



## AUDITOR GENERAL OF PAKISTAN

### ENVIRONMENTAL IMPACT ASSESSMENT OF NATIONAL ACADEMY OF PUBLIC FINANCE AND ACCOUNTANCY (NAPFA), SECTOR H-8/4, ISLAMABAD.



**SEPTEMBER 2021**

**FINAL REPORT**



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## Executive Summary

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### Title of the Project

This report presents the findings of "Environmental Impact Assessment (EIA) of National Academy of Public Finance and Accountancy (NAPFA), Sector H-8/4, Islamabad."

The EIA study aims at the identification of the possible environmental and social impacts of the proposed project on its immediate surroundings on both short and long-term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures.

### Location of the Project

The project site is located on Street 8 of Sector H-8/4, Islamabad, on a square plot measuring 160,000 sq. ft. The project site can be accessed from Street 8. The coordinates of the project site are 33°40'45.75"N, 73° 04'20.68"E.

### Name of Proponent and Organization preparing the Report

Auditor General of Pakistan, Islamabad is the proponent of the project.

Pakistan Public Works Department, Islamabad is the executing agency of the project which has prepared the Environmental Impact Assessment of the Project through Development Consultancy Services.

### Outline of the Project

Auditor General of Pakistan intends to develop National Academy of Public Finance and Accountancy.

The project consists of development of an Academic Block (2B+G+5 Floors), Auditorium (B+G) and 4 Residential Blocks comprising of 47 Residencies.

The project includes one Category-1 house, basketball badminton court and extra foundation for future extension. The plot area is 400'x400' (160,000 sq ft.).

NAPFA building shall have several environmentally friendly features such as central HVAC, component of renewable energy on rooftop and vertical gardening approach will be adopted.

The total cost of the project is Rs 3.605 billion and duration of the project is 3 years.

### Environmental Baseline Conditions

In order to assess and evaluate the impacts and related mitigation measures, in the project area, existing conditions of physical, biological and the socio-economic environment were studied as under:

#### Physical Environment

Topography: The topography of Islamabad consists of plains and mountains. The northern part of the metropolitan area comprises mountain terrain of the Margalla Hills, and Rawal Lake lies in the northeast just below the hills. The southern portion of this city is an undulating plain drained by Korang River followed by its tributaries. Towards the east is a relatively flat area with bare soil and settlements.

The project site is a plain land bounded by Street 8 from the North and Service Road from the South.

Geology and Soil: The Potohar region has a complex geological history of mountain formation, alluvial-loessic depositions, and erosion cycles. Limestone is the characteristic rock of Margalla range. In age, it ranges from the Jurassic to Triassic. It is usually reddish or bluish-white in colour, mixed or alternating with its beds of red or bluish clay or shades or sandstones. Adiala, Dhamial-Loibher forests are situated over alluvial deposits. The deposits contain small-sized rounded pebbles of sandstone, quartzite or granite and sand mixed or alternating with clayey deposits. They have been described as alluvial deposits, but it is equally probable that they have a glacial origin.

The soil of the project area is composed of clay/silt formed of alluvial deposits laid by the past and present river system in varying thickness.

Surface Water:

The Soan and Kurang Rivers are the main streams draining the area. Their primary tributaries are the Ling River, draining north-westward into the Soan; Gumreh Kas, draining westward into the Kurang from the area between the Kurang and Soan; and Lei Nala, draining southward into the Soan from the mountain front and urban areas. The Kurang and Soan Rivers are dammed at Rawal and Sambli Lakes, respectively, to supply water for the urban area. Extensive forest reserves in the headwaters of the Kurang and Soan Rivers benefit the quality and quantity of supply.

There is no nullah or other surface water resource in the vicinity of the project site.

Ground Water: A supplemental network of municipal and private wells as deep as 200 meters (m) produces ground water primarily from Quaternary alluvial gravels. The altitude of the water table decreases from about 600 m at the foot of the Margalla Hills to less than 450 m near the Soan River, so that the saturated zone generally lies 2–20 m below the natural ground surface (Ashraf and Hanif, 1980). Lei Nala carries most of the liquid waste from Rawalpindi and contributes greatly to the pollution of the Soan River below their confluence. Solid-waste disposal practices threaten the quality of ground-water reserves, particularly at the temporary solid waste dumping sites.

Land Use: Patterns of land use in Islamabad have evolved through years and have been influenced by environmental and physical factors such as landforms, climate, and water availability as well as human factors such as population size, growth, economic demands and cultural practices or customs.

The project site can be classified as non-agriculture land.

Seismic Risk: Islamabad region can be divided into three major structural zones. The mountainous north, including Margalla Hills, is complexly folded and thrust along the Hazara Fault Zone. Southwards the mountains are a sloping piedmont bench that is truncated in sandstone and shale. The Soan River flows along the axis of Soan syncline. Islamabad lies just at the edge of Hazara Fault Zone that consists of an arc of thrust and folded rocks about 25km wide and 150 km long that is convex to the south and extends west-southward away from the Himalayan syntaxis. There are many thrust sheets in Islamabad area, some of these thrust faults are in front of Margalla Hills which extends north of Fatehjang and form Kala Chita Range.

Climate: Islamabad has distinct seasons marked by the wide variation in temperature. The climate remains very salubrious from April to October, but the winters get very

cold due to snowfall. The coldest months are December, January and February. The hottest months are June and July. Rainfall in April and May is occasional, but the heaviest rain is in July and August.

The temperature of capital territory Islamabad ranges between  $-1^{\circ}\text{C}$  to  $46^{\circ}\text{C}$ . The coldest month is January when the mean maximum temperature is  $18.3^{\circ}\text{C}$ , and the mean minimum is  $3.8^{\circ}\text{C}$ .

From February to May the temperature rises at the rate of  $5.0^{\circ}\text{C}$  per month. The highest temperature reached in May when the mean maximum temperature remains  $39.1^{\circ}\text{C}$ .

Air Quality: The ambient air and noise level monitoring was conducted on 4<sup>th</sup> May 2021 for 24 hours at the project site.

The GPS coordinates of ambient air quality and noise level monitoring location are  $33^{\circ}40'45.75''\text{N}$ ,  $73^{\circ}04'20.68''\text{E}$ . The ambient air quality and noise monitoring was carried out by EPA Certified laboratory, ESPAK.

The concentrations of  $\text{SO}_2$ ,  $\text{CO}$ ,  $\text{NO}$ ,  $\text{NO}_2$ ,  $\text{O}_3$ ,  $\text{PM}_{10}$ , and  $\text{PM}_{2.5}$ , concentrations (i.e.,  $20.499\ \mu\text{g}/\text{m}^3$ ,  $1.246\ \text{mg}/\text{m}^3$ ,  $13.104\ \mu\text{g}/\text{m}^3$ ,  $22.478\ \mu\text{g}/\text{m}^3$ ,  $5.846\ \mu\text{g}/\text{m}^3$ ,  $123.26\ \mu\text{g}/\text{m}^3$ , and  $30.386\ \mu\text{g}/\text{m}^3$ ) meet the NEQS limits (i.e.,  $120\ \mu\text{g}/\text{m}^3$ ,  $5\ \text{mg}/\text{m}^3$ ,  $40\ \mu\text{g}/\text{m}^3$ ,  $80\ \mu\text{g}/\text{m}^3$ ,  $130\ \mu\text{g}/\text{m}^3$ ,  $150\ \mu\text{g}/\text{m}^3$ ,  $35\ \mu\text{g}/\text{m}^3$ ).

Noise and Vibration: The averaged noise level during daytime was  $57.266\ \text{dB}$  and  $42.260\ \text{dB}$  during night time. The slight spike in noise levels can be attributed to the traffic on Street 8 and Faisal Avenue. During the construction of the project, special care will be taken for noise and vibration.

## Ecological Environment

### Flora

The vegetation of Islamabad is a representative of Dry Subtropical Scrub Forest which is dominated by *Acacia modesta* (Phulai), *Ziziphus mauritiana* (Ber); *Ziziphus nummularia* (Mullah), etc. Other associates existing in varying proportions include *Prosopis cineraria* (Jand), *Melia azadirachta* (Dharek); *Morus alba* (Mulberry-Shahtoot); *Dalbergia sissoo* (Tahli-Shisham); *Acacia nilotica* (Kiker). In the undergrowth *Cannabis sativa* (Bhang), *Calotropis procera* (Desi Ak), *Parthenium hysterophorous* (Gandi Booti) and *Ocimum bacilicum* (Niazbo) are predominant.

There are a total of 203 trees at the Project Site. The project site has dense vegetation including mature trees of shisham, paper mulberry, toot / mulberry, loquat, bakain, bhang and arand/ caster oil.

### Fauna

In its original form, the Dry Subtropical Scrub Forest constituted the habitat of wild fauna consisting of a host of animals and birds. As the disturbance increased to a maximum level with complete inhabitation, wildlife abundance and diversity decreased to a minimum degree. Mammals commonly found in the project area are Rat, Wild boar and Pocupine, birds include Quail, House Sparrow and House Crow and reptiles common in the area are Monitor Lizard, and Spin tailed lizard.

## Socio-Economic and Cultural Environment

The socio-cultural and socio-economic conditions of the local community in the project area, Islamabad is described in the report. This area may get direct positive or negative impacts from the construction of NAPFA Project.

### Public Consultation

During the public consultation, meetings were held with the concern officials at Federal Board of Intermediate and Secondary Education (FBISE), Shifa College of Medicine, Nokia Networks, CDA, IESCO, Emergency and Disaster Management Directorate, Metropolitan Corporation Islamabad, Real Estate Dealers and business owners and community living around the project site. The project activities impact the physical, biological, and socio-economic environment of the project area were highlighted to them. Stakeholders concerns regarding various aspect, existing environment, and impacts of the project were noted, and mitigation measures are proposed in the EIA report.

Much of the public consultation process has revolved around concerns for the mitigation of construction stage and operational stage impacts. The information obtained from the community was used to identify concerns and issues that have been subsequently mentioned and addressed in the EIA report.

## Major Impacts and Recommended Mitigation Measures

### Physical Environment

Impacts: Soil-related issues include soil erosion, slope stability, and soil contamination. The land clearing, levelling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles may cause these issues. The quality of soil would be affected, as soil contamination would occur because of the disposal of untreated wastewater or direct disposal of chemical and onsite preparation of materials. Oils, chemical spills, and waste from construction site may also deteriorate the quality of the soil.

