agriculture fields and in the environs of the tube wells, the place which also serves as a resting place for the farmers. Due to presence of canals existing in the project area, linear plantation including road side and canal side plantation are commonly seen. Moreover, native plants and animals can be seen along the highway also.

The most common flora of the district is the karir (*Capparis aphylla*), jhand (*Prosopis spicigera*), vann (*Salvadora oboeoides*), shisham (*Dalbergia sissoo*), kikar (*Acacia Arabica*), peepal (*Ficus religiosa*), bohar (*Ficus indica*), eucalyptus (*eucalyptus*), poplar (*Populus*), shirin (*Albizia lebbek*), lana (*Sida ruitessa*), lani (*Salsola foetida*), babul (*Acacia nilotica*), semal or silk cotton tree (*Bombax ceiba*), aak (*Calotropis procera*), and ber (*Ziziphus mauritania*). Grasses, and shrubs include dab (*Desmostachya bipinnata*), kai (*Saccharum spontaneum*), kundar (*Typha angustata*), and nar (*Phragmites karka*) as well as shrubs like lai (*Tamarix dioca*), jawanha (*Alhaji maurorum*), water cabbage (*Pistiastratiotes*), water hyacinth (*Eichhorniacrassipes*), reed (*Phragmites*), lotus (*Nelumbonucifera*), Sugar cane (*saccharum rotundus*), coconut (*Nucifera*), and bulrush (*Typhadomigensis*).

#### b) Trees

During site visit of the proposed project site, a variety of trees species along the roadsides has been observed. **Table 4.7** shows the tree species found in and around the proposed area including their Local and Botanical names.

**Table 4.7 Common Non Fruit Trees (Forest Trees) in the project Area**

Sr. No.	Local name	Biological Name
1.	Piloo	Salix tetrasperma
2.	Shahtoot	Morus alba
3.	Shishum	Dalbergia sisoo
4.	Peepal	Ficus religiosa
5.	Lasora	Cordia myxa
6.	Bohar	Ficus bengalensis
7.	Bohree	Ficus Specie
8.	Dharek	Melia azadirach
9.	Kikar	Rosales
10.	Mango	Mangifera indica
11.	Poplar	Populus deltoides
12.	Jaman	Syzygium jambulenum
13.	Ber	Ziziphus mauritiana
14.	Phagwara	Ficus palmate
15.	Sharin	Albizia procera
16.	Euclyptus	Eucalyptus
17.	Ber	Zizyphus jujube
18.	Neem	Sapinadle
19.	Jand	Broussonetia papyrifera

#### 4.2.2 Fauna

##### a) Mammals

Wild boar, jackals, stray dogs, and are the only wildlife found in the district. Domestic livestock that was observed during field visit include buffalo, cattle, goats, sheep's, and donkeys that are used by the local residents for their living

and mobilization purposes.

**b) Amphibians**

Amphibians frequently seen in and around the project area, especially during rainy season include common Frog (*Rana tigrina*) and common toad.

**c) Birds**

House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sight in the area. In addition, following birds have also been observed in the area as shown in **Table 4.8**.

**Table 4.8 Birds of the Project Area**

Sr. No.	Common Name	Scientific Name
1	Nightingale	<i>Pycnonotus cafer</i>
2	Parrot	<i>Psittacula krameri</i>
3	Pigeon	<i>Columba livia</i>
4	Hoopoe	<i>Upupa epops</i>
5	Koel	<i>Eudynamys scolopacea</i>
6	Black kite	<i>Mivus migrains</i>

**d) Reptiles**

Lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are observed in the proposed project site.

**4.2.3 Wetlands**

There are no significant wetlands in the project study area.

**4.2.4 Endangered Species**

There are no endangered species of flora and fauna in the project study area.

**4.2.5 Wildlife Sanctuaries and Game Reserves**

No wildlife sanctuary or game reserves are located in the vicinity of the project study area.

**4.2.6 Critical Habitats**

No wild life sanctuary or game reserve (Critical Habitats) exists near project study area and therefore it can be quantified that proposed project does not

affect any critical habitat as no critical habitat is located close to the Project area.

### **4.3 Cultural Heritage and Community Structure**

There are no official heritage sites or historical and archeologically important sites in the project study.

### **4.4 Socio-Economic Structure**

This section deals with the existing social conditions of the proposed project area. During the desk/ office study, available reports/ documents were comprehensively reviewed. Detailed site visits were conducted by the Consultants' EIA team (Male/Female Sociologists and Environmentalists) to appraise the prevailing socio-economic conditions and to assess the impacts of construction of Lundianwala Interchange on Motorway M-3. To achieve the project objectives, it is imperative to study the prevailing socio-economic and socio-cultural aspects of their livelihoods. During the field survey, interviews and meetings were conducted with the local residents of the project area, private land & shop owners, shop keepers (renters), pedestrians, traveller's and drivers in Lundianwala area. Observations were made after giving consideration to the desk/ office study results.

#### **4.4.1 Methodology**

##### **Data Source**

Data collection for socioeconomic study of the proposed project involved socioeconomic baseline survey of the proposed project area.

##### **i. Primary Data**

Primary data was collected through socio-economic baseline survey. For the selection of respondents simple random sampling technique was adopted and 100 households residing within the project area and in the vicinity of proposed project were selected. After determining sample size, an interview schedule was developed for the collection of baseline data. This interview schedule included the baseline data/ information (i.e.

demographic characteristics, livelihoods, economic conditions, quality of life and land acquisition) that is required for establishing the baseline study and was collected during the socio economic baseline survey.

The collected data was analyzed by a software "Statistical Package for Social Sciences" (SPSS), because it has an easier and quicker access to basic functions and also useful to get the actual and accurate results of baseline data.

Spread sheet for baseline data of EIA study was created in SPSS in the form of quantitative data. After entering, checking, sorting, and transforming the data, the basic operation, data analysis was taken place through descriptive analysis by finding out the percentages and the frequencies of the respondent's views in the form of tables and charts/graphs. These percentages, frequencies and charts/graphs of baseline data were automatically generated by this software.

#### **ii. Secondary Data**

Secondary data was collected from District Census Report Faisalabad 1998 for socio economic baseline survey.

#### **4.4.2 Political and Administrative Setup**

The project area falls in Faisalabad District. District Co-ordination Officer (DCO) is the highest ranked administrator of the district. For the collection of revenue and administration, the districts are subdivided into Tehsils. Local governments also administer the area through Union Councils and Tehsils. The total area of the district Faisalabad is 5,856 square kilometers.

#### **4.4.3 Study Area**

The study area falls in Jaranwala Tehsil of District Faisalabad. According to population census of 2017, Tehsil Jaranwala has a population of 1,493,923 persons of which 767,809 are male while 725,957 are female. Out of total population, 15.2% population live in the urban areas and 84.8% live in the rural areas.

#### **4.4.4 Demographic Characteristics of the Project Area**

The total population of Faisalabad District was 7,882,444 as enumerated in March, 2017 with an intercensal percentage increase of 31.11 since March, 1998 when it was 5,429,547 souls. The average annual growth rate was 1.63 percent during this period. The total area of district is 5,856 square kilometers which gives population density of 1,346 per square kilometer observed in 2017.

##### **i. Rural and Urban Distributions**

The urban population was 3,766,866 or 47.7 percent of the total population of the district which grew at an average rate of 2.58 percent during 1998 – 2017.

##### **ii. Religion**

The population of the district is predominantly Muslims i.e., 96.4 percent while Christians were 3.35% of the population.

##### **iii. Ethnic Structure**

The main castes and groups of the Faisalabad district are Kharal, Jutt, Arrain, Butt, Gujjar and Sikh

##### **iv. Mother Tongue**

The mother tongue refers to the language used for communication between parents and their children in any household. Punjabi is the predominant language being spoken by majority (98.8 percent) of the population of the district followed by Urdu, Pushto and Siraki.

##### **v. Sex Ratio**

Sex ratio, i.e. number of males for every 100 females was 105.11 percent recorded in 2017 Census.

##### **vi. Marital Status**

The population above 15 years was classified into never married, married, widowed and divorced. 32.6 percent of the total population was never married, 61.1 percent married, 5.5 percent widowed and 0.6

percent divorced. The percentage share of never married male was higher than that of females, being 37.3 percent and 27.7 percent respectively. The percentage of never married females was higher in urban than in rural areas.

**Table 4.9** gives details about percentage of population 15 years and above by marital status, sex and rural and urban residence

**Table 4.9 Population Percentage Distribution by Marital Status, Sex and Rural/Urban Areas**

Marital Status		Faisalabad District		
		All Areas (%)	Rural (%)	Urban (%)
Never Married	Both Sexes	32.6	31	34.4
	Male	37.3	35.7	38.9
	Female	27.7	26.1	29.5
Married	Both Sexes	61.1	62.2	59.8
	Male	58.6	59.7	57.5
	Female	63.7	64.9	62.3
Widowed	Both Sexes	5.5	5.9	5.1
	Male	3.5	3.9	3.0
	Female	7.6	7.9	7.3
Divorced	Both Sexes	0.6	0.7	0.5
	Male	0.4	0.5	0.3
	Female	0.8	0.9	0.7

### vii. Migration

The total number of life time in-migrants in Faisalabad district was 679,676 or 12.5 percent of population of the district of total life time in-migrants 364,018 persons settled in towns. Of total district migrant's 60.4 percent came from other districts of Punjab, 3.7 percent were from Sindh, NWFP and Balochistan, 0.6 percent from Northern Areas while remaining 35.3 percent were Pakistanis who repatriated from other countries. There is no migrant whose birth place is not reported.

## 4.5 Economic Conditions

### A. Economically Active Population of the Faisalabad District

The economically active population is defined here as the persons working, most of the time during the year preceding the census date looking for work, laid off and un-paid family helpers assisting their family. The economically active population as enumerated in the last census was 22.8 percent of the total population i.e., the population exposed to the risk of entering the economically active life at any time. Of the total male population 41.8 percent were economically active, while 58.2 percent not economically active, 27.6 percent children under 10 years, 15 percent students, 2.1 percent domestic workers while 13.5 percent were land lords, property owners, retired persons, disabled etc. Further details can be seen in **Table 4.10**.

**Table 4.10 Percentage of Population by Economic Categories and Sex**

Economic Category	All Areas		
	Both Sexes	Male	Female
Economically Active	22.8	41.8	2.0
Not Economically Active	77.2	58.2	98.0
Children Under 10	27.9	27.6	28.3
Students	8.7	15.0	2.0
Domestic Workers	33.3	2.1	67.2
Others	7.3	13.5	0.5
Unemployment Rate	17.4	17.6	11.6

## B. Unemployment

Unemployment rate is measured as ratio of looking for work and laid off in total economically active population comprising employed, looking for work, laid off and un-paid family helpers, generally representing in percentage. As per above table, the unemployment rate in the district was 17.4 percent which was mainly due to unemployment amongst male representing 17.6 percent, while female unemployment rate was 11.6 percent. This is because of their small proportion in their total economically active population.

## C. Employed Population by Occupations

In 1998 of the total employed persons, 45.0 percent had skilled agricultural and fishery works. About 24.3 percent had elementary occupations, followed by service workers, shop and market sales workers represented 10.1 percent, craft and related trade workers, 5.0 percent. In rural areas people having skilled agricultural and fishery works were again in majority, followed by elementary occupations and service workers, shop and market sales workers, represented 41.5, 27.2 and 6.7 percent respectively. The highest percentage in urban area is of elementary occupations, followed by service workers & shop and market sales workers and Professionals having 50.2, 15.2, 8.1 percent respectively. Further details are given in **Table 4.11**.

**Table 4.11 Percentage of Employed Population by Occupation & Rural/Urban**

Occupation		All Areas	Rural	Urban
No.	Description			
1	Legislators, Senior Officials and Managers	0.1	0.1	0.2
2	Professional	5.5	3.7	8.1
3	Technicians and Associate Professionals	2.8	2.4	3.3
4	Clerks	1.8	1.4	2.2
5	Services Workers and Shop and Market Sales Workers	10.1	6.7	15.2
6	Skilled Agricultural and Fishery Workers	24.3	37.2	5.4
7	Craft and Related Trade Workers	5.0	3.3	7.6
8	Plant and Machine Operators and Assemblers	4.9	3.1	7.5

9	Elementary Occupations	45.0	41.5	50.2
10	Others	0.5	0.6	0.3

#### **D. Industry, Trade and Trade Centers**

Faisalabad District is a major part of the country in economic production. A network of mills and factories and the vast production of agricultural products make it a substantial contributor to Pakistan's economy. This district is mainly famous for its contribution in textile products. Faisalabad city has a number of industries and mills working in the field of textile. These units manufacture cotton, woolen and silk cloths, carpets and rugs, textile products, leather and rubber foot wears and wearing apparel. Apart from textile products this district also plays an important role in the production of pharmaceutical goods, soap, iron and steel products, heating, plumbing and lighting equipment, hardware, miscellaneous fabricated products, agriculture machinery, engines and turbines, textile machinery, printing machinery, metal working machinery, pumps and compressors, household. There are also a good number of printing and publishing units. Besides, there are units of canning and preservation of food, edible oils, beverages, metal and wood furniture, rubber products, chemicals, glass products, toys, stationary etc.

### **4.6 Transportation**

District Faisalabad is well connected by roads. Some of the important roads of the district include the Motorway M-3 which starts at Pindi Bhattian Tehsil of Hafizabad district and ends at Faisalabad. This M-3 connects Faisalabad to M-2 Motorway which leads to Lahore and Islamabad. Other important Provincial Highways include

- Sheikhpura Road
- Jhang Road
- Sargodha Road
- Samundri Road
- Satyana Road
- Jaranwala Road

- Risala Road

### **Railways**

The district is connected to other cities in the province by the following railway lines:

- Faisalabad-Gojra-Shorkot-Khanewal Railway Line
- Faisalabad-Chak Jhumra-Sheikhupura-Lahore Railway Line
- Faisalabad-Chak Jhumra-Sargodha Railway Line
- Lahore-Jaranwala-Shorkot Railway Line

## **4.7 Educational Facilities**

Educational facilities in Faisalabad are mainly being provided by the Government of Punjab, the city government and the private sector and voluntary organizations. To a limited extent the high school education is also being managed by the Federal Government through the operation of few institutes located in the cantonment area.

Similarly, there are number of colleges and universities are dealing with all fields of science and arts. The numeric details of these institutes are given in **Table 4.12**

**Table 4.12 Population-Institution Relationship**

Sr. No	Type of Institutions	Boys/Girls
1	Primary Schools	763/548
2	Secondary Schools	213/251
3	Middle Schools	169/314
4	Higher Secondary	38/60
5	Degree Colleges	35/48
6	Universities	10

## **4.8 Health Facilities**

Topography survey of the land has been completed and road alignment has been marked on the ground at prominent locations. During the survey, it was observed that people had pretty good idea about the route alignment and the land and structures falling on the ROW of the road. Topographic survey showed that no health institution (BHU, hospital and dispensary) is falling within the ROW as a result no demolition of the existing health institutions will take place during the execution of the project.

## **4.9 Socioeconomic Baseline Survey**

The information regarding socioeconomic baseline survey is based on the primary data collected from the project area. Baseline survey was carried out to identify the situation analysis of socioeconomic conditions and impacts & their magnitudes on the affected population. A sample of 50 respondents was selected on the basis of simple random sampling technique, which included Project Affected Persons (PAPs) which further includes private land & shop owners, shop keepers (renters), local residents, factory workers, pedestrians, travellers and drivers etc. During the survey, both males and females were included in the sample.

Efforts were made to include the different types of stakeholders according to their stakes in the sample and contact the maximum population during the survey. A Social Survey form is attached in **Annex-VIII**.

### **4.9.1 Field Survey**

A site visit of the proposed project was carried out from August 15 to August 16, 2023. This included the collection of demographic and socio-economic baseline information. During the survey major focus was to collect information about educational levels, economic resources and dependencies, quality of life, availability of facilities, water resources and its use & satisfaction, housing settlement patterns, general health status, perceived impacts of the project, their protective measures, basic needs, the means to safeguard their interests during project implementation and most importantly land acquisition and resettlement issues. A baseline survey was carried out at Lundianwala Interchange as shown in **Table 4.13**.

**Table 4.13 Baseline Survey of Proposed Project**

<b>Sr. No.</b>	<b>Location</b>	<b>District</b>	<b>Educational Institute</b>	<b>Hospitals</b>	<b>Mosques</b>	<b>Total Population (Approx.)</b>
1.	Bhugthal	Faisalabad	1. Govt Girls Primary School, 2. Two Private Schools		01 Mosque	1513
2.	Chak No, 229, GB Fazalpur	Faisalabad	1. Govt Boys Elementary School 2. Govt Girls Primary School 3. 01 Private		02 Jamia Mosques	8464
3.	Chak No. 276 GB, Othian,	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School 3. 01 Private School		02 Mosque	2581
4.	Chak No. 277 GB, Kharian	Faisalabad	1. Govt Boys Primary School		01 Jamia Masjid	1628
5.	Chak No. 273 GB, Anuana	Faisalabad	1. Boys High School 2. Govt Girls	01 Govt Hospital	04 Jamia Mosque	11628

			Elementary School			
6.	Maoza Sial	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School		01 Jamia Mosque	2353
7.	Chak 376 GB, Chaungah	Faisalabad	1. Girls High School 2. Boys High School	01 Hospital	03 Jamia Mosque	11528
8.	Chak 275, Tehsil Jaran Wala	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School		03 Jamia Mosque	5584
9.	Chak No. 584, GB Othwal	Faisalabad	1. Govt Primary School		02 Jamia Mosque	1372
10	Chak No. 276, Tehsil Jaranwala	Faisalabad	1. Govt Girls Primary School 2. Govt Boys Primary School		01 Jamia Mosque	3239
11.	Chak no. 363 Jhok Sammi Di	Faisalabad	1. Govt Model School		01 Jamia Mosque	1068
12	Chak No 363 Maoza Sial	Faisalabad	1. Govt Boys Primary School 2. Govt Girls		01 Jamia Mosque	2521

			Primary School			
13	Chak no 384, GB Chakku	Faisalabad	1. Govt Boys Primary School	01 Hospital Nearest Area THQ, Tandianwala	01 Jamia Mosque	4526
14	Chak No. 374, GB Arkana	Faisalabad	1. Govt Boys High School 2. One Private School	01 Hospital Nearest Area THQ, Tandianwala	01 Mosque	1056
15	Chak No. 381	Faisalabad	1. Govt Boys primary School	01 Hospital Nearest Area THQ, Tandianwala	02 mosque	3738
16	Chak No. 381, GB, Janubi	Faisalabad	1. Govt Boys Primary School	01 Hospital Nearest Area THQ, Tandianwala	01 mosque	1323
17	Chak No. 380, GB,	Faisalabad	1. Govt Boys Primary School		03 mosque	1315
18	Chak No. 378, GB,	Faisalabad	1. Govt Boys High School 2. one private School		01 Jamia Mosques	2372
19	Chak No. 653, GB, Kot Shahdat Khan	Faisalabad	1. Govt Boys primary School		02 Mosque	3172
20	Chak No. 631, GB, Dangali	Faisalabad	1. Govt Girls primary School	01 Hospital	01 Mosque	1103
21	Chak No. 628, GB,	Faisalabad	1. Govt Boys		01 Mosque	1741

	Parhan Kot		Primary School			
22	Baghidal	Faisalabad	1. Govt Girls Primary School		01 Mosque	1115
23	Lundian Wala	Faisalabad	1. Govt Girls High School 2. Govt Boys high School	01 BHU	04 Mosque	9159
24	Chak No. 570, GB, Kundian	Faisalabad	1. Govt Boys Primary School 2. Govt Girls Primary School		02 Jamia Masjid	2597

**4.9.2 Settlements along the Project Area**

In the proposed project pertaining to the service road, there are no significant settlements observed along the project corridor.

**4.9.3 Physical and Cultural Heritage****i. Shrine**

There is a no shrine near the proposed project area.

**ii. Mosques**

A small mosque was observed near the proposed project. It has been constructed by the local residents with the mutual contributions of the concerned communities.

**iii. Graveyards**

There are no graveyards near the proposed project area.

**4.9.4 Recreational Sites**

No recreational site is located near the proposed project area.

## SECTION – 5

### PUBLIC CONSULTATION

#### 5.0 General

This section describes the outcome of the public consultation sessions held with different stakeholders that may be affected by the proposed project. Public consultation is a mandatory part of the EIA process for development projects. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

The consultation process was carried out in accordance with the requirements of Pakistan Environmental Assessment Procedures. The objectives of this process were to:

- a) Involve all stakeholders, especially Project Affected Persons (PAPs), in the consultative and participative process;
- b) Share information with stakeholders on the design and construction of the proposed project and anticipated impacts on the physical, biological and socio-economic environment of the proposed project area;
- c) Understand stakeholders' concerns regarding various aspects of the project, including the existing available facilities and problems, construction of the proposed project and the likely impacts of construction and operation related activities of the proposed project;
- d) Understand the perceptions, assessment of social impacts and concerns of the Project Affected Persons (PAPs) / communities in the vicinity of the proposed project;
- e) Provide an opportunity to the public in the public consultation session to provide valuable suggestions for the project design in a positive manner; and
- f) Reduce the chances of conflict through the identification of controversial issues, and consult them to find up to standard solutions.

#### 5.1 Identification of Main Stakeholders

Stakeholders are those who have a direct or indirect interest in project development, and who will be involved in the consultative process. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The

identification of those indirectly affected is more difficult, and to some extent it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal.

**a) Methods of Public Consultation**

Public Consultation was carried out in order to establish stakeholder's opinion regarding project implementation. The following methods were used for public consultation with project stakeholders.

- Interview Survey
- A structured set of questions from representative sample of PAPs
- General / Public Meetings
- Discussion with community, religious leaders, local government representatives, civil society representatives, politicians and teachers
- Rapid Participatory Appraisal
- Site visit by a multidisciplinary team consisting environmental engineer, environmental scientist, social scientist, ecologist and local community representatives to gather information regarding project site
- On-Site Meetings
- Other interested parties including project proponent or contractor

**b) Categories of Stakeholders Contacted**

Stakeholders are groups or individuals that can affect or take affect from a project's outcome. Affected Communities include population that is likely to be affected by the Project activities. Potential impacts of the Project on the local environment include disturbances and changes to the physical and biological environment, such as, land transformation, noise disturbances, and air and water quality issues. These disturbances can result in indirect socioeconomic impacts, such as, physical or economic displacement. These impacts are expected to reduce with the increased distance from the Project facilities. In addition to the Potentially Affected

Communities, nomad communities frequenting the area, local government and local Non-Government Organization (NGO) officials were also consulted.

The contacted stakeholders belonging to different categories are shown in **Table 5.1**.

**Table 5.1 Stakeholders Contacted in the Project Area**

Sr. No.	Stakeholder Category
1	Residents
2	Business'/Shop owners
3	Pedestrians
4	Farmers
5	Schools/Colleges/Students
6	Daily Wages Laborer's
7	Locals

Following areas were consulted for project "Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway M-3".

**Table 5.2 Participants involved in the Project Area**

Sr. No.	Venue	No of Participants
1	Chak No. 568 (Ballo Khel)	05
2	Chak No 569 Abdullah Wala	03
3	Chak No 570, 644, 628 Pathan Wala	08
4	Chak No 654 GB	08
5	Lundian	12

### c) Institutional Stakeholders

The institutional stakeholders consulted for the Project include relevant government agencies, NGOs and private sector organizations. Following is the list of institutional stakeholders.

**Table 5.3 Govt Departments of Project Area**

Sr. No.	Departments
1	Environment Protection Department
2	Irrigation Department
3	Agriculture Department
4	Tehsil Council
5	NGO
6	Environment Expert

The list of stakeholders consulted is shown in Exhibit.

Sr#	Participant	CNIC/Designation	Concerns/Remarks	How the concerns are addressed
1	Muhammad Nawaz	Deputy Director (Field, Faisalabad)	<ul style="list-style-type: none"> <li>Regular Monitoring should be conducted during construction.</li> <li>Testing of Raw materials should be done to check the quality</li> </ul>	NHA conducts monitoring twice during construction phase from 3 <sup>rd</sup> party EPA certified lab.
2	Mr. Rana Siddique	Inspector Faisalabad 03006827162	<ul style="list-style-type: none"> <li>Effective CSR methodologies should be implemented</li> <li>EMP should be implemented and reviewed regularly.</li> <li>Accidents should be reported to concerned authority</li> </ul>	<ul style="list-style-type: none"> <li>Community development has been the top most concern of NHA</li> </ul>
<b>Irrigation Department</b>				
3	Abdul Waheed	Assistant	<ul style="list-style-type: none"> <li>Employment opportunities should be ensured.</li> <li>Plantation should be the priority</li> </ul>	<ul style="list-style-type: none"> <li>Regular maintenance will be carried out</li> <li>Preference will be given to Local labor.</li> <li>Proper landscaping plan has been done</li> </ul>
<b>Agriculture Department</b>				
4	Ghulam Asghar Khan Niazi	Asst. Director (0300-8322512)	<ul style="list-style-type: none"> <li>Social welfare should also one of the priorities</li> <li>Plantation should be ensured in project premises</li> <li>Arrange plantation activities in city premises with the collaboration of city government.</li> </ul>	<ul style="list-style-type: none"> <li>The site has a diverse flora and fauna which is being sustained in an effective manner.</li> <li>As the Interchange will be constructed in already existing facility, no natural resource will be disturbed.</li> </ul>
<b>NGO</b>				

5	Sana Khan	Project Assistant 0333-6871950	<ul style="list-style-type: none"> <li>• Labor rights and empowerment should be ensured</li> <li>• Regular monitoring of air and water should be done</li> <li>• Solid waste should be managed properly to ensure the cleanliness</li> <li>• Safety of the workers should be ensured.</li> </ul>	<ul style="list-style-type: none"> <li>• Labor Rights policy will be implemented properly.</li> <li>• Safety of workers will be kept on top priority.</li> <li>• Solid waste will be managed properly.</li> </ul>
<b>Environmental Expert</b>				
6	Mr. Faqeer Hussain	Environmental precautionary	<ul style="list-style-type: none"> <li>• EMMP should be strictly followed.</li> <li>• Hazardous solid waste should be handled properly</li> </ul>	<ul style="list-style-type: none"> <li>• EMMP is strictly followed</li> <li>• Hazardous waste is disposed of through EPA certified contractor</li> </ul>

**Stakeholders Concerns and Priorities**

For implementation of SEP, identified stakeholders were consulted and their concerns were documented with pictures and minutes of meetings held with project interested parties including project staff, government officials, and local communities to predict the nature and scale of risks, challenges and impacts of project perceived by them. Following describes the details of general / public meetings and series of focused group discussions held with different categories of the stakeholders at various locations along with their concerns & priorities raised about proposed project.

**Table 5.4 Schedule Of Meetings With Stakeholders, Their Concerns/Comments & Suggestions**

<b>Time &amp; Date</b>	<b>Venue</b>	<b>Stakeholder Category</b>	<b>No of Participants</b>	<b>Concerns &amp; Comments Raised</b>	<b>Response to Comments</b>
10:00 AM 16/08/23	Chak No. 568 (Ballo Khel), 569 (Abdullah Wala) 570, 644, 628 (Pathan Wala), 654 GB, Lundian, Tehsil Jaranwala, District Faisalabad	Farmers, Shopkeepers,	12	<ul style="list-style-type: none"> <li>• It is a much-needed project and it would decrease traffic congestion and facilitate the poor.</li> <li>• Agri business activities will be enhanced by Construction of Interchange.</li> <li>• Relaxation should be given in Tool Tax by Government to local transporters</li> <li>• Preference should be given to locals for skilled &amp; non-skilled people for job.</li> <li>• Much beneficial for the farmers for commodities supply</li> <li>• Time and money consumption will be reduced due to easy approach to other cities via this interchange on Motorway for education, health, business and other daily routine work</li> </ul>	<ul style="list-style-type: none"> <li>• Economics opportunities for the people of area. Contractor will be advised to hired local force on prefer during construction</li> <li>•</li> </ul>
11:05 AM 16/08/23	Chak No. 568 (Ballo Khel), 569 (Abdullah Wala) 570, 644, 628 (Pathan Wala), 654 GB, Lundian, Tehsil Jaranwala, District Faisalabad	Students	05	<ul style="list-style-type: none"> <li>• Much beneficial for the students whose are studying in Jaranwala and Faisalabad especially relying on public transport.</li> <li>• Local Peoples should prefer for employment</li> <li>• Safety measures to avoid dust &amp; noise and accidents.</li> <li>• The construction will impact on wild life</li> </ul>	<ul style="list-style-type: none"> <li>• Accidents will be reported immediately and sign boards will be displayed to avoid accidents. PPEs will be provided to workers for safety. Maintenance of working machineries will be done on priority basis to reduce noise level. water sprinkling will be done on daily basis to suppress the dust</li> </ul>

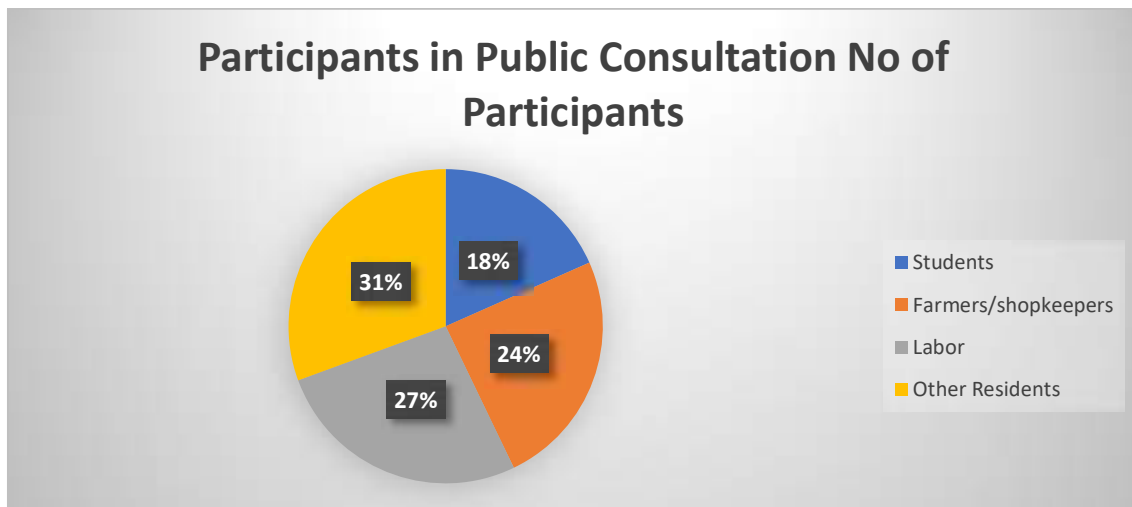
					<ul style="list-style-type: none"> <li>• Contractor will prepare safety plan and also responsible for its implementation.</li> <li>• Contractor will be advised to hired local force on prefer during construction</li> <li>• Identification of local wildlife will be done and recommended measures will be taken at the time of implementation of project.</li> </ul>
12:15 PM 16/08/23	Chak No. 568 (Ballo Khel), 569 (Abdullah Wala) 570, 644, 628 (Pathan Wala), 654 GB, Lundian, Tehsil Jaranwala, District Faisalabad	Labors (Daily Wages)	10	<ul style="list-style-type: none"> <li>• Preference should be given to locals for skilled &amp; non-skilled people for job.</li> <li>• After construction of Interchange, approach will be easy to other cities of Punjab</li> <li>• Construction work should be completed on given time</li> <li>• Business activities will be increased in Said project area</li> <li>• Try to avoid unnecessary tree cutting to save the environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Economics opportunities for the people of area. Contractor will be advised to hired local force on prefer during construction</li> <li>• Unnecessary tree cutting activities will be avoided to save the environment</li> <li>• Implementation Schedule has been planned for completion of project on time</li> <li>•</li> </ul>
01:12 PM 16/08/23	Chak No. 568 (Ballo Khel), 569 (Abdullah Wala) 570, 644, 628 (Pathan Wala), 654 GB, Lundian, Tehsil Jaranwala, District Faisalabad	Other Residents	09	<ul style="list-style-type: none"> <li>• Adopt necessary Measures to avoid accidents</li> <li>• It is Beneficial project for locals. Time and money consumption will be decreased after construction of Interchange</li> <li>• Solid waste should be disposed of properly</li> </ul>	<ul style="list-style-type: none"> <li>• Sign boards will be displayed to avoid accidents. PPEs will be provided to workers for safety</li> <li>• Contractor will prepare safety plan and also responsible for its implementation.</li> <li>• Contractor will prepare solid waste management plan for solid waste disposal</li> </ul>

## 5.2 Stakeholder Concerns And Recommendations

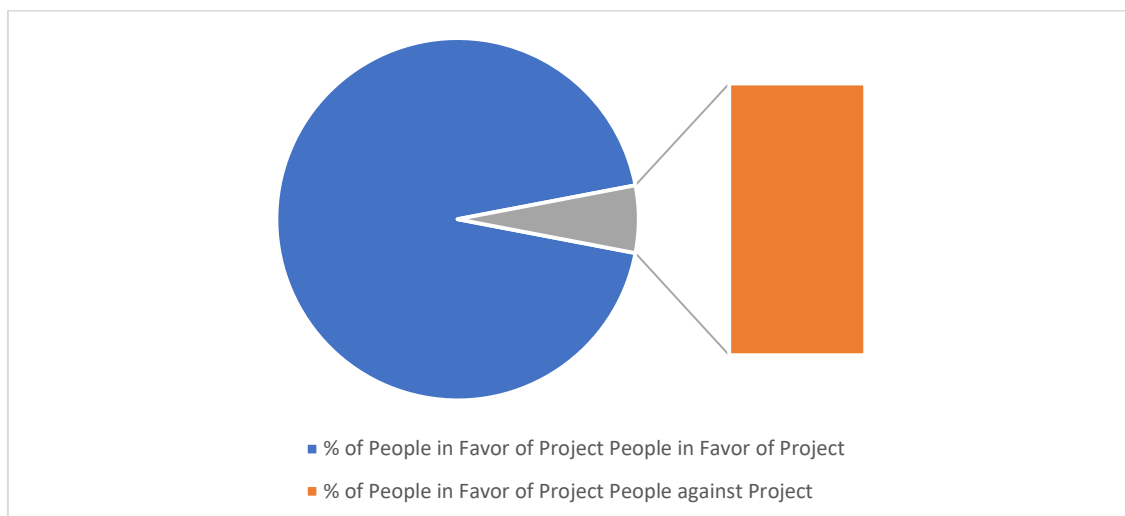
The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

Participants have been categorized into students, shopkeepers, farmers, labors and other residents. Out of total respondents of, 86% knew about the project whereas 14% were not aware of the project planning and implementation. All people were then briefed about the project.

