AL-GHAZI TRACTORS LIMITED (AGTL)

REPORT OF ENVIRONMENTAL IMPACT ASSESSMENT(EIA) OF AL-GHAZI TRACTORS LIMITED (AGTL) PLANT REFURBISHMENT AT DERA GHAZI KHAN

FINAL REPORT

SUBMITTED BY

ENVIRONMENTAL SERVICES
SGS PAKISTAN (PVT.) LTD.

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Acronyms

ANSI	**American National Standards Institute**
APHA	**American Public Health Association**
BHU	**Basic Health Unit**
BOD	**Biological Oxygen Demand**
CBD	**Convention on Biological Diversity**
COD	**Chemical Oxygen Demand**
CMS	**Conservation of Migratory Species of Wild Animals**
EIA	**Environmental Impact Assessment**
EMP	**Environmental Management Plan**
EPA	**Environmental Protection Agency**
EPD	**Environment Protection Department**
ERP	**Emergency Response Plan**
HSE	**Health, Safety and Environment**
hr	**Hour**
HSSE	**Health Safety Security and Environmental Management**
IUCN	**International Union of Conservation for Nature**
kg	**Kilogram**
Km^2	**Square Kilometre**
m	**Meter**
mg/kg	**Milligram per Kilogram**
mg/l	**Milligram per Litre**
mg/m^3	**Milligram per Cubic Meter**
MW	**Mega Watt**
NEP	**National Environmental Policy**
NEQS	**National Environmental Quality Standards**
NFPA	**National Fire Protection Association**

NCS	**National Conservation Strategy**
NGO's	**Non-Governmental Organizations**
OSHA	**Occupational Safety and Health Administration of the United States**
PEPA	**Pakistan Environmental Protection Act 1997**
PEPC	**Pakistan Environmental Protection Council**
PEQS	**Punjab Environmental Quality Standards**
PM	**Particulate Matter**
PPE's	**Personal Protective Equipment**
ppm	**Parts per Million**
ROW	**Right of Way.**
sq km	**Square Kilometer**
TDS	**Total Dissolved Solids**
TSS	**Total Suspended Solids**
WHO	**World Health Organization**

Executive Summary

Al-Ghazi Tractors Limited (AGTL) being the proponent of this project is planning for construction of Plant refurbishment. 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 Provincial Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof".

Construction of the project is comprised on two buildings:

- Double Story Building having offices (covered area approx. area 6,000 sft.)
- Assembly Plant Shed (covered approx. area 160,000 sft.)

A brief survey was conducted by third party consultant to seek structural issues in the exiting building, to resolve above mentioned issues, one of the possible solutions is to construct a new facility.

SGS Pakistan Pvt. Ltd. has been assigned to prepare a complete feasibility of the project; including the preparation of the EIA of the said project to be submitted by them to AGTL. This report presents the EIA process and its findings, project alternatives, project impacts, and mitigation measures to be implemented during the execution of the proposed activities.

Details of the project is given below:

ES.1 Title of the Project

The proposed project to which this Environmental Impact Assessment EIA relates is entitled as *"EIA for Construction of AGTL Plant Refurbishment"*.

ES.2 Project Location

The project is falls within factory area. The complete location of project is as Al-Ghazi Tractors Limited Tractor Factory, Sakhi Sarwar Road NH70, Dera Ghazi Khan, Punjab, Pakistan**.** Project location map is attached as Figure 1.1.

ES.3 Name of Organization Preparing the Report

To comply with Pakistan Environmental Regulations as conceived in the Punjab Environmental Protection (Amendment) Act (PEPA) 2012, SGS Pakistan (Pvt.) Ltd. with the assignment of carrying out an EIA Study of the proposed project.

ES.4 A Brief Outline of the Proposal

Al Ghazi Tractors (Head Office) is located in Lahore and the company operates a manufacturing plant at Dera Ghazi Khan, which manufactures New Holland tractors in technical collaboration with Case New Holland, the number one manufacturer of agricultural tractors in the world. Robust and sturdy, the company's tractors are rated to produce 55, 65, 75 and 85 HP and all carry a local content of 92 per cent, the highest in the country.

Construction of the project is comprised on two buildings.

Double Story Building having offices (covered area approx. area 6,000 sft)

Assembly Plant Shed covered approx. area 160,000 sft.

ES.5 Assessment Methodology

This study has been conducted using standard environmental assessment methodology, in accordance with national and international environmental guidelines. The study evaluates the proposed project according to the environmental assessment requirements of the Pakistan Initial Environmental Examination and Environmental Impact Assessment Amended, 2022.

ES.7 Purpose and Scope of the Study

A brief survey was conducted by third party consultant to seek structural issues in the exiting building. Some of the following issues were highlighted during survey.

- Chipping & and spalling of concrete from beam surface.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Concrete spalling.
- Reinforcement of the column exposed and corroded massively.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: HIGH

- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Column bolts missing

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Cracks in the walls.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: LOW

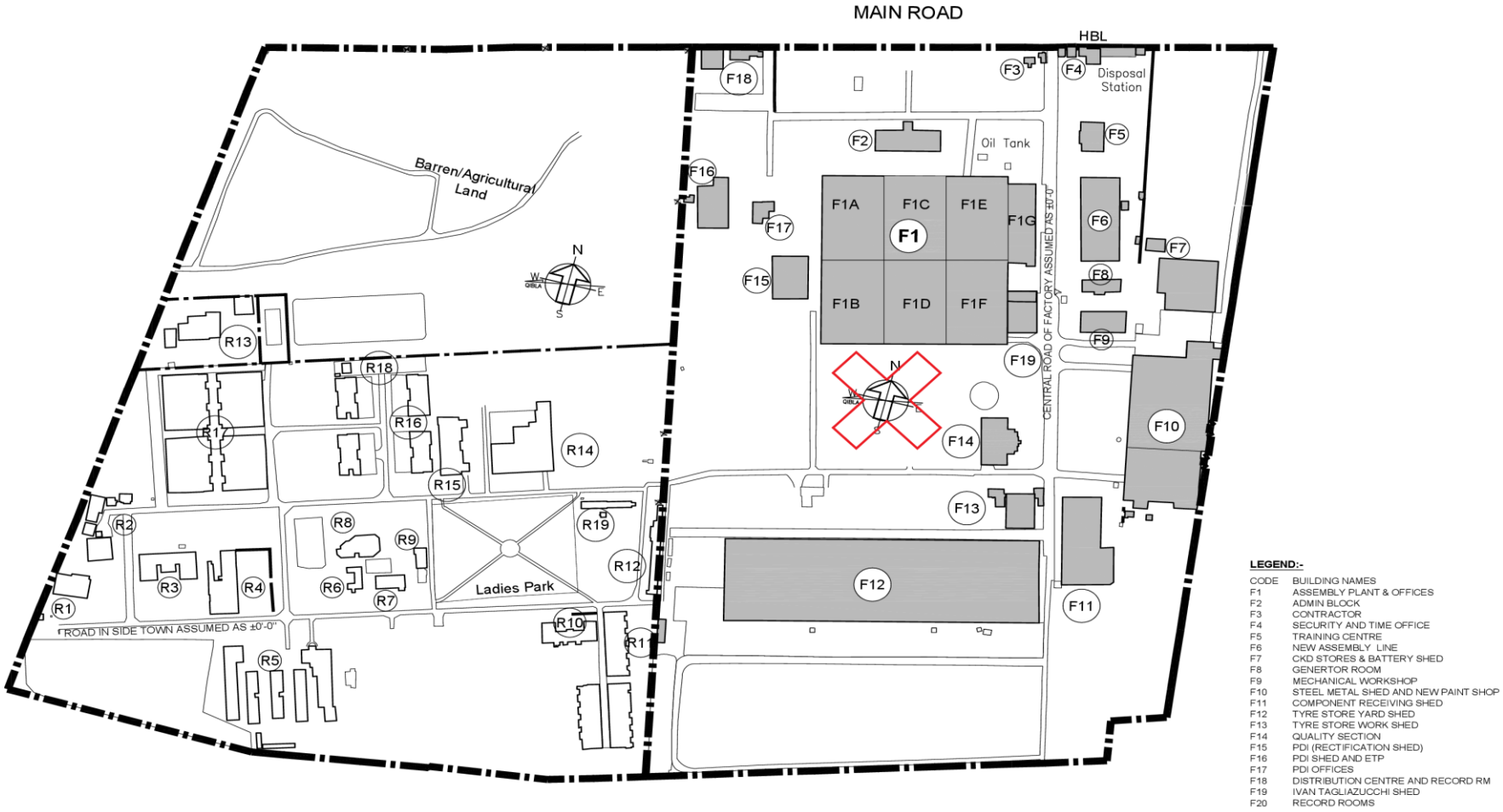
- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

The above survey and images are the reasons to refurbishment of plant, the factory establish in 1983 so over the time, it is the requirements to deal with advance structure and technology to contribute the output production in nationwide. In environmental point of view, installation of new or upgraded services to improve internal comfort conditions of workers and energy efficiency, contribute to better sustainability and higher performance standards for the indoor climate. To avoid any accident in future caused by old, damaged building, it was necessary to rebuild a new one for the safety of employees.

Figure ES-1: AGTL Project Location Map



ES.8 Description of the Environment

Topography

The Dera Ghazi Khan is located in a strip between the river Indus and the Koh-Suleman range of mountains separating it from the Baluchistan Province. It is surrounded by Dera Ismail Khan on the North and Rajanpur on its South. Indus river flows on the East across which lie the districts of Muzafargarh and Layyah. Loralai and Dera Bugti districts of Baluchistan Province lies on the West separated by the Koh-Suleman range of mountains.

D.G. Khan is one of the most progressive looking districts of Punjab with literacy rate of 48% amongst school going children. During the survey it was observed that mostly people use filtration plants for drinking purpose.

Water Resources

Indus river is one of the longest rivers in the world, with a length of some 2,000 miles (3,200 km). Its total drainage area is about 450,000 square miles (1,165,000 square km), of which 175,000 square miles (453,000 square km) lie in the ranges and foothills of the Himalayas, the Hindu Kush, and the Karakoram Range; the rest is in the semiarid plains of Pakistan. River Indus is flowing in the east of DG Khan.

Climate

The climate of district is hot in summer and cold in winter. The climate is almost uniform throughout the district except hilly portion which has severe winter and a mild summer. Except the hilly track, land of D.G. Khan is plain. The temperature here averages 32 °C. The average annual rainfall is 104 mm. There is not much of rainfall during the winter which lasts from the end of October till the middle of March and is generally quite pleasant. The change from winter to summer is very sudden and by the end of April heat become intolerable.

Floral Attributes of the Project Area

Based upon observations during the field visit; no species found within project area however in surroundings some species of plants were directly observed. The number of anthropogenic activities in the area is very high. The major crops of the district are Wheat, Rice, Oil Seeds and Cotton. This is among one of the best cotton growing districts of the country. The major fruits are Citrus, Mango and Guava. Besides, Sunflower, Sugarcane, Jawar, Bajra, Mash, Moong, Masoor, Gram, Maize are also grown in minor quantities in the district.

Faunal Attributes of the Project Area

Based upon observations during the field visit; no species found within project area however in surroundings some species of birds were directly observed. The most favorite habitat of the Avian Fauna was found in the surroundings of the study area especially trees in agricultural fields. These areas are composed of larger as well as smaller patches of vegetation. Most common species include Quail, Black Drongo, Brown Partridge, Egret, House Crow, Pigeon and Duck etc.

ES.9 Socioeconomic Environment

A detailed socioeconomic survey was carried out in and around the project area. The purpose of the survey was to enumerate, evaluate and assess the existing social, cultural and economic conditions and to determine the community's requirements.

During field visit consultation was done nearby proposed project area. Population at and near vicinity of the proposed project area was consulted in order to get socioeconomic profile of the area. The average household size of the consulted population was found 6 persons per household.

The majority of the area's population depends mainly on agriculture and livestock rearing for its livelihood, small business is also a source of earning. A number of people are employed in the education, irrigation, police, roads departments and

Pakistan army. People also work in industries present at different locations in the vicinity of proposed project area.

Health facilities are available in the project site. In case of emergency, the patients visit District Government Hospitals present in city. There are several government and private schools in the city. For higher education, people consider moving to major cities like Multan, Lahore and Islamabad.

Agriculture is one of the most important economic activities in the project area. The land is suitable for irrigated agriculture and is capable of producing good yields of wheat, corn, sugarcane and maize. Livestock consists primarily of buffalos, sheep, cows, goats and donkeys. Livestock is the most important asset of the poor and the livestock they own is their major buffer against poverty.

ES.10 Potential Project Impact and Mitigation

The potential impacts associated with the proposed project construction and operation activities included: loss of vegetation and soil erosion due to earthwork, vehicle movement; soil contamination; increase in water consumption, air pollution from vehicle, generator exhausts and fuel combustion, waste generation, noise and disturbance.

The physical scarring caused by clearing and levelling during project site construction activities could lead to alteration of soil quality by removal of topsoil, loses of plant cover and limited soil erosion induced by disturbance to native soil. Water will be required during proposed project activities.

Estimate demand in water resources to meet the requirements would be fulfilled from existing ground water sources within project area. The plan will also include strategies to minimize water use (and therefore volume of discharge) and maintain reserves.

The ambient air quality of the area can be affected by exhaust emissions from the generators, vehicles and combustion of biomass. The pollutants can seriously impair human health and ecological environment and other materials. The

emissions include sulphur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide, and particulates. The emission levels depend on the type and size of activity, the type and quality of fuel and the manner in which it is burned.

A significant impact will be interpreted if the concentration of pollutants in the ambient air exceeds the PEQS or recognised international guidelines for ambient air quality guidelines. To reduce the impact on air quality, cleaner fuels (less 1% Sulphur content) will be preferred to procure. Monitoring of Ambient air parameters and emissions should be carried out on to ensure compliance with the PEQS.

AGTL will implement a thorough waste management plan to ensure that any impact resulting from waste generation and management shall be minimal. The recyclable waste will be sold to waste contractors, as per waste management plan. No hazardous chemical will be uncontrollably discharged into the environment. A waste management plan will be developed and implemented by considering the best technological and environmental options and will apply the "Reduce, Re-use, Recycle" hierarchy thereby minimizing the overall fuel consumption.

Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register. Audits of the waste disposal contractors and waste disposal facilities will be undertaken on a regular basis to ensure the implementation of waste handling and disposal procedures.

Noise has the potential to cause an impact to nearby communities and working personnel. To avoid the impact of noise, it will be ensured that generators, vehicles and other potentially noisy equipment used are in good condition. All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.

To mitigate the project's impacts on the already stressed biological resources of the area, following measures will be incorporated into its design:

- Clearing of vegetation will be kept to an absolute minimum.
- All the wastes will be properly handled, stored and disposed through implementation of an effective waste management plan.
- Reforestation activities will be followed.

A summary of potential impacts and proposed mitigation measures for construction and operation phase are provided in Table ES-1 & ES-2.

Table ES-1: Potential Impacts and Mitigation Measures for Construction Phase

Sr.	*Project Activity*	*Impacts*	*Mitigation*
1	**Site clearing / leveling**	▪ Loss of vegetation may occur. ▪ Soil erosion.	▪ Unnecessary clearing of outside the working areas will be avoided and shall be strictly prohibited. ▪ Clear without destroying large plants and turf where possible and preserve them for replanting in temporary nurseries. ▪ Use erosion control measures such as hay bales, berms, straw, or fabric barriers. ▪ Re-vegetate with recovered plants.
2	**Construction crews and camps**	▪ Construction and operation of crew camps may pollute the groundwater. ▪ Workers may rise conflicts with the locals.	▪ Keep camp size to a minimum. ▪ Avoid as much clearing of vegetation as possible, define footpath for crew. ▪ The contractor will provide plan for removal and rehabilitation of site upon completion. ▪ Photographs will be taken before any activity to record the conditions of site at locations that are likely to undergo soil erosion. Similar photographs will be taken after restoration, where applicable. ▪ Provide proper solid waste disposal facilities at camp. ▪ Provide proper sanitation facilities. ▪ Maintain emergency response system. ▪ Drinking water should meet the PEQS and WHO Guidelines. ▪ Movement of all project personnel will be restricted to work areas.
3	**Handling/ transportation of hazardous materials**	▪ Toxicity, soil contamination and air pollution are the major impacts which may occur by mishandling of hazardous waste.	▪ Prevent dumping of hazardous materials. ▪ Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc. ▪ Emergency Response Plan is prepared to address the accidental spillage of fuels and hazardous materials.
4	**Waste Management**	▪ Solid waste may be generated from the active construction sites and also from the camp sites.	▪ Bitumen waste should be stored in closed containers and placed in a fenced storage area with paved floor. ▪ Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton. ▪ Recyclable material will be separated at source. The recyclable waste will be sold to

Sr.	*Project Activity*	*Impacts*	*Mitigation*
			waste contractors. ▪ An emergency response plan will be developed for the hazardous waste and substances. ▪ Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register. ▪ Training will be provided to personnel for identification, segregation, and management of waste. ▪ No waste will be dumped at any location.
5	**Worker's Health & Safety**	▪ Health problems or immediate risk may take place. ▪ Occupational health of workers may be affected.	▪ Providing 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) will be provided to the workers operating in the vicinity of high noise generating machines. ▪ Proper maintenance of facilities for workers will be monitored. ▪ Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. ▪ Ensure strict use of wearing PPE during work activities.
6	**Implementation of Plantation Plan**	▪ Clearing of vegetation and trees from the area	▪ The vegetation will only be cleared from the proposed site if required. ▪ Compensation for trees required to be cut will be replant accordingly.
7	**Socioeconomic / Local community**	▪ Community awareness ▪ Skilled and un-skilled jobs for local community.	▪ Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities. ▪ Awareness and cultural inductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities. ▪ Discharging firearms will be explicitly prohibited.

Table 0-1: Potential Impacts and Mitigation Measures for Operational Phase

Sr.	*Project Activity*	*Impacts*	*Mitigation*
1	**Spillage**	▪ Oil spill may occur which could cause an accident.	▪ In case of any accidental spillage, emergency plan should be implemented. ▪ Relevant department should coordinate on spillage emergency.
2	**Waste Management**	▪ Generated waste resulting from various operations.	▪ Provide appropriate options for waste management. ▪ Assess opportunities for reducing solid waste generation in particular of hazardous and undesirable materials (oils and grease). ▪ Dumping of oil residuals and any other waste to be done in designated areas only. ▪ Encourage segregation of waste from the source and use the 3R waste management approach: Reduce, Reuse and Recycle. ▪ Design provisional waste material storage for the sorted-out waste at the site (e.g. spoil area).

AGTL = Al-Ghazi Tractors Limited

ES.11 Environmental Management Plan (EMP)

For effective implementation and management of mitigation measures, an Environmental Management Plan has been prepared. The EMP provides a delivery mechanism to address potential impacts of project activities, to enhance project benefits and to introduce standards of good practice in all project activities. The EMP has been prepared with the objective of:

- Defining legislative requirements, guidelines and best industry practices that apply to the project.
- Defining mitigation/ monitoring plan required for avoiding or minimizing potential impacts assessed by the EIA.
- Defining roles and responsibilities of the project proponent and the contractor.
- Defining requirements for environmental monitoring and reporting.
- Defining the mechanism with which training will be provided to the project personnel.

Environmental sensitivities and impacts, as well as the associated mitigation plan have been addressed in the EMP. AGTL will ensure that the project staff will be adequately trained in HSE sensitivities and operational management procedures, so that all levels of staff effectively contribute to impact prevention and mitigation at all times.

An Environmental Management Plan (EMP) has been prepared and provided in Chapter # 8 of the report, providing:

- A systematic approach to ensure that mitigation strategies prepared in this EIA are implemented during project activities.
- An appropriate monitoring plan is device to ensuring strict adherence to the environmental mitigation and control measures.
- A training program is device to providing awareness training on all potential environmental issues of the project to all personnel at site.
- A waste management plan, identifying the most suitable waste disposal and pollution control options throughout the project lifecycle.

ES.12 Proposed Monitoring

To monitor actual impacts of the project on selected sensitive receptors so that impacts not anticipated in the EIA or impacts which exceed the levels anticipated in the EIA can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.

Considering the environmental conditions of the project area and the assessment of potential impacts of the project made in the EIA, the following environmental parameters will be monitored at locations identified during the construction phase (e.g. location of asphalt plants, construction camps etc.).

Air Quality Monitoring – Air quality monitoring will be done during the construction and operation phase of the project at the representative locations. Ambient air quality parameters will include NO_X, SO_X, CO, PM_{10}.

Water Quality Monitoring – Ground water quality monitoring will be done during the construction and operation phase of the project at the representative locations.

Groundwater Quality Parameters: Total Coliforms, Total Colonial Count, Faecal Enterococci, pH, TDS, Total Hardness, Nitrate, Chloride, Sodium.

Wastewater Quality Parameters: pH, DO, TSS, Alkalinity, BOD_5, COD, Turbidity.

Noise Monitoring - The monitoring will be carried out at key locations covering all receptors.