Dumping of construction wastes/excavated material, in the surrounding area, may limit the use of land in the project area. The solid waste may be generated due to different construction activities, and it will mainly include surplus excavated and construction material.

Land-use change is expected during the construction phase, one at the burrow areas and others where the spoil or mucking material will be disposed of.

Construction machinery and project vehicles will release exhaust emissions, containing Carbon Monoxide (CO), Oxides of Sulfur (SO<sub>x</sub>), Oxides of Nitrogen (NO<sub>x</sub>), and Particulate Matter (PM). In addition, various burning activities involved in roads construction will also cause air pollution.

These emissions can deteriorate the ambient air quality in the immediate vicinity of the project site. Furthermore, construction activities such as excavation, land levelling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions.

Noise and vibration will be generated by construction machinery and vehicles.

During the deep excavation, the aquifer may be hit, and the quality of water will be depleted. Because of the preparation of construction material on-site, leachate may

be produced and percolated through the soil. It may then reach the water table and contaminate the water that may be consumed by the local people.

NAPFA project is being developed in an area where there are lot of institutions and organisations situated.

Mitigations: Soil erosion can be minimized by appropriate land clearing, levelling and grading. Excavated slopes will not be left untreated/unattended for long durations, and appropriate slope stabilization measures will be taken as per the design.

For the domestic sewage from the contractor's office, a septic tank with a soaking pit will be constructed having adequate capacity. Waste oils will be collected in drums and sold to the recycling contractor.

The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractors, or where appropriate to reuse/recycle it. The hazardous waste will be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked. The water table of the project site well below the excavation to be carried out and as such aquifer will not be impacted during the excavation for basements.

Shade-loving plants will be planted to reduce the impacts of the shadows on the plants.

### **Ecological Environment**

Impacts: The project area has a dense natural vegetation cover. The site preparation and construction activities may necessitate the removal of natural vegetation. Damage and/or loss of vegetation and clearing of other indigenous and introduced species, as well as undergrowth species which comprising bushes, grass, etc., will also lose.

Mitigations: Endeavors will be made to compensate for the loss by enhancing the environment, through a plantation of trees and ornamental plants. A plantation plan for NAPFA project has been prepared. The plan has a mix of appropriate trees/bushes which will be raised within the available open spaces within the premises of NAPFA project. All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect soil fauna and ensure microbial activity according to the NEQS. A record will be maintained for any tree cutting.

### **Environmental Management Plan and Proposed Monitoring**

The purpose of the Environmental Mitigation Plan (EMP) is to minimize the potential environmental impacts due to the project. The EMP reflects the commitment of NAPFA to safeguard the environment as well as the surrounding population.

The EMP provides a delivery mechanism to address the adverse environmental impacts, to enhance the project's benefits and to introduce standards of best practices to be adopted for all phases of the project.

The contractor will prepare a Quarterly Environmental Monitoring Report of project activities carried out during the construction phase of the project. These reports will be submitted to the Pakistan Environmental Protection Agency for their review and consideration. The total Environmental Mitigation & Monitoring Cost is Rs. **7.170 million**.

### **Conclusion and Recommendations**

Based on the overall impact assessment, more specifically, nature and magnitude of the residual environmental impacts identified during the present EIA, it is concluded

that NAPFA project is likely to cause environmental impacts during its constructional phase. However, these impacts can be mitigated provided that the proposed project activities are carried out, as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented.

There are no remaining issues that warrant further investigation. This EIA is considered adequate for the environmental and social justification of the project.

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## List of Abbreviations

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<b>AGP</b>	Auditor General of Pakistan
<b>BOD</b>	Biological Oxygen Demand
<b>CO</b>	Carbon Mono Oxide
<b>COD</b>	Chemical Oxygen Demand
<b>E</b>	East
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EPA</b>	Environmental Protection Agency
<b>FBISE</b>	Federal Board of Intermediate and Secondary Education
<b>Govt.</b>	Government
<b>GPD</b>	Gallons per Day
<b>HSE</b>	Health, Safety and Environment
<b>HRD</b>	Human Resource Development
<b>IEE</b>	Initial Environmental Examination
<b>MIS</b>	Management Information Systems
<b>N</b>	North
<b>NAPFA</b>	National Academy of Public Finance and Accountancy
<b>NCS</b>	National Conservation Strategy
<b>NE</b>	North-East
<b>NEQS</b>	National Environment Quality Standards
<b>NOC</b>	No Objection Certificate
<b>Nos</b>	Numbers
<b>NO<sub>x</sub></b>	Nitrogen Oxides
<b>PAAS</b>	Pakistan Audits And Accounts Services
<b>Pak-PWD</b>	Pakistan Public Works Department
<b>Pak-EPA</b>	Pakistan Environmental Protection Agency
<b>PEPA</b>	Pakistan Environmental Protection Act 1997
<b>PEPC</b>	Pakistan Environmental Protection Council
<b>PM</b>	Particulate Matter
<b>PPI</b>	Project Procurement International
<b>Pvt.</b>	Private
<b>SAI</b>	Statement of Additional Information
<b>SO<sub>x</sub></b>	Sulphur Oxides

<b>Sr. No.</b>	Serial Number
<b>SW</b>	South-West
<b>TDS</b>	Total Dissolved Solids
<b>TSS</b>	Total Suspended Solids
<b>UNEP</b>	United Nations Environment Program
<b>W</b>	West
<b>WHO</b>	World Health Organization
<b>MCI</b>	Metropolitan Corporation Islamabad

## List of Units

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<b>%</b>	Percent (age)
<b>°C</b>	Degree centigrade
<b>cm</b>	Centimeter
<b>dB (A)</b>	Decibel
<b>ft<sup>2</sup></b>	Square foot
<b>ft<sup>3</sup></b>	Cubic foot
<b>km</b>	Kilometre
<b>km/h</b>	Kilometer/hour
<b>m</b>	Meter
<b>m<sup>2</sup></b>	Square meter
<b>m<sup>3</sup></b>	Cubic meter
<b>MT</b>	Metric Ton
<b>Rft</b>	Running Feet
<b>Rpm</b>	Revolutions per Minute

# 1 Introduction

## 1.1 Project Background and Overview

As a major HRD component, training is an ongoing and systematic process for every knowledge-based organisation which desires to create an effective workplace capable of delivering beyond expectations of their stakeholders. It is through this learning process that the vibrant organisations of the 21<sup>st</sup> century tend to facilitate and coach their employees to learn different tasks management, cross functional skills and other behavioural changes. Auditor General of Pakistan (AGP) intends to transform audit and accounts training institute into a center of excellence as the National Institute of Public Finance and Accountancy. It is imperative that the competencies of human resources be developed to the highest ethical and professional standards. The proposed institute NAPFA would not only focus on the training needs of PAAS officers but would also access the training needs of other public sector organisation in the area of public financial management.

The main objectives are as under

- To professionalize probationers program increase the duration of specialized trainings from the present nine months to two years in order to award diploma/degree in public accounting and auditing.
- Sixteen weeks incentive training program on Government Financial management for officers of all occupational groups.
- Continued professional education program for middle and senior management in different areas such as Accounting, MIS, Auditing, Budgeting, Project Management.
- To provide trainings to executives of federal, provincial and local governments in the field of accounting, financial management and internal audit to meet the growing challenges, etc
- To organize international training programs for other SAI's to promote international collaboration.
- To work as degree awarding institution in financial management, accounting, auditing, etc fields

The significance of the project is enhanced by the fact that it is situated in Sector H-8 has a lot of public / private sector offices, schools, colleges and government departments e.g. Pak-EPA, FBlSE, Nokia Networks and Shifa International Hospital. The proposed project will be developed exclusively for audits and accounts offices and residential purposes i.e., academy, residencies and hostels will be part of the proposed project.

The future benefits of the total initial investment cost at the proposed location will be much higher as compared to a location in the outskirts of Islamabad.

This report gives an overview of the project description, impact identification and their assessment, proposed mitigation measures through environmental impact assessment study methodology. The key map of the project location has been shown in **Figure 1.1**.

## 1.2 The Project

The project consists of development of an Academic Block (2B+G+5 Floors), Auditorium (B+G) and 4 Residential Blocks comprising of 47 Residencies.

The key location map of the project is shown in **Figure 1.1**.

## 1.3 The Proponent

Auditor General of Pakistan is the proponent of the project.

The Auditor General of Pakistan is a government organization and the prime and Supreme Audit Institution (SAI) in the country for ensuring public accountability and fiscal transparency and oversight in governmental operations.

The organization is expected to bring improvements in the financial discipline and internal control environment in the executive departments for minimizing the possibility fraud. AGP will ensure that the construction and operational phases of the project will be in accordance with the recommendations of EIA report and the Environmental Management Plan (EMP) will be implemented.

## 1.4 The Executing Agency – Pak PWD

Pakistan Public Works Department is the executing agency of the Project.

It is an attached Department of Ministry of Housing & Works and owing to PAN Pakistan establishment from Gawadar to Gilgit, successfully undertakes execution of Federal Government building and infrastructure works. The organisation will assist in the construction phase and will act as a technical adviser to AGP in Engineering matters.

Figure 1.1: Key Location of the Project Site



## 1.5 Name of the Organisation Preparing the Report

The list of names, qualification and roles of team members carrying out the EIA for Development Consultancy Services has been attached in **Annexure-1**.

## 1.6 Contact Persons

The authorized representative of Auditor General of Pakistan is of the following:

Proponent's Representative	Environmental Consultant
Project Director/ Director PAAA, Auditor General of Pakistan, Sector G-5, Islamabad  Tel: 051 9224080	Mr. Saadat Ali, Environmental Engineer 26, 2 <sup>nd</sup> Floor, Silver City Plaza, G 11 Markaz, Islamabad Tel: 051 2363624 Cell: 0300 8540195

## 1.7 Environmental Impact Assessment

According to the Pakistan Environmental Protection Agency (Review of IEE/EIA), Regulations 2000.

*"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 Federal Agency approval in respect thereof".*

## 1.8 Purpose of Environmental Impact Assessment Report

The Environmental Impact Assessment (EIA) is the assessment of the environmental consequences (positive and negative) of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action.

