ENVIRONMENTAL IMPACT ASSESSMENT

PROVISION OF BIKES TO STUDENTS

(PHASE – I)

A PROJECT OF

TRANSPORT & MASSTRANSIT DEPARTMENT

GOVERNMENT OF THE PUNJAB

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Disclaimer

The data was based on the originality of the project site shown by the project proponent/stakeholders / promoters, provided maps, verbal communications, and all other related documents. The authenticity of supra-mentioned relies with the proponent / stakeholders / promoters, not with the environmental consultant. The EIA report can't be negotiated in any court of law.

Author: _____

EIA & EIA Team

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EXECUTIVE SUMMARY

The Punjab Government, an initiative of the Transport & Masstransit Department, had decided to provide bikes/motorcycles to the students in Punjab in Phase-I. In this phase the electric and petrol bike will be provided in 41 districts of Punjab depending upon the allocation of quota based on the applications received. The selection criteria for the provision of bikes to students is "The students, currently enrolled as 'regular' students in degree programs of any university/ graduate college in the Punjab (public or private), duly recognized by the HEC, after verification by the authorities of the institutions concerned, are eligible to apply for Bikes under the scheme".

The proposed project for the commissioning of its objective requires fulfilling the legal requirements of the Punjab Environmental Protection Act-1997, Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted.

NAME OF PROPONENT

Transport & Masstransit Department, Government of the Punjab is the implementing body/proponent of this initiative of provision of Bikes.

NAME OF THE ORGANIZATION PREPARING THE REPORT

ECO-IDEAL Consultants as independent consultant has been appointed by the proponent to conduct Environmental Impact Assessment (EIA). Company office address is 209-H, Fazaia Housing Society, Phase-I, Raiwind Road, Lahore, e-mail: ideal-consultant@hotmail.com, Ph: +92 304 9588595.

BRIEF OUTLINE OF PROJECT

The project is provision of Bikes/Motorcycles (electric bikes &petrol bikes) through the Bank of Punjab to the students with regular registration in educational institutions duly recognized by HEC in Punjab Province. The bikes will be purchased from local manufacturers. The quota for provision of E-Bikes will be provided in 05 cities of Punjab i.e. Lahore (including Kala Shah Kaku), Faisalabad, Rawalpindi, Multan and Bahawalpur. The quota for provision of P-Bikes will be provided on applications from each District including 50% quota for girls in Divisional Headquarter Districts and 30% quota in other districts. The Number of e-bikes in Lahore was increased due the acceptance of all applications for e-bikes received in the district. The funds amounting Rs.450-Million (400+50) shall be disbursed as advance payment to the BOP for opening of saving account with title "Advance Payment for Capital Subsidy and Rejected Applications' Verification Charges". The E-Bikes and P-Bikes shall be provided to

the students free of any interest. The interest upon bank financing shall be borne by the Government of the Punjab @ KIBOR plus 1.5% for P-Bikes and KIBOR plus 2% for E-Bikes with 40% of the bike price credit loss guarantee. The fiscal implication of markup subsidy comes to Rs. 518.094-Million. The total cost of the scheme may be increased due to the increase in number of Bikes.

In meeting with CM Punjab held on 17-05-2024, it is decided that all application received form female students for provision of e-bikes will be considered and Government of the Punjab will provide e-bikes to all female students subject to clearance of financial scrutiny and physical verification by the BOP. Transport & Masstransit Department has already initiated a summary for the approval of the proposal by the Provincial Cabinet. Resultantly, the number of e-bikes in Lahore district will increase 1.7 times compared to p-bikes.

PROJECT'S SALIENT FEATURES

Title:

Provision of Bikes/Motorcycles to Students in Punjab through the Bank of Punjab.

Location:

41 districts of Punjab, Pakistan

Project Area:

All districts of the Punjab Province

Process:

Distribution of electric bikes and petrol bikes to students enrolled in medical, engineering, agriculture, technical, veterinary & general universities as well as those studying in graduate colleges as recognized by HEC & PHEC.

Bike Distribution Details:

Distribution of Electric Bikes with ratio of 50% quota in Divisional Headquarter Districts for girls and 30% in all other districts. All applications for e-bike from girls will be accepted. It is decided by the government of the Punjab that all application received for e-bikes in District Lahore will be accepted and the number of provisions of p-bikes will be at the proportionate ratio.

Selection Criteria:

Students must be currently enrolled as regular students in degree programs of any university/graduate college in Punjab (public or private) recognized by the HEC & PHEC verification by the authorities of the respective educational institutions.

Legal Requirements:

The project must comply with the Punjab Environmental Protection Act-1997, Section 12, necessitating the submission of an Environmental Impact Assessment (EIA) report.

Proponent:

Transport & Masstransit Department, Government of the Punjab

Consultant:

ECO-IDEAL Consultants

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Project Outline:

- The project involves provision of bikes to students
- The bikes will be sourced from local manufacturers
- Funds of Rs. 450 million will be disbursed to the Bank of Punjab for managing the project
- The bikes will be provided to students without any interest charges
- The government will bear the interest on bank financing at rates of KIBOR plus 1.5% for petrol bikes and KIBOR plus 2% for electric bikes with 40% of the bike price credit loss guarantee. The fiscal implication of markup subsidy comes to Rs. 518.094-Million.

Project Brief Outline

Provision of Bikes to Students in Punjab. Distribute bikes (electric and petrol) to regular students in HEC-recognized degree programs across 41 districts of Punjab

PROJECT IMPACTS AND RECOMMENDATION FOR THEIR MITIGATION

The table given below shows the project impacts; related with construction and operation of the Project. Accordingly, mitigation measures have also been proposed to manage the environment and for sustainable development.

Table: Project impacts and mitigation measures

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
OPERATION PHASE		
Manufacturing of Vehicles	Major / Long term	The manufacturers must be Complying with the Environmental laws, rules, regulations, and Punjab Environmental Quality Standards applicable to the manufacturing unit
Vehicular exhaust	Major / Long term	• Use of Euro-II engines and proper maintenance/tuning of vehicle. • Installation of catalytic convertor.
Noise will be generated from the standby generator	Minor / Long term	Proper maintenance/tuning of vehicle.

PROPOSED MONITORING

The monitoring program is designed to ensure that the requirements of the environmental approval awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project operation activities will cause an environmental disturbance.

Table: Environmental monitoring plan for manufacturing units

Environmental segment/element	Monitoring parameters	Reference location / monitoring Point	Monitoring frequency
CONSTRUCTION PHASE			
OPERATIONAL PHASE			

Air emissions / odor	Oxides of Nitrogen, oxides of Sulfur, Carbon dioxide, SPM, CO, VOCs	Stack of kilns / boilers	Quarterly
Noise	Noise levels	Running of machinery	Once monthly at all involved places
Solid Waste Disposal	Ensure that all wastes are disposed of according to legal requirements of the country.	Municipal solid waste / Solid Wastes generated from receiving and storing area including packing material	Regularly in connection with environmental And safety rounds.

STAKEHOLDER CONSULTATIONS

Public discussions were held with all other departments affiliated with the implementation of the project. They are all with the positive views about the project and accomplishing towards the positive development in the province at community level as a whole. EIA findings depict that people perceive overall positive social and economic impacts by the project. Their attitude towards the project is highly optimistic. Majority of the people are convinced for economic and environment friendly initiatives of the Punjab Government. and they correlate this progress with the pace of their social mobility.

CONCLUSION AND RECOMMENDATION

The report provides a conclusion based on the impacts assessed and mitigation measures suggested. The report recommends that EMP will be made a part of all contract documents. The manufacturers will be bound to completely implement relevant mitigation measures set out in the EMP during manufacturing process.

SECTION – 1

INTRODUCTION

This Section of the report provides an overview of the rational of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the Environmental Impact Assessment (EIA).

As far as the development projects is concerned, the Punjab province is rapidly growing in this aspect and with the growing population the need is also increasing. It is an important factor for the economic growth of any country as it enhances the economy by the gains it provides revenue to the stakeholders.

The proposed project for the commissioning of its objective and operation requires fulfilling the legal requirements of Section-12 of the Punjab Environmental Protection Act–1997; this Environmental Impact Assessment (EIA) report is being submitted.

1.1 Purpose of Report

The proposed project (scheme/plan) envisages the provision of Bike to students. This report provides detailed basic information and facts of project; including especially among others environmental, economic, social, etc., enabling its assessment and justification that the project will meet the requirements of environmentally sustainable practices during its commencement; as desired under the Punjab Environmental Protection Act – 1997, the Punjab Environment Quality Standards and the rules and the regulations thereof. The other relevant regulations and guidelines considered while preparing this EIA report include:

- Policy and procedures for filing, review, and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Detailed sectoral guidelines

Different environmental aspects like social, physical and biological etc. and other related features of the project are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impact on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision-makers and EPA Punjab in the present case, before issuing the desired Environmental Approval (EA).

1.2 Identification of Project

In accordance with the Environmental Protection Agency, Government of the Punjab, Lahore, the said project is not mentioned in any category of Schedule-I or Schedule-II of IEE/EIA Review Regulation 2022. However, the honorable Lahore High Court in Writ Petition No. 30823/2024 (copy is attached as Appendix) ordered the Executing Department of the Scheme to file EIA with Environmental Protection Agency Punjab.

1.3 Identification of the Proponent

Transport & Masstransit Department, Government of the Punjab is the implementing body/proponent of this initiative of provision of Bikes.

1.4 Details of Consultant

The Environmental Impact Assessment (EIA) has been carried out by aptly skilled and duly qualified group of professionals working for the environmental consulting Services namely ECO-IDEAL Consultants. The consultant is authorized to submit the application and any document on behalf of the proponent. The consulting team can be approached through; Company office address is 209-H, Fazaia Housing Society, Phase-I, Raiwind Road, Lahore, Contact: 0304-9588595.

The current study was carried out by the following professionals:

SN	Designation	Name & Qualification	Experience
1	Chief Chemist/ Subject Matter Specialist (SMS)	Dr. Faiz Rabani Ph.D. Chemistry UET Lahore, Pakistan	Fourteen Years' experience
2	Sr. Environmentalist / Environmental Professional	Dr. Muhammad Imran Ashraf Ph.D. (Agri. Res. & Environment) SYAU, Liaoning, CHINA.	Fifteen Years' Experience as Environmentalist
3	Associate Environmnetalist	Rohama Nassir M.Phill. (Env. Science) Government College University Lahore, Pakistan	Two years' Experience as EIA/EIA Specialist
4	Environmentalist / Environmental Professional	Saiqa Amjid M.Phill. (Env. Science) University of Lahore, Lahore, Pakistan	Seven years' Experience as EIA/EIA Specialist

5	Environmentalist / Environmental Professional	Neha Javid John M.Phill. (Env. Science) Govt. College University Lahore	One year' Experience as EIA/EIA Specialist
6	Environmentalist / Environmental Professional	Yawar Abbas M.Phill. (Env. Science) University of Lahore, Lahore, Pakistan	Five years' Experience as EIA/EIA Expert
7	Subject Specialist	Ali Raza M.Sc. (Coal Technology) University of the Punjab, Lahore, Pakistan	Five years' experience
8	Associate Environmentalist	Mubeen Shaukat BS (Honr) (Env. Science) GCU, Lahore, Pakistan.	Five years' Experience as Environmentalist
9	Associate Environmentalist	Noor Bibi BS (Honr) (Env. Science) GCU, Lahore, Pakistan	Five years' Experience as Environmentalist
10	Monitoring Officer	Muhammad Mohsin M.A.	Nine years' Experience
11	Compliance Officer	Hafiz Abdul-Rehman B.A.	Nine years' Experience

1.5 Objective of report

Objectives to conduct this EIA are as following:

1) A legal binding in accordance to the Punjab Environmental Protection Act – 1997.
2) To identify the potential environmental issues pertaining to the proposed site.
3) To evaluate the ability of the site by keeping in view the social acceptance and environmental soundness.
4) Providing maximum information to the proponent and other stakeholders, regarding existing environmental conditions and the implications of the proposed project.
5) Collection of available data, reports, drawings and other relevant information about the proposed project.
6) Review of applicable existing environmental legislation and Punjab environmental quality standards (PEQS).
7) Propose mitigation measures to eliminate or to reduce the negative impacts to an acceptable level.

8) Development of well-resourced environmental management and monitoring plans to identify mitigation strategies targeted towards avoidance, minimization, and rehabilitation of the impacts.

1.6 Extent of the Study

In compliance with the Punjab Environmental Protection Act-1997 requirements, an EIA report has been prepared and submitted by the proponent. This document covers all environmental impacts, due to the proposed project, in and around the project area comprising the physical, ecological and socio-economic aspects together with identification of the potential positive and negative impacts. Any developmental activities outside the project area and establishment of the other project have not been covered under this study.

1.7 Methodology

The methodology adopted to carry out the EIA study of the proposed project was as follow:

a) Orientation
b) Planning of Data Collection
c) Data Collection
d) Literature Review
e) Public Consultations
f) Field Studies/visits
g) Evaluation of Impacts and their analysis
h) Categorization of impacts based on their potential environmental significance and prescription of preventive / mitigation measures.

In addition to the evaluation and review of the available records, data and the facts for the previous project, detailed discussions were held with the concerned members of the project management as well as other project stakeholders.

Notes and proposals for measures to be taken to mitigate and compensate for any determined/detrimental environmental impacts are contained in the Environmental Management Plan (EMP) as well as a Monitoring Plan, including all parameters that need to be measured, and the frequency of monitoring actions.

A comprehensive qualitative and quantitative methodology was adopted to conduct this study inter-alia in due compliance with the EIA requirements. The study included a collection of both primary and secondary data regarding environmental status and other relevant factors. This EIA report has been accomplished after carrying out thorough visit to the proposed site and detailed investigation to identify the following Environmental areas of concern:

1) To achieve the desired environmental compliance standards; as per the national environmental regulatory requirements; as applicable to the project.
2) Plans and activities to prevent/mitigate any potential impacts and the gaps that could probably remain after implementation.
3) Any other points/steps to be taken which could be beneficial to mitigate environmental adverse impacts that may accrue both during construction and regular operation of the project.

Table: Environmental Process Assessment

Phase	Activities	Status	Responsibility
Screening and Scoping	Reconnaissance and initial site visit and consultations, identification of environmental and social issues & applicable safeguard environment policy, categorization and working out an action plan.	Carried out during the present EIA	Proponent
Impact Assessment	Identification of potential environmental and social impacts through site visits, stakeholders' consultations, review of drawings, alternatives etc.	Carried out during the present EIA	Proponent
Impact categorization	The significant potential impacts were tabulated and mitigation / preventive measures were prescribed	Carried out during the present EIA	Proponent
EMP Preparation	Stakeholder consultation EMP Social Framework Agreement (SFA)	Carried out during/prepared as part of the present EIA	Proponent
Final EMP	Final version of EMP produced	Included in the present EIA	Proponent

1.8 The report Structure

This EIA document is structured as follow:

Section–1: **Introduction:** Containing general information about the project and

process of carrying out the study.

Section–2 **Screening of the Project:** Screening was performed at the first stage of the EIA process which resulted in a key EIA decision, namely to either conduct the assessment (based on the likely significant impacts) or not conduct it (in the anticipated absence of such impacts).

Section–3 **Scoping:** Scoping is the process of identifying the key environmental issues and is perhaps the most important step in an EIA/IEE. It occurred early in the project cycle at the same time as outline planning and pre-feasibility studies.

Section-4: **Consideration of Alternatives:** This Chapter deals with the analytical overview of different alternatives that have been considered for the project.

Section–5: **Description of the Project:** Describes an overall detail of the works to be done.

Section–6: **Description of the Environmental:** Gives information on Physical, Biological and Social conditions collected through a survey of the Project Area.

Section–7: **Impacts Assessment:** Identifies various environmental impacts of said project on the physical, biological and socioeconomic environment due to the location, Design, during construction phase, during operation phase of the project.

Section–8: **Screening of Environmental Impacts and Mitigation Measures:** Identifies various environmental impacts and their preventive actions. This makes the basis of the Environment Management Plan.

Section–9: **Environmental Management and Monitoring Program:** Contains comprehensive prescriptions regarding environmental impacts and their mitigation measures. This also includes institutional arrangements and Environmental Management & Monitoring Plan.

Section–10: **Stakeholders Consultations:** Explains the process of public consultation and disclosure of the project in related stakeholder. It makes this document a legal public document.

Chapter–11: **Conclusion and Recommendation:** Concludes the EIA report with some practical recommendation.

SECTION – 2

SCREENING OF THE PROJECT

The proposed project an initiative of the Transport & Masstransit Department, Government of the Punjab. The project is extended over the Punjab Province. The total cost of the proposed project is PKR **518.094-Million** with markup subsidy.

Screening was performed at the first stage of the EIA process which resulted in a key EIA decision, namely to either conduct the assessment (based on the likely significant impacts) or not conduct it (in the anticipated absence of such impacts). Screening was done as early as possible in the development of the proposal in order for the proponent and other stakeholders to be aware of possible EIA obligations.

The standardized approach i.e., defined in applicable regulations was applied. The proposed project was assessed based upon a set of criteria determined by Environmental Protection Department (EPD) i.e., Review of EIA/EIA Regulations, 2022 provided by Government of Pakistan, Ministry of Environment (Ministry of Climate Change), Local Government and Rural Development were considered for the purpose of screening mainly.

After detail review in the light of Section-12 read with Section-2 of the Punjab Environmental Protection Act-1997, it is observed that the project does not fall in any category of the projects mentioned in Schedule-I or Schedule-II of the EIA/EIA Review Regulations 2022. However, the honorable Lahore High Court in Writ Petition No. 30823/2024 ordered the Executing Department of the Scheme to file EIA with Environmental Protection Agency Punjab.

Moreover, following factors were also considered at the earlier stage:

- Magnitude of change in environmental conditions
- Diversity of new features with the existing environment
- Potential for trans-boundary or over large area impact
- Likelihood of effecting receptors of other types (fauna and flora, businesses, facilities) be affected?
- Probability of affecting valuable or scarce features or resources
- Risk of breached environmental standards
- Risk of affected protected sites, areas, features
- High/low probability of the effect occurring
- Long/short duration of effect
- Either effect is permanent or temporary

- Is the impact continuous rather than intermittent?
- If it is intermittent, will it be frequent rather than rare
- Reversibility of impacts
- The likelihoods to avoid, or reduce or repair or compensate for the effect

After detailed analysis on the basis of these factors; the proposed project was found suitable for Environmental Impact Assessment (EIA) study rather than Environmental Impact Assessment (EIA) study.

SECTION – 3

SCOPING

3.1 Introduction to Scoping Process:

The scoping process is a pivotal step in the Environmental Impact Assessment (EIA) framework, crucial for identifying and addressing key environmental concerns early in the project cycle. Its significance lies in its ability to facilitate informed decision-making by highlighting potential impacts and allowing for the exploration of mitigation measures before significant investments are made. In the context of the proposed project to provide 10,000 electric bikes to students in Punjab, scoping serves as a proactive measure to anticipate and address environmental challenges associated with the initiative.

3.2 Objectives of Scoping:

The primary objectives of the scoping process for the proposed bike distribution project are two-fold:

Early Problem Identification: To identify potential environmental issues at the outset, enabling prompt design adjustments to mitigate adverse impacts.

Detailed Prediction Work: To ensure comprehensive assessment and prediction of significant environmental concerns, laying the groundwork for a thorough EIA study.

3.3 Methodology Adopted for Scoping:

The scoping methodology entails a systematic approach to defining the study's scope and engaging relevant stakeholders.