96% commented their views about the project and 04% didn't respond.



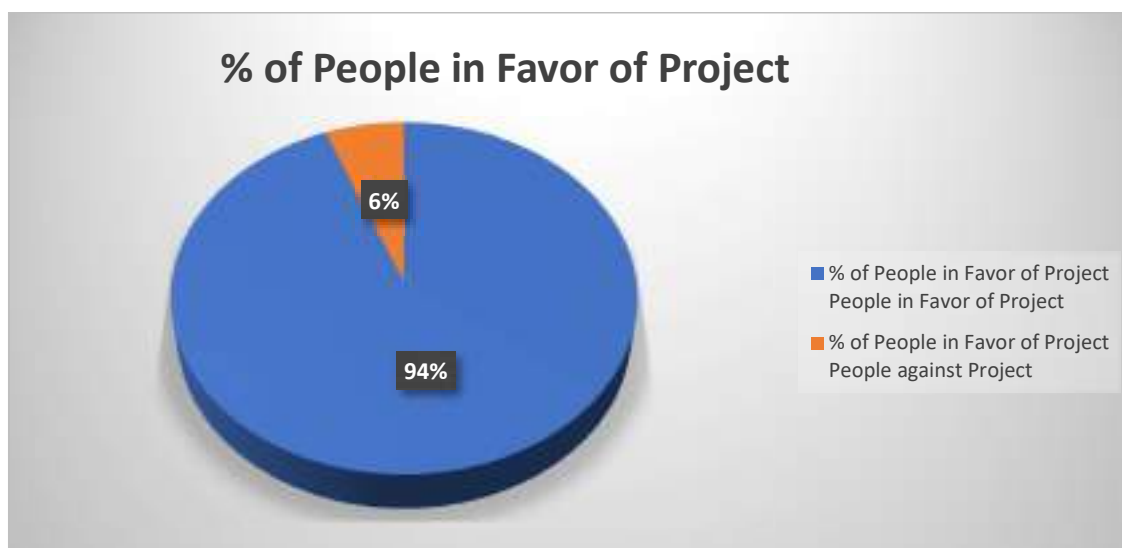
**Figure 5.1: Participants of Lundianwala, Chak No. 568, 596, 570, 644, 648**



**Figure 5.2: Percentage of People who showed Interest**

Out of 96%, majority of the people (about 94%) favoured the construction of the project keeping in view its importance and 6% people showed pessimistic views in general but mitigation measures and solutions to their concerns were provided.

Majority of people were in Favor of project. They said that project will result not only in direct jobs opportunities for locals but also will enhance subsidiary business, trade, education, and agriculture and community development. The people were of the view that project might also elevate education standards, struggle for career enhancement besides improvement in standard and quality of living in area. People were also of the view that project may also be instrumental in connecting the local people with major cities and will result in increase in GDP. Very few near to 6 % only shows concerns over traffic issues, noise and health impacts. Majority of the concerns were changed in the Favor of installation after communicating the participants proper solutions and mitigation measures.



**Figure 5.3: Percentage of People in Favor of Project**

### Stakeholder Consulted

Names of consulted stakeholders are given in table below:

Sr. No.	Stakeholder Name	Category
1.	M. Iqbal	Farmer
2.	Ali Haider	Shop Keeper
3.	M. Shamshad	Farmer
4.	Muhammad Tariq	Driver
5.	Tauqir Ahmad	Student
6.	Irshad Hussain	Govt Servant
7.	Ghulam Mujtaba	Farmer

8.	M. Arsalan	Student
9.	Fazal Din	Farmer
10.	Haji Fiaz	Shop Keeper
11.	Asmat Ullah	Farmer
12.	Habib Ahmed	Student
13.	Amin Akram	Student
14.	Hamid Naeem	Shop Keeper
15.	Laraib Arshad	Pedestrian
16.	Rizwan Nadeem	Farmer
17.	Numan Anwar	Farmer
18.	Ghulam Ali	Farmer
19.	Hikmat Baig	Farmer
20.	Muhammad Awais	Student
21.	Umer Hayat	Shop Keeper
22.	Kaleem	Local Labour
23.	Ilyas Dawood	Local Labour
24.	Muhammad Shahid	Local Labour
25.	Sohail Kamboh	Local labour
26.	Kamran Zaman	Local Labour
27.	Akmal Najeeb	Local labour
28.	Asif Irshad	Farmer
29.	Ajmal Khalid	Farmer
30.	Usama Ashraf	Student
31.	Husnain Ijaz	Farmer
32.	Mubeen Shoukat	Shop keeper
33.	Manzoor Boot	Farmer
34.	Atta Muhammad	Farmer
35.	Rab Nawaz	Farmer
36.	Ghulam Abbas	Student

**Figure 5.4: Stakeholder Engagement at Irrigation Department, Agriculture Department Tehsil Council Department, Rescue 1122 in sequence**



### 5.3 Concerns / Apprehensions of the Stakeholders

Respondents were consulted during interview survey and their comments about project recorded on prescribed questionnaire. Following are the outcomes of consultation;

Sr. No	Concerns Shown by Stakeholders	How they will be addressed
<b>01.</b>	<b>Disturbance to Ambient Air</b>	
	Air, noise & soil pollution will increase not only during construction activities.	Regular water sprinkling will be done by the contractor Monitoring of ambient air, ambient noise and ground water analysis will be conducted as per SMART rules, 2000.
<b>02.</b>	<b>Clearance of land</b>	
	Tree cutting will be involved during road construction	No significant trees cutting is involved during project construction
<b>03.</b>	<b>Protection of local population and business</b>	
	Any business or land if is in the selected area should be paid compensation.	NHA will take the responsibility to compensate and address the graveness of affectees if arises at any point of construction or implementation stage.
<b>04.</b>	<b>Timely Construction of Road</b>	
	Road should be completed within the planning and as per implementation plan.	The contractor will complete the construction as per schedule of implementation given in chapter 3 of EIA report
<b>05.</b>	<b>Transportation and Storage of Raw Materials</b>	
	The raw materials including construction material will create problem for local residents	Raw material will be stored at designated areas. The material will be transported during night times. Safety signage will be placed at construction sites.
<b>06.</b>	<b>Adverse Impacts on Local community</b>	
	The representative from AC Office stated that a commitment should be made to provide locals with as many jobs related to the Project as possible. These include technical jobs for which training should be started as soon as possible	NHA will take responsibility of addressing these concerns as per finalized GRM
	The presence of a colony and camps for workers and laborers will present	The contractor will provide all basic facilities to the labours.

Sr. No	Concerns Shown by Stakeholders	How they will be addressed
	challenges.	
	The maximum benefit of the Project should be to the locals. The resettled people, in particular, should be wealthier with an improved quality of life.	The contract will prefer local labours for in direct operation.
	Under social assessments, the EIA should include analysis on human rights, community benefit sharing, conflicts and security, etc.	The EIA will cover these aspects
<b>07.</b>	<b>Concerns about Resettlement</b>	
	All displaced households should be rehabilitated	NHA will make sure the payment for the acquisition of properties if require; Compensation rates will be finalized after the consultation with PAPs;
	Public infrastructure such as Basic Health Units (BHU) should be relocated.	This concern will be addressed in finalized GRM.
	Graves should be managed with the consent of the communities	There are no graves/ grave yard at the selected location for construction of interchange.
<b>08.</b>	<b>Impacts on Terrestrial Ecology &amp; Species of Conservation Importance</b>	
	Construction phase disturbances area concern for terrestrial wildlife more so than operational phase disturbances. Air and noise pollution, in particular are important to address.	Landscaping plan will be presented along with EIA report to handle this concern
<b>09</b>	<b>Safe alternate route for travelling</b>	
	Alternate routes and traffic will be disturbed during construction times.	All necessary measures will be taken to ensure the safety of traffic during construction, including barricades (including signs, pavement markings). All such barricades will be set up to facilitate the local traffic.

Generally, people were found to be aware & convinced Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway M-3, and indicated remarkably their support for the implementation of project. Local communities demanded that they should be the part of meaningful consultation activities along with other stakeholders at different stage

of the Project including the design, construction, and operational periods. The pictorial presentation of public involvement (PI) process is given below.

### **Information Disclosure**

Extensive information disclosure and public consultation / participation would be undertaken throughout the project cycle. During the preparation of EIA report and consultation meetings, not only the project related information has not been disseminated to PAPs but also will be disclosed once again at the stage of Draft EIA report and accessible to interested parties and general public on request. The version of final report will be available with project proponent and its summary will be provided in stakeholders' relevant local language at stage of Public Hearing (after submission of final EIA report to the EPA) of proposed project.

**Figure 5.5: Pictorial Evidences of Different Site of project**





### **Engagement During Project Implementation**

Project affected parties (PAPs) will also be consulted during implementation stage of project for getting their feedback about their concerns addressed properly and what measures adopted for its resolution to enhance project effectiveness and sustainability. In case, if any residual impacts & risks or significant change occurs at project implementation stage, the project affected parties would be informed and as well consulted once again about its potential impacts & risks and how these will be mitigated or compensated.

### **5.4 Grievances Redressal Mechanism (GRM)**

Grievance redress mechanism (GRM) is important for development projects where ongoing risks or adverse impacts are anticipated. These mechanisms serve as a way to meet requirements, prevent and address community concerns, reduce risks, and assist larger processes that create positive social change. The major objective of GRM is to implement and maintain a procedure for handling environmental and social concerns of the project stakeholders. This procedure will include a redress mechanism scaled to the project's identified risks and adverse impacts, focusing on stakeholders. Project proponent (NHA) will establish, maintain and implement a Grievance Redress Committee (GRC) to facilitate resolution of affected persons (APs) concerns and complaints about the project's performance at site, in line with the requirement of Environmental Protection Agency (EPA). The GRC will be coordinated by Director-Environment. The GRC will address affected people concerns and complaints promptly, using an open, effective, understandable and transparent process..

### **5.5 Composition of Grievances Redress Committee (GRC)**

The GRC will directly work under the supervision of Director Environment (EALS). The following members are recommended to form a GRC to resolve the grievances;

- Deputy Director Environment (EALS)
- Representative of Affected persons (APs)
- Environmental Engineer of Supervision Consultant
- Environmental Engineer of Construction Contractor

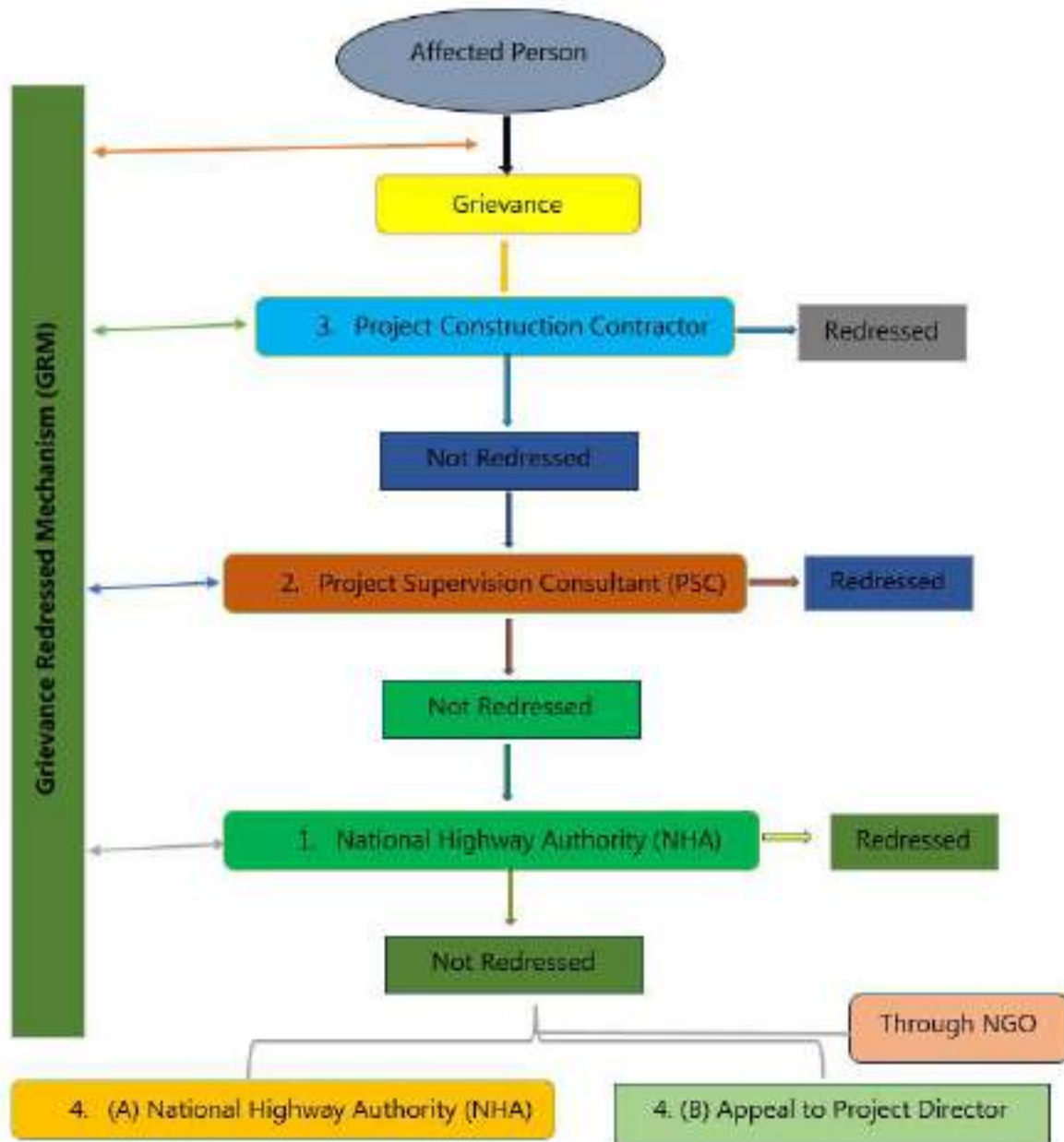
NHA Director (Environment) will nominate one Deputy Director as member of GRC

and shall act as Project Environmental Grievance Officer (PEGO). The complaint would be lodged to GRC. GRC will review the case on merit and address the problem in accordance with prevailing rules/ procedures applicable to such grievances as per Environmental Management Plan (EMP). If the complaint is genuine, GRC would ask the contractor to address the grievance within seven days (07) depending upon nature of grievance. Representative of supervision consultant will monitor the contractor.

If the affected person does not receive a response from GRC or his complaint is not settled within thirty (30) days of the registry of the compliant, then it can be elevated to Director (Environment) NHA for its resolution, who should act on the compliant/grievance within two weeks of day of its filing. If the affected person is not satisfied with the decision of Director (Environment), then it can be referred to higher authorities/ relevant govt departments for its resolution.

As a last resort, He/ She may submit the compliant to Punjab EPA or contact the appropriate Court / local judiciary. At each stage the Grievance Redress Committee will act as third party to ensure a fair and just resolution, and assist in grievance mediation. Appeals to the GRC will be free of charge, and all reasonable expenses incurred will be paid from project funds. Once the operation phase commences and the PIU no longer exists, the PIU portion of the GRC will be eliminated

The flow chart of the proposed redress mechanism is shown in **Figure 5.6** on the next page:

**Figure 5.6: Flow Diagram of Proposed Redress Mechanism**

### Responsibilities of GRC

The responsibilities of GRC will include the following:

- The GRC shall review, consider and resolve grievances related to environmental issues during implementation received by the PD office - NHA.
- Environmental Specialist of SC is responsible for conducting investigations on these grievances.

- Any grievances presented to the GRC should ideally be resolved on the first day of hearing or within a period of one week, in case of complicated issues requiring additional investigations.
- GRC is empowered to take decision which is binding on NHA and considered final.
- GRC meeting will be held in the PD office, NHA or other locations agreed by the committee. If needed GRC members may undertake field visits to verify and review the issues at dispute.

## **5.6 Procedure for Filing the Complaint**

- 1) Any affected person can register his complaint through application to GRC office located in project area. The complaint would be lodged in complaint register.
- 2) There are several ways one can report a grievance:
  - a) Contact the PEGO of GRC over the phone call. The contact details will be provided in the GRC office.
  - b) Send an email, text message, or in-writing to the address provided in the PD office.
- 3) The PEGO will direct the Environmental Engineer of Supervision Consultant (EE-SC) for resolution of complaints from contractor at the same day and report back to PEGO. The EE-SC will have maximum one week to resolve the complaint. If complaint is not addressed within a week time, then a meeting of GRC would be convened by PEGO to discuss the issue.
- 4) The grievance will be reviewed and will be decided by the GRC. In case the grievance is not connected to the project related activity or in case the project authority finds that they are working within the applicable PAK EPA standards, the grievance will not be further processed. In these cases, this will be explained in writing to the grievant.
- 5) In all the other cases the GRC will investigate whether they have failed to work to the intended standard and if they have identified measures which might be taken to protect against the incident occurring again.
- 6) The grievance mechanism will be made public through the public consultations and information leaflets during implementation.

**Type of Grievance**

The following are some of the environmental issues could be subject for grievance from the affected people, concerned public and NGOs.

- Dust, noise and air pollution from construction activities
- Nuisance
- Intensive schedule of construction activities
- Inappropriate timing of construction vehicle flow
- Traffic Movement
- Water Pollution
- Waste disposal
- Disturbances to flora and fauna
- Health and safety
- Criminal activities
- Failure to comply with standards or legal obligations

## SECTION 6

# ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 6.0 General

This section provides the analysis of the potential impacts during pre-construction/design, construction and operational phases of the proposed project on the physical, biological and socio-economic environment of the project area. In addition, it also describes the measures that will mitigate the project's potential environmental impacts. Environmental sensitivity of the project area is described through a sensitivity map and evaluation of significance of impacts is carried out through environmental impact matrices.

### 6.1 Evaluation of Identified Impacts

Methodology adopted for the identification, evaluation and analysis of environmental impacts by the proposed project is "Matrix Method and Significance Rating of Impacts".

#### 6.1.1 Environmental Impact Matrices

The environmental impact matrices have been developed to evaluate magnitude of the impacts of various project activities on different environmental settings for construction and operational phases. These matrices are given in **Table 6.1** and **6.2**. The following scale has been used for the evaluation of impacts:

LA	=	Low Adverse (low/short-term damage to the environment)
MA	=	Medium Adverse (moderate damage to the environment)
HA	=	High Adverse (severe damage to the environment)
LB	=	Low Beneficial (less beneficial to the environment)
MB	=	Medium Beneficial (moderate beneficial to the environment)
HB	=	High Beneficial (highly beneficial to the environment)
N/A	=	Not Applicable
O	=	Insignificant / No Impact

**Table 6.1**  
**Environmental Impacts Matrix for the Construction Phase**

Sr. No.	Project Activities	Physical Environment					Biological Environment			Socioeconomic Environment								
		Topography	Soil Erosion/Contamination	Landscape	Air Quality	Hydrology and Drainage	Groundwater Quality	Habitat Change	Vegetation	Animal Movement	Health & Safety for Public and Worker	Disruption of Public Utilities	Employment	Population Disturbance	Cultural/Religious Values	Noise & Vibration	Local Economy/Benefits to Community	Traffic Management
1	Construction camps, workshops etc.	O	LA	O	LA	O	LA	O	O	LA	LA	O	LB	LA	O	LA	LB	O
2	Excavation operations	LA	LA	LA	MA	LA	O	LA	LA	LA	LA	LA	MB	LA	O	MA	LB	LA
3	Transportation of construction materials	O	LA	O	LA	LA	O	O	O	LA	LA	O	LB	LA	O	MA	LB	LA
4	Use of construction materials etc.	O	LA	O	LA	O	LA	O	O	O	LA	O	O	O	O	LA	LB	LA
5	Earthwork/concrete work operations	LA	LA	LA	LA	O	LA	LA	O	LA	LA	LA	MB	LA	LA	MA	MB	LA
6	Operation of concrete batching plants	O	LA	LA	HA	O	O	O	O	O	LA	O	MB	O	O	MA	MB	O
7	Disposal of Waste Water	O	MA	LA	MA	LA	LA	O	O	O	LA	O	MB	LA	O	MA	LB	O
8	Solid Waste Management ( Disposal of Excavated Material)	O	LA	LA	LA	LA	LA	O	O	O	LA	O	LB	O	O	O	O	O
9	Storage of oils/diesel	O	LA	O	LA	O	LA	O	O	O	LA	LA	LB	LA	O	O	O	O

**Legend**

O - Insignificant / no impact  
NA - Not Applicable

LA - Low Adverse  
LB - Low Beneficial

MA - Medium Adverse  
MB - Medium Beneficial

HA - High Adverse  
HB - High Beneficial

**Table 6.2**  
**Environmental Impacts Matrix for the Operational Phase**

Sr. No.	Project Activities	Physical Environment				Biological Environment		Socioeconomic Environment			
		Soil Erosion/Quality	Surface Runoff	Air Quality	Groundwater Quality	Flora	Fauna	Public Transport	Employment	Community Development	HSE & Road Safety Issues
1	Movement of Traffic	O	LA	LA	O	O	LA	MB	MB	MB	LA
2	Road Maintenance Works	O	O	LA	O	O	O	O	LB	O	LA
4	Maintenance Contractor Camps	LA	O	LA	LA	LA	LA	O	O	O	LA

**Legend**

O - Insignificant / no impact  
NA - Not Applicable

LA - Low Adverse  
LB - Low Beneficial

MA - Medium Adverse  
MB - Medium Beneficial

HA - High Adverse  
HB - High Beneficial

### 6.1.2 Significance Rating of Impacts

The overall significance of the impacts was defined based on the result of a combination of the consequence rating and the probability rating. Each identified impact was analyzed individually according to a number of criteria including descriptions of their magnitude, extent, duration; and probability of occurrence; the value of the affected environment and likely degree of recovery of the affected area. The results of the assessment of the significance of the residual impacts were then linked to decision making in the following manner (as shown in **Table 6.3**)

**Table 6.3 Description of Impacts significance ratings**

Significance Rating	Implication
Minor	Should not have an influence on the decision to proceed with the proposed project, provided that recommended mitigation measures to mitigate impacts are implemented.
Moderate	Should influence the decision to proceed with the proposed project, provided that recommended measures to mitigate impacts are implemented.
High	Should strongly influence the decision to proceed with the proposed project regardless of mitigation measures

### 6.2 Delineation of Project Corridor of Impact (COI)

Before proceeding to the environmental analysis of the proposed project, it is imperative to delineate the COI. The identified dumping site, camping site, borrow areas, asphalt and batching plant sites with their tentative location are marked on Figure 6.1. There are two (02) types of Project corridors which have been used for the environmental baseline information, impacts assessment and mitigation purposes and is described briefly as under:

**a) Corridor of Impact (COI)**

COI is a limit which identifies the area where direct and indirect impacts of the project activities are envisaged like existence of forests, game reserves, wetlands, archaeological sites etc. COI also includes the ROW. The limit for COI for the proposed project was taken as 100 m on either side of the existing road for collection of baseline information, impacts assessment and mitigation measures of physical, ecological as well as social resources.

**b) Project Right of Way (ROW)**

ROW is the corridor where direct impacts due to the construction of the proposed project are envisaged. In the ROW there will be direct impact on the environment like relocation of the physical infrastructure, clearing of vegetation, cutting of trees and some indirect impacts on shrubs, ornamental trees etc. are also envisaged. ROW is taken as 40 m for proposed interchange.

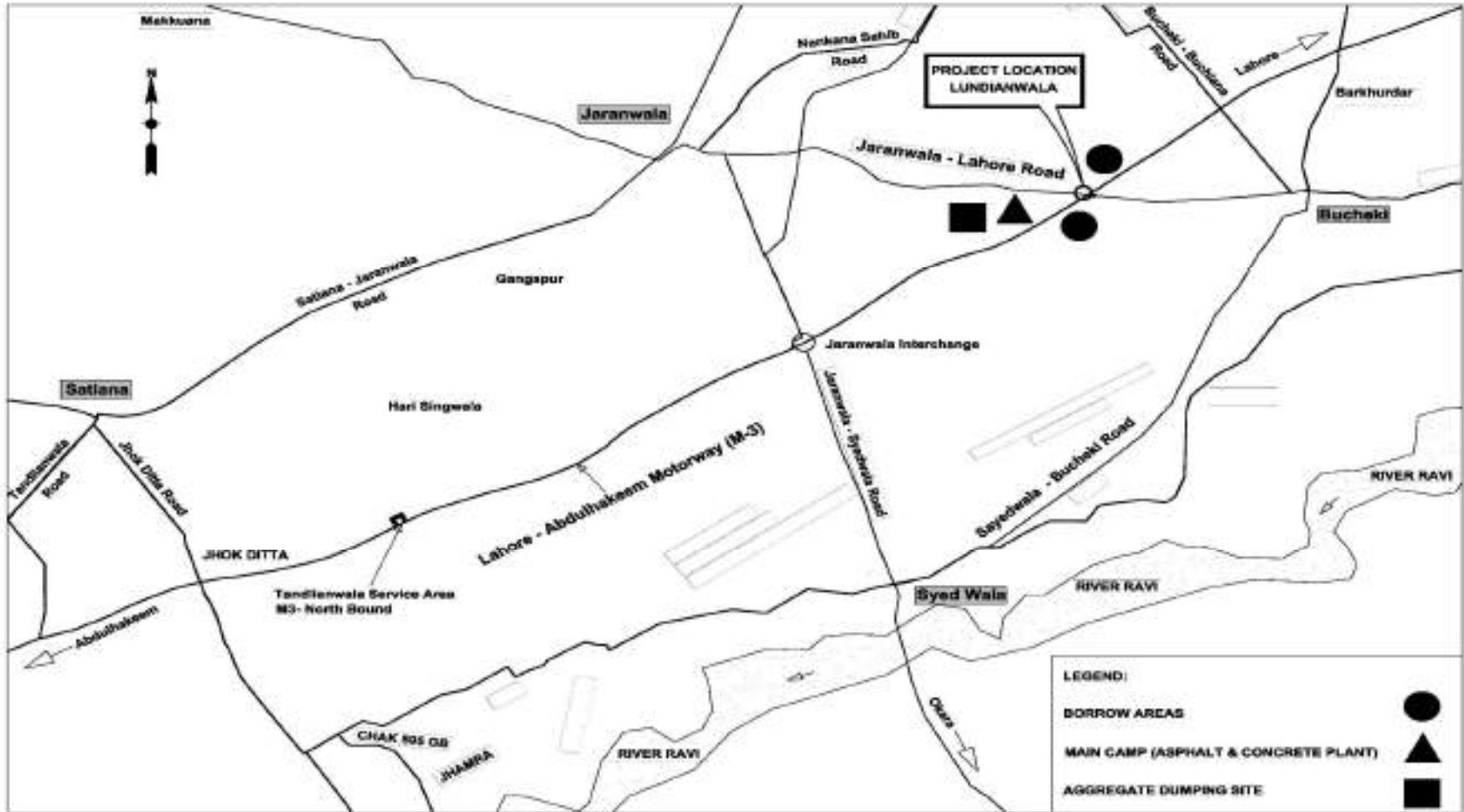


Figure 6.1 Marked locations of site

### **6.3 Pre-Construction/Design Phase**

Impacts envisaged during Pre-construction/Design Phase and the recommended mitigation measures have been described as follows;

#### **6.3.1 Topography**

The topography in the project area will change due to the construction of the proposed project. Visual changes to the topography will be of permanent and moderate adverse in nature and have no mitigation measures except that the project design should consider aesthetic concerns.

#### **6.3.2 Formation width in Built-up Areas**

The formation width in built-up areas may result in creating hindrance of market opportunities, loading and vending activities for the local residents/business owners/workers. However, this impact will be temporary and moderate adverse in nature.

##### Mitigation

- Incorporate technical design features that allow flexible shoulder width(s) near built-up areas; and
- Explore the incorporation of additional pedestrian overheads.

#### **6.3.3 Land Acquisition**

One of the major projects related impact will be the land acquisition. The land required for the proposed project is mostly agricultural land. This impact will be permanent and high adverse in nature.

##### Mitigation

- Careful alignment selection by the designer to minimize the impact;
- Also, adequate budget should be allocated in the Project's budget for the compensation to the affectees as per Land Acquisition Act, 1894 and framing of a judicious and fair compensation package for provision of compensation on prevailing market rates.