1 Introduction

Al-Ghazi Tractors Limited (AGTL), the Company/Project Proponent) proposes to construct a double story office building and assembly plant within factory premises area. This chapter presents the data relevant to the undertaking of the EIA carried out by SGS Pakistan (Pvt.) Limited for AGTL Plant Refurbishment at DG Khan, Punjab, Pakistan and details of the project title, project proponent, EIA consultants, the project rationale and the approach taken to the EIA study.

1.1 Project Title and Project Proponent

1.1.1 Project Title

The proposed project to which this Environmental Impact Assessment (EIA) relates is entitled as *"EIA for Construction of AGTL Plant Refurbishment"*. A key map showing the location of the project area in **Figure 1.1.**

1.1.2 Project Proponent

The proponent of the project is "Al-Ghazi Tractors Limited (AGTL)".

1.2 EIA Consultant

The EIA study was carried out by team of SGS Pakistan (Pvt.) Limited, comprising of Environmentalist, Environmental Chemist and sector experts with diversified experience on local and international assignments. The detail of the project team deputed on this assignment is attached as **Annexure-A.**

1.3 Purpose of the Report

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 Provincial Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact*

assessment, and has obtained from the Provincial Agency approval in respect thereof".

1.4 Brief Description of Nature, Size, and Location of the Project

Incorporated in June 1983 and privatised in December 1991, Al Ghazi Tractors Limited, a subsidiary company of UAE headquartered Al-Futtaim, with a record of consistent corporate achievement, the company is recognised for corporate excellence and 'Best Corporate Performance'.

Al Ghazi Tractors (Head Office) is located in Lahore and the company operates a manufacturing plant at Dera Ghazi Khan, which manufactures New Holland tractors in technical collaboration with Case New Holland, the number one manufacturer of agricultural tractors in the world. The company's tractors are rated to produce 55, 65, 75 and 85 HP and all carry a local content of 92 per cent, the highest in the country.

Third party survey was conducted to seek the structural condition of the facility as established in 1983. It was recommended to Refurbishment of plant assembly facility.

Construction of the project is comprised on two buildings:

1. Double Story Building having offices (covered area approx. 6,000 sft).
2. Assembly Plant Shed (covered area approx. 160,000 sft).

Some of the following issues were highlighted during survey.

- Chipping & and spalling of concrete from beam surface.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Concrete spalling.
- Reinforcement of the column exposed and corroded massively.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: HIGH

- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Column bolts missing

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

- Cracks in the walls.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: LOW

- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

►RISK: MEDIUM

The above survey and images are the reasons to refurbishment of plant, the factory establish in 1983 so over the time, it is the requirements to deal with advance structure and technology to contribute the output production in nationwide. In environmental point of view, installation of new or upgraded services to improve internal comfort conditions of workers and energy efficiency, contribute to better sustainability and higher performance standards for the indoor climate. To avoid any accident in future caused by old, damaged building, it was necessary to rebuild a new one for the safety of employees.

1.5 EIA Process

1.5.1 Overview of EIA

EIA is a systematic process to identify, predict and evaluate the environmental impacts of proposed actions and projects. The process is applied prior to major decisions and commitments being made. Wherever appropriate, social, cultural and health effects are considered as an integral part of EIA. Particular attention is given to practical implementation of EIA to prevent and mitigate significant adverse effects of proposed undertakings.

1.5.2 Objective of EIA

The overall objective of the EIA is as follows:

- Description of the proposed project, including an estimate of emissions, effluent, waste and consideration of the project alternatives.

- Identify and investigate all impacts of the proposed project on the physical, biological, and socio-economic environment.
- Evaluation of the baseline environmental conditions in the impact zone to provide a basis for assessing the incremental impacts of the proposed project, including existing pollution levels and nuisance conditions.
- Identification and assessment of the potential impacts on the environment during each of the project phases.
- To propose mitigation measures that would help the Project Proponent in conducting the operation in an environmental sustainable manner.
- To develop an Environmental Management Plan that would assist the Project Proponent in the effective implementation of the recommendations of the EIA.

1.5.3 Scope of EIA

This EIA covers the construction & operational anticipated impacts of AGTL Plant Refurbishment at Dera Ghazi Khan. The scope of the EIA includes:

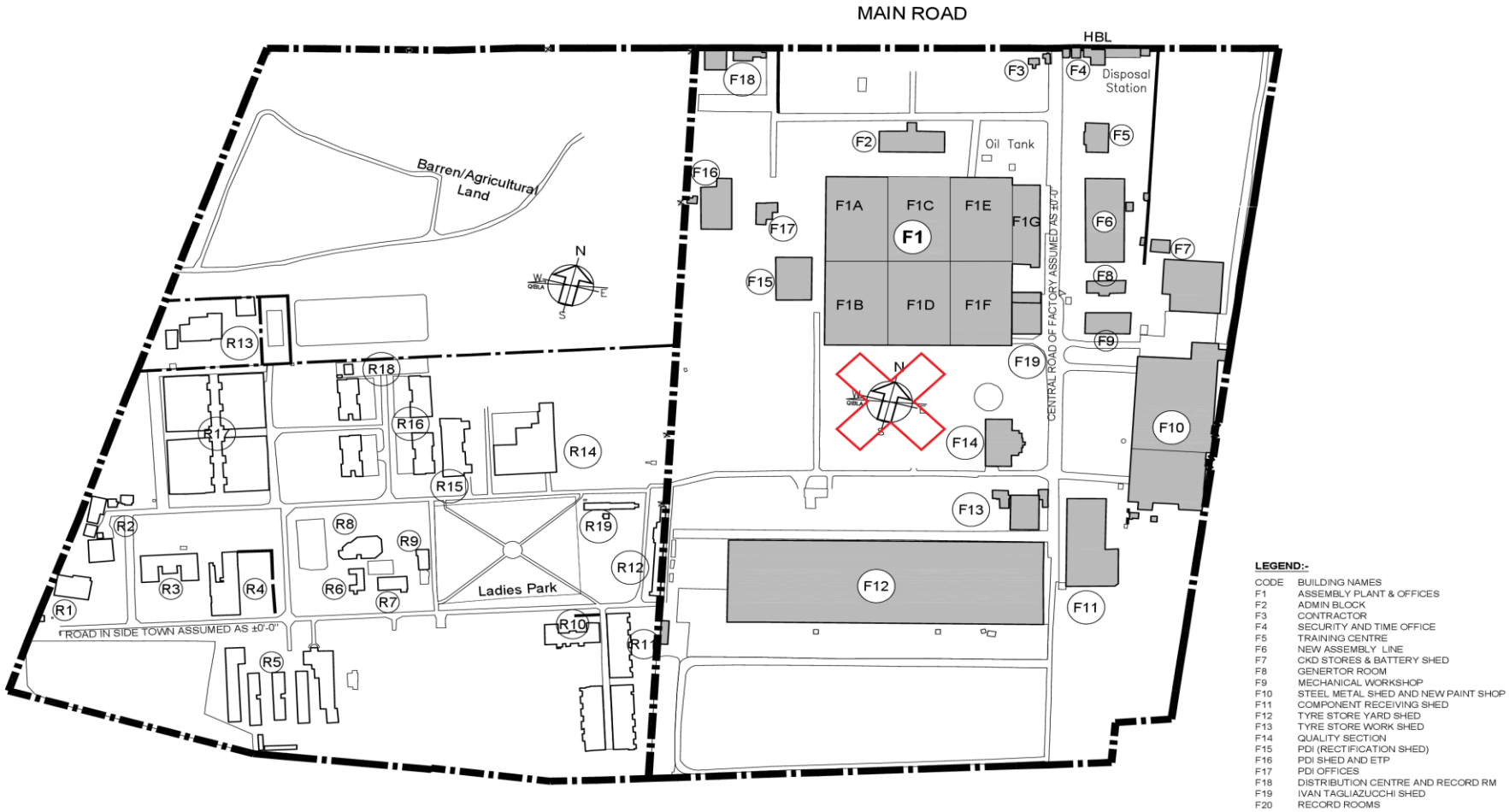
- Construction.
- Operation.

1.5.4 Spatial Scope

Impacts are assessed within the area of influence of the proposed project defined as:

- *Immediate Area of Influence:* at immediate footprint of proposed project location.
- *Direct Area of Influence:* within the proposed project corridor

Figure 1.1: AGTL Project Location Map



1.6 EIA Methodology

The EIA project passes through series of stages prior to report preparation. The EIA process and the approach followed for the proposed project is defined below:

1.6.1 Data Collection

Following literature review and data collection was carried out for EIA:

- A generic description of the proposed project and its related activities was collected from the client.
- Legislative review of the applicable laws, regulations, guidelines and standards from various organizations and literature search.
- Baseline of the area's environmental and socio-economic settings was collected through literature search and field surveys.

1.6.2 Baseline

The environmental impact is measured through a change in the environment, resulting from a designated action or activity. In order to identify such a change, it is essential to have as complete as practicable understanding of the nature of the existing environment, prior to its interaction with the proposed activity. This translates into the need to characterize the existing baseline environmental conditions, including establishing prevailing conditions for a range of environmental media, particularly air, water, soil and groundwater, flora and fauna and the human environment.

This was achieved through a detailed review of all secondary resources (i.e. existing documentation and literature) and the undertaking of project specific baseline studies and surveys to collect supplementary data in the following areas:

- Geology.
- Flora and fauna.
- Water quality characteristics.
- Soil quality.
- Ambient air quality.
- Noise conditions.

- Socio-economic conditions.
- Archaeology.

Both the existing secondary sources and literature studies were conducted and integrated into one coherent description of baseline characteristics.

1.6.3 Stakeholder Consultation

Communities nearby the project area were consulted during the fieldwork to record their concerns and suggestions, also consultation was done with Govt. bodies to keep in loop and their suggestions as well.

1.6.4 Evaluation of Alternatives

To establish an environmentally sound preferred option for achieving the objectives of the proposed project, different alternatives including site selection, raw material and technology alternatives were studied in collaboration with the project proponent. Technology selection was made taking into consideration environmentally, economically and socially suitable as well as technically feasible options.

1.6.5 Impact Assessment and Mitigation

The information collected in the previous phases was used to assess the potential environmental impacts of the proposed project activities. The impact assessment approach is provided in **Table 1.1.** Detailed methodology is included in Chapter 7 of the report. Mitigation measures were evaluated to reduce the impacts of project activities on environment. The issues studied during impact assessment include potential impacts on:

- Physical environment of the area
- Biological environment of the area
- Socio-economic environment of the area.

Table 1-1: Impact Assessment Approach

Impact Characteristics	Categories
Nature of the Impact	**Direct**: The environmental parameter is directly changed by the project. **Indirect:** The environmental parameter changes as a result of change in another parameter.
Duration of the impact	**Short term:** Lasting only till the duration of the project such as noise from the construction activities. **Medium term:** Lasting for a period of few months to a year after the project before naturally reverting to the original condition. **Long term:** Lasting for a period much greater than medium term impacts before naturally reverting to the original condition.
Geographical Location of the impact	**Local:** Within the area of project i.e. operation site. **Regional:** Within the boundaries of the project area. **National:** Within the boundaries of the country. **Global:** Trans-boundary impacts
Timing	Construction Operation
Likelihood of the impact	**High:** High likelihood of occurrence during lifetime of operation, Regular/continuous part of operations. **Moderate:** Moderate possibility of occurrence during lifetime of operation, Periodic/occasional part of operations. **Low:** Unlikely to occur during lifetime of operation.
Reversibility of the impact	**Reversible:** When a receptor resumes its pre-project condition. **Irreversible**: When a receptor does not or cannot resume its pre-project condition.
Significance of the impact	**Major, Moderate, Minor, Negligible and Beneficial** Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.
Consequence severity of impact	**High:** ❑ Serious/catastrophic damage to environment ❑ Direct legislative requirement ❑ Corporate requirement ❑ Serious threat to corporate reputation/profitability/ability to do business. **Medium:** ❑ Measurable damage to the environment ❑ Subject to potential future legislation ❑ Potential to affect reputation/cost ❑ Implication/reduced efficiency **Low:** ❑ Negligible damage to the environment ❑ No risk to business

1.7 Organization of the Report

This report has been structured in the following manner:

Chapter 1 *(Introduction)* gives an introduction of the project and overview of EIA process.

Chapter 2 *(Legal Framework)* gives an overview of policy and legislation along with international guidelines relevant to EIA.

Chapter 3 *(Project Description)* provides the description of the proposed project, its layout plan and associated activities, raw material details and utility requirement.

Chapter 4 *(Project Alternatives)* provides the description of the site alternatives for the proposed project.

Chapter 5 *(Description of Baseline Environment)* provides a description of the micro-environment and macro-environment of the proposed project site. This chapter describes the physical, ecological and socioeconomic resources land of project area and surroundings.

Chapter 6 *(Stakeholder Consultation)* presents the process and finding of stakeholder consultation being carried out for the proposed project.

Chapter 7 *(Impact Assessment and Mitigation Measures)* describes the potential environmental and social impacts of proposed project on the different features of the micro and macro-environment using the matrix method.

Chapter 8 *(Environmental Management Plan)* explains the mitigation measures proposed for the project in order to minimize the impacts to acceptable limits. It also describes implementation of mitigation measures on ground and monitoring of environmental parameters against likely environmental impacts.

Chapter 9 *(Conclusion)* summarizes the report and presents its conclusions.

The last Chapter is followed by the references and series of **Annexes** that provides supporting information.

Chapter 9 *(References)* presents the list of references where secondary data collected.

1.8 Contact Details

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2 Legal Framework

This chapter provides an overview of the environmental policies, legislations, and guidelines that may have relevance to the proposed project. These include national environmental policy, legislation, guidelines and international conventions and guidelines. AGTL will be required to adhere to the relevant requirements of the policies and legislation during the construction and operation of the proposed activities, which has also been incorporated in the mitigation measures and the EMP provided in the EIA.

2.1 Constitutional Provision

According to the Constitution of Pakistan, the legislative powers lie with the federal parliament and the legislative assemblies of the four provinces of Pakistan. The Fourth Schedule of the constitution provides two lists of issues. One of the lists, the *Federal Legislative List*, includes issues on which only the federal government has legislative powers. The second list, the *Concurrent Legislative List* includes issues on which both the federal and the provincial governments have legislative powers. If a particular legislation passed by a provincial assembly comes into conflict with a law enacted by the national assembly, then according to the constitution, the federal legislation will prevail over the provincial legislation to the extent of the inconsistency. The subject of 'environmental pollution and ecology' is included in the concurrent list of the constitution. Thus, allowing both the federal and provincial governments to enact laws on the subject.

Prior to the 18th amendment in the constitution in 2010, only the federal government had enacted laws on environment, and the provincial environmental institutions derived their power from federal law. Article 9 of the constitution defines the right to life as a fundamental right in these words "No person shall be deprived of life or liberty save in accordance with law".

2.2 National Environmental Policy, 2005

The National Environmental Policy (NEP) was approved by the Pakistan Environmental Protection Council (PEPC) in its 10th meeting on 27th December, 2004 under the chairmanship of the Prime Minister of Pakistan and thereafter approved by the Cabinet on 29th June 2005. NEP is the primary policy of Government of Pakistan that addresses the environmental issues of the country. The broad Goal of NEP is, "To protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP identifies the following set of sectoral and cross-sectoral guidelines to achieve its Goal of Sustainable Development.

Sectoral Guidelines:

Water and sanitation, Air quality and noise, Waste management, Forestry, Biodiversity and Protected areas, Climate change and Ozone depletion, Energy efficiency and renewable, agriculture and livestock, and Multilateral environmental agreements.

Cross Sectoral Guidelines:

Poverty, Population, Gender, Health, Trade and environment, Environment and local governance and Natural disaster management.

The NEP suggests the following policy instruments to overcome the environmental problems throughout the country:

- Integration of environment into development planning,
- Legislation and regulatory framework,
- Capacity development,
- Economic and market-based instrument,
- Public awareness and education, and
- Public private civil society partnership.

NEP is a policy document and does not apply to projects. However, AGTL should ensure that the project should not add to the aggravation of the environmental

issues identified in NEP and mitigation measures should be adopted to minimize or avoid any contribution of the project in these areas.

2.3 National Conservation Strategy

Before the approval of National Environmental Policy (NEP) the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment this strategy just exists as a national conservation program.

NCS does not directly apply to construction projects, however, AGTL should ensure that the project should not add to the aggravation of the 14 core environmental issues identified in the NCS and mitigation measures should be adopted to minimize or avoid any contribution of the project in these areas.

2.4 National Environmental Legislation

The definition of environmental law can be derived from the legal definition of 'environment' as defined in PEPA 1997. In Section 2(x) of the Pakistan Environmental Protection Act 1997 (PEPA 1997) environment is defined to include air, water, land and layers of the atmosphere; living organisms and inorganic matter; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; social and economic conditions affecting community life; and the interrelationship between these elements. From this definition, an environmental law can be considered to include all laws that are designed to, or that directly or indirectly affect, the management of natural resources including the control of pollution of these natural resources.

By this definition, environmental laws include a) laws that have been specifically enacted to protect the environment such as the PEPA 1997, and b) laws relating to subject such as forest, water resources, wildlife, land, agriculture, health, and town planning.

2.4.1. The 18th Amendment in Constitution of Pakistan and Status of Punjab EPA

Prior to the 18th Amendment to the Constitution of Pakistan in 2010, the legislative powers were distributed between the federal and provincial governments through two 'lists' attached to the Constitution as Schedules as mentioned above. The subject of 'environmental pollution and ecology' was included in the Concurrent List and hence allowed both the national and provincial governments to enact laws on the subject. However, as a result of the 18th Amendment this subject is now in the exclusive domain of the provincial government. As a result, the Ministry of Environment at the federal level has been abolished. Its functions related to the national environmental management have been transferred to the provinces. The international obligations in the context of environment will be managed by the Ministry of Climate Change.

As a result, Departments of Environment, Forest and Wildlife were formed by the Government of Punjab and Punjab Environmental Protection Department (PEPD) operates under this provincial government.

PEPD is a monitoring and regulating agency with the following main functions:

- Enforcement of Punjab Environmental Protection Act 1997 (Amendment 2012)
- Enforcement of PEQS and where unavailable NEQS
- Implementation of Self-Monitoring and Reporting Tool (SMART)
- Implementation of PEPA-Review of IEE and EIA Regulations 2000
- Coordination of pollution prevention and abatement measures between government and non-governmental organizations
- Assistance to provincial and local governments in implementation of schemes for proper disposal of wastes to ensure compliance with PEQS
- Undertaking measures to enhance awareness on environment among general public
- Conduct research and studies on different environmental issues
- Attend to public complaints on environmental issues
- Carry out any other task related to environment assigned by the government

Punjab EPD will be responsible for the review and approval of the EIA for the construction of DG Khan Northern Bypass Project.

2.4.2. Punjab Environmental Protection Act 1997 (Amended on 2012)

Legislative assembly of Punjab province reviewed and accepted the PEPA 1997 as Punjab's provincial act with some amendments on 18th April 2012. This act has been approved to provide protection, conservation, rehabilitation and improvement of the environment for the prevention and control of pollution and promotion of sustainable development in the whole of Punjab.

The Punjab Environmental Protection Act, 1997 (PEPA, Amended on 2012) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The PEPA is broadly applicable to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. Penalties have been prescribed for those contravening the provisions of the Act. The powers of the Provincial Environmental Protection Agency (PEPD) were also considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

Under section 12 of PEPA, no project involving construction activities or any change in the physical environment can be taken unless an IEE or EIA as required is conducted and a report submitted to the provincial EPA. This report has been prepared in general requirement of this Section of the Act.

2.4.3. Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the 'Regulations'), prepared by the Pak-EPA under the powers conferred upon it by the Punjab EPA, provide the necessary details on the preparation, submission, and review of the Initial Environmental Examination (IEE) and the Environmental Impact Assessment (EIA). The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists

them in two separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule II lists projects of potentially significant environmental impacts requiring preparation of an EIA.

As per Sub Part 2 of Part D (Transport) of Schedule II: any provincial highways or major road with a total cost of Rs. 50 million and above shall require filing of an EIA. Hence, the proposed project requires EIA to be submitted in EPA for Environmental Approval.

2.4.4. The Punjab Environmental Quality Standards (PEQS 2016)

The PEQS 2016 promulgated under the PEPA 1997 specify standards for industrial and municipal effluents, gaseous emissions, vehicular emissions, and noise levels. The PEPA 1997 empowers the Punjab EPA to impose pollution charges in case of non-compliance to the PEQS. Standards for disposal of solid waste have as yet not been promulgated.

During the project, PEQS will apply to all type of effluents, emissions and noise levels from construction camp, commissioning and operation of the proposed project and associated facilities as follows.

- PEQS for Municipal and Industrial Effluents
- PEQS for Drinking Water
- PEQS for Ambient Air Quality
- PEQS for Motor Vehicle Exhaust and Noise
- PEQS for Noise
- PEQS for Industrial Gaseous Emissions.