The EIA is the process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development project prior to major decisions being taken and commitments made. Furthermore, the report will enable Pak PWD to obtain environmental approval of the construction of National Academy of Public Finance and Accountancy (NAPFA) project from Pakistan Environmental Protection Agency (Pak-EPA) Islamabad.

The purpose of the EIA is to ensure that decision-maker consider the environmental impacts when deciding whether to proceed with a project.

## 1.9 Scope of EIA

The project requires the Environmental Impact Assessment to identify environmental impacts of construction and operational phases of the proposed project of Auditor General of Pakistan.

The scope of EIA of NAPFA project is as follows:

- The identification and assessment of all major and minor impacts during pre-construction, construction and operational phases.
- Identification of all significant impacts that may require detailed assessment.

- Propose mitigation measures to minimize, eliminate or to compensate for the potential adverse impacts that may arise during pre-construction, construction, and operational phases of the project.
- Public consultation with all the stakeholders of the proposed project.
- Preparation of Environmental Management Plan.
- Conclusions and recommendations; and
- Preparation of an Environmental Report for submission to Environmental Protection Agency, Pakistan.

The Terms of Reference for the EIA report has been attached in **Annexure-2**.

## **1.10 Approach and Methodology**

### **1.10.1 Approach for EIA**

The approach for conducting EIA of NAPFA project is to follow the requirement of Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000.

### **1.10.2 Kick-off Meeting with the Proponent**

A kick-off meeting was held with Project Director of NAPFA and the Project Consultant i.e. Development Consultancy Services.

During this meeting, the list of activities for the study relevant to the environmental impact assessment of the project was discussed.

### **1.10.3 Collection of Secondary Data**

All available published and unpublished information pertaining to the background environment was obtained and reviewed. All data sources were carefully reviewed to collect the following information:

- Physical Environment: topography, geology, soils, surface and groundwater resources and climate.
- Biological Environment: habitat types, flora, and fauna (particularly rare or endangered species), critical habitats, and vegetation communities within the area.
- Socio-Economic Environment: settlements, socio-economic conditions, infrastructure, and land use; and
- Heritage Aspects: sites of cultural, archaeological or historical significance.

The list of the references of secondary data consulted during the EIA study is provided in **Annexure-3**. The glossary of terms used in the EIA report has been provided in **Annexure-4**.

### **1.10.4 Collection of Primary Data and Field Visit**

The Consultant visited the project site and adjoining areas for obtaining detailed knowledge of the environmental conditions of the area. During the field visits, the existing environmental conditions were studied.

The Rapid Social Appraisal method was applied to discover the facts, empirically verifiable observations or verifying the old facts, on the prevailing socio-economic and cultural conditions of the project area. Communities that were in the surrounding 1 km radius investigated during the field survey.

The ambient air quality and noise monitoring at the project site were carried out.

#### **1.10.5 Analysis of Alternatives**

The EIA report gives the details of alternatives considered during the planning and design phases of the project.

#### **1.10.6 Public Consultation**

Public consultations were held with community living in the vicinity of NAPFA project site. Different aspects of the proposed project were highlighted to the community regarding their impacts on the physical, biological, and socio-economic environment of the project area and their concerns and suggestions were solicited.

The information obtained from the community was used to identify concerns and issues that have been subsequently mentioned and addressed in the EIA report. The list of the people met during the public consultation is provided in **Annexure-5**.

#### **1.10.7 Review of Legislative Requirements**

The information on environmental policies, national and international laws as well as guidelines relevant to the project was reviewed, and a synopsis of all relevant laws has been narrated in the report.

#### **1.10.8 Identification and Evaluation of Impacts**

The identification of impacts is a key activity in the environmental assessment process, which is based on the professional judgment of our experienced team supported by national and international guidelines.

The potential impacts were identified with methodical consideration of likely or possible significant impacts on the environment for Installation of the incinerator project. The aim of this task was to assess the associated risks with these impacts.

Each impact identified has been evaluated against its significance in terms of severity and likelihood of its occurrence. The impact evaluation process prioritized each potential impact and screened out insignificant or inconsequential impacts.

The significance of the impacts has been assessed in terms of the effects on the natural ecosystem, level of public concern and conformity with legislative or statutory requirements. The assessment of the severity was to consider the nature, magnitude, extent and location, timing and duration and reversibility of the potential impact. The evaluation of the significant impacts has formed the basis for the development of the Environmental Management Plan.

#### **1.10.9 Identification of Mitigation Measures**

The objective of identification of mitigation measures is to identify practices, technologies or activities that would prevent or minimize all significant environmental impacts and propose physical and procedural controls to ensure that mitigation is effective.

Based on the impact evaluation performed, changes or improved practices have been suggested, where practical, in the planned activities, to prevent and control unacceptable adverse impacts resulting from normal or extreme events. Monitoring requirements and institutional arrangements for monitoring have been defined and suggested.

### 1.10.10 Development of Environmental Management Plan (EMP)

An Environmental Management Plan has been developed for effective implementation of the recommended mitigation measures of negative impacts during pre-construction, construction, and operation phase. The Environmental Monitoring Plan has been developing to monitor the achievement of the Environmental Management Plan during pre-construction, construction, and operational phases of the project.

The EMP also lays down procedures to be followed during the operation of the project and identifies the roles and responsibilities of all concerned personnel, including reporting in the operational phase.

### 1.11 Organization of the EIA Report

This report has been structured in the following manner:

**Chapter 1 (Introduction)** provides an overall introduction to the project and impact assessment methodology.

**Chapter 2 (Legal Framework)** describes the regulatory framework of Pakistan on the environment and its implications for the project.

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

**Chapter 4 (Project Alternatives)** details the potential alternatives that were considered during the design phase.

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

**Chapter 6 (Public Consultation)** describes details of discussions held with primary and secondary stakeholders.

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

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

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

The last chapter is followed by **Annexures** that provides supporting information.

**Table 1.1** shows the summary of methodologies and activities to conduct EIA.

**Table 1.1: Summary of Methodologies and Activities to Conduct EIA**

Objectives		Activities
<ul style="list-style-type: none"> <li>▪ To develop a detailed understanding of the planned activities</li> <li>▪ To obtain equipment-specific information</li> <li>▪ To obtain information on alternatives and best construction practices</li> <li>▪ To form the basis of impact identification and evaluation</li> <li>▪ To define normal conditions for various parameters</li> <li>▪ To define current and expected trends</li> <li>▪ To understand and define the nature and degree of impacts.</li> <li>▪ To form the basis for developing a mitigation program</li> <li>▪ To compile all the information in one document</li> <li>▪ To submit a final report</li> </ul>	<p>Review of proposed alternatives</p> <p style="text-align: center;">↓</p> <p>Information on baseline Conditions</p> <p style="text-align: center;">↓</p> <p>Impact Assessment</p> <p style="text-align: center;">↓</p> <p>EIA Report</p>	<ul style="list-style-type: none"> <li>▪ Meetings and discussions</li> <li>▪ Review of secondary data</li> <li>▪ Collection of baseline data</li> <li>▪ Public consultation with the community and stakeholders.</li> <li>▪ Analysis of data</li> <li>▪ Identification of impacts</li> <li>▪ Evaluation of impacts</li> <li>▪ Preparation of Environmental Management Plan</li> <li>▪ Compilation and finalization of the report</li> <li>▪ Feedback from Pak-EPA</li> <li>▪ Public Hearing of Pak-EPA</li> <li>▪ Approval of EIA Report</li> </ul>

## 2 Legislative Institutional Framework

### 2.1 Introduction

Pakistan being a signatory of multilateral international treaties has a comprehensive set of environmental legislation covering multiple environmental issues facing Pakistan like pollution of freshwater bodies and coastal water, air pollution, deforestation, loss of biodiversity, lack of proper waste management and climate changes. The basic policy and legislative framework along with detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation for the protection of the environment and overall biodiversity are in place.

The compliance status of the NAPFA project has been reviewed with reference to the legislation and existing legal framework on the environment in Pakistan and International level as described henceforth.

### 2.2 National Conservation Strategy

The National Conservation Strategy (NCS) is the first policy document that pledged to balance Pakistan's economic development with the conservation of natural resources. It is the underlying goal of this document that all economic and statutory development in the country should be such that it does not conflict with the interests of nature conservation. The Pakistan Environmental Protection Act, 1997 is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The World Bank environmental guidelines are used to bridge the gaps, wherever needed. The policy, laws, regulations and standards relevant to NAPFA project in the context of environmental protection are described in the following sections.

### 2.3 Biodiversity Action Plan

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

### 2.4 National Environmental Policy, 2005

The National Environment Policy (NEP) aims to protect, conserve, and restore Pakistan's environment to improve the quality of life of the citizens through sustainable development. In NEP, the further sectorial guidelines, Energy Efficiency and Renewable directly related to building energy code for newly constructed buildings were introduced.

### 2.5 Laws and Regulations

Pakistan has a number of laws concerned with the regulation and protection of the environment. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental issues were enforced over an extended period

of time, and are context-specific. The laws relevant to the developmental projects are briefly reviewed below.

### **2.5.1 Pakistan Environmental Protection Act, 1997**

The Pakistan Environmental Protection Act, 1997 (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) specified by the Pakistan Environmental Protection Agency (Pak EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983, have also been considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord or upon the registration of a complaint.

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

### **2.5.2 Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2000**

Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2000 (the Regulations) prepared by the Pakistan Environmental Protection Agency under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the Regulations.

Projects have been classified on the basis of the expected degree of adverse environmental impacts. Project types listed in Schedule-I are designated as potentially less damaging to the environment and those listed in Schedule-II as having potentially serious adverse effects. Schedule-I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the Schedule-II projects, conducting an EIA is necessary. Salient features of the regulation, relevant to the proposed project are listed below:

- Categories of projects requiring IEE and EIA are issued through two schedules attached to the regulations.
- A fee, depending on the cost of the project, has been imposed for review of EIA and IEE.
- The submittal is to be accompanied by an application in prescribed format included as schedule IV of the Regulations.