#### **6.3.4 Changes in Land Value**

The proposed project is expected to increase the land values, especially in nearby villages/societies. Land owners will have an opportunity to sell their land on increased prices and start new businesses. This impact will be moderate beneficial in nature.

#### **6.3.5 Flora**

Due to the proposed project, about 36 numbers of trees of various species will be affected. This may have an adverse effect on the ecological habitat of the project area. This impact will be permanent and moderate adverse in nature.

##### Mitigation

- Incorporate technical design measures to minimize removal of trees, if possible, such as change in alignment;
- Plan for compensatory planting for four (4) trees against each fallen tree of similar floral function; and
- Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.).

#### **6.3.6 Social Disturbance**

Due to the proposed project, entry/exit problems for shop owners or industrialists and bifurcation of settlements, agricultural land/fields may occur for the residents. This will result in causing inconvenience and affecting daily activities and business. This impact is permanent and moderate adverse in nature.

##### Mitigation

- Provision of pedestrian overhead bridges (after every 2 to 3 kilometers) in the design to minimize the impact.

#### **6.3.7 Public Utilities**

Due to the proposed project, public utilities affected may create disruption of public services and economics. This impact is however temporary and moderate adverse in nature.

Mitigation

- Incorporate technical design features to minimize effect on public utilities; and
- All public utilities (e.g., sewage, drainage/water pipes, power transmission lines, underground telephone lines, etc.) likely to be affected by the proposed project, need to be relocated well before the commencement of construction work.

**6.3.8 Loss of Business**

Petrol pumps, factories, shops and hotels will be affected by the execution of the proposed project. This impact is temporary and moderate adverse in nature.

Mitigation

- Incorporate technical design features to minimize the project construction activities to avoid the loss of private property if possible; and
- In case of unavoidable interference prior notification and consultation needs to be made to reach consensus on procedures and options or any other form of agreed judicious compensation with the concerned stakeholders/affectees.

**6.3.9 Surface/ Wastewater Resources**

While the project does not encompass any significant surface water bodies, there are a few minor hydrological features present within its parameters. The wastewater may generate from canteens and toilets which needs to be disposed of properly. If disposed of improperly this wastewater will contaminate the surface water body and increase the contamination of the above-mentioned minor canals. The impact is moderate adverse and permanent in nature.

Mitigation

- Provision of septic tanks in the design to treat the wastewater;
- Provision of adequate drainage network to reduce infiltration; and
- Provision of storm water drainage system with adequate capacity.

**6.3.10 Traffic Management**

During the construction phase of the project, improper traffic management may

result in traffic jams and cause inconvenience to the people passing through the project area. The main reasons are the movement of vehicles carrying construction materials, different construction activities and the presence of terminals of freight services along the proposed route. This impact is temporary and minor adverse in nature.

Mitigation

- Proper traffic management plan should be formulated and announced before the construction to avoid traffic jams/public inconvenience.

### **6.3.11 Solid Waste**

Solid waste will be generated from construction camps and different construction activities. Moreover, construction waste will also be generated during construction phase. The waste if not collected and disposed of properly will affect the aesthetics of area. It will lead to generation of odour, attracting disease vectors and clogging of canal and drain. The impact is considered to be temporary and minor adverse in nature.

Mitigation

- Waste management plan shall be devised including provision of waste bins, defining collection frequencies, allocating personnel and defining safe disposal options.

### **6.3.12 Resource Conservation**

The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement and cement etc.

Almost all the materials to be used in the construction of proposed project are non-renewable or derived from non-renewable sources and therefore their sustainable use is necessary for the future use. The impact is considered to be permanent and high adverse in nature.

Mitigation

- Proper planning for reduction of wastage of water should be done;
- Provision of adequate insulation to reduce heat loss through batching

plants; and

- Planning for regular monitoring of CO and CO<sub>2</sub> content of the flue gases to verify that combustion systems are using practical excess air volumes.

## **6.4 Construction Phase**

Following is the brief description of impacts and their mitigation envisaged during the construction phase.

### **6.4.1 Topography**

The main impact during the construction will be the clearing of ROW, cutting and filling of borrow pits including erosion of topsoil cover. This impact is temporary and Moderate adverse in nature.

#### Mitigation

- Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer will be stripped of and stockpiled for redressing the land after the required borrow material has been removed;
- Where deep ditching is to be carried out, the top 1 m layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled up with scrap material from construction and then leveled with the stockpiled topsoil;
- Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people; and
- Landowners will be compensated according to the terms of lease agreements negotiated with them and the restoration actions agreed upon by the Contractor will be duly carried out.

### **6.4.2 Soil**

Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on roadside, at contractors' camps and at embankment works as a result of uncontrolled run-off from equipment washing yards, excavation of earth cutting operations and clearing of vegetation whereas contamination of soil may be caused by oil and chemical spills at asphalt plant

sites, workshop areas and equipment washing yards. Also due to unauthorized use of borrow areas and quarries, soil erosion may occur including degradation of landscape. This may limit the future use of land for agricultural purposes. This impact is, however, of temporary and moderate adverse in nature.

#### Mitigation

- Low embankments will be protected by planting Vetiver grass that can flourish in relatively dry conditions;
- Soil contamination by asphalt will be minimized by placing all containers in caissons;
- All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over;
- Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered;
- Productive land or land adjacent to agricultural land may not be preferred for excavation; and
- Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials.

### **6.4.3 Land Acquisition**

One of the major impacts during construction of the proposed project will be the land acquisition. About approximately 62 acres of land (both Northern and Southern side) would be acquired for construction of the proposed project. Similarly, few structures including residential and community structures within the proposed ROW will be affected by the proposed project.

This will result in loss of infrastructure, livelihood, agricultural activities and disturbance to people. The impact will be permanent and high adverse.

#### Mitigation

- Provide judicious compensation to the affectees by providing sufficient budget in the project cost. The process of land acquisition and compensation should be followed in a transparent manner to minimize the

impacts.

According to Land Acquisition Act 1894, the following points are to be considered while determining compensation to the project affectees:

- While determining the amount of compensation to be awarded for land acquisition under this Act, the court (the land acquisition collector) shall take into consideration the following:
  - *The market value of land at the date of publication of notification under section 4 sub section (1);*
  - *The damage sustained by the person interested, by reason of the taking of any standing crops, or trees which may be on the land at the time of the collector's taking possession thereof;*
  - *The damage if any sustained by the person interested at the time of the collector's taking possession of the land by reason of acquisition injuriously affecting his other property, moveable, or immoveable, in any other manner, or his earning;*
  - *As a consequence of the acquisition of the land by the collector, the person affected is compelled to change his residence or place of business, the reasonable expenses incidental to such change.*

#### **6.4.4 Religious/Cultural Resources**

Since no physical cultural resources are falling within the ROW of the proposed project area, so there is no need for relocation of such resources. Hence, no mitigation is required for this impact.

#### **6.4.5 Construction Camps/Camp Sites**

Due to the proposed camp sites, loss of vegetation and dissatisfaction of rehabilitation measures during and after completion of construction phase may occur. However, the impact will be temporary and moderate adverse in nature. For these impacts, mitigation measures have been developed to minimize the likelihood, extent or duration of their occurrence and any associated adverse effects. **Table 6.4** summarizes potential impacts and proposed mitigation measures associated with construction camps.

**Table 6.4 Summary of Worker Camp Impacts & Mitigation Measures**

Potential Impact	Proposed Avoidance and Mitigation Measures
<p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>▪ Temporary habitat loss or disturbance</li> <li>▪ Temporary visual intrusion</li> <li>▪ Noise emissions at a single location</li> <li>▪ Waste generation</li> <li>▪ Discharge of sanitary effluents and rainwater run-off to nearby water bodies</li> </ul>	<p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>▪ Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas.</li> <li>▪ Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures.</li> <li>▪ Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary.</li> <li>▪ Provide adequate warnings of impending works to all potential receptors within a 1 km corridor surrounding the RoW via public notices and local news</li> </ul>
<p><b>Social</b></p> <ul style="list-style-type: none"> <li>▪ Worker camp site: consultation surrounding potential construction camp sites revealed concerns regarding the location of proposed sites for Worker Camps.</li> </ul>	<p><b>Social</b></p> <p>State land will be a second preference for worker camp locations, followed by land where there is a willing lessee.</p> <p>Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values</p> <p>Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages:</p> <ul style="list-style-type: none"> <li>▪ A briefing on camp rules</li> <li>▪ A community relations orientation to increase awareness about the local area, cultural sensitivities and the project Code of Conduct</li> <li>▪ Awareness-raising on health considerations, including sexually transmitted diseases (STDs).</li> </ul> <p>The construction contractor is required to develop a Construction Camp Management Plan to address:</p> <ul style="list-style-type: none"> <li>▪ Discipline;</li> <li>▪ Community liaison;</li> <li>▪ Ethnic tensions and;</li> <li>▪ Communicable diseases;</li> </ul>

Potential Impact	Proposed Avoidance and Mitigation Measures
	A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior
<p><b><i>Camp Location</i></b> The final location will be determined by the construction contractors and agreed with the NHA.</p>	<p><b><i>Camp Location</i></b> The construction contractor will be required to assess the environmental/social sensitivity of any additional or alternative sites prior to their approval for adoption.</p>

Some additional mitigation measures will include:

- The contractor(s) should provide plan for removal & rehabilitation of site upon completion;
- Photographical and botanical inventory of vegetation before clearing the site; and
- Compensatory plantation to be scheduled when construction works near end.

#### 6.4.6 Health and Safety

##### a) Occupational Health and Safety

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material. Workers should be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in the project area. This is a temporary and moderate adverse in nature.

##### Mitigation

- Obligatory insurance against accidents for labourers/workers;
- Provide basic medical training to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;

- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers;
- Protection devices (ear muffs) should be provided to the workers doing job in the high noise areas;
- Provision of adequate sanitation, washing, cooking and dormitory facilities;
- Proper maintenance of facilities for workers will be monitored;
- Provision of protective clothing i.e. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. for labourers handling hazardous materials;
- Ensure strict use of wearing these protective clothing during work activities;
- Instruct foremen to strictly enforce the keeping out of non-working persons particularly children, off work sites; and Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic in Lundianwala area and access roads.

#### **b) Community Health and Safety**

Quality of ground water and surface water resources available in the nearby local communities may get contaminated due to the construction activities, oil spillage and leakage. The labourers work with different transmittable diseases may spread out those diseases in the local residents. The impact is permanent and high adverse in nature.

##### Mitigation

- There should be proper control on construction activities and oil spillage/ leakage from construction vehicles/ machinery.
- The labour works with different transmittable diseases should be restricted within the construction site;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions to maintain community integrity & social links;
- Fencing around the camps should be strong enough so that it cannot be

broken easily by local people for making passages; and

- Use of water should not disturb public water availability and source of water should be selected carefully.

#### **6.4.7 Borrow/ Open Pits**

Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, and loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments.

Borrow/ Open pits may also result in potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the project area. This impact is permanent and moderate adverse in nature.

##### Mitigation

- Borrow pits will be restored with the consent of owners and one possible option provided will be conversion of pits to fish farms;
- Necessary permits to be obtained for borrow pits
- Care must be taken in selection of borrow area so that it is not posing any threat /danger to road construction, stability and safety;
- In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1:4;
- Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and
- In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites.

#### **6.4.8 Air Quality**

Air quality will be affected by fugitive dust emissions from construction machinery, asphalt plants and vehicular traffic. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability.

The critical sources of air pollution during the construction phase will be:

- Asphalt plants that generate toxic emissions which contain unburnt carbon particles, sulphur compounds and dust from batch preparation;
- Quarry areas that generate fugitive dust during crushing;
- Traffic diversion routes marked along dirt tracks that generate fugitive dust when in use by vehicular traffic; and
- Transportation of materials and other construction activities that create dust emissions.

During construction, the continuous operation of machinery and movement of heavy trucks and vehicles may generate gaseous emissions and have a temporary and moderate adverse impact on the surrounding environment.

The overall impact on the quality of air during the construction phase will, however, be limited to the project's implementation phase only.

#### Mitigation

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize exhaust emissions;-
- Open burning of solid waste from the Contractor's camps should be strictly banned;
- Preventive measures against dust should be adopted for on-site mixing and unloading operations. Regular sprinkling of the site by water should be carried out to suppress excessive dust emission(s);
- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions;
- Quarry areas and asphalt plants should be located at least 500m downwind from populated areas, wildlife habitats and contractor's camps to minimize the impact of dust emissions;
- Asphalt, hot mix and batching plants should be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce level of dust emissions;
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during

construction works;

- Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants should be taken up; e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards;
- Regular sprinkling to avoid dust; and
- Regular monitoring of air quality in accordance with NEQS.

#### **6.4.9 Noise**

Noise is most pervasive environmental problems in the urban areas especially on the road side. Main sources are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers asphalt plants and other equipment's. Noise generated by construction machinery is likely to affect workers working on the site. This impact is temporary and minor adverse in nature.

The likely impacts due to noise are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels;
- Noisy settings and higher background levels can cause temporary threshold shift and consequent habit of speaking loud, which may cause damage to vocal cords in the persons exposed; and
- Noise produced from moving construction vehicles and blowing of pressure horns, at times, could be intolerable particularly during quite hours of night.

#### Mitigation

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;
- Confine excessively noisy work to normal working hours in the day, as far as possible;

- Provide the construction workers with suitable hearing protection like ear cap or earmuffs and train them in their use;
- Preferably, restrict construction vehicles movement during nighttime;
- Heavy machinery like percussion hammers and pneumatic drills should not be used during the night;
- Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained;
- Use of low noise machinery, or machinery with noise shielding and absorption;
- Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures; Noise barriers in sensitive areas in the form of high boundary walls (concrete or wood), earth berms, etc. in front of schools, hospitals/ clinics and mosques; and
- Public hearings to discuss appropriate solutions and materials to control noise (e.g. mud or brick walls, bushes, etc.)

#### **6.4.10 Surface and Groundwater**

Surface water might get contaminated due to the disposal of construction waste generated during the project activities and earth and stone work activities. This contamination will not only endanger the aquatic life but may also result in jeopardizing the health of natives that use this water for meeting domestic requirement.

In addition to that, construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it. Also, the water for construction and consumption may come in conflict with local water demand.

There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly. During the construction phase, the sanitary wastewater will be generated at the workers' camp(s). If this

wastewater is allowed to stagnate in water ponds on the site, it can percolate into the soil, thereby, contaminating groundwater. This impact is temporary and moderate adverse in nature.

#### Mitigation

- Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;
- The solid waste should be disposed of in designated landfill sites to sustain the water quality for domestic requirements;
- Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected;
- Conduct regular water quality monitoring according to Drinking Water Quality Standards (DWQS) and determined sampling schedule;
- The contractor should ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged;
- Work on canal areas should be kept to a minimum or protective walls should be constructed;
- Prohibit washing of machinery and vehicles in surface water, provide sealed washing basins and collect wastewater in sedimentation/retention pond; Construction work close to the water bodies should be avoided, especially during monsoon period; and
- Wastes must be collected, stored and taken to approved disposal site.

#### Spill control

- No refueling, storage, servicing or maintenance of equipment should take place within 150 feet of drainages or other sensitive environmental resources; and
- Any fluids drained from the machinery during servicing will be collected in leak proof container and taken to an appropriate disposal or recycling facility.

### 6.4.11 Flora

Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth, supply of oxygen etc. Due to the proposed project, about 36 numbers of trees of different species will need to be cut due to the execution of the proposed project.

The trees coming in the ROW are mostly of Kikar (*Acacia Nilotica*), Sufaida (*Eucalyptus*) Borh (*Ficus bengalensis*), Sheesham (*Dalbergia sisso*), Willow (*Salix babylonica*), Simbal (*Salmalica malabarica*) and Jand (*Prosopis spicigera*).

Following impacts are expected on the flora of the project area:

- Trees act as a binding force as their roots are spread in the soil, which helps to keep the soil intact. With the removal of trees, however less, this binding force will be vanished and the soil will be liable to increased erosion;
- During the entire construction period dust laden polluted air will form a dust film on leaves thus blocking the stomata consequently hindering photosynthesis processes causing detrimental effect on the plant health;
- Exhaust of noxious gases from movement of heavy machinery will further pollute air which will adversely affect health of plants;
- Establishment of Contractors camps and warehouses for storage of equipment, material etc. will involve clearing of vegetation from the area, causing an adverse impact; and
- During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

This impact will be permanent and high moderate negative in nature.

#### Mitigation

- The indigenous trees most suited to the tract should be re-planted;
- Flowering and fruiting shrubs should be planted along the road to beautify

the landscape. Planting would however be done keeping in view the principles of landscape designing;

- An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees;
- The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement and should not be allowed to trespass through farmlands;
- Construction vehicles, equipment's and machinery should remain confined within their designated areas of movement;
- Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should not be allowed; and
- Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However, if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to trees.

#### **6.4.12 Fauna**

The usual fauna found in the project area have already been mentioned earlier in Section-4. Due to the implementation of the proposed project, the free movement of fauna would be disturbed. Another impact on the fauna of the project area will be the probable dislocation of the birds/animals (rodents) from their nests and burrows. Birds who have nests on the trees located in the ROW or who frequently visit the project area in search of food may receive an adverse impact and shall have to move to adjoining areas.

Also, due to the leakages/spills from the construction equipment/machinery the local ponds/water storages and canal water from where the animals/birds drink water may get contaminated; thus, endangering the fauna of the project area. The impact may be considered permanent & moderate adverse in nature

#### Mitigation

- Plantation of large number of trees along the proposed project to regain the ecological habitat;
- New and good condition machinery with minimum noise should be used

in construction;

- Noisy work should not be carried out in night time so that there should be no disturbance to local birds and animals;
- Contractor should ensure that the no hunting, trapping of animals should be carried out during construction;
- Borrow pits should be fenced so that no animal can fall into these;
- The camps should be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps should be properly disposed off to prevent the chances of eating by wild animals, which may prove hazardous to them; and
- Special measures should be adopted to minimize impacts on birds such as avoiding noise generating activities during the critical period of breeding.

#### **6.4.13 Disposal of Mucking Material**

Inevitable cut and fill earthwork operations will open up scars on the land around the project area. This impact is temporary and minor adverse in nature.

##### Mitigation

- The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites.

#### **6.4.14 Disruption of Existing Public Utilities/ Infrastructure**

There may be some disruption to the already existing utilities like electricity poles, underground telephone lines, power transmission lines etc. in the project area during the construction phase. This impact is, however, temporary and moderate adverse in nature.

##### Mitigation

- Rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the project area or provide them with alternate arrangement during the construction period.

#### **6.4.15 Traffic Management**

Due to the proposed construction activities, traffic management may pose a challenge in the project area. Movement of vehicles carrying construction

materials may result in traffic jams and time delays and cause inconvenience to the people passing through the Project Area. It will also increase the traffic load on the existing road network, thus deteriorating the existing condition of the road. Also, the movement of vehicles along the haulage routes may cause soil compaction, vegetation pattern and damage to properties and utilities. This impact is temporary and moderate adverse in nature.

#### Mitigation

- Proper traffic management plan should be implemented to avoid traffic jams/public inconvenience;
- Movement of vehicles carrying construction materials should be restricted during the daytime to reduce traffic load and inconvenience to the local residents/ business owners;
- Coordinate planning of traffic diversions with the traffic police and the Transport Department in accordance with the construction program with advance warnings to the affected residents and road users;
- Availability of continuous services of the traffic police in the diversion and control of traffic; and
- The executing agency is required to maintain liaison between the Highway/ Traffic Police, local residents/ travelers and the contractor to facilitate traffic movement during construction stage.

#### **6.4.16 Impact of Heavy Vehicles on Existing Road Network**

The plying of heavy vehicles on existing road network may result in air pollution (if unpaved roads), noise pollution especially near sensitive receptors (residential areas, school, health facilities etc.), and damage to roads and traffic congestion. However, the impacts would be temporary and moderate adverse in nature for which the following mitigation measures are proposed.

#### Mitigation

- Vehicle with the open load carrying area used for transportation of materials should have properly fitted side and tail boards;
- Materials having potential to produce dust should not be loaded to a level higher than the side and tail boards and should be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and

- extended to at least 300 mm over the edges of the side and tail board; and
- The contractor should not use any vehicle either on or off road with excessive noise pollution. Noise mufflers should be installed and maintained in good condition on all motorized equipment's.

#### **6.4.17 Solid & Liquid Waste (Municipal, Construction and Hazardous Waste)**

Different types of waste are likely to be generated during the construction phase of the proposed project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, wood, metal pieces and electrical wires. Whereas hazardous waste can be comprising paints and construction chemicals. Due to construction activities waste will also be generated at construction and contractors camp site which may include wastewater, oil spillage from machinery and solid waste etc. Handling and storage of oil, asphalt/bitumen may be a source of environmental pollution as a hazardous waste. This will result in unhygienic conditions, health risk to work force at the camp site.

All these, if left unintended, can become a source of nuisance and environmental pollution in the project area. The impact is considered to be temporary and moderate adverse in nature.

#### Mitigation

- Wastewater effluent from contractor's workshop and equipment washing yards should be passed through gravel/ sand beds to remove oil/ grease contaminants before discharge;
- Training of work force should be conducted in the storage and handling of materials and chemicals that can potentially cause soil contamination;
- Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor should provide a proper waste management plan;
- Reusable/recyclable (iron bars, aluminum) waste should be sold to waste vendors and those which cannot be sold out may be used as a filling material for leveling the depressions, subject to technical feasibility;
- Debris generated by dismantling of existing pavement structures should

be re-used subject to the suitability of the material;

- Ensure proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.;
- Conduct training of employees involved in the transportation of hazardous material regarding emergency procedures;
- Provide the necessary means for emergency response on call 24 hours/day;
- The sewage system for camps should be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;
- Lined wash areas should be constructed within the camp site or at site, for the receipt of wash waters from construction machinery; and
- Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of waste.

#### **6.4.18 Disturbance to People**

Approach/ hindrance problems for the residents/ business owners and movement of the people to the mosque/ shrines will be disturbed during construction activities. This impact is temporary and minor adverse in nature.

##### Mitigation

- Timely completion of the construction works and provides alternate routes for the areas where the construction is being carried out.

#### **6.4.19 Economic Activity**

Due to the construction of the proposed project, economic activity will be generated in the project area as the labourers and semi-skilled staff will have an opportunity to work for the construction of the proposed project. This will help in developing their skills and capacities. This is a moderate beneficial impact.

#### **6.4.20 Maintenance of Construction Equipment**

Improper maintenance of construction equipment may lead to safety and environmental hazards like groundwater and soil contamination or injury to workers. This impact is temporary and moderate negative in nature.

**Mitigations:**

- Place substantial blocking under any chain-hoist-suspended or jack supported equipment under which people must work. (The operator of trenching equipment should never leave the controls while shovels are suspended without blocking);
- No work should occur in areas where passing automobiles or moving machinery result in a hazardous condition;
- All work areas should be provided with proper ventilation. Employees shall not work in areas where they are exposed to excessive carbon monoxide gas from exhausts of running engines;
- Gasoline should not be kept in open containers or pits;
- Use a reasonably nontoxic solvent with a high flash point for cleaning parts and never use gasoline;
- Keep wrenches or tools clean and in safe working condition;
- Secure unbolted heavy parts or engines if necessary to leave the work;
- Always keep a suitable fire extinguisher ready. Inspect fire extinguishers regularly, and keep them in good operating order;
- Ground electric appliances, keep them in good working condition, and ensure that sparking will not ignite gases or vapors. Do not permit live cords to touch workers;
- Put oily rags in closed metal containers for disposal after use; and
- The maintenance workshop must be equipped with washing yards for cleaning of heavy equipment and septic tanks/soakage pits for the treatment of waste water.

**6.5 Anticipated Impacts during Operational Phase**

The anticipated impacts related to the proposed project have been studied for the operational phase and discussed hereunder.

**6.5.1 Flora**

No negative impacts are envisaged on the flora of the area during the operational phase. However, improper maintenance of the saplings planted against the trees cut for the proposed project may adversely affect the growth of those saplings which were planted to improve the environmental aesthetics of

the project area. Raising of new trees in four rows on either side of the proposed project, will render a positive impact on the flora of the area and will also cause a beneficial impact on the landscape of the area, which will be of permanent in nature.

Presence of adequate flora will absorb noxious hydro-carbon gases, through photosynthesis, emitted from an expected large number of cars, vehicles and public transport, thus purifying air of hazardous particles.

#### Mitigation

- The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients;
- An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees; and
- Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides.

### **6.5.2 Fauna**

The project activities will bring some adverse impacts on the fauna of the project area such as the uneasiness of movement and increased probability of accidents, if the animals/livestock approach the proposed project. This impact is permanent and high adverse in nature. Noise and air pollution caused due to heavy and fast traffic will be the source of disturbance to the fauna of the project area and especially to the avifauna of the area, which is another high adverse impact.

Raising of dense plantation of shady trees on both sides of the proposed project will provide resting, nestling and roosting habitat to the avifauna which is a high beneficial impact

#### Mitigation

- Provision of animal/ livestock crossings after some distances to facilitate their movement; and
- Installation of sign boards indicating the sensitive areas for the road users to avoid accidents.

### **6.5.3 Surface and Groundwater**

No major adverse impact on surface and groundwater is anticipated during the operational phase with the exception of some occasional oil spills, which may be restricted up to the road surface.

### **6.5.4 Air Quality**

The existing dust pollution will be reduced drastically by operation of the project due to improvement in road condition but it will be short termed. However, in the longer run, increased traffic levels and congestion will lead to PM10 pollution levels above the national standards, which may result in causing public health risks, nuisance and other impacts on bio-physical environment. These conditions will result in the rise of vehicular emissions (CO, NO<sub>x</sub>, SO<sub>x</sub>, PM10) associated with the adverse effects on the environment and humans. This impact is permanent and moderate beneficial during operational phase of the proposed project.

### **6.5.5 Noise**

During the operational phase, the noise levels are anticipated to increase due to traffic related noise pollution; vibrations from movement of heavy vehicles and mainly use of pressure horns. This impact is permanent and minor adverse in nature.

#### Mitigation

- Noise measurements should be carried out at locations and schedule specified in the Environmental Management Plan (EMP) to ensure the effectiveness of mitigation measures;
- Signs for sensitive zones (health centers/ educational institutions etc.) to disallow the use of pressure horns; and
- Enforcement and penalties against traffic rules violators.

### **6.5.6 Road Safety**

Enhanced vehicular movement and speed in the long run may result in road safety issues like traffic accidents. This impact is permanent but moderately adverse in nature, since the frequency of accidents may be lowered, but their intensity may be quite severe due to enhanced speeds at which vehicles will

move. The impact may be considered permanent and high adverse in nature.

Mitigation

- Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic) and enforcement of penalties for the violators.

### **6.5.7 Landscape**

At present, the landscape of the project area is dominated by commercial area with small cluster of trees. However, after the construction of the proposed project, the landscape of the project area will be changed in terms of road infrastructure and planned plantation of trees along the road. This will permanently change the landscape of the project area and at the same time will have a beneficial impact in terms of socio-economic development of the project area.

### **6.5.8 Drainage**

During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding of the drainage. In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate on the project road and can cause traffic jams. The impact may consider to be moderate adverse in nature.

Mitigation

- The impact can be controlled/ reduced by timely and continuous maintenance/ cleaning of the drainage system; and
- Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain.

## SECTION – 7

# ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

### 7.0 General

This Section provides an overall approach for managing and monitoring the potential environmental and social impacts and describes the institutional framework and resource allocations to implement these measures. The main objectives of the Environmental Monitoring and Management Plan (EMMP) are:

- Provide the details of the Project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the role and responsibilities of the Project Proponent, Contractor, Supervisory Consultants and other role players and effectively communicate environmental issues among them;
- Define a monitoring mechanism, reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented; and
- Identify the resources required to implement the EMMP and outline the corresponding financing arrangements.

For effective environmental management, the Client should assign the necessary responsibilities to an Environmental Committee (EC) through Project Director NHA, who will be responsible for implementation of the EMMP. The Project Director will be assisted by an Environmental Expert and a Social Expert in implementing the mitigation measures proposed in EMP.

### 7.1 Environmental Committee and its Responsibilities

NHA will form up an Environmental Committee (EC), which will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed project. EC will consist of Environmental Expert by the Contractor, Supervision Consultant (SC) and NHA. The responsibilities of the Environmental Committee (EC) are as follows:

- To ensure implementation of all the proposed mitigation measures proposed in EMMP during the construction of the Project;
- To organize routine monitoring of air quality, traffic, noise and vibration; etc. In case, the noise and emission levels exceed the acceptable levels; a penalty or ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA Punjab; and
- To ensure that the proposed project is implemented in an environment friendly manner, causing least harm to the existing environment.

## **7.2 Environmental Management and Monitoring Plan (EMMP)**

The EMMP provides the framework for the implementation of the mitigating measures and environmental management and monitoring during the construction and operational phases of the proposed project. **Table 7.1** portrays impacts, targets, mitigations and the responsible organizations for the implementation of the mitigation measures during the construction and the operational phases.