The above PEQS are provided in **Annexure-B**.

2.4.5. Land Acquisition Act, 1894

The Land Acquisition Act (1894) deals with the acquisition of private properties for public purposes. The large development projects including are also being considered under this Act. There are 55 sections in this Act mainly dealing with

area notifications, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

2.4.6. Canal and Drainage Act, 1873

Canals are defined as channels, pipes and reservoirs constructed and maintained by the Government for the supply for storage of water. Under section 27 of the Act a person desiring to have a supply of water from a canal for purposes other than irrigation shall submit a written application to a Canal Officer who may, with the sanction of the Provincial Government give permission under special conditions.

2.4.7. The Forest Act 1927

This act is applicable to all regions of Pakistan. It includes procedures for constituting and managing various types of forests, such as reserved forests and protected forests. There are no preserved forests within the Right of Way (ROW) of the proposed project; however, in case of any deviation from the ROW, proponent shall intimate to the Department about the same.

2.4.8. Cutting of Trees (Prohibition) Act, 1975

This Act prohibits cutting or chopping of trees without permission of the Forest Department. Proponent shall ensure that no trees are cut within the Right of Way of the proposed project, except deemed necessary and with the approvals of associated department.

2.4.9. Antiquities Act 1975

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

No antiquity protected under the law was identified in the vicinity of the proposed project during fieldwork for the EIA. Furthermore, the project site is unlikely to contain any buried antiquity. However, the project staff will be instructed before ground preparation and earthworks to report any archaeological artifact or what may appear to be an archaeological relic to the project management. In case of such a discovery, appropriate action will be taken.

2.4.10. Pakistan Penal Code, 1860

The Pakistan Penal Code (1860) authorises fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.

2.5 National Environmental Guidelines

2.5.1. The Pakistan Environmental Assessment Procedures, 1997

The Pakistan Environmental Protection Agency prepared the Pakistan Environmental Assessment Procedures in 1997. They are based on much of the existing work done by international donor agencies and Non Governmental Organisations (NGO's).

2.6 International Conventions & Treaties

2.6.1. Convention on Biological Diversity

The Convention on Biological Diversity was adopted during the Earth Summit of 1992 at Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity, and to integrate these plans into national development programmes and policies. Parties are also required to identify components of biodiversity that are important for conservation, and to develop systems to monitor the use of such components with a view to promoting their sustainable use.

2.6.2. The Convention on Conservation of Migratory Species of Wild Animals, 1979

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), 1979, requires countries to take action to avoid endangering migratory

species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or co-operate with other countries in matters of research on migratory species.

The Convention contains two appendices. Appendix I contain the list of migratory species that are endangered according to the best scientific evidence available. For these species, the member states are required to:

- Conserve and restore their habitats.
- Prohibit their hunting, fishing, and capturing, harassing and deliberate killing.
- Remove obstacles and minimize activities that seriously hinder their migration.
- Control other factors that might endanger them, including control of introduced exotic species.

Appendix II lists migratory species, or groups of species, that have an unfavorable conservation status as well as those that would benefit significantly from the international co-operation that could be achieved through intergovernmental agreements.

2.6.3. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

This convention came into effect in March 1973 at Washington. In all 130 countries are signatory to this convention with Pakistan signing the convention in 1976.

The convention requires the signatories to impose strict regulations (including penalization, confiscation of the specimen etc.) regarding trade of all species threatened with extinction or that may become so, in order not to endanger further their survival.

The Convention contains three appendices. Appendix I include all species threatened with extinction, which are or may be affected by trade. The Convention requires that trade in these species should be subject to strict regulations. Appendix

II includes species that are not necessarily threatened presently but may become so unless trade in specimen of these species is subject to strict regulations. Appendix III includes species which any contracting party identifies as subject to regulations in trade and requires other parties to co-operate in this matter.

2.6.4. International Union for Conservation of Nature and Natural Resources (IUCN) Red List

The red list is published by IUCN and includes those species that are under potential threat of extinction. These species have been categorized as:

- Endangered: species that are sent to be facing a very high risk of extinction in the wild in the near future, reduction of 50% or more either in the last 10 years or over the last three generations, survive only in small numbers, or have very small populations.
- Vulnerable in Decline: species that are seen to be facing a risk of extinction in the wild, having apparent reductions of 20% or more in the last 10 years or three generations.
- Vulnerable: species that are seen to be facing a high risk of extinction in the wild, but not necessarily experiencing recent reductions in population size.
- Lower Risk: species that are seen to be facing a risk of extinction that is lesser in extent that for any of the above categories.
- Data Deficient: species that may be at risk of extinction in the wild but at the present time there is insufficient information available to make a firm decision about its status.

2.6.5. International and National NGOs

International environmental and conservation organisations such as IUCN and the World-Wide Fund for nature (WWF) have been active in Pakistan for some time. Both these organisations have worked closely with government and act in an advisory role with regard to the formulation of environmental and conservation Policies. Since the convening of the Rio Summit, a number of national environmental NGO's have also been formed, and have been engaged in advocacy, and in some cases, research.

2.7 Project Administrative Bodies

The implementing agency of the proposed project is AGTL, therefore, AGTL is responsible for liaising with line departments to ensure that the Project complies with the laws and regulations controlling the environmental concerns of bypass construction and operation, and that all pre-construction requisites, such as permits and clearances are met. The AGTL will be responsible for ensuring that all the measures proposed in the Environmental Management Plan are effectively implemented by the contractor during construction phase and by Directorate of Operation & Maintenance of AGTL during operation phase of the proposed Project.

2.7.1. Environmental Protection Agency EPA Punjab

Pakistan Environmental Protection Council (PEPC) is the apex inter-ministerial and multi-stakeholder decision making body, which is headed by the Prime Minster. The Pakistan Environmental Protection Agency (Pak-EPA) is the regulatory body responsible for enforcement of Pakistan Environmental Protection Act, 1997. After the 18th amendment, the powers have been delegated to provincial environmental protection agencies for review, approval and monitoring of environmental assessment of projects. For this proposed project, the Punjab-EPA will be responsible for reviewing the EIA report, issuing environmental approval and post approval monitoring of the proposed project activities to ensure compliance with the Environmental Management Plan (EMP) and any other condition of the environmental approval.

2.7.2. Wildlife Department Punjab

Punjab Wildlife Department control the district wildlife through District Officers Wildlife DO (W). According to wildlife department setup, this project comes under the jurisdiction of DO (W) of the two districts of Punjab.

Wildlife related issues pertaining to such areas and associated with the jurisdiction of Punjab during all stages of the Project, the contractor/ proponent will resolve it with the consultation of respective wildlife offices.

3. Project Description

This section provides the brief detail of the proposed project construction of AGTL Plant Refurbishment at DG Khan, Punjab, Pakistan. The project is for construction of two buildings.

1. Double Story Building having offices (covered area approx. area 6,000 sft.)
2. Assembly Plant Shed (covered approx. area 160,000 sft.)

Third party survey was conducted to seek the structural condition of the facility established in 1983.

3.1 Need Assessment of the Project & Objectives

Incorporated in June 1983 and privatised in December 1991, Al Ghazi Tractors Limited, a subsidiary company of UAE headquartered Al-Futtaim, with a record of consistent corporate achievement, the company is recognised for corporate excellence and 'Best Corporate Performance'.

Al Ghazi Tractors (Head Office) is located in Lahore and the company operates a manufacturing plant at Dera Ghazi Khan, which manufactures New Holland tractors in technical collaboration with Case New Holland, the number one manufacturer of agricultural tractors in the world. The company's tractors are rated to produce 55, 65, 75 and 85 HP and all carry a local content of 92 per cent, the highest in the country.

Third party survey was conducted to seek the structural condition of the facility as established in 1983. It was recommended to Refurbishment of plant assembly facility.

Construction of the project is comprised on two buildings:

3. Double Story Building having offices (covered area approx. 6,000 sft).
4. Assembly Plant Shed (covered area approx. 160,000 sft).

Some of the following issues were highlighted during survey.

- Chipping & and spalling of concrete from beam surface.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

- Concrete spalling.
- Reinforcement of the column exposed and corroded massively.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

- Column bolts missing

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

- Cracks in the walls.

Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

- Bricks surface deteriorated.
- Freeze & thaw damage to bricks.

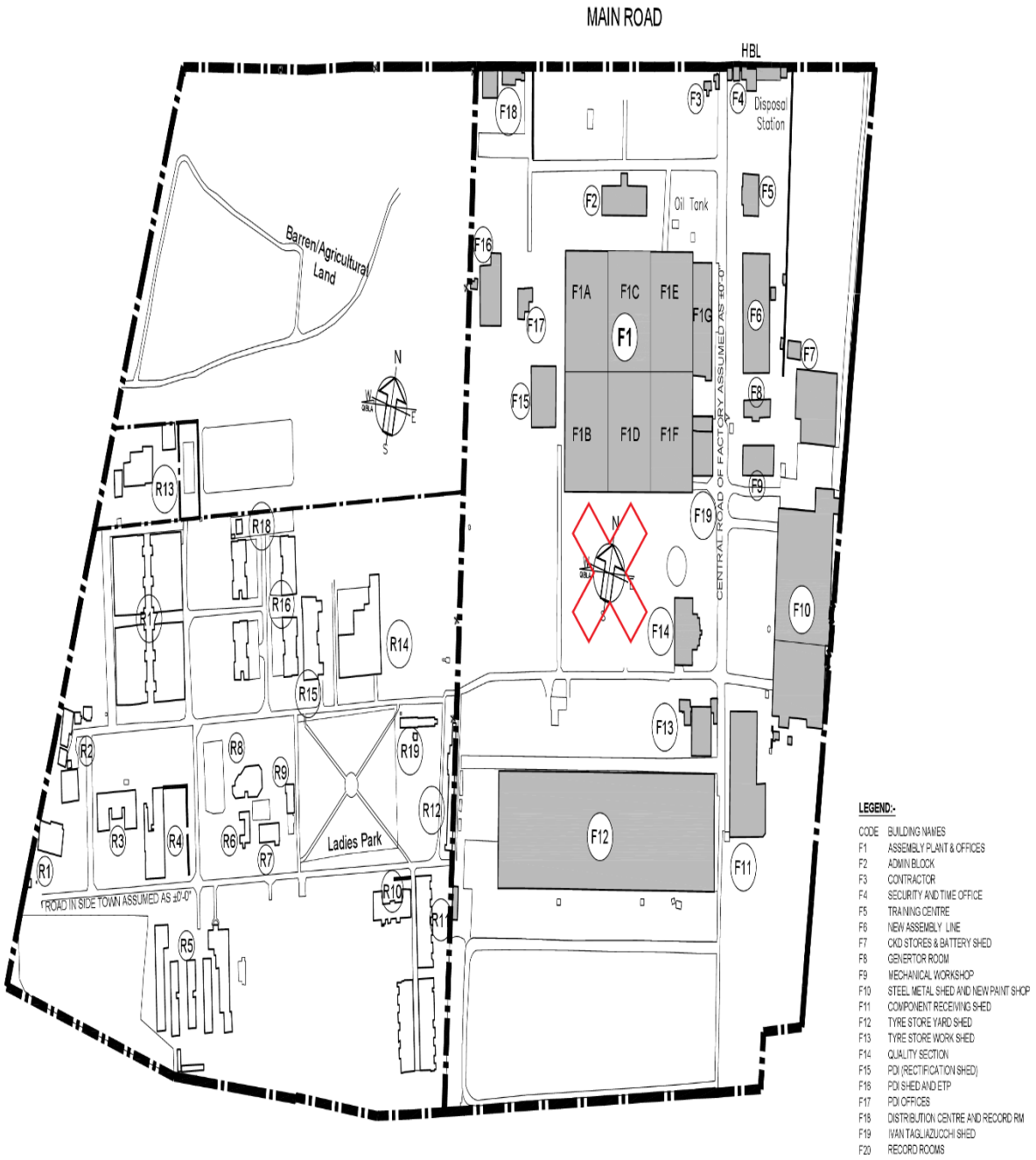
Type of Deficiency	
Design Deficiency	No
Aging Deficiency	Yes
Construction Deficiency	Yes
Subsurface Deficiency	Yes

The above survey and images are the reasons to refurbishment of plant, the factory establish in 1983 so over the time, it is the requirements to deal with advance structure and technology to contribute the output production in nationwide. In environmental point of view, installation of new or upgraded services to improve internal comfort conditions of workers and energy efficiency, contribute to better sustainability and higher performance standards for the indoor climate. To avoid any accident in future caused by old, damaged building, it was necessary to rebuild a new one for the safety of employees.

3.2 Project Location

The project is falls within factory area. The complete location of project is as Al-Ghazi Tractors Limited Tractor Factory, Sakhi Sarwar Road NH70, Dera Ghazi Khan, Punjab, Pakistan. Project location map is attached as Figure 3.1.

Figure 3.1: AGTL Project Location Map



3.3 Project Implementation Schedule

It is projected that the construction phase of entire project will be started after getting environmental approval from Punjab EPA and will be complete in last quarter of 2025. The construction of the proposed project will be executed after receiving of all relevant approvals.

3.4 Project Alternatives

Keeping in view the environmental, social and economic aspects of the development; three alternatives were considered for the proposed project. Most feasible option in the context of environment, economic and social sustainability was considered for further development. The options that were evaluated to achieve the required goal are provided in Chapter # 4, Project Alternatives.

3.5 Components of the Project

The proposed Project is designed for two buildings.

Double Story Building having offices (covered area approx. area 6,000 sft.)

Assembly Plant Shed (covered approx. area 160,000 sft.)

Following are the key tractor manufacturing process at AGTL:

Sheet Metal Production

Metal sheets are shaped into different tractor parts in this process through cutting/shaping through pressers, welding and other hot work processes.

Paint shop processes

All fabricated metal parts are then moved to Paint shop, where these parts are being cleaned and painted through a defined process.

Engine assembly line

This involves the systematic integration of various engine components, including cylinders, pistons, crankshafts, and fuel systems, according to precise specifications and engineering diagrams. The department oversees the assembly process, from component preparation and fitting to final testing and inspection, to guarantee the functionality and performance of each engine unit.

Allied assembly line

This includes the integration of various ancillary parts such as hydraulic systems, camshaft gears assembly process, steering assembly and other accessories necessary

to enhance the functionality and comfort of the tractors. The department oversees the meticulous assembly process, ensuring precise fitting, proper alignment, and adherence to quality standards to guarantee the reliability and performance of each component.

Transmission assembly line

Involves the systematic assembly of transmission systems for tractors, ensuring precision, efficiency, and quality. This includes the assembly of gears, shafts, bearings, and other components to manufacture fully functional transmissions according to specified designs and standards. The department oversees the coordination of assembly processes, including component installation, alignment, and testing, to ensure the reliability and performance of each transmission unit.

Tractor assembly line

Overseeing the systematic assembly of various components to manufacture complete tractors. This encompasses coordinating the sequential installation of parts, including engines, transmissions, chassis, and other components, according to established specifications and quality standards. The department ensures efficient workflow management, adherence to production schedules, and continuous process improvements to enhance productivity and minimize assembly time.

Stores and warehouse operations

Serving as the central hub for managing inventory and ensuring smooth production processes. Its scope of work encompasses receiving, storing, and distributing raw materials, components, and finished goods efficiently and accurately. Additionally, it involves inventory management, including stock control, order fulfillment, and tracking, to support uninterrupted production schedules.

Plant engineering and maintenance activities

Ensuring the optimal functioning of all machinery, equipment, and infrastructure essential for production operations. This includes conducting regular inspections, preventive maintenance, and repairs to minimize downtime and enhance efficiency. Additionally, the department is responsible for implementing continuous improvement initiatives to upgrade machinery, streamline processes, and enhance safety standards.

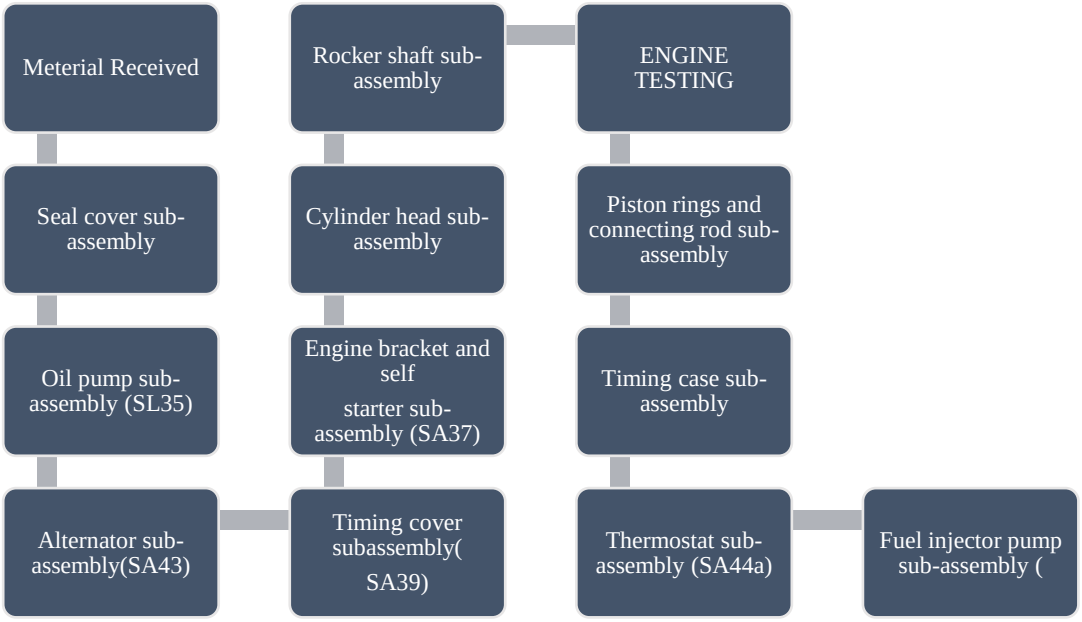
Distribution processes

involves orchestrating the seamless delivery of finished tractors to various distribution channels and customers. This encompasses coordinating transportation logistics, scheduling shipments, and ensuring timely and accurate order fulfillment.

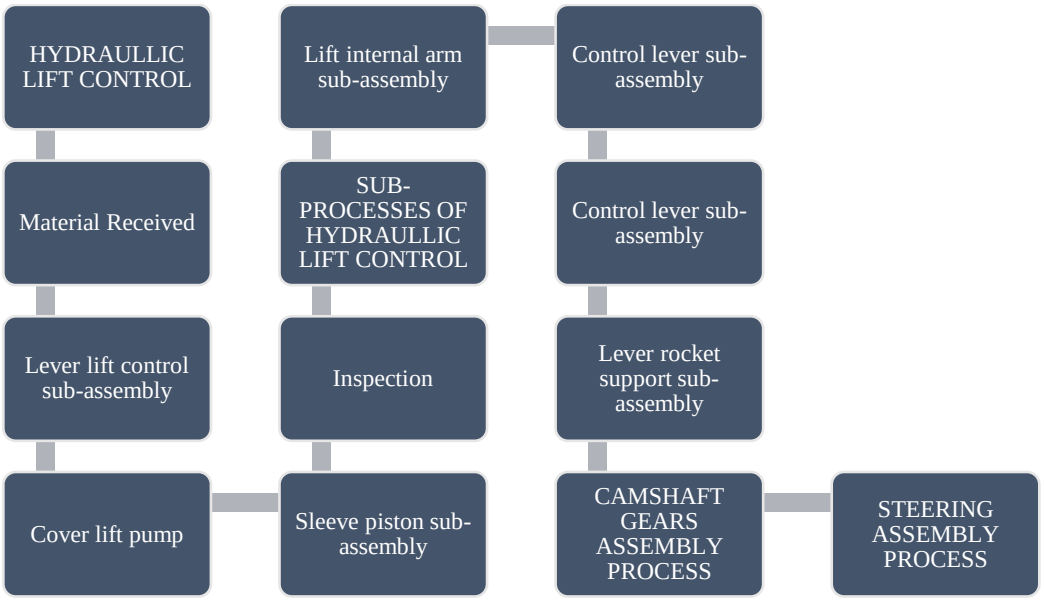
3.6 Design of Proposed Project

The project is comprise on construction of two buildings, one is for offices and the second is for assembly plant shed. Here's the complete process flow chat / principle for assembly plant.