- The EPA is bound to conduct preliminary scrutiny and reply within 10 days of submittal of the report a) confirming completeness, b) asking for additional information, or c) requiring additional studies.
- The EPA is required to make every effort to complete the review process for IEE within 45 days and of the EIA within 90 days, of the issue of the confirmation of completeness.
- EPAs accord their approval subject to the following conditions:
  - Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
  - Before commencing operation of the project, the proponent is required to obtain from EPA a written confirmation of compliance with approval conditions and requirements of the IEE/ EIA.
- An EMP is required to be submitted with the request for obtaining confirmation of compliance.
- The EPAs are required to issue a confirmation of compliance within 15 days of receipt of the request and complete documentation.
- The IEE/ EIA approval will be valid for three years from the date of the accord.
- A monitoring report is required to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operations.

The construction of NAPFA project falls in schedule-II of the regulations. Hence, this type of project needs an EIA to be conducted.

### 2.5.3. Islamabad Fire Fighting and Life Safety Regulations, 2010

The regulation was formulated to make more effective provision for the Fire Prevention and Life Safety measures in certain buildings and premises in the Islamabad Capital Territory. The regulation provides conditions for inspection of buildings and its premises to ensure safety of life and property. The regulation further provides power to the authority to seal a building or premises and whoever contravenes any provision of the regulation will be fined with with five hundred thousand rupees<sup>[1]</sup>.

## 2.6 National Environmental Quality Standards (NEQS), 2000

The NEQS, promulgated under the PEPA 1997, specify the following standards:

- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources,
- For power plants operating on oil and coal:
  - Maximum allowable emission of sulphur dioxide,
  - Maximum allowable increment in the concentration of sulphur dioxide in the ambient air,
  - Maximum allowable concentration of nitrogen oxides in ambient air, and
  - Maximum allowable emission of nitrogen oxide for steam generators as a function of heat input.

<sup>[1]</sup> <https://cda.gov.pk/documents/docs/safety-regulation-2010.pdf>

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate sets of numbers).

The NEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided as on the following website. <http://www.environment.gov.pk/info.html>

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

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources
- Maximum allowable concentration of pollutants (02 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.
- Maximum allowable noise levels from vehicles.

These standards also apply to the gaseous emissions and liquid effluents generated by the generator, process waste etc. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for air quality have not been prescribed as yet.

### 2.6.1 NEQS for Liquid Effluent

The National Environmental Quality Standards (NEQS) for the discharge of effluent from industry are presented in **Table 2.1**.

**Table 2.1: NEQS for Liquid Effluent Discharge**

Parameters	Into Inland Waters	Into Sewage Treatment	Into Sea
Temperature	≤3°C	≤3°C	≤3°C
pH Value	6-9	6-9	6-9
Biological Oxygen Demand (BOD) <sub>5</sub>	80	250	80
Chemical Oxygen Demand (COC)	150	400	400
Total Suspended Solids (TSS)	200	400	200
Total Dissolved Solids (TDS)	3500	3500	3500
Grease & Oil	10	10	10
Phenolic Compounds (as phenol)	0.1	0.3	0.3
Chlorides (as Cl')	1000	1000	SC
Fluoride (as F')	10	10	10
Cyanide (CN') total	1.0	1.0	1.0
An-ionic Detergents (as MBAs)	2.0	20	20
Sulphate (SO'')	600	1000	SC

Parameters	Into Inland Waters	Into Sewage Treatment	Into Sea
Sulphide (S <sup>2-</sup> )	1.0	1.0	1.0
Ammonia (NH <sup>3</sup> )	40	40	40
Pesticides	0.15	0.15	0.15
Cadmium	0.1	0.1	0.1
Chromium (trivalent & hexavalent)	1.0	1.0	1.0
Copper	1.0	1.0	1.0
Lead	0.5	0.5	0.5
Mercury	0.01	0.01	0.01
Selenium	0.5	0.5	0.5
Nickel	1.0	1.0	1.0
Silver	1.0	1.0	1.0
Total Toxic Metals	2.0	2.0	2.0
Zinc	5.0	5.0	5.0
Arsenic	1.0	1.0	1.0
Barium	1.5	1.5	1.5
Iron	8.0	8.0	8.0
Manganese	1.5	1.5	1.5
Boron	6.0	6.0	6.0
Chlorine	1.0	1.0	1.0

**Source:** NEQS, Pakistan Environmental Protection Agency

## 2.6.2 NEQS for Gaseous Emission

The National Environmental Quality Standards (NEQS) for permissible limits of gaseous emission from industry are presented in **Table 2.2**.

**Table 2.2: NEQS for Gaseous Emission**

Parameter	Source of Emission	Standard
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
Particulate Matter	Boilers & Furnaces:	
	Oil Fired	300
	Coal-Fired	500
	Cement Kilns	300
	Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	500
Hydrogen Chloride	Any	400

Parameter	Source of Emission	Standard
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10
Sulphur Oxides	Sulfuric Acid/sulphonic Acid Plants	5000
	Other Plants except power plants operating on oil and coal	1700
Carbon Monoxide	Any	800
Lead	Any	50
Mercury	Any	10
Cadmium	Any	20
Arsenic	Any	20
Copper	Any	50
Antimony	Any	20
Zinc	Any	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit	3000
	Other plants except for power plants operating on oil or coal:	
	Gas-fired	400
	Oil fired	600
	Coal-fired	1200

Source: NEQS Pakistan Environmental Protection Agency

### 2.6.3 NEQS for Vehicular Emission

The National Environmental Quality Standards (NEQS) for permissible limits of exhaust emissions from vehicles are presented in **Table 2.3**.

**Table 2.3: NEQS for Vehicular Emission**

Parameters	Standards permissible limits)	(Maximum Measuring Method
Smoke	40% or 2 on the Ringleman Scale During engine acceleration mode	To be compared with Ringleman chart at a distance of 6 meters or more
Carbon Monoxide	Emission Standards: New Vehicle = 4.5% Used Vehicle = 6%	Under idling conditions: non-dispersive infrared detection through the gas analyzer.
Noise	85 dB (A)	A sound meter at 7.5 meters from the source

Source: NEQS Pakistan Environmental Protection Agency

### 2.6.4 NEQS for Drinking Water, 2010

The National Environmental Quality Standards (NEQS) for drinking water quality, 2010 are presented in **Table 2.4**.

**Table 2.4: NEQS for drinking water quality**

Parameter	Standard values	WHO guidelines
<b>Biological</b>		
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
Treated water entering the distribution system (E. Coli or Thermo-tolerant Coliform and Total Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
Treated water in the distribution system (E. Coli or Thermo-tolerant Coliform and Total Coliform bacteria)	Must not be detectable in any 100 ml sample. In the case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample. In the case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.
<b>Physical</b>		
Color	≤ 15 TCU	≤ 15 TCU
Taste	Non-acceptable	Non-acceptable
Odour	Non-acceptable	Non-acceptable
Turbidity	< 5 NTU	< 5 NTU
Total hardness	< 500 mg/L	---
TDS	<1000	<1000
pH	6.5- 8.5	6.5- 8.5
<b>Chemical</b>		
Essential Organic	mg/Litre	mg/Litre
Aluminium	≤ 0.2	0.2
Antimony	≤ 0.005	0.02
Arsenic	≤ 0.05	0.01
Barium	0.7	0.7
Boron	0.3	0.3
Cadmium	0.01	0.003
Chloride	≤ 250	250
Chromium	≤ 0.05	0.05
Copper	2	2
Toxic Inorganic		mg/Litre
Cyanide	≤ 0.05	0.07
Flouride	≤ 1.5	1.5
Lead	≤ 0.05	0.01

Parameter	Standard values	WHO guidelines
Manganese	≤ 0.5	0.5
Mercury	≤ 0.001	0.001
Nickel	≤ 0.02	0.02
Nitrate	≤ 50	50
Nitrite	≤ 3	3
Zinc	5	3
Pesticides mg/L		PSQCA No.4639-2004. page No 4 Table No. 3serial No. 20-58
Phenolic Compounds		<0.002
Polynuclear aromatic hydrocarbons		0.01
<b>Radioactive</b>		
Alpha emitters bq/L	0.1	0.1
Beta emitters	1	1

Source: NEQS Pakistan Environmental Protection Agency

## 2.6.5 NEQS for Ambient Air and Noise

The National Environmental Quality Standards (NEQS) for Ambient Air and Noise, 2010 are presented in **Table 2.5** and **2.6**.

**Table 2.5: NEQS for Ambient Air**

Pollutants	Time Weighted Average	Concentration in Ambient Air (ug/m <sup>3</sup> )
Sulfur Dioxide (SO <sub>2</sub> )	Annual	Average* 80
	24 hrs**	120
Oxides of Nitrogen gas (NO)	Annual	Average* 40
	24 hrs**	40
Oxides of Nitrogen gas (NO <sub>2</sub> )	Annual	Average* 40
	24 hrs**	80
Ozone (O <sub>3</sub> )	1 hour	130
Suspended Particulate Matter (SPM)	Annual Average*	360
	24 hrs**	500
Respirable Particulate Matter (PM <sub>10</sub> )	Annual Average*	120
	24 hrs**	150
Respirable Particulate Matter (PM <sub>2.5</sub> )	Annual Average*	15
	24 hrs**	35
	1 hr	15
Lead (Pb)	Annual	Average* 1
	24 hrs**	1.5
Carbon monoxide (CO)	8 hrs	5 mg/m <sup>3</sup>
	1 hr	10 mg/m <sup>3</sup>

\*\* Annual Arithmetic mean of minimum 1040 measurements in a year taken twice a week 24 hourly at a uniform interval

\* 24 hourly /8 hourly values should be met 98 % of the year, 2 % of the time, it may exceed.

**Source:** NEQS, Pakistan Environmental Protection Agency

**Table 2.6: NEQS for Noise**

Area	Daytime	Nighttime
Residential area	55	45
Commercial area	65	55
Industrial area	75	65
Silence area	50	45

**Source:** NEQS, Pakistan Environmental Protection Agency

## 2.7 The Capital Development Authority Ordinance 1960

The objective of Ordinance, Firstly, planning and development of Capital (Islamabad), secondly completing or authorizing Capital Development Authority to perform functions of a Municipal Committee and to provide for cleanliness, health, education of inhabitants, the supply of goods, articles of food and mild, to promote the interest of different sections of the public. All provisions are for advancing interest and the public good. Such statutes are not repugnant to Sharia (PLD 1985 FSC 221).