**Table 7.1 Environmental Management Plan**

Sr. No.	Project Component or Impact	Target	Mitigation	Responsibility	
				Design Consultant	Concerned Department
<b>A. PRE-CONSTRUCTION/ DESIGN PHASE</b>					
1	Topography	To ensure minimum changes in the topography of the project area	<ul style="list-style-type: none"> <li>Project design should consider aesthetic concerns.</li> </ul>	Prepare topographic survey plans with tentative alignment	District administration shall ensure the preservation of the original topographical configuration without alteration.
2	Formation width in built-up areas	To minimize the hindrance for the local people; and To lessen the density of traffic.	<ul style="list-style-type: none"> <li>Incorporate technical design features that allow flexible shoulder width in villages; and</li> <li>Explore the incorporations of additional underpasses</li> </ul>	Prepare Geometric Design with plan and profile drawings	District administration is mandated to ensure strict adherence to the

					design parameters as sanctioned by the design consultant.
3	Land Acquisition	To minimize land acquisition	<ul style="list-style-type: none"> <li>Careful alignment selection by the designer to minimize the impact; and</li> <li>Also adequate budget will be provided in the Project cost for the compensation to the affected people as per Land Acquisition Act, 1894</li> </ul>	List of Land Acquisition areas and utilities prepared has been attached in Annex-VI of EIA report	Land Acquisition Controller / NHA shall acquire land as per SOP of Government of Pakistan
4	Flora	To avoid/minimize tree cutting	<ul style="list-style-type: none"> <li>Incorporate technical design measures to minimize removal of trees, if possible, such as change in alignment;</li> <li>Plan for compensatory planting for four (4) trees against each fallen tree of similar floral function; and</li> <li>Disallow introduction of exotic species with known environmental setbacks (Eucalyptus)</li> </ul>	An estimated number of removal of trees has been included in BOQ and the same has been mentioned in Executive summary of EIA	Forest Department shall replant trees as per SOP of Govt of Pakistan

				Report	
5	Social Disturbance	To minimize the entry/exit problems of the locals in the Project Area	<ul style="list-style-type: none"> <li>Mitigation measures will include provision of pedestrian overhead bridges (after every 2 to 3 kilometers) in the design to minimize the impact.</li> </ul>	<p>In current design considerations, there is no immediate requirement for the implementation of overhead bridges. However, such structures would be provided in future, if need arise</p>	<p>District administration / Punjab Police shall oversee any site-related social disturbances in accordance with the (SOP) established by the Govt of Pakistan</p>
6	Public Utilities	To avoid disturbance to the public	<ul style="list-style-type: none"> <li>Incorporate technical design features to minimize effect on public utilities; and</li> <li>All public utilities (e.g., sewage, drainage/water pipes, power transmission lines, underground telephone lines, etc.) likely to be affected by the proposed project, need to be relocated well before the</li> </ul>	<p>List of public utilities prepared has been attached in Annex-VI of EIA report</p>	<p>NHA along with respective departments shall relocate utilities as per SOP of Govt of Pakistan</p>

			commencement of construction work.		
7	Loss of business	To avoid the loss of private property and economic loss.	<ul style="list-style-type: none"> <li>• Incorporate technical design features to minimize the project construction activities to avoid the loss of private property if possible; and</li> <li>• In case of unavoidable interference prior notification and consultation needs to be made to reach consensus on procedures and options or any other form of agreed judicious compensation with the concerned stakeholders/affectees.</li> </ul>	Our design considerations prioritize the minimization of private property encroachment on the project site to the greatest extent possible.	NHA / District administration shall be responsible for the supervision and mitigation of any instances involving the loss of private property and economic losses on-site, adhering to the (SOP) as stipulated by the Govt of Pakistan.
8	Surface/ Water Resources	To avoid/ minimize the contamination of surface water body and drain.	<ul style="list-style-type: none"> <li>• Provision of septic tanks in the design to treat the wastewater;</li> <li>• Provision of adequate drainage network to reduce infiltration; and</li> <li>• Provision of storm water drainage system with adequate capacity.</li> </ul>	Total water requirement and wastewater generation	WASA Department shall ensure the proper disposal and

				calculations has been mentioned on page 3-17 and 3-18 of EIA report	avoidance of contamination.
10	Traffic Management	To minimize traffic problems in the Project Area.	<ul style="list-style-type: none"> <li>• Proper traffic management plan should be formulated and announced before the construction to avoid traffic jams/public inconvenience.</li> </ul>	Proper Traffic management plan prepared has been attached in Annex-IX of EIA report	To be implemented by Construction Contractor and supervised by NHA
11	Solid waste	To minimize odour, spreading of diseases and clogging of canal and drain.	<ul style="list-style-type: none"> <li>• Waste management plan shall be devised including provision of waste bins, defining collection frequencies, allocating personnel and defining safe disposal options.</li> </ul>	Proper Waste management plan prepared has been attached in Annex-IX of EIA report	To be implemented by Construction Contractor and supervised by NHA
12	Resource Conservation	To reduce the use of non-renewable resources.	<ul style="list-style-type: none"> <li>• Proper planning for reduction of wastage of water should be done;</li> <li>• Provision of adequate insulation to reduce heat loss through batching</li> </ul>	Total water requirement and wastewater	NHA to ensure that proper disposal should be

			<p>plants; and using practical excess air volumes</p> <ul style="list-style-type: none"> <li>• Planning for regular monitoring of CO and CO2 content of the flue gases to verify that combustion systems are using practical excess air volumes</li> </ul>	<p>generation calculations has been mentioned on page 3-17 and 3-18 of EIA report</p>	<p>made</p>
<b>B. CONSTRUCTION STAGE</b>					
Sr. No	Project Component or Impact	Target	Mitigation	Responsibility	
1	Topography	To minimize adverse impact to topography of the Project Area	<ul style="list-style-type: none"> <li>• Where the use of agricultural land is unavoidable, the top 30 cm of the plough layer will be stripped of and stockpiled for redressing the land after the required borrow material has been removed;</li> <li>• Where deep ditching is to be carried out, the top 1m layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled up with scrap material from construction and then leveled with the stockpiled topsoil;</li> <li>• Ditches or borrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people; and</li> <li>• Landowners will be compensated</li> </ul>	CC, SC EC	

			according to the terms of lease agreements negotiated with them and the restoration actions agreed upon by the Contractor will be duly carried out.	
2	Soil	To minimize soil erosion and contamination	<ul style="list-style-type: none"> <li>• Low embankments will be protected by planting Vetiver grass that can flourish in relatively dry conditions;</li> <li>• Soil contamination by asphalt will be minimized by placing all containers in caissons;</li> <li>• All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over;</li> <li>• Non- bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for the dumpsites, and covered;</li> <li>• Productive land or land adjacent to agricultural land may not be preferred for excavation; and</li> <li>• Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials.</li> </ul>	CC, SC EC, NHA
3	Land Acquisition	To provide compensation to the affectees.	<ul style="list-style-type: none"> <li>• Provide judicious compensation to the affectees by providing sufficient budget</li> </ul>	LAC

			in the project cost. The process of land acquisition and compensation should be followed in a transparent manner to minimize the impacts.	
4	Construction Camps/ Camp Sites	To minimize loss of assets and vegetation/ trees due to construction of construction camps.	<ul style="list-style-type: none"> <li>• The contractor(s) should provide plan for removal &amp; rehabilitation of site upon completion;</li> <li>• Photographical and botanical inventory of vegetation before clearing the site; and</li> <li>• Compensatory plantation to be scheduled when construction works near end.</li> </ul>	CC, SC, EC, NHA
5	Health and safety of workers and communities	To minimize health risks	<p><i>Health &amp; Safety of workers:</i></p> <ul style="list-style-type: none"> <li>• Obligatory insurance against accidents for labourers/workers;</li> <li>• Provide basic medical training to specified work staff and basic medical service and supplies to workers;</li> <li>• Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;</li> <li>• Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers;</li> <li>• Protection devices (ear muffs) should be provided to the workers doing job in</li> </ul>	CC, SC, EC

			<p>the high noise areas;</p> <ul style="list-style-type: none"> <li>• Provision of adequate sanitation, washing, cooking and dormitory facilities;</li> <li>• Proper maintenance of facilities for workers will be monitored;</li> <li>• Provision of protective clothing i.e. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. for labourers handling hazardous materials;</li> <li>• Ensure strict use of wearing these protective clothing during work activities;</li> <li>• Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites; and</li> <li>• Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic in Lundianwala Area and other access roads.</li> </ul> <p><i>Community Health &amp; Safety:</i></p> <ul style="list-style-type: none"> <li>• There should be proper control on construction activities and oil spillage/ leakage from construction vehicles/ machinery.</li> <li>• The labour works with different transmittable diseases should be restricted within the construction site;</li> </ul>	
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			<ul style="list-style-type: none"> <li>• Timely public notification on planned construction works;</li> <li>• Close consultation with local communities to identify optimal solutions to maintain community integrity &amp; social links;</li> <li>• Fencing around the camps should be strong enough so that it cannot be broken easily by local people for making passages; and</li> <li>• Use of water should not disturb public water availability and source of water should be selected carefully.</li> </ul>	
6	Borrow/Open Pits	To avoid land disputes and to minimize soil erosion	<ul style="list-style-type: none"> <li>• Borrow pits will be restored with the consent of owners and one possible option provided will be conversion of pits to fish farms;</li> <li>• Necessary permits must be obtain for any borrow pits from the competent authorities;</li> <li>• Care must be taken in selection of borrow area so that it is not posing any threat /danger to road construction, stability and safety;</li> <li>• In borrow pits the depth of the pit will be regulated so that the sides of the excavation will have a slope not steeper than 1:4;</li> <li>• Soil erosion along the borrow pit shall be regularly checked to prevent / mitigate impacts on adjacent lands; and</li> </ul>	CC, SC, EC

			<ul style="list-style-type: none"> <li>• In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites</li> </ul>	
7	Air Quality	To minimize air pollution	<ul style="list-style-type: none"> <li>• All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;</li> <li>• Open burning of solid waste from the Contractor's camps should be strictly banned;</li> <li>• Preventive measures against dust should be adopted for on-site mixing and unloading operations. Regular sprinkling of the site by water should be carried out to suppress excessive dust emission(s);</li> <li>• Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions;</li> <li>• Quarry areas and asphalt plants should be located at least 500m downwind from populated areas, wildlife habitats and contractor's camps to minimize the impact of dust emissions;</li> <li>• Asphalt, hot mix and batching plants should be equipped with dust control</li> </ul>	CC, SC EC

			<p>equipment such as fabric filters or wet scrubbers to reduce level of dust emissions;</p> <ul style="list-style-type: none"> <li>• NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works;</li> <li>• Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants should be taken up; e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards;</li> <li>• Regular sprinkling to avoid dust; and</li> <li>• Regular monitoring of air quality in accordance with NEQS</li> </ul>	
8	Noise	To minimize noise pollution	<ul style="list-style-type: none"> <li>• Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;</li> <li>• Confine excessively noisy work to normal working hours in the day, as far as possible;</li> <li>• Provide the construction workers with suitable hearing protection like ear cap or earmuffs and train them in their use;</li> <li>• Preferably, restrict construction vehicles movement during nighttime;</li> </ul>	CC, SC and EC

			<ul style="list-style-type: none"> <li>• Heavy machinery like percussion hammers and pneumatic drills should not be used during the night;</li> <li>• Vehicles and equipment used should be fitted, as applicable, with silencers and properly maintained;</li> <li>• Use of low noise machinery, or machinery with noise shielding and absorption;</li> <li>• Contractors should comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures;</li> <li>• Noise barriers in sensitive areas in the form of high boundary walls (concrete or wood), earth berms, etc. in front of schools, hospitals/ clinics and mosques; and</li> <li>• Public hearings to discuss appropriate solutions and materials to control noise (e.g., mud or brick walls, bushes, etc.); and</li> </ul>	
9	Surface & Groundwater	To avoid contamination of surface and groundwater and to avoid use of canal water in construction work.	<ul style="list-style-type: none"> <li>• Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality;</li> <li>• The solid waste should be disposed of</li> </ul>	SC and EC, CC

			<p>in designated landfill sites to sustain the water quality for domestic requirements;</p> <ul style="list-style-type: none"> <li>• Water required for construction should be obtained in such a way that the water availability and supply to nearby communities remain unaffected;</li> <li>• Conduct regular water quality monitoring according to Drinking Water Quality Standards and determined sampling schedule;</li> <li>• The contractor should ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged;</li> <li>• Work on canal areas should be kept to a minimum or protective walls should be constructed;</li> <li>• Prohibit washing of machinery and vehicles in surface water provide sealed washing basins and collect wastewater in sedimentation/retention pond</li> <li>• Construction work close to the water bodies should be avoided, especially during monsoon period; and</li> <li>• Wastes must be collected, stored and taken to approved disposal site.</li> </ul> <p><i>Spill Control</i></p> <ul style="list-style-type: none"> <li>• No refueling, storage, servicing or maintenance of equipment's should</li> </ul>	
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			<p>take place within 150 feet of drainages or other sensitive environmental resources; and</p> <ul style="list-style-type: none"> <li>• Any fluids drained from the machinery during servicing will be collected in leak proof container and taken to an appropriate disposal or recycling facility.</li> </ul>	
10	Flora	To minimize the impact on flora	<ul style="list-style-type: none"> <li>• The indigenous trees most suited to the tract should be re-planted;</li> <li>• Flowering and fruiting shrubs should be planted along the road to beautify the landscape. Planting would however be done keeping in view the principles of landscape designing;</li> <li>• An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees;</li> <li>• The contractor's staff and labour should be strictly directed not to damage any vegetation such as trees or bushes. They should use the paths and tracks for movement and should not be allowed to trespass through farmlands;</li> <li>• Construction vehicles, equipment's and machinery should remain confined within their designated areas of movement;</li> <li>• Contractor should supply gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel should</li> </ul>	CC, SC, NHA

			<p>not be allowed; and</p> <ul style="list-style-type: none"> <li>• Camp sites and asphalt plants should be established on waste/barren land rather than on forested or agriculturally productive land. However, if such type of land is not available, it should be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to the trees</li> </ul>	
11	Fauna	To minimize the impact on fauna and avi- fauna and their dislocation	<ul style="list-style-type: none"> <li>• Plantation of large number of trees along the proposed project to regain the ecological habitat;</li> <li>• New and good condition machinery with minimum noise should be used in construction;</li> <li>• Noisy work should not be carried out in night time so that there should be no disturbance to local birds and animals;</li> <li>• Contractor should ensure that the no hunting, trapping of animals should be carried out during construction; Borrow pits should be fenced so that no animal can fall into these;</li> <li>• The camps should be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps should be properly disposed off to prevent the chances of eating by wild animals, which may prove hazardous to them; and</li> </ul>	CC, SC, EC

			<ul style="list-style-type: none"> <li>• Special measures should be adopted to minimize impacts on birds such as avoiding noise generating activities during the critical period of breeding.</li> </ul>	
12	Disposal of mucking material	To minimize the scars on the land in the project area	<ul style="list-style-type: none"> <li>• The excavated materials that are unsuitable for use will need to be stored, transported and disposed of appropriately at designated sites.</li> </ul>	CC, SC, EC
13	Disruption of existing public utilities and infrastructure	To minimize the disturbance to public utilities and infrastructure	<ul style="list-style-type: none"> <li>• Rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the project area or provide them with alternate arrangement during the construction period.</li> </ul>	CC, SC, EC
14	Traffic Management	To minimize traffic problems in the project area	<ul style="list-style-type: none"> <li>• Proper traffic management plan should be implemented to avoid traffic jams/public inconvenience</li> <li>• Movement of vehicles carrying construction materials should be restricted during the daytime to reduce traffic load and inconvenience to the local residents/ business owners;</li> <li>• Coordinate planning of traffic diversions with the traffic police and the Transport Department in accordance with the construction program with advance warnings to the affected residents and road users;</li> <li>• Availability of continuous services of the traffic police in the diversion and control of traffic; and</li> <li>• The executing agency is required to</li> </ul>	CC, SC, EC, Traffic Police

			maintain liaison between the Highway/Traffic Police, local residents/ travelers and the contractor to facilitate traffic movement during construction stage.	
15	Maintenance of Construction Equipment	Improper maintenance of construction equipment may lead to safety and environmental hazards like groundwater and soil contamination or injury to workers	<ul style="list-style-type: none"> <li>• Place substantial blocking under any chain-hoist-suspended or jack supported equipment under which people must work.</li> <li>• All work areas should be provided with proper ventilation.</li> <li>• Always keep a suitable fire extinguisher ready.</li> <li>• Put oily rags in closed metal containers for disposal after use</li> <li>• Secure unbolted heavy parts or engines if necessary to leave the work</li> </ul>	CC, SC, EC
16	Impact of heavy vehicles on existing roads network	To minimize air and noise pollution, traffic congestion and damage to roads	<ul style="list-style-type: none"> <li>• Vehicle with the open load carrying area used for transportation of materials should have properly fitted side and tail boards;</li> <li>• Materials having potential to produce dust should not be loaded to a level higher than the side and tail boards and should be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the side and tail board; and</li> <li>• The contractor should not use any vehicle either on or off road with excessive noise pollution. Noise</li> </ul>	CC, SC, EC

			mufflers should be installed and maintained in good condition on all motorized equipment's.	
17	Solid & liquid waste (municipal, construction and hazardous waste)	To minimize the impact on soil and water resources	<ul style="list-style-type: none"> <li>• Wastewater effluent from contractor's workshop and equipment washing yards should be passed through gravel/ sand beds to remove oil/ grease contaminants before discharge;</li> <li>• Training of work force should be conducted in the and handling of materials and chemicals that can potentially cause soil contamination;</li> <li>• Solid waste generated during construction and camp sites should be safely disposed in demarcated waste disposal sites and the contractor should provide a proper waste management plan;</li> <li>• Reusable/recyclable (iron bars, aluminum) waste should be sold to waste vendors and those which cannot be sold out may be used as a filling material for leveling the depressions, subject to technical feasibility;</li> <li>• Debris generated by dismantling of existing pavement structures should be re-used subject to the suitability of the material;</li> <li>• Ensure proper labelling of containers, including the identification and quantity of the contents, hazard contact</li> </ul>	CC, SC, EC

			<p>information etc.;</p> <ul style="list-style-type: none"> <li>• Conduct training of employees involved in the transportation of hazardous material regarding emergency procedures;</li> <li>• Provide the necessary means for emergency response on call 24 hours/day;</li> <li>• The sewage system for camps should be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;</li> <li>• Lined wash areas should be constructed within the camp site or at site, for the receipt of wash waters from construction machinery; and</li> <li>• Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of waste.</li> </ul>	
18	Disturbance to people	To minimize the disturbance (hindrance in free movement) to people in the project area	<ul style="list-style-type: none"> <li>• Timely completion of the construction work and provide alternate routes for the areas where the construction is being carried out.</li> </ul>	CC, SC, EC
<b>C. OPERATIONAL STAGE</b>				
1	Flora	Proper maintenance of saplings planted	<ul style="list-style-type: none"> <li>• The saplings planted in the project area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients;</li> </ul>	NHA

			<ul style="list-style-type: none"> <li>• An awareness campaign targeted on the neighborhood farmers should be run to popularize the planting of trees; and</li> <li>• Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides.</li> </ul>	
2	Fauna	To provide alternate crossings for animals and livestock	<ul style="list-style-type: none"> <li>• Provision of animals/livestock crossings after every some distances to facilitate their movements; and</li> <li>• Installation of sign boards indicating the sensitive areas for the road users to avoid accidents</li> </ul>	NHA, Traffic Police
3	Noise	To minimize noise pollution	<ul style="list-style-type: none"> <li>• Noise measurements should be carried out at locations and schedule specified in the Environmental Management Plan (EMP) to ensure the effectiveness of mitigation measures;</li> <li>• Signs for sensitive zones (health centers/educational institutions etc.) to disallow the use of pressure horns and</li> <li>• Enforcement band penalties against traffic rules violators</li> </ul>	NHA, EPA Punjab
4	Road safety	To control speed violation	<ul style="list-style-type: none"> <li>• Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic) and enforcement of penalties for the violators.</li> </ul>	Traffic Police

5	Drainage	To avoid chocking, flooding and nuisance to public.	<ul style="list-style-type: none"> <li>• The impact can be controlled/ reduced by timely and continuous maintenance/ cleaning of the drainage system; and</li> <li>• Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain.</li> </ul>	NHA
---	----------	---	--	-----

KEY

DC Design Consultant  
 CD Concerned Department  
 CC Construction Contractor  
 SC Supervision Consultant

EC Environmental Committee  
 NHA National Highway Authority  
 EPA Environmental Protection Agency  
 LAC Land Acquisition Collector

### **7.3 Environmental Monitoring**

Environmental Monitoring is undertaken during both the construction and operational phases to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters are selected and quantitative analysis is carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not. Parameters to be analyzed during construction and operation of the proposed project and responsibilities for monitoring and reporting have been discussed below. A cost estimate for this measurement of parameters is given in **Table 7.2**.

#### **7.3.1 Construction Phase**

##### **a) Air Quality**

Air quality monitoring will be carried out on quarterly basis during the construction phase for the parameters CO, NOR, SO<sub>2</sub> and PM<sub>10</sub>.

##### **b) Ground Water Quality**

Ground water quality monitoring will be done quarterly during the construction phase and will be in accordance to Drinking Water Quality Standards (DWQS).

##### **c) Noise Level**

The noise level monitoring will be carried out quarterly during the whole construction period for the proposed project and will be in accordance to NEQS for noise

#### **7.3.2 Operational Phase**

##### **a) Air Quality**

Air quality monitoring will be done bi-annually during the operational phase of the proposed project. The parameters will be monitored are CO, NO<sub>x</sub>, SO<sub>2</sub> and PM<sub>10</sub>.

##### **b) Ground Water Quality**

Ground water quality monitoring will be done bi-annually during the operational phase and will be in accordance to Drinking Water Quality Standards (DWQS).

**c) Noise Level**

The noise level monitoring will be carried out bi-annually during the operational phase and the resulting values will be compared with NEQS for noise.

**7.3.3 Responsibilities for Monitoring and Reporting**

The EC will be responsible for environmental monitoring and reporting throughout the construction and operational phase. A monitoring report will be prepared on monthly basis and one comprehensive report will be prepared at the end of the project construction phase and a comprehensive quarterly report will also be prepared and submitted to the EPA-Punjab for the first year of the project. Contents of the final report will include results of environmental monitoring in comparison to the standards for the various parameters, location and sampling time along with recommendations for the future projects. One report will be submitted during the construction phase to each of the following authorities and institutions: (i) NHA and (ii) EPA-Punjab whereas, one report will be submitted to EPA-Punjab during the operational phase.

**Table 7.2 Budget Estimate For Environmental Monitoring During The Construction & Operational Phase**

Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
<b>Construction phase (1.5 year)</b>						
<b>Air quality</b>	CO, NO <sub>x</sub> , SO <sub>2</sub> , PM <sub>10</sub>	1x1x4 = 4	Quarterly @ Rs. 25,000/ sample	Contractor & SC	24 hours	100,000
<b>Ground water quality</b>	According to Drinking Water Quality Standards	1x1x4 = 4	Quarterly @ Rs. 25,000/ sample	Contractor & SC		120,000
<b>Noise level</b>		1x1x4 = 4	Quarterly @ Rs. 4,000/ point	Contractor & SC	24 hours	16,000
<b>TOTAL</b>						<b>236,000</b>
<b>Operational phase (1 year)</b>						
<b>Air quality</b>	CO, NO <sub>x</sub> , SO <sub>2</sub> , PM <sub>10</sub>	1x1x2 = 2	Bi-annual @ Rs. 25,000/ sample	NHA & EPA Punjab	24 hours	50,000
<b>Ground water quality</b>	According to Drinking Water Quality Standards	1x1x2 = 2	Bi-annual @ Rs. 30,000/ sample	NHA & EPA Punjab		60,000
<b>Noise level</b>		1x1x2 = 2	Bi-annual @ Rs. 4,000/ point	NHA & EPA Punjab	24 hours	8,000
<b>TOTAL</b>						<b>118,000</b>

Components	Parameters	Quantity (No. of samples x No. of locations x Frequency)	Frequency	Responsibility	Duration	Cost (Rs.)
<b>GRAND TOTAL</b>						<b>354,000</b>

**KEY**

SC – Supervision Consultant

NHA – National Highway Authority

EPA – Environmental Protection Agency

## 7.4 Tree Plantation Plan

Tree plantation plan has been prepared for the proposed project keeping in view the design and length of the project. This plan is based on best possible estimations and can be modified accordingly at the execution stage. A total number of 350 trees are to be planted in linear pattern, keeping the distance from plant to plant as 10 meters for 3.5 km length of the proposed project.

### Plantation Cost

The cost of raising 500 plants has been estimated as Rs. 857,500/- including price of plants, earthwork, procurement of manures, continued supply of water to young plants throughout the year and its maintenance for five (5) years. Break-up of expenditure of 500 plants@ Rs.500/- per diem is as follows:

**Table 7.3: Estimated Cost of Plantation of 500 Plants for First Year**

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Layout	1 km	2 MD/Av.km	1000
2	Digging of Pits 2.5 ft. each 2.5x500 =1500 cft.	1500 cft.	10 MD/Av.km	5000
3	Cost of plants including	500 No.	Rs.750/- plant	375000
4	Cost of planting of plants	500 No.	Rs. 10/- plant	5000
5	Carriage of plants from private nursery to site including loading/unloading	500 No.	Rs. 5/- plant	2500
6	Cost of Manure and Bhall (silt) including carriage	600	Lump Sum	5000
7	H/watering 50 times 500x50 with water bowser, one driver and one coolie	25,000 no's.	5 MD/per 1000	62500
8	Weeding twice 500x2	1200 no.	5 MD	2500

9	Reopening of Pits twice (500x2)/cft/pit	1200 cft.	5 MD	2500
10	Unforeseen	---	---	1000
<b>Total</b>				<b>462,000</b>

**Table 7.4: Estimated Cost of Plantation of 20% of First year (100) plants and their Maintenance for Second Year**

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Cost of Plants 20% Restocking	100 No.	Rs.750/- plant	75,000
2	Cost of planting	100 No.	Rs. 10/- plant	1000
3	Carriage of plants	100 No.	Rs. 5/- plant	500
4	H/watering 30 times with water bowser, one driver and one coolie	25,000 no.	5 MD/per 1000	75000
5	Reopening of Pits twice (500x2)	1200 cft.	5 MD	2,500.00
6	Weeding twice 500x2	1200 no.	5 MD	2,500.00
7	Unforeseen	---	---	1000
<b>Total</b>				<b>157,500.00</b>

**Table 7.5: Estimated Cost of Plantation of 10% (100) plants and Maintenance for Third Year**

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	Cost of Plants 10% Restocking 100 No.	100 No.	Rs.750- plant	75,000.00
2	Cost of planting	100 No.	Rs. 10/- plant	1000
3	Carriage of plants	100 No.	Rs. 5/- plant	500
4	H/watering 40 times	20000	5 MD/1000	50,000
5	Reopening of Pits twice (500x2)	1000 cft.	5 MD	2,500.00
6	Unforeseen	---	---	1000
<b>Total</b>				<b>130,000.00</b>

**Table 7.6: Estimated Cost for maintaining 500 plants for Fourth Year**

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	H/watering 40 times	20000	5 MD/1000	50,000
2	Pruning and cleaning of plants	1200 cft.	5 MD	2,500.00
3	Unforeseen	---	---	1500
<b>Total</b>				<b>54000</b>

**Table 7.7: Estimated Cost for maintaining 500 plants for Fifth Year**

Sr.No	Item	Quantity	Rate	Amount (Rs.)
1	H/watering 40 times	20000	5 MD/1000	50,000
2	Pruning and cleaning of plants	1200 cft.	5 MD	2,500.00
3	Unforeseen	---	---	1500
<b>Total</b>				<b>54000</b>

Total cost for raising 500 plants & Maintenance for 5 years = Rs. 857,500/-

Cost for raising 1 plant & its maintenance for 5 years = Rs. 1715/-

Total cost for raising 350 plants including Maintenance for 5 years = Rs. 600,250/-

## 7.5 Environmental Technical Assistance and Training Plan

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. The EC should play a key role in this respect and arrange the trainings.

An environmental and social training and Technical Assistance (TA) program is to be carried out before the implementation of the project. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A suitable training program is proposed to train the

Contractor(s) staff who will be involved in the construction phase and the professional staff from the client involved at the operational stage of the project.

The NHA will direct its Environment Cell to manage the environmental training program. The objective of this will be, to help in establishment of appropriate systems, and to train senior NHA staff and EC responsible for managing environment, operations, and planning, who can then impart training at a broader level within and outside the NHA (i.e., the training of trainers). The Environment Professionals engaged from the Environment Cell will organize training courses for NHA and contractor staff to train them in specialized areas such as air and noise pollution monitoring; develop environment operation manuals in consultation with the EPA, Punjab. The details of this training program are presented in **Table 7.8**.

**Table 7.8 Personnel Training Program/ TA Services**

Provided by	Contents	Trainees/Events	Duration
Environment Cell/ organizations specializing in environmental management and monitoring	Short seminar and a course on: Environmental laws and regulations, daily monitoring and supervision	One seminar for NHA and contractor project staff	2 days
Environment Cell / organizations Specializing in social management and monitoring	Short seminar and course on: Social awareness	One seminar for project staff dealing in Social/lands matters	2 days
Environment Cell/ organizations specializing in Occupational, health and safety issues	Short lecture relating to Occupational Safety and Health	One seminar for contractor's staff	2 days

## **7.6 Environmental Monitoring, Mitigation and Training Cost**

The cost required to effectively implement the mitigation measures is important for the sustainability of the Project both in the construction and operational phases of the Project.

These costs are summarized in **Table 7.9** and the break-up for Health Safety & Environment cost is given in **Table 7.10**.

**Table 7.9 Environmental Mitigation and Monitoring Cost**

Sr. No.	Activity	Basis	Cost (Rs.)
1	Medical screening for workers	Rs. 1200 for 70 employees	84,000
2	Drinking water analysis	Rs. 20,000 for microbiological and chemical analysis for one sample collected quarterly for 12 months from one (01) camp site	80,000
3	Material Storage, handling and use	Five (05) No. of tarpaulins of Rs. 20,000 each	100,000
4	Handling/ transportation of hazardous material	Rs. 12,000/month for a period of 12 months will be required for transportation of material	144,000
5	Handling of solid waste	Rs.10,000 per month (two trips per month) for a period of 12 months, which includes the cost of collection, transportation and disposal to the designated site	120,000
6	Excavation, cutting and filling	Rs. 5000 for 50 hay bales are estimated	250,000
7	Health & Safety of Workers	For 70 employees for the provision of dust masks, safety shoes, gloves, first aid box, ear plugs, safety helmets and safety jackets (Hi Vis) And Provision of dust bins, warning tap, safety cones, safety sign boards and water sprinkling	6,703,400
8	Environmental Monitoring Cost	Air, water, noise ( <b>From Table 7.2</b> )	354,000
9	Tree plantation and maintenance for five (05) years	----	600,250
<b>Grand Total</b>			<b>8,435,650</b>

**Table 7.10 Break-up for Health Safety & Environment cost (Serial No. 7 of Table 7.9)**

Items	Quantity	Cost / Item (Rs.)	Total Cost (Rs.)
<b>(A) Personal Protective Equipment</b>			
Dust Masks	3360	20	67,200
Safety Shoes	140	1200	168,000
Gloves	1680	200	336,000
First Aid Box	2	2000	4,000
Ear Plugs	840	30	25,200
Safety Helmets	70	800	56,000
Safety Jackets (Hi Vis)	140	400	56,000
<b>Sub Total (A)</b>			<b>712,400</b>
<b>(B) Others</b>			
Provision of Dust Bins	7	1000	7,000
Warning Tape	50	500	25,000
Safety Cones	40	1000	40,000
Safety Sign Boards	20	1200	24,000
Water Sprinkling	2 times/day	15000	5,475,000
Rain Coat	140	2000	280,000
Gum Boots	140	1000	140,000
<b>Sub Total (B)</b>			<b>5,991,000</b>
<b>Total (A) + (B)</b>			<b>6,703,400</b>

**Time required for Construction = 12 months**

**No. of labour required during construction = 70**

**(A) Personal Protective Equipment's PPEs**

Dust Mask	1 dust mask to be used in a week by each labourer
Safety Shoes	1 safety shoe for six months for each labourer
Gloves	2 pair of gloves for each labourer for a month
First Aid Box	1 first aid box for every 50 labourers
Ear Plug	1 set of ear plug to be used for 1 month for each labourer
Safety Helmet	1 safety helmet for each labourer for 12 months
Safety Jackets (Hi Vis)	2 safety jackets (Hi Vis) for each labourer for 12 months

**(B) Others**

Dust Bin	1 after every 500 m
Water sprinkling	for the whole construction period (12 months)
Rain Coat	1 rain coat for each labourer for six months
Gum Boots	1 gum boot for each labourer for six months

The Environmental Mitigation and Monitoring cost will be **Rs. 8,435,650** or **Rs. 8.43 Million**

## SECTION 8

### CONCLUSION AND RECOMMENDATIONS

#### 8.0 General

This section presents conclusions of the EIA Report. Overall Project has been conceived to direct and comfortable route in Lundianwala area at M-3 Motorway to ease the traffic movement for the project area.

The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Provincial EPA-Punjab.

#### 8.1 Identification of the Main Issues and Concerns

During the field surveys, significant efforts were made to identify the main social, cultural and environmental issues related to the widening/rehabilitation of the existing road. Social surveys and public consultations were also conducted with area resident/stakeholders. Following is the list of main issues and concerns:

- Land acquisition for construction of cutting of trees falling within the proposed corridor;
- Disturbance to the public movement during construction;
- Reduction in the daily routine activities of local residents during construction;
- Noise and air pollution due to the operating of construction machinery during construction phase of the Project;
- Provision of proper diversion arrangements during construction stage;
- Solid waste generation during construction;
- Oil spillages from construction machinery, resulting in soil and groundwater contamination; and
- Loss of fertile agricultural land due to the proposed Project.