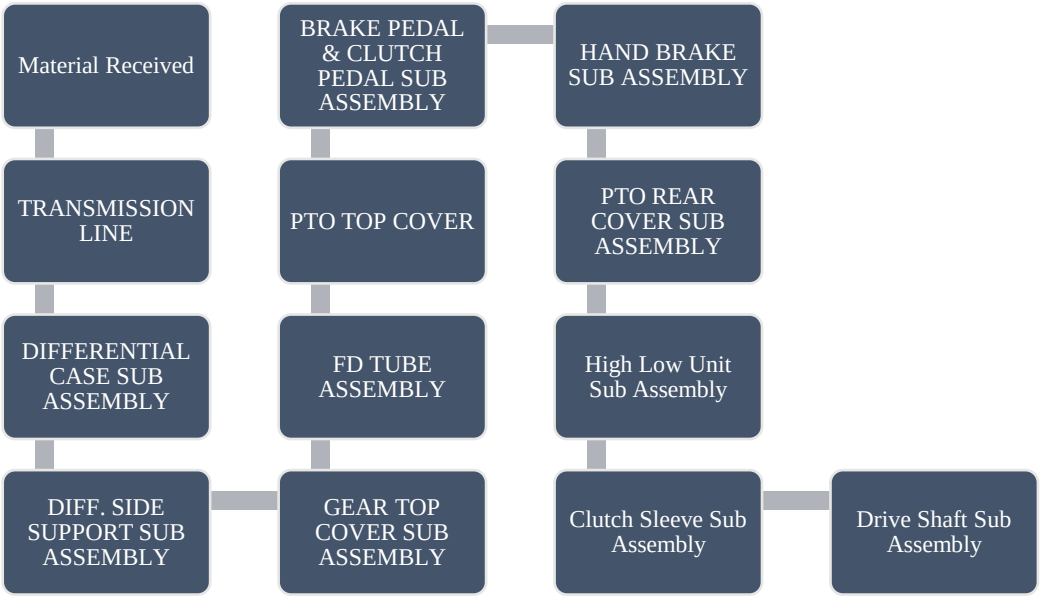
- **Engine Assembly Line (EAL)**



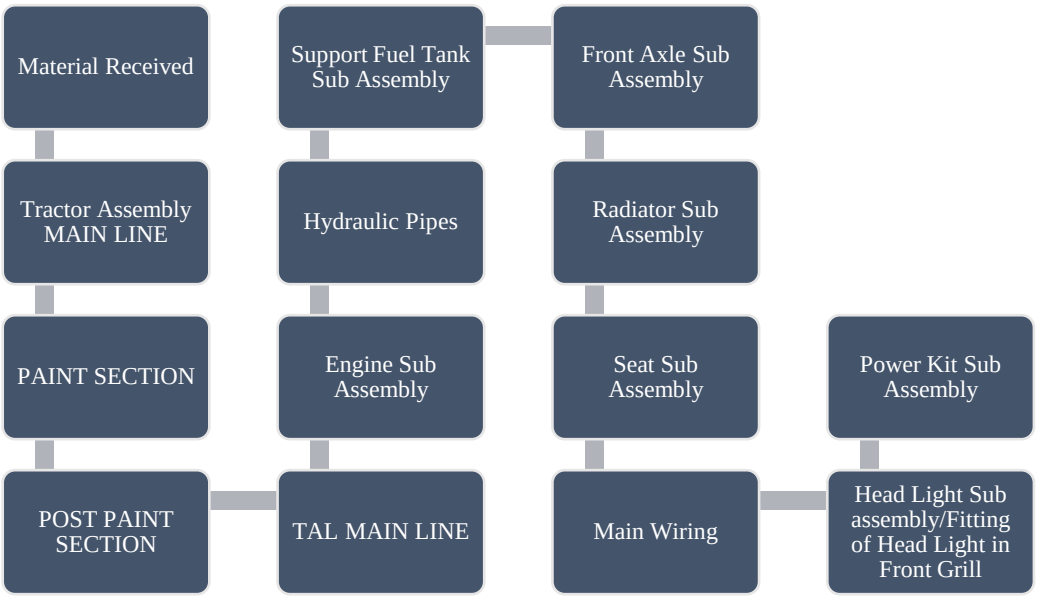
- **Allied Assembly Line (AAL)**



- **Transmission Line**



- **Tractor Assembly Line**



3.7 Civil Works

The civil works will involve construction of two buildings. Almost 150 to 200 workers will involve for construction phase.

3.8 Construction Materials

The materials to be used in construction of this project would include Structural Steel, Concrete, Roofing Materials, Insulation, Doors and Windows, Electrical and Plumbing Supplies, Finishing materials such as paint, flooring, ceiling tiles & trim etc.

3.9 Cost

The total approximate cost of the proposed project is estimated to be around 500/- million for the project.

3.10 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 and an appropriate distance from sensitive areas in the vicinity. Final locations will be selected by the contractor after approval from client- AGTL.

The area requirement for construction camps will depend upon the deployed manpower and the type and quantity of machinery mobilized. In view of the area required, there will be no issue for land requirement as project falls within factory premises. Environmental Management Plan (EMP) considerations will have to be considered before the selection of sites for the required purpose.

3.11 Manpower Requirements

The contractor will mobilize staff depending on the stretch of site to be constructed and package length awarded to the contractor. The manpower required during the construction of the proposed project would be 150 to 200 and approximately 900 staff during operation phase of the project.

3.12 Construction Machinery and Equipment

The list of the machinery and the equipment required but not limited to for the proposed project is given below:

Excavators, Bulldozers, Cranes, Concrete Mixers and Pump Trucks, Forklifts, Scissor Lifts and Aerial Work Platforms, Compactors, Welding Equipment, Various power tools.

3.13 Restoration and Rehabilitation Plan

After the completion of construction phase of the proposed project, it is the responsibility of the contractor to restore the site that has been disturbed due to construction activities. There may be areas that could be affected by construction activities which may require rehabilitation such as stockpile sites, campsites, side-tracks, borrow pits and washing yard.

4 Project Alternatives

The discussion and analysis of Alternatives in an EIA considers different practicable strategies that will promote the elimination of identified negative environmental impacts. This section is a requirement of the EPA Punjab and is critical in consideration of the ideal development with minimal environmental disturbance. This report has identified some major environmental impacts as noted by scientific experts. The findings of these impacts were utilized to analyze possible options for the final development. The following alternatives have been identified and are discussed in further detail below:

- Alternative-I 'Demolishing the Current Facility.'
- Alternative-II 'New location other than DG Khan.'
- Alternative-III 'New Construction within Factory Premises.'

4.1 Alternative-I Demolishing the Current Facility

Alternative One proposes demolishing the current facility and constructing a new one at the same location. However, it's deemed infeasible due to potential loss in business continuity issues. It will also cause major social impact as production could stop and create unemployment for the workers until new facility develop at the same location, so in this regard this option is not feasible for both owner and for the workers.

4.2 Alternative-II New Location other than DG Khan

Alternative Two suggests constructing a new facility at a location other than DG Khan. Nevertheless, this option faces challenges related to skilled manpower as difficult and time taken to hire new skilled people and also unskilled manpower as it should first priority to hire local persons, huge cost due to new location, transportation, and logistic issues, these are the main aspects which could lead negative social and environmental impact.

4.3 Alternative-III New Construction within Factory Premises

Alternative Three suggests construction of new facility within factory premises in new location. This option is most feasible as compared to all others as it is within factory premises and at a new location so the production would not be disturb and local unskilled persons will engage during construction phase of the project.

4.4 Comparison Analysis of Alternatives

The comparison between the above three alternatives were based on the environmental, social, technological and economic impacts. The comparison shows that Alternative: III: Selection of Best Possible Site Option was found to be the most suitable alternative to have it applicable.

4.4.1 Evaluation Criteria

The sites were evaluated for the proposed project in order to control and mitigate the environmental and socioeconomic impacts at an early stage. The evaluation of sites was based on following criterion:

1. Sufficient land should be available for development.
2. It should be easily accessible not putting an additional construction/transportation cost to access the proposed project.
3. Proximity of environmentally sensitive receptors should be avoided.
4. There must be minimum resettlement requirements.
5. Avoiding all the locations/structures of cultural and archeological importance.

4.4.2 Site Selection

Recognizing that the proposed development may have adverse impacts on surrounding environment, site selection exercise was carried out in close consultation with the SGS team. The merits and demerit of the options evaluated are given in below Table 4.1.

Table 4-1: Merits & Demerits of Site Options for the Proposed Project

Site Options	Merits	Demerits
Option 1	▪ Shorter route ▪ Easy and safe movement	▪ Loss in business ▪ Social impact as production could stop ▪ Create unemployment for the workers ▪
Option 2	▪ Job opportunities for new area ▪ Development for the new area	▪ Take much time ▪ Extra cost ▪ Legislative issues ▪ Shortage of skilled person ▪
Option 3	▪ Shorter route ▪ Easy and safe movement ▪ Job opportunities for the local ▪ Less cost ▪ Social benefits for the local community ▪ Production will not be damage	▪ Cutting of some trees

5 Description of Baseline Environmental

This chapter describes the existing environmental and socioeconomic settings of the project area and surroundings. The project area in this document is defined as 'the area where the project related activities to be carried out which include the proposed project site and surroundings and the area that can interact with the project's positive and negative externalities in the long run'. The environmental impact of any activity or process will be assessed on the basis of a deviation from the baseline or normal situation. Followings are the main components of the baseline:

- Physical Environment
- Biological Environment
- Socioeconomic Environment

The description provided in this section is based on Desk-top surveys and literature review, field surveys, air and noise monitoring, soil and water analysis, existing information sources and information obtained through detailed consultation with the Government departments and other agencies.

5.1 Physical Environment

5.1.1 Topography

Pakistan geologically overlaps both with the Indian and the Eurasian tectonic plates where its Sindh and Punjab provinces lie on the north-western corner of the Indian plate while Baluchistan and most of the Khyber-Pakhtunkhwa lie within the Eurasian plate which mainly comprises the Iranian plateau, some parts of the Middle East and Central Asia. The northern areas and Azad Kashmir lie mainly in Central Asia along the edge of the Indian plate and hence are prone to violent earthquakes where the two tectonic plates collide.

Most of the area is characterized by rugged hilly terrain with high mountains of Koh-e-Sulaiman, steep parallel ridges and narrow valleys. The local relief is about 700 meters

with maximum and minimum heights of 1025 and 300 meters above sea level respectively.

The Dera Ghazi Khan is located in a strip between the river Indus and the Koh-Suleman range of mountains separating it from the Baluchistan Province. It is surrounded by Dera Ismail Khan on the North and Rajanpur on its South. Indus river flows on the East across which lie the districts of Muzafargarh and Layyah. Loralai and Dera Bugti districts of Baluchistan Province lies on the West separated by the Koh-Suleman range of mountains.

D.G. Khan is one of the most progressive looking districts of Punjab with literacy rate of 48% amongst school going children. During the survey it was observed that mostly people use filtration plants for drinking purpose.

5.1.2 Seismicity

Pakistan lies on an active seismic belt of earth. Seismic observations indicate that hundreds of shocks originate every year. Mostly, these seismic waves are of low intensity and do not have significant effect. On the basis of Peak Ground Acceleration (PGA) values obtained through Probabilistic Seismic Hazard Assessment, Pakistan is divided into 5 seismic zones. The boundaries of these zones are defined in Table 5.1.

Table 5-1: PGA Values of Seismic Zones of Pakistan

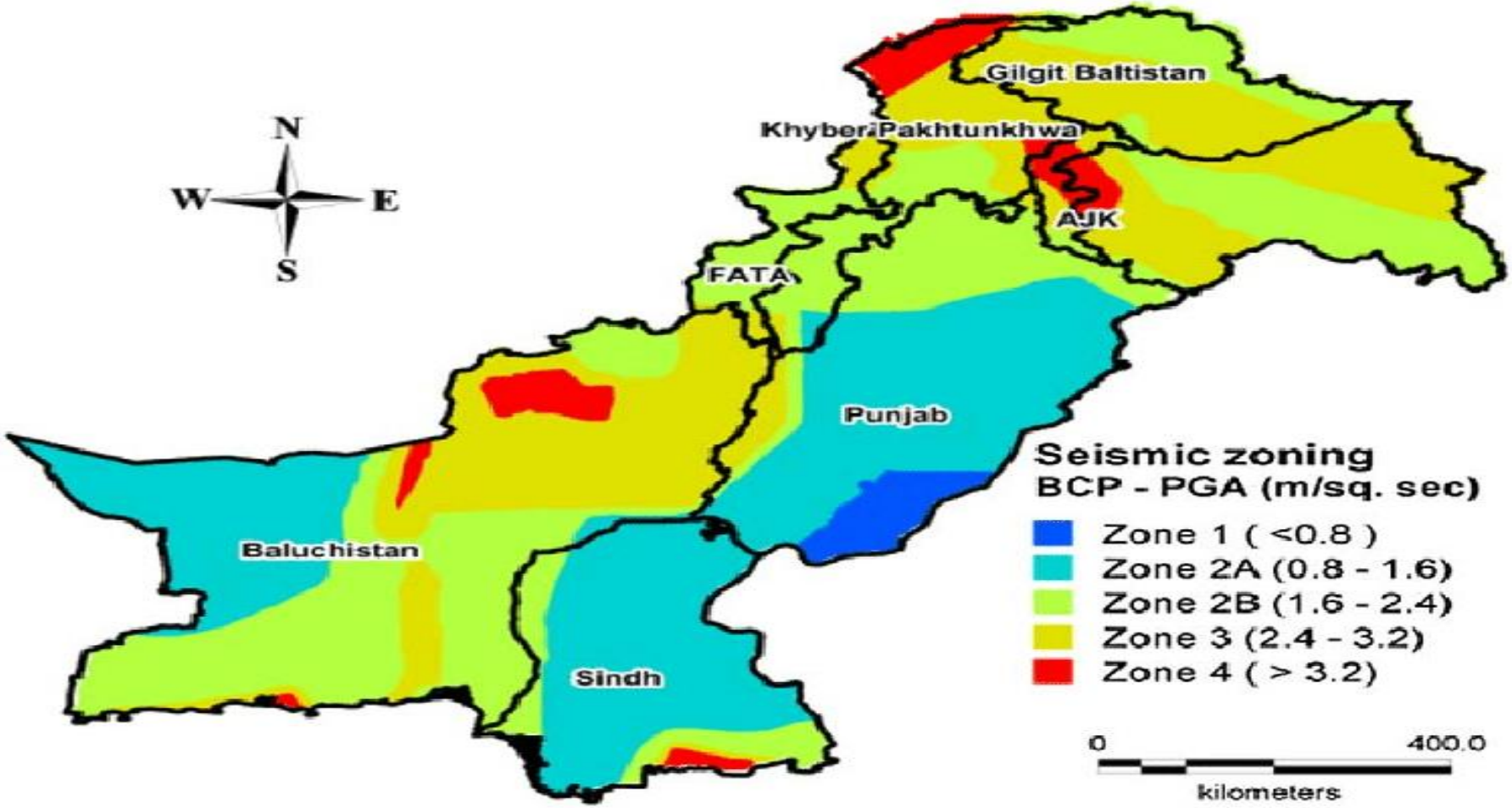
Zone	PGA (g)
1	0.05 to 0.08
2A	0.08 to 0.16
2B	0.16 to 0.24
3	0.24 to 0.32
4	> 0.32

Source: Building Code of Pakistan Seismic Provisions, 2007

As per Building Code of Pakistan – Seismic Provision 2007, proposed project site lies in Zone 2B of the Seismic Zones with a peak horizontal ground acceleration of 0.16-0.24g. This indicates that the project lies in moderate seismic zone. Hence all the applicable provisions, related to soil and foundations, structural design requirements

have been considered in the design of the structures. The seismic zoning map is shown in Figure 5.1.

Figure 5-1: Seismic Zoning Map of Pakistan

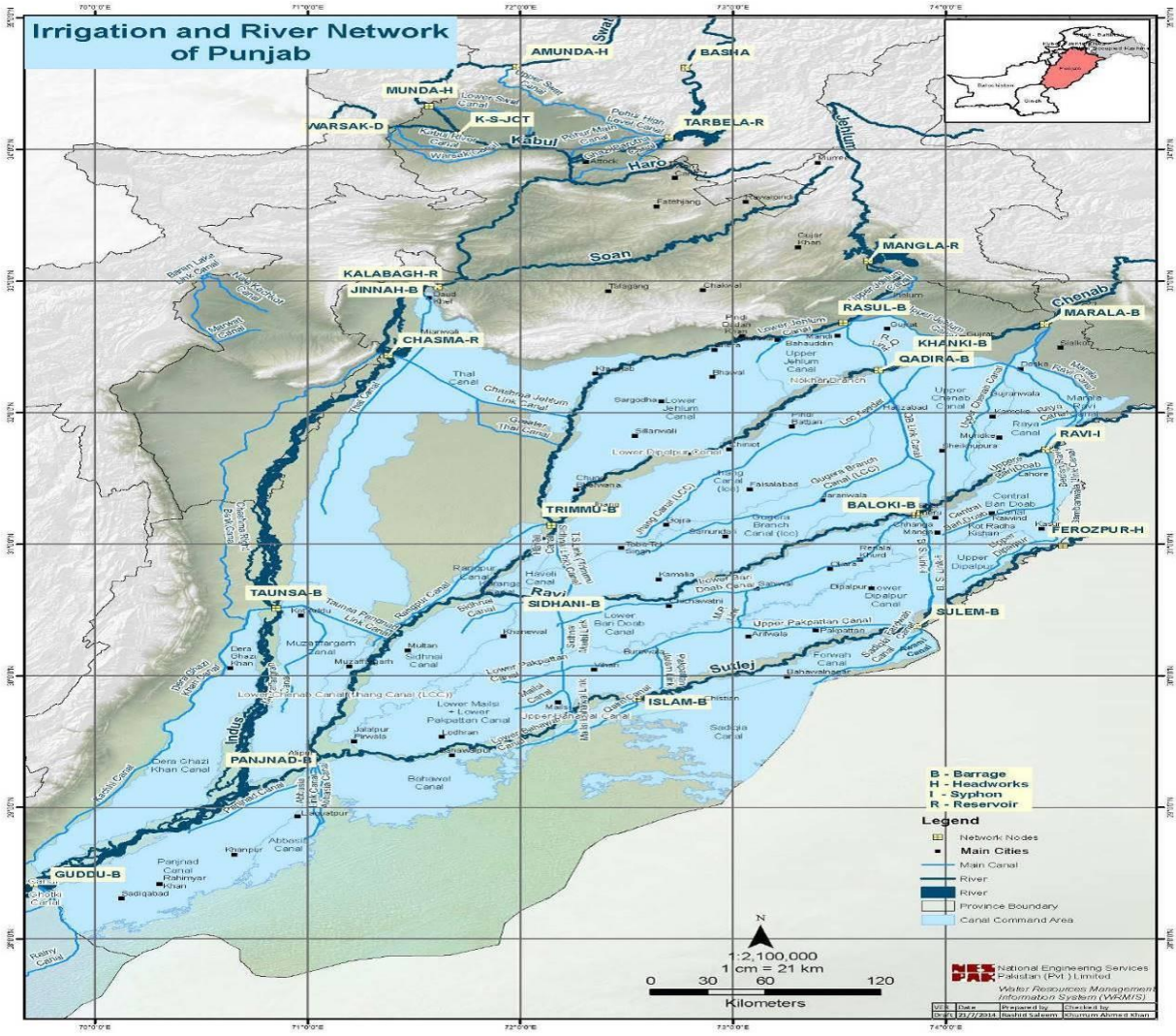


5.1.3 Water Resources

5.1.3.1 Surface Water

Indus river is one of the longest rivers in the world, with a length of some 2,000 miles (3,200 km). Its total drainage area is about 450,000 square miles (1,165,000 square km), of which 175,000 square miles (453,000 square km) lie in the ranges and foothills of the Himalayas, the Hindu Kush, and the Karakoram Range; the rest is in the semiarid plains of Pakistan. River Indus is flowing in the east of DG Khan.

Figure 5-2: Irrigation Network of Punjab



5.1.3.2 Groundwater

Aquifer Characteristics

A certain amount of water filters into the ground because of seepage from the canals and rainwater collected on the surface. This water drains downwards below the root zone and finally reaches at a groundwater level at which every available crevice in the earth is filled with water. This area is known as the zone of saturation and the water found here is referred to as groundwater.

Aquifer Recharge

The sources of aquifer recharge are:

- Rainwater drains are the primary source of recharge in the area
- Leaching of irrigation water from agricultural fields
- Rainwater percolation.
- River Indus
- DG Canal

Groundwater Table

During the visit of the project area and its vicinity; groundwater depth was found about 50-200 feet. Exploitation of ground water through tube wells for irrigation. Ground water samples was collected within the project area.

5.1.4 Climate

The climate of district is hot in summer and cold in winter. The climate is almost uniform throughout the district except hilly portion which has severe winter and a mild summer. Except the hilly track, land of D.G. Khan is plain. The temperature here averages 32 °C. The average annual rainfall is 104 mm. There is not much of rainfall during the winter which lasts from the end of October till the middle of March and is generally quite pleasant. The change from winter to summer is very sudden and by the end of April heat become intolerable.

There is a tendency for the rainfall to increase with the expansion of cultivation and vegetation. Due to the barren mountains of Koh-Suleman and the sandy soil of the area, windstorms are common in the summer. During summer, the temperatures are generally amongst the highest in Pakistan. Fort Munro, located on the edge of Punjab Province, has relatively cooler weather.