Key steps include:

Defining Study Remit: Agreement on the study's parameters by pertinent parties, including project decision-makers, EIA consultants (Eco-Ideal consultants), and parallel engineering study teams.

3.4 Identifying Key Interest Groups:

Identification of governmental and non-governmental stakeholders, such as the Environmental Protection Agency (EPA), local communities, and adjacent industries.

Stakeholder Engagement: Conducting scoping sessions with representatives from identified groups to brief them on the project, establish communication channels, and solicit feedback.

Utilizing EIA Techniques: Employing baseline studies, checklists, and matrices to collect and present information systematically, facilitating informed decision-making.

Incorporating Stakeholder Feedback: Actively listening to stakeholders' concerns, resolving issues where feasible, and integrating feedback into the scoping process.

3.5 Discussion Points and Agenda Items:

The scoping meeting will focus on several key discussion points and agenda items, including:

- Identification of potential environmental impacts associated with the distribution of electric bikes.
- Consideration of concerns raised by stakeholders, such as the EPA, surrounding communities, and adjacent industries.
- Review of proposed mitigation measures and design adjustments to address identified environmental issues.
- Determination of the scope and terms of reference for the subsequent full-scale EIA study.

Next Steps and Action Plan:

Following the scoping meeting, the next steps and action plan will include:

- Finalization of the scoping report based on stakeholder inputs and discussions.
- Initiation of the full-scale EIA study in accordance with the agreed scope and terms of reference.
- Ongoing stakeholder engagement and communication throughout the EIA process to ensure transparency and accountability.
- Regular monitoring and evaluation of project impacts, with the implementation of mitigation measures as needed to address identified environmental concerns.

3.6 Spatial and Temporal Boundaries of Environmental Assessment

Spatial Boundaries:

The spatial boundaries of the environmental assessment for the provision of petrol bikes by the Bank of Punjab encompass the geographical areas directly affected by the project. This includes but is not limited to:

- The distribution sites for the electric bikes across Punjab.
- Surrounding areas where potential environmental impacts may occur, such as traffic congestion, noise pollution, and changes in air quality.
- Routes frequently used by students to commute to educational institutions and other destinations.

Temporal Boundaries:

The temporal boundaries of the environmental assessment extend across various stages of the project lifecycle, from pre-implementation to post-implementation phases. This includes:

Pre-Implementation Phase: Assessment of potential environmental impacts during the planning and design stages of the project, including construction activities and site preparation.

Implementation Phase: Evaluation of environmental impacts during the distribution and deployment of electric bikes, including transportation logistics, infrastructure development, and operational activities.

Post-Implementation Phase: Monitoring and assessment of ongoing environmental impacts resulting from the continued use and maintenance of electric bikes, including traffic patterns, emissions, and land use changes.

By delineating clear spatial and temporal boundaries, the environmental assessment can effectively identify, evaluate, and mitigate potential environmental impacts associated with the provision of electric bikes, ensuring sustainable development and environmental stewardship throughout the project lifecycle.

3.7 Conclusion and Closing Remarks:

In conclusion, the scoping meeting represents a critical milestone in the environmental assessment process for the proposed bike distribution project. By actively engaging stakeholders and systematically identifying environmental issues, the project can proceed with a comprehensive understanding of potential impacts and mitigation strategies. The commitment to transparency, stakeholder involvement, and sustainability underscores the project's dedication to responsible development and environmental stewardship.

3.8 Characterization of Potential Impacts Based Upon Spatial Boundaries

Traffic Congestion:

The distribution of bikes across Punjab may lead to localized traffic congestion in areas where distribution sites are concentrated. Increased traffic volumes, especially during peak hours, could result in delays, reduced vehicle speeds, and decreased roadway capacity, affecting the overall efficiency of transportation networks. Additionally, congestion may exacerbate air pollution and noise levels in densely populated urban areas, impacting the quality of life for residents and commuters.

Air Quality:

The spatial distribution of electric bikes may influence air quality parameters, particularly in urban and densely populated areas. While electric bikes produce fewer emissions compared to

traditional gasoline-powered vehicles, localized increases in traffic density may still contribute to elevated levels of air pollutants such as particulate matter (PM), nitrogen oxides (NOx), and volatile organic compounds (VOCs). Poor air quality can have adverse health effects on residents, including respiratory issues, cardiovascular diseases, and exacerbation of existing health conditions.

Noise Pollution:
The concentration of electric bike distribution sites in urban and residential areas may lead to elevated levels of noise pollution. Increased traffic activity, including the operation of electric bikes, could contribute to higher ambient noise levels, particularly along busy roadways and intersections. Excessive noise exposure has been linked to sleep disturbances, stress, and impaired cognitive function, impacting the well-being and quality of life of residents in affected areas.

Land Use and Infrastructure:
The spatial distribution of electric bikes may influence land use patterns and infrastructure requirements in urban and peri-urban areas. The establishment of distribution sites and bike parking facilities may necessitate changes in land use zoning, allocation of space for bike lanes, and installation of bike racks or docking stations. These modifications could impact urban aesthetics, pedestrian accessibility, and the overall functionality of transportation infrastructure, requiring careful planning and integration into existing urban landscapes.

Socioeconomic Factors:
The spatial distribution of electric bikes may have socioeconomic implications, particularly in communities where access to transportation options is limited. The provision of bikes to students could enhance mobility and accessibility, enabling easier access to educational institutions, employment opportunities, and essential services. However, disparities in access to bikes and infrastructure may exacerbate existing inequalities, particularly among low-income and marginalized populations, necessitating equitable distribution and accessibility measures.

Ecological Considerations:
The spatial distribution of electric bikes may intersect with ecologically sensitive areas, including parks, nature reserves, and wildlife habitats. Increased human activity associated with bike distribution and usage could disturb natural ecosystems, leading to habitat fragmentation, soil erosion, and disturbance of wildlife populations. Furthermore, improper disposal of batteries and electronic components from electric bikes may pose risks to local

biodiversity and water quality, highlighting the need for environmentally responsible management practices.

By characterizing potential impacts based upon spatial boundaries, stakeholders can better understand the localized effects of the proposed electric bike distribution project and develop targeted mitigation strategies to address environmental concerns while promoting sustainable transportation solutions.

3.9 Issues and Concerns Raised During Consultation

During consultations regarding the project to distribute electric bikes in Punjab, several issues and concerns were raised by stakeholders. These included:

1. Traffic Congestion: Stakeholders expressed concerns about potential increases in traffic congestion, particularly around distribution sites and along commuting routes. The influx of additional vehicles, including electric bikes, could lead to traffic bottlenecks and delays.

2. Air Quality: There were concerns regarding the impact of increased vehicular traffic on air quality. Stakeholders highlighted the potential for elevated levels of air pollution, including particulate matter and nitrogen oxides, which could have adverse effects on public health and environmental quality.

3. Noise Pollution: Stakeholders raised concerns about potential noise disturbances resulting from elevated traffic activity and the operation of electric bikes. Increased vehicle noise, especially in urban and residential areas, could negatively impact the quality of life for residents.

4. Land Use: Questions were raised regarding changes in land use patterns and zoning regulations associated with the distribution of electric bikes. Stakeholders sought clarification on how the project would impact existing land use and the allocation of public space for bike parking and infrastructure.

5. Infrastructure: Concerns were raised about the adequacy of existing infrastructure to accommodate the increased demand for bike parking and facilities. Stakeholders highlighted the need for additional bike lanes, parking racks, and other amenities to support the widespread use of electric bikes.

6. Socioeconomic Impact: Stakeholders expressed concerns about equitable access to bikes and potential disparities in transportation access. Questions were raised about affordability, accessibility, and the distribution of bikes to underserved communities.

7. Ecological Considerations: There were concerns about the potential impact of the project on local ecosystems, wildlife habitats, and biodiversity. Stakeholders emphasized the

importance of mitigating potential environmental risks and ensuring responsible management practices throughout the project lifecycle.

These issues and concerns reflect the diverse range of considerations associated with the proposed project and underscore the importance of thorough environmental assessment and stakeholder engagement in its planning and implementation.

3.10 Significant Impacts and Mitigation Measures

Traffic Congestion:

Impact: Increased traffic congestion due to the distribution of 10,000 electric bikes, particularly in urban areas and around distribution sites.

Mitigation: Implement staggered distribution schedules to reduce peak traffic times. Invest in infrastructure improvements such as dedicated bike lanes to alleviate congestion.

Air Quality:

Impact: Potential degradation of air quality from increased vehicular traffic, leading to elevated levels of air pollutants.

Mitigation: Promote the use of electric bikes as a sustainable alternative to gasoline-powered vehicles, reducing emissions. Implement vehicle emission standards and regular maintenance checks to minimize pollution.

Noise Pollution:

Impact: Higher ambient noise levels resulting from increased traffic activity and the operation of electric bikes.

Mitigation: Designate noise-sensitive areas and implement noise reduction measures such as sound barriers and noise-reducing pavement. Enforce speed limits and noise regulations to mitigate noise pollution.

Land Use Changes:

Impact: Changes in land use patterns and zoning regulations to accommodate bike parking facilities and infrastructure.

Mitigation: Conduct comprehensive land use planning to optimize space allocation for bike lanes and parking. Ensure compatibility with existing land use regulations and community needs.

Infrastructure Requirements:

Impact: The need for additional infrastructure, including bike lanes, parking racks, and charging stations, to support electric bike usage.

Mitigation: Invest in infrastructure development to enhance bike accessibility and safety. Prioritize the construction of bike lanes and parking facilities in high-traffic areas and near educational institutions.

Socioeconomic Equity:

Impact: Ensuring equitable access to electric bikes and addressing potential disparities in transportation access among different socioeconomic groups.

Mitigation: Implement subsidy programs or financial assistance to make electric bikes more accessible to low-income communities. Conduct outreach and education programs to raise awareness about bike-sharing programs and incentives.

Ecological Impact:

Impact: Potential impact on local ecosystems, wildlife habitats, and biodiversity from increased human activity and improper disposal of bike components.

Mitigation: Implement environmental management practices such as proper disposal and recycling of bike batteries and electronic components. Conduct ecological assessments and habitat restoration efforts to mitigate impacts on local ecosystems.

By addressing these significant impacts through proactive mitigation measures, stakeholders can minimize the negative consequences of the project while maximizing its positive contributions to sustainable transportation and community development.

SECTION – 4

CONSIDERATION OF ALTERNATIVES

Considering alternatives is an important aspect of project planning and implementation. Here are some considerations for exploring alternatives in the provision of bikes to students in Punjab:

Type of Bikes: Instead of providing both electric and petrol bikes, the project could focus solely on electric bikes to promote sustainability and reduce carbon emissions. Alternatively, it could explore other environmentally friendly options such as hybrid bikes or bicycles.

Funding Mechanism: While the project currently involves disbursing funds to the Bank of Punjab for managing the project, alternative funding mechanisms could be explored. For example, the project could seek funding through public-private partnerships or solicit donations from corporate sponsors interested in supporting education and transportation initiatives.

Distribution Model: The project could consider different distribution models for allocating bikes to students. Instead of distributing bikes based on applications received, it could adopt a lottery system or prioritize students based on specific criteria such as financial need or academic performance.

Partnerships with Manufacturers: Instead of purchasing bikes solely from local manufacturers, the project could explore partnerships with international manufacturers to access a wider range of bike options and potentially lower costs.

Educational Initiatives: In addition to providing bikes, the project could include educational initiatives aimed at promoting bike safety, maintenance, and responsible riding practices among students. This could involve partnering with local organizations or schools to offer workshops or training programs.

Integration with Existing Programs: The project could explore opportunities to integrate bike provision with existing government programs or initiatives aimed at promoting education, health, or environmental sustainability. This could help maximize resources and avoid duplication of efforts.

By considering these alternatives, the project can evaluate different approaches and identify the most effective and sustainable solution for providing bikes to students in Punjab. This

process can help ensure that the project aligns with its objectives while also addressing potential challenges and opportunities.

This section covers the project alternatives considered for establishment of the proposed project. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options are adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. In particular, it outlines the following options that were considered for this project.

Reasons for Rejection of Buses

1. High Exhaust Emissions: Buses, particularly older models, often have high exhaust emissions, contributing significantly to air pollution. They emit large quantities of nitrogen oxides (NOx), particulate matter (PM), and carbon dioxide (CO2), which are harmful to both the environment and public health.

2. Operational Costs: Buses can be costly to operate and maintain. They require regular servicing, significant fuel expenses, and infrastructure investments, such as bus depots and maintenance facilities.

3. Traffic Congestion: In densely populated urban areas, buses can contribute to traffic congestion, especially if not part of an efficient, dedicated lane system. This congestion can lead to increased emissions and longer travel times.

4. Flexibility and Accessibility: Buses follow fixed routes and schedules, which may not always be convenient for passengers. This inflexibility can reduce their attractiveness compared to more versatile modes of transport.

5. Public Perception: There can be a negative public perception of buses due to concerns over cleanliness, reliability, and personal safety, which can deter potential users.

High Demand for Bikes

1. Environmental Impact: Bikes equipped with Euro-II engines and catalytic converters have significantly lower emissions compared to buses. These bikes produce less NOx, CO_2, and PM, making them more environmentally friendly.

2. Fuel Efficiency: Bikes are typically more fuel-efficient than buses. This makes them a more cost-effective option for individuals, especially with rising fuel prices.

3. Convenience and Flexibility: Bikes offer greater flexibility and convenience for short to medium distances. They can navigate through traffic more easily, reducing travel time, and can be parked almost anywhere, enhancing accessibility.

4. Lower Maintenance Costs: Bikes generally require less maintenance and are cheaper to repair than buses. This lowers the overall cost of ownership for individuals.

5. Personal Space and Comfort: Bikes provide personal space, which can be more comfortable for many people compared to crowded public buses, especially during peak hours.

6. Fitness and Health Benefits: Riding a bike can provide physical exercise, contributing to improved health and well-being.

Overall Impact Comparison

Emissions: Buses, particularly older and non-eco-friendly models, emit higher levels of pollutants compared to Euro-II standard bikes with catalytic converters. The latter are designed to reduce harmful emissions and are therefore less detrimental to air quality.

Energy Consumption: Buses consume more fuel per passenger kilometre compared to bikes. While a bus might be more efficient when fully loaded, its overall fuel consumption and emissions remain higher on average.

Urban Mobility: In urban settings, bikes contribute less to traffic congestion and can be a quicker mode of transport for shorter distances. They require less space on roads and for parking, enhancing urban mobility.

Cost Efficiency: Bikes are more cost-effective in terms of initial purchase price, fuel, and maintenance costs. This economic advantage drives higher demand among individual commuters.

By understanding these factors, it is clear why there is a growing preference for bikes over buses in many urban areas, driven by considerations of environmental impact, cost, convenience, and health benefits.

Overall Impact Comparison

Emissions

Buses: Older and non-eco-friendly buses are significant sources of air pollution. They emit high levels of nitrogen oxides (NOx), particulate matter (PM), and carbon dioxide (CO_2). These

emissions contribute to smog, respiratory problems, and climate change. Even newer buses, though improved, still produce more emissions per vehicle than modern bikes with advanced emission controls.

Bikes: Modern bikes with Euro-II engines and catalytic converters produce substantially lower emissions. They emit fewer NOx, CO_2, and PM, making them a cleaner alternative. Catalytic converters in bikes effectively reduce harmful pollutants, making them more environmentally friendly.

Energy Consumption

Buses: The energy consumption of buses is higher due to their size and the energy required to transport multiple passengers. While they can be efficient when fully loaded, buses often run below capacity, leading to higher per-passenger energy use.

Bikes: Bikes are highly fuel-efficient, consuming significantly less fuel per kilometer. This efficiency makes them an attractive option for individuals, especially for short to medium distances.

Urban Mobility

Buses: Buses can contribute to traffic congestion, especially if they do not have dedicated lanes. Their larger size and frequent stops can slow down traffic. However, they are effective for moving large numbers of people along high-demand routes.

Bikes: Bikes enhance urban mobility by being nimble and capable of weaving through traffic. They require less road space and can be parked easily, reducing congestion and improving traffic flow.

Cost Efficiency

Buses: Operating and maintaining buses involves higher costs. This includes fuel, regular maintenance, and the need for extensive infrastructure like bus depots. While they can be economical on a per-passenger basis when fully utilized, the overall expenses remain substantial.

Bikes: Bikes are more cost-effective to purchase, fuel, and maintain. Lower operational costs make them a financially attractive option for individuals. This cost efficiency drives their high demand, especially in urban areas where affordability is a key consideration.

Personal Space and Comfort

Buses: Public buses can be crowded and uncomfortable, particularly during peak hours. Concerns about cleanliness, safety, and reliability can also affect their attractiveness.

Bikes: Bikes offer personal space and the convenience of direct travel without the need for shared public transport. This can provide a more comfortable and personalized commuting experience.

By comparing these factors, it becomes evident why bikes are increasingly favored over buses in urban environments. Bikes' lower emissions, better fuel efficiency, reduced congestion impact, cost-effectiveness, and health benefits make them an appealing choice for many commuters.

- In Punjab, registered Motor vehicles was reported at 24.12-million unit from 1965 to April 2024.
- The total bikes (including electric bikes) registered was reported as 20.149-million unit from 1965 to April 2024.
- The electric bikes registered in Punjab are 4338 units from 2018 to April 2024.
- Pakistan Registered Motor Vehicles was reported at 4,553.947 unit in Dec 2020.
- This records an increase from the previous number of 3,220.000 unit for Dec 2015.
- Pakistan Registered Motor Vehicles data is updated yearly, averaging 2,348.950 unit from Dec 2005 to 2020, with 12 observations.
- The data reached an all-time high of 4,553.947 unit in 2020 and a record low of 1,761.610 unit in 2005.

Pakistan Registered Motor Vehicles data remains active status in CEIC and is reported by International Organization of Motor Vehicle Manufacturers. The data is categorized under World Trend Plus's Association: Automobile Sector.

SECTION – 5

DESCRIPTION OF THE PROJECT

5.1 Type and Category of Project

In accordance with the Environmental Protection Agency, Government of the Punjab, Lahore, the said project is not mentioned in any category of Schedule-I or Schedule-II of IEE/EIA Review Regulation 2022. However, the honorable Lahore High Court in Writ Petition No. 30823/2024 ordered the Executing Department of the Scheme to file EIA with Environmental Protection Agency Punjab.

5.2 Objectives of Project

The project is the provision of E-Bikes and P-Bikes to students in the educational institutions dully recognized by HEC and PHEC though the Bank of Punjab (BOP) with zero markup.

5.3 Location of the project

The project is extended to whole Punjab. The provision of Bikes extended to Divisional Headquarter Districts including Lahore, Rawalpindi, Gujranwala, Sargodha, Faisalabad, Sahiwal, Gujrat, Multan, DG Khan and Bahawalpur. The Punjab Province lies between 29.30° – 32.32° N and 73.55° – 67.50° E.