Capital Development Authority is a statutory body expected to deal with citizens fairly, and honestly and conduct it's all actions transparently (2003 CLC1684). It is expedient to establish a Capital Development Authority for making all arrangements for the planning and development of Islamabad within the framework of a regional development plan.

This Ordinance may be called the Capital Development Authority Ordinance, 1960. The Ordinance has 8 chapters.

## 2.8 National Rangeland Policy 2010

The main objectives of the policy include;

- To enhance the productivity and the related functions and services of the rangeland ecosystem
- To promote rangeland enterprises for the livelihood improvement of the rangeland dependent communities
- To conserve and maintain rangeland biodiversity
- To mitigate the negative impacts of global warming and climate change especially related to the desertification
- To enhance the skill and capacity of the key stakeholders for the sustainable management of the rangeland management
- To undertake applied and action research on the key problems of the rangeland

## 2.9 National Drinking Water Supply 2009

In September 2009, the government approved the National Drinking Water Policy that provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people by 2025.

Drinking water is the constitutional responsibility of the provincial governments, and the specific provision function has been devolved to specially created agencies in cities and Towns and Tehsil Municipal Administrations under the Local Government Ordinance 2001.

Therefore, this policy framework is intending to guide and support the provincial and district governments in discharging their responsibility in this regard. The overall goal of the national drinking water policy is the following:

- To ensure safe drinking water to the entire population at an affordable cost in an equitable, efficient and sustainable manner.
- To ensure a reduction in the incidence of mortality and morbidity caused by water-borne diseases.

The policy is expected to be reviewed and updated every five years to examine its implementation and efficacy and to adapt it to the changing situation in the country.

### **2.10 National Sanitation Policy**

The National Sanitation Policy aims at providing adequate sanitation coverage for improving the quality of life of the people of Pakistan and to provide the physical environment necessary for a healthy life. The Policy can be accessed at:

<http://waterinfo.net.pk/sites/default/files/knowledge/National%20Sanitation%20Policy%202006.pdf>

### **2.11 Land Acquisition Act, 1894**

The Land Acquisition Act (LAA) of 1894 amended from time to time has been the de-facto policy governing land acquisition and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It comprises of 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions.

### **2.12 Building Energy Code of Pakistan, 2008**

The scope of this code is to provide:

(a) Minimum energy-efficient requirements for the design and construction of:

- New buildings and their systems.
- New portions of buildings and their systems.
- New systems and equipment in existing buildings.

(b) Criteria for determining compliance with these requirements.

The Building Energy Code of Pakistan 2008 is available at the following link;

<http://www.enercon.gov.pk/images/building%20code.pdf>

### **2.13 Antiquity Act, 1975**

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc.

The law prohibits new construction in the proximity of protected antiquity and empowers the Government of Pakistan to prohibit excavation in an area that may contain articles of archaeological significance.

Under the Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of protected antiquity, and
- If during the course of the project, an archaeological discovery is made, it should be reported to the Department of Archaeology, Government of Pakistan.

#### **2.14 Cutting of Trees (Prohibition Act), 1992 - Gazette of Pakistan**

Section 3 of this Act states “No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.”

The Cutting of Trees (Prohibition) Act, 1992 is available at:

<http://extwprlegs1.fao.org/docs/pdf/pak64061.pdf>

#### **2.15 Protection of Trees and Bush wood Act, 1949**

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

#### **2.16 Pakistan Explosive Act, 1884**

This Act provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The transmission line tower installation may need blasting at rocky/mountainous areas. Thus these regulations will be applicable to the proposed project.

#### **2.17 Employment of Child Act, 1991**

Section 3, Prohibition of Employment, of this Act starts “No child shall be employed or permitted to work in any of the occupations set forth in Part I of the Schedule or in any workshop wherein any of the processes set forth in Part II of that Schedule is carried on: Provided that nothing in this section shall apply to any establishment wherein such process is carried on by the occupier with the help of his family or to any school established, assisted or recognized by Government.”

The Employment of Child Act, 1991 is available at

[http://www.na.gov.pk/uploads/documents/1335242011\\_887.pdf](http://www.na.gov.pk/uploads/documents/1335242011_887.pdf)

#### **2.18 Factories Act, 1934**

The clauses relevant to the proposed project are those that address the health, safety and welfare of the workers, disposal of effluents, and damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances. The Pakistan Environmental Protection Act, 1997 (discussed above), supersedes parts of this Act pertaining to the environment and environmental degradation.

#### **2.19 Pakistan Penal Code, 1860**

This outlines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance. “A person is guilty of a public nuisance who does any act or is guilty

of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy the property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right.”

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the Pakistan Environmental Protection Act, 1997.

## 2.20 Institutional Set-Up

The apex environmental body in the country is the Pakistan Environmental Protection Council (PEPC), presided over by the Chief Executive of the Country. Other bodies include the Pakistan Environmental Protection Agency (Pak-EPA), provincial EPAs (for four provinces, AJK and Gilgit Baltistan) and environmental tribunals.

The EPAs were first established under the 1983 Environmental Protection Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (IEEs and EIAs) of the proposed projects, and provide their approval (or otherwise).

NAPFA project is located at Islamabad. Therefore, the EIA report will be submitted to the Pakistan Environmental Protection Agency, Islamabad for obtaining environmental approval for the project.

## 2.21 Environmental Protection Agency's Environmental Guidelines

The Pak EPA has prepared a set of guidelines for conducting environmental assessments. The package of regulations, of which the guidelines form a part, includes the PEPA 1997 and the NEQS. The guidelines themselves are listed below:

- Guidelines for the preparation and review of Environmental Reports,
- Guidelines for public consultation,
- Guidelines for Sensitive and Critical Areas, Sectorial Guidelines.

It is stated in the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 that the EIA or IEE must be prepared, to the extent practicable, in accordance with the Pakistan Environmental Protection Agency guidelines. The government of Pakistan has also framed guidelines for the preparation of IEE of Projects in various developmental sectors.

## 2.22 Obligation under International Treaties

Pakistan is a signatory to various international treaties and conventions on the conservation of the environment and wildlife protection. The country is obliged to adhere to the commitments specified in these treaties. The Convention on Biological Diversity (CBD) was adopted during the Earth Summit of 1992 in Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity and to integrate these plans into national development programs and policies.

Parties are also required to identify components of biodiversity that are important for conservation and to develop systems to monitor the use of such components with a view to promoting their sustainable use.

The Convention on the Conservation of Migratory Species of Wild Animals, 1979 requires countries to take action to avoid endangering migratory species, where the term migratory species refers to species of wild animals of which significant proportions cyclically and predictably cross one or more national jurisdictional boundaries.

The parties are also required to promote or cooperate with research into migratory species. Under the international plant protection convention, 1951, Pakistan is required to take steps to ensure the protection of certain plant species that face the extinction threat. Pakistan signed and ratified on a number of international agreements and Convention and bound to implement them in its territory.

### **2.23 Implication of Legislations to the Project**

The implication of the above-mentioned legislation to the pre-construction, construction, and operational phase of the NAPFA project would be as follows:

Pak PWD on behalf of Auditor General Pakistan will ensure that construction and operational phases of the project be carried out in accordance with the EIA report and Environmental Management Plan is effectively implemented.

The project will be subjected to four basic provisions relating to pollution control under the Pakistan Environmental Protection Act, 1997, as contained in section 11, 13, 14 and 15 as follows:

- Section 11 prohibits discharge or emission of any effluent or waste or air pollutant or noise in excess of the NEQS, or the established ambient standards for air, water or land.
- Section 13 prohibits hazardous wastes.
- Section 14 prohibits the handling of hazardous substance except under a license or in accordance with the provision of any local law or international agreement.
- Section 15 prohibits the operation of motor vehicles for each air pollutant or noise is being emitted in excess of the NEQS or the established ambient standard.

## 3 Description of the Project

### 3.1 Introduction

This chapter provides a description of the project, its salient features, location, components and various phases.

### 3.2 Type and Category of the Project

The proposed project is the construction of NAPFA, Sector H-8/4 Islamabad, which falls in Schedule II of Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulation 2000 under category J. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.

### 3.3 Objective of the Project

The main objective of the project is to provide official and residential space for professional trainings in order to award diploma/degree in public accounting and auditing.

### 3.4 Project Administrative Jurisdiction

The project site lies in the capital city of Islamabad, which comes under the jurisdiction of the administration of the Federal Government.

### 3.5 Project Location and Accessibility

The project site is located in Street 8 of Sector H-8/4, Islamabad, on a piece of land measuring 160,000 sq. ft. The project site can be accessed from Street 8 from the north, and through Service Road from the south of the project site. The coordinates of the project site are X= 33°40'45.75"N, Y= 73° 04'20.68"E.

The surrounding areas near the project site of NAPFA project are as follows and shown in **Figure 3.1**:

- **North :** Street 8 + Sheikh Zayed International Academy
- **South :** Service road + Shifa College of Medicine
- **East :** Jaffer Khan Jamal Road
- **West :** Nokia Networks + Pakistan Bait ul Maal

The project location and accessibility map of the project site is shown in **Figure 3.1**.

Figure 3.1: Project Location & Accessibility Map



### 3.6 Description of the Project

The project consists of development of an Academic Block (2B+G+5 Floors), Auditorium (B+G), and 4 Residential Blocks comprising of 47 Residencies.

The project includes one Category-1 house, basketball badminton court and extra foundation for future extension.

NAPFA building shall have several environmentally friendly features such as central HVAC, component of renewable energy on rooftop and vertical gardening approach will be adopted. The building will be constructed in accordance with the Capital Development Authority bye-laws which are currently applicable in Islamabad.

The total cost of the project is 3.605 billion and will be completed in a period of 3 years.

#### Salient Features

- Two basement parking floors
- Secure entrance and ample reception area
- Six passenger and two cargo lifts
- 24 hours security system
- 24 hours backup generator for lifts, basement parking and circulation area
- Generator for limited office back-up available on separate payment

The aim of the project is to bring unique design and state of the art amenities and conveniences required for offices and work environment.

The master plan and ground floor plan of NAPFA project have been provided as **Figure 3.2 to 3.3**.

The total area of the plot is 400'x400' (160,000 sq.ft). The land use of NAPFA project will be in accordance with the CDA's existing building bye-laws.