Figure 5-3: Mean Monthly Temperature (C°) at DG Khan

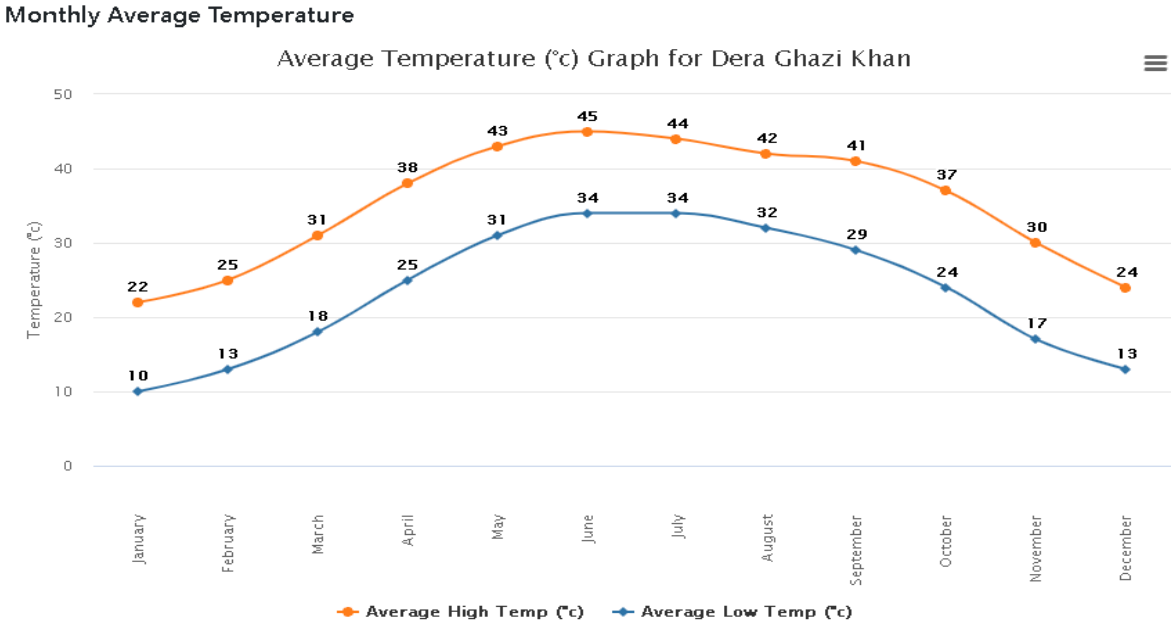
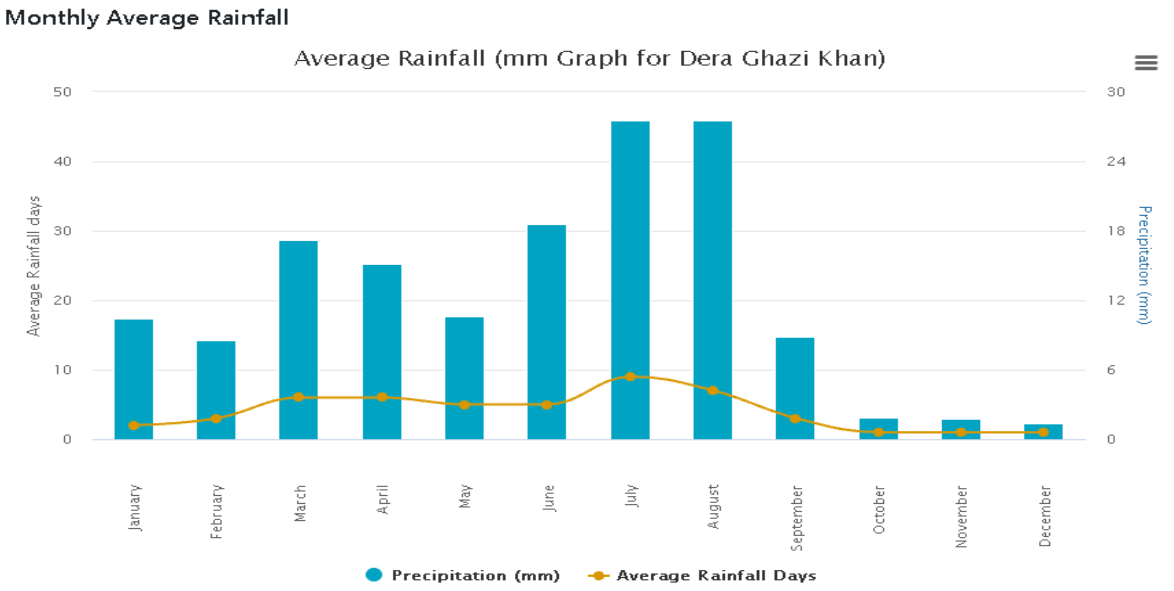


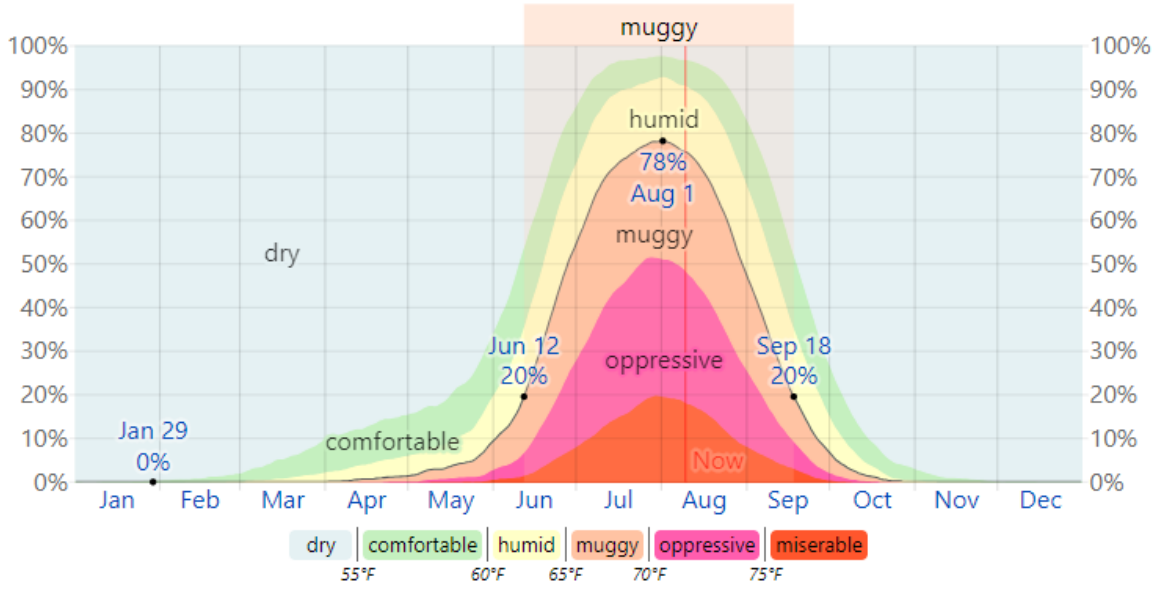
Figure 5-4: Mean Monthly Rainfall (mm) at DG Khan



Relative Humidity

The relative humidity in project region varies from 13% to 78%. The highest humidity in the area was recorded 78%, which was in the month of July. The humidity data is depicted in the following Figure 5.5.

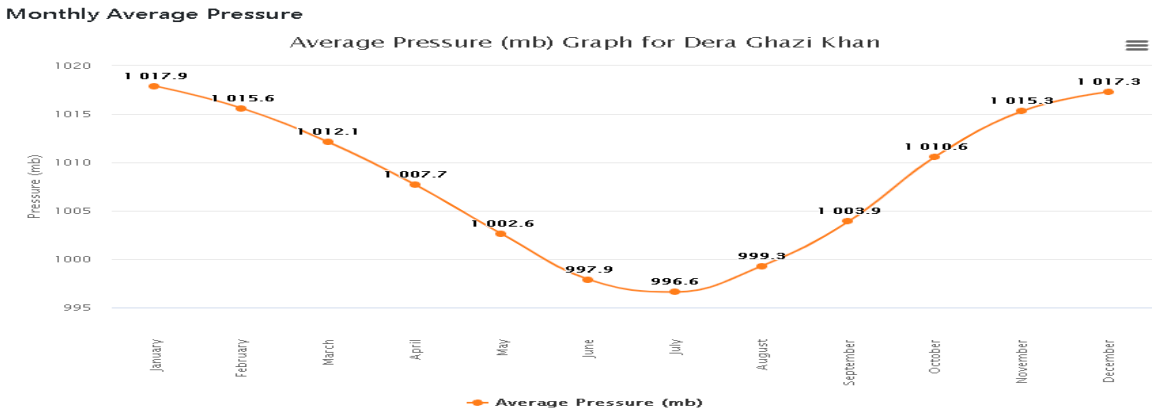
Figure 5-5: Mean Monthly Cloud and Humidity (%)



Atmospheric Pressure

Atmospheric pressure has important effects on weather conditions. High pressure supports sunny, clear, and favorable weather conditions, but lower levels promotes rainy and cloudy weather conditions. Wind speeds and seasonal patterns vary considerably in the project area. The annual pressure is ranging from 996.6 to 1017.9 of millibar. The data of monthly barometric pressure of proposed project area is summarized as Figure 5.6.

Figure 5-6: Mean Monthly Pressure (millibar)



5.1.5 Environmental Baseline Monitoring

To assess the environmental conditions of the project area, following environmental parameters were monitored;

1. Ambient air quality monitoring,
2. Noise monitoring,
3. Water sampling and analysis
4. Soil sampling and analysis

Environmental baseline monitoring was conducted at project site. The details of the sampling/ monitoring locations along with discussions on results are given in the subsequent sections. Pictorial over-view of environmental monitoring carried out in the project area is presented in Figure 5-7. Monitoring results are presented in Annexure-E of report.

5.1.5.1 Ambient Air Quality

There is no significant source of air pollution in the area except for the areas close to highway. The remainder of the project area is rural, and cultivation & livestock is the main occupational activity. The potential existing sources of air pollution in the project area are road traffic, plant activities.

Major air pollutants including CO, NO, NO_2, NO_X, SO_2 and Particulate Matter (PM_{10}) were monitored during field visit at midpoint of the proposed project site. The ambient air monitoring was done at 50-100meter distance from roadside. The results of all ambient air quality monitoring were observed below the standards because there are few air pollution sources were found in the study area. Results of Ambient air monitoring are presented in Table 5.2. Photographic record of environmental monitoring for ambient air quality and noise levels is given in Figure 5.7.

Table 5-2: Results of Ambient Air Quality Monitoring at Proposed Project Site

Parameter	*Methodology / Technique*	*Unit*	*Monitoring Duration*	*LDL*	*Factory Area*	*Limits as per PEQS*
Nitrogen Oxide (NO)	US EPA Designated Method RFNA-1289-074	µg/m3	24Hours	0.75	10.66	40 (µg/m^3) For 24 Hours
Nitrogen Dioxide (NO_2)	US EPA Designated Method RFNA-1289-074	µg/m3	24Hours	0.75	18.01	80 (µg/m^3) For 24 Hours
Sulfur Dioxide (SO_2)	US EPA Designated Method ESQA-0486-060	µg/m3	24 Hours	1.3	15.01	120 (µg/m^3) For 24 Hrs
Carbon Monoxide (CO)	US EPA Designated Method RFCA-0981-054	mg/m3	24 Hours	0.1	1.32	5 (mg/m^3) For 8 Hours
Ozone (O3)	USEPA Designated Method EQOA-0880-047	µg/m3	24 Hours	1.96	6.48	130 (µg/m^3) For 01 Hrs
Particulate Matter (PM10)	ISO 21501-4:2007	µg/m3	24 Hours	1.00	123.93	150 (µg/m^3) For 24 Hrs
Particulate Matter (PM2.5)	ISO 21501-4:2007	µg/m3	24 Hours	1.00	29.07	35 (µg/m^3) For 24 Hrs
Suspended Particulate Matter (SPM)	High Volume Sampler	µg/m3	24 Hours	1.00	268.55	500 (µg/m^3) For 24 Hrs

5.1.5.2 Noise

There is no continuous major source of noise in the proposed project area. Intermittent sources include farm tractors, farm equipment, crushing units and road traffic. Considering the intermittent nature of these noise sources, it can be concluded that the noise pollution in this area is low. Noise Levels measured during the field surveys are given in Table 5.3.

Table 5-3: Noise Level Results

Location	*Noise Level (dB) (Reading-1)*	*PEQS (Reading-2)*	*Noise Level (dB) (Reading-3)*	*Noise Level (dB) (Average)*	*PEQS*
Factory Area	64.5	64.7	65.9	65.0	65

5.1.5.3 Water Quality

Groundwater

In order to examine the groundwater quality of the project area, groundwater samples from project site was collected and analyzed.

The sampling and analysis were carried out in accordance to the internationally recognized methods including APHA and UESPA recognized methods. The samples were analyzed for 21 parameters (both physical and chemical). The analysis results of groundwater samples show that value of majority of physical and chemical parameter are within limits defined in PEQS. Detailed results are provided in Table 5.4.

Table 5-4: Physical and Chemical Analysis of Ground Water

S.No.	Parameters	Analysis Results Method	Unit	PEQS	Factory Area
1.	pH	APHA4500H^+ B 20nd Edition	-	6.5-8.5	7.77
2.	Color	APHA 2120 C 20nd Edition	Pt-Co	≤15	<5.0
3.	Total Dissolved Solids (TDS)	APHA 2540 C 20nd Edition	mg/l	<1000	5948
4.	Chloride (Cl)	APHA 4500Cl^- B 20nd Edition	mg/l	<250	208.83
5.	Total Hardness	APHA 2340 B & C 20nd Edition	mg/l	<500	2310
6.	Fluoride	APHA 4500F^- B,D 20nd Edition	mg/l	≤ 1.5	2.22
7.	Nitrate	APHA 4500NO_3 B 20nd Edition	mg/l	≤50	5.64
8.	Nitrite	APHA 4500NO_2 B 20nd Edition	mg/l	≤3	<0.01
9.	Cyanide (CN)	APHA 4500CN E 20nd Edition	mg/L	≤0.05	<0.05
10.	Cadmium (Cd)	APHA-3111 B 20nd Edition	mg/l	0.01	<0.003
11.	Copper (Cu)	APHA-3111 B 20nd Edition	mg/l	2	<0.005
12.	Lead (Pb)	APHA-3111 B 20nd Edition	mg/l	≤ 0.05	<0.005
13.	Nickel (Ni)	APHA 3111 B 20nd Edition	mg/l	≤ 0.02	<0.005
14.	Manganese (Mn)	APHA-3111 B 20nd Edition	mg/l	≤ 0.5	<0.005
15.	Aluminum (Al)	APHA-3120 B 20nd Edition	mg/l	≤ 0.2	<0.005
16.	Antimony (Sb)	APHA-3120 B 20nd Edition	mg/l	≤ 0.005	<0.005
17.	Arsenic (As)	APHA 3120 B 20nd Edition	mg/l	≤ 0.05	<0.005
18.	Boron (B)	APHA 3120 B 20nd Edition	mg/l	0.3	0.11
19.	Mercury (Hg)	APHA 3112 B 20nd Edition	mg/l	≤ 0.001	<0.001
20.	Selenium (Se)	APHA 3120 B 20nd Edition	mg/l	0.01	0.047
21.	Barium (Ba)	APHA 3120 B 20nd Edition	mg/l	0.7	<0.005

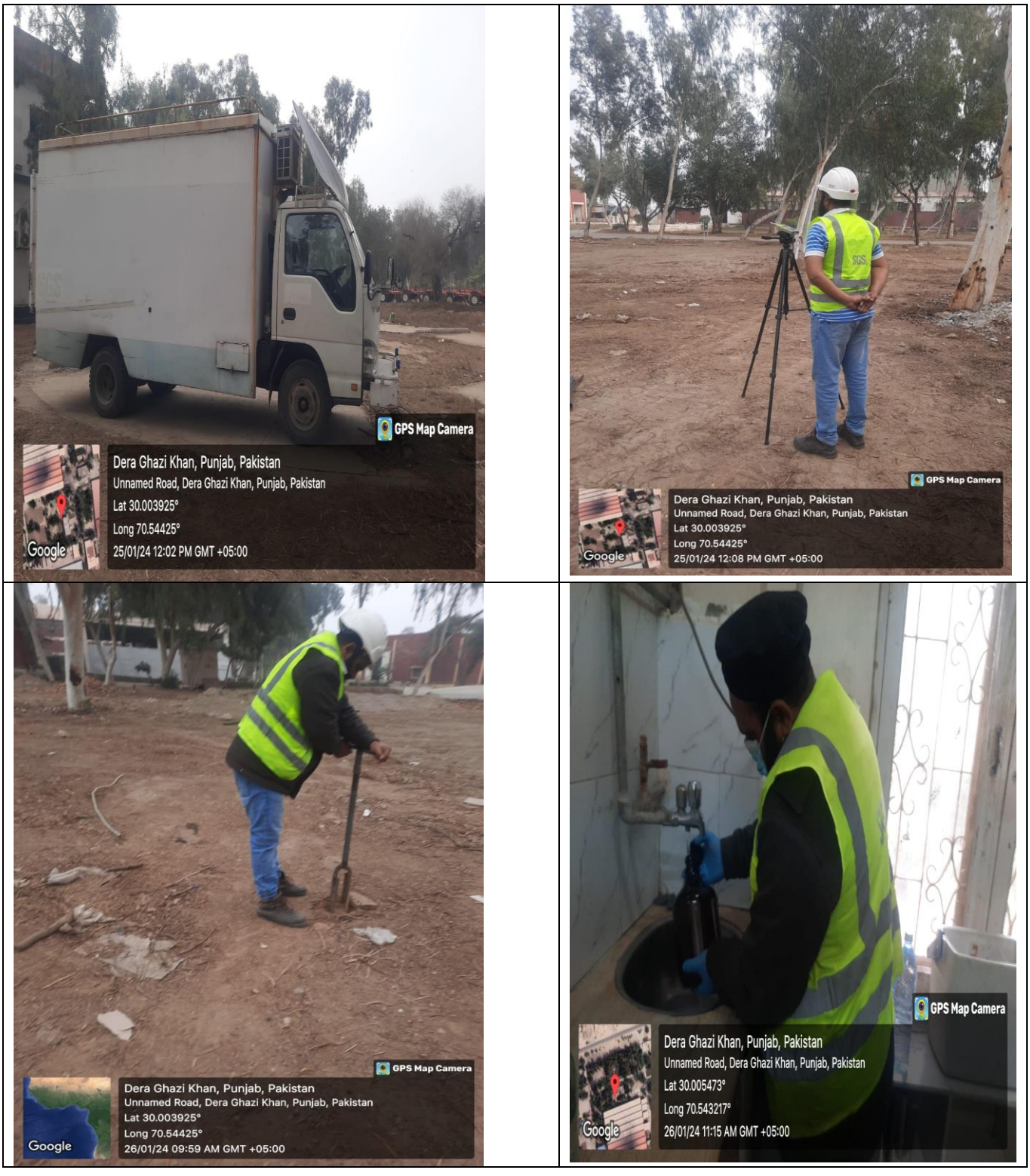
5.1.5.4 Soil Quality

Three soil samples were collected from project area to check the soil quality of the project site. The collected samples were preserved and submitted to laboratory for analysis. A summary of soil sampling results is presented as Table 5.5. sampling photographs are shown in Figure 5.7.

Table 5-5: Soil Analysis Results

Parameters	*Method/Technique*	*Unit*	*Factory Area*
pH	USEPA 9045 C	-	7.89
Conductivity	ISO 11265:1994	µS/cm	<1.0
Grease & Oil	USEPA 9071 B	mg/kg	0.0026
Chloride	In House Titrimetric	mg/kg	241.06
Chromium (Cr)	USEPA 3050 B	mg/kg	<0.50
Lead (Pb)	USEPA 3050 B	mg/kg	163
Cadmium (Cd)	USEPA 3050 B	mg/kg	4.12
Zinc (Zn)	USEPA 3050 B	mg/kg	148.15
Silver (Ag)	USEPA 3050 B	mg/kg	9.25
Arsenic (As)	USEPA 3050B	mg/kg	<0.50
Selenium (Se)	USEPA 3050B	mg/kg	<0.50
Barium (Ba)	USEPA 3050B	mg/kg	0.21
Mercury (Hg)	USEPA 7471B	mg/kg	<0.05

Figure 5-7: Photographs of Environmental Monitoring



5.2 Biological Environment

In this section, the baseline environmental conditions pertaining to biological environment have been described on the basis of primary and the secondary data. These conditions have subsequently been used to identify the potential impacts on the biological environment that are likely to arise from the project activities. There is no protected area located near or within the project boundaries.

5.2.1 Floral Attributes of the Project Area

Based upon observations during the field visit; no species found within project area however in surroundings some species of plants were directly observed. The number of anthropogenic activities in the area is very high. The major crops of the district are Wheat, Rice, Oil Seeds and Cotton. This is among one of the best cotton growing districts of the country. The major fruits are Citrus, Mango and Guava. Besides, Sunflower, Sugarcane, Jawar, Bajra, Mash, Moong, Masoor, Gram, Maize are also grown in minor quantities in the district.