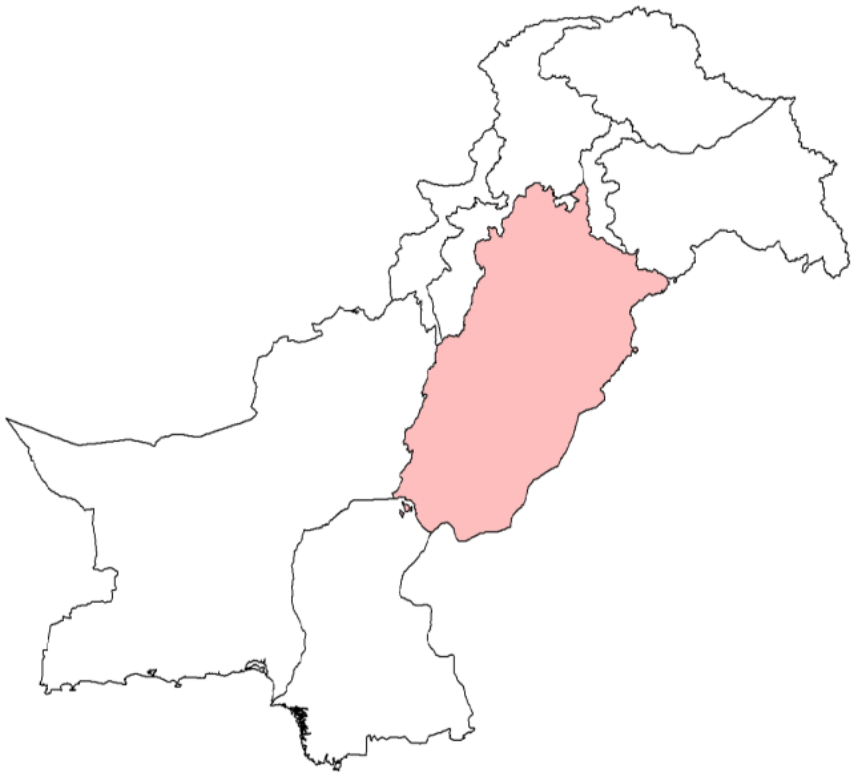


Figure: Google map of the Project (Site)

5.4 Road Access

The roads approaching the mega cities of Punjab are carpet road and properly maintained. Most of the cities are connected through Motorways.

5.5 Cost and magnitude of operation

The total cost that has to be spending on the project is approximately **Rs. 518.094-Million**. The project will be operated in all Districts in the Punjab. The quantities of Bike will be decided on the basis of applications received from District.

5.6 Project statement

"The project aims to facilitate sustainable transportation solutions by providing electric bikes to students in Punjab. Through the distribution of electric bikes, we seek to address transportation challenges, reduce carbon emissions, and promote active lifestyles among students. By fostering partnerships with educational institutions, governmental agencies, and local communities, we aim to create a more accessible, equitable, and environmentally friendly transportation system. The project is committed to promoting socioeconomic equity, enhancing air quality, and minimizing traffic congestion while contributing to the overall well-being and sustainability of Punjab."

5.7 Schedule of implementation

It is planned that the following schedule of project implementation will be adhered to. This is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered. The implementation stages of the project activity include:

1st Stage

The stage –1 preparation of scheme for provision of Bikes and approval from concerned government authorities.

2nd Stage

The stage –2 invitation of applications from students and selection through e-balloting.

3rd Stage

The stage –3 acquisition of Bikes from local manufacturers.

4th Stage

The stage – 4 provision of Bikes to qualified students.

5.8 Operational arrangements

At operation stage, the project proponent will be involved in operation and maintenance of the proposed facility.

SECTION – 6

DESCRIPTION OF THE ENVIRONMENT

This section describes the baseline conditions, which cover the existing Physical, ecological and socio-economic environment of the project as well as study area. Data was collected by reviewing secondary data and field survey.

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. This section covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socioeconomic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socioeconomic parameters. Further, consultations were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project.

6.1 General

Description of the environmental settings (also referred to as "baseline", "existing, "background", or "affected environment") is an integral part of an Environmental Impact Assessment. There are two major purposes of describing the environmental settings in an environmental study, namely:

- To ascertain and evaluate the existing environmental quality, as well as environmental impacts of the alternatives being studied, including the no-action or no-project alternatives, and
- To identify environmentally significant factors or geographical areas that could preclude the development of a given alternative or alternatives

Additional purposes of describing the baseline settings include, but are not limited provision of sufficient information so that the decision makers and the report reviewers, who might be unfamiliar with the general location, may develop an understanding of the project's needs and environmental characteristics of the area.

One of the significant environmental impacts of a development could be the likely changes in the land use profile. If implementation of a development involves massive conversion of

agriculturally useful land into non-agricultural or otherwise less useful lands or leads to deterioration of the ecological environment by substantially altering the land use pattern in a manner, which is less favorable for propagation of agriculture, then the resultant impacts can be labelled as deleterious and harmful for the environment. Conversely, if a developmental scheme envisages very little or negligible changes in the existing land use scenario or the new land usage is of superior nature, then the development is regarded an environment friendly activity to the extent of this parameter.

It would not be out of context to mention here that usually the format of an EIA is either project specific or area specific or a combination of both. The baseline environmental conditions, therefore, have been described according to this format approach. The text following hereafter contains a description of the baseline characteristics of the project area and the district, wherever relevant.

The Consultant's Professional Team in conjunction with the proponent and other concerned agencies undertook various studies and surveys relating to the project, such as: -

- Studies and investigations into the baseline environmental profile of the project area, where relevant
- Physical, geological, hydrological, and topographic environmental surveys of project area, where relevant
- Surveys about education profile and services in the area, where relevant
- Soil quality surveys and investigations, where relevant
- Socioeconomic surveys of the project area, where relevant
- Water quality investigations and analyses
- Ambient noise profile in the vicinity of the site
- Social surveys
- Surveys and interactive meetings with the neighboring populations to know their understanding of the project and to solicit their specific concerns over the project, if any

The objectives of the social surveys were:

- Finding out impacts of the project on education, health, hygiene, lifestyle and social value system of the workers and inhabitants within the site's zone of influence

- Any probable dislocation of the persons and property and removal of encroachments, if any from project's construction, expansion or operation
- Assessing the prospects of employment and job opportunities and impacts on the economic portfolio of the beneficiary population of the project area ascertaining likelihood of cropping up of any social conflicts and sources of frictions with the neighboring community or the locals
- Finding out any sources of social and physical nuisances for the project or the local community

The above-mentioned studies included visits and physical surveys of the site and the nearby populations within a radius of 1 km from the site. The social surveys were carried out through random selection of the beneficiaries and the stakeholders. The nearby residents and the businesspersons, being the important stakeholders, were consulted in particular to solicit their views over various aspects of the project facility. Direct interviewing and soliciting the requisite information by asking short questions was found the best mode of eliciting the requisite information. The collective public gatherings were found another effective mode of procuring the requisite information. By and large, the stakeholders and the persons, who were consulted during the EIA, welcomed construction of the plant as being beneficial for them from all angles and aspects.

6.2 Baseline Physical Environment

The study examines the physical resources, topography, soil, climate, surface and ground water and geology not only of the project site but also the city as whole to assess whether the project under review can or does impact on any of these parameters. The description of physical environment of Lahore and the project site is present in the following sub sections.

6.3 Physical Environment

The study examines the physical resources, topography, soil, climate, surface and ground water and geology not only of the project site but also the city as whole to assess whether the project under review can or does impact on any of these parameters. The description of physical environment of Punjab Province is present in the following sub sections.

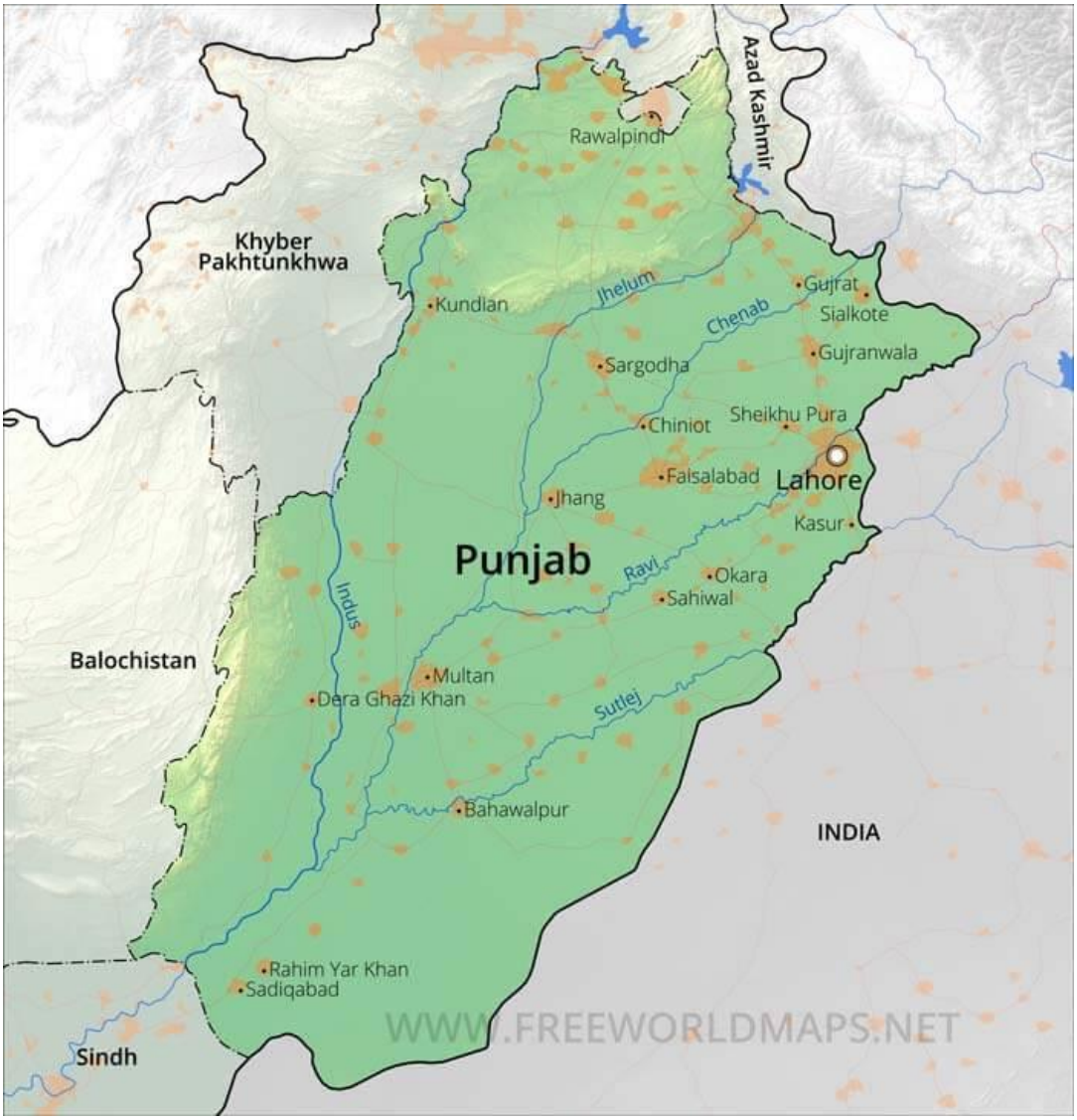


Figure: Map of District Lahore

6.3.1 Topography

The topography of the Punjab is plain however there are some hilly areas in the North-West and extreme South-West. The Punjab Province extends from 29.30° – 32.32° N and 73.55° – 67.50° E. The Punjab Province elevated between 180-500 meters above sea level.

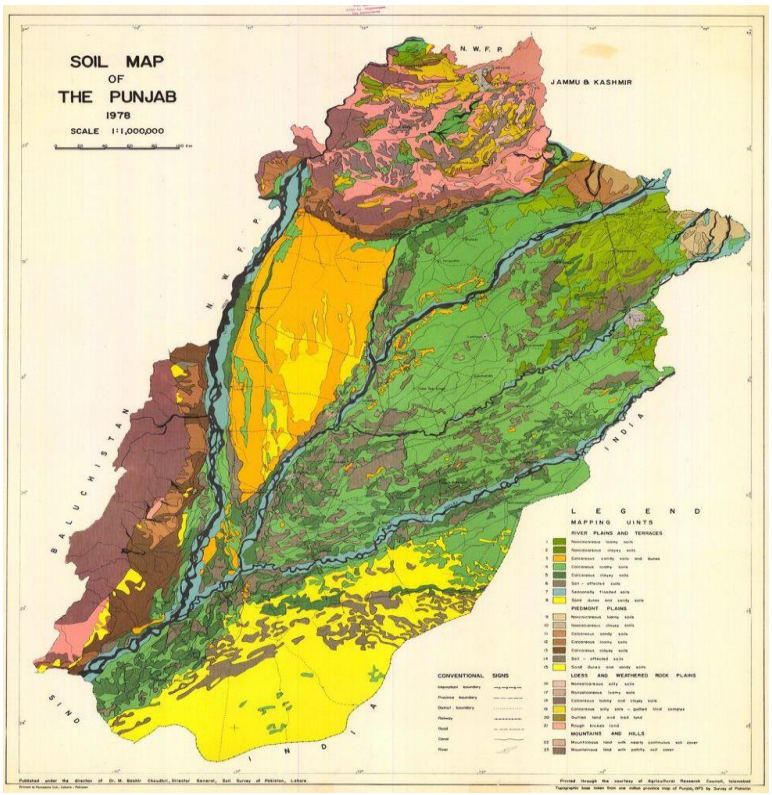
Punjab's landscape consists mostly consists of fertile alluvial plains of the Indus River and its four major tributaries in Pakistan, the Jhelum, Chenab, Ravi, and Sutlej rivers which traverse Punjab north to south – the fifth of the "five waters" of Punjab, the Beas River, lies exclusively in the Indian state of Punjab. The landscape is amongst the most heavily irrigated on earth and canals can be found throughout the province. Punjab also includes several mountainous regions, including the Sulaiman Mountains in the southwest part of the province, the Margalla Hills in the north near Islamabad, and the Salt Range which divides the most northerly portion of Punjab, the Pothohar Plateau, from the rest of the province. Sparse deserts can be found in southern Punjab near the border with Rajasthan and near the Sulaiman Range. Punjab also

contains part of the Thal and Cholistan deserts. In the South, Punjab's elevation reaches 2,327 metres (7,635 ft) near the hill station of Fort Munro in Dera Ghazi Khan.

6.3.2 Geological Formation and Soil

Punjab is Pakistan's second largest province by area after Balochistan with an area of 205,344 square kilometres (79,284 square miles). It occupies 25.8% of the total landmass of Pakistan. Punjab province is bordered by Sindh to the South, the province of Balochistan to the Southwest, the province of Khyber Pakhtunkhwa to the West, and the Islamabad Capital Territory and Azad Kashmir in the North. Punjab borders Jammu and Kashmir in the North, and the Indian states of Punjab and Rajasthan to the East.

The capital and largest city is Lahore which was the capital of the wider Punjab region since 17th century. Other important cities include Faisalabad, Rawalpindi, Gujranwala, Sargodha, Multan, Sialkot, Bahawalpur, Gujrat, Sheikhupura, Jhelum, Rahim Yar Khan and Sahiwal. The undivided Punjab region was home to six rivers, of which five flow through Pakistan's Punjab province. From west to east, the rivers are; the Indus, Jhelum, Chenab, Ravi and Sutlej. It is the nation's only province that touches every other province; it also surrounds the federal enclave of the national capital city at Islamabad.



The soil is different in character and generally inclined to be dry. However, it is rich in potential plant nutrients. Rainfall is low and groundwater is saline and brackish at the shallow depth and irrigation is largely dependent on the canals. Tube wells have also been sunk at the greater depths in the Project Area where fresh water is available.

The chemical quality of groundwater in the district varies with depth. However, the sweet potable water is available in a belt five to twenty miles wide paralleling the Ravi River.

Alluvium is soil or sediments deposited by a river or other running water. Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length. Where the river flow is fast, more particles are picked up than dropped. Where the river flow is slow, more particles are dropped than picked up. Areas where more particles are dropped are called alluvial or flood plains and the dropped particles are called alluvium.

6.3.3 Climate

Most areas in Punjab experience extreme weather with foggy winters, often accompanied by rain. By mid-February the temperature begins to rise; springtime weather continues until mid-April, when the summer heat sets in. The onset of the southwest monsoon is anticipated to reach Punjab by May, but since the early 1970s, the weather pattern has been irregular. The spring monsoon has either skipped over the area or has caused it to rain so hard that floods have resulted. June and July are oppressively hot. Although official estimates rarely place the temperature above 46 °C, newspaper sources claim that it reaches 51 °C and regularly carry reports about people who have succumbed to the heat. Heat records were broken in Multan in June 1993, when the mercury was reported to have risen to 54 °C. In August the oppressive heat is punctuated by the rainy season, referred to as barsat, which brings relief in its wake. The hardest part of the summer is then over, but cooler weather does not come until late October.

In early 2007, the province experienced one of the coldest winters in the last 70 years. Punjab's region temperature ranges from −2° to 45 °C, but can reach 50 °C (122 °F) in summer and can touch down to −10 °C in winter. Climatically, Punjab has three major seasons;

- Hot weather (April to June) when temperature rises as high as 123 °F (51 °C).
- Rainy season (July to September). Average rainfall annual ranges between 96 cm sub-mountain region and 46 cm in the plains.
- Cold / Foggy / mild weather (October to March). Temperature goes down as low as 35.6 °F (2.0 °C).

Weather extremes are notable from the hot and barren south to the cool hills of the north. The foothills of the Himalayas are found in the extreme north as well, and feature a much cooler and wetter climate, with snowfall common at higher altitudes

6.4 Environmental Monitoring

6.4.1 Ambient Air Quality

Atmospheric pollution particularly in urban area has a strong impact upon daily life. Lahore is the second largest city of Pakistan. Its economic growth and rising energy consumption are causing the increase in air pollution. The main sources of the air pollution are motor vehicles and industrial activities. SO_2, NO_2, CO_2, CO, O_3 and Particulate Matter (PM) are investigated as the pollution indicators.

The project site is surrounded by other industrial units and agricultural land. The major sources of air pollution in the area are surrounding industrial units and transportation or vehicular traffic. To record the baseline ambient air quality of the project area, monitoring was conducted at advised locations to assess the concentration of priority pollutants (Carbon monoxide, Nitrogen dioxide, Sulphur dioxide and PM_{10}) in the air.

6.4.2 Noise Level

Lahore is capital of the Punjab Province having population around ten million. There are many a large, medium and small industries which are still working within city premises. Industrial activity and vehicular emissions are causing excessive noise in the city. According to a survey it was observed that noise level was an average of 75 dB(A) and average noise level in industrial area was recorded as above 120 dB(A).

6.5 Water Sources

6.5.1 Surface Water

There are no surface water resources like canal or ponds, near the project area.

6.5.2 Regional Flow Pattern and Condition of Groundwater

The regional groundwater flow in the area is from northeast, the Jammu and Kashmir foothills which are at higher elevation, towards the southwest along the general slope of the area.

The previous studies and behavior of existing shallow and deep tube wells in the area have shown that in spite of local variation, aquifer overall behaves as a single homogeneous water body and 73 % of the total consists of sand. This condition is during the monsoon season, when the water table is the high and the annual fluctuation is reported not more than 10 feet.

Before the introduction of controlled irrigation system in Punjab, the water table was deep towards the center of Doabs and was shallow along the rivers. After the introduction of controlled irrigation system in the region, water table started rising as a result of leakage/seepage from irrigation canals and infiltration from irrigation applications on crop

fields. As a result, the area became water logged until about 1960 when a quasi-equilibrium state was reached, controlled in part, by evapotranspiration and drainage.

6.6 Ground Water

Ground water quality is fresh (defined as acceptable in terms of its salinity). Raw water abstracted from the deep tube wells is believed to be essentially bacteria free.

The water quality in the upper 50 meters zone of subsoil is generally brackish. For city's drinking purposes water is abstracted from groundwater aquifer by means of tube wells located throughout the city. The quality of water is generally adequate for direct consumption. About 83% of city population is consuming groundwater for drinking purposes.