Figure 3.2: Master Plan of NAPFA Project, Sector H-8, Islamabad

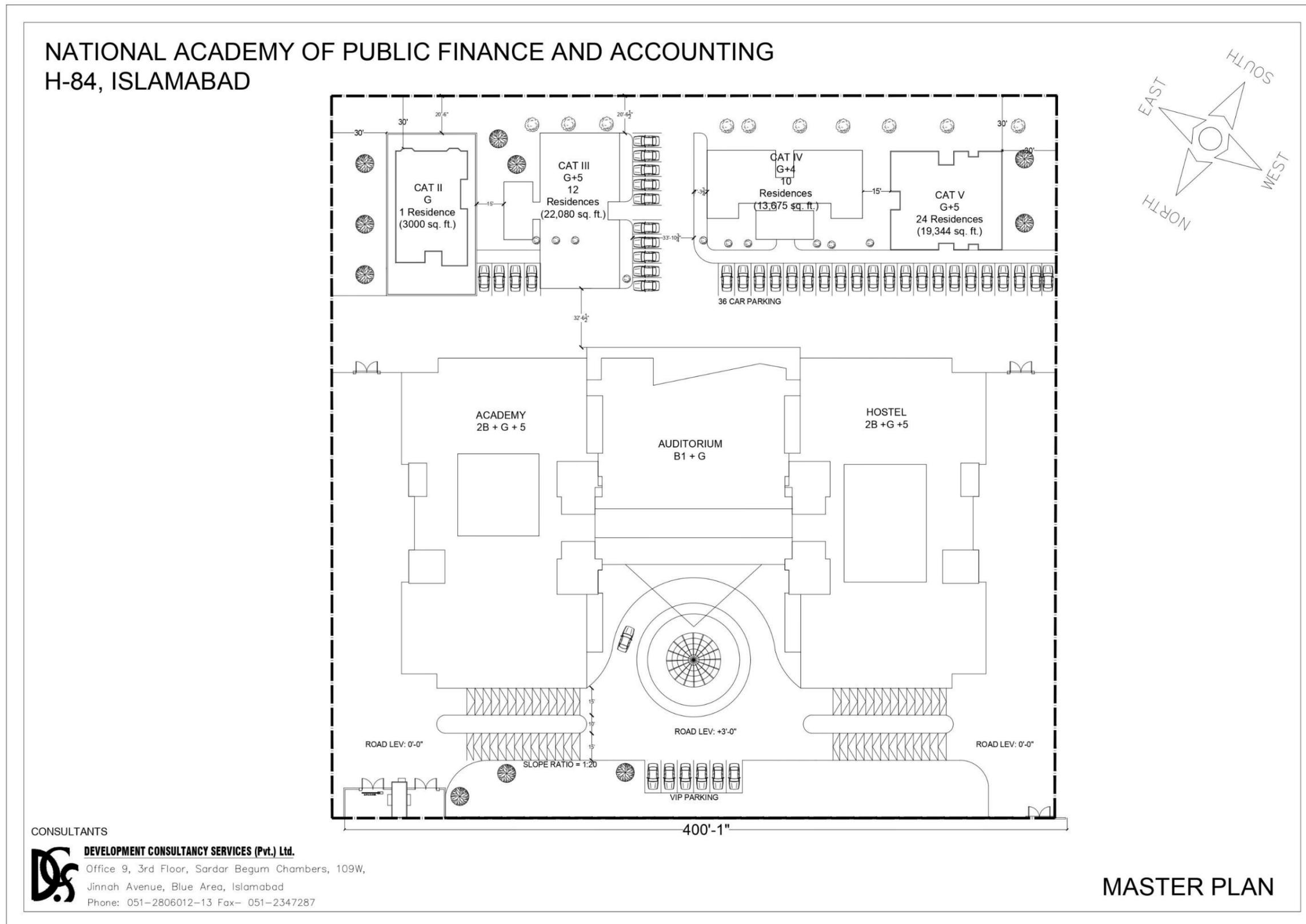
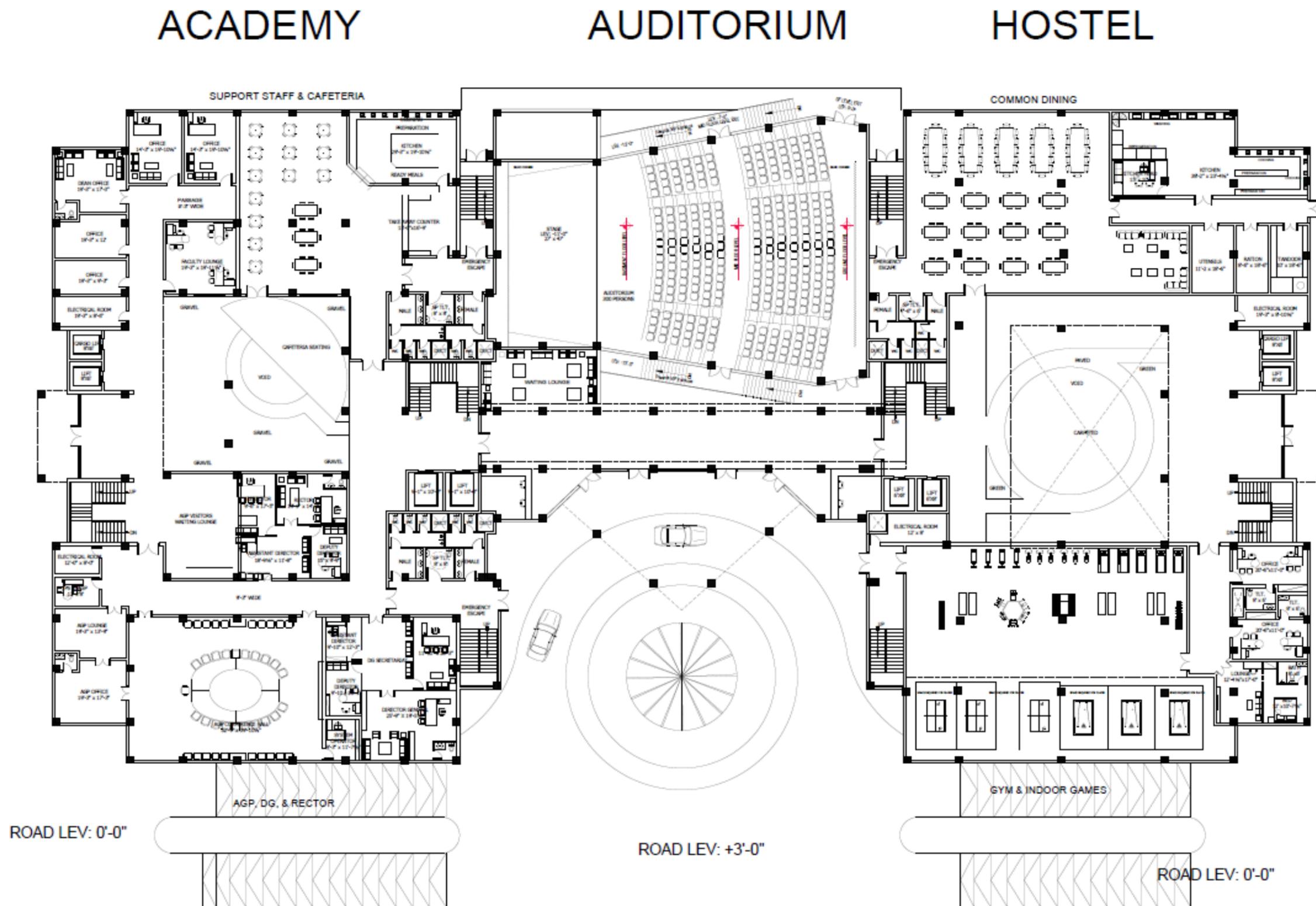


Figure 3.3: Ground Floor Layout Plan of Academic Block



NTS

### 3.7 Occupancy of NAPFA Project

The estimated population of NAPFA project will be 766 with average persons per office as 4, per room as 2 and per residence as 6. The expected population is shown in Table 3.1.

**Table 3.1: Total Occupancy for NAPFA project**

Sr. No.	Description	No. of Units.	Persons/Office	Total Persons
1.	Offices	66	4	264
2	Academic Room	110	2	220
3	Residences	47	6	282
	<b>Total</b>	<b>223</b>		<b>766</b>

### 3.8 General and Life Safety Standards

The building services design for NAPFA building, Street 8, Sector H-8/4, Islamabad will be prepared in accordance with the following codes of practice, guides and standards.

#### **Islamabad Standards**

Islamabad Municipality Building Regulations (CDA – Capital Development Authority)

Water, sewerage, stormwater and drainage Regulations of CDA

Electricity Authority Regulations and Requirements (IESCO)

Telephone Provider Regulations and Requirements (PTCL)

Gas Utility Company Requirements (SNGCL)

#### **Life Safety Standards**

CDA building standards for Fire Prevention and Life Safety 2010

#### **Mechanical Building Service Standards**

NFPA National Fire Protection Association

Building Code of Pakistan Fire Safety Provision-2016

BS 4514 Building Drainage

BS 5255 Code of Practice for Sanitary Pipe Work

#### **Electrical Building Services**

IEEE - Institute of Electrical & Electronic Engineers.

NFPA - National Fire Protection Association

PSI - Pakistan Standards Institution

PEC - Pakistan Energy Codes

IES - International Illuminating Society

## **Additional Considerations**

In addition to the above, the requirements of Financiers, Insurance Companies, Local Authorities and Utility Suppliers will be given due consideration, and the ramifications on mechanical and electrical services to establish suitable incorporations in the building services design.

### **3.9 Design Criteria of NAPFA Project, Street 8, Sector H-8/4, Islamabad**

NAPFA project has been designed to ensure life and positivity on all the floors and in every corner of the building. Luxury, Comfort and Style, all put in together without compromising on highest architectural standards and construction quality. Purpose built spaces for various businesses with immaculate detailing and unmatched finishing.

#### **3.9.1 Structural System**

Intermediate Moment Resisting Frame: Building frame system will be used for building design. The intermediate moment resisting system frame consists of a combination of reinforced concrete shear/core walls.

Floor System: Floor system shall be reinforced concrete flat slab system and flat slab system.

Foundation: Reinforced concrete raft foundation supported on the soil.