Potato, Turnip, Garlic, Cauliflower, Peas and Onion are main vegetables grown in the district. Besides, Carrot, Tomato, Ladyfinger and Chillies are also grown in the district in minor quantities.

5.2.2 Faunal Attributes of the Project Area Birds

Based upon observations during the field visit; no species found within project area however in surroundings some species of birds were directly observed. The most favorite habitat of the Avian Fauna was found in the surroundings of the study area especially trees in agricultural fields. These areas are composed of larger as well as smaller patches of vegetation.

Most common species include Quail, Black Drongo, Brown Partridge, Egret, House Crow, Pigeon and Duck etc. All these species are also commonly found in other ecological zones of the country.

Mammals

Dense vegetation provides living shelter to the mammals like Urial, Cats, Russian Dog, Goats, Sheep, Cow, Buffalo, Horse etc. All these species are commonly found in the project areas as well as in country and no significant threat can be expected from any activity.

Reptiles

During the study, several types of droppings were found which indicate the presence of reptiles.

None of the reptiles and mammalian species found here is listed under any category of the IUCN Red List. Ten species of reptiles were also recorded including snakes, lizards and agamas. Only one species i.e. Indian cobra is listed as Data Deficient in the IUCN Red List.

5.3 Socio-economic Environment

5.3.1 Methodology

This section describes the key socioeconomic features of the study area, including the administrative setup, population, education, health, infrastructure, occupations, and cultural resources.

Primary and secondary data sources were used to develop the socioeconomic baseline of the area. Secondary data was collected using published data in the form of literature, research journals and internet. Primary data was collected using questionnaires and then verifying the information through community meetings. Stakeholder consultation was carried out with local community and Government departments.

There were two basic aims of the study; first to inform and consult with the local communities about what is the proposed project and what would be the likely impacts and second to carry out an in-depth socio-economic survey of the villages/cities falling in the project area. To this end, a detailed study of the project

area was conducted. The Socio-economic features of the project area is shown in Figure 5.8.

Focused group discussion and Structured Questionnaire survey was carried out to arrive at community needs and their concerns regarding the proposed activities.

5.3.2 Structures of Authority

Formal Structure

The project district falling in project work are under the general charge of the Deputy Commissioner, who combines the functions of the District Magistrate as well as the District Collector. He is also responsible for the co-ordination of the functions of all nation building departments in the district. As District Magistrate, he is responsible for maintaining law and order in their district. For the purpose, the Executive Magistrate and the police assist him.

5.3.3 Demographics

Population

The majority of the population is poor, but they have been ruled by the rich landlords and chiefs of Baloch tribes which played a significant role in the national and provincial politics. Some of these feudal use the title Sardar for themselves, including the former President of Pakistan Farooq Leghari, Governors of the Punjab Zulfiqar Ali Khosa and Latif Khosa, Mir Badshah Qaisrani, Sardar of the Malghani Balouch tribe, Chief Minister of Punjab Dost Muhammad Khosa, Chief Secretary of Punjab, Nasir Mehmood Khosa, Former Inspector General Police of Punjab, Tariq Khosa, and Supreme Court Judge Asif Khosa. The city is one of the oldest districts in South Asia. Dera Ghazi Khan did not develop like other cities in Punjab. Based on the surveys of 2004–2005, Dera Ghazi Khan district is considered one of the twenty poorest districts of Pakistan with about 51% of its population living below the poverty line.

Population at and near vicinity of the proposed project area was consulted in order to get socioeconomic profile of the area. The average household size of the consulted population was found 6 persons per household.

During field survey, public consultation was carried with different age group of community members. Number of community members from almost all field of life were interviewed during field survey and their comments were recorded. 100% of the people shows their willingness for the proposed project. They said the project will brings job opportunities for us, so they could improve their life quality, also will brings some welfare aspects like water filtration plant, schools and medical facilities for locals.

5.3.4 Land Use

Three broad land-use categories were recorded in the area, includes:

- **Uncultivable wasteland:** This includes the area's flooded lands, mountainous area and waterlogged areas.
- **Cultivated land:** This comprises land being currently cultivated and fallow agricultural land**.**
- **Human settlements:** This includes all structures and shelters created by human beings, including livestock sheds and places of worship, education, and recreation. In addition, this category includes the tracks, paths and uncultivated land within the cumulative locus of household-built structures.

5.3.5 Livelihood and Property Rights System

Land Ownership

The land in the project area mostly private land owned by locals comprising small and big landowners. The project area will be bought by the Government of Pakistan and proper compensation will be provided to locals as per laws of Government of Pakistan.

Agriculture

Agriculture is one of the most important economic activities in the project area. The land is suitable for irrigated agriculture and is capable of producing good yields of wheat, corn, sugarcane and maize.

Livestock

Livestock consists primarily of buffalos, sheep, cows, goats and donkeys. Livestock is the most important asset of the poor and the livestock they own is their major buffer against poverty.

Employment

While the majority of the area's population depends mainly on agriculture and livestock rearing for its livelihood, small business is also a source of earning. A number of people are employed in the education, irrigation, police, roads departments and Pakistan army. People also work in industries present at different locations in the vicinity of proposed highway project.

5.3.6 Socioeconomic Profile

Health Profile

Health facilities are available in the project site. In case of emergency, the patients visit BHU, THQ, DHQ, Tayyip Erdogan Hospital and other private clinics and hospitals present in nearby cities including Multan and rural health units.

Housing

Both Kaccha and mostly Pakka houses were observed in the project area but majority of the families live in pakka houses (made of concrete). About 70% of Pakka while 30% of Kaccha houses were found are in the project area.

Source of Information

Radio and TV are major source of information for community. Newspapers and mobiles are also present in the project area. Newspapers like The News, Dawns, Jang, Nawa-e-Waqt etc. are also available in the city.

Literacy Rate & Education System

According to Bureau of Statistics Report, the literacy ratio of Dera Ghazi Khan District is 48%. There are several government and private schools in the district. For higher education, people consider moving to major cities like Multan, Islamabad & Lahore etc.

Infrastructure

Electricity is available in most of the areas although many villages around the proposed bypass alignment lack facility of Natural Gas and locals use LNG cylinders and wood for cooking.

Water

Hand pump is major source of ground water consumption with an average depth of about 80-150 feet. Most of housing units use piped water. The majority of the population in the project area relies on groundwater as surface water is not suitable for consumption.

Transport

The project area is accessible through the N-70 and N-55 highway. The area remains busy around the clock with the freight and commuter traffic. Tractor trolleys and donkey carts are used to carry loads locally. People in the area have their own cars and motorbikes. Local transport such as buses, pickups and rickshaws are also available.

Dress

People usually wear Shalwar and Kameez.

Food

Chapati are usually eaten as food. Locals also eat rice. The southern Punjab cities of Multan, Dera Ghazi Khan, Bahawalpur are also known for their sohan halwa products. Multani Chaamp is a meat dish consisting of lamb chops prepared with various flavours and spices.

Betrothal

Generally, betrothal traditions are found, and pre-marriage relations are established which is called mangni.

Marriage

In few rural area marriages are happened under Watta Satta customs and arranged marriages are generally held throughout the all relevant districts.

Gender

Gender analysis defines the evolving socioeconomic role and functions of men and women as they relate to and complement each other within a specific sociocultural and economic context. This section describes the roles and responsibilities of women in the project area, as well as their access to and control over resources, health, education, and ownership of assets.

Activities Performed by Women

Women play an important role in addressing food security and nutritive wellbeing at the household level. They remain busy in indoor and outdoor work from early morning to sunset. Women are responsible for cooking, dishwashing, looking after their children, washing clothes, collecting fuel wood, collecting fodder for livestock, and working in agricultural fields.

Female Education and Awareness

Education facilities for girls are available in the surrounding residential area of project site.

Photographs of socio-economic environment of the project area are attached in Figure 5.8.

5.3.7 Locals Perception of the Proposed Project

Focused group discussions revealed a high satisfaction of locals based on their general perception about the projects. The majority of participants expressed no

serious complaints regarding proposed project activities in the area and welcome the idea of the proposed project.

The community members also hoped that the new project activities will provide jobs for local community and Government authorities will also provide health facilities as welfare work in the area. They welcomed the project with the hopes that the project will bring development in the area. They also highlighted that unemployment, lack of natural gas and health facilities are major issues of the area.

5.3.8 Secondary Consultation

Stakeholder consultation was also carried out with Government departments. The following Government departments were visited in Dera Ghazi Khan.

- District Forest Departments
- Environment Protection Agency.
- Wildlife Department DG Khan
- Irrigation Department DG Khan

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental assessment.

During the discussion, the brief project description and details were communicated with the concerned departments and their comments and suggestions were noted. None of the government official expressed any serious issue regarding the implementation of the proposed project. In general, all of the officials welcomed the project as it will bring development in the area and betterment for the community. Details on Secondary stakeholder consultation is presented in Chapter-6 of the report.

Figure 5-8: Socio-economic Condition of the Project Area


College of Nursing Teaching Hospital
Dera Ghazi Khan


ڈائریکٹر
ایگریکلچر
آن فارم واٹر مینجمنٹ
ڈیرہ غازیخان

6. Stakeholders Consultation

Stakeholder consultation is a mean of involving all primary and secondary stakeholders in the project's decision-making process in order to address their concerns, improve project design, and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a mean of enhancing project sustainability.

Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision-making. Stakeholder consultation was therefore conducted in the project area not only to satisfy the legal requirements of the EIA process in Punjab but also to improve and enhance the social and environmental design of the project.

6.1 Objectives of Stakeholders Consultation

The process of public participation and consultation was endorsed in the United Nations Conference on the Environment and Development (UNCED) in 1992 through one of the key documents of the conference-Agenda 21. Agenda 21 is a comprehensive strategy for global action on sustainable development and deals with issues regarding human interaction with the environment. It emphasizes the role of public participation in environmental decision-making for the achievement of sustainable development.

6.2 Consultation Process

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in the Saraiki and Urdu languages. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the proposed project, their feedback was documented during the primary stakeholder consultation.

The issues and suggestions raised were recorded in field notes for analysis, and interpretation, by reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, and focus group discussions.

Secondary stakeholder consultations were more formal as government officials were consulted during face-to-face meetings. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid any conflict with local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

6.3 Stakeholders Consulted

In the consultation process for EIA, following key stakeholders were consulted:

- Primary Stakeholders i.e. Local communities.
- Secondary Stakeholders i.e., Environment, Wildlife, Forest, Agriculture and Irrigation Departments etc.

Meetings with stakeholders consisted of community consultation meetings, focus group discussions, and in-depth interviews with government officials. The location of the meetings, the process followed, and the outcomes are discussed in this section. Photographs of consultations are included as **Figure 6.1.**

6.4 Primary Stakeholder

The findings of the Community consultations are given as follow. All these have been addressed in various sections of the EIA, and the mitigation plans have been incorporated into the EMP. The summary of the various primary stakeholder consultations is given below:

6.4.1 Community Concerns

Project Approval

The community consultations demonstrated that goodwill towards the project proponents indeed exists; approval for project activities by the communities was

evident. The consultations were considered a good gesture and appreciated, especially by the men and village elders. The poverty level is such that communities are looking to any project proponent to improve their financial well-being to a great extent. Project proponent recognizes that benefits from the project should be distributed judiciously and equitably especially among primary stakeholders in the project area and will continue to ensure that this principle is followed in its projects and community development program.

Local Employment

Communities in the project area emphasized that local villagers should be given priority when employing people for various project-related works and activities according to their skills, mainly during construction phase.

Interaction with Local Community

Non-Local work force coming in the project area that will not be aware of the local customs and norms may result in conflicts with the local community. Most of the project area people welcomed the project idea and showed their comfortability in case of non-local work force.

All Primary stakeholders are in favour of proposed project. They said this proposed project will have positive impacts on their life.

6.5 Secondary Stakeholders Consultation

The secondary stakeholder consultation was conducted in order to provide details about the proposed project and get suggestions if any about the proposed project and its activities. Some of the main offices are mentioned as follow:

- Environmental Protection Agency
- Wildlife Department DG khan
- Forest Department DG khan
- Agriculture Department DG khan
- Water Management Department DG khan

Meetings were held with all above mentioned stakeholders. Brief detail about the project was provided to all available officers. All the stakeholders welcomed the idea of proposed project.

A detailed meeting was held with EPA representative Mr. Azhar Nawaz Inspector. Detailed discussion was held, and he welcomed the idea of construction of bypass alignment. He suggested that:

- Minimum 1% of the total cost of project shall be designated for tree plantation.
- Water shall be sprinkled regularly during construction to suppress the dust.
- Waste collection, segregation and disposal system shall be developed and implemented.
- Regular inspection and maintenance of vehicles shall be done.

In a meeting with Mr. Shahid Nawaz Assistant director Wildlife department DG khan has welcomed the idea of proposed project and informed that no protected area is present in the vicinity of proposed project area and suggested that proponent should do some welfare work for local communities.

Mr. Khalid Javed Bhutta (DFO) Forest dept. DG Khan and Mr. Afzal shahid (clerk) office of the forest department were visited to record their views about the proposed project. They suggested that AGTL shall plant and maintain the trees along the proposed bypass after regular coordination with Forest Department. He added that indigenous species of plants shall be planted.

Consultation with Mr. Sabir Hussain (Executive engineer) Agriculture Dept. DG Khan was done, and their comments were recorded. He added that heavy rain may affect the road and its protection measures shall be considered during design and construction.

Generally, all of the secondary stakeholders were in favor of proposed project. Further, the proposed project should be executed with appropriate mitigation measures to reduce the environmental and social impacts. The proposed bypass road is dire need of the people of project area. A detail list of primary and secondary stakeholder consulted, and consultation/surveyed forms is presented in **Annexure-D** of the report

Figure 6-1 : Stakeholder Consultation









7 Impact Prediction, Evaluation and Mitigation Measures

This chapter discusses the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact and assesses the significance. The proposed mitigation measures to minimize adverse impacts, resulting residual impacts of the project and environmental management plan (EMP) are discussed in the next chapter.

The discussion of the environmental and socioeconomic impacts is then organized in the following manner:

Impacts Associated with Proposed Project Activities

- Environmental Impact—Construction and Operation Activity
- Socioeconomic Impact—Construction and Operation Activity

7.1 Identification of Potential Impacts

In the first step, potential impacts of the project are identified by desktop screening exercise, using checklist during field visits for collection of baseline data, professional judgment, published literature on environmental impact of similar projects and standard environmental guidelines. A critical step in identifying potential impacts is discussion with project proponent, consultation with stakeholders and communities to identify their concern. Public consultation was carried out to identify the concerns of primary and secondary stakeholders.

The main aspects associated with potential impacts are as follow:

- Geomorphology, soil
- Water resources
- Ambient air quality
- Waste discharge
- Noise pollution
- Ozone depleting substance
- Ecology of the area, including flora and fauna
- Traffic movement

- Socio-economic conditions

7.2 Impact Classification

The potential impacts are classified according to the type of potential receptors. The following receptor categories were used:

- Community (people, their social and cultural values, aspirations and archaeological sensitivity)
- Land and soil (land resources, soil resources)
- Air quality (ambient air quality, ozone depletion)
- Water resources (surface and ground water resources)
- Ecosystem (vegetation, wildlife, and biodiversity).

7.3 Impact Scoping Criteria

Identified potential impacts are evaluated on the basis of following criteria:

- The present baseline conditions, the change in environmental parameters likely to be affected by proposed project related activities.
- Any project impact that environmental standards or environmental guidelines applicable to the project will be breached.
- If project activity results in a high risk of a permanent, irreversible, and significant change to environmental conditions.
- Nearby communities concerns related to project.

An impact scoping matrix is described in below Table 7.1.

Table 7-1: Impact Scoping Matrix

Project Phase	Environmental Impact	Social Impact
Construction Activity	❑ Water resoures depletion, contamination. ❑ Dust Emission ❑ Vegetation Loss ❑ Vehicle and Equipment Exhaust ❑ Soil Contamination ❑ Drainage and Storm Water Run-off ❑ Camp Effluent ❑ Hazardous and Non-Hazardous Waste Management ❑ Wildlife Disturbance	❑ Traffic disturbance, road accident ❑ Land acquisition ❑ Employment conflicts ❑ Safety and security ❑ Project and Community Interface ❑ Cultural and religious sites ❑ Local Economy ❑ Local Employment
Operation Activities	❑ Air Pollution ❑ Noise Pollution ❑ Wastewater	❑ Unskilled labour jobs ❑ Occupational Health and Safety

	❑ Green House Gas emissions ❑ Water Resources Depletion ❑ Hazardous and non-hazardous substances ❑ Waste Management	❑ Economic Activity (Primary and multiplier effects)

7.4 Impact Assessment Methodology

The impacts have been assessed following standard international guidelines and best available practices. The method defines three levels of consequence (or severity) and likelihood (or probability of occurrence) - High, Medium or Low - of an impact. A standard risk based approach has been used in which;

The significance of an impact is determined on the basis of the level of consequence and likelihood of the impact e.g. an impact of medium severity is assigned a low significance if the likelihood of occurrence of the impact is low and high significance if the likelihood of occurrence is high or almost certain. The definition of consequence and likelihood is illustrated in Table 7.2 and impact significant matrix is provided in Table 7.3.

Table 7-2: Definitions for Consequence and Likelihood of Impacts

Level	Consequence (Severity of Impact)	Likelihood
High	Serious/catastrophic damage to local and regional environment Direct legislative requirements of EPA and World Bank Corporate requirement Serious threat to corporate reputation/profitability/ability to do business	High likelihood of occurrence during lifetime of operation Regular/continuous part of operations
Medium	Measurable damage to the environment Subject to potential future legislation Potential to affect reputation/cost Implication/reduced efficiency	Moderate possibility of occurrence during lifetime of operation Periodic/occasional part of operations
Low	Negligible damage to the environment No risk to business	Unlikely to occur during lifetime of operation

Table 7-3: Impact Significant Matrix

Consequence	Likelihood		
	High	Medium	Low
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

The prediction of impacts also includes the duration of impacts (in terms of long-medium and short-term), nature of impact, geographical location of the impact and reversibility of the impact. Impact assessment criteria for the above-mentioned parameters are illustrated in Table 7.4.

Table 7-4: Impact Assessment Criteria

Impact Characteristics	Categories
Nature of the Impact	**Direct**: The environmental parameter is directly changed by the project. **Indirect:** The environmental parameter changes as a result of change in another parameter.
Duration of the impact	**Short term:** Lasting only till the duration of the project such as noise from the construction activities. **Medium term:** Lasting for a period of few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil. **Long term:** Lasting for a period much greater than medium term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical Location of the impact	**Local:** Within the area of project i.e. operation site and access road. **Regional:** Within the boundaries of the project area. **National:** Within the boundaries of the country.
Reversibility of the impact	**Reversible:** When a receptor resumes its pre-project condition. **Irreversible:** When a receptor cannot resume its pre-project condition.

Identification of the mitigation measures: If it is determined that the predicted impact is significant, suitable mitigation measures are identified. There is a range of mitigation measures that can be applied to reduce impacts. This is discussed in following Sections 7.6.

Evaluation of the residual impact: Incorporation of the suggested mitigation measures reduces the adverse impact of the project and brings it within the acceptable limit. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied—the residual impacts. This is discussed in following Sections 7.6.

Identification of the monitoring requirements: The last step in the assessment process is the identification of the monitoring requirements. The scope and frequency of the monitoring depends on the residual impacts. The purpose of monitoring is to confirm that the impact is within the predicted limits and to provide timely information if unacceptable impact is taking place. An environmental management plan (EMP) will be developed with identification of monitoring requirements. This is discussed in next chapter.

7.5 Potential Impacts Associated with Design Phase

7.5.1. Topography

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

7.5.2. Landscape

Topography of the project area is mixed with most of the area as flat with no noticeable variation in the surface.

The proposed project is the construction of AGTL Plant Refurbishment so it is within factory area so landscape impact will be minimum.

After the construction of proposed project, the landscape of the project area will not be changed.

7.5.3. Flora

For the establishment of proposed project and camps; different areas will be cleared, so loss of vegetation will occur. It is expected to cut quite a number of small tree nearby proposed project site.

This loss will be compensated by planting strip. As a desirable requirement specific area will be located for plantation. Planting will be done as soon as the construction of the buildings is completed. Native species would be planted, and no invasive/ exotic species would be introduced.

Maintenance is the key to the establishment of the plantation. Regular monitoring of plantation will be carried out by the executing agency.

7.5.4. Public Utilities

Due to the proposed project is within factory area so public utilities will not be affected.

7.6 Impacts Associated with Construction Activities

In this section, the environmental and socioeconomic impacts associated with the proposed project construction activities are discussed. Construction activities here mean construction of buildings, campsite and associated activities. The identified impacts assessment is detailed in the below Table 7.5.