Groundwater is available at a depth ranging between 15 to 23m below the natural surface level. Deep groundwater from a depth of about 210ft in the vicinity of the Project Area is being extracted for meeting the domestic and commercial water demands in nearby areas. Adequate quantity of good quality groundwater is available below a depth of 50m.

Water consumption varies significantly and its variation as of industrial units. Usual water consumption pattern for industrial units and data collected from the prospective industrialist will form basis for total water demand. According to Master Plan-2030 for the city of Lahore, the mean average decline in ground water is about 2.03 feet per year.

Most of the cities of Punjab are underlain by the deep permeable aquifer formed within the alluvial plane is the part of Greater Indus Plain.

Ground water is the principal source of municipal water supply in Punjab. This is also the case in the immediate vicinity of the site. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Groundwater is pumped from 400-800 feet and is generally good for direct consumption. About 83% of the city's population is consuming groundwater for drinking purposes.

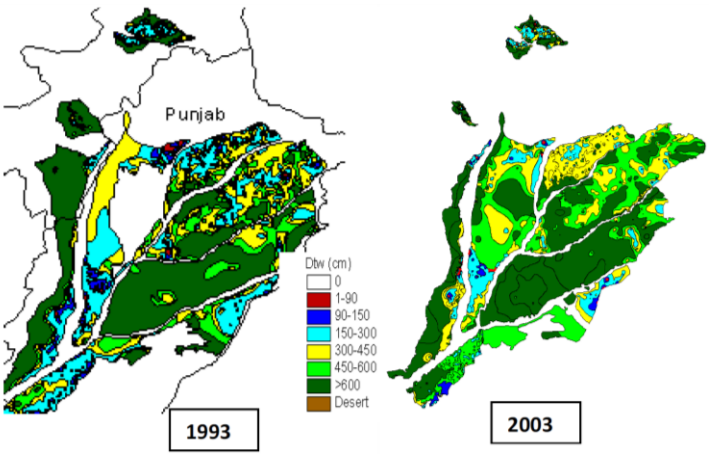


Figure: Ground water depth between 1993 and 2003 in the Punjab Province

6.7 Drainage

All of the Lahore districts drain ultimately to River Ravi which is the major natural surface water resource located in the northern part of the district. River Ravi receives huge amount of wastewater from the city of Lahore and other industrial discharges from different sources especially Hudyara Drain, a natural drain which carries pollution loads from both Pakistan and India. Most wastewater discharge reaches to Ravi in the 60km stretch between Bulloki and Lahore. These wastewater discharges, along with reduction in available water in River Ravi for dilution, has greatly deteriorated the quality of river water. River Ravi runs merely as a sullage carrier near Lahore during low flow season.

Besides, there are 76 minor drains which finally fall in eight (8) major drains namely Satto Kattla drain, Lakshimi Drain, Suk Neher Drain, Upper Chota Ravi Drain, Siddique Pura Drain and Shahdara Drain. Nowadays, all these drains collect wastewater from different areas of Lahore and finally fall into River Ravi.

6.8 Drinking Water Quality

WASA (Water and Sanitation Agency Lahore) is providing drinking water to the residents of Lahore. WASA claims the quality of water conform to the Drinking Water Standards.

The increase in population will have direct impact on the water sector for meeting the domestic, industrial and agricultural needs. Pakistan has now essentially exhausted its available water resources and is on the verge of becoming a water deficit country. The quality of water supplies in many cities of Pakistan is deteriorating fast. Over pumping of groundwater due to extended drought has affected the water quality adversely.

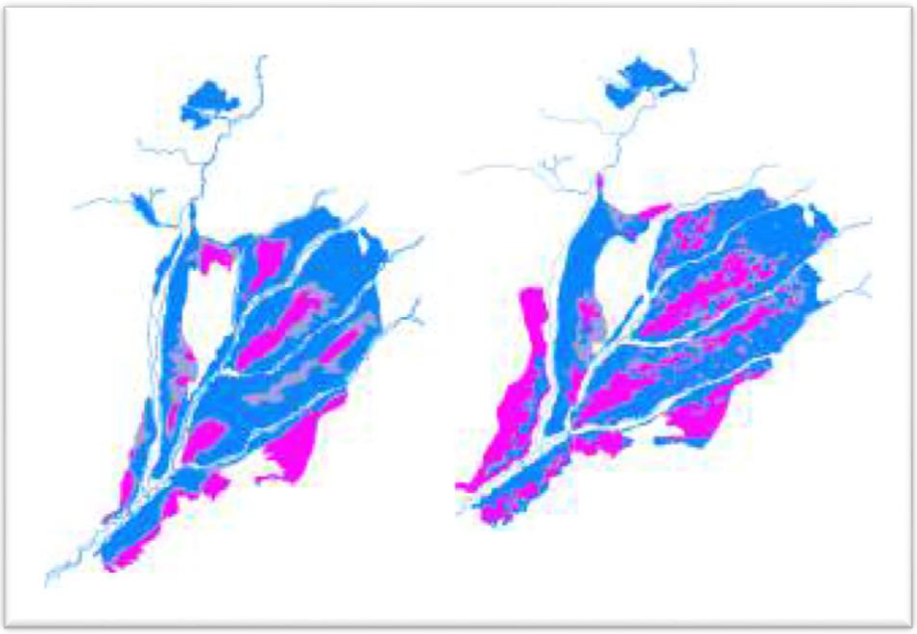


Figure: Change in groundwater quality between 1977 and 2003 in the Punjab

6.9 Seismology

According to building code of Pakistan prepared by NESPAK recently, most of the Punjab is located in Seismic Zone 2A of Pakistan (Lower limit of moderate damage). Zone 2A represents peak ground acceleration (PGA) from 0.08 to 0.16g. Figure given below shows the seismic zoning map of Punjab.

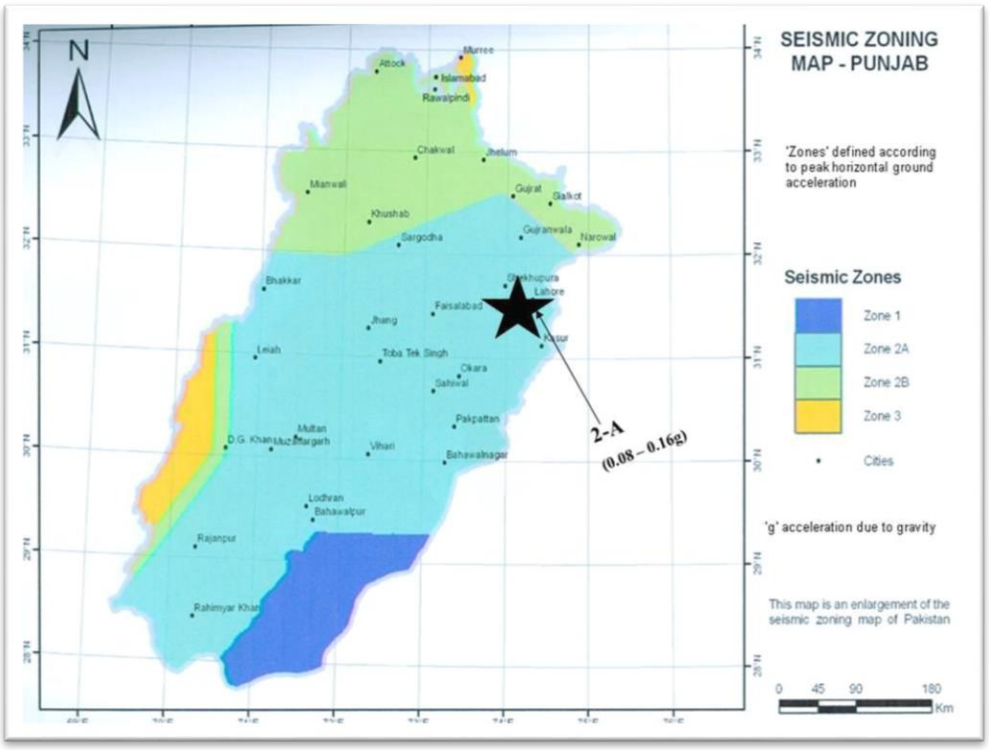


Figure: Seismic Zoning Map of Punjab

6.10 Biological Environment

The climate of the Lahore is semi-arid and sub-tropical, the vegetation of the area falls; scrub dry, tropical thorn forest type as per Phyto-geographical classification of the area. The Punjab province is enriched with the presence of natural flora and fauna but with the growing population and development activities, it's somewhat effected.

6.10.1 Flora

Punjab is mostly lush green and agricultural land. Trees, also called the 'lungs' of the earth, are important for the restoration of the eco-system. People can benefit immensely from their survival and existence. Trees have also been a source of medicine for thousands of years and a refuge for various species of birds. Several species of the trees in Punjab are being used in medicines. Some trees of significant medicinal value are grown easily.

Most of the mega cities of Punjab have considerably expanded. However, along these modern additions, the ancient monuments, old gardens, trees, graveyards and traditional bungalows having attached gardens, large expanses of lawn and old roadside trees some of them can still

be seen, are gradually disappearing. These green areas and old endemic trees are home to many resident bird species as well as many summer, winter and transit migrants.

Table: Inventory of some Flora

SR.NO	COMMON NAME	SCIENTIFIC NAME
1	Indian Lilac	*Azadir achtaindica*L.
2	Ber	*Ziziphus mauritiana* Lamk
3	Yellow	*Terminalia chebula* Retz.
4	Temple plant	*Crataevaadansonii* DC.
5	Bombax	*Bombaxceiba* Linn.
6	Bistula	*Cassia fistula* Linn.
7	India laburnum	*Acacia nilotica*(Linn.)Delile.
8	Indian banyan	*Ficusbenghalensis* Linn.
9	Buddha tree	*Ficusreligiosa* Linn.
10	Benzoil tree	*Moringaoleifera*Lam.
11	Devil tree	*Alstoniascholaris*(L.) R.Br.
12	Rosewood	*Dalbergiasissoo*Roxb.
13	Mango	*Mangiferaindica* L.
14	Spanish cherry	*Mimusopselengi* L.
15	Jujube	*Ziziphuszizyphus* Mill.

Endangered Species of flora

There are few floral species which are at the risk of extinction. Table below shows the list of endangered and prohibited floral species.

Table: Endangered and prohibited floral species

SR. NO.	ENDANGERED SPECIES	PROHIBITED SPECIES
1.	Salvedorapersica	Broussonetiapapyrifera
2.	Ficusbengalensis	Salmaliamalabarica
3.	Ficusreligiosa	Populusnigra/Alba
4.	Ficusenfectoria	Nerium odorum
5.	Ficusglomerata	Thevetianerifolia
6.	Albbiziaprocera	
7.	Albizzia lebbek	
8.	Anogeissusacuminit	
9.	Artocarpusintegrifolia	
10.	Artocarpuslakoocha	
11.	Azadirachtaindica	
12.	Bischofiajavanica	
13.	Berser Serrata	
14.	Dilleniaindica	
15.	Meringa oleifera	
16.	Prosopis spiligera	
17.	Ziziphusmauritiana	
18.	Cassia alata	

19.	Jaguiniaaristata	
20.	Tecomaundalata	
21.	Prosopis juliflora	
22.	Tamyrix articulate	
23.	Magnolia grandiflora	

6.10.2 Fauna

With an increase in the rate of urbanization, the ecology of mega cities have been considerably affected and population of birds has reduced to just 85 including the endemic and migratory ones. Lahore Zoo is the main preserver of Lahore's fauna. Other popular wildlife centers are Jallo Park, Wildlife Safari Park, Rana Resort. These green areas and old endemic trees of Lahore are home to many resident birds as well as providing to seasonal migrants. Three types of migratory birds are regular visitors to Punjab's provincial metropolis. These are winter visitors, summer visitors and transit migrants. Some of Resident species include Indian grey hornbill, yellow-footed green pigeon, parakeets, bulbuls, doves, spotted owlet, Old World babblers, Old World flycatchers, mynas, woodpeckers, crows, black kites, ashy prinia, redstarts, warblers, red-wattled lapwing, kingfishers, and the Oriental white-eye. The Changa Manga forest near Lahore is a hotspot for wildlife in Punjab.

Table: Inventory of some Fauna

SR.NO.	COMMON NAME	SCIENTIFIC NAME
1	Intermediate Egret	*Egretta intermedia*
2	Indian-Pond Heron	*Ardeolagrayii*
3	Red-Wattled Lapwing	*Hoplopterusindicus*
4	Common Sandpiper	*Actitishypoleucos*
5	White Wagtail	*Motacilla alba*
6	Yellow Wagtail	*Motacillaflava*
7	Red-vented Bulbul	*Pycnonotuscafer*
8	House Sparrow	*Passer domesticus*
9	Common Myna	*Acridotherestristis*
10	Bank Myna	*Acridotheresginginianus*
11	Pied Myna	*Sturnus contra*
12	House Crow	*Corvussplendens*
13	Nectariniaasiatica	*Purple sunbird*
14	Black Drongo	*Dicrurusmacrocersusvieillot*
15	Black kite	*Milvus migransmigrans*
16	Blue rocky pigeon	*Columba livia*
17	Little brown dove	*Streptopeliasenegalensis*
18	White-breasted Kingfisher	*Halcyon smyrnensis*
19	Little Green Bee eater	*Meropsorientalis*
20	Golden-backed woodpecker	*Dinopiumbenghalense*
21	Hoopoe	*Upopaepops*

22	Pheasant-tailed jacana	*Hydrophasianuschirurgus*

Some birds and few animals like Buffaloes, cows, goats, donkeys, hens, rats, cats and dogs are present in the vicinity of proposed site. Some reptiles like lizards are also present. The only amphibian seen the project area is frog. No threatened or endangered species are found in the project site. Similarly, no wildlife is present.

6.10.3 Wildlife Sanctuaries and Game Reserves

Tere are 10 wildlife sanctuary in Punjab (Bajwat Wildlife Sanctury, Balkasar Bear Sanctury, Changa Manga, Chashma and Taunsa Barrage Dolphin Sanctury Cholistan Wildlife Sanctury, Chumbi Suria Wildlife Sanctury, Lashari wala Forest, Lehri Nature Park, Rakh Jhok Forest and Taunsa Barrage Wildlife Sanctury).

6.10.4 Critical Habitats

No wild life sanctuary or game reserve (Critical Habitats), exists in the Punjab or the study area and therefore it can be stated that this project does not affect any critical habitat as, no critical habitat is located close to the project area.

6.11 Socio-economic Assessment

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. The social change that results from intrusion into community life can also be beneficial, but can have undesirable or negative outcomes. Even that change in the long run may have positive effect on the social well-being of a community.

Social Impact Assessment is a methodology used for examining social change due to external sources, especially specific developmental projects, but also government policies, technological changes and social processes or anything that has a social impact.

The objectives of the given study are outlined as follow:

- To carry out the assessment of social impact.
- Acquire socioeconomic data to evaluate and identify the project interventions.
- Assess needs of community related environmental concerns.
- To assess adverse and beneficial socioeconomic and health impacts of the activity.
- To suggest remedial measures and solutions to improve socio economic conditions.
- To analyse socio economic conditions of community, with special reference to environment and conservation of natural resources.

6.12 Demographic Profile of Punjab

The province forms the bulk of the transnational Punjab region, divided in 1947 among Pakistan and India. The provincial capital is Lahore, a cultural and cosmopolitan centre of Pakistan. Punjab is also the world's fifth-most populous subnational entity, and the most populous outside of China and India.

Punjab is Pakistan's most industrialized province, with the industrial sector comprising 24 percent of the province's gross domestic product. It is known for its relative prosperity, and has the lowest rate of poverty among all Pakistani provinces. However, a clear divide is present between the northern and southern regions of the province; with northern Punjab being more prosperous than south Punjab. Punjab is also one of the most urbanized regions of South Asia, with approximately 40 percent of its population being concentrated in urban areas.

The Punjabi peoples are native to the province, comprising over 90 percent of the total population. Demography of Punjab is spread over an area of 205,345 square kilometers.

Table: Population and Intercensal Increase and Growth Rates

Description	2023
Population	127,688,922
Intercensal Increase (2017-2023)	13.86%
Average Annual Growth Rate (%)	2.5%

SECTION – 7

IMPACT ASSESSMENT

The following chapter will describe the overall possible impacts of said project on the physical, biological and socioeconomic environment due to the location, Design, during construction phase, during operation phase of the project.

7.1 Problem and its Occurrence

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. A proper management plan shall be prepared in case of an accident like;

- Any health hazard to workers/other persons during construction or operation phase.
- Gaseous emissions to the environment.
- Inappropriate waste handling.

7.1.1 Air Pollution

Transportation is a significant source of air pollution, with buses and other large vehicles contributing heavily to this issue. Buses typically use diesel engines, which emit substantial amounts of pollutants, including carbon dioxide (CO_2), nitrogen oxides (NOx), and particulate matter (PM). These emissions degrade air quality and have severe health impacts. NOx contributes to the formation of ground-level ozone and fine particulate matter, both of which can penetrate deep into the lungs and bloodstream, causing respiratory and cardiovascular diseases. Long-term exposure to these pollutants is linked to chronic respiratory diseases such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). Moreover, particulate matter, especially fine particles ($PM_{2.5}$), can lead to premature death in people with heart or lung disease, nonfatal heart attacks, and irregular heartbeat. Urban areas, where bus traffic is dense, experience the highest levels of air pollution, making this a critical public health issue that requires immediate and sustained action to mitigate.

7.1.2 Noise Pollution

Noise pollution from transportation, particularly from buses, is another significant environmental impact. The operation of bus engines, coupled with frequent honking, braking, and accelerating in congested urban areas, leads to elevated noise levels that contribute to the overall ambient noise environment. This constant exposure to high noise levels has direct adverse effects on human health, including hearing loss, stress-related conditions, and sleep

disturbances. Chronic noise pollution can lead to increased levels of stress hormones such as cortisol, which in turn can contribute to cardiovascular problems, including hypertension and heart disease. Additionally, noise pollution has cognitive effects, impairing concentration and productivity, especially in schools and workplaces. The cumulative effect of noise pollution from a large fleet of buses in densely populated cities significantly diminishes the quality of life for residents, making noise pollution a pressing environmental issue that demands comprehensive mitigation strategies.

7.1.3 Consumption

The transportation sector is a major consumer of fossil fuels, with buses being particularly energy-intensive due to their size and passenger capacity. This reliance on fossil fuels such as diesel and gasoline not only deplete these non-renewable resources but also contributes to a high carbon footprint. The combustion of these fuels releases large quantities of greenhouse gases (GHGs), including CO_2, which is a primary driver of climate change. As the global demand for transportation grows, the sector's energy consumption continues to rise, exacerbating the challenge of reducing GHG emissions and mitigating climate change. Transitioning to more energy-efficient and sustainable modes of transport is essential to address this issue. This includes adopting electric buses, which produce zero tailpipe emissions, improving fuel efficiency of existing vehicles, and integrating renewable energy sources into the transportation infrastructure. Such initiatives can significantly reduce the environmental impact of energy consumption in the transportation sector.