## 8.2 Conclusions

After the execution of the proposed project, people living in the project area and the road user/ travellers will get the following benefits:

- Overall safety of passengers will be increased.
- Less time will be required for travelling and reaching the destination.
- During the construction phase, local labour will be accommodated in the construction activities.
- Less fuel consumption will be another positive impact of the project.

Overall, the proposed Project will have a positive and healthy improvement on socio-economic environment of the project area.

## 8.3 Recommendations

Finally on the basis of EIA study conclusion, following recommendations must be taken care prior to any of the decision about execution of the project:

- A proper judicious compensation to the land and structure affectees must be given to the respective owners;
- A proper traffic diversion plan must be formulated and conveyed to the road users;
- Tree plantation plan must be followed during operational phase;
- Operation and maintenance of the drainage structures and road wear and tear must be done periodically;
- Health and safety plan for the workers must be followed during construction phase; and
- Environmental compliance during the construction phase of the project must be done for which EMP must be a part of the construction contract document.

# **Annexure I**

## **Ambient Air Monitoring Reports**



# SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

## Ambient Air Quality Monitoring

**Client Name:** Feasibility Study and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)      **Monitoring Location:** 31°18'26.60"N 73°33'29.76"E

**Monitoring Date:** 15-08-2023 to 16-08-2023      **Report Issue Date:** 24-08-2023

**Monitoring Point:** Landianwala Interchange      **Reference Number:** EHS-LHR-327/23/AA1

### Results are as under

Sr.#	Parameters	Unit	Results
1	Air Temperature	°C	37
2	Air Humidity	% rH	43

### Average Ambient Air Quality Monitoring Results

Sr.#	Parameters	Unit	PEQS*	Results
1.	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	130	8.2
2.	Carbon Monoxide (CO)	mg/m <sup>3</sup>	5	1.13
3.	Nitrogen Oxide (NO)	µg/m <sup>3</sup>	40	20.4
4.	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	80	59.3
5.	Sulfur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	120	29.3
6.	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	35	30.7
7.	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	150	123.2



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# SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

## Hourly Ambient Air Quality Monitoring Results

Sr. No	Time (H)	O <sub>3</sub>	CO	NO	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
	Unit	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>
1	14:00	8.2	0.82	15.2	60.2	22.5	112.6	31.2
2	15:00	---	0.64	16.2	61.8	24.6	111.4	23.5
3	16:00	---	0.93	16.7	58.6	25.7	116.5	26.4
4	17:00	---	1.2	17.2	60.1	26.7	115.3	30.2
5	18:00	---	1.32	17.5	57.8	28.2	116.8	31.25
6	19:00	---	1.51	19.4	60.2	29.1	118.6	33.6
7	20:00	---	1.31	18.3	59.6	32.3	120.7	34.4
8	21:00	---	1.34	20.6	62.2	33.2	122.6	24.93
9	22:00	---	---	20.3	61.1	30.4	125.7	29.6
10	23:00	---	---	20.5	58.54	31.2	126.8	26.23
11	0:00	---	---	22.6	53.7	29.6	126.4	29.23
12	1:00	---	---	25.6	62.1	28.7	128.3	20.6
13	2:00	---	---	23.7	61.2	27.69	127.6	23.4
14	3:00	---	---	24.3	66.7	29.3	122.3	30.2
15	4:00	---	---	25.2	62.2	28.64	128.5	31.4
16	5:00	---	---	21.2	63.1	32.4	130.2	36.4
17	6:00	---	---	24.12	68.4	32.5	132.6	39.4
18	7:00	---	---	26.3	62.3	33.4	128.4	34.62
19	8:00	---	---	24.1	72.4	33.2	129.3	42.53
20	9:00	---	---	25.2	67.4	30.2	127.4	34.23
21	10:00	---	---	17.8	46.1	28.6	130.2	33.56
22	11:00	---	---	16.3	50.2	30.1	118.3	29.7
23	12:00	---	---	17.1	43.2	27.8	121.3	35.2
24	13:00	---	---	14.2	44.6	29.2	119.6	26.4
<b>Average Values</b>		<b>8.2</b>	<b>1.13</b>	<b>20.4</b>	<b>59.3</b>	<b>29.3</b>	<b>123.2</b>	<b>30.75</b>



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# SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

## PEQS: Punjab Environmental Quality Standards

- The values were representative of process conditions when monitoring was carried out.
- The client is responsible for lawful usage of reported data in the future.
- The report is not valid for any court / negotiations / EPA Submission.
- Report has been issued for client's self-reference only.

Monitoring Supervisor: Numan Anwar

Signature: 

Name of Chief Chemist: Saad Shahid

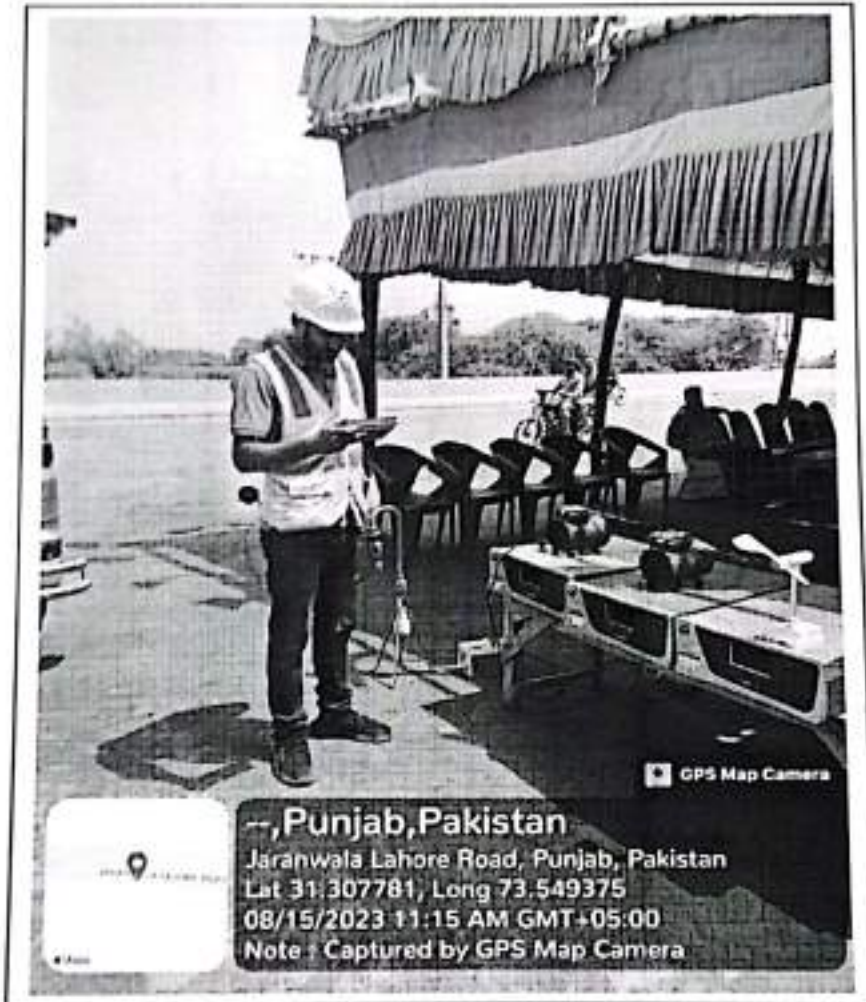
Signature: 

Date: 24-08-2023



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**Pictorial Log:**



# **Annexure II**

## **Noise Level Monitoring Reports**



# SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

## NOISE LEVEL MONITORING REPORT

**Project Name:** Feasibility Study and Detailed Design for Construction of Lundianwala, interchange on Lahore-Abdul Hakeem Motorway (M-3)  
**Monitoring Date:** 15-08-2023 to 16-08-2023  
**Reporting Date:** 24-08-2023  
**Monitoring by:** SES&L  
**Results:**

**GPS Location:** 31°18'26.60"N  
73°33'29.76"E  
**Instrument Used:** Digital Sound Level Meter UT 353  
**Reference No:** EHS-LHR-327/23/NL/01

Sr. #	Time	Unit	Average Value	PEQS Standard for Commercial Area
1	10:00 AM	dB(A)	62.4	65
2	11:00 AM	dB(A)	64.1	65
3	12:00 PM	dB(A)	63.3	65
4	1:00 PM	dB(A)	64.7	65
5	2:00 PM	dB(A)	61.1	65
6	3:00 PM	dB(A)	65.5	65
7	4:00 PM	dB(A)	64.5	65
8	5:00 PM	dB(A)	66	65
9	6:00 PM	dB(A)	66.3	65
10	7:00 PM	dB(A)	67	65
11	8:00 PM	dB(A)	66.8	65
12	9:00 PM	dB(A)	67	65
13	10:00 PM	dB(A)	65.6	55
14	11:00 PM	dB(A)	64.2	55
15	12:00 AM	dB(A)	61.2	55
16	1:00 AM	dB(A)	59.8	55
17	2:00 AM	dB(A)	59.7	55
18	3:00 AM	dB(A)	57.7	55
19	4:00 AM	dB(A)	55.9	55
20	5:00 AM	dB(A)	56.4	55
21	6:00 AM	dB(A)	57.5	65
22	7:00 AM	dB(A)	60.8	65
23	8:00 AM	dB(A)	63.8	65
24	9:00 AM	dB(A)	66.9	65
Average Day Time			64.23	65
Average Night Time			60.06	55



GO FOR GREEN - THERE IS NO OTHER PLANET TO LIVE

THIS RECYCLED PAPER PROTECTS OUR ENVIRONMENT




# SUSTAINABLE ENVIRONMENTAL SERVICES & LABORATORY

## PEQS: Punjab Environmental Quality Standard

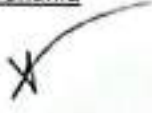
### Note:

- The average Noise levels describe the overall Noise intensity of the site.
- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self-calibration of the instrument.
- The measurements were carried out on client request.
- The client is responsible Unlawful usage of reported data in future.
- The report is not valid for any Court / negotiations / EPA Submission.
- Report has been issued for client self-reference only.

Monitoring Supervisor: Numan Anwar

Signature of Supervisor: 

Name of Chief Chemist: Saad Shahid

Signature of Chief Chemist: 

Date: 24-08-2023



# **Annexure III**

## **Water Analysis Reports**



**Report Number:** PI-01520-23 A  
**Sampling Date:** 15 August, 2023  
**Receiving Date:** 18 August, 2023  
**Issue Date:** 22 August, 2023

**Customer** : Feasibility Study and Detailed Design for Construction of Lundianwala Interchange on Lahore-Abdul Hakeem Motorway (M-3)  
**Project Location** : 31°18'26.60"N  
 73°33'29.76"E  
**Contact person** : /  
**Contact details** : /  
**Email** : /

**Sample Information**

**Sample Description:** : Ground Water  
**Vendor Reference:** : Landianwala Interchange

**Image of Sampling & Submitted sample**



For and on behalf of  
**Tti Testing Laboratories**

**Hamad Ahmad**  
 Head Food and Water Lab



REPORT NUMBER: PI-01520-23 A

## Test Results:

## Drinking Water Analysis: Landianwala Interchange

Sr.#	Parameter	Method	Unit	MDL	PEQS Limit	Results
1.	Taste	Sensory Evaluation	-	-	Not objectionable	Acceptable
2.	Odor	Sensory Evaluation	-	-	Not objectionable	Acceptable
3.	Color	APHA 2120 C	TCU	≤ 5	≤ 15	< 5
4.	Turbidity	APHA 2130 B	NTU	≤ 5	< 5	< 5
5.	pH Value @ 25 °C	APHA 4500 H*B	pH Unit	0.01	6.5-8.5	7.90
6.	Conductivity	APHA 2510 B	µS/cm	-	N.S	1904
7.	Total Dissolved Solids (TDS)	APHA 2540 C	mg/L	5.0	< 1000	1160
8.	Fluoride	APHA 4500 D	mg/L	0.02	≤ 1.5	0.13
9.	Nitrates NO <sub>3</sub>	APHA 4500 NO <sub>3</sub> <sup>-</sup> E	mg/L	0.04	≤ 50	0.65
10.	Nitrite, NO <sub>2</sub>	APHA 4500 NO <sub>2</sub> <sup>-</sup> B	mg/L	0.001	≤ 3	0.004
11.	Residual Chlorine	APHA 4500 Cl G	mg/L	0.01	N.S	N.D
12.	Cyanide	APHA 4500 CN <sup>-</sup> E	mg/L	0.002	≤ 0.05	N.D
13.	Total Hardness (as CaCO <sub>3</sub> )	APHA 2340 C	mg/L	4.0	< 500	113
14.	Chloride	APHA 4500 Cl B	mg/L	1.0	< 250	151
15.	Phenolic Compounds	APHA 5330 D	mg/L	0.05	N.S	N.D
16.	Aluminium (Al)	APHA 3111 / 3120 B	mg/L	0.1	≤ 0.2	N.D
17.	Antimony (Sb)	APHA 3111 / 3120 B	mg/L	0.005	≤ 0.005	N.D
18.	Arsenic (As)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	0.013
19.	Barium (Ba)	APHA 3111 / 3120 B	mg/L	0.1	0.7	N.D
20.	Boron (B)	APHA 3111 / 3120 B	mg/L	0.1	0.3	0.25
21.	Cadmium (Cd)	APHA 3111 / 3120 B	mg/L	0.003	0.01	N.D



REPORT NUMBER: PI-01520-23 A

Sr.#	Parameter	Method	Unit	MDL	PEQS Limit	Results
22.	Chromium (Cr)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
23.	Copper (Cu)	APHA 3111 / 3120 B	mg/L	0.5	2.0	N.D
24.	Iron (Fe)	APHA 3111 / 3120 B	mg/L	0.1	8.0	0.13
25.	Lead (Pb)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.05	N.D
26.	Manganese (Mn)	APHA 3111 / 3120 B	mg/L	0.1	≤ 0.5	N.D
27.	Mercury (Hg)	APHA 3112 / 3120 B	mg/L	0.001	≤ 0.001	N.D
28.	Nickel (Ni)	APHA 3111 / 3120 B	mg/L	0.01	≤ 0.02	N.D
29.	Zinc (Zn)	APHA 3111 / 3120 B	mg/L	0.5	5.0	N.D
30.	Selenium (Se)	APHA 3111 / 3120 B	mg/L	0.005	0.01	N.D
31.	Sodium (Na)	APHA 3111 / 3120 B	mg/L	1.0	N.S	137.5
32.	Potassium (K)	APHA 3111 / 3120 B	mg/L	1.0	N.S	7.9
33.	Total Coliform	APHA 9222 B	cfu/100mL	-	Absent	03
34.	Fecal E. coli	APHA 9222 D	cfu/100mL	-	Absent	Absent
35.	Fecal Streptococci / Enterococci	APHA 9230 C	cfu/100mL	-	Absent	Absent
36.	Chemical Oxygen Demand (COD)	APHA 5220 D	mg/L	5.0	N.S	17
37.	Biochemical Oxygen Demand (BOD <sub>5</sub> )	APHA 5210 B	mg/L	5.0	N.S	06

**Note:**

- PEQS = Punjab Environmental Quality Standards  
MDL = Method Detection Limit  
mg/L = milligram per liter  
APHA = American Public Health Association  
N.D = Not Detected  
N.S = Not Specified

- Report has been issued for client's self-reference only.
- Report is not Valid for any Court / Negotiations
- Uncertainty of the parameters and laboratory conditions at the time of analysis can be provided as per client's requirement.
- The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%.
- Other Terms and Conditions are mentioned overleaf.

# **Annexure IV**

## **Punjab Environmental Quality Standards**

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



# The Punjab Gazette

PUBLISHED BY AUTHORITY

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LAHORE MONDAY AUGUST 15, 2016

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**GOVERNMENT OF THE PUNJAB  
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION  
(122 of 2016)**

12<sup>th</sup> August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Ambient Air is published for general information:

---

**DR SYED ABUL HASSAN NAJMEE**

Secretary  
Government of the Punjab  
Law and Parliamentary Affairs  
Department

**Government of the Punjab  
Environment Protection Department**

**NOTIFICATION: No. SO(G)/EPD/7-24/2013.** - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Ambient Air:

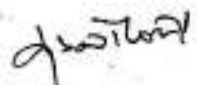
**Punjab Environmental Quality Standards for Ambient Air**

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide (SO <sub>2</sub> )	Annual Average*	80 µg/m <sup>3</sup>	Ultraviolet Fluorescence method
	24 hours**	120 µg/m <sup>3</sup>	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m <sup>3</sup>	Gas Phase Chemiluminescence
	24 hours**	40 µg/m <sup>3</sup>	
Oxides of Nitrogen as (NO <sub>2</sub> )	Annual Average*	40 µg/m <sup>3</sup>	Gas Phase Chemiluminescence
	24 hours**	80 µg/m <sup>3</sup>	
Ozone (O <sub>3</sub> )	1 hour	130 µg/m <sup>3</sup>	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m <sup>3</sup>	High Volume Sampling, (Average flow rate not less than 1.1 m <sup>3</sup> /min).
	24 hours**	500 µg/m <sup>3</sup>	
Respirable Particulate Matter PM <sub>10</sub>	Annual Average*	120 µg/m <sup>3</sup>	Preferably β-Ray absorption method
	24 hours**	150 µg/m <sup>3</sup>	
Respirable Particulate Matter PM <sub>2.5</sub>	Annual Average*	15 µg/m <sup>3</sup>	Preferably β-Ray absorption method
	24 hours**	35 µg/m <sup>3</sup>	

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	1 hour	15 $\mu\text{g}/\text{m}^3$	
Lead (Pb)	Annual Average*	1 $\mu\text{g}/\text{m}^3$	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 $\mu\text{g}/\text{m}^3$	
Carbon Monoxide (CO)	8 hours**	5 $\text{mg}/\text{m}^3$	Non Dispersive Infra Red (NDIR) method
	1 hour	10 $\text{mg}/\text{m}^3$	

\* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

\*\* 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

  
 (IQBAL MOHAMMED CHAUHAN)  
 Secretary, Government of the Punjab  
 Environment Protection Department

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



# The Punjab Gazette

PUBLISHED BY AUTHORITY

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LAHORE MONDAY AUGUST 15, 2016.

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**GOVERNMENT OF THE PUNJAB  
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION  
(121 of 2016)**

12<sup>th</sup> August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Noise is published for general information:

---

**DR SYED ABUL HASSAN NAJMEE**  
Secretary  
Government of the Punjab  
Law and Parliamentary Affairs  
Department

**Government of the Punjab  
Environment Protection Department**

**NOTIFICATION:** No. SO(G)/EPD/7-26/2013. In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Noise:

**Punjab Environment Quality Standards for Noise**

No.	Category of Area/Zone	Effective from 1 <sup>st</sup> July, 2010		Effective from 1 <sup>st</sup> July, 2013	
		Limits in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Day time hours; 6:00am to 10:00pm.
2. Night Time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospital, educational institutions and courts
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority

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

*(Signature)*  
(IQBAL MOHAMMED CHAUHAN)  
Secretary, Government of the Punjab  
Environment Protection Department

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532



# The Punjab Gazette

PUBLISHED BY AUTHORITY

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LAHORE MONDAY AUGUST 15, 2016

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**GOVERNMENT OF THE PUNJAB  
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT**

**NOTIFICATION  
(124 of 2016)**

12<sup>th</sup> August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Drinking Water is published for general information:

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**DR SYED ABUL HASSAN NAJMEE**  
Secretary  
Government of the Punjab  
Law and Parliamentary Affairs  
Department

**Government of the Punjab  
Environment Protection Department**

**NOTIFICATION: No. SO(G)/EPD/7-26/2013** - In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Drinking Water:

**Punjab Environmental Quality Standards for Drinking Water**

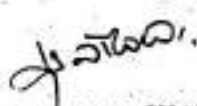
Properties/Parameters	Standard Values	WHO Standards	Remarks
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Most Asian countries also follow WHO standards
Colour	≤15 TCU	≤15 TCU	
Taste	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Odour	Non objectionable/ Acceptable	Non objectionable/ Acceptable	
Turbidity	<5 NTU	<5 NTU	

Properties/Parameters	Standard Values	WHO Standards	Remarks
Total hardness as CaCO <sub>3</sub>	< 500 mg/l	---	
TDS	<1000	<1000	
pH	6.5 - 8.5	6.5 - 8.5	
<b>Essential Inorganic</b>			
	mg/Litre	mg/Litre	
Aluminum (Al) mg/l	≤0.2	0.2	
Antimony (Sb)	≤0.005 (P)	0.02	
Arsenic (As)	≤0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	<250	250	
Chromium (Cr)	≤0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	mg/l	mg/l	
Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤1.5	1.5	
Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤0.001	0.001	
Nickel (Ni)	≤0.02	0.02	
Nitrate (NO <sub>3</sub> )*	≤50	50	
Nitrite (NO <sub>2</sub> )*	≤3 (P)	3	
Selenium (Se)	0.01(P)	0.01	

Properties/Parameters	Standard Values	WHO Standards	Remarks
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source		
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
<b>Organic</b>			
Pesticides mg/l			PSQCA No. 4639- 2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.**
Phenolic compounds (as Phenols) mg/l		<del>0.01</del>	
Poly-nuclear aromatic hydrocarbons (as PAHs) g/l		0.01 (By GC/MS method)	
<del>Radioactive</del>			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

\* Indicates priority health related inorganic constituents, which need regular monitoring.

\*\* PSQCA: Pakistan Standards Quality Control Authority.

  
(IQBAL MOHAMMED CHAUHAN)  
Secretary, Government of the Punjab  
Environment Protection Department

# **Annexure V**

## **Tti-SES&L Certifications**



**ENVIRONMENT PROTECTION DEPARTMENT**  
Government of the Punjab  
National Hockey Stadium, Lahore.



**CERTIFICATION AS AN ENVIRONMENTAL LABORATORY**

In exercise of power conferred by clause (k) of sub section (1) of section 6 of the Punjab Environmental Protection Act 1997 (XXXIV of 1997), the Provincial Agency is pleased to certify the laboratory mentioned below as an Environmental Laboratory, for conducting tests and analysis.

Name: - TTI Testing Laboratories

Address: - 347/S. Quaid-e-Azam Industrial Estate, Lahore.

Certificate No. 21/DD (Lab)/EPA/2021

1. This certification is valid as described below subject to fulfillment to the conditions of certification placed at **Annex-C**:
  - (a) Municipal & Liquid Industrial Effluents as per **Annexure-A**.
  - (b) Drinking Water Quality as per **Annexure-B**.
2. This certification is subject to the conditions laid down in regulation 9 of the Certification of Environmental Laboratories Regulations, 2000 and QA/QC conditions contained in **Annex-C**.
3. This certificate is valid until 03/02/2025 unless earlier suspended or revoked.

Dated 04/02/2022

*3. Jafri*  
Director General

*Fm*  
*Fair* *DMU*



# Pakistan National Accreditation Council

Ministry of Science & Technology  
Government of Pakistan  
Islamabad



## *Certificate of Accreditation*

is awarded to

**Tti Testing Laboratories**  
**(Textile Testing International)**  
**347-S, Quid-e-Azam Industrial Estate, Kot Lakhpat**  
**Lahore-54770-Pakistan**

in accordance with the requirements of **ISO/IEC 17025:2017**  
The accreditation is subject to regular surveillance and compliance  
to the requirements of PNAC

For scope of accreditation, see Appendix

**Accreditation Certificate Number: LAB 022**

Date of Issue:  
09-08-2021

  
**Director General**

Valid until  
08-08-2024



**Pakistan National Accreditation Council**  
Ministry of Science & Technology  
Government of Pakistan  
Islamabad



## *Certificate of Accreditation*

is awarded to

**Tti - Inspection (Pvt.) Limited,**  
347-S, Quaid-e-Azam Industrial Estate, Kot lakhpat  
Lahore-54770-Pakistan

in accordance with the requirements of **ISO/IEC 17020:2012**  
The accreditation is subject to regular surveillance and compliance  
to the requirements of PNAC  
For scope of accreditation, see Appendix

**Accreditation Certificate Number: IB 006**



Date of Issue:  
13-09-2021

Valid until  
12-09-2024

  
**Director General**



# ENVIRONMENT PROTECTION DEPARTMENT

Government of the Punjab  
National Hockey Stadium, Lahore.



## CERTIFICATION AS AN ENVIRONMENTAL LABORATORY

In exercise of power conferred by clause (K) of sub section (1) of section 6 of the Punjab environmental protection Act 1997 (XXXIV of 1997). The provincial agency is pleased to certify the laboratory mentioned below as an environmental laboratory.

**Name:** Sustainable Environmental Services & Laboratory  
**Address:** Office No. 4, 3rd Floor, Amana Tower, 1-C-P-III, PECO Road, Lahore

**Certificate No.** 177 /DD(Lab)/EPA/ 06/2019

1. This certification is valid for:
  - a) Liquid effluents/wastes as per Annexure - A
  - b) Drinking water quality as per Annexure - B
  - c) Industrial gaseous Emissions as per Annexure - C
  - d) Ambient air quality as per Annexure -D
  - e) Motor vehicle exhaust and noise (in use vehicle) as per Annexure - E
  - f) Subject to fulfillment of conditions of certificate as per Annexure - F
2. This certification is subject to the conditions laid down in regulation 9 of the National environmental quality Standards (Certification of Environmental Laboratories) Regulations, 1999.
3. This certificate is valid until 17.06.2022 unless earlier suspended or revoked.

Dated: 17.06.2019

  
Director General

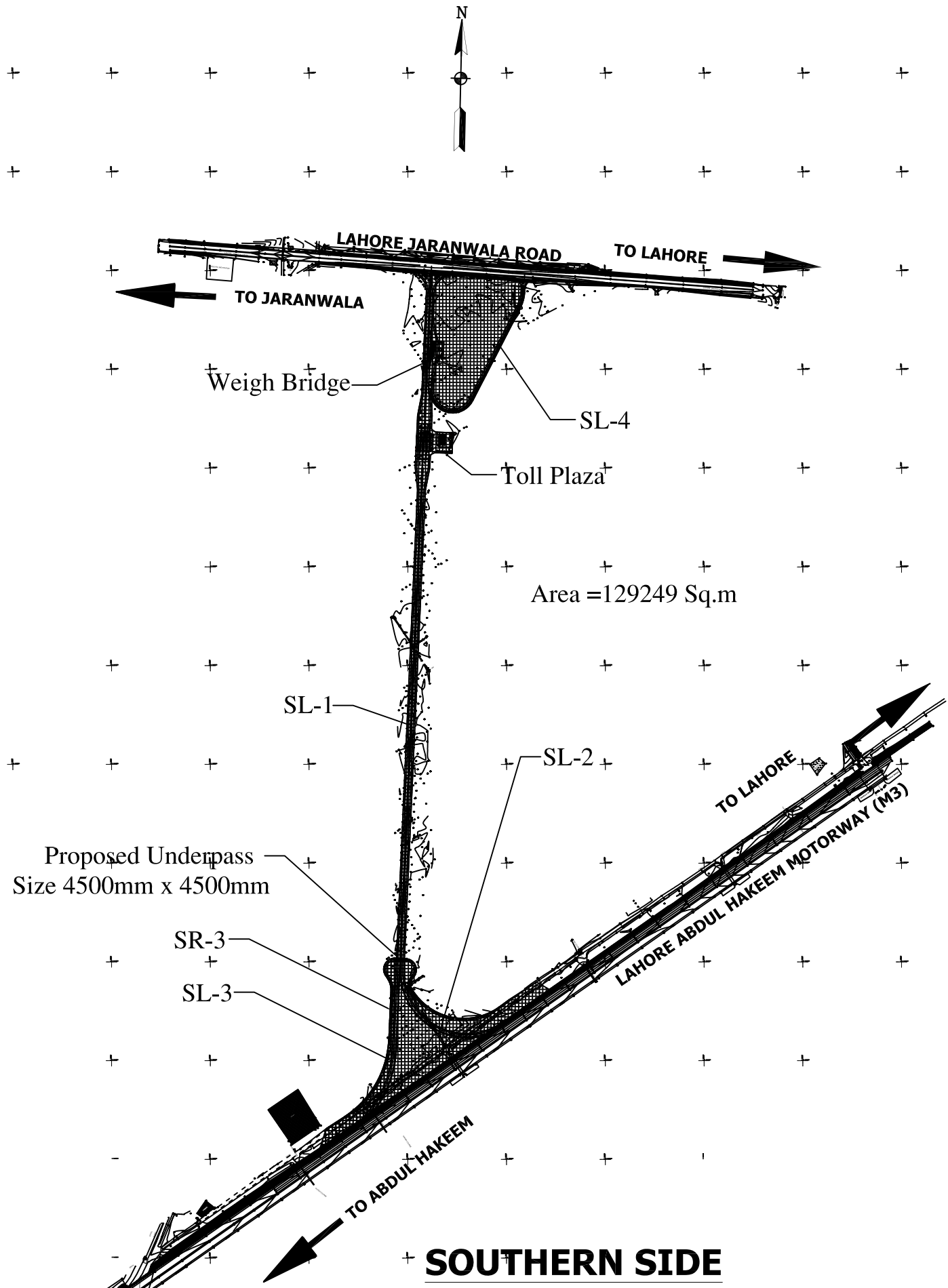
*Received*  
*18/06/2019*  
*187/2019*  
*187/2019*  
*187/2019*