Table 7-5: Impact Assessment of Construction Activities

Environmental Aspects	*Potential Impact*	*Project Phase*	*Description*	*Consequence Severity Rating*	*Likelihood /Frequency*	*Nature of Impact*	*Geographical Location of Impact*	*Duration of Impact*	*Reversibility of Impact*	*Significance of Impact*
Geology and Soils	Soil erosion, soil contamination by the spillage of fuel, oil and chemicals	C	The construction activity will involve clearing of land for the purpose of construction of proposed project. During construction, there is a potential for spills of fuel, lubricating oils and chemicals that could lead to soil contamination.	Low	Low	Direct	Local	Short term	Reversible	Low
Water Resources	Depletion of aquifer from overuse, and contamination of water resources by the spillage of fuel, oil and chemicals	C	During Construction activity ground water resources will use from existing pumping facility so there is no chance of over exploitation or depletion of water resources in the project area.	Low	Low	Direct	Local	Short term	Reversible	Low
Air Quality	Vehicular emission, Dust emission	C	Construction activities can generate exhaust emission and dust during activities such as 'earthmoving' operations by using tower cranes, bulldozers etc. and other pollutants emission from generators and vehicles.	Medium	Medium	Direct	Local	Short Term	Irreversible	Medium
	Ozone Depletion	C	HCFC and CFC's if any of them used during	Low	Low	Indirect	National	Long term	Irreversible	Low

Environmental Aspects	*Potential Impact*	*Project Phase*	*Description*	*Consequence Severity Rating*	*Likelihood /Frequency*	*Nature of Impact*	*Geographical Location of Impact*	*Duration of Impact*	*Reversibility of Impact*	*Significance of Impact*
			project activities, can deplete ozone layer.							
Noise	Impacts at workers, nearest community, disturbance to the wildlife	C	There is no impact on local community as well as wildlife as project falls within project area. Workers could be affect by noise pollution	Low	Low	Direct	Local	Short term	Irreversible	Low
Waste	Liquid Waste: Risk of liquid waste contaminating water resource or soil	C	The proposed project activity would generate liquid waste from campsite.	Low	Low	Direct	Local	Short term	Reversible	Low
	Solid Waste (Non-hazardous): Aesthetic issues	C	The proposed project works will result in the generation of a range of non- hazardous solid wastes.	Low	Low	Direct	Local	Short term	Reversible	Low
Traffic	Disturbance to local community	C	As project falls within factory area so there is no disturbance for traffic	Low	Low	Direct	Local	Short term	Reversible	Low
Wildlife and Habitat	Direct habitat loss and migration of wildlife	C	As project falls within factory area so there is no disturbance to any wildlife and founa.	Low	Low	Direct	Regional	Short term	Irreversible	Low

Environmental Aspects	*Potential Impact*	*Project Phase*	*Description*	*Consequence Severity Rating*	*Likelihood /Frequency*	*Nature of Impact*	*Geographical Location of Impact*	*Duration of Impact*	*Reversibility of Impact*	*Significance of Impact*
Natural Vegetation	Clearing of vegetation	C	There is a no potential for the floral loss and trees to be cut because project area is a open plot, little bit trees may be due to construction activities. The plan is to grow more trees in replacement.	Low	Low	Direct	Local	Short term	Reversible	Low
Socio – Economic Environment	Local Procurement of Goods and Service	C	Local procurement of goods and services will be procured from local market. So overall it is benefit for locals.	Positive impact	-	-	-	-	-	Positive impact
	Local Employment	C	Due to proposed project activities, there will be employment opportunities for locals for unskilled work. Almost 150 to 200 personnel will be required during construction activities which will generate work opportunities for locals.	Positive impact	-	-	-	-	-	Positive impact
	Disturbance to community from material and equipment transport	C	Project site is not accessed through route So, there will be no major issue of disturbance for local due to project.	Low	Low	Direct	Local	Short term	Reversible	Low
	Project and Community Interface	C	Inter-cultural differences between the project staff from other areas and the local community can result in frictions.	Low	Low	No impact	No impact	No impact	No impact	Low
C = Construction										

7.7 Discussion on Key Environmental Aspects, Mitigation Measures and Residual Impacts during Construction Phase of Project

The potential impacts of the proposed project have been discussed in the following sections. Where appropriate, mitigation measures have also been included to reduce the unacceptable impacts. This section includes a priority list of the most important measures that the project proponent should adopt to ensure a practical, cost-effective and sufficient approach to impact mitigation. Information is included as to how the recommended mitigation measures should be incorporated into detailed project design and in the contract documents.

Broadly, these measures can be classified into following categories:

- Avoiding the impact altogether by not taking certain proposed activity or parts of an activity, for example, using Halon, HCFC and CFC-free equipment to avoid impact on ozone layer.
- Minimizing impacts by limiting the degree or magnitude of the activity, for example, minimizing dust emission by using water sprinkler.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Compensating for the impact by replacing or providing substitute resources or environments.

The project proponent plays a vital role in developing the mitigation plan by identifying possible mitigation measures and assessing the feasibility of proposed measures.

This section provides a summary of the residual effects that are likely to be present following implementation of the mitigation measures.

7.7.1. Geomorphology and Soils

Potential Impacts

Impacts on geomorphology and soils may arise from the following project activities:

- Clearing and levelling for buildings construction
- Contamination of soil due to spillage of fuels, oils or chemicals.

Likely impacts of these activities can include:

- Physical scarring of the landscape,
- Accelerated soil erosion,
- Alteration of soil quality by loss of topsoil,
- Soil contamination.

Assessment of Potential Impacts

The clearing and levelling during construction activities could lead to alteration of soil quality by removal of topsoil, losses of plant cover and limited soil erosion.

Loss of topsoil may take place in the proposed project area. The spillage and leakage of fuels, oils and other chemicals may lead to soil contamination. Possible contaminant sources include fuel and chemical storage areas at sites, and all project vehicles. A spill prevention plan will be developed and implemented. The mitigation measures listed in following section of the report are adhered with.

Mitigation Measures

The proposed mitigation measures to reduce the impacts on geology, topography, and soil during the proposed construction activities are:

- Vegetation clearing will be kept minimum.
- Unnecessary clearing of vegetation and offset clearing shall be strictly prohibited.
- Vehicle speeds shall be regulated and monitored to avoid excessive dust emissions.
- Vehicles and equipment would not be repaired in the field. If unavoidable, impervious sheathing / drip trays will be used to avoid soil and water contamination.
- Waste oils should be collected in drums and disposed-off through recycling / waste contractors.
- Regular inspections would be carried out to detect leakages in construction vehicles and equipment.
- Fuels, lubricants, and chemicals will be stored in covered and with bunded walls, underlain with impervious lining.
- Appropriate arrangements for spill control, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas.

Residual Impact

The land use will change as a result of construction of the project. The nature of impact is direct and its duration is short term in nature but takes time to rehabilitate the natural environment of the area, so the overall significance of impact is low. If the mitigation measures are effectively implemented, the residual impact of the proposed activities on the area's geophysical environment is expected to be reduced.

7.7.2. Water Resources

Potential Impacts

Proposed activities could affect the area's water resources in two ways:

- Reduction due to overuse, and
- Contamination (Groundwater)

Assessment of Potential Impacts

Water will be required during construction activities. Water will be procured from existing ground water pumping resources. Water conservation practices will be utilized to reduce the overall water consumption. The analysis results for the ground water resources shows that the water is fit for construction process.

Groundwater quality may deteriorate if pollutants are mixed with surface runoff during rain and carried to water resources in the vicinity or seeped in the ground. Potential sources of pollution in such cases may include:

- Domestic wastewater (sanitary and kitchen discharge)
- Oil and grease from vehicles and machinery.
- Stored fuel, oil and other chemicals.

Sewage from the camp should go into an impermeable septic tank. The impermeable septic tank will prevent untreated sewage from polluting ground water.

Mitigation Measures

The mitigation measures described below will ensure that the project area's ground water resources are not significantly affected by project activities.

- The water extraction will be kept at minimum.
- A water management plan will be developed. The plan will also include strategies to minimize water use (and therefore volume of discharge) and maintain reserves.
- Follow good housekeeping practices with all machinery that may potentially discharge wastewater.
- No untreated effluents will be released to the environment.
- Effluents from the camp offices and the residential camps will be treated in the septic tank before its disposal. The treated water (if confirming to PEQS) will be used for tree plantation or will be disposed-off through waste contractor (if effluent does not confirm to PEQS). The septic tank will be completely covered, so that surface runoff may not come in contact with the effluent.
- Fuels, lubricants, and chemicals will be stored in covered and with bund walls, underlain with impervious lining.
- Spill prevention plan shall be followed to mitigate any kind of spill.

Residual Impact

Implementation of the proposed mitigation measures is likely to leave no long-term residual impact on water resources.

7.7.3. Air Quality

Potential Impacts

Air emissions from proposed project-related activities are likely to include:

- Dust emissions produced during construction activities.
- Combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide, and volatile organic compounds) from generators.
- Combustion products from vehicles used for project-related activities.

Assessment of Potential Impacts

The sources of emissions during construction activities will not be significantly enough to alter the ambient air quality at a regional level. The emissions will disperse quickly with the prevalent wind currents. All generators, vehicles, equipment and machinery will be properly maintained during the operation to minimize emissions.

Other factors that support the insignificant nature of the impact are:

Dust Emissions:

Dust emissions during construction can be an issue. Potential sources of dust emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces, exposed storage piles, truck dumping, hauling, vehicle movement, and concrete mixing and batching.

Dust emitted during construction activities can result in deterioration of ambient air quality in the vicinity of the source.

Vehicle and Equipment Exhaust Emissions:

Combustion processes in generators and other construction equipment result in exhaust gases that can affects the ambient air quality locally.

Emissions produced by vehicles and equipment will be in terms of the resulting pollutants (SO_2, NO_X, PM, etc.).

Mitigation Measures

The mitigation measures given below will further reduce their impact and ensure that they remain within acceptable limits.

- Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of sprinkling will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors.
- All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.

- Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.
- All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.

Residual Impact

Implementation of the proposed mitigation measures is likely to leave no long-term residual impact on the ambient air.

7.7.4. Ozone Depletion

The proposed project will not use any source of ozone depleting compounds such as Halon, Chlorofluorocarbons (CFC), Hydrochlorofluorocarbons (HCFC) or any other source which deplete the ozone layer, so the overall assessment of the impact is significantly low.

7.7.5. Noise Pollution

Potential Impacts

Potential sources of noise pollution will include operation of generators, machinery, construction equipment, and vehicles during the project activities.

The potential noise related issues during construction activities would disturb workers only.

Assessment of Potential Impacts

The potential sources of significant noise during the construction period include the construction machinery, generators at camps. There is no continuous major source of noise.

The main exposure of noise pollution will be on crew members.

The overall impact level is low in significance as the likelihood of occurrence is low.

Mitigation Measures

- All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.
- Proper engineering control will be applied to noise producing sources like generator.

- It will be ensured that generators, vehicles and other potentially noisy equipment used are in good condition. Noise from generators, vehicles, other equipment and machinery will be kept to the minimum through regular maintenance.

The strategy to minimize the noise will be based on the following:

- Reduce equipment noise at source.
- Before the start of the operations conduct a noise survey of the equipment and prepare a noise control plan.
- Use noise-abating devices wherever needed and practicable.
- Blowing of horn will be prohibited on the access road to the project site and inside the site.

Residual Impact

By implementing the above mitigation measures, the overall impact will be significantly low. Residual noise impact is expected to be low from the construction activities of the proposed project.

7.7.6. Waste Discharges

Potential Impacts

The expected waste generated during construction activities and their proposed methods of disposal are discussed below Table 7.6.

Likely impacts from Hazardous and non- hazardous waste generated by construction activities (if disposed-off improperly) can include:

- Groundwater pollution
- Soil contamination
- Air pollution, odor
- Health hazards
- Aesthetic issues.

Table 7-6: Construction Activities Waste

Category	*Waste Generated and point source*	*Mitigation Measures*
Solid Waste		
Hazardous	Batteries, rubber tire, used oil filters, chemical containers, contaminated soil, grease trap sludge.	Used oil and ferrous/non-ferrous materials will be provided to approved contractor for recycling. Batteries will be hauled away by contractor for recycling.
Non-hazardous	Packaging waste Paper, textiles cardboard, rubber, wood, glass, tin cans.	Combustible materials such as paper, cardboard, textiles will be burnt on-site. Non-combustible materials such as glass, plastics, tin and aluminum cans will be hauled away by contractor for recycling.
Non-hazardous Recyclable	Cable drums, wood, packaging, scrap metal, recyclable plastic sheeting, debris, plastic, aluminum cans etc.	Will be hauled away by contractor for recycling.
Non-recyclable	Demolition Waste: Concrete, spent, plaster, plumbing, heating and electrical parts	Concrete and plaster will be utilized for filling of depressions / pits. Plumbing, heating and electrical parts will be hauled away by the contractor for recycling.
Liquid Waste		
Non-Hazardous	Sewerage water	Wastewater from kitchen and washing areas will be collected for reused for plantation. Sewerage will be treated by using septic tank and treated water will be reused for water sprinkling.

Assessment of Potential Impacts

All the waste generated during construction activities will be disposed-off through implementation of an effective waste management plan. By proper implementation of a waste management plan, the overall potential risk/impact will be significantly low.

Mitigation Measures

A waste management plan will be developed before the start of the project activities. Key elements of the waste management system will be the following:

On-site handling

- The recyclable waste will be sent to approved waste contractor.
- Waste bins will be placed inside the boundary. All waste removed from the site will be under license and handled by an approved contractor. All hazardous waste will be separated from other waste.

Records

- Record of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register.

Disposal

- All non-hazardous waste material that cannot be recycled or reused will be disposed of as per waste management plan.
- Depending on the nature and quantity of the hazardous waste, it will be disposed of by licensed hazardous waste contractor as per the waste management plan.

Other Management Measures

- Training will be provided to personnel for identification, segregation, and management of waste.
- An emergency response plan will be developed for the hazardous waste (and substances).
- All containers of hazardous waste will be labelled appropriately.

Residual Impact

Even after implementation of the above measures, it is possible that some littering may take place. Monitoring will be undertaken to minimize the residual impact.

7.7.7. Traffic

Potential Impacts

Following will be the potential impacts from the traffic:

- Disturbance to local community,

Assessment of Potential Impacts

The nearest community settlement is located within 8 to 10 km from the proposed project and proposed project falls within factory area so no disturbance of traffic for local communities.

Mitigation Measures

- Vehicles will remain confined to defined access.
- Parking at NO PARKING areas shall not be allowed.
- Speed of vehicles shall be kept 20 km/hr.

Residual Impacts

By implementing the above mitigation measures, the overall impact will be significantly low, so the residual impact is low.

7.7.8. Natural vegetation

Potential Impacts

Clearing of or damage to vegetation due to camp, construction activities will occur due to:

- Clearing of land building construction
- Clearing of land for camp sites

Assessment of Potential Impacts

For the establishment of proposed project and camps, minimum areas will be cleared, so loss of vegetation will minimum. It is expected to cut quite a number of tree trunks within proposed project site. At the length of proposed project few trees will be cut off. No rare, sensitive or vulnerable species are recorded or reported in the study area. Most of the plants found in the area have the properties to grow in more than one habitat because of their wide ecological aptitude and have populations large enough to ensure their genetic diversity. To minimize the impact, camp sites and access routes will be constructed on those areas where vegetation loss may be avoided and unnecessary damage to vegetation will be avoided. Moreover, the vegetation will be removed only in the construction area. The plan is to grow

more trees in replacement. Every single tree being cut for construction will be replaced by 10 trees. Moreover, tree species will be planted as per ecological conditions of the respective project area. The significance of the impact is reduced and any loss of vegetation is reversible.

Mitigation Measures

The following mitigation measures will reduce any adverse impact on vegetation:

- Vegetation clearing from project site and camp sites will be kept to a minimum.
- Fuel-wood will not be used during project activities.
- Any significant removal of or damage to vegetation in this area will be compensated by afforestation/reforestation.

Residual Impact

Given the current state of the vegetation, and implementation of the proposed mitigation measures, the overall impact will be significantly low, so the residual impact is low.

7.7.9. Socio-economic Impact

Potential Impacts

Potential sources of positive and meditative impacts on local communities can include:

- Project and Community Interface
- Cultural and religious sites
- Archaeological sites
- Local Economy
- Local Employment.

Assessment of Potential Impacts

Project and Community Interface:

Inter-cultural differences between the project staff from other areas and the local community could result in frictions.

To mitigate these issues locals will preferred for unskilled jobs. Also with proper management of the workforce, it is possible to avoid any complaints.

Cultural and Religious Opportunities:

There is no cultural sites in the form of mosques, tombs and graveyards exist in the proposed project.

Archaeological Sites:

There are no documented sites of archaeological, historical, or cultural significance within the proposed project as its construction is within factory area.

Local Economy and Employment:

There will be positive impact on local economy due to project activities:

- During the proposed project activities such as construction, material such as the gravel, aggregate, steel, cement, sand for site construction will be procured from local market. General supplies which include camp supplies (food, etc.), fuels and oils etc. will also be procured from nearest urban areas.
- An increase in the income of locals may occur due to employment in the project.
- Local Employment.
- Distribution of employment opportunities during construction activities. Local people will be hired for unskilled jobs.

Mitigation Measures

The following mitigation measures will be implemented:

- Limit the social interaction between the workforce and the local communities.
- Safe driving practices and safe speed limits for vehicles will be followed.
- The construction crew's interaction with the local population will be minimized.
- There will be no interaction with the local women folk.
- The company will maintain a social complaint register at the site to document all complaints. The register will also record the measures taken to mitigate these concerns.

- Awareness and cultural inductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities.
- Project staff will respect cultural norms.
- The non-local project staff will be sensitized to local culture and norms.
- Unnecessary interaction of local population with the non-local project staff will be avoided.
- Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.

7.8 Impacts Associated with Operation Activities and Mitigation Measures

In this section, the environmental and socioeconomic impacts associated with the proposed project operation activities are discussed. The impacts that are discussed are as follows:

Environmental Impacts

- Water Resources
- Noise Level
- Solid Waste Management
- Occupational Health and Safety
- Environmental and Social Benefits

7.8.1. Water Resources

Potential Impacts

Proposed activities could affect the area's water resources in two ways:

- The surface water bodies may get polluted due to uncontrolled release of contaminated wastewater.
- The pollution risk from accidental spillage may increase moderately.

Assessment of Potential Impacts

There is not any surface water body near the project area so the impact on surface water is negligible.

7.8.2. Noise

Potential Issues

Using generators could increase noise may be a source of disturbance to only workers and for nearby staff colony.

Assessment of Potential Impacts

Specifically during day times. The PEQS for noise require that the sound level in residential areas should not exceed 65 dB(A) during the day and 55 dB(A) during the night.

Mitigation Measures

The following mitigation measure will be undertaken in order to further reduce the noise levels.

- Tree plantation to reduce the effect of noise pollution.
- Proper tunning of the generators and noise generating equipments.

Residual Impacts

Implementation of the mitigation measure proposed above will result in negligible / no residual impact due to noise on surrounding environment.

7.8.3. Solid Waste Management

Potential Issues

The solid waste generated during the operational phase of proposed project can pose a health hazard, pollute soil, ground water if not managed properly.

Assessment of Potential Impacts

A significant impact will be interpreted if the waste management is not carried out properly, which may affect the health of workers, pollution of soil, groundwater:

The operation of the proposed project will generate a relatively minor volume of solid wastes. This solid waste will be domestic in nature.

Domestic waste from the building which will include, waste from kitchen and general rubbish, recyclable waste such as empty containers, paper, plastics bottles etc.

All wastes generated from the project will be properly managed by proposed controls discussed in the following section. The environmental impacts will be minimum after the implementation of the proposed mitigations.

Mitigation Measures

Key elements of the waste management system will be the following:

- Separate waste bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.
- Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors for recycling.
- Non-hazardous, non-recyclable wastes such as kitchen wastes will be disposed-off on designated site.
- No waste will be dumped at any location outside the proposed project boundary.
- Training will be provided to personnel for identification, segregation, and management of waste.

Residual Impacts

Proper implementation of the mitigation measures will ensure that the residual impact from waste is minimum.

7.8.4. Occupational Health and Safety

Health risks and workers safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment specifically due to air emissions, unhealthy drinking water, storage handling and transport of hazardous material etc. Workers will be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in project area.

Mitigation Measures

- Obligatory insurance against accidents for laborers/workers.

- Providing basic medical training specified work staff and basic medical service during operations.
- Firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents.
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction.
- Elaboration of a contingency planning in case of major accidents.
- There should be proper spill control for Oil spillage / leakage.
- Eliminate any unusable impounding of water.

7.8.5. Environmental and Social Benefits

Employment

The project will generate jobs during the construction phase of the project. The project operational phase may also generate new jobs. Most of these vacancies will be filled by Pakistani nationals.

Overall the proposed project will have a very positive impact on the employment opportunities for locals.