7.1.4 Infrastructure Strain

The extensive use of buses places considerable strain on transportation infrastructure. Roads and bridges must endure the heavy loads and constant use associated with bus traffic, leading to accelerated wear and tear. This necessitates frequent maintenance and repairs, which can be costly and disruptive to daily commutes. The degradation of infrastructure not only increases maintenance costs but also contributes to traffic delays and congestion. Moreover, the presence of large numbers of buses exacerbates traffic congestion, particularly in urban areas with limited road space. Traffic congestion increases travel times, fuel consumption, and emissions as vehicles idle and operate inefficiently in stop-and-go conditions. Addressing the strain on infrastructure requires substantial investment in road maintenance and the development of efficient public transport systems that can reduce dependency on buses and alleviate congestion. Innovative solutions, such as dedicated bus lanes and intelligent traffic

management systems, can also help improve the efficiency of bus operations and reduce their impact on infrastructure.

7.1.5 Land Use and Habitat Disruption

The expansion of transportation networks to accommodate buses and other vehicles often necessitates significant land use changes. Urban sprawl, characterized by the development of new roads, parking facilities, and maintenance depots, encroaches on natural habitats and green spaces. This expansion can lead to the fragmentation of ecosystems, disrupting wildlife corridors and reducing biodiversity. The alteration of landscapes to facilitate transportation infrastructure can have long-lasting effects on local flora and fauna, as well as on the ecological balance of affected areas. In many cases, the construction of transportation infrastructure leads to the displacement of wildlife, loss of vegetation, and alteration of natural watercourses. To mitigate these impacts, careful planning and implementation of green infrastructure are essential. This includes creating wildlife corridors, constructing green bridges, and incorporating urban green spaces into transportation planning to maintain ecological connectivity and support biodiversity. Such measures can help balance the need for transportation infrastructure with the preservation of natural habitats.

7.1.6 Waste Management

The end-of-life disposal of buses and their components presents significant waste management challenges. Old buses, when decommissioned, generate a considerable amount of waste, including metal parts, plastics, and hazardous materials such as batteries, oils, and coolants. Proper recycling and disposal of these materials are crucial to prevent environmental contamination. However, the complexity and cost of recycling bus components often lead to improper disposal methods, resulting in the pollution of soil and water resources. Batteries, for instance, contain toxic substances like lead and acid, which can leach into the ground and contaminate groundwater if not disposed of correctly. Effective waste management strategies are essential to mitigate the environmental impact of decommissioned buses. These strategies include developing comprehensive recycling programs, promoting the use of environmentally friendly materials in bus manufacturing, and enforcing strict regulations on the disposal of hazardous waste. By implementing these measures, the transportation sector can minimize its waste footprint and reduce its environmental impact.

7.1.7 Water Pollution

Transportation infrastructure, particularly roads, contributes to water pollution through runoff contamination. During rainfall, pollutants such as oil, grease, heavy metals, and debris from

buses are washed off-road surfaces and into nearby water bodies. This runoff can significantly degrade water quality, harming aquatic ecosystems and posing risks to human health. Contaminated water can affect fish and other wildlife, disrupt breeding habitats, and reduce biodiversity. For example, oil and grease form a film on the water surface, reducing oxygen exchange and affecting aquatic life. Heavy metals can accumulate in the tissues of aquatic organisms, leading to bioaccumulation and biomagnification up the food chain. To address runoff contamination, improved road design and the implementation of effective filtration systems are vital. This includes the use of permeable pavements that allow water to filter through, trapping pollutants before they reach water bodies, and the construction of retention basins that capture and treat runoff. These measures are essential for protecting water resources and maintaining healthy aquatic ecosystems.

7.1.8 Public Health and Safety

The operation of buses and other large vehicles raises significant public health and safety concerns. The risk of traffic accidents involving buses is substantial due to their size and maneuverability constraints, particularly in urban environments with dense traffic. Accidents can result in severe injuries or fatalities for both passengers and other road users. Moreover, the high frequency of bus operations increases the likelihood of accidents, especially in areas with inadequate traffic control measures. The proximity of bus routes to residential areas also increases exposure to pollutants and noise, exacerbating health problems among vulnerable populations such as children and the elderly. Ensuring the safety of public transportation and minimizing health risks requires comprehensive traffic management plans, enhanced safety standards for buses, regular maintenance checks, and public awareness campaigns on road safety. By implementing these measures, the transportation sector can improve safety and reduce the health impacts associated with bus operations.

7.1.9 Climate Change

The transportation sector’s contribution to climate change is profound, primarily through the emission of greenhouse gases. Buses, as substantial emitters of CO_2, play a notable role in this global issue. The accumulation of GHGs in the atmosphere leads to the warming of the planet, which triggers a series of environmental changes, including more frequent and severe weather events. These changes can disrupt transportation infrastructure, increase the frequency of maintenance needs, and pose challenges to the resilience of transportation systems. For instance, extreme weather events such as heavy rainfall and flooding can damage roads and bridges, leading to costly repairs and service disruptions. To mitigate climate change, a

concerted effort to reduce emissions from all sectors, including transportation, is essential. This involves promoting the use of electric and hybrid buses, enhancing fuel efficiency, and supporting public transport initiatives that reduce the carbon footprint of the transportation sector. Additionally, incorporating climate resilience into the planning and design of transportation infrastructure can help mitigate the impacts of climate change and ensure the sustainability of transport systems in the long term.

In conclusion, the environmental impacts of transportation, particularly buses, are multifaceted and far-reaching. Addressing these impacts requires a holistic approach that combines technological innovation, policy interventions, and public awareness. By prioritizing sustainable transportation solutions, investing in green infrastructure, and promoting cleaner technologies, it is possible to mitigate the adverse environmental impacts and create a more sustainable and resilient transportation system for the future. The transition to electric buses, improved fuel efficiency, and the integration of renewable energy sources are crucial steps toward reducing the environmental footprint of the transportation sector. Moreover, effective urban planning and infrastructure development can help balance the need for efficient transportation with the preservation of natural habitats and the protection of public health. Through concerted efforts, the transportation sector can contribute to a healthier environment and a more sustainable future for all.

7.2 Impact Assessment of Providing Bikes to Students: Benefits Over Buses

7.2.1 Reduced Traffic Congestion

Providing bikes to students significantly reduces traffic congestion compared to buses. Buses occupy substantial road space and often contribute to congestion, particularly during peak hours. Bikes, on the other hand, are compact and require less space, allowing for smoother traffic flow. In urban areas where road space is limited, the shift from buses to bikes can alleviate congestion, leading to less time spent in traffic for all road users. This reduction in congestion also minimizes the stop-and-go conditions that exacerbate fuel consumption and emissions from all vehicles on the road.

7.2.2 Decreased Travel Time

Bikes offer a faster and more flexible mode of transportation for students, reducing travel time compared to buses. Buses follow fixed routes and schedules, which can be inconvenient and time-consuming, especially when transfers are necessary. Bikes provide door-to-door

transportation, allowing students to take the most direct routes to their destinations. This flexibility can significantly cut down travel time, making it easier for students to manage their schedules and reduce the stress associated with long commutes.

7.2.3 Lower Resource Consumption

Bikes are far less resource-intensive than buses, both in terms of manufacturing and operation. The production of a bus involves significant amounts of metal, plastic, and other materials, as well as a considerable energy investment. In contrast, bikes require fewer materials and less energy to produce. Additionally, the operational costs of bikes are minimal compared to buses, which consume large quantities of fuel and require frequent maintenance. Bikes, especially electric ones, are energy-efficient and can be charged using renewable energy sources, further reducing their environmental footprint.

7.2.4 Easier Maintenance and Tuning

Maintaining and tuning bikes is simpler and less costly compared to buses. Bikes require basic maintenance, such as tire inflation, brake adjustments, and occasional chain lubrication, which can often be performed by the users themselves. In contrast, buses require regular and complex maintenance routines, including engine checks, brake inspections, and tire replacements, which involve specialized labor and higher costs. The ease of maintaining bikes encourages regular upkeep, ensuring their longevity and reliability without the extensive infrastructure needed for bus maintenance.

7.3 Mitigation of Environmental Hazards

Bikes, particularly electric ones, significantly mitigate environmental hazards associated with transportation. Electric bikes produce zero tailpipe emissions, helping to reduce air pollution and greenhouse gas emissions. Even petrol bikes, though not emission-free, generate far fewer emissions than buses. The lower emissions from bikes contribute to improved air quality, particularly in urban areas where pollution from buses can be a significant health concern. Moreover, the noise pollution from bikes is considerably less than that from buses, contributing to a quieter and more pleasant urban environment.

7.4 Enhanced Physical Activity and Health

Using bikes as a mode of transportation encourages physical activity, which has numerous health benefits. Regular cycling can improve cardiovascular fitness, strengthen muscles, and enhance mental well-being. For students, incorporating biking into their daily routines can lead to healthier lifestyles and improved academic performance due to the positive effects of

physical exercise on cognitive function and stress reduction. In contrast, traveling by bus is sedentary and does not provide the same health benefits.

7.5 Economic Benefits

The economic benefits of providing bikes to students are substantial. Bikes are significantly cheaper to purchase and maintain than buses, reducing the financial burden on both the government and the students. The initial cost of acquiring a fleet of bikes is much lower than that of buses, and the ongoing costs related to fuel, maintenance, and repairs are minimal. Additionally, the reduced congestion and faster travel times associated with bike use can lead to broader economic benefits, including increased productivity and reduced transportation-related costs for the community.

7.6 Infrastructure Requirements

Bikes require minimal infrastructure compared to buses. While buses need dedicated lanes, large depots, and extensive road networks capable of supporting heavy vehicles, bikes need only bike lanes and parking facilities. Creating bike-friendly infrastructure, such as dedicated bike lanes and secure parking, is relatively inexpensive and can be integrated into existing urban layouts without significant alterations. This reduces the financial and environmental costs associated with building and maintaining extensive transportation infrastructure for buses.

In conclusion, providing bikes to students offers numerous advantages over buses, particularly in terms of reducing traffic congestion, decreasing travel time, and minimizing resource consumption. The simpler maintenance and lower environmental impact of bikes, combined with their health and economic benefits, make them an ideal transportation solution for students. By promoting the use of bikes, especially electric ones, the initiative can contribute to a more sustainable, efficient, and healthier urban transportation system.

7.7 Ways of Achieving Mitigation Measures

7.7.1 Infrastructure Development:

Bike Lanes and Paths:

Developing dedicated bike lanes and paths separated from vehicular traffic is essential to ensure the safety and comfort of cyclists. These lanes should be wide enough to accommodate cyclists of all skill levels and should be strategically located along major commuting routes. Additionally, incorporating protective barriers, such as bollards or curbs, can further enhance

cyclist safety by preventing encroachment from motor vehicles. Proper signage and road markings are also crucial to delineate bike lanes and alert motorists to the presence of cyclists.

Bike Parking Facilities:

Installing secure bike parking facilities at schools, universities, public transit hubs, and other key locations encourages bike use by providing cyclists with a convenient and safe place to store their bikes. These facilities should include bike racks or lockers that are well-lit, sheltered from the elements, and equipped with security features such as surveillance cameras or access control systems. Adequate signage and wayfinding signage should also be provided to guide cyclists to designated parking areas.

Bike Sharing Systems:

Implementing bike-sharing programs can further promote bike use among students by providing them with access to bikes for short-term use. These programs typically involve the placement of bike-sharing stations at key locations throughout the city or campus, where users can rent bikes on a per-ride or subscription basis. Integration with mobile apps and payment systems streamlines the rental process, making it easy and convenient for students to access bikes when needed. Additionally, bike-sharing programs can help address issues of bike ownership and storage for students who may not have the means to purchase or maintain their own bikes.

7.7.2 Policy and Regulation:

Bike-Friendly Policies:

Enacting policies that prioritize cycling infrastructure in urban planning and transportation development is crucial for promoting bike use among students. This may include incorporating bike lanes and paths into street design standards, allocating funding for bike infrastructure projects, and establishing targets for increasing bike mode share. Additionally, implementing policies that incentivize bike use, such as providing tax breaks or subsidies for bike purchases, can further encourage students to choose biking as their mode of transportation.

Incentives:

Offering incentives such as tax breaks, subsidies, or discounts on bike purchases can encourage students to choose biking over other modes of transportation. These incentives can help offset

the initial cost of purchasing a bike and make cycling more accessible to students from diverse socioeconomic backgrounds. Incentive programs can be tailored to meet the specific needs of students, such as offering discounts on bike accessories or maintenance services or providing incentives for participating in bike safety training programs.

Regulations:
Implementing regulations to ensure the safety of cyclists is essential for creating a supportive environment for bike use. This may include enacting helmet laws, requiring cyclists to follow traffic rules and signals, and establishing vehicle sharing ordinances that prioritize the safety of vulnerable road users such as cyclists and pedestrians. By enforcing these regulations, policymakers can help reduce the risk of accidents and create a safer environment for students to bike to and from school or university.

7.7.3 Education and Awareness:

Safety Education:
Providing education programs for students on safe cycling practices is essential for promoting bike use and reducing the risk of accidents. These programs should cover topics such as traffic rules and signals, proper signaling and maneuvering techniques, and bike maintenance and repair. Hands-on training sessions, led by certified instructors, can help students develop the skills and confidence they need to cycle safely in a variety of traffic conditions. Additionally, incorporating bike safety education into school curricula can help instill lifelong habits of safe cycling behavior among students.

Promotional Campaigns:
Launching promotional campaigns to raise awareness of the benefits of biking is crucial for encouraging students to choose biking as their mode of transportation. These campaigns can highlight the environmental, health, and economic advantages of biking, as well as the convenience and flexibility it offers for getting around campus or the city. Promotional materials such as posters, flyers, and social media posts can be used to spread the message and engage students in the benefits of biking. Partnering with local businesses, community organizations, and bike advocacy groups can help amplify the reach of promotional campaigns and increase their effectiveness.

Community Engagement:
Engaging with community groups, schools, and universities to promote biking as a sustainable mode of transportation is essential for building support and momentum for biking initiatives.

This may include organizing bike rides, workshops, or events that bring together students, faculty, staff, and community members to discuss biking-related issues and opportunities. Collaborating with local governments, transportation agencies, and other stakeholders to develop and implement cycling infrastructure projects can also help ensure that biking initiatives are integrated into broader transportation planning efforts. By fostering a sense of community around biking, policymakers can create a supportive environment where students feel encouraged and empowered to bike regularly.

7.7.4 Infrastructure Improvement:

Complete Streets:

Adopting a "complete streets" approach to urban planning is essential for creating safe and accessible biking infrastructure. This approach involves designing roads that accommodate the needs of all road users, including cyclists, pedestrians, and public transit users. Key elements of complete streets design include dedicated bike lanes and paths, wide sidewalks with pedestrian amenities, and well-marked crosswalks and intersections. By prioritizing the needs of cyclists and pedestrians in street design, policymakers can create a more equitable and inclusive transportation system that promotes active transportation and reduces reliance on cars.

Traffic Calming Measures:

Implementing traffic calming measures such as speed bumps, roundabouts, and raised crosswalks can help create safer streets for cyclists and pedestrians. These measures are designed to slow down traffic speeds and reduce the risk of accidents, particularly in areas with high levels of pedestrian and cyclist activity. Additionally, traffic calming measures can help create a more pleasant and inviting environment for biking and walking, encouraging students to choose these modes of transportation over driving. By incorporating traffic calming measures into street design standards, policymakers can create safer and more livable communities for students and residents alike.

Intermodal Connectivity:

Improving connectivity between biking infrastructure and other modes of transportation, such as buses, trains, and pedestrian pathways, is essential for promoting multimodal travel options for students. This may include installing bike racks or lockers at transit stops, providing bike-sharing stations near transit hubs, and integrating bike lanes and paths with transit routes. By making it easy for students to combine biking with other modes of transportation, policymakers can encourage more sustainable and efficient travel behaviors. Additionally, enhancing

intermodal connectivity can help reduce reliance on cars and alleviate traffic congestion, leading to a more seamless and integrated transportation system for students and the community.

7.7.5 Technology and Innovation:

Smart Bike Infrastructure:

Deploying smart bike infrastructure, including bike-sharing systems with integrated GPS tracking and mobile apps for user convenience, can enhance the biking experience for students. These systems allow users to locate and reserve bikes in real-time, track their rides, and receive alerts and notifications about bike availability and maintenance issues. Additionally, smart bike infrastructure can provide valuable data insights to policymakers, such as bike usage patterns and demand trends

SECTION – 8

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The following section will describe the overall possible impacts of said project on the physical, biological and socioeconomic environment due to the location, Design, during construction phase, during operation phase of the project and mitigation measures to minimize the significance of the possible impacts. The anticipated impacts related to these apartment buildings have been assessed and mitigation measures provided accordingly.

8.1 General

Throughout history, transportation has undergone significant transformations driven by technological advancements and socio-economic changes. The earliest modes of transportation relied on human and animal power, with ancient civilizations developing rudimentary road networks and watercraft to facilitate trade and travel.

The invention of the wheel revolutionized transportation, enabling the development of carts and chariots in ancient Mesopotamia and Egypt. Over time, innovations such as the steam engine, the internal combustion engine, and electricity propelled the evolution of transportation, leading to the advent of trains, automobiles, airplanes, and ships.

In the modern era, transportation networks have become increasingly interconnected, with the rise of global trade and tourism driving the demand for faster and more efficient modes of travel. The emergence of digital technologies has further transformed transportation, enabling the development of smart transportation systems and the integration of renewable energy sources.

8.2 Transportation in Pakistan

In Pakistan, transportation plays a crucial role in connecting urban centers, facilitating economic activities, and providing access to essential services. ***Lahore,*** the capital city of Punjab province, serves as a major hub of transportation with a diverse range of modes including road, rail, and air transport.

The road network in almost all mega cities of Punjab consists of a mix of modern highways, urban roads, and historic streets, catering to the needs of commuters, freight transport, and public transportation. Metro Bus Systems and the Rapid Masstransit Systems are significant

developments aimed at improving the city's public transportation infrastructure and reducing traffic congestion. Rail transportation also holds significance in Punjab, with the Lahore Junction serving as a major railway station connecting the city to various destinations across Pakistan. Additionally, the Allama Iqbal International Airport facilitates air travel, connecting Lahore to domestic and international destinations.

Despite these developments, all mega cities of Punjab facing challenges related to traffic congestion, air pollution, and inadequate infrastructure. Rapid urbanization and population growth have strained the city's transportation system, leading to environmental degradation and public health concerns. Lahore, the capital city of Punjab province in Pakistan, is known for its rich cultural heritage, historical landmarks, and vibrant atmosphere. However, rapid urbanization and population growth have led to significant challenges in managing traffic congestion and ensuring efficient transportation systems. Understanding the current traffic situation in Lahore is crucial for addressing these challenges and implementing effective solutions.

Traffic Congestion

- **Urban Expansion:** All mega cities / divisional headquarters of Punjab have experienced substantial urban expansion in recent years, resulting in increased vehicular traffic on roads that were not designed to accommodate such volumes. The lack of proper urban planning has exacerbated congestion in key areas of the city.
- **Population Growth:** The population of Lahore has grown rapidly, putting immense pressure on the city's transportation infrastructure. As the population continues to increase, the demand for transportation services escalates, leading to congestion during peak hours.
- **Limited Public Transport:** While Lahore has a public transportation system comprising buses, metro trains, and rickshaws, it is insufficient to meet the needs of the growing population. Many residents rely on private vehicles, further contributing to traffic congestion.

8.3 Traffic Management Challenges

- **Poor Road Infrastructure:** The condition of roads in Lahore varies, with some areas suffering from potholes, uneven surfaces, and inadequate signage. Poor road

infrastructure not only slows down traffic but also poses safety hazards for motorists and pedestrians.