#### **3.9.2 Design Codes of Practice**

The following Codes of Practice, Standards and Publications have been adopted in the design of NAPFA, Street 8, Sector H-8, Islamabad:

SBC 2007 Standard Building Code of Pakistan

ACI 31899 Details and Detailing of Concrete Reinforcement

### **3.10 Facilities to be provided at NAPFA Project**

NAPFA project will have state of the art facilities as follows:

#### **3.10.1 Electrical Systems**

The total estimated load of the project will be 3500 KVA. The main source of electricity will be Islamabad Electric Supply Corporation (IESCO).

The frequent power failure in the city has made the "Stand-By Power Supply" an essential part of the Power System in building, in view of the nature of this project it has been mutually decided to provide 100 % backup power supply through prime-rated Diesel Generators.

Adequate low consumption LED lights are proposed in all areas including Lift lobbies, corridors, entrance to other common services areas.

Centralized Intelligent Lighting Control system shall be provided to operate and control the Light fixtures of Circulation, Parking, Boundary Wall, and Facade areas in the most optimized and scheduled manner.

All the services rooms, lobbies, Corridors, and Circulation areas shall be provided with enough general power socket outlets for cleaning and convenience purpose.

### 3.10.2 Water Demand

The estimated domestic water demand of NAPFA project per day is 42,896 Gallons per day.

**Table 3.2: Daily Water Requirements**

No	Description	Occupancy	Recommended Daily Water Requirement	Daily Water Consumption	Daily Water Requirement
		Number	Gal/Day/Person	Gal/day	Gal/day
1	Offices & Apartments	766	56	42,896 GPD	42,896 GPD
Total Water Requirement					42,896 <b>GPD</b>

Water supply for NAPFA project is primarily based on CDA water supply connection and water tankers.

### 3.10.3 Sewerage Disposal System

The sanitary sewerage system is designed based on 80% of the daily water consumption for NAPFA project is 34,317 Gal/Day. So accordingly, the sewage of NAPFA will be approximately 34,317 Gal/Day.

The sewer system of NAPFA has been designed to dispose into the CDA sewer.

### 3.10.4 Water Drainage System

The drainage system of NAPFA project will be connected with drainage network of CDA.

### 3.10.5 Solid Waste Management

According to an estimate, the NAPFA Project, Street 8, Sector H-8/4, Islamabad will produce approximately 479 kg (0.479 tons) of solid waste per day during the operational phase with an average of 0.625 kg/capita/day.

The solid waste will have a proper management system. A garbage room shall be provided to receive the daily waste material for final dispose-off through garbage vans.

Solid Waste will be handed over to Metropolitan Corporation Islamabad (MCI) for further disposal. For recyclables, the contractor shall be hired to sell this waste. The solid waste will be collected by MCI staff, and they will dispose of waste at a designated disposal site in Islamabad.

### 3.10.6 Fire Suppression

The Fire Suppression Systems includes Standpipe and Hose systems and Portable Extinguishers.

The fire standpipe and hose systems have been provided for class III occupancy level as per NFPA-14. Landing Valves have been installed on each floor in the fire exit stairs for the use of firemen.

Portable fire extinguishers have been provided along fire escape routes. The type and number of extinguishers shall be subjected to the requirement of NFPA-10. Firefighting system will be comprised of;

**Fire Fighting System:**

- Automatic Sprinkler System
- Staircase pressurization system
- Smoke Extraction system
- 4 x Lifts Pressurization system
- Class-1 Fire Hose Cabinet system
- Class-II Fire Hose Reel system
- Fire Extinguishers
- Fire Suppression System (Electrical Rooms)
- Fire Breeching Inlets
- Portable Trolley Extinguishers

**Fire Alarm System:**

- Fire Alarm Control Panel
- Emergency Light System Panel
- Smoke Detectors
- Heat Detectors
- Gas Detectors
- Manual Call Point
- Manual Glass Break
- Monitoring Modules
- Zone Control Valve Modules
- Emergency Lights
- Emergency Exit Lights

**3.10.7 Air-conditioning system**

In NAPFA building, HVAC system will be installed for air conditioning. This centralized option is environment-friendly and cost-effective as compared to decentralized options.

**3.10.8 Vertical Transportation**

NAPFA building will have 6 passenger lifts and 4 cargo lifts for vertical transportation.

**3.10.9 Building Management System**

The Building Management System will be a PC based system. It will combine the latest state of the art technology with simple operating techniques and will be used to manage and monitor the building services installation. The BMS PC will be located in the control room, which will monitor all the buildings through the BMS network.

**3.10.10 Car Parking**

The car parking is as per the requirement of CDA. The parking requirements will be accommodated within the plot line including basements.

As per parking requirements basement shall be used for parking only. According to the design of the project, there is a provision of 80 slots for car parking in the 2 basements of NAPFA project.

### 3.10.11 Vegetation Features of the project site

Presently, project site has dense vegetation including mature trees of shisham, paper mulberry, toot / mulberry, loquat, bakain, bhang and arand/ caster oil.

**Table 3.2: Types of Trees at the Project Site**

Sr. #	Local Name of Plant	Scientific Name	Growth Status/Type	No. of Plants
1.	Shisham	Dalbergia sissoo	Mature trees and under size plants	30
2.	Paper mulberry	Broussonetia papyrifera		150
3.	Toot / mulberry	Morus alba	Mature trees and under size plants	7
4.	Bakain/ China Berry	Melia azedarach	Mature trees and under size plants	12 mature trees
5.	Loquat	Eriobotrya japonica		4
6.	Bhang	Cannabis sativa		herb spread over 30% of the ground
7.	Arand/ Caster oil	Ricinus communis	Shrubs/Plant	14
			<b>Total</b>	<b>203</b>

### 3.11 Sustainable Features of the Project

AGP is committed to developing its project in a sustainable way. The following sustainable features have been provided in this project:

- The planning & design of NAPFA project will be carried out, keeping in mind the natural topography, sun, and wind direction.
- HVAC Air Conditioning System will be installed in the building which is an energy efficient system.
- The building will have PC Based Building Management System. Adequate low consumption LED lights are proposed in all areas including Lift lobbies, corridors, entrance to other common services areas.
- Efforts will be made to procure treated wastewater which meets NEQS for construction activities only (e.g. concrete curing). This will greatly reduce the load on groundwater resources of the project area.
- AGP will encourage its residents to use Oxo-biodegradable D<sub>2</sub>W plastic bags or use cotton bags instead of plastic bags.

### 3.12 Land acquisition

There is no issue of Land Acquisition of the Project site. The proponent has been allocated this plot for the development of National Academy of Public Finance and Accountancy (NAPFA).

### **3.13 Current Status of the Project**

The project is in the planning and design phase. There is no construction activity at the project site. The project activities will start when environmental approval to EIA of NAPFA Project is granted by Pakistan Environmental Protection Agency.

### **3.14 Cost of the Project**

The total cost of the project is Rs 3.605 billion.

### **3.15 Time Schedule**

The construction of the NAPFA project will be completed by Year 2024 (3 years). The time schedule of the project is shown in **Table 3.3**.

**Table 3.3: Time Schedule for NAPFA project**

Description/Year	Year	1				2				3			
	Months	1-3	4-6	7-9	10-12	13-16	14-16	17-20	21-24	25-27	28-30	31-33	34-36
Foundation works													
Construction of 2 Basement													
Construction of ground floor													
Construction of floors 1-2													
Construction of floors 3-5													
Handover of NAPFA Project													

### 3.16 Project Phases

NAPFA project would be implemented in three phases, i.e. Pre-construction/ design, Construction and Operation.

#### 3.16.1 Pre-construction/Design Phase

**Site Investigation:** The key site investigation activities include area survey, land surveying and site investigations.

**Geotechnical/Soil Investigation:** An extensive soil investigation of the project site will be carried out.

#### 3.16.2 Construction Phase

**Contractor Mobilization:** This component involves the transportation of construction machinery and equipment to the project site and the establishment of the contractor's camp and office. The contractor will be responsible for the activities being carried out at the project site.

The equipment and machinery will be brought to the project site through Jafer Khan Jamali Road which is connected to Street 8. All activities related to the transportation of materials will be carried out during nighttime. The campsite facilities of the contractor include site office, and areas for equipment and installation materials. The contractor office will be established at the project site.

**Site Preparation:** Usually, this activity involves the operation of earth-moving machinery and substantial land clearing, levelling and grading, as well as cutting and filling activities.

The first task of this activity is to demarcate the site and other benchmarks, with the help of drawings prepared during the pre-construction and design phase of the project. Once marking is complete; the land will be cleared and prepared for subsequent construction activities. The whole purpose is to maintain the harmony of the area during construction.

**Construction Activities:** The construction activities will be carried out using the conventional methodology and sequence of work. The activities will include excavation, masonry work, carpentry, wiring, piping and plumbing, flooring, painting and installation of fixtures. Other activities will include the laying of cables, water supply, sewerage and storm drainage systems, junction boxes and providing connections to the building. Supervision of this whole activity will be carried out by the NAPFA project management and the consultant.

**Staffing:** Construction crews will have the responsibility of the civil contractor and its petty contractor. It is estimated that a maximum of 50 personnel will be working at the site at a given time during the peak construction period.

These will essentially include masons, carpenter, electricians, painters, plumbers and general labourers. For unskilled employment, preference will be given to local residents of the project area. **Table 3.4** details the staffing requirement during the construction phase of the project.

**Table 3.4: Staff for the Construction Phase of NAPFA Project**

No	Description	No Posts
1	Skilled workers (Technicians, plumbers, labour)	40
2	Unskilled labour/ helper	60
	<b>Total</b>	<b>100</b>

**Construction Machinery:** The following construction machinery is expected to be present at the project site:

- Water tanker
- Water pumps
- Diesel generator
- Vehicles for personnel movement
- Compactors

An exact number of the above equipment and vehicles will vary depending upon the work schedule.

**Construction Material:** The construction material will include cement, sand, crush, bricks, steel bars, paint, piping material, electrical material and finishing material. Most materials will be procured from Islamabad and Lahore.

**Cement Mixing Plant:** With the advancement of technology, pre-mix concrete is now widely available and very successful for building project particularly, in dense urban environments where installation of Cement Mixing Plant is not possible.

To significantly reduce dust, noise and air pollution at the project site, ready mix concrete will be brought and poured at the construction element.