8 Environmental Management Plan

The potential environmental impacts are identified from the planning stage of proposed project through the EIA process. The EIA has identified potential impacts that are likely to arise during the project. The EIA has examined in detail both negative and positive impacts at each stage of the project covering both construction and operations phase. To minimize the effects of adverse impacts the EIA has recommended mitigation measures. These mitigation measures include the use of alternative technologies, management and physical controls. The proposed mitigation measures have been based on the understanding of the sensitivity and behavior of environmental receptors in the project area, the legislative controls that apply to the project and a review of good industrial practices while operating in similar environments. For residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the EIA stage, monitoring measures have been recommended to ascertain these impacts during the course of the project.

For effective implementation and management of the mitigation measures an Environmental Management Plan (EMP) has been prepared. The EMP satisfies the requirement of the Punjab Environmental Protection Department Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, amended 2022.

The EMP is a tool that serves as to manage environmental impacts and specifically focuses on implementation of mitigation measures in its true sense against likely environmental impacts.

8.1. Purpose and Objectives of the EMP

The primary objectives of the EMP are to:

- Achieve AGTL Corporate HSE goals.
- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define legislative requirements, guidelines and best practices that apply to the project.
- Define the responsibilities of the project proponent.

- Define a monitoring mechanism and identify monitoring parameters in order to:
  - Ensure the complete implementation of all mitigation measures.
  - Ensure the effectiveness of the mitigation measures.
- Define requirements for environmental monitoring and auditing.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

8.2. Components of the EMP

The EMP consists of the following:

- Legislation and guidelines
- Organizational structure and responsibilities
- Monitoring / Management plan
- Environmental monitoring
- Communication and documentation
- Change management Plan
- Training programme

8.3. Legislation and Guidelines

The EIA has discussed national and international legislation and guidelines that are relevant to the project, proponent will ensure that the project is conducted in conformance to the project proponent corporate environmental policy, national legislation and relevant international conventions and that guidance is sought from national and international guidelines. Project proponent will also ensure that its key project management staff and all its assigned contractors are aware of these legislation and guidelines prior to the start of project activities. The details on national and international legislation and guidelines are given in Chapter # 2 of the report.

8.4. Organizational Structure and Responsibilities

This section provides an organizational structure for environmental management during the proposed project operation and defines the roles and responsibilities of the various players for the duration of the project. The proposed project includes the following organizations:

- AGTL as the project proponent and owners of the EMP.
- Project construction contractor(s) as executors of the EMP during construction phase of the project.
- Operation & Maintenance (O&M) team as executor of the EMP during the operational phase of the project.

These organizations will have the following roles and responsibilities during the project.

8.5. Planning and Design of the Operation

Design of the Operation

Design and operations of the proposed project have been described in Chapter # 3 of the EIA report. Following approval of the EIA, if any aspect of the operations or requirements of the EIA need to be changed, project proponent will categories that change in accordance with the Change Management Plan provided in this EMP and take appropriate measures thereon.

Approvals

Obtaining No Objection Certificate (NOC) from Environment Protection Department Punjab (Punjab EPD) will not relieve the proponent or its appointed contractors or suppliers of any other legal obligations and hence the proponent and its contractors and suppliers will obtain all other relevant clearances and necessary approvals required by the Government of Punjab prior to commencing the respective operations.

Contractual Provisions

Adherence to the requirements of the EIA and EMP provided NOC in terms of environmental mitigation will be required from all project contractors and suppliers and thus EMP will form part of their contracts with project proponent.

8.6. Implementation of the EMP

Co-ordination with Stakeholders

Project proponent will ensure that co-ordination required with the project stakeholders on environmental and social matters as required by the EMP is maintained throughout the operation.

Environmental Management Systems

Project proponent and the contractors will ensure that the mitigation measures mentioned in the EIA are adhered to and organizational Environmental Management Systems are implemented during the proposed project. The contractors will abide by the relevant contractual provisions relating to the environment.

Monitoring

Project proponent and its contractors will ensure that monitoring of the project activities is carried out according to the monitoring programme given in the EMP.

Change Management

The EIA recognizes that changes in the operation or the EMP may be required during the construction & operation activities and therefore provides a Change Management Plan (incorporated in Section 8.10) to manage such changes.

Emergency Procedures

Project proponent and its contractor will prepare and maintain contingency plans to deal with any emergency situation that may arise during the construction or operation phase e.g. fire, major oil spills, medical evacuation and communicate these to the regulatory agencies if and when required by these agencies. Emergency plans will be in accordance to project proponent internal procedures.

Approvals

The project contractors will be responsible for obtaining all relevant approvals from project proponent such as approvals for waste contractors and others as specified in the environmental management plan.

Training

Project proponent and its contractors and suppliers will be responsible for the selection and training of their staff which shall be capable of completing the project activities in an environmentally safe manner. Project proponent and its contractors and suppliers will be responsible for providing induction to their staff members on the EIA, the EMP and their implementation provided in the EMP. The contractors will be responsible for

providing awareness training on potential environmental issues of the project to all personnel at site. In addition, trainings on medical evaluation, emergency preparedness and implementation of EMP will also be covered during the training.

Communication and Documentation

For effective monitoring, management and documentation of the environmental performance during the construction and operational phase of the project, environmental matters will be discussed during meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between project proponent and the contractors. Any issues that require attention of project proponent higher management will be communicated to them for action. Project proponent and its contractors will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the project.

Restoration

Project proponent will ensure that the restoration of the site after the end of construction activities and after the useful life of proposed project is carried out according to the requirements of the EIA and EMP.

Audits

Project proponent and its contractors and sub-contractors will carry out periodic audits/inspections of all project activities regarding their effects on the surrounding environment. The contractors will take account of any recommendations relating to the activity/operation arising during the monitoring, with the prior consent of the proponent.

8.7. Environmental Management and Monitoring Plan

The Environmental Management and Monitoring Plan (EMMP) will be used as a management and monitoring tool for implementation of the mitigation measures. The purpose of monitoring is to ensure that the impact is within the predicted limits and to provide timely information if unacceptable impact is taking place. The scope and frequency of the monitoring depends on the residual impacts identified in Chapter # 7 of this report. To address the mitigation measure and monitoring requirement identified

in EIA, a management plan is developed. It ensures that the project is designed, constructed, maintained and implemented in the manner described in the EIA.

A detailed monitoring plan is discussed in following tables. These tables list all the impacts of project components and their associated mitigation measures identified in the EIA. For each component, the following information is presented in the plan:

- The required mitigation measures recommended in EIA.
- The person/organization directly responsible for adhering to or executing the required mitigation measures.
- The person/organization responsible for ensuring and monitoring adherence to mitigation measures.
- The parameters which will be monitored to ensure compliance with the mitigation measures.
- The timings at which the mitigation or monitoring has to be carried out.

Project proponent will hold primary and overall responsibility for ensuring full implementation of the EMP. The Environmental Management and Monitoring Plan has been provided separately for pre-construction, construction and operations phase of the proposed project activities in Table 8.1, Table 8.2 and Table 8.3 respectively.

Table 8-1: Environmental Management Plan – Design /Pre-construction Phase

Sr.	*Project Activity*	*Impacts*	*Mitigation*	*Responsibility*
1	**Identification of sites for construction building and camps.**	▪ Tree cutting may be involved for the construction of camp site	▪ Construction camps will be located away sites.	AGTL, DC
DC= Design Consultant, **AGTL** = Al-Ghazi Tractors Limited				

Table 8-2: Environmental Management Plan – Construction Phase

Sr.	*Project Activity*	*Impacts*	*Mitigation*	*Responsibility*
1	**Site clearing / leveling**	▪ Loss of vegetation may occur. ▪ Soil erosion.	▪ Unnecessary clearing of outside the working areas will be avoided and shall be strictly prohibited. ▪ Clear without destroying large plants and turf where possible and preserve them for replanting in temporary nurseries. ▪ Use erosion control measures such as hay bales, berms, straw, or fabric barriers. ▪ Re-vegetate with recovered plants.	CC, SC, AGTL
2	**Construction crews and camps**	▪ Construction and operation of crew camps may pollute the groundwater. ▪ Workers may rise conflicts with the locals.	▪ Keep camp size to a minimum. ▪ Avoid as much clearing of vegetation as possible, define footpath for crew. ▪ The contractor will provide plan for removal and rehabilitation of site upon completion. ▪ Photographs will be taken before any activity to record the conditions of site at locations that are likely to undergo soil erosion. Similar photographs will be taken after restoration, where applicable. ▪ Provide proper solid waste disposal facilities at camp. ▪ Provide proper sanitation facilities.	CC, SC, AGTL

Sr.	Project Activity	Impacts	Mitigation	Responsibility
			▪ Maintain emergency response system. ▪ Drinking water should meet the PEQS and WHO Guidelines. ▪ Movement of all project personnel will be restricted to work areas.	
3	**Handling/ transportation of hazardous materials**	▪ Toxicity, soil contamination and air pollution are the major impacts which may occur by mishandling of hazardous waste.	▪ Prevent dumping of hazardous materials. ▪ Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc. ▪ Emergency Response Plan is prepared to address the accidental spillage of fuels and hazardous materials.	CC, SC, AGTL
4	**Waste Management**	▪ Solid waste may be generated from the active construction sites and also from the camp sites.	▪ Bitumen waste should be stored in closed containers and placed in a fenced storage area with paved floor. ▪ Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton. ▪ Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors. ▪ An emergency response plan will be developed for the hazardous waste and substances. ▪ Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register. ▪ Training will be provided to personnel for identification, segregation, and management of waste. ▪ No waste will be dumped at any location.	CC, SC, AGTL
5	**Worker's Health & Safety**	▪ Health problems or immediate risk may take place. ▪ Occupational health of workers may be affected.	▪ Providing 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.	CC, SC, AGTL

Sr.	*Project Activity*	*Impacts*	*Mitigation*	*Responsibility*
			▪ Protection devices (ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines. ▪ Proper maintenance of facilities for workers will be monitored. ▪ Provision of protective clothing for laborers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc. ▪ Ensure strict use of wearing PPE during work activities.	
6	**Implementation of Plantation Plan**	▪ Clearing of vegetation and trees from the area	▪ The vegetation will only be cleared from the proposed site if required. ▪ Compensation for trees required to be cut will be replant accordingly.	CC, SC, AGTL
7	**Socioeconomic / Local community**	▪ Community awareness ▪ Skilled and un-skilled jobs for local community.	▪ Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities. ▪ Awareness and cultural inductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities. ▪ Discharging firearms will be explicitly prohibited.	CC, SC, AGTL
CC = Construction Contractor, **SC** = Supervision Consultant, **AGTL** = Al-Ghazi Tractors Limited				

Table 8-3: Environmental Management Plan – Operational Phase

Sr.	*Project Activity*	*Impacts*	*Mitigation*	*Responsibility*
1	**Spillage**	▪ Oil spill may occur which could cause an accident.	▪ In case of any accidental spillage, emergency plan should be implemented. ▪ Relevant department should coordinate on spillage emergency.	AGTL
2	**Waste Management**	▪ Generated waste resulting from various operations.	▪ Provide appropriate options for waste management. ▪ Assess opportunities for reducing solid waste generation in particular of hazardous and undesirable materials (oils and grease). ▪ Dumping of oil residuals and any other waste to be done in designated areas only. ▪ Encourage segregation of waste from the source and use the 3R waste management approach: Reduce, Reuse and Recycle. ▪ Design provisional waste material storage for the sorted-out waste at the site (e.g. spoil area).	AGTL

AGTL = Al-Ghazi Tractors Limited

8.8. Communication and Documentation

An effective mechanism for storing and communicating environmental information during the project is an essential requirement of an EMP. The key features of such mechanism are:

- Precise recording and maintenance of all information generated during the monitoring.
- Communicating the information to a central location.
- Processing the information to produce periodic reports.
- Providing information and answering queries on monitoring originating from various researchers and stakeholders.

8.8.1 Meetings and Reporting

The purpose of the meetings will be to present the environmental management plan to the senior staff of the project team, contractors and stakeholders and discuss its implementation.

Meetings will be held to discuss the environmental conditions of the operation, non-compliances noted by the field supervision consultant (Environmental Engineer), and their remedial measures. Minutes of the meeting will be recorded in the form of action tracking register.

The purpose of the meeting will be to review the weekly or monthly performance of the project activities by reviewing the number of non-conformances and the environmental incidents that occurred during the week/month.

Weekly and monthly reports will be communicated to the project proponent management and senior members of the contractors. The report will include:

- Summary of weekly/monthly project activities.
- Non-compliances observed and mitigation measures taken or required.

8.8.2 Social Complaints Register

The project proponent Field Environmental Representative will maintain a register of complaints regarding environmental issues received from local communities and measures taken to mitigate these concerns.

8.8.3 Photographic Record

Project proponent will maintain a photographic record of all areas to be used during the project. As a minimum the photographic record will include the photographs of project areas prior to and after activities (restoration). Project proponent will ensure that a photographic record including the following is maintained.

- All areas used by the project activities before use, during use and after restoration.
- Key non-compliances.
- Key project activities.

8.8.4 Audit Reports

Project proponent will keep a record of all audits and inspections commissioned or undertaken by the company to check conformance with the EMP.

8.9. Environmental Monitoring and Reporting

Environmental monitoring can be categorized into two types: 1)- compliance monitoring and 2) - effects monitoring. The environmental monitoring programme is summarized in Table 8.4 which identify the roles and responsibilities of project monitoring, further described in detail in following section.

8.9.1 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA. The objectives of the EIA compliance monitoring will be to:

- Systematically observe the activities undertaken by the contractors or any other person associated with the project.
- Verify that the activities are undertaken in compliance with the EIA and other conditions identified by project proponent.
- Document and communicate the observations to the concerned person(s) at project proponent so that any corrective measures, if required, can be taken timely.
- Maintain a record of all incidents of environmental significance and related actions and corrective measures.

Compliance monitoring will be the responsibility of all teams involved in the project activities i.e. Project proponent and the contractors. Project proponent staff and contractors will carry out the inspections on a set frequency.

8.9.2 Effects Monitoring

To monitor actual impacts of the project on selected sensitive receptors so that impacts not anticipated in the EIA or impacts which exceed the levels anticipated in the EIA can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.

Considering the environmental conditions of the project area and the assessment of potential impacts of the project made in the EIA, the following environmental parameters will be monitored at locations identified during the construction phase (e.g. location of asphalt plants, construction camps etc.).

Considering the receptors with less environmental impact, the proposed location is tentative and based on current field survey finding, situation may vary at the time of construction.

Air Quality Monitoring – Air quality monitoring will be done during the construction and operation phase of the project at the representative locations. Ambient air quality parameters will include: NO_X, SO_X, CO, PM_{10}, Smoke.

Water Quality Monitoring – Ground water quality monitoring will be done during the construction and operation phase of the project at the representative locations.

Groundwater Quality Parameters: Total Coliforms, Total Colonial Count, Faecal Enterococci, pH, TDS, Total Hardness, Nitrate, Chloride, Sodium.

Wastewater Quality Parameters: pH, DO, TSS, Alkalinity, BOD^5, COD, Turbidity.

Noise Monitoring - The monitoring will be carried out at key locations covering all receptors.

8.10. Monitoring Roles and Responsibilities

Monitoring Plan has been provided separately for pre-construction, construction and operations phase of the proposed project activities in Table 8.1, Table 8.2 and Table

8.3 respectively while detailed environmental monitoring plan is provided in Table 8.4.

Supervision Consultant

Supervision Consultant will involve the Environmental Specialist/ Monitoring Consultant and Resident Engineer for compliance and effect monitoring described above. The Resident Engineer will overlook the performance of contractor to make sure that the contractor is carrying out the work in accordance with EMP. The Environmental Specialist will prepare bi-annual environmental monitoring reports The Monitoring Consultant (MC) on the other hand will carry out the environmental monitoring and report to AGTL for adequacy of the monitoring program as specified in EMP. The MC will also induct a Technical Training Consultant to educate the Contractor's and AGTL's staff.

Table 8-4: Environment Monitoring Plan

Component	*Parameters*	*Frequency*	*Responsibility*	*Duration*
Construction Phase				
Gaseous Emissions	CO, NO_2, SO_2, PM	Quarterly or as required	AGTL	-
Ambient Air Quality	CO, NO_2, SO_2, Ozone, PM_{10}, $PM_{2.5}$, Lead, SPM	Quarterly or as required	AGTL	24 hours
Ground Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci, pH, TDS, Total Hardness, Nitrate, Chloride, Sodium, Arsenic	Quarterly or as required	AGTL	-
Noise Level	-	Quarterly or as required	AGTL	24 hours
Operation Phase				
Gaseous Emissions	CO, NO_2, SO_2, PM	Quarterly or as required	AGTL	-
Ambient Air Quality	CO, NO_2, SO_2, Ozone, PM_{10}, $PM_{2.5}$, Lead, SPM	Quarterly or as required	AGTL	24 hours

Component	*Parameters*	*Frequency*	*Responsibility*	*Duration*
Ground Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci, pH, TDS, Total Hardness, Nitrate, Chloride, Sodium, Arsenic	Quarterly or as required	AGTL	-
Noise Level	-	Quarterly or as required	AGTL	24 hours

8.11. Environmental Training

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

Environmental training will form part of the environmental management system. The training will be directed towards all personnel for general environmental awareness.

8.12. Objectives of the Training Program

The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related controls specified in the EIA and EMP.

8.13. Roles and Responsibilities

Project proponent Field Environmental Representative and the contractor's Environmental Engineer will primarily be responsible for providing training to all project personnel on potential environmental issues of the project. Contractor will prepare a project specific training manual for this purpose. Contractors on their part will be required to provide induction training/ briefing to all their staff before the start of any activity in the project area.

8.14. Training Topics

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, Environmental Quality Standards usage of personal protection equipment's, and health and safety related issues on the construction site.

The contractor will train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria etc.) and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

8.15. Change Management Plan

The EIA recognizes that changes in the operations or the EMP may be required during the project activities and therefore a Change Management Plan has been provided to manage such changes. The management of changes is discussed under two separate headings, changes to the EMP and changes to the operation.

8.16. Changes to the EMP

The EIA and the EMP have been developed based on the best possible information available at the time of the EIA study. However, it is possible that during the construction and operation phase some aspects of the EMP may need to be changed owing to their non-applicability in a certain area of operation or the need for additional mitigation measures based on the findings of environmental monitoring during the construction and operation phase. In such cases following actions shall be taken.

- A meeting will be held between project proponent and the concerned contractor. During the meeting the proposed deviation from the EMP, planning and designing will be discussed and agreed upon by all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the original EMP clause/plan or design, the change that has been agreed upon, and the reasons for the change.
- The report will be signed by all the parties and will be filed at the site office. A copy of the report will be sent to project proponent and contractor head offices.
- All relevant project personnel will be informed of the change.

8.17. Changes to the Operation

The change management system recognizes three orders of changes:

First-Order Change

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA and consequently require a reassessment of the environmental impacts associated with the change. Examples of such change include change in location of the proposed plant.

In such an instance, the environmental impacts of the proposed change will be reassessed, and the results sent to the Punjab EPA for approval.

Second- Order Change

A second-order change is one that entails project activities not significantly different from those described in the EIA and which may result in project impacts whose overall magnitude would be similar to the assessment made in this report.

In case of such changes, the environmental impact of the activity will be reassessed, additional mitigation measures specified if necessary, and the changes reported to the Punjab EPA.

Third –Order Change

A third-order change is one that is of little consequence to the EIA findings. This type of change does not result in impact levels exceeding those already assessed in the EIA; rather these may be made onsite to minimize the impact of an activity. The only action required in this case will be to record the change in the change record register.

9 Conclusion

The proposed project to which this Environmental Impact Assessment (EIA) relates is entitled as *"EIA for Construction of AGTL Plant Refurbishment''* in Dera Ghazi Khan, Punjab.

Third party survey was conducted to seek the structural condition of the facility established in 1983. It was recommended by the consultant to Refurbishment of plant assembly facility.

Construction of the project is comprised on two buildings;

1. Double Story Building having offices (covered area approx. area 6,000 sft)
2. Assembly Plant Shed covered approx. area 160,000 sft.

The environmental study of the project area requires that potential environmental effects due to the proposed project are evaluated, mitigation measures required to minimize or obviate these impacts are assessed, implemented and monitored. Any residual impacts are assessed for their significance. These requirements have been addressed in this EIA, which has covered in detail the following:

- The proposed project activities
- Alternatives considered in finalizing the project
- Environmental conditions of the project area
- Legislative requirements related to the project
- Potential environmental effects of the proposed project activities on the physical, natural and socio-economic receptors
- Mitigation and monitoring measures that will help in avoiding or minimizing these impacts.

After assessing the significance of potential impacts, it has been concluded that if the

project activities are carried out as described in this report, and the suggested mitigation measures are implemented, the proposed project will not have a significant impact on the area's natural and socioeconomic environments.

Hence, this EIA concludes that the upon implementation of the mitigation, the residual impacts of the proposed operation will be low and careful implementation of the provided EMP will ensure that environmental impacts are managed and minimized and all statutory requirements are met by the project proponent.

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