- **Lack of Traffic Enforcement:** Traffic laws exist in Lahore, but enforcement is often lax, leading to violations such as reckless driving, illegal parking, and encroachments on roads. The absence of strict enforcement mechanisms undermines efforts to maintain order and safety on the streets.
- **Pedestrian Safety Concerns:** Pedestrians in Lahore face numerous challenges, including inadequate sidewalks, lack of pedestrian crossings, and disregard for traffic signals. Improving pedestrian safety is essential for creating a more inclusive and sustainable transportation environment.

8.4 Solutions and Initiatives

- **Infrastructure Development:** Investing in the expansion and improvement of road infrastructure is crucial for alleviating traffic congestion in Lahore. This includes constructing new roads, widening existing ones, and enhancing connectivity between different parts of the city.
- **Promotion of Public Transport:** Encouraging the use of public transportation through incentives such as reduced fares, improved services, and dedicated bus lanes can help reduce reliance on private vehicles and alleviate congestion on roads.
- **Traffic Management Measures:** Implementing stricter traffic enforcement measures, including fines for traffic violations and deployment of traffic police officers at key junctions, can deter reckless driving and improve compliance with traffic laws.
- **Pedestrian-Friendly Initiatives:** Creating pedestrian-friendly infrastructure, such as wider sidewalks, pedestrian bridges, and designated crossing points, can enhance safety and encourage more people to walk or cycle instead of relying on motorized transport.
- **Promotion of Cycling and Non-Motorized Transport:** Encouraging the use of bicycles and non-motorized transport modes can help reduce traffic congestion and emissions while promoting a healthier lifestyle.

8.5 Vehicular Emissions and Environmental Impact

- One of the most significant environmental impacts of transportation, particularly in urban areas like Lahore, is vehicular emissions. Vehicles powered by fossil fuels release pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), particulate matter

(PM), and volatile organic compounds (VOCs) into the atmosphere, contributing to air pollution and climate change.

- Exposure to these pollutants has been linked to respiratory diseases, cardiovascular problems, and adverse effects on the environment. In Lahore, vehicular emissions are a major contributor to air pollution, exacerbating health issues and reducing the quality of life for residents.
- To mitigate the environmental impact of transportation, various measures can be implemented, including promoting the use of public transportation, investing in cleaner and more fuel-efficient vehicles, and adopting sustainable urban planning practices. Additionally, the integration of alternative fuels such as compressed natural gas (CNG) and electric vehicles (EVs) can help reduce emissions and improve air quality in cities like Lahore.

8.6 How Pollutants Can Be Generated from Motor Vehicles

Pollutants emitted from vehicles can originate from various sources within the vehicle's engine and exhaust system. These pollutants are produced as byproducts of combustion and other chemical processes involved in the operation of internal combustion engines. Here's how pollutants can arise from vehicles:

1. Tailpipe Emissions:

Carbon Monoxide (CO): Produced by incomplete combustion of carbon-containing fuels, such as gasoline or diesel. CO is a colourless, odourless gas that is harmful when inhaled in high concentrations.

Nitrogen Oxides (NOx): Formed when nitrogen in the air reacts with oxygen under high temperatures in the engine combustion chamber. NOx includes nitrogen oxide (NO) and nitrogen dioxide (NO_2) and contributes to smog formation and respiratory issues.

Particulate Matter (PM): Small particles of solid or liquid matter emitted from vehicle exhaust. PM includes both fine particles ($PM_{2.5}$) and coarse particles (PM_{10}) and can penetrate deep into the lungs, causing respiratory and cardiovascular problems.

Volatile Organic Compounds (VOCs): Organic chemicals that vaporize into the air from fuel and other vehicle components. VOCs contribute to the formation of ground-level ozone and smog, leading to respiratory issues and environmental damage.

2. Evaporative Emissions:
Hydrocarbons (HC): Unburned fuel vapours that escape from the vehicle's fuel system and evaporative emissions control system. HC emissions contribute to smog formation and can react with nitrogen oxides to form ground-level ozone.

VOCs: In addition to tailpipe emissions, VOCs can also evaporate from fuel tanks, fuel lines, and engine components, further contributing to air pollution.

3. Secondary Pollutants:
Ground-level Ozone (O_3): Formed through complex chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Ground-level ozone is a major component of smog and can cause respiratory issues and damage to crops and ecosystems.

Secondary Particulate Matter: Chemical reactions involving nitrogen oxides (NOx), volatile organic compounds (VOCs), and other pollutants can lead to the formation of secondary particulate matter in the atmosphere, further exacerbating air quality issues.

4. Brake and Tire Wear:
Heavy Metals: Brake and tire wear generate particulate matter containing heavy metals such as copper, zinc, and cadmium, which can be released into the air and deposited onto roads and surrounding areas, posing environmental and health risks.

5. Air Conditioning and Refrigerant Leakage:
Hydrofluorocarbons (HFCs): Used as refrigerants in vehicle air conditioning systems, HFCs are potent greenhouse gases that can leak into the atmosphere if the vehicle's air conditioning system is not properly maintained.

8.7 Phytoremediation: Harnessing Plants to Cleanse the Environment

Phytoremediation is a fascinating process where plants act as natural purifiers, effectively detoxifying soil, water, and air polluted by various contaminants. This eco-friendly approach relies on the unique abilities of plants and their associated phytochemicals to mitigate pollution in different environments. There are three primary mechanisms through which phytoremediation operates: phytoextraction, phytodegradation, and Phyto stabilization.

1. Phytoextraction
Phytoextraction involves the uptake and accumulation of pollutants by plants, primarily through their roots and leaves. This process relies on the remarkable ability of certain plant

species to absorb contaminants from the soil or air. Phytochemicals such as flavonoids and terpenes play a crucial role in facilitating the uptake and transformation of pollutants into less harmful forms within the plant.

For instance, volatile organic compounds (VOCs) emitted by vehicles can be absorbed by plants like ivy and spider plant. Once inside the plant, phytochemicals assist in breaking down these pollutants, effectively purifying the air. Through this mechanism, plants serve as natural air filters, reducing the concentration of harmful substances in the environment.

2. Phytodegradation

Phytodegradation involves the breakdown of pollutants within plant tissues through biochemical reactions. Certain compounds found in plants, such as phenolics and tannins, can react with pollutants like nitrogen oxides (NOx) and sulfur dioxide (SO_2), transforming them into less toxic forms or sequestering them within the plant.

This process occurs primarily within the roots and stems of plants, where phytochemicals interact with pollutants and initiate degradation pathways. By harnessing the natural detoxification capabilities of plants, phytodegradation offers a sustainable solution for reducing the environmental impact of various pollutants.

3. Phyto stabilization

Phyto stabilization involves the immobilization of pollutants in the soil, preventing their migration and reducing their bioavailability to plants and animals. In this process, plants release phytochemicals from their roots, which bind with heavy metals and other contaminants, effectively sequestering them within the soil matrix.

Plants with deep root systems, such as certain grasses and shrubs, are particularly effective at stabilizing contaminated soil. Through the secretion of phytochemicals, these plants create a barrier that prevents pollutants from leaching into groundwater or being taken up by other organisms.

8.8 Utilization of Euro Engine Standards and High-Grade Oil:

Euro Engine Standards:

Euro engine standards are regulations set by the European Union (EU) to limit emissions from vehicles, particularly targeting pollutants like nitrogen oxides (NOx), particulate matter (PM), and hydrocarbons (HC).

- Vehicles manufactured in compliance with Euro engine standards are equipped with advanced emission control technologies such as catalytic converters, diesel particulate filters, and selective catalytic reduction (SCR) systems.
- These technologies help reduce harmful emissions from vehicles, leading to improved air quality and public health outcomes. Adopting vehicles with Euro-compliant engines can significantly mitigate vehicular emissions and contribute to environmental sustainability.

High-Grade Oil:

Using high-quality engine oil formulated for specific vehicle models and engine types can enhance engine performance and reduce emissions.

High-grade oils have better lubricating properties, which minimize friction and wear in the engine, leading to improved fuel efficiency and reduced emissions.

Additionally, high-grade oils may contain additives that help clean and protect engine components, ensuring optimal performance and longevity while minimizing harmful emissions.

Promotion of Alternative Fuels:

Encourage the use of alternative fuels such as compressed natural gas (CNG), liquefied petroleum gas (LPG), biofuels, and hydrogen in vehicles.

Alternative fuels produce fewer emissions compared to conventional gasoline and diesel, reducing air pollution and greenhouse gas emissions.

Vehicle Fleet Modernization:

Replace older, more polluting vehicles with newer models equipped with cleaner engine technologies and emission control systems.

Offer incentives or subsidies for vehicle owners to upgrade to low-emission or electric vehicles, thereby accelerating the transition to cleaner transportation options.

Traffic Management and Congestion Reduction:

Implement intelligent transportation systems (ITS) to optimize traffic flow, reduce congestion, and minimize idling.

Promote carpooling, ride-sharing, and telecommuting initiatives to reduce the number of vehicles on the road and alleviate traffic congestion.

Green Urban Planning:

Embrace green urban planning principles to create walkable neighborhoods, pedestrian-friendly streets, and dedicated cycling lanes.

Prioritize mixed land-use development, compact city designs, and green spaces to minimize the need for vehicular travel and promote sustainable transportation options.

Eco-Driving Education:

Provide eco-driving training programs for drivers to promote fuel-efficient driving habits, such as smooth acceleration, maintaining steady speeds, and minimizing idling. Raise awareness among motorists about the environmental impact of their driving behaviour and the benefits of adopting eco-friendly practices.

8.9 Regular Vehicle Maintenance:

Scheduled maintenance, including tune-ups, ensures that vehicles operate efficiently and emit fewer pollutants. Proper tuning of vehicles is another important aspect in mitigating vehicular emissions and improving overall performance. Here's how tuning and related strategies can contribute to emission reduction:

Routine checks of engine components, such as spark plugs, fuel injectors, and oxygen sensors, help maintain optimal performance and reduce emissions.

Engine Calibration and Tuning:

Proper calibration of engine control units (ECUs) and tuning of engine parameters optimize fuel-air mixture ratios, ignition timing, and exhaust gas recirculation (EGR) rates.

Tuning engines to run at their peak efficiency reduces fuel consumption and minimizes emissions of pollutants like CO, NOx, and HC.

Emission Testing and Compliance:

Regular emission testing ensures that vehicles meet regulatory standards for emissions control.

Compliance with emission regulations, such as Euro engine standards, is essential for reducing harmful pollutants and minimizing environmental impact.

Retrofitting and Aftermarket Solutions:

Retrofitting vehicles with emission control devices, such as catalytic converters and diesel particulate filters, can significantly reduce pollutant emissions.

Aftermarket solutions, such as exhaust gas recirculation (EGR) systems and selective catalytic reduction (SCR) systems, can be installed to improve emission performance.

Fuel Quality and Additives

Ensuring the use of high-quality fuel and additives helps maintain engine cleanliness and optimize combustion efficiency.

Fuel additives, such as fuel system cleaners and octane boosters, can enhance fuel combustion, reduce carbon buildup, and lower emissions.

Telematics and Vehicle Tracking:

Utilizing telematics systems and vehicle tracking technologies allows for real-time monitoring of vehicle performance and emissions.

Data analytics from telematics can identify inefficient driving behaviors, engine malfunctions, and emission anomalies, enabling proactive maintenance and optimization.

Driver Training and Behavior Modification:

Educating drivers about the importance of proper vehicle tuning, maintenance, and eco-friendly driving habits promotes responsible vehicle operation.

Encouraging drivers to adopt fuel-efficient driving practices, such as avoiding aggressive acceleration and excessive idling, helps minimize emissions.

SECTION – 9

ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAM

9.1 Purpose and Objectives of the EMP

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA
- Define the responsibilities of the project proponent.
- Define a monitoring mechanism and identify monitoring parameters
- Ensure the complete implementation of all mitigation measures
- Ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

9.2 Environmental Management Plan

The EMP provides mitigation and management measures for the following phases of the project:

9.2.1 Operation and Mitigation Phase

This section of EMP provides management principles for the operation and maintenance phase of the manufacturing units. Environmental actions, procedure, and responsibilities are required from manufacturers within the operation and maintenance phase are satisfied.

9.3 Schedule of Implementation and Environmental Budget

The implementation of an EMP will be based on ISO guidelines for continuous improvement environment management.

9.4 EMP implementation stages

To implement an EMP, four steps will be taken:

Stage I. Environmental Planning. Planning is one of the most important stages in the process of building and implementing EMP. For this the following must be determined:

- The organization's environmental policy;
- Environmental matters;
- Legal procedures and other requirements;

— General objectives and specific targets;

— Environmental management program, including;

- designation of responsibility for achieving objectives and targets at each relevant function and level of the organization;
- the means and the time to be achieved.

Stage II. Implementation and operation. For an effective implementation of the environmental management plan, the organization will develop resources and support mechanisms necessary to perform environmental policy, objectives and targets in this domain.

For the implementation of an EMP the following must be defined:

— Structure and accountability;

— Training and awareness;

— Documentation of the EMP;

-Document control;

-Operational control);

-Prevention (emergency preparedness and response capacity).

Stage III. Checking and corrective action.

This step is a key element of the environmental management, which comes after planning and implementation of the environmental policy. The organization will control and correct, where appropriate, key elements of the environmental management. The organization will monitor and evaluate its environmental performance by;

- Monitoring and measurement;
- Non-conformity, corrective action and preventive action;
- Recordings (reports);
- Environmental management system audit (internal and external).

Stage IV. Management analysis. The organization will analyze and continuously improve its environmental management, aimed at improving overall performance. These analyzes can be made with the analyzes quality management system done by the leadership.

To maintain continuous improvement, fitness and effectiveness of the EMP, and through this, its performance, the organization management will review and assess the EMP at defined intervals. The management review will ensure that the necessary information is collected to allow management to continue this assessment.

This review shall be documented. Management review will address the possible need to change the strategy, objectives or other elements of the Environmental Management, in light of the

audit systems of environment management results, changing circumstances and the commitment to continuous improvement. Reviewing the strategy, objectives and procedures will be carried out at the managerial level which defined them.

The review shall include:

- the audit results;
- the extent to which they achieved objectives and targets;
- continuous convenience of the EMP related to the changing information and conditions.

The implementation requires the involvement of all staff of the organization, whatever level of seniority and functions involved, and especially the employment of a dynamic and cyclic process of continuous improvement and self-assessment of environmental impacts.

The management cost that has to be spending by manufacturers on the mitigation measures has been estimated and is included in the following table.

9.5 Environmental Management Team along with their Roles and Responsibilities

The proponent will make sure the implementation of EMP through its qualified team of professionals. The trainings will be arranged as required for the implementation of the Environmental Management and Monitoring Program.

Sr. No	Designation	Responsibility
1	Assistant Manager	To ensure legal requirements are addressed in legal register and implemented. Conduct frequent review of legal requirements and other requirements and record the compliance review. Communicate with senior management and arrange meetings regarding required actions for the legal compliances.
2	SHE Engineer / Assistant Manager	To conduct EHS risk assessment of all activities in liaison with operations. Ensure frequent review of risk assessments and verify implementation of control measures. To implement recommended practices for conservation of natural resources.

9.6 Proposed monitoring program to assess performance

The monitoring program is designed to ensure that the requirements of the NOC awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for

more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause an environmental disturbance. Following is a tentative plan for environmental monitoring.

The vehicles must be complied with the exhaust standards inspected and certified by Vehicle Inspections and Certifications Regime (VICS).

9.7 Proposed EMP reporting and reviewing procedures

The EMP is intended to be a 'living' document that will be responsive to changes in plans/scheme, stakeholder priorities and research results. Notwithstanding the evolution of the document in response to an expanding knowledge base, the logic behind the EMP should remain. Amendments to the EMP may require engagement with relevant stakeholder groups. As a minimum, the EMP will need to be reviewed and, if necessary, revised in conjunction with changes to the implementation of scheme. Changes to the implementation plan of scheme and/or operation schedule or methods, and recommendations based on the performance monitoring of the control measures, will necessitate changes to the EMP. The performance of the EMP should be audited periodically (annually).

9.7.1 Environmental Monitoring

A schedule of statutory and internal monitoring requirements for the site is to be included in the report while assessing either it is IEE or EIA to includes all the findings related to the subject matter. Monitoring is to be carried out in accordance with the Monitoring and Reporting schedule.

9.7.2 Reporting

Various statutory and internal reports will need to be prepared and submitted to assist in monitoring and advising on environmental performance. Examples that are applicable to the operation phase include:

9.7.3 Annual internal environmental audit report

An Annual Internal Environmental audit and Social (Sustainability) Report is required. This report will compile information from the quarterly monitoring reports into one document which will be obtain at the time of audit either conducted by the statutory body or third-party audit from customers side / stakeholders.

9.7.4 Records

All records shall be stored in an electronic format and retained for a period of not less than five years.

9.7.5 Auditing

Periodic audits (internal as well as third party) will be undertaken. The audits will be of the systems and, importantly, of the environmental outcomes.

9.7.6 Management review

A management review of the EMP will be carried out annually with third party assistance.

9.8 Need of Training to Implement EMP

Periodic training will be carried out by the proponent with the help of third-party consultant to ensure the implementation of the EMP. Furthermore, the auditing process will be formulated to check the overall performance of the EMP.

TABLE: ENVIRONMENTAL MANAGEMENT PLAN (OPERATIONAL PHASE)

Sr. No.	Project Component / Impact	Project Activities	Targets to be Achieved	Mitigation / Preventive Action	RESPONSIBILTIY	
					Implementation	Monitoring
OPERATIONAL PHASE						
1.	Vehicle Manufacturing	Manufacturing of vehicles	Manufacturing unit must be complied with PEQS.	• The stack emission must comply with the PEQS. • Wastewater discharge of manufacturing unit must comply with PEQS limits. • Euro-II engines must be used in vehicle. • Vehicle exhaust assisted with catalytic converter. • Vehicular exhaust must comply with	HSE Executive of Project / Proponent/VICS	Proponent

				the exhaust standards set by manufacturer. • The contractors to whom any waste recyclable material is to be sold shall be fully made aware of the environmental impacts and health effects of the waste to be sold to him if there is any.		
2.	Noise Impacts	The noise generated by machinery	Compliance with prescribed PEQS to control Noise pollution	• Noise reduction measures like buffering of noise through trees should be adopted where deemed necessary to reduce the noise level at the manufacturing unit. • Mitigation measures during operation for noise impacts	HSE Executive of Project / Proponent	Proponent

				on workers will include standard occupational health and safety practices		

9.9 Emergency Response Plan & Evacuation / Exit Plan

9.9.1 Emergency Response Plan

The objective of this plan is to prepare the workers at the manufacturing site to rescue from various emergencies that may occur at the workplace during the operation or else activities at project site.

9.9.2 Scope

This plan assesses risks, assign roles and responsibilities, and outlines steps to be followed in any emergency situation. It increases understandings of employees in the handling of different types of emergencies which may occur at the manufacturing site.

9.9.3 Types of Emergencies

Enlisted below are some emergencies which may occur at workplace/dormitories:

- Fire Hazards
- Chemical/Oil/ spillage
- Hazardous / Toxic Gas Release
- Extreme Weather Conditions
- Earthquake
- Flood

9.9.4 Responsibilities

The overall responsibility lies with EHS Manager supported by Departmental Heads. Central EHS Team will be overall responsible for implementation of ERP Plan. EHS Manager and Departmental (EHS Rep) will be responsible for emergency preparedness that includes the availability of resources, training of staff and monitoring and maintenance of emergency equipment's and conduction of drills.