# **Annexure VI**

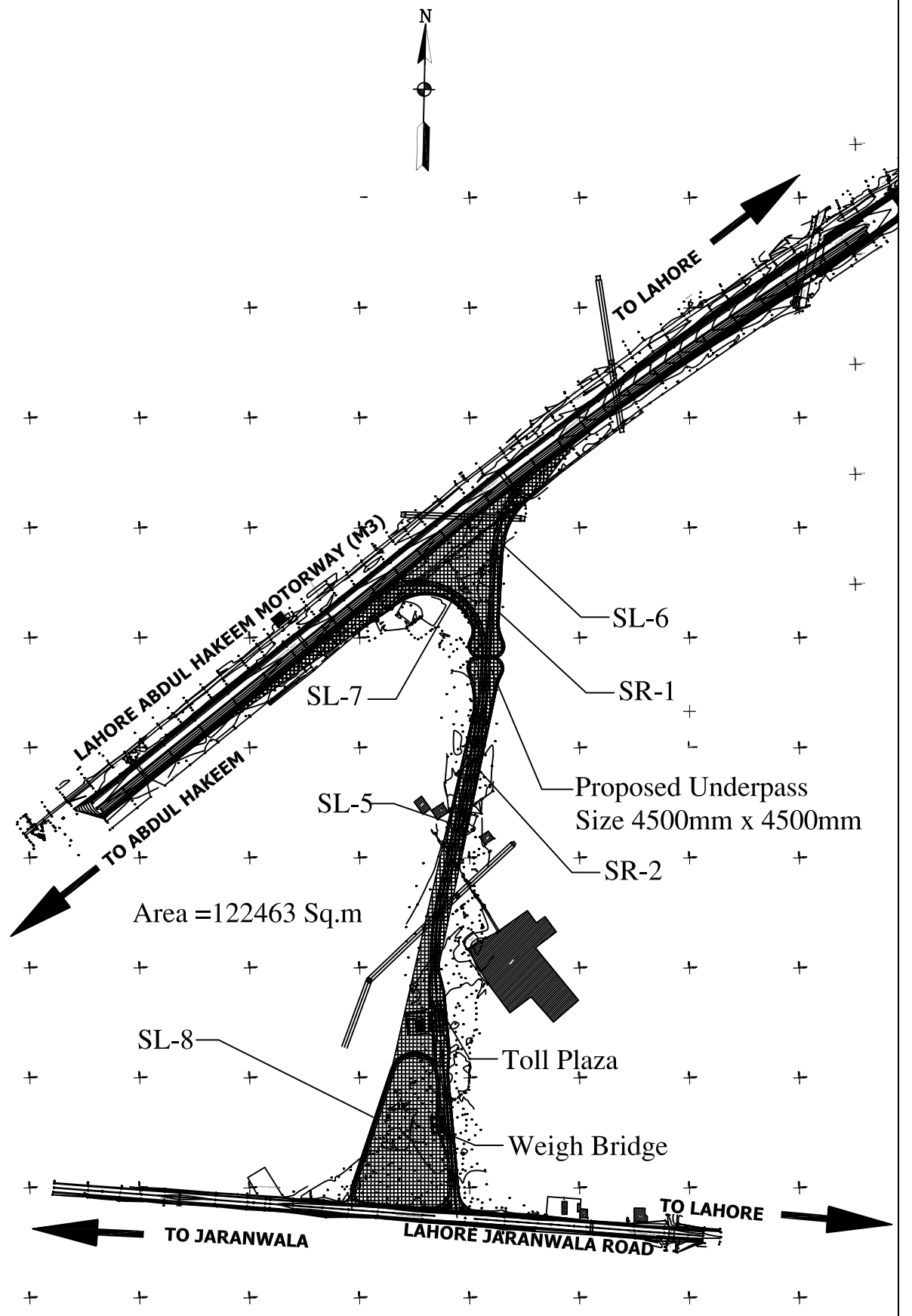
## **List of Land Acquisition Areas & Utilities**

LIST OF LAND ACQUISITION			
Sr. No.	Location	Description	Area (Sq-m)
1	Southern side	Total Land acquisition	129249
2	Northern side	Total Land acquisition	122463
<b>Total Sq - meter</b>			<b>251712</b>
<b>Total Acre</b>			<b>62.2</b>

LIST OF UTILITIES			
Sr. No.	Chainage	Utilities	Location
1	0+402 (SL-5) (Northern side)	Electric Pole	L/S
2	0+356 (SL-5) (Northern side)	Electric Pole	L/S
3	1+174 (SL-1) (Southern side)	Electric Pole	L/S
4	0+092 (SL-4) (Southern side)	Tube-Well	Centre



**SOUTHERN SIDE**



**NORTHERN SIDE**

04					DRAWN
03					SUBMITTED
02					RECOMMENDED
01					CHD./VER.
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

TITLE		SCALE
LAND ACQUISITION PLAN		
DATE	DWG. NO.	SHEET NO.
SEPTEMBER, 2023	68/LAQP/01	01

# **Annexure VII**

## **Raw Material Quantities Wastage**

### Quantities for Work Plan

Item Description	Course Aggregate	Bitumen	O.P Cement	Sand
Subbase	20,459			
Aggregate Base	25,280			
Asphalt Base Course				
Triple Surface Treatment		156,148		
Concrete	2362		590	1,181
<b>Units</b>	<b>m<sup>3</sup></b>			

Subbase		
As		
<b>Quantity of Aggregate</b>	20,459	m <sup>3</sup>
Construction period for Sub base	12	months
material used for 1 day	56.8301	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	3	m <sup>3</sup> /day

Aggregate Base Course		
As		
<b>Quantity of Aggregate</b>	25,280	m <sup>3</sup>
Construction period for Aggregate Base	12	months
material used for 1 day	70.2213	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	4	m <sup>3</sup> /day

Triple Surface Treatment		
As		
<b>Quantity of Bitumen</b>	156,148	m <sup>3</sup>
Construction period for TST	12	months
material used for 1 day	433.7444	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	21.69	m <sup>3</sup> /day

Concrete		
As		
<b>Quantity of Aggregate in Concrete</b>	2,362	m <sup>3</sup>
Construction period for Concrete	12	months
material used for 1 day	6.5603	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	0	m <sup>3</sup> /day

Concrete		
As		
Quantity of <b>Cement</b> in Concrete	590	m <sup>3</sup>
Construction period for Concrete	12	months
material used for 1 day	1.6401	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	0.08	m <sup>3</sup> /day

Concrete		
As		
Quantity of <b>Sand</b> in Concrete	1,181	m <sup>3</sup>
Construction period for Concrete	12	months
material used for 1 day	3.2802	m <sup>3</sup> /day
% of material wasted in 1 day	5	%
material wasted for 1 day	0	m <sup>3</sup> /day

# **Annexure VIII**

## **Social Survey Form**

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Hikmat Ali Contact #/ CNIC 0315-2652316  
2. Address Chak NO 584, G/B Athwal, Tehsil Jaran wala district  
Faisalabad  
3. Age 57  
4. Education Under primary  
5. Marital Status  Married  Single  
6. If married, No. of children 07  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 46,000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Hospital in this area, 1 hospital is at  
distance  
12. How many schools and colleges are present in the area?  
1 of Govt Boys Primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes / my friend  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial for locals  
15. What do you think would be the positive/ negative effects of the Project?  
Save, Positive effects both as employment, time and money  
Business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By:

Shulam Habib

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Kamran Zaman Contact #/ CNIC 0312-7521412  
2. Address Chak No 229 GB Faisalpur, Tehsil Jaran  
wala, Faisalabad district  
3. Age 34  
4. Education Primary  
5. Marital Status  
 Married  Single  
6. If married, No. of children 03  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 21500/Local labor  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Hospital in located area only a private  
clinic but not open properly all the time  
12. How many schools and colleges are present in the area?  
03 schools, 01 Girls Govt Primary school, 01 Elementary boys  
school, 1 private school and 02 mosque

Project Information

13. Do you know about this project? How were you informed?  
yes / Team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
yes it should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
positive effects, Employment, Easy approach to motor  
way for approaching other cities, Agribusiness activities enhance  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By:

Farhad Ahmad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Schail Kamboh Contact #/ CNIC 0332-3251342  
2. Address Chak No 229 GB, Fazalpur, Tehsil Jaranwala, District Faisalabad  
3. Age 44  
4. Education Primary  
5. Marital Status  Married  Single  
6. If married, No. of children 05  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 22,500 / local labor  
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only a private clinic but not permanent  
openly  
12. How many schools and colleges are present in the area?  
01 Elementary school for boys, 01 GG Primary school  
01 private academy and school

Project Information

13. Do you know about this project? How were you informed?  
yes / my friend informed me  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
positive effects. easy approach to citiel. Employment opportunities. Agri business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO  
17. Would you like to add anything else?  
No

Interviewed By: Saad Shahid

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ilyas Dawood Contact #/ CNIC 0331-7331871
2. Address Chok 273 GB Anwana, Tehsil Jaranwala District  
Faisalabad
3. Age 45
4. Education Primary
5. Marital Status  
 Married  Single
6. If married, No. of children 04
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 22,000 / Local labor
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
0 Hospital out 10 than distance, THQ
12. How many schools and colleges are present in the area?  
01 Girls primary school, 01 Boys primary school, 01  
Govt Girls Elementary school

Project Information

13. Do you know about this project? How were you informed?  
No
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive impacts such as Time and money saving project  
productivity activities increased. Education and Health sector will be  
Improved
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammad Shahid Contact #/ CNIC 0309-2353609  
2. Address Chak No 277, Kharian, Tehsil Jaranwala  
District Faisalabad  
3. Age 40  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 03  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 21,000 / Local labor  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Hospital, 01 Hospital at 10 km distance THQ  
12. How many schools and colleges are present in the area?  
01 Govt Boys Primary school and 02 mosques

Project Information

13. Do you know about this project? How were you informed?  
yes / A team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied.  
15. What do you think would be the positive/negative effects of the Project?  
Positive effects, like employments, Easy approach to  
cities, Business activities increased  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Saad Shahid

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Umey Hayat Contact #/ CNIC 0322-7292201  
2. Address Chak No 376 G.B. Chaunjab, Tehsil Jaran wala  
District Faisalabad  
3. Age 32  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 03  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 23000 / Shopkeeper  
10. Is there any family member suffering from some disease?  
Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Hospital, Hospital is at some distance  
12. How many schools and colleges are present in the area?  
01 Govt Boys High school, 01 Govt Girls High school  
01 Girls Elementary School

Project Information

13. Do you know about this project? How were you informed?  
Yes / Team came for survey already  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects such as employment, Easy approach  
To cities, Agri-business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammad Awaiz Contact #/ CNIC 0312-3591113  
2. Address Chak NO 375, GB Jannah, Tehsil Jannah, District Faisalabad  
3. Age 23  
4. Education B.S (Hons)  
5. Marital Status  
 Married  Single  
6. If married, No. of children \_\_\_\_\_  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 37,000 / student  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Hospital
12. How many schools and colleges are present in the area?  
01 Govt Boys primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes / team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive impacts such as Employment, Time and money saving project. Students will use local transport. Education and Health status will be improve
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) M. Awaiz

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Kaliam Contact #/ CNIC 0312-2712527  
2. Address Chak No 273, Arbana, Tehsil Jaranwala, District Faisalabad  
3. Age 28  
4. Education Primary  
5. Marital Status  
 Married  Single  
6. If married, No. of children 02  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 150,000 / local labor  
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 hospital at some distance THQ.  
12. How many schools and colleges are present in the area?  
01 Govt Boys primary school, 01 Govt Boys primary school  
01 Govt Girls Elementary school

Project Information

13. Do you know about this project? How were you informed?  
yes / my Brother informed me  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
positive effects such as employment, agribusiness activities  
easy approach to cities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ghulam Ali Contact #/ CNIC 0315-6512423  
2. Address Chak no. 380QB, Tehsil Jaran wala district  
Faisalabad  
3. Age 50  
4. Education Primary  
5. Marital Status  
 Married  Single  
6. If married, No. of children 05  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 21500 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital T.H.C Jandianwala nearest  
12. How many schools and colleges are present in the area?  
01 Govt Boys primary school, 03 mosque

Project Information

13. Do you know about this project? How were you informed?  
N/A  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied, Beneficial for locals  
15. What do you think would be the positive/ negative effects of the Project?  
Positive impacts, Employment, Education and Health status will be improve, Business activities increased  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammad Anwar Contact #/ CNIC 0331-8640302  
2. Address Chak 378 GB, Tehsil Jaranwala district  
Faisalabad  
3. Age 42  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 04  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 25000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital near, THQ Jandianwala  
12. How many schools and colleges are present in the area?  
01 Govt Boys High school, 01 private school and academy, 01 mosque

Project Information

13. Do you know about this project? How were you informed?  
yes / my brother  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied, Good for locals  
15. What do you think would be the positive/ negative effects of the Project?  
Health and education. Employment  
Positive impacts such as business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By:

Ghulam Habib

Sign of Person (Interviewed)

محمد انور

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Rizwan Nadeem Contact #/ CNIC 0  
2. Address Chak 653 G.R, Kot Shahdat Khan, Tehsil Jaranwala, District Faisalabad  
3. Age 38  
4. Education Matric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 02  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 32,000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Nearest Hospital Tandianwala THA will be approached in case of emergency  
12. How many schools and colleges are present in the area?  
01 Govt Boys Primary school, 02 madrasa

Project Information

13. Do you know about this project? How were you informed?  
yes / my friend  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
Positive Impacts like employment, Time and money saving  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) Rizwan Nadeem

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Larab Arshad Contact #/ CNIC 0300-6516317  
2. Address Chak 631 G.B. Rangali, Jaranwala, Faisalabad  
3. Age 22  
4. Education Intermediate (B.S Hon) continue  
5. Marital Status  
 Married  Single  
6. If married, No. of children 00  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 35,000 / Student / pedestrian  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
No Nearest hospital, only BHU Lundian is nearest  
12. How many schools and colleges are present in the area?  
0 Govt Girls primary school

Project Information

13. Do you know about this project? How were you informed?  
yes / Team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects, such as employment, Easy approach to cities, Education status will be improved and Revenue enhance project  
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO  
17. Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) Larab Arshad

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Armin Akram Contact #/ CNIC 0345-7204212  
2. Address Chak # 384, G.B Chakko - Tehsil Jaranwala  
District Faisalabad  
3. Age 18  
4. Education FSC  
5. Marital Status  
 Married  Single  
6. If married, No. of children NO  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 35,000/- Student  
10. Is there any family member suffering from some disease?  
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest area THO, Tandiawala.  
12. How many schools and colleges are present in the area?  
1 Govt Boys Primary School,

Project Information

13. Do you know about this project? How were you informed?  
Yes, I know about this project through a relative.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
This is a good project, must be implemented.  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effect will be the better transportation facilities for the locals.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
Noise and dust pollution due to construction.  
17. Would you like to add anything else?  
NO.

Interviewed By: Saad Shahid

Sign of Person (Interviewed) Armin Akram

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Hamid Naveem Contact #/ CNIC 0345-3204225  
2. Address Chak NO 384, 4B Chaku. Tehsil Jaranwala  
District Faisalabad  
3. Age 33  
4. Education Matric.  
5. Marital Status  
 Married  Single  
6. If married, No. of children 3  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 30,000/- shop keeper  
10. Is there any family member suffering from some disease?  
No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
1 Govt Hospital.  
12. How many schools and colleges are present in the area?  
1 Govt Boys Primary school.

Project Information

13. Do you know about this project? How were you informed?  
Yes, I know about this project through a relative.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It is a good project, it must be applied.  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects would be better transportation for the locals.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
Dust and noise pollution will be an issue.  
17. Would you like to add anything else?  
NO

Interviewed By: Humaira

Sign of Person (Interviewed) Humaira

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Asmat Duan Contact #/ CNIC 0331-2645214  
2. Address Chak # 374, GB Atkama, Tehsil Jaranwala  
District Faisalabad  
3. Age 30.  
4. Education Matric.  
5. Marital Status  
 Married  Single  
6. If married, No. of children 2.  
7. Religion Islam.  
8. No. of earning members in family 01  
9. Total income/ occupation 30,000/- / Farmer  
10. Is there any family member suffering from some disease?  
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest Area THO, Tandianwala.  
12. How many schools and colleges are present in the area?  
1 Govt Boys high school, 2- one private school.

Project Information

13. Do you know about this project? How were you informed?  
Yes, I know about the project, a friend told me about it.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It is a good project, it must be applied.  
15. What do you think would be the positive/ negative effects of the Project?  
Job opportunities will increase due to the construction of the road.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
Pollution Load will increase / noise / dust pollution will increase.  
due to construction of the road.  
17. Would you like to add anything else?  
NO.

Interviewed By: Saad Shalish.

Sign of Person (Interviewed) Asmat Duan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Habib Ahmad Contact #/ CNIC 0312-3545225  
2. Address Chok # 374, GB Arkana • Tehsil Jaranwala  
District Faisalabad  
3. Age 18  
4. Education FSc.  
5. Marital Status  
 Married  Single  
6. If married, No. of children Nil  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 33,000/- Student  
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest Atco THQ, Tandianwala.  
12. How many schools and colleges are present in the area?  
1. Govt Boys high school. 2. one Private school.

Project Information

13. Do you know about this project? How were you informed?  
yes, I know about the project through a friend.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
This a good project, the condition of the area will improve.  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effect will be the job opportunity for the locals during construction  
16. What will be the Health and Safety Issue due to this project in your point of view?  
Noise pollution/ Smoke emission will be the health issues during construction phase.  
17. Would you like to add anything else?  
NO

Interviewed By:

Saad Shahid

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Akmal Najeeb Contact #/ CNIC 03014055247  
 2. Address Chak # 381, GB, Tehsil Jaran wala, District  
Faisalabad  
 3. Age 33  
 4. Education Matric.  
 5. Marital Status  
 Married 3  Single  
 6. If married, No. of children  
 7. Religion Islam.  
 8. No. of earning members in family 01  
 9. Total income/ occupation 30,000/- Labor  
 10. Is there any family member suffering from some disease?  
No.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest From THQ, Tandianwala.  
 12. How many schools and colleges are present in the area?  
1 Govt Boys Primary School.

Project Information

13. Do you know about this project? How were you informed?  
Yes, I know about the project through local.  
 14. What do you think about the Project? Do you think it should be applied? Why, why not?  
Yes it is a good project must be applied.  
 15. What do you think would be the positive/ negative effects of the Project?  
Positive effect will be the better transportation facilities.  
 16. What will be the Health and Safety Issue due to this project in your point of view?  
Health issues like difficulties breathing and hearing issue many arise from the noise from construction of the Road.  
 17. Would you like to add anything else?  
NO

Interviewed By: Saad Shahid.

Sign of Person (Interviewed): [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Usman Ashraf Contact #/ CNIC 03014041575  
2. Address Chak No 628, G.B Pathan Kot, Jaran wala  
Faishabad  
3. Age 21  
4. Education Intermediate  
5. Marital Status  
 Married  Single  
6. If married, No. of children \_\_\_\_\_  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 26,000 / Student  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital BHU Lodian at 5km distance  
12. How many schools and colleges are present in the area?  
01 Govt Boys Primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes / Team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects such as employments, Time and money  
Saving project  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) U Ashraf

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ghulam Abbas Contact #/ CNIC 0301-4045575  
2. Address Chak 628 GB Pathan Kot, Jaran wala  
District Faisalabad  
3. Age 25  
4. Education M.A education  
5. Marital Status  
 Married  Single  
6. If married, No. of children \_\_\_\_\_  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 55,000 / Student  
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only one BHU Hospital Lundian is nearest  
12. How many schools and colleges are present in the area?  
01 Boys Primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes / My Father  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied  
15. What do you think would be the positive/negative effects of the Project?  
Positive effects Education and Health status will improve  
Easy approach to cities, Time and money saving, Business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Fahad Ahmad

Sign of Person (Interviewed)

Ghulam

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Asif Irshad Contact #/ CNIC 03403803135  
2. Address Chak No 570 GB Kundian, Jaran wala  
District Faisalabad  
3. Age 48  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 03  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 24000 Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital BHU Nearest  
12. How many schools and colleges are present in the area?  
01 Girls Govt Primary school, 01 Govt Boys Primary School

Project Information

13. Do you know about this project? How were you informed?  
Yes / A Team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / Beneficial For us  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects such as employment, Business activities.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad Ahmad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ajmal Khalid Contact #/ CNIC 0346-4481789  
2. Address Chak No. 570 GB, Kundian, Jaran wala  
District Faisalabad  
3. Age 46  
4. Education Matric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 04  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 27,000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 BHU Kundian nearest Hospital  
12. How many schools and colleges are present in the area?  
01 Girls Primary School, 01 Boys Primary School

Project Information

13. Do you know about this project? How were you informed?  
Yes/ My Uncle  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / Beneficial  
15. What do you think would be the positive/negative effects of the Project?  
Positive effects like employment, Time and money saving of business activities enhance  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad Ahmad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Atta Muhammad Contact #/ CNIC 0332-4556322  
2. Address Chak NO 275 GB, Tehsil Jaranwala, District Faisalabad  
3. Age 30  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children NO  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 38000/- | Farmer  
10. Is there any family member suffering from some disease?  
Yes, Sugar disease in family.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only one BHO Hospital.
12. How many schools and colleges are present in the area?  
01 Govt girls High school, 01 Boys High school 03 Masjid.

Project Information

13. Do you know about this project? How were you informed?  
Yes / A team came for survey.
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied beneficial for the community.
15. What do you think would be the positive/negative effects of the Project?  
positive effects will be better opportunity for Jobs.
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
NO

Interviewed By:

Azmat & Magsood

Sign of Person (Interviewed)

Sik

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Mamzoor Botta. Contact #/ CNIC \_\_\_\_\_
2. Address Lundianwala, Jaranwala Faisalabad.
3. Age 33.
4. Education Matric.
5. Marital Status  Married  Single
6. If married, No. of children 03.
7. Religion Islam.
8. No. of earning members in family 01
9. Total income/ occupation 35,000/- Farmer
10. Is there any family member suffering from some disease?  
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only 01 Bhu Hospital.
12. How many schools and colleges are present in the area?  
01 Govt girls High School, 01 Boys High School 03 Madaris.

Project Information

13. Do you know about this project? How were you informed?  
Yes A team came for survey.
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It is a beneficial Project should be applied.
15. What do you think would be the positive/ negative effects of the Project?  
Employment, connected to other cities of Punjab.
16. What will be the Health and Safety Issue due to this project in your point of view?  
\_\_\_\_\_
17. Would you like to add anything else?  
Good Taxi should be made for local transporters.

Interviewed By

Fahad Ahmad.

Sign of Person (Interviewed)

Mamzoor

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Mubeen Shaukat Contact #/ CNIC \_\_\_\_\_  
2. Address Lundianwala Jaranwala, Faisalabad.  
3. Age 35.  
4. Education Matric  
5. Marital Status  
 Married 03.  Single  
6. If married, No. of children \_\_\_\_\_  
7. Religion Islam.  
8. No. of earning members in family 01  
9. Total income/ occupation 35,000/- Shopkeeper  
10. Is there any family member suffering from some disease?  
NO.

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only one BHU Hospital.  
12. How many schools and colleges are present in the area?  
01 Govt Girls High School, 01 Boys High School, 1 Masjid

Project Information

13. Do you know about this project? How were you informed?  
Yes / A team came for survey.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / It is beneficial for the community.  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects such as employment, connected to other cities of Punjab.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
Noise Pollution.  
17. Would you like to add anything else?  
Toll Tax should be reduce for local transporters.

Interviewed By:

Fahad Ahmad

Sign of Person (Interviewed)

Mubeen Shaukat

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Husnain Ijaz Contact #/ CNIC 0322-6180491  
2. Address Lurdian wala, Jaran wala, Faisalabad  
3. Age 38  
4. Education Matric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 03  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 35,000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
only one BHU Hospital  
12. How many schools and colleges are present in the area?  
01 Govt Girls High School, 01 Boys High School  
03 madrasa

Project Information

13. Do you know about this project? How were you informed?  
YES / A Team came for survey  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / Beneficial  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects such as employment, connected To other cities of Punjab.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
  
17. Would you like to add anything else?  
Toll Tax should be reduce for local Transporters

Interviewed By:

Farhad Ahmad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Iqbal Contact #/ CNIC \_\_\_\_\_
2. Address Chak no 628, Pathan wala, Lurdian, Tehsil Jaran wala, District Faisalabad
3. Age 45
4. Education Middle
5. Marital Status  
 Married  Single
6. If married, No. of children 02
7. Religion Islam
8. No. of earning members in family \_\_\_\_\_
9. Total income/ occupation 22000/ Farmer/Shopkeeper
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital near by area
12. How many schools and colleges are present in the area?  
One boys primary, 01 Girls primary

Project Information

13. Do you know about this project? How were you informed?  
Yes / Brother informed me
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied/ Beneficial project
15. What do you think would be the positive/ negative effects of the Project?  
Positive impacts/ Employment, JTI business activities increase
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Haji Fiaz Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 568 Balla Khel, Lundian, Tehsil Jaran Wala, Faisalabad
3. Age 45
4. Education Middle
5. Marital Status  
 Married  Single
6. If married, No. of children 03
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 40000 / Farmer
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest in this area
12. How many schools and colleges are present in the area?  
01 Govt Girls Primary School, Govt Girls Boys Primary School

Project Information

13. Do you know about this project? How were you informed?  
yes / My friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / Beneficial for locals
15. What do you think would be the positive/ negative effects of the Project?  
Positive Impacts - Employment. Time and money saving project. Business activities increased, Easy approach to cities
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed): Fiaz

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Fazal Din Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 508, Ballo Khet, Lundian, Tehsil  
Jaranwala, District Faisalabad
3. Age 35
4. Education Primary
5. Marital Status  
 Married  Single
6. If married, No. of children 02
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 15,000 / Farmer
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Neares at the distance of 10  
km approxi.
12. How many schools and colleges are present in the area?  
There are only one girls Primary School

Project Information

13. Do you know about this project? How were you informed?  
YES / A team come for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive Business activities Beneficial for Locals. Employment
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed): [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ghulam Mustafa Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 569, Abdullah wala, Lundian, Tehsil  
Taran wala, District Faisalabad
3. Age 32
4. Education F.A
5. Marital Status  
 Married  Single
6. If married, No. of children \_\_\_\_\_
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 20,000/Farmer
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest in this area
12. How many schools and colleges are present in the area?  
There are only Two Schools. Govt Girl's  
Primary school, Boys Primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes / Friend
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive Impacts / Employment, Easy approach to  
Cities, Agri-business activities
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed): G. Mustafa

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Shamshad Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 570, Lundian, Tehsil Jaran wala  
District Faisalabad
3. Age 48
4. Education Matric
5. Marital Status  
 Married  Single
6. If married, No. of children 03
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 45000/Farmer
10. Is there any family member suffering from some disease?  
Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest area
12. How many schools and colleges are present in the area?  
01 Primary School for girls, High School for boys and one High School for Girls

Project Information

13. Do you know about this project? How were you informed?  
Yes / My cousin
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
Positive. It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
positive impacts: Time and money saving  
Employment, Easy approach to city
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO
17. Would you like to add anything else?  
No

Interviewed By: Fahad

Sign of Person (Interviewed): M. Shamshad

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ali Haider Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 644, Ladian, Tehsil Jaran wala  
District Faisalabad
3. Age 25
4. Education Under Matric
5. Marital Status  
 Married  Single
6. If married, No. of children \_\_\_\_\_
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 22,000 / Shop keeper
10. Is there any family member suffering from some disease?  
B.P

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospitals Nearest this area
12. How many schools and colleges are present in the area?  
01 Girls Primary school and 01 Boys primary school in nearest area

Project Information

13. Do you know about this project? How were you informed?  
Yes/ Team already came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects: Employment opportunities, Easy approach to cities.
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Tariq Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 569 Abdullah wala, Lundian, Tehsil Jaran wala District Faisalabad
3. Age 39
4. Education Primary
5. Marital Status  
 Married  Single
6. If married, No. of children 01
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 18,000 / Driver
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 hospital at the distance of some KM
12. How many schools and colleges are present in the area?  
01 Girls primary school

Project Information

13. Do you know about this project? How were you informed?  
yes / My Brother
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
Positive effects. It should be applied. Beneficial for all
15. What do you think would be the positive/ negative effects of the Project?  
Positive effects, revenue enhanced, Employment opportunities  
Traffic will enhance and easy approach to cities
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By Ghulam Habib

Sign of Person (Interviewed) Tariq

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Irshad Hussain Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 569, Abdullah wala, Kundian Tehsil  
Jaran wala, district Faisalabad
3. Age 52
4. Education Primary
5. Marital Status  
 Married  Single
6. If married, No. of children 05
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 55,000 / Govt servant
10. Is there any family member suffering from some disease?  
Blood Pressure

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital
12. How many schools and colleges are present in the area?  
01 Girls primary school

Project Information

13. Do you know about this project? How were you informed?  
No
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
15. What do you think would be the positive/ negative effects of the Project?  
Positive Impacts, Beneficial for Locals, Employment  
Easy approach to cities
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) Irshad Hussain

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Ras Nawaz Contact #/CNIC 0321-9547262  
2. Address Chak No 643 C/B, Jaranwala District  
Faisalabad  
3. Age 40  
4. Education Primary  
5. Marital Status  Married  Single  
6. If married, No. of children 05  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 25,000 / Farmer  
10. Is there any family member suffering from some disease?

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
1 of hospital near ~~Area~~ Conclian wala. In exist location. no hospital  
12. How many schools and colleges are present in the area?  
1 of Govt Girls primary school

Project Information

13. Do you know about this project? How were you informed?  
yes / my brother  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied / beneficial  
15. What do you think would be the positive/ negative effects of the Project?  
positive impacts like Agri business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad Ahmad Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

- Name Tauqir Ahmad Contact #/ CNIC \_\_\_\_\_
- Address Chak No. 569, Abdullah wala, Lundian, Tehsil Jaran wala, District Faisalabad
- Age 24
- Education B.A
- Marital Status  
 Married  Single
- If married, No. of children \_\_\_\_\_
- Religion Islam
- No. of earning members in family 01
- Total income/ occupation 27,500 / Student
- Is there any family member suffering from some disease?  
No

Receptors Information

- How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest the area THQ out the some km distance
- How many schools and colleges are present in the area?  
01 Boys primary school and 01 Girls primary school

Project Information

- Do you know about this project? How were you informed?  
yes / my cousin
- What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied
- What do you think would be the positive/ negative effects of the Project?  
Positive effects, employment opportunities, Time and money saving project, Revenue enhance for country, Business activities.
- What will be the Health and Safety Issue due to this project in your point of view?  
No
- Would you like to add anything else?  
No

Interviewed By: Ghulam Habib

Sign of Person (Interviewed) توقیر احمد

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

- Name M. Arsalan Contact #/ CNIC \_\_\_\_\_
- Address Ghat no 508 Ballo Khel, Lundian, Tehsil Jaran wala, District Faisalabad
- Age 22
- Education Intermediate
- Marital Status  
 Married  Single
- If married, No. of children \_\_\_\_\_
- Religion Islam
- No. of earning members in family 01
- Total income/ occupation 33 000 / Student
- Is there any family member suffering from some disease?  
Diabetes

Receptors Information

- How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest in this area
- How many schools and colleges are present in the area?  
01 Boys Primary School

Project Information

- Do you know about this project? How were you informed?  
yes / A team came for survey already
- What do you think about the Project? Do you think it should be applied? Why, why not?  
Positive effect. Should be applied
- What do you think would be the positive/ negative effects of the Project?  
Positive effects, employment, Easy approach to cities, Time and money consuming, Local transport substance
- What will be the Health and Safety Issue due to this project in your point of view?  
No
- Would you like to add anything else?  
No

Interviewed By:

Fareed

Sign of Person (Interviewed)

M. Arsalan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Wijahat Ali Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 275, Tehsil Jaranwala, District Faisalabad
3. Age 22
4. Education F.A
5. Marital Status  
 Married  Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 30,000 / Student
10. Is there any family member suffering from some disease?  
Blood Pressure

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 Hospitals near this area, 01 clinic private.
12. How many schools and colleges are present in the area?  
01 Primary model school for girls and boys.

Project Information

13. Do you know about this project? How were you informed?  
NO.
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied, Beneficial for locals.
15. What do you think would be the positive/ negative effects of the Project?  
Positive impacts, Easy approach to cities - Time and money saving employment.
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO
17. Would you like to add anything else?  
NO

Interviewed By: Farhad

Sign of Person (Interviewed) Wajahat

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

- Name M. Abbas Ali Contact #/ CNIC 0302-6782435
- Address Chak No 363 G/B Moza Sial Tehsil Jaranwala District Faisalabad.
- Age 56
- Education NO
- Marital Status  
 Married  Single
- If married, No. of children 06
- Religion Islam
- No. of earning members in family 01
- Total income/ occupation Farmer
- Is there any family member suffering from some disease?  
NO

Receptors Information

- How many hospitals/ dispensaries are available in the area?  
03 hospitals including 01 private clinic
- How many schools and colleges are present in the area?  
05 Primary and High School including Private School

Project Information

- Do you know about this project? How were you informed?  
Yes/ Team came for Survey.
- What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be Applied. Beneficial for locals.
- What do you think would be the positive/ negative effects of the Project?  
Positive effect like Employment, Fuel Time and money saving. Agri-Bussines activities enhanced.
- What will be the Health and Safety Issue due to this project in your point of view?  
NO
- Would you like to add anything else?  
NO

Interviewed By: Fahad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Jahangir Contact #/ CNIC 0312 4042280  
2. Address Chak No 276, Tehsil Jaran wala, District Faisal abad  
3. Age 39  
4. Education Matric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 02  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 25,000 / Shop Keeper  
10. Is there any family member suffering from some disease?  
Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 Hospitals near this area, 01 clinic private  
12. How many schools and colleges are present in the area?  
01 primary model school for girls and boys

Project Information

13. Do you know about this project? How were you informed?  
No.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial for locals  
15. What do you think would be the positive/ negative effects of the Project?  
positive impacts, Easy approach to cities. Time and money saving, Employment  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Fas had

Sign of Person (Interviewed): Jahangir

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Sana Ullah Contact #/ CNIC 0346-7623659  
2. Address ghak No 275 GB Tahsil Jaran wala  
District Faisalabad  
3. Age 55  
4. Education Metric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 02  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 5500 Farmer / Shopkeeper  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 Hospitals Nearest this area  
12. How many schools and colleges are present in the area?  
03 schools primary and High School

Project Information

13. Do you know about this project? How were you informed?  
yes / my cousin

14. What do you think about the Project? Do you think it should be applied? Why, why not?

It should Applied. Beneficial for local populations

15. What do you think would be the positive/ negative effects of the Project?

positive Effect like employment and agribusiness activities enhance

16. What will be the Health and Safety Issue due to this project in your point of view?

No

17. Would you like to add anything else?

No

Interviewed By: Farhad

Sign of Person (Interviewed)

Sana Ullah

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Khizer Hayat Contact #/ CNIC 03453988275  
2. Address Chak No. 2469B Tehsil Jaranwala, District  
Faisalabad  
3. Age 30  
4. Education No  
5. Marital Status  
 Married  Single  
6. If married, No. of children 8  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 20,000 / Farmer  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital nearest this  
12. How many schools and colleges are present in the area?  
02 schools primary

Project Information

13. Do you know about this project? How were you informed?  
yes / my Brother  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial For us  
15. What do you think would be the positive/ negative effects of the Project?  
It should be positive effect. employment, agri business enhanced  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) خیزر

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Bilal Contact #/ CNIC 0348-8617275  
2. Address Chak No 36348 Thok sammi di, Tehsil Jaranwala, District Faisalabad  
3. Age 16  
4. Education U-Metric  
5. Marital Status  Married  Single  
6. If married, No. of children 00  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation 20K/ Farmer  
10. Is there any family member suffering from some disease?  
Faladge, Paralysis

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest this area  
12. How many schools and colleges are present in the area?  
02, 01 Govt girls primary and 01 Govt Boys Primary School

Project Information

13. Do you know about this project? How were you informed?  
Yes/ Here, Survey Team Came  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial for people  
15. What do you think would be the positive/ negative effects of the Project?  
Positive Effect like employment, Time Saving, money save  
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO  
17. Would you like to add anything else?  
NO

Interviewed By:

Farhad

Sign of Person (Interviewed)

Bilal

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Turan Contact #/ CNIC 0346 75 62 275  
 2. Address Chak No. 2 7680 Tehsil Jaran wala, District Faisalabad  
 3. Age 27  
 4. Education 05  
 5. Marital Status  Married  Single  
 6. If married, No. of children 01  
 7. Religion Islam  
 8. No. of earning members in family 01  
 9. Total income/ occupation 30,000 / Shop keeper  
 10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 General Hospital nearest this area  
 12. How many schools and colleges are present in the area?  
01 Primary school and 01 Girl primary school

Project Information

13. Do you know about this project? How were you informed?  
yes/ my father  
 14. What do you think about the Project? Do you think it should be applied? Why, why not?  
Beneficial project. It should be applied  
 15. What do you think would be the positive/ negative effects of the Project?  
enhanced positive effects. employment, Agri business  
 16. What will be the Health and Safety Issue due to this project in your point of view?  
NO  
 17. Would you like to add anything else?  
NO

Interviewed By:

Farhad

Sign of Person (Interviewed)

Turan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Izar ul Haq Contact #/ CNIC 03434496275  
2. Address Moaza Sial Chak No 36398 Tehsil Jaran  
Wala, District Faisalabad  
3. Age 17  
4. Education Hire Duran  
5. Marital Status  
 Married  Single  
6. If married, No. of children 0  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation Farmer  
10. Is there any family member suffering from some disease?  
Sugar, Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
02 Hospitals near this area  
12. How many schools and colleges are present in the area?  
02 primary, Boys High School

Project Information

13. Do you know about this project? How were you informed?  
Yes / my friend  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should Applied. Beneficiary take benefit  
15. What do you think would be the positive/ negative effects of the Project?  
activities Positive effect like employment, Agriculture  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Ezhaq

Sign of Person (Interviewed) EZHAY

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Nazeer Ahmad Contact #/ CNIC 03060974793  
2. Address Chak No 275 Gb Tehsil Jaranwala  
District Faisalabad.  
3. Age 54  
4. Education NO  
5. Marital Status  
 Married  Single  
6. If married, No. of children 05  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 01 / Farmer  
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 hospitals including 01 private clinic  
12. How many schools and colleges are present in the area?  
05 / 01 Girls / 04 Boys

Project Information

13. Do you know about this project? How were you informed?  
Yes/ Team came for survey.  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial for locals.  
15. What do you think would be the positive/ negative effects of the Project?  
Positive effect like employment, fuel, time and money saving. Agri-Business activities enhanced.  
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO  
17. Would you like to add anything else?  
No

Interviewed By: Fazhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Wakeel Hassan Contact #/ CNIC 63424417378
2. Address Chak No 3639B Maoza Sial, Jehli/  
Jasran wala, District Faisalabad
3. Age 29
4. Education F.A
5. Marital Status  
 Married  Single
6. If married, No. of children 00
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation 45,000 / Port Servant
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
01 Hospital Nearest this area
12. How many schools and colleges are present in the area?  
02, schools and one play ground for school  
primary and High school

Project Information

13. Do you know about this project? How were you informed?  
Yes/ My brother
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied - Beneficial For people
15. What do you think would be the positive/ negative effects of the Project?  
Time saving, Fuel and money saving
16. What will be the Health and Safety Issue due to this project in your point of view?  
No
17. Would you like to add anything else?  
NO

Interviewed By: Farhad

Sign of Person (Interviewed) Wakeel Hassan

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Muhammed Raza Contact #/ CNIC 0311 1701261  
2. Address Chak No 363GB, Thok Sammi di, Tehsil Jaran Wala, District Faisalabad  
3. Age 22  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 00  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 30000 / Mechanic  
10. Is there any family member suffering from some disease?  
Sugar, Diabetes

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
02, Hospital Nearest Thok Sammi di  
12. How many schools and colleges are present in the area?  
01 Girls Primary, 02 Boys High

Project Information

13. Do you know about this project? How were you informed?  
yes / my Brother  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied. Beneficial Project  
15. What do you think would be the positive/ negative effects of the Project?  
positive Effect like agribusiness activities, employment, Easy approach, Road connectivity  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By

Farhad

Sign of Person (Interviewed)

M.R.A

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Maqbool Ahmad Contact #/ CNIC 0346-7709914  
2. Address 275 GB Tehsil Jaranwala District  
Faisalabad  
3. Age 70  
4. Education Middle  
5. Marital Status  
 Married  Single  
6. If married, No. of children 04  
7. Religion Islam  
8. No. of earning members in family 02  
9. Total income/ occupation Labor/20,000  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 Hospitals nearest this area including  
private clinic  
12. How many schools and colleges are present in the area?  
03 Govt schools including girls  
primary school

Project Information

13. Do you know about this project? How were you informed?  
Yes  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
Positive Impact, It should be applied  
15. What do you think would be the positive/ negative effects of the Project?  
Beneficial for locals. connected areas with  
each other. Business activities increase  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By: Farhad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Mudassar Contact #/ CNIC 0346-40681363  
2. Address Chak no 3639B Jhak Sammi di, Tehsil  
Jaran wala District Faisalabad  
3. Age 35  
4. Education Matric  
5. Marital Status  
 Married  Single  
6. If married, No. of children 02  
7. Religion Islam  
8. No. of earning members in family 01  
9. Total income/ occupation 201020/ labor  
10. Is there any family member suffering from some disease?  
No

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 Hospitals nearest this area  
12. How many schools and colleges are present in the area?  
02, Boys High, Girls primary

Project Information

13. Do you know about this project? How were you informed?  
yes A team came for survey in this area  
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be applied.  
15. What do you think would be the positive/ negative effects of the Project?  
positive, save time and money, Business activities  
16. What will be the Health and Safety Issue due to this project in your point of view?  
No  
17. Would you like to add anything else?  
No

Interviewed By:

Farhad

Sign of Person (Interviewed)

[Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name Zafar Iqbal Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 2769B Tehsil Jaranwala  
District Faisalabad
3. Age 36
4. Education NO
5. Marital Status  
 Married  Single
6. If married, No. of children 04
7. Religion Islam
8. No. of earning members in family 01
9. Total income/ occupation Labour
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 hospitals including 01 private clinic
12. How many schools and colleges are present in the area?  
05 primary and high school including private school

Project Information

13. Do you know about this project? How were you informed?  
Yes / Team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should be Applied. Beneficial for locals
15. What do you think would be the positive/ negative effects of the Project?  
positive Effect like Employment, Fuel, Time and money saving. Agro-Business activities enhanced.
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO
17. Would you like to add anything else?  
NO

Interviewed By: Faizad

Sign of Person (Interviewed) [Signature]

QUESTIONNAIRE FOR SOCIOECONOMIC SURVEY

Personal Information

1. Name M. Basheer Contact #/ CNIC \_\_\_\_\_
2. Address Chak No 363<sup>4B</sup> Maoza Sial Tehsil Jaran wala district Faisalabad
3. Age 60
4. Education NO
5. Marital Status  
 Married  Single
6. If married, No. of children 04
7. Religion Islam
8. No. of earning members in family 02
9. Total income/ occupation Farmer
10. Is there any family member suffering from some disease?  
NO

Receptors Information

11. How many hospitals/ dispensaries are available in the area?  
03 General hospital including one dispensary nearest area
12. How many schools and colleges are present in the area?  
05 schools including Private schools

Project Information

13. Do you know about this project? How were you informed?  
Yes. Team came for survey
14. What do you think about the Project? Do you think it should be applied? Why, why not?  
It should Applied Beneficial For locals
15. What do you think would be the positive/ negative effects of the Project?  
Positive effect like employment Agri business
16. What will be the Health and Safety Issue due to this project in your point of view?  
NO
17. Would you like to add anything else?  
NO

Interviewed By: Fatmad

Sign of Person (Interviewed) \_\_\_\_\_

# **Annexure IX**

## **Management Plans**

# **MANAGEMENT PLANS**

**SOLID WASTE**  
**MANAGEMENT PLAN**

**LIST OF ABBREVIATIONS**

<b>NHA</b>	National Highway Authority
<b>EPA</b>	Environmental Protection Agency
<b>HSE</b>	Health, Safety & Environment
<b>Ltd.</b>	Limited
<b>No.</b>	Number
<b>NOC</b>	No Objection Certificate
<b>PPEs</b>	Personal Protective Equipment's

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## **1 INTRODUCTION**

### **1.1 General**

This report covers Solid waste Management Strategies and three key pillars of Solid Waste Management such as Micro Planning, Decentralized management and Stakeholder engagement. The Decentralized Solid Waste Management (DSWM) is a system to provide a clean environment and hygienic living condition by reducing the quantity of waste at source.

#### **Hazardous Waste**

Waste material that may cause damage to human health or the environment that requires precautions when storing, handling, transporting or disposing due to its toxicity corrosiveness, ignitability or reactivity.

#### **Non-Hazardous Waste**

Non-hazardous waste includes any rubbish or recycling that causes no harm to human or environmental health. This can be from business or household producers. This can include general household waste like food or bathroom rubbish and recycling, and business wastes including any that come from industrial or agricultural sources. Waste can be offensive but not hazardous. This can include healthcare waste that is soiled but poses no threat to human or environmental health.

### **1.2 Project Background**

National Highway Authority is taking up the feasibility study and detailed design of road from Lahore - Abdul Hakeem (M-3) Motorway, The Motorway starts from Lahore and after traverses through the Cities/Towns like Nankana Sahib, Jaranwala, Tandlianwala, samgndri, Toba Tek Singh, Kamalia, Pir Mahal, shorkot and terminates at Abdul l-lakeem in Khanewal District. The proposed interchange is located at a distance of (14.9 km Approx.) from Jaranwala Interchange and (23 km approx.) from Nankana Sahib Interchange.

### **1.3 Introduction of Firm**

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech

Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

#### 1.4 Location of Project:

The proposed Interchange, is located near Lundianwaia on M-3 at intersection point of M-3 and Jaran Wala road.



**Figure 1: Site Vicinity Map**

#### 1.5 Procedure

All waste arising from the project site operations and activities will be managed to minimize the risk and impact on the environment and human health. Waste management activities will be performed in accordance with the following waste hierarchy principles.

##### **Reduce:**

The quantity of waste through improved supply chain management and improved process and design initiatives.

**Reuse:**

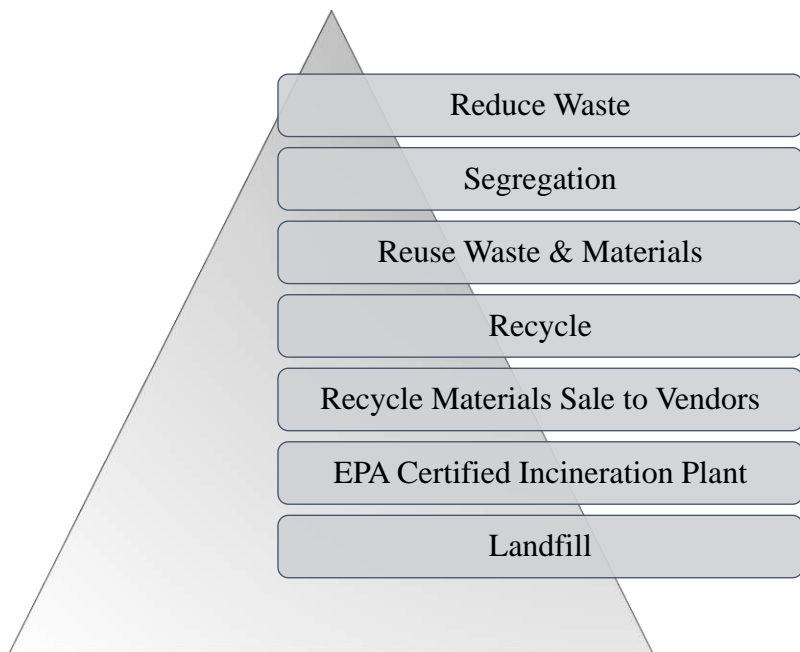
Material where possible in engineering structures or alternative use, and/or through take back schemes to suppliers were surplus to requirements.

**Recycle:**

Material streams where possible to reduce the quantity of waste (e.g., metals, wood, POL, paper, plastics, other) that has to be disposed of.

After following the 3Rs above, for whatever waste remaining, the responsible authorities for project site will conduct responsible disposal either through internal or contractor managed incineration, alternative treatments or landfill in order to reduce hazards, risks and long-term impact on the environment.

Waste minimization and the application of the above principle shall also be addressed in contracts and procurement strategies, in accordance with existing rules and regulations, and taken into consideration as much as possible in the supply chain, e.g., when reviewing shipping, storage and disposal options throughout the project lifecycle.



***Figure 2: Hierarchy of Solid Waste Management***

**1.6 Waste Reduction & Supply Chain Management**

The overall reduction of waste is a primary objective across project site and therefore is of paramount importance to provide clear actions on how waste reduction will be achieved.

- Procurement of material for the mission as much as possible based on strict ‘rate of use formula’ to reduce oversupply and accumulation of stockpiles as a result of product expiration.
- Preference is given to vendors who operate ‘take back schemes’
- Preference on less hazardous or non-hazardous alternatives materials to reduce to burden on earth due to environmental pollution.
- Preference in the implementation to reduce printing, water use to prevent waste plastic containers, others.

**1.7 Waste Generation Assessment**

Estimation of waste generated will be performed by the assessment of waste generation for specific source considering the following factors,

- i. Frequency of collection.
- ii. Maximum quantity of waste generated.
- iii. Peak waste generating hours.
- iv. Collection trolley capacity.













After the assessment of waste generation, waste container/ bin will be placed with in the section or area. The location of waste bin layouts / list must be updated by area owner and will submit to Admin department. Area owner is responsible to keep the update list of waste generated from his area.

**1.8 Segregation Color Coding & Labeling of Waste and waste Containers**

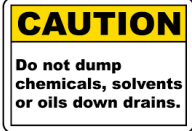












Waste segregation is encouraged using color coding containment bins placed across Project premises or facilities.

Labels identifying the waste type are placed on three sides of the assigned colored bins.

**Table 1: category, description, symbol, label, color code and Treatment Method**

Category	Description	Symbol	Label	Packaging	Color Code	Treatment
<b>Paper &amp; cardboard waste</b>	Office papers, production cardboards, paper, wood, coths, fiber etc.		Recyclable	Poly bad or rigid container	<b>Blue</b>	Recycle by EPA approved body
<b>Glass, metals, sharps</b>	Machine metal parts, scrap, nail sheets, broken glasses, syringes etc.	 	Sharp – Handle with care	Puncture proof, rigid container	<b>Yellow</b>	Recycle by EPA approved body
<b>Mercury containing material</b>	Thermometer, mercury bulbs, others		Mercury – Do not open	Puncture proof, sealed, rigid container	<b>Red</b>	Recycle by EPA approved body
<b>Lube lights, bulbs, etc.</b>	Florecent lights, incandacent lights, other		Hazardous waste	Puncture proof, rigid container	<b>Red</b>	Recycle by EPA approved body
<b>Asbestos containing material</b>	Asbestos sheet, lining, sealing, others	 	Asbestos containing material – Authorized person only.	Puncture proof, Sealed	<b>Red</b>	Disposed by EPA approved body.
<b>Organic (food material)</b>	Kitchen waste,		Recyclable	Poly bad or rigid container	<b>Black</b>	Disposed or composted by EPA approved body.
<b>Organic (Process waste)</b>	Production food waste, QC rejected food waste, Autoclave waste, IRD trail waste, etc.		Recyclable	Poly bad or rigid container	<b>Black</b>	Disposed or composted by EPA approved body.
<b>Organic (Process waste)</b>	Production food waste such as red chilli waste (skin irritant, eyes irritant, respiratory)	 	Irritant	Puncture proof, Sealed with label of irritant.	<b>Black</b>	Disposed or composted by EPA approved body.
<b>Plastic</b>	Pet bottles, packing, shrink wrap, foam,		Recyclable	Poly bad or rigid container	<b>Green</b>	Recycle by EPA approved body

Solid Waste Management Plan - 2023

<b>Chemicals for lab</b>	Solvents, chemical bottles etc.	 	Handle with care	Heavy duty Puncture proof plastic bag or container	Red	Recycle by EPA approved body after rinsing of container
<b>Chemicals (operation or workshop)</b>	WD-40, Lube oil, kerosene, oil filters, rugs, air filters, Oil paints buckets, sealing, fumigation waste etc.	 	Handle with care	Heavy duty Puncture proof plastic bag or container	Red	Recycle or incinerate by EPA approved body
<b>Fumigation waste solid</b>	Tablets, waste powder, others	 	Flammable	Puncture proof, rigid metal container with soapy water in it.	Red	Disposed by EPA approved body
<b>Cleaning equipment</b>	Used mops, cleaning equipment, used spill kits, other		Hazardous waste	plastic bag or container sealed and labelled	Red	Disposed or incinerated by EPA approved body
<b>Used PPE – Hazardous</b>	Respiratory filters, gloves, apron, others.		Hazardous waste	plastic bag or container sealed and labelled	Red	Disposed or incinerated by EPA approved body
<b>E-Waste</b>	LEDs, Sensors, lights, electronic devices, holder, switches, socket etc.	 	E- Waste, Hazardous Waste	Put in boxes, sealed and labelled accordingly.	Yellow	Recycle by EPA approved body
<b>Construction waste</b>	Waste from Demolishment, debris, silica etc.			Puncture proof, rigid container	Yellow	Recycle by EPA approved body
<b>Mixed Waste</b>	Any above which can't be segregate.	Relevant sign as per hazard nature or SDS		Heavy duty Puncture proof plastic bag or container	Pink	Disposed by EPA approved body
<b>Radioactive Waste</b>		 	Radioactive waste	Heavy duty Puncture proof plastic bag or container	Purple	Disposed by EPA approved body

## 2 Handling of Waste

Handling of waste is to be carried out in such way as to minimize risk to human health and to the environment. In particular, all precautions should be taken in order to avoid accidents that affect:

- Soil or water pollution.
- Fire or explosion
- Toxic gas generation

The following are good practices should be adopted by the project authorities for internal transportation of waste:

- i. Containers containing liquids should always be closed.
- ii. Containers carrying solid or liquid waste should be secured to the means of transport being used in order to avoid any spills of material.
- iii. Any waste which has fallen out of the container should be collected immediately.
- iv. Provide Safety Data sheet for hazardous chemicals along with waste.

**Table 2: Solid Waste Management Plan**

<b>Objective</b>	<b>Management Action</b>	<b>Responsibility</b>	<b>Time framework</b>
<b>Water pollution</b>			
Proper disposal of wastewater /sewerage	<ul style="list-style-type: none"> <li>✓ Proper disposal of construction debris.</li> <li>✓ Proper handling, storage and disposal of oil and oil wastes.</li> <li>✓ Proper disposal of wastewater /sewerage at Contractor's workmen's camps.</li> </ul>	Contractor	Throughout Construction
<b>Oil pollution</b>			
Proper storage, handling and disposal of oil	<ul style="list-style-type: none"> <li>✓ Proper storage, handling and disposal of oil and oil wastes</li> <li>✓ Maintain plant and equipment</li> <li>✓ Maintenance of construction vehicles should be carried out in the Contractor's camp Warning signs are placed on all the containers carrying hazardous waste</li> </ul>	Contractor	Throughout Construction
<b>Construction waste</b>			
Disposal of Construction Wastes	<ul style="list-style-type: none"> <li>✓ Proper disposal of construction wastes including oil, solid wastes and debris Dike wall and spill drain shall be provided.</li> <li>✓ Hazardous materials containers are labelled according to their category i-e explosive, flammable etc.</li> </ul>	Contractor	Throughout Construction
<b>Demobilization</b>			

Clean up site	<ul style="list-style-type: none"> <li>✓ Clean up site</li> <li>✓ Remove all debris</li> <li>✓ Remove to original condition</li> </ul>	Contractor	Throughout Construction
<b>Public Health and Occupational Safety</b>			
Proper disposal of solid and sanitary waste	<ul style="list-style-type: none"> <li>✓ Proper disposal of solid and sanitary waste at site.</li> <li>✓ Design and locate pit latrines prudently.</li> <li>✓ Have communal ablution facilities.</li> </ul>	Contractor	Throughout Construction

## **2.1 Waste Storage areas:**

Waste storage area must be correctly planned. The following points should always be considered:

- i.** Spills and leakages should be avoided wherever possible, or preferably kept to a minimum.
- ii.** Skips for hazardous waste should be covered and the site should have suitable containment with appropriate drainage facilities.
- iii.** Spills are to be contained and collected such that they do not contaminate soil or water.
- iv.** Soil or water are not to be polluted by rainwater which is contaminated through contact with waste.
- v.** Waste storage area should be separated and clearly identified/marked (in native language) and understood by all operators including those from transport companies and those collecting waste.
- vi.** Any hazard risk (flammable, toxic etc.) should be clearly legible and immediately identifiable.
- vii.** Chemically incompatible wastes are to be segregated.
- viii.** Appropriate emergency equipment for first aid, fire and spills should be easily accessible.
- ix.** In case of hazardous waste, a safety data sheet should be available with the waste.
- x.** Waste generated within Project premises for any contractor must be disposed of, off site by a fully licensed carrier as soon as reasonably practicable so as not to accumulate on Project premises. The responsible person will ensure that the site is checked that it is properly clean and waste free before the work are terminated.

## **2.2 Training & Awareness**

Individual must be provided with detail training on waste management system. The supervisor must provide the on-hand training to every individual on handling the waste along with safety measure taken for the prevention of environmental and health impact.

Training record must be kept by supervisor and area owner.

## **2.3 Record Keeping**

- The admin is to maintain a waste records of all disposal of hazardous and non-hazardous waste.
- The Waste contractor should regularly provide a certificate of the collected waste together with all weight chits.

## **2.4 Disposal**

The waste with the project authority logo or private details must be remove/shredded in supervision of admin prior handing over the waste contractor.

The admin will ensure that the waste is properly treated and dispose on EPA approved landfill site or location to comply regulatory requirement.

## **2.5 Responsibilities**

### **2.5.1 General Manager Operation**

The General Manager operation shall be responsible for ensuring that this procedure is implemented and staff with required competency is appointed.

### **2.5.2 Manager HSE**

The HSE Manager will be responsible to ensure that:

- This procedure is effectively implemented at the site
- Provide oversight and monitor this procedure.
- Ensure that the selected risk controls are implemented.

### **2.5.3 HSE Representative**

The relevant Site HSE representative shall

- a) Communicate the requirements laid down in this procedure to all employees.
- b) He/she will monitor and track the practical implementation.
- c) He/she will be responsible for delivering training on this procedure to all relevant employees.
- d) Extend necessary advice for effective conduct of assessment.
- e) Conduct inspection and audit to check the effectiveness of procedure.
- f) Maintain relevant/auditable record.

### **2.5.4 Supervisor**

The supervisor shall

1. Communicate the requirements laid down in this procedure to all employees.
2. Ensure practical implementation on floor.
3. Conduct daily walkabout to check the effectiveness of implemented controls measures.

**HAZARDOUS WASTE**  
**MANAGEMENT PLAN**

**LIST OF ABBREVIATIONS**

**HWMP** Hazardous waste Management Plan

**Engr.** Engineer

**EPA** Environmental Protection Agency

**ETP** Effluent Treatment Plant

**HSE** Health, Safety & Environment

**Ltd.** Limited

**No.** Number

**NOC** No Objection Certificate

**PPEs** Personal Protective Equipment's

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# **1 INTRODUCTION**

## **1.1 General**

The Hazardous Waste Management Plan (HWMP) is developed to supplement the overall EHS system with regards to protecting human health and safety, appropriately managing various site wastes, reducing negative impact to the environment, managing disposal costs, and ensuring regulatory compliance.

The HWMP provides information for the proper management and disposal of three types of waste found;

- Hazardous waste,
- Regulated non-hazardous waste
- Universal waste.

## **1.2 Definition**

Any substance, agent, effluent, object, material or equipment to be discarded, destroyed or disposed of, which has been generated through any operation, activity or process, premises etc.

## **1.3 Hazardous Waste**

Waste material that may cause damage to human health or the environment that requires precautions when storing, handling, transporting or disposing due to its toxicity corrosiveness, ignitability or reactivity.

## **1.4 Purpose of Report**

The environmental issue has become a worldwide concern in the last decades being the focus of discussions in a variety of forums both at national and international levels. Because environmental problems are rooted in economic and social policies, they occur at all levels from local to global, and success requires action by many players over long periods of time.

The purpose of this report is therefore to highlight the Hazardous Materials Handling and Management at the time of construction of subject road. This is an important factor to be considered that during construction of roads there might involve usage of such substances which

can be declared hazardous/ dangerous as well as it is the responsibility of the contractor to scientifically disposed of such chemicals to avoid Environmental degradation. This HWMP underlines the framework to check the compliance of site initiatives and to take timely actions for correction in case any accident of significant criteria, requirements or goals are found.

### **1.5 Project Background**

National Highway Authority is taking up the feasibility study and detailed design of road from Lahore - Abdul Hakeem (M-3) Motorway, The Motorway starts from Lahore and after traverses through the Cities/Towns like Nankana Sahib, Jaranwala, Tandlianwala, samgndri, Toba Tek Singh, Kamalia, Pir Mahal, shorkot and terminates at Abdul I-Iakeem in Khanewal District. The proposed interchange is located at a distance of (14.9 km Approx.) from Jaranwala Interchange and (23 km approx.) from Nankana Sahib Interchange.

### **1.6 Project Objectives**

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

### **1.7 Objectives of Hazardous Waste Management**

Conducting hazardous substance audit is a sound precaution and proactive measure in environmental governance system. Specific objectives of proposing this management plan are as follows:

- Proposing a management plan for handling, storage, transportation and disposal of hazardous substance through detailed study of the process and identifying potential sources of hazardous pollution
- Suggest appropriate recommendations through hazardous substance management plan to mitigate or minimize the adverse impact of hazardous substances.
- Dispose-off every type of waste in responsible and environmentally friendly manner and to keep record.

### 1.8 Introduction of Firm

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

### 1.9 Location of Project:

The proposed Interchange, is located near Lundianwaia on M-3 at intersection point of M-3 and Jaran Wala road.



Figure 1: Site Vicinity Map

## 2 HAZARDOUS MATERIALS MANAGEMENT PLAN

### 2.1 General

This section includes detailed and comprehensive Hazardous Materials Management Plan for safe handling, storage and disposal of hazardous chemicals, materials and/or substances associated.

### 2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

**Authority:** The project leading authority will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

### 2.3 Hazardous Materials Management Plan (EMP)

It lists all the mitigation measures associated with the environmental or social aspect in line during handling and management of hazardous materials with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by making it environmental friendly.

Table 1 shows hazardous materials management plan being implemented at project site and also highlights the points to be implemented.