9.9.5 Response Measures

- The manufacturing units will maintain a dedicated emergency response team equipped with fire tenders along with all required emergency handling accessories. Fire water network mains coupled with hydrants will be encircling the whole premises. A pump maintains the network pressure at 100psi (7 Bar) in normal conditions.
- Scenario based emergency response drills & evacuation plans.
- Fire Extinguishers, fire alarm system, fire blankets, Hydrants & monitors, Eye washers, Hose reels, are installed in all buildings, plant areas and other offices.

9.9.6 Important Records

- HSE Executive / Security Officer / Supervisor must maintain the following updated records at all times:
- List of staff trained in firefighting procedures.
- Location of hazardous materials in each section.
- List of evacuation zones and their assembly points.
- Location of isolation switches/valves.
- List of firefighting and first aid equipment available in each section.

9.9.7 Support Services

One electrician, one mechanic and four general workers (for salvage operations) will be arranged to ensure the necessary services to the unaffected areas continue and removal of any equipment etc. which may be affected by the incident.

9.9.8 Emergency due to Fire Hazards

9.9.8.1 Fire Fighting System

The fire protection systems shall be designed as per NFPA codes:

- NFPA 101 – Life Safety Code,
- NFPA 14 – Stand Pipe and Hose system
- NFPA-22 – Standard for water tanks for fire protection
- NFPA-10 – Standard for portable fire extinguishers

The fire-fighting system shall include the following:

- External Fire Hydrant system
- Portable Fire extinguisher
- Self-triggered standalone type fire extinguisher filled with clean agent shall be provided in the Server room.

- Fire pumps and electrical control panel.

Water will be drawn from fire reserve tanks by electrically driven jockey pumps (independent for fire hydrant), electrical pumps & standby diesel engine driven pump into a common suction header for fire hydrants. Fire water network mains coupled with hydrants are encircling the whole premises. A jokey pump maintains the network pressure at 100psi (7 Bar) in normal conditions. A fire diesel engine & electric driven pumps are also installed to maintain the fire network pressure at 7 Bar during the firefighting.

9.10 Trainings

- All the workers and contractors will receive training in the general plan procedures and specific departmental procedures related to the plan. Training will cover evacuation procedures, incident discovery, notifications, basic firefighting, fire extinguishers and first aid.
- All supervisors will receive additional training, for the safety of personnel, visitors, and the protection of facility assets.
- All emergency response team members receive specialized training for the response to and handling of emergency situations that could occur at the facility.

SECTION – 10

STAKEHOLDERS CONSULTATION

In conducting the Environmental Impact Assessment (EIA) for the proposed bike distribution project among students in Punjab, extensive surveys and interactions with students were conducted to gauge their preferences and needs regarding transportation options. These engagements revealed a strong preference among students for bikes as their mode of travel. Many students expressed enthusiasm for the initiative, highlighting the convenience, affordability, and health benefits associated with biking.

Through these surveys and interactions, it became evident that students perceive bikes as a practical and sustainable solution to their transportation challenges. Unlike traditional public transport options, which may be unreliable or insufficiently catered to their schedules, bikes offer flexibility and autonomy, allowing students to navigate their daily commutes with ease. Additionally, the prospect of biking resonated with students' concerns about environmental sustainability, with many expressing a desire to reduce their carbon footprint and contribute positively to their communities.

Furthermore, consultations with stakeholders, including educational institutions, local authorities, and community organizations, revealed widespread support for the bike distribution project. Recognizing the potential benefits of increased bike usage, stakeholders emphasized the importance of investing in cycling infrastructure, such as bike lanes, parking facilities, and safety measures, to ensure the project's success. By engaging stakeholders in the decision-making process, concerns regarding potential adverse impacts, such as congestion or safety hazards, were addressed proactively, paving the way for collaborative efforts to mitigate any challenges that may arise.

In light of these findings, proceeding with the bike distribution project aligns not only with the expressed preferences of students but also with broader objectives related to sustainable development and accessibility. By providing students with bikes, the project not only addresses immediate transportation needs but also promotes active lifestyles, fosters environmental stewardship, and contributes to the creation of vibrant, inclusive communities across Punjab. Through diligent monitoring, evaluation, and stakeholder engagement, the bike distribution project has the potential to serve as a model for sustainable transportation initiatives, inspiring

similar efforts in other regions and demonstrating the transformative power of cycling as a mode of travel.

10.1 Objectives

1. To provide accessible and sustainable transportation options for students enrolled in degree programs across Punjab.
2. To alleviate transportation challenges by distributing bikes, including both electric and petrol models, to eligible students.
3. To promote active and healthy lifestyles among students by encouraging cycling as a mode of transportation.
4. To reduce traffic congestion and carbon emissions by promoting the use of bikes as an alternative to motorized vehicles.
5. To enhance students' mobility and independence, particularly in areas where public transportation options are limited.
6. To foster environmental stewardship by incorporating eco-friendly transportation solutions into daily student life.
7. To contribute to the overall improvement of air quality and urban sustainability in Punjab through the adoption of biking as a preferred mode of travel.
8. To support the socioeconomic well-being of students by reducing transportation costs and improving access to educational institutions.
9. To ensure equitable access to bikes among students from diverse socioeconomic backgrounds, promoting inclusivity and equal opportunity.
10. To comply with legal and environmental regulations, including the Punjab Environmental Protection Act-1997, Section 12, through responsible project planning and implementation**.**

10.2 Consultation Mechanism

Primary stakeholders were consulted during informal and formal meetings. The consultation process was carried out in the Urdu language. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's potential 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, focus group discussions, in - depth

interviews, and participatory rural appraisal EIA involved the community in active decision-making. This process will continue even after this EIA has been submitted, as well as during future EIA in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

Secondary stakeholder consultations were more formal as they involved government representatives and local organizations, 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 undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

This section involves communication of possible impacts and concerns with

- ✓ Proponents Environmental Management Team
- ✓ The responsible authority
- ✓ Other departments and agencies
- ✓ Environmental practitioners and experts
- ✓ Affected and wider community

10.3 Proponents Environmental Management Team

The Proponent's Environmental Management Team for the bike distribution project would typically consist of officials or designated personnel from the Transport & Masstransit Department, Government of Punjab. They would be responsible for overseeing environmental management activities related to the project. Specific individuals and their roles within the Environmental Management Team would vary, but typically, it would include environmental experts, project managers, and other relevant stakeholders tasked with ensuring compliance with environmental regulations, implementing mitigation measures, and monitoring environmental impacts throughout the project lifecycle.

10.4 The responsible authority

The responsible authority for the implementation of this initiative is the Transport & Masstransit Department, Government of Punjab. They are the proponent of the project and are tasked with overseeing its execution. Additionally, ECO-IDEAL Consultants, as appointed independent consultants, are responsible for preparing the EIA report to ensure compliance with legal requirements under the Punjab Environmental Protection Act-1997, Section 12.

Other Department and Agencies

Higher Education Commission (HEC): Responsible for recognizing and accrediting universities and graduate colleges in Punjab. They play a crucial role in verifying the enrolment status of students in degree programs.

The Bank of Punjab (BOP): Facilitates the disbursement of funds for the project and manages the financial aspects, including opening saving accounts for advance payments and handling the subsidy disbursement.

Local Government Authorities: Responsible for coordinating with the Transport & Masstransit Department to ensure smooth distribution of bikes across the 41 districts of Punjab. They may also be involved in providing logistical support for the project.

Environmental Protection Agency (EPA): Ensures compliance with environmental regulations and may review the Environmental Impact Assessment (EIA) report submitted by ECO-IDEAL Consultants to ensure that the project meets environmental standards outlined in the Punjab Environmental Protection Act-1997.

District Administrations: Responsible for overseeing the distribution of bikes within their respective districts and coordinating with educational institutions to verify student enrolment status.

Local Police Departments: May assist in ensuring the safety and security of bike distribution events and handling any logistical or security issues that may arise during the implementation phase

Punjab Environmental Protection Act 1997

Public consultation is mandated under Punjab Environmental Law. The Provincial Agency, under Regulation 6 of the EIA-EIA Regulations 2000, has issued a set of guidelines of general applicability and sectoral guidelines indicating specific assessment requirements. This includes Guidelines for Public Consultation, 1997 (the Guidelines), that are summarized below

Table: Framework of Consultation

Objectives of public involvement	The main aim is to inform the public regarding the proposed project.
Stakeholders	The important stakeholders involve the local or affected community, proponents, local government and NGOs.
Mechanism	Gathering of the relevant information, listening and reviewing the complaints of stakeholders that leads to the decision making.

Timing and frequency	Should be started during screening of the project
Consultation tools	The important tools involved focus group meetings, workshops or formal and informal interviews
Important consideration	Objectives of the study, to seek alternatives through consultation, and identification of stakeholders and the required mechanisms.

10.5 Consultation process

The regular survey and background studies were conducted to identify the stakeholders. People residing nearby was gathered which are likely to be affected, focus group meetings were conducted by the representatives of the villages. They were all briefed about the project whereabouts in the nontechnical and understandable way. Certain issues and suggestion about the project that is included and raised by the locals were filed and recorded.

The consultation with the government officials, welfare organizations, NGOs were conducted in the formal way which includes the technical approaches to the project and the verdict of the affected or local community was also kept in view.

Stake holder's consultation techniques

The purpose of the consultation is to inform the affected parties about the proposed project and to analyze the knowledge, skills, and resources of the local community. It is important to be aware of how different power relations can distort participation. Following are the certain techniques that are used for consultation.

- Focus group meetings
- Formal and informal interviews with locals

Stake holders involved and their roles

The stakeholders or parties involved and the roles played by them are listed in the table below.

Table: Stakeholders and their Roles

Stakeholders	**Roles**
Proponent/Responsible Authority	The discussion with the proponent proposed the mitigation measures and alternatives to control any disparity in the project.
Environmental Expert	The consultants from the integrated environmental consultancy survey the project site to gather relevant information and to record the local community stance and behaviors regarding the

	project. Also, the evaluation of socio-economic impacts of the project has been done.
Government Departments	The consulted government department includes Environmental protection agency, wildlife, planning, and development. The departments overviewed the proposed projects and its socio-economic impacts.
Local communities affected	The surveys determined the extent of community that could be affected and their verdict about the proposed project.

Discussed points

The points that have been kept in view while consulting stakeholders are as follows:

- Activities of the project and their consequences.
- Requirements of the people likely to be affected.
- Mitigation measures or compensation strategies.
- Role of the affected people in the implementation and development of the project.

Affected and wider community

There is no affected community present in the area of the proposed project. Consultant's team has consulted with the inhabitants or neighboring areas. The remarks of people are positive regarding the project and people foresee positive impacts like employment opportunities, business, development of the area etc.

Grievance redressal mechanism

A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate and facilitate the resolution of affected person/s concerns, complaints and grievances about the social and environmental performance at the level of the subproject. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. A common GRM will be in place for social, environmental, or any other grievances related to the project.

A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. The objective of the grievance redress mechanism is to resolve complaints as quickly as possible and at the local level through a process of conciliation; and if that is not possible, to provide clear and transparent procedures for appeal. All affected persons will be made fully aware of their rights, and the detailed

grievance redress procedures will be publicized through an effective public information campaign.

Procedure for Redress of Grievances

Project management unit and project implementation unit will ensure that the GRM is fully disclosed prior to construction: (a) in public consultations and information, education and communication, or social/community preparations, (b) through posters displayed in the offices of the PMU, PIU, township and ward as well as at strategic places within the main subproject areas (posters to include names and contact details). The following procedures for grievance redress are proposed:

- Affected person/s (AP/s) will address complaints to the arbitration unit or other designated grievance officers. The unit will organize a meeting with the AP/s to resolve the issue using its traditional methods of conciliation and negotiation; the meeting will be held in a public place and will be open to other members of the public to ensure transparency.
- If within 5 days of lodging the complaint, no understanding or amicable solution can be reached or no response is received from the arbitration unit, the affected person can bring the complaint to the PIU. The PIU will meet with the AP/s to discuss the complaint, and provide a decision within 10 days of receiving the appeal.
- If the AP/s is not satisfied with the decision of the PIU or in the absence of any response, the AP/s can appeal to the PMU. The PMU will provide a decision on the appeal within 10 days.

Safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (a) number of cases registered with the Grievance Redress Committee, level of jurisdiction (first, second, and third tiers), number of hearings held, decisions made, and the status of pending cases; and (b) lists of cases in process and already decided upon may be prepared with details such as name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e. open ,closed, pending)

Procedure of Filing and Resolving Grievances

Grievances will be logged and resolved in the following steps:

Step 1: Receive and Acknowledge Complaint

Once the PIU receives a complaint, which could be the complainant giving it in person, via letter or email, or through a GFP, an acknowledgment of receipt of the complaint has to be sent

to the complainant. PIU will work to understand the cause of the grievance for which the PIU may need to contact the complainant again and obtain details.

Step 2: Investigation

The PIU will be required to complete preliminary investigations within five working days of receiving the complaint and send a response to the complainant documenting the results of their investigations and what the PIU plans to go ahead.

Step 3: Resolution through PIU

PIU have investigated a grievance, it will share with the complainant the proposed course of action to resolve the complaint, should PIU believe any to be necessary. If the complainant considers the grievance to be satisfactorily resolved, the PIU will log the complaint as resolved in their records. In case the grievance remains unresolved it will be reassessed and GRC will have further dialogue with the complainant to discuss if there are any further steps, which may be taken to reach a mutually agreed resolution to the problem.

SECTION – 11

CONCLUSION AND RECOMMENDATIONS

Transportation stands as a vital cornerstone in shaping societies and economies globally, acting as a conduit that connects people, cultures, and markets. Despite its undeniable significance, the environmental repercussions of transportation, particularly in urban environments, present formidable challenges that demand immediate attention and concerted action. Implementing sustainable transportation policies and embracing clean technologies offer cities like Lahore a pathway to mitigating the adverse effects of vehicular emissions. Through collaborative efforts involving governments, businesses, and communities, we can cultivate transportation systems that are not only efficient but also environmentally friendly, thereby ensuring a better quality of life for both current and future generations. The traffic landscape in Lahore underscores the urgency for comprehensive solutions and collaborative endeavours. Addressing issues such as congestion, inadequate infrastructure, and safety concerns requires the collective effort of government authorities, urban planners, transportation experts, and the public. By tackling these challenges head-on, Lahore can evolve into a more liveable and sustainable city with transportation systems tailored to meet the needs of its residents. Pollutants stemming from vehicles result from a myriad of sources, including fuel combustion, evaporation of volatile compounds, and the wear of vehicle components. Effective mitigation strategies necessitate a holistic approach, encompassing comprehensive emission control measures, proactive vehicle maintenance, and the adoption of cleaner technologies. By aligning with Euro engine standards and prioritizing the use of high-grade oil, transportation companies can play a pivotal role in reducing vehicular emissions, improving air quality, and contributing to the transition to a more sustainable transportation system. Moreover, it's imperative for transportation companies to conduct strategic environmental impact reports to assess and address their ecological footprint comprehensively. These reports should go beyond mere compliance with regulatory requirements and encompass proactive measures to minimize environmental harm while maximizing sustainability efforts. By integrating strategic environmental impact assessments into their operations, transportation companies can demonstrate their commitment to environmental stewardship and pave the way for a greener future.

APPENDICES

Form No:HCJD/C-121

ORDER SHEET

IN THE LAHORE HIGH COURT LAHORE

JUDICIAL DEPARTMENT

Case No. W.P. No.30823/2024

Ch. Rizwan Ali Rao Versus Government of Punjab & others

S.No.of order/ Proceeding	Date of order/ Proceeding	Order with signature of judge, and that of parties or counsel, where necessary.
	17.05.2024	M/s. Mian Ejaz Latif, M. Azhar Siddique and Ch. Arshad Gulzar, Advocates for the petitioner. Mrs. Hina Hafeez Ullah Ishaq and Syed Kamal Ali Haider, Advocates/Members of the Judicial Water and Environmental Commission. Mr. Asad Ali Bajwa, Deputy Attorney General. Mr. Hassan Ejaz Cheema, Assistant Advocate General with Dr. Ahmad Javed Qazi, Secretary Transport and M. Nawaz Manik, Legal Advisor for EPA.

This order will also decide connected W.P.No. 30822/2024 as similar questions of law have been raised in these petitions.

2. Notices were issued and report has been filed by the learned Members of the Judicial Water and Environmental Commission regarding a scheme sought to be launched by the Government of Punjab to provide motorcycles to the students. Under the scheme the proposal is to provide 23000 bikes to the students of which 19000 would be petrol bikes (**The Scheme**). This raised concerns regarding environment pollution and adverse impact on the environment by induction of a large number of motorcycles in the traffic pattern of Punjab. It is made clear that this issue has engaged the attention of this Court purely because of environmental concerns which strictly affects the right to life enshrined in Article 9 of the Constitution of Islamic Republic of Pakistan, 1973. Two reports have been filed on behalf of Transport & Masstransit Department, Government of Punjab. To reiterate, this Court is

not concerned with the other aspects of the scheme which is within the domain of the Government but merely relates to the impact on environment by the launch of the scheme. Different applications were filed which have now been converted into instant constitutional petitions and which are being heard and disposed of together.

3. Learned Advocate General Punjab on the last date of hearing as well as learned Assistant Advocate General have been heard today as also the Secretary Transport and Masstransit Department, Government of Punjab have been heard in the matter. There are various reports placed on the record filed by the Urban Unit, Government of Punjab as well as World Bank and other Multilateral Agencies which establish in different studies that of the various factors vehicular emission constitutes the largest proportion of pollution being caused. Out of the entire bulk of vehicular emission, the major contributor to pollution is the emission by motorcycles. Therefore, it should be of deep concern for any reasonable Government to engage in a priorly conducted feasibility study regarding impact of induction of thousands of motorcycles into the mainstream traffic of Punjab.

4. The Punjab Environmental Protection Act, 1997 ("**Act, 1997**") assumes significance in this regard. Adverse environmental effect has been defined as:

> *"(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes –*
> *(a) impairment of, or damage to, human health and safety or to biodiversity or property;*
> *(b) pollution; and*
> *(c) any adverse environmental effect as may be specified in the regulations;"*

5. Project in the Act, 1997 means:

> "project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes–
> *(a) construction by use of buildings or other works;*
> *(b) construction or use of roads or other transport*

systems;

(c) construction or operation of factories or other installations;

(d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;

(e) any change of land use or water use; and

(f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;"

6. Lastly, proponent has been defined as:

> *"proponent" means the person who proposes or intends to undertake a project;*

7. A cumulative reading of these definitions would clearly show that a project would mean any activity, plan, scheme or undertaking involving any change in the environment. Doubtless, the scheme being proposed by the Government is such a scheme and would involve a change in the environment and there can be no two opinions about this aspect. The launch of the scheme would be caught by the definition of adverse environmental effect and would cause pollution and impairment of human health and safety. Since the scheme is definitely a project within the meaning of the Act, 1997, this would trigger Section 12 which provides that:

> *"12. Initial environmental examination and environmental impact assessment.– (1) 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.*
>
> *(2) The Provincial Agency shall–*
>
> *(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or*
>
> *(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.*
>
> *(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to–*
>
> *(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial,*

scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director - General of the Provincial Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) International relations, national security or maintenance of law and order, except with the consent of the Government; or

(iii) matters covered by legal professional privilege.

(4) The Provincial Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

(5) Subject to sub-section (4) the Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The Provincial Agency shall maintain separate Registers for initial environmental examination and environmental impact assessment project, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3)."

8. The provisions set out above is couched in mandatory terms and prohibits any project to commence unless an environmental impact assessment has been filed with the Provincial Agency whose approval has been obtained in this regard. This, *a fortiori*, applies to a scheme or undertaking by the Government and is of the essence of a responsible Government. This has admittedly not been done by the Transport Department while formulating the scheme and obtaining its approval from the Government. The Secretary present in the Court does not dispute the applicability of the Act, 1997 under these circumstances. Finally, section 19 makes it an offence for any Government Agency to proceed with the implementation of the scheme without the approval of the Provincial Agency and the head of that Government Agency

will be directly liable for being punished under the provisions of the Act, 1997. Therefore, it can be culled out from the above narration of the provisions of Act, 1997 that an Environmental Impact Assessment (**EIA**) as a *sine qua non* was to be submitted by the Transport Department with regard to the scheme to the Provincial Agency and an approval had to be obtained priorly before the scheme was formally launched. This can still be done by the Transport Department which is under obligation to do so.

9. In view of the above, these petitions are **disposed of** with a direction that before the scheme is formally put into effect and the distribution of petrol motorcycles takes place, an EIA shall be submitted to the Provincial Agency for its approval in accordance with law. Once that approval has been granted, this scheme may proceed ahead. It is further made clear that the Provincial Agency shall engage private and independent consultants to review the EIA so submitted and thereafter proceed to grant or refuse approval on the basis of the recommendations. The fee of the independent consultants shall be borne by the Transport Department. Until the approval is granted, the scheme shall be held in abeyance and no further steps shall be taken by the Transport and Masstransit Department with regard to the scheme.

(SHAHID KARIM)
JUDGE

Approved for reporting.

JUDGE

Abdul Waheed

GLOSSARY

Words	Dictionary
Air Quality Sensitive Receptors	People, property, species or designated sites for nature conservation that may be at risk from exposure to air pollutants potentially arising as a result of a proposed development.
Air Quality Standard	Air quality limiting values and objectives.
Annual Average Rainfall	Average amount of precipitation falling at a specified site recorded by the Meteorological Office. It gives a measure of the overall wetness of the local climate.
Anticipated Impacts	Expected Impacts
Aspects	A distinct feature or element in a problem
Atm	Standard unit of atmospheric pressure; the pressure exerted by the weight of air in the atmosphere of Earth
Baseline	Existing environmental conditions present on, or near a site, against which future changes can be measured or predicted.
Biodiversity	The variety of life in the world or in a particular habitat or ecosystem.
Climate	The climate can be described simply as the 'average weather', typically looked at over a period of 30 years. It can include temperature, rainfall, snow cover, or any other weather characteristic.
Climate Change	A change in the state of the climate, which can be identified by changes in average climate characteristics that persist for an extended period - typically decades or longer.
Compliance	Acting according to certain accepted standards
Cutting	A linear excavation of soil or rock to make way for a new railway or road. Cuttings help reduce the noise and/or visual impact of passing trains or road vehicles.
Decibel(S)	A unit used to express relative differences in sound power or intensity. There is a million to one ratio in sound pressure (measured in Pascal (Pa)) between the quietest

	audible sound and the loudest tolerable sound. The decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement because of this wide range. Audibility of sound covers a range of approximately 0-140dB.
Discharge	spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
Discrepancies	A difference between conflicting facts, claims or opinions
Dust	All airborne particulate matter.
Earthworks	The removal or placement of soils and rocks such as in cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/rocks to achieve desired properties.
Ecosystem	A biological community of interacting organisms (e.g. plants and animals) and their environment.
Environment	air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned.
Environment Agency	Government agency established to protect and improve the environment and contribute to sustainable development. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
Environment Budget	Monetary assets reserve for Environmental activity
Evaluated	Estimate or determine the nature, value, quality, ability, extent, or significance of
Excavated Material	Soil, rock and other material that has been removed from the ground during construction.
Fauna	All the animal life in a particular region or period
Flora	Variety of Plants found in an area

Greenhouse Gas	A gas such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor that contributes to the greenhouse effect by absorbing infrared radiation.
Groundwater	All water that is below the surface of the ground and within the permanently saturated zone.
Groundwater Body	A distinct volume of groundwater within an aquifer
Heavy Metals	A loosely defined term which refers to a group of metal and metalloids, many of which are toxic to some degree.
	Impact Used throughout this EIA Report to refer to changes to the environment that have the potential to occur as a result of the construction and/or operation of the Proposed Scheme.
Impact	Used throughout this environmental impact assessment report to refer to the consequence of an impact to the receiving environment.
Initial Environmental Examination	a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment
Legislation	law enacted by a legislative body
Million	10,00,000
Mitigation	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment.
Mitigation Measures	Measures aimed to curtail or entirely control an adverse impact or to compensate some loss or cause additional improvements
Punjab Environmental Quality Standards	the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste specifically in Punjab.
Nuisance	Annoyance
Orientation Session	Direction Session

Potential Issue	Problems likely to arise
Proposed Project	Planned activity
Rehabilitation	The conversion of wasteland into land suitable for use of habitation or cultivation
Residual Impacts	Impacts left behind after implementation of the mitigation measures
Risk Assessment	An assessment of the probability of a hazard occurring that could result in an impact.
Sand	Soil particles from 0.06mm-2.0mm in equivalent diameter. Fine sand particles are from 0.06mm-0.2mm; medium sand from 0.2mm-0.6mm; and coarse sand from 0.6mm-2.0mm.
Scoping	An initial stage in the environmental impact assessment process to determine the nature and potential scale of environmental effects arising as a result of a proposed development
Screening	The first stage in an environmental impact assessment. It is used to determine if further assessment is necessary and to categorize the project.
Significant	Important
Soil Erosion	The detachment and movement of soil by the action of water and/or wind.
Soil Profile	A vertical cross-section through a soil.
Stakeholders	A person or organization with an interest or concern in Something
Statutory Requirements	Legal Requirements
Substitutions	An event in which one thing is substituted for another
Surface Water	Waters including rivers, lakes, reservoirs, canals, streams, ditches, coastal waters and estuaries.
Sustainability	such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs.

Topography	The natural or artificial features, level and surface form of the ground surface.
Topsoil	Upper layer of a soil profile, usually darker in color (because of its higher content of organic matter) and more fertile than subsoil, and which is a product of natural biological and environmental processes.
Waste	any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process

List of abbreviations

°C	Degree Celsius
BOD	Biochemical Oxygen Demand
CC	Construction Contractor
CDM	Clean Development Mechanism
CO	Carbon Monoxide
CO_2	Carbon dioxide
COD	Chemical Oxygen Demand
dB(A)	A weighted decibel scale
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
EMMP	Environmental Mitigation and Monitoring Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Order
GHGs	Green House Gases
GOP	Government of Pakistan
IEE	Initial Environmental Examination
Km	Kilometer
LAA	Land Acquisition Act
Ltd.	Limited
m^3/h	Cubic meter per hour
MW	Megawatt
NA	Not Applicable
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
NGO	Non-Government Organization
No.	Number
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
OHSAS	Occupation Health and Safety Assessment Series

PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Punjab Environmental Protection Act, 2012
PEPC	Pakistan Environmental Protection Council
PEPO	Pakistan Environmental Protection Ordinance
PHA	Parks and Horticulture Authority
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipments
SOPs	Standard Operation Procedures
SO_x	Oxides of Sulfur
TDS	Total Dissolved Solids
Tpd	Tons per day
TSS	Total Suspended Solids

Stakeholder Consultation


PROVISION OF 20,000 BIKES
BY
THE BANK OF PUNJAB


PROVISION OF 20,000 BIKES
BY
THE BANK OF PUNJAB

REFERENCES

1 Environment related Laws in Pakistan and the Province of Punjab;

2 Google earth, maps.

3 Guidelines for Preparation and Review of Environmental Report

4 Guidelines for Public Consultation

5 Information and data provided by project proponents;

6 Information collected from the technical documents of various suppliers of machinery/equipment.

7 Information gathered through discussions with the project related persons of the project proponent;

8 Labor Laws

9 Meteorological data from meteorological department and website

10 National Environmental Policy 2005

11 National Environmental Quality Standards (Self-Monitoring and Reporting by Industries) Rules, 2001

12 Pakistan Environmental protection act 1997

13 Pakistan Environmental Protection Agency (Review of EIA/EIA) Regulations, 2000.

14 Pakistan Environmental Protection Order (PEPO) 1983

15 Pakistan Penal Code, 1860

16 Provincial Wildlife Act, 1974

17 Punjab Environmental Protection Act 1997

18 The Land Acquisition Act, 1894

19 workplace safety and health act 2011

TERMS OF REFERNCES

These terms and references are being submitted for the subject EIA study under clause 5(f) of policy and procedure for the filing, review and approval of environmental assessment. These TORs of EIA been prepared by ECO-IDEAL Consultants in consultation with proponent of the project. Proposal and TORs for the EIA accepted by the M/s Moiz Textile Mills Limited.

1. INTRODUCTION OF PROJECT

Subject project is a scheme of Transport & Masstransit Department, Government of the Punjab for "Provision of Bikes (E-Bikes & P-Bikes) to the Students" in 41 Districts of Punjab, Pakistan.

2. ENVIRONMENTAL CONSULTANT & CLINT

Transport & Masstransit Department has appointed ECO-IDEAL Consultants as Consultant for the subject project to conduct the Environmental Impact Assessment. M/s ECO-IDEAL Consultants will be called as "CONSULTANT" and Transport & Masstransit Department will be called as "CLIENT".

3. OBJECTIVE OF THE EIA STUDY

The objective of the study includes the compliance of Section 12 of Punjab Environmental Protection Act-1997, Punjab Environmental Quality Standards and fulfilment of HSE conditions.

4. PURPOSE OF EIA STUDY

The key objectives of the EIA are to:

1. Document the ecological and socioeconomic baseline conditions of the study area and the affected communities.
2. Inform and obtain input from stakeholders (e.g. government authorities, public and indigenous communities) and capture their relevant issues and concerns.
3. Assess in detail the environmental, social and health impacts that would result from the Project.
4. Identify environmental and social mitigation measures to address the impacts identified.
5. Develop the EMPs as discussed above, based on the mitigation measures developed in the EIA.
6. Meet the requirements or recommendations of the applicable National Environmental Laws and Guidelines.

5.1. Scope of Services

EIA for commissioning of the scheme to deal with the need of local students and provide them with basic facilities under the name “Moiz Textile Mills Limited” located at 35-KM Raiwind Road, Lahore.

In accordance with:

1.0 The Punjab Environmental Protection Act 1997 and the
   - 1.1 Various guidelines developed by the Punjab Environmental Protection Agency
   - 1.2 Pakistan Environmental Protection Agency Guidelines
   - 1.3 Guidelines of Labor & Human Resource Department
   - 1.4 Punjab Local Government Guidelines

2.0 Review of existing regulatory framework
   - 2.1 Laws and Regulations
   - 2.2 National and International Guidelines and policy
   - 2.3 Guidelines of Labor & Human Department
   - 2.4 Punjab Local Government Guidelines

3.0 Methodology for carrying out this study
   - 3.1 Project Description
   - 3.2 Site selection
   - 3.3 Project alternatives

4.0 Process Description
   - 4.1 Detailed review of the process
   - 4.2 Design Parameters
   - 4.3 Details related to plant and equipment

5.0 Environmental profile of the study area
   - 5.1 Climatology
   - 5.2 Geographical features
   - 5.3 Geological and Hydrological features
   - 5.4 Historical review
   - 5.5 Land use
   - 5.6 Ecology of the area (Flora & Fauna)

6.0 Analysis Reports of EPA required parameters
   - 6.1 Sampling of Air, Water and Noise Level
   - 6.2 Ambient Air Quality of the project site
   - 6.3 Ground Water Quality of the project area
   - 6.4 Landscaping

7.0 Investigate Socio-Economic and Socio-Environmental aspects ad cultural values within and around the operating facility

7.1 Administrative Setup

7.2 Cultural and social values

7.3 Social Cohesion

7.4 Interviews of different groups

8.0 Development activities and Waste Management

9.0 Identify and evaluate major environmental impacts

10.0 Identify mitigation measures and develop Environmental Management and Monitoring Plan

11.0 Conclusion based on the study conducted for this EIA.

12.0 All other requirements, as set forth by

12.1 The Punjab Environmental Protection Act 1997.

12.2 Various guidelines developed by Environmental Protection Agency Punjab

12.3 Any other legal requirement existing within Pakistan

13.0 Site visits for Data Acquisition

14.0 Environmental monitoring

15.0 Provision of Lab Analysis Reports (Baseline Environmental Reports)

16.0 Preparation of Environmental Management Plan

17.0 Submission of application for obtaining Environmental Approval/NOC in the office of Director General, EPA, Punjab, Lahore.

18.0 Briefing & presentation at the site to Deputy Director/Inspector for Environmental Management

19.0 Reply to technical Environmental Objections/Review

20.0 Presentation to the expert committee in the office EPA, Punjab

21.0 Presentation in the office of Director General, EPA, Punjab

6. METHODLOLOGY

6.1. Development of Data acquisition plan

A detailed Data Acquisition Plan (DAP) will be developed immediately after the award of the contract for the internal use of the consulting team. A literature review shall be carried out and a detailed methodology and Work Plan will be developed. The plan will identify specific requirements of primary and secondary data and their sources; determine time schedules and responsibilities for their collection; and indicate the logistics and facilitation needs.

6.2. Data Collection

In this step, physical, technical and environmental parameters of the environmental study shall be collected from the Client and other agencies. Field visits shall be made to carryout socio-economic survey. An extensive feedback/cross examination of all the stake holder in the neighborhood will also be carried out in this step.

Following types of information are likely to be collected for this assignment:

Physical Surveys:

Proposed environmental study area

- Climatology
- Topography, Geology
- Geomorphology
- Demography
- Hydrology, Hydrogeology
- Ecology, flora and fauna
- Socio-Economic conditions
- Sensitive Areas

Environmental Surveys:

Environmental survey will be conducted to find out various environmental associated with effluent and solid waste handling as well as air emissions.

6.3. WORK PLAN

The work plan and description of activities has been formulated with reference to the scope of included herein. The activities will span over the period of two (02) weeks for the draft report preparation. This period will start from the date on which authorization to start the EIA, environmental audit study is given to ECO-IDEAL Consultants by Transport & Masstransit Department. The final draft of EIA report will be share with the client for comments before submission of report in the office of Director General, EPA, Punjab, Lahore.

6.4. SAMPLE COLLECTION & LABORATORY ANALYSIS

During the site visits, the significant areas will be identified and the samples of underground/surface water and waste water will be collected for laboratory analysis, air monitoring and noise levels measurement will also be carried out. The water samples will be tested in certified environmental laboratory, and will then be forwarded to our concerned departments for analysis with respect to the preparation of the EIA.

6.5. DATA ANALYSIS

The data collected in the steps above will be analyzed. A sensitivity analysis shall be carried out by using the statistical software.

6.6. IDENTIFICATION AND SCREENING

Based on the data analysis, impacts shall be identified and any significant impacts shall be screened.

6.7. DRAFT AND FINAL REPORT

A copy of the Draft report shall be submitted to the Client for comments within one month after the modifications will be incorporated. Final report will be submitted to the Client and in the Office of Director General, EPA, Punjab, Lahore on behalf of the proponent.

6.8. CLIENT RESPONSIBILITY

We expect the following inputs from the clients:

I. As soon as the Proposal is accepted, the Consultants will request for the nomination of senior officer to be nominated as Coordinator who will be responsible for all coordination activities as required by the Consultants and to whom the Consultants will refer for information and assistance. All correspondence between the Consultants and the CLIENT will be routed through the coordinator.

II. *EDO-IDEAL Consultants* require free access to all relevant information available with the Client.

III. Assess and identify major potential issues and impacts particularly those which may have influence on design, construction and operation at any stage.

IV. The report developed for the CLIENT shall be the property of the CLIENT and the Consultant shall adhere to confidentiality morality as well as legally.

V. Client will provide relevant documents as,

   a) Signed application on company letter head (pattern will be provided).
   b) Affidavit on Rs 100- Stamp Paper (pattern will be provided)
   c) Undertaking on Rs. 100/- Stamp Paper (pattern will be provided)
   d) Copy of NIC of proponent
   e) Signature on Schedule IV (pattern will be provided)
   f) Detail Company Profile
   g) Details of firefighting Equipment
   h) Layout Map of the project
   i) Other NOCS/Certificates form other concerned departments (if any)

VI. If any legal litigation arises from stockholders during the proceeding of EIA. The consultants will not be responsible for the delay in the approval process.

Signature:	Signature:
CONSULTANT	**CLIENT**
M/s ECO-IDEAL Consultants	*Transport & Masstransit Department*

Profile of EIA/EIA Professional Team

1. Dr. Faiz Rabbani				
Designation	Chief Chemist / Subject Matter Specialist (SMS)			
Qualification	Ph.D. Chemistry			
Institution	University of Engineering & Technology, Lahore, Punjab, Pakistan.			
Sectors	Government Agency, Industries, Environmental Monitoring, Autonomous Bodies (Education Sector), Entrepreneur (Environmental Consultancy)			
Experience	10 Years			
Worked With:	1. COMSIT Abbotabad. 2. COMSIT Vehari. 3. *ENCAP* for 02 years as Chief Chemist/ Subject Matter Specialist (SMS)			
Skills	Research & Development, Chemist, Environmental Assessment, Conservation Strategies and Policies, Project Management			
Environmental Assessment Experience	Reports drafted	30	Reports reviewed	Nearly 50
2. Saiqa Amjad				
Designation	Environmentalist / Environmental Professional			
Qualification	M.Phill. (Env. Science)			
Institution	University of Lahore			
Sectors	Consultancy Firm			
Experience	3 Years			
Worked With:	ECO-IDEAL Consultants			
Skills	Report Writing, Social Survey			
Environmental Assessment Experience	Reports Drafted		Field Survey	4
3.Mubeen Shoukat				
Designation	Environmental Associate			
Qualification	MPhil (TQM), PU, Lahore Punjab. BS Environmental Sciences			
Institution	Government College University, Lahore			
Sectors	Consultancy Firm			
Experience	1 Year			
Worked With:	IE Solutions Consultants			
Skills	Social Survey, Lab working			
Environmental Assessment Experience	Reports Review	15	Field Survey	16
4.Noor Bibi				
Designation	Environmental Associate			

Qualification	MPhil (Environmental Sciences)			
Institution	Government College University, Lahore			
Sectors	Consultancy Firm			
Experience	1 Year			
Worked With:	ECO-IDEAL Consultants			
Skills	Social Survey, Lab working			
Environmental Assessment Experience	Reports Review	5	Field Survey	5
5.Rohama Nassir				
Designation	Environmental Associate			
Qualification	MPhil (Environmental Sciences)			
Institution	Government College University, Lahore			
Sectors	Consultancy Firm			
Experience	2 Year			
Worked With:	ECO-IDEAL Consultants			
Skills	Social Survey, Lab working			
Environmental Assessment Experience	Reports Review	15	Field Survey	40
6.Neha Javid John				
Designation	Environmental Associate			
Qualification	MPhil (Environmental Sciences)			
Institution	Government College University, Lahore			
Sectors	Consultancy Firm			
Experience	1 Year			
Worked With:	ECO-IDEAL Consultants			
Skills	Social Survey, Lab working			
Environmental Assessment Experience	Reports Review	5	Field Survey	5
7.Hafiz Abdul Rehman				
Designation	Compliance Officer			
Qualification	BSc			
Institution	Punjab University			
Sectors	Consultancy Firm			
Experience	3 Years			
Worked With:	ECO-IDEAL Consultants			
Skills	Social Survey, Lab working			