*Table 1: Hazardous Materials Management Plan*

Objective	Management Action	Responsibility	Time framework
<b>Hazardous Materials Supply/ Transportation</b>			
Hazardous Materials Supply	After receiving of hazardous materials, strict supervision of following aspects should be made: <ul style="list-style-type: none"> <li>✓ The container etc. shall have label affixed with a specific code to the container by department ordering the hazardous material</li> <li>✓ Hazardous items received on site must be inspected, handled, stored and controlled in accordance to Hazardous material rules 2014.</li> </ul>	Contractor, EHS, Administration	Throughout Construction
<b>Handling of Hazardous Materials</b>			
Handling of Hazardous Materials	<ul style="list-style-type: none"> <li>✓ Trained personnel should be allowed to handle hazardous materials.</li> <li>✓ All hazardous substances should be used in accordance with material safety data sheets (MSDS).</li> <li>✓ All personnel handling or using hazardous materials shall use PPEs as directed by EHS unit.</li> <li>✓ Hazardous materials handling workers should be properly supervised by EHS team head.</li> </ul>	Contractor, EHS, Administration	Throughout Construction

	<ul style="list-style-type: none"> <li>✓ No worker aged below eighteen years or over sixty years shall be employed for any job involving physical handling of hazardous substances.</li> <li>✓ A record of every worker shall be maintained containing amongst others details, his name and address, his medical checkup history and hazardous substances handled by him.</li> <li>✓ The use of appropriate storage systems, such as drums, bottles, carboys, crates and boxes etc. for hazardous reactive materials. Hazardous materials should be stored in containers according to the color-coding system of hazardous waste storage.</li> <li>✓ Containers should be filled leaving headspace for expansion of contents. Often the original container is perfectly acceptable.</li> <li>✓ Warning signs are placed on all the containers carrying hazardous waste</li> </ul>		
<b>Storage of Hazardous Material</b>			
<p>Storage of Hazardous Materials</p>	<ul style="list-style-type: none"> <li>✓ All the personnel involved in handling, storage, transportation and disposal of hazardous substances should be trained on regular basis. A training program should be designed and implemented</li> <li>✓ Only authorized personnel are allowed to handle hazardous materials</li> <li>✓ Environmental conditions of storage area i-e temp, humidity etc. should be checked regularly</li> </ul>	<p>Contractor, EHS, Administration</p>	<p>Throughout Construction</p>

	<ul style="list-style-type: none"> <li>✓ Materials should be stored according to their MSDS</li> <li>✓ Danger sign should be displayed on hazardous materials storage area</li> <li>✓ Hazardous materials containers should be labelled according to their category i-e explosive, flammable etc.</li> <li>✓ Gas tests should be conducted to ensure that gases are not exceeding tolerable limit</li> </ul>		
<b>Hazardous waste Spills and Leaks</b>			
<p>Hazardous waste spills and Leaks</p>	<ul style="list-style-type: none"> <li>✓ Keep out unnecessary and unprotected personnel from designated storage area.</li> <li>✓ Use Personal Protective Equipment (PPE's) as required.</li> <li>✓ Remove or isolate incompatible materials as well as other hazardous materials.</li> <li>✓ Contain and soak up the spill with absorbent that does not react with spilled product.</li> <li>✓ Flush the spill area where possible.</li> <li>✓ Proper PPEs must be worn during spill control activity</li> <li>✓ Neutralize the hazardous material according to MSDS</li> <li>✓ Used materials of the spill kit must be discarded carefully in an enclosed container and dispose of with hazardous waste.</li> </ul>	<p>Contractor, EHS, Administration</p>	<p>Throughout Construction</p>
<b>Occupational Health and Safety</b>			

<p>Health and safety planning</p>	<ul style="list-style-type: none"> <li>✓ PPEs including health and safety shoes, caps, safety gloves and masks are provided to the workers</li> <li>✓ Use of PPEs will be strictly enforced in order to save the workers from hazards.</li> <li>✓ Incidents should be reported directly to the concerned authority</li> <li>✓ HSE Manager should be deputed at site and should conduct regular inspections.</li> </ul>	<p>Contractor, EHS, Administration</p>	<p>Throughout Construction</p>
<p><b>Fire Hazard Management</b></p>			
<p>Fire Hazard</p>	<ul style="list-style-type: none"> <li>✓ Fire extinguishing arrangements should be ensured.</li> <li>✓ Fire extinguisher should be easily accessible near storage area.</li> <li>✓ Fire warning signs should be used to identify flammable materials and other fire hazards</li> <li>✓ Fire alarms should be present in storage area.</li> </ul>	<p>Contractor, EHS, Administration</p>	<p>Throughout Construction</p>
<p><b>Hazardous Waste Management</b></p>			
<p>Disposal of Hazardous waste</p>	<ul style="list-style-type: none"> <li>✓ Hazardous waste disposal shall conform to federal and provincial legislation</li> <li>✓ Ensure that hazardous waste should not be mixed with non-hazardous waste</li> <li>✓ Quantity and characteristics of hazardous waste generated and discarded should be recorded properly</li> </ul>	<p>Contractor, EHS, Administration</p>	<p>Throughout Construction</p>

	✓ All waste bags or containers should be labelled with basic information on their content. The information may be written directly on the bag or container or on preprinted labels, securely attached.		
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## **2.4 Emergency Preparedness and Response Plan**

Emergency preparedness and response plan can be considered as the tool for implementing management plan as handling, transportation and storage of hazardous substance can cause a serious harm if not taken seriously. The probable emergency situation can be:

- Serious fire or explosion
- Major spillage
- Any other incident involving all or large part of the premises and its workers.

To handle emergency situations HSE Training plans should be the part of construction activities. Emergency response training as an HSE training program will cover the following:

- General awareness
- Emergency alarms and evacuations
- Employees responsibilities during emergencies
- Firefighting
- First aid
- Spillage control
- Use of appropriate PPE
- Risk Management

## **2.5 Conclusion:**

This management plan is formed to for handling, transportation, storage and disposal of hazardous chemicals at construction site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts due to hazardous substance has been incorporated and this Hazardous Chemicals Management Plan is sufficient if implemented in true spirit.

**TRAFFIC MANAGEMENT**  
**PLAN**

### LIST OF ABBREVIATIONS

**TMP** Traffic Management Plan

**Engr.** Engineer

**EPA** Environmental Protection Agency

**HSE** Health, Safety & Environment

**Ltd.** Limited

**No.** Number

**NOC** No Objection Certificate

**PPEs** Personal Protective Equipment's

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# 1 INTRODUCTION

## 1.1 General

The purpose of this Traffic Management Plan is to organize site activities so that vehicle traffic and pedestrian traffic can be segregated to minimize the risk from vehicles, and so that traffic routes can be used safely. The risks from construction site traffic can be controlled through the organization and management of traffic on site. The term vehicles include: cars, vans, lorries, delivery vehicles, low-loaders and mobile plant such as excavators, lift trucks and site dumpers etc. The term pedestrians include: operatives, workers, management, consultants, visitors and any other person accessing the site on foot. This construction site traffic management plan outlines the management of the movements of vehicles and pedestrians on site and interaction with adjacent land use. It does not cover the present permanent traffic situation and conditions surrounding the site.

Key issues in dealing with traffic management on site and that will be addressed within this traffic management plan are:

1. Pedestrian and vehicle separation
2. Minimizing vehicle movements
3. People on site
4. Loading and storage areas
5. Turning vehicles
6. Visibility
7. Signs and instructions
8. Public protection

## 1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from Lahore - Abdul Hakeem (M-3) Motorway, The Motorway starts from Lahore and after traverses through the Cities/Towns like Nankana Sahib, Jaranwala, Tandlianwala, samgndri, Toba Tek Singh, Kamalia, Pir Mahal, shorkot and terminates at Abdul I-Iakeem in Khanewal District. The proposed interchange is located at a distance of (14.9 km Approx.) from Jaranwala Interchange and (23 km approx.) from Nankana Sahib Interchange.

## 1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

#### **1.4 Aims and Objectives of Traffic Management Plan**

The purpose and aims of this plan are:

1. To identify the traffic related hazards and risks present on site.
2. To effectively manage the risk from construction site traffic through implementing control measures.
3. To communicate the construction site traffic management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.
5. To eliminate traffic related accidents on site. This document aims to provide a suitable site-specific plan for managing the risks of construction site traffic. The business has duty to ensure the safe management of pedestrian and vehicle movements on site.

#### **1.5 The Site Manager**

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the construction site in accordance with this document.
- Ensure a suitable briefing on traffic management requirements is included in the site induction for new starters and communicated in the form of a toolbox talk to existing workers in accordance with the arrangements in this document.
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities, including deliveries, on a weekly basis in accordance with the arrangements in this document.
- Ensure suitable steps are taken to co-ordinate traffic movements of adjacent sites, client occupied areas or other access requirements, in regular reviews of planned activities, in accordance with the arrangements in this document.
- Investigate, take appropriate action and respond to reports from workers on deficiencies and faults in the implementation of the traffic management arrangements in accordance with this document.
- The Site Manager may delegate particular elements of the requirements of the traffic management plan to other competent members of the site management team as required to ensure the requirements are met in an effective and efficient manner.

## **1.6 Site / Highway Management Road Closures**

It is not foreseen that any road closures will be required during the construction of the development. Although ultimately the decision on the need to close a road will fall to the contractors, it is recommended they do not do this due to the busy nature of the adjacent carriageway.

Traffic Management, as with road closures, the need for traffic management will fall to the contractors. Due to the size of the development, it is unlikely that traffic management measures will need to be put into place for any significant length of time. Footway Management as some deliveries will need to be made on the highway, there is the potential for disruption to the footway. There is a pedestrian crossing to the north of the application site, with traffic lights and associated tactile paving, that pedestrians can use to by-pass any development related activity on the footway.

As all deliveries will take place outside of network and school peak hours, and outside of the TRO operational hours, the impact of deliveries on the adjacent footway will be minimized. Maintaining Signage and barriers associated with the site will be the responsibility of the contractor, as the application site is relatively small, it is not anticipated that the regime of signage and barrier inspection and maintenance will have a severe impact on the highway.

There will be construction workers arriving at the application site first thing in the morning and departing in the evening, although the numbers involved are forecast to be relatively low on a day-to-day basis and will typically comprise private cars and light vans. Construction workers associated with the development will be required to park off-site, the nearest car park. Based on the provision of car parking in the vicinity of the site, it is not considered that employee traffic will disrupt the operation of the TRO on the adjacent highway. Employee parking will be subsidized by the contractor, to avoid employees seeking free parking at the site.

## **1.7 Introduction of Firm**

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

## **1.8 Location of Project:**

The proposed Interchange, is located near Lundianwaia on M-3 at intersection point of M-3 and Jaran Wala road.



Figure 1: Site Vicinity Map

## 2 MANAGEMENT PLAN

### 2.1 General

This section includes detailed and comprehensive Traffic Management Plan for safe handling, of traffic at the project site.

### 2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

**Proponent:** The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

### 2.3 Traffic Management Plan (TMP)

It lists all the mitigation measures associated with the traffic aspect in line during management of traffic with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by making the traffic manageable.

Table 1 shows traffic management plan being implemented in the said location and also highlights the points to be implemented.

**Table 1: Traffic Management Plan**

Objective	Management Action	Responsibility	Time framework
<b>Pedestrians and vehicles interface</b>			
Pedestrian struck by vehicles	<ul style="list-style-type: none"> <li>✓ Separate vehicle and pedestrian access routes to be established.</li> <li>✓ Pedestrians to wear high visibility clothing (jacket or vest minimum) at all times on site.</li> <li>✓ Audible and visual alarms to be in working order on vehicles. Signage to be displayed on site directing vehicles and pedestrians.</li> <li>✓ Speed limit to be established and enforced. Provide anticipated delivery times.</li> </ul>	Contractor	Throughout Construction
<b>Deliveries</b>			
Collision / conflict with other work activities or site operation	<ul style="list-style-type: none"> <li>✓ Clear instructions to be given for delivery drivers when placing orders / arranging deliveries.</li> <li>✓ Site Manager contact details to be displayed at the main site entrance for contact on arrival.</li> <li>✓ All delivery vehicles to be directed to site office on arrival and banksman notified where access onto site required. Request that the suppliers provide their drivers with cyclist safety training and limit the size of their vehicles for deliveries.</li> <li>✓ Containers should be filled leaving headspace for expansion of contents. Often the original container is perfectly acceptable.</li> <li>✓ Warning signs are placed on all the containers carrying hazardous waste</li> </ul>	Contractor	Throughout Construction
<b>Access equipment</b>			

Struck by vehicles/ overturning	<ul style="list-style-type: none"> <li>✓ Access equipment positioned in areas at risk from being struck by vehicles, including other mobile access equipment, to be segregated from vehicle routes with barriers. Mobile access equipment to be accompanied by a banksman on site roads when moving around site. Danger sign is displayed on hazardous materials storage area.</li> </ul>	Contractor	Throughout Construction
<b>Excavations</b>			
Vehicles entering / overturning	<ul style="list-style-type: none"> <li>✓ Vehicles routes to be planned away from excavations as far as possible.</li> <li>✓ Vehicles to be kept a safe distance from excavations. Excavations adjacent to and within 1m of vehicle routes where there is a risk of driving directly into the excavation to be provided with pedestrian barriers and stop blocks (minimum 200mm high) along entire length of excavation.</li> <li>✓ Excavation parallel to and within 1m of vehicle routes where there is a risk of driving indirectly into the excavation to be provided with barriers along excavation.</li> </ul>	Contractor	Throughout Construction
<b>Excavations by walkways</b>			
Falls from height	<ul style="list-style-type: none"> <li>✓ Excavations to be provided with solid pedestrian barriers/fences a minimum of 300mm from edge of excavation. Barriers are to be distinctively marked with warning signs.</li> </ul>	Contractor	Throughout Construction
<b>Vehicles Reversing And/or Maneuvering</b>			
Collision with pedestrian ns / structures	<ul style="list-style-type: none"> <li>✓ All reversing and/or turning vehicles (delivery vehicles and construction site) to be accompanied by banksman.</li> </ul>	Contractor	Throughout Construction

<b>Poor maintenance of vehicles</b>			
Failure of built-in controls	<ul style="list-style-type: none"> <li>✓ All site to be maintained and examined in accordance with manufacturer’s instructions.</li> <li>✓ Where extra workers to be hired obtain copies of certificates from the hire company.</li> <li>✓ All construction vehicles to be provided with suitable audible and visual indications of movement. Controls, lights and warning systems to be checked before first use each shift.</li> </ul>	Contractor	Throughout Construction
<b>Lack of competence</b>			
Human error due to lack of awareness	<ul style="list-style-type: none"> <li>✓ Confirm the competence of drivers for the particular vehicles to be used. Instruction given through inductions, on site safety briefings, signage and regular tool box talks.</li> <li>✓ A banksman will be used if the driver’s vision is restricted or when operating in a congested area. The carrying of passengers is prohibited.</li> </ul>	Contractor	Throughout Construction
<b>Congestion</b>			
Collision of vehicles / excessive maneuvering	<ul style="list-style-type: none"> <li>✓ Schedule of planned deliveries to be maintained and deliveries planned in advance to avoid conflict with other site operations or adjacent land uses.</li> </ul>	Contractor	Throughout Construction
<b>Unauthorized use</b>			
Misuse of Vehicle	<ul style="list-style-type: none"> <li>✓ The ignition key will be removed whenever machine is left unattended and if left on site overnight all site will be immobilized.</li> </ul>	Contractor	Throughout Construction
<b>Noise</b>			

Hearing damage	✓ Figures for noise levels will be obtained from the hire company and where these are above 80dB(A) ear protectors will be worn.	Contractor	Throughout Construction
<b>Vibration</b>			
Whole body vibration syndrome	✓ Drivers should be provided with 'suspension' seats to reduce effects of whole-body vibration. Drivers do not drive for prolonged periods to minimize risk of whole-body vibration.	Contractor	Throughout Construction

## **2.4 Control of Construction Vehicles**

Vehicular access routes will be established on site, and as far as reasonably practicable these will be away from pedestrian routes, uneven ground, excavations and structures. The site allows for a one-way system, this will be implemented where possible to avoid the need to turn or reverse on site. No vehicle will exceed 8 tones. No HGV is anticipated. All turning or reversing will be accompanied by a competent banksman. Records shall be kept on site for all construction vehicles accessing the site, and shall include the following:

1. Make, model and serial number.
2. Records of inspection of work equipment including a written weekly check of the operation of the equipment confirming adequacy of safety devices such as emergency stops, audible and visual alarms, controls, guards etc.
3. Records of thorough examination of lifting equipment including dates of last and next examination.
4. Operators' certification and training records.

A register of authorized users of each designated piece of construction site. Subcontractors shall also make the above information available on site and will be stored at the site office. Unused construction materials are stored away from work areas and designated traffic routes in agreement with the site manager and construction material will be promptly removed from site on completion of use.

All requirements for additional material will be discussed with the site manager in advance, prior to delivery to site. Parking is outside the site hoarding and there are 2 spaces which belong to the actual site in Invicta close for the project team. The site does not anticipate more than 5 people on site at its peak.

## **2.5 Communication of Information**

The site will be hoarded with a minimum 2m hoarding and decorated to be aesthetically pleasing to the area, the planned works will be approximately 3 months and during this time there will be communication with the residents and Construction Traffic Management Plan.

The traffic management will form part of the site induction, and a tool box talk will be delivered within the early stages of the project as a further reminder of the hazard of construction site traffic and the site-specific controls in place to reduce the risks on site. Traffic management arrangements will be discussed during daily briefings to include planned deliveries and any restrictions or changes due to developing site conditions or short-term activities.

Consultation and an open-door policy will be implemented on site to gain worker involvement and understanding in traffic management arrangements.

## **2.6 Reporting**

Everyone on site has a duty to contribute to site safety, and will be requested to report any near misses or dangerous situations, including that involving traffic management on site. The near miss reporting system will be used to assess any deficiencies in the traffic management arrangements, and remedial action will be taken as necessary.

## **Subcontractors**

All subcontractors will be inducted and provided with information on the traffic management procedures in place. Sub-contractor deliveries must be arranged via the Site Manager and coordinated with other planned deliveries.

## **2.7 Monitoring**

Traffic management will be assessed and monitored ongoing throughout the project with any changes made to the plan as necessary to ensure safe access, egress and movement around the site.

A record of all deliveries will be held at the site office. Delivery notes for all deliveries will be held on site (these will include the points of origin of the material). The above information will be used to produce a monthly report this will identify any improvements required to the plan in addition to any deviations from that proposed.

## **2.8 Conclusion**

This environmental management plan is formed to for traffic related issues at construction site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts due to traffic discrepancy has been incorporated and this Traffic Management Plan is sufficient if implemented in true spirit.

**BATCHING AND ASPHALT**  
**PLANT MANAGEMENT**  
**PLAN**

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# 1 INTRODUCTION

## 1.1 General

The purpose of this Batching and Asphalt Plant Plan is to organize activities so that at batching plant no environmental, social and economic issues are raised during the construction process.

### **Asphalt Plant:**

During road construction, it is necessary to temporarily arrange batching and asphalt plants to make the perfect material to be utilized for. Asphalt facility is an assembly of mechanical equipment where aggregates (i.e. inert mineral materials such as stone dust, crushed stone) are blended, heated, dried and mixed with bitumen (asphalt cement). Asphalt production involves the blending and drying of a mixture of aggregates before being heated to an appropriate temperature for coating with a bitumen binder. There are generally two component parts of an asphalt mixing plant with the first being the aggregate dryer which removes moisture from the aggregate, and the second part being the mixer where the aggregate is coated with bitumen and heated to the required mixing temperature as per the mixture specification. This report gives an over view for the management plan set by the contractor for asphalt plant.

## 1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from Lahore - Abdul Hakeem (M-3) Motorway, The Motorway starts from Lahore and after traverses through the Cities/Towns like Nankana Sahib, Jaranwala, Tandlianwala, samgndri, Toba Tek Singh, Kamalia, Pir Mahal, shorkot and terminates at Abdul I-Iakeem in Khanewal District. The proposed interchange is located at a distance of (14.9 km Approx.) from Jaranwala Interchange and (23 km approx.) from Nankana Sahib Interchange.

## 1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

## 1.4 Objectives of Asphalt Plant/Area Management Plan

The purpose and aims of this plan are:

1. To identify the hazards and risks present on batching and asphalt site.
2. To effectively manage the risk from construction site through implementing control measures.
3. To communicate the construction site, batching and asphalt area management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.

5. To propose enhancement measures after utilizing the resources

### **1.5 The Site Manager**

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the batching site in accordance with this document.
- Ensure a suitable briefing on asphalt plant area management requirements is included in the site induction for new starters
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities from asphalt area, including deliveries, on a weekly basis in accordance with the arrangements in this document.

### **1.6 Introduction of Firm**

Asif Ali & Associates Pvt. Ltd. was founded in 2004. It is a Civil Engineering firm with the expertise in design, design review and construction supervision of highways, motorways and urban roads. Over the last 20 years, have provided consultancy services. Providing services for Highway Engineering, Transportation, Structural Engineering, Hydrology, Topographic Surveys, Environmental Impact Assessments, Bridge Engineering, Soil Investigation, Geotech Investigation, Traffic Studies, Pavement Design, Highway Safety Audit, Feasibility Studies, Economic Analysis, Tender Documents, Bills of Quantity, Engineer's Estimates, PC-I's, EPC, PPP, BOT, Construction Supervision, Project Management, QA/QC, Traffic Assessment.

### **1.7 Location of Project:**

The proposed Interchange, is located near Lundianwaia on M-3 at intersection point of M-3 and Jaran Wala road.



Figure 1: Site Vicinity Map

## 2 MANAGEMENT PLAN

### 2.1 General

This section includes detailed and comprehensive Batching and Asphalt Plant Management Plan for proper utilization of resources for the project construction.

### 2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

**Proponent:** The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

### 2.3 Batching and Asphalt Area Management Plan

It lists all the mitigation measures associated with the Batching and Asphalt area with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 1 shows batching and asphalt area management plan being implemented in the said location and also highlights the points to be implemented.

**Table 1: Batching and Asphalt Area Management Plan**

<b>Anticipated Impacts</b>	<b>Mitigation Measures</b>	<b>Responsibility</b>	<b>Frequency</b>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>✓ Dust collector will be installed to collect dust generating from drying process.</li> <li>✓ Low sulphur fuel will be used in generators.</li> <li>✓ Regular monitoring will be carried out by 3rd party to assess the nuisance of emissions from the project site.</li> <li>✓ Monitoring data should be kept in record for further correspondence.</li> </ul>	Contractor	Construction Phase
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>✓ Domestic wastewater should be disposed of in sewer line.</li> <li>✓ Proper wastewater management should be carried out to avoid pollution of surface and groundwater.</li> </ul>	Contractor	Construction Phase
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Solid waste should be disposed off through approved vendors.</li> <li>• Training will be provided to personnel for identification, segregation, and management of waste.</li> <li>• For the collection of such waste, receptacles will be provided.</li> <li>• Waste from such containers shall be collected separately on a daily basis.</li> <li>• All the collection bins shall be properly maintained on regular bases.</li> </ul>	Contractor	Construction Phase
<b>Noise</b>	<ul style="list-style-type: none"> <li>• Equipment should be regularly serviced.</li> </ul>	Contractor	Construction Phase

	<ul style="list-style-type: none"> <li>• 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</li> <li>• Schedule different noisy activities to occur at the same time as less frequent noise activities would be less annoying.</li> </ul>		
<b>Fire Hazard</b>	<ul style="list-style-type: none"> <li>• Availability of fire extinguishers at plants site.</li> <li>• Install fire-fighting equipments in the entire plant area.</li> <li>• Train employees to use fire-fighting equipments at the time of emergency.</li> </ul>	Contractor	Construction Phase
<b>Increased Risk of Occupational Health and Safety Incidences</b>	<ul style="list-style-type: none"> <li>• Ensure that workers are oriented to the specific hazards of individual work assignments.</li> <li>• Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards;</li> <li>• Conduct basic first aid, fire safety training, and Occupational Safety and Health training.</li> <li>• Provide adequate lighting in all operating rooms.</li> <li>• Passageways for pedestrians and vehicles within and outside building should be segregated and should provide for easy, safe, and appropriate access.</li> <li>• Provision of fire-fighting equipment in strategic and well labelled sites.</li> <li>• Train workers on safe work practices, and provide appropriate PPE.</li> </ul>	Contractor	Construction Phase

	<ul style="list-style-type: none"> <li>• Enforcement of use of PPE such as gloves, lab coats, nose masks in all workrooms requiring use.</li> </ul>		
<b>Equipment Maintenance</b>	<ul style="list-style-type: none"> <li>• Prepare and keep the record of equipment maintenance log.</li> <li>• Prepare proper maintenance sheets for vehicles.</li> <li>• Use fully tuned vehicles and machinery.</li> </ul>	Contractor	Construction Phase

## **2.4 Control of Transportation Vehicles**

Vehicular access routes will be established on site from asphalt area, and as far as reasonably practicable these will be away from pedestrian routes, uneven ground, excavations and structures. Records shall be kept on site for all construction vehicles accessing the site, and shall include the following:

1. Make, model and serial number.
2. Records of inspection of work equipment including a written weekly check of the operation of the equipment confirming adequacy of safety devices such as emergency stops, audible and visual alarms, controls, guards etc.
3. Records of thorough examination of lifting equipment including dates of last and next examination.
4. Operators' certification and training records.

All requirements for additional material will be discussed with the site manager in advance, prior to delivery to site. Parking is outside the site hoarding and there are 2 spaces which belong to the actual site in Invicta close for the project team. The site does not anticipate more than 5 people on site at its peak.

## **2.5 Reporting**

Everyone on site has a duty to contribute to site safety, and will be requested to report any near misses or dangerous situations, including that involving asphalt area management on site. The near miss reporting system will be used to assess any deficiencies in the asphalt area management arrangements, and remedial action will be taken as necessary.

## **2.6 Conclusion**

This management plan is formed to for batching and asphalt plant site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts at asphalt plant are observed and this Management Plan is sufficient if implemented in true spirit.

**BORROW AREA**  
**MANAGEMENT PLAN**

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# 1 INTRODUCTION

## 1.1 General

The purpose of this Borrow Area Management Plan is to organize activities so that the area from which material is excavated to be used as fill material in another area can be reclaimed or rehabilitated. The abandoned borrow areas can result into various risk factors which can be:

1. Loss of ecosystem
2. Ground water contamination
3. Loss in vector population and associated illness
4. Loss of flora and fauna

During road construction or any other development project at large scale, the materials are excavated from borrow sites, it is necessary that borrow area sites should be properly maintained after the material is excavated as well as during excavation disturbance to nearby environment should be minimized by adopting mitigation measures. This report gives an over view for the management plan set by the contractor for borrow area.

## 1.2 Project Background

National Highway Authority is taking up the feasibility study and detailed design of road from Lahore - Abdul Hakeem (M-3) Motorway, The Motorway starts from Lahore and after traverses through the Cities/Towns like Nankana Sahib, Jaranwala, Tandlianwala, samgndri, Toba Tek Singh, Kamalia, Pir Mahal, shorkot and terminates at Abdul I-Iakeem in Khanewal District. The proposed interchange is located at a distance of (14.9 km Approx.) from Jaranwala Interchange and (23 km approx.) from Nankana Sahib Interchange.

## 1.3 Project Objectives

- This section is intended to provide safer, quicker and more efficient passage.
- After construction of subject project as per detailed design, smooth traffic flow will be possible to a great extent.
- Vehicle operating cost will be reduced & travel time will be saved.
- Job opportunities will be created for local.

## 1.4 Objectives of Borrow Area Management Plan

The purpose and aims of this plan are:

1. To identify the Excavation related hazards and risks present on site.
2. To effectively manage the risk from construction site through implementing control measures.
3. To communicate the construction site, borrow area management procedures to all site operatives, visitors and other interested parties.
4. To raise awareness of the risks identified and controls in place.
5. To propose enhancement measures after utilizing the resources

**6. To ensure safe route of raw material transportation**

**1.5 The Site Manager**

The site manager shall:

- Ensure measures such as the use of pedestrian barriers, stop blocks, one-way systems where possible, segregation of routes, signage, etc. are implemented as required within the borrow site in accordance with this document.
- Ensure a suitable briefing on borrow area management requirements is included in the site induction for new starters
- Ensure suitable steps are taken to co-ordinate traffic movements in the construction area by involving subcontractor supervisors in regular reviews of planned work activities from borrow area, including deliveries, on a weekly basis in accordance with the arrangements in this document.

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**1.7 Location of Project:**

The proposed Interchange, is located near Lundianwaia on M-3 at intersection point of M-3 and Jaran Wala road.



Figure 1: Site Vicinity Map

## 2 MANAGEMENT PLAN

### 2.1 General

This section includes detailed and comprehensive Borrow Area Management Plan for proper utilization of resources/ fill space for the project construction.

### 2.2 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

**Proponent:** The project proponent will designate responsibilities for compliance with the management plan. Concerned Departments will carry out verification checks to ensure that the workers are effectively implementing their environmental and social requirements.

### 2.3 Borrow Area Management Plan

It lists all the mitigation measures associated with the borrow area with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 1 shows borrow area management plan being implemented in the said location and also highlights the points to be implemented.

**Table 1: Borrow Area Management Plan**

<b>Project Activities</b>	<b>Potential Impacts On Environment</b>	<b>Mitigation Measure</b>	<b>Responsibility</b>	<b>Time Frame</b>
Mining activities and blasting	Soil Erosion, Emissions, Water Contamination, Noise & Vibration, Wildlife affected, Employment, Health & Safety of Workers	<ul style="list-style-type: none"> <li>✓ Dust emission from aggregate storage stockpiles will be reduced by keeping the material moist by sprinkling of water at appropriate frequency</li> <li>✓ Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emission.</li> <li>✓ Noise control measures will be implemented</li> <li>✓ In said case surface excavation will be done in which strips will be cut till ground surface only. So, no sinkhole will be there. Off-road driving will be minimized in order to avoid accidental killing of fauna.</li> <li>✓ Workers will be provided with PPEs</li> <li>✓ Training of workers</li> <li>✓ Break of workers during blasting'</li> <li>✓ Water sprinkling on the site will minimize the dust pollution. Transportation will be done in covered trucks.</li> </ul>	Contractor	During Construction
Vehicles Usage	Soil & Water Contamination due to Fuel Leakages &	<ul style="list-style-type: none"> <li>✓ Periodic maintenance and inspection of vehicles</li> <li>✓ Vehicles with leaks will not be operated.</li> </ul>	Contractor	During Construction

	Spillage, Emissions, Noise & Vibration	<ul style="list-style-type: none"> <li>✓ All project vehicles should be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.</li> <li>✓ PPEs should be provided to workers</li> <li>✓ Machinery should be maintained properly to avoid gaseous emissions.</li> <li>✓ Vehicles should not be washed or serviced in the field.</li> <li>✓ All vehicles will be maintained in good working condition</li> <li>✓ All vehicles will have properly functioning silencers (mufflers).</li> </ul>		
Transportation of material	Dust and Particulate Emissions, Noise Generation, Safety and Health Effects	<ul style="list-style-type: none"> <li>✓ Excessive use of horns will be avoided</li> <li>✓ PPE's will be provided to workers</li> <li>✓ Covering of transporting material trucks</li> <li>✓ Nighttime driving of project vehicles will be limited where possible</li> <li>✓ Low speed limit will be maintained on the section of the access road that is adjacent to the community and site.</li> </ul>	Contractor	Proponent*
Use of local water resources	disturbance to local community	<ul style="list-style-type: none"> <li>✓ Initiation of water conservation program</li> <li>✓ Where possible, water should be recycled</li> </ul>	Design engineer & Contractor	Proponent*
Heavy machinery	Particulate Matter, Emission of GHG, Noise, Vibration	<ul style="list-style-type: none"> <li>✓ Spill prevention trays provision</li> <li>✓ Noise control plans No machinery will be left unattended, particularly in running condition</li> </ul>	contractor	Proponent*

and vehicles operation		<ul style="list-style-type: none"> <li>✓ All vehicles, other equipment used will be tuned and maintained in good working condition in order to minimize emission of pollutants</li> <li>✓ Reducing equipment noise at source by proper design, maintenance and repair of construction machinery and equipment,</li> <li>✓ Minimizing noise from vehicles by use of proper silencers and mufflers</li> <li>✓ Use noise-abating devices wherever needed and practicable.</li> <li>✓ PPE's provision</li> </ul>		
Hazardous material management	Safety hazard, spills	<ul style="list-style-type: none"> <li>✓ Labeling will be placed on all storage vessels/containers as appropriate to national and international standards. The labeling will clearly identify the stored materials</li> <li>✓ Explosives will be provided to only concerned person and proper record will be maintained.</li> </ul>	Contractor	Proponent*

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## **2.6 Conclusion**

This management plan is formed to for borrow area site of road construction to be incorporated in Environment Assessment Report (EIA) of said project. It is hereby concluded that all the potential impacts at borrow area are observed and this Borrow Area Management Plan is sufficient if implemented in true spirit.