Disposal of Excavated/Construction Waste: Construction waste will be recycled by the contractor if possible. Otherwise, it will be disposed of at designated site which will be decided at the time of award of a contract with the contractor in consultation with CDA.

Traffic Load during Mobilization (and Demobilization) of Contractor: All of the constructions equipment and vehicles will be transported to the site via Jafer Khan Jamali Road. However, the arrival of this equipment and vehicle will be fairly controlled and minimized during weekdays.

Traffic Load for Construction Materials Supplies: It is estimated that on average, 2-3 truckloads per day will be supplying different types of materials to the site during the peak construction period. The condition of Jafer Khan Jamali Road is satisfactory and as such larger trucks will be used. Other staff will move on small vehicles.

#### Other Supplies

Water: During the construction phase, a maximum of about 1,000 GPD of water will be required for construction activities and human consumption. The water supply will be arranged by the contractor.

Efforts will be made to procure treated wastewater which meets NEQS for construction activities only (e.g. concrete curing).

Fuels: For the construction equipment and vehicle, diesel will be required. The peak consumption of diesel would be 1,000 litres per day.

Electricity: Temporary connections will be obtained from IESCO for construction activities and camp.

Camp Supplies: Camp supplies can be procured from Islamabad and transported to the site via Jafer Khan Jamali Road which is connected to Street 8.

Camp Site Sanitation Facilities: The sanitation facilities will be provided at the campsite, and the contractor will construct a septic tank with soakage pit for storage, removal, and careful disposal of solids from wastewater in order to minimize environmental pollution and to improve the project site environment. The sewerage from the project site will be connected with the CDA sewerage system.

Site Restoration Plan: The contractor will prepare a site restoration plan for closure of the construction site office, which will be submitted to the Project Engineer and management of NAPFA project.

The main areas to be considered for the site restoration include the construction areas, campsite etc. These areas to be restored to the original condition before construction with maximum efforts. The restoration work comprises removal of all temporary construction works, and removal of fence installed, levelling off areas (where required), etc.

### **3.16.3 Operational Phase**

The project manager will be responsible for the day-to-day operation and maintenance of NAPFA project.

**Figure 3.4: Pictorial presentation of Project Site**



**Exhibit 3.1: North Side view**



**Exhibit 3.2: View of Nokia Tower along the north western border of the Project site**



**Exhibit 3.3: Trees and Shrubs along the north-eastern border**



**Exhibit 3.4: Environmental Consultant team consulting visiting the project site**



**Exhibit 3.4: West Side View**



**Exhibit 3.5: Project Site**

## 4 Project Alternatives

### 4.1 Background

Regardless of the chosen approach and its adjoining management strategies for project implementation, there are always some alternative ways to implement the project using the same resource base. Therefore, to exercise all available options and for the selection of suitable Management and technological options, it is necessary to exercise the alternatives available.

The three significant alternative management options used therein are the 'no project option', 'site alternative option' and the 'build as proposed option'.

### 4.2 Site Alternative

The project site is located in Street 8 of Sector H-8/4, Islamabad, on a piece of land measuring 160,000 sq. ft. The project site can be accessed from Street 8 from the north, and through Service Road from the south of the project site. The coordinates of the project site are X= 33°40'45.75"N, Y= 73° 04'20.68"E.

The surrounding areas near the project site of NAPFA project are as follows

- **North :** Street 8 + Sheikh Zayed International Academy
- **South :** Service road + Shifa College of Medicine
- **East :** Empty Plot + Jaffer Khan Jamal Road
- **West :** Nokia Networks + Pakistan Bait ul Maal

The Sector H-8 has been allocated for public / private sector offices, schools, colleges and universities and the proposed project will be constructed exclusively for audits and accounts offices and residential purposes i.e., academy, residencies and hostels will be part of the proposed project.

The proposed project will be built on a vacant land adjacent to the Sheikh Zayed International Academy with the objective to optimize the land use at the prime location with Street 8 to the north and Service Road to the south and south-east.

The future benefits of the total initial investment cost at the proposed location will be much higher as compared to a location in the outskirts of Islamabad. The proposed location is easily accessible from all corners of Islamabad which is why Auditor General Pakistan at such a prime location. Moreover, Islamabad Expressway / Faisal Avenue and I-8 Markaz are at walking distance from the proposed project location, employees can have easy access to public transport as well.

Considering all the benefits of being located at the proposed site, it is concluded that the current site is the most suitable location for the establishment of Public Finance and Accountancy Academy.

### 4.3 Economic Alternative

The immediate economic benefits of the proposed project are production of experienced and trained personnels in the field of finance and accountancy that would contribute in economic growth of country. The land use will be changed from vacant land into a NAPFA building which will return more benefits during operational phase as compared to the current land use of the project site.

The NAPFA project will comprise of academy, hostels and residences. The net present value of future benefits exceeds the initial investment cost for the proposed project, which is an indication of the economic feasibility of a project, considering all the mitigation measures suggested as part of this EIA report are implemented during construction as well as operational phase of the project.

#### **4.4 Environmental Alternative**

The proposed project site is located in an urban setting, in the middle of sector which predominately occupied by similar landuse i.e. offices, colleges, hospitals. There may be potential environmental and human health impacts of the proposed project during construction phase of the project. However, the proposed project has been planned to introduce the concept of green building and to contribute towards a sustainable development. All the sustainable features required for a green building have been incorporated into the building design. Following green features are part of the proposed project.

- Energy Efficiency and Renewable Energy.
- Water Efficiency.
- Environmentally Preferable Building Materials and Specifications.
- Waste Reduction.

Considering the environmental protection measures to be taken during construction and operational phase of the project and the sustainable features of the proposed project, it can be implied that the proposed project will enhance the environment of the project area during operational phase of the project.

#### **4.5 Conclusion**

No alternative site has been identified. If the project is not implemented, then all positive impacts related to the NAPFA project will be lost. The establishment of NAPFA will uplift the social, and economic growth of the country. So, the best option is to go ahead with the project while ensuring the implementation of mitigation measures against potential adverse impacts.

## 5 Description of the Environment

### 5.1 Introduction

This chapter describes the existing environmental conditions of the project site and area. The project area is the area falling within 1-2 km radius of the project site.

### 5.2 Islamabad

Islamabad Capital Territory is the capital and the ninth-largest city in the country which is spread over an area of 906 sq. km., and is divided into three segments; namely, (i) Islamabad Urban Area, including institutional and industrial area, covering 220 sq. km. (ii) Islamabad Park is occupying 220 sq. km., and (iii) Islamabad rural area are measuring 446 sq. km.

Islamabad Capital Territory is divided into eight zones: Administrative Zone, Commercial District, Educational Sector, Industrial Sector, Diplomatic Enclave, Residential Areas, Rural Areas and Green Area. Islamabad city is divided into five major zones: Zone I, Zone II, Zone III, Zone IV, and Zone V. The rural area of Islamabad encompasses 132 villages and administratively consists of 12 Union Councils. Islamabad has been planned in parallel belts with Administrative Sector, Diplomatic Enclave, Public Building Area, Residential Sectors, a Commercial area called the Blue Area and Industrial areas.

Islamabad is located at 33.43°N 73.04°E, at the northern edge of the Potohar Plateau and at the foot of the Margalla Hills in Islamabad Capital Territory. Its elevation is 540 meters (1,770 ft.). The modern capital and the ancient Gakhar city of Rawalpindi stand side by side and are commonly referred to as the Twin Cities, where no exact boundary exists between the two cities.

To the northeast of the city lies the hill station of Murree and to the north lies the Haripur District of Khyber Pakhtunkhwa. Kahuta lies on the southeast, Taxila, Wah Cantt, and Attock District to the northwest, Gujar Khan, Rawat, and Mandrah on the southeast, and the metropolis of Rawalpindi to the south and southwest. Islamabad is located 120 kilometres (75 mi) SSW of Muzaffarabad, 185 kilometres (115 mi) east of Peshawar, 295 kilometres (183 mi) NNE of Lahore, and 300 kilometres (190 mi) WSW of Srinagar, the capital of Indian Kashmir.

The area of Islamabad is 906 square kilometres (350 sq. mi). A further 2,717 square kilometres (1,049 sq. mi) area is known as the Specified Area, with the Margalla Hills in the north and northeast. The southern portion of the city is an undulating plain. It is drained by the Kurang River, on which Rawal Dam is located.

### 5.3 Physical Environment

#### 5.3.1 Topography

The topography of Islamabad consists of plains and mountains. The northern part of the metropolitan area comprises mountains terrain of the Margalla Hills, and Rawal Lake lies in the northeast just below the hills. The southern portion of this city is an undulating plain drained by Korang River followed by its tributaries. Towards the east is a relatively flat area with bare soil and settlements.

The project site is a plain land bounded by Service Road to the south and Jaffer Khan Jamal Road to the north east.

### 5.3.2 Geology and Soils

The Potohar region has a complex geological history of mountain formation, alluvial-loessic depositions, and erosion cycles. Limestone is the characteristic rock of Margalla range. In age, it ranges from the Jurassic to Triassic. It is usually reddish or bluish-white in colour, mixed or alternating with its beds of red or bluish clay or shades or sandstones. Adiala, Dhamial-Loibher forests are situated over alluvial deposits. The deposits contain small-sized rounded pebbles of sandstone, quartzite or granite and sand mixed or alternating with clayey deposits. They have been described as alluvial deposits, but it is equally probable that they have a glacial origin.

The ridges and valleys in the area are formed by alluvial deposits from the hills that that have been buried in the ridges of sandstone and covered by interbedded sandy silt and limestone gravel. Most of the urbanization in the region is primarily focused on the Piedmont bench area dissected more into the south side. The southern area which comprises sandstone, mudstone, and conglomerate of the Siwalik Group of Neogene to Pleistocene crop out along the many steep-sided stream valleys that dissect the land. The northern edge of which extends southwards is predominantly Piedmont bench. Landforms of the area can be further divided into land formed by erosion and landforms constructed by the deposition of sediments. Different soil types and landforms with a range of slopes and active geological processes may limit the suitability of the land for the various purpose.<sup>1</sup>

The soil of the project area is composed of clay/silt formed of alluvial deposits laid by the past and present river system in varying thickness.

### 5.3.3 Land Use

Patterns of land use in Islamabad have evolved through years and have been influenced by environmental and physical factors such as landforms, climate, and water availability as well as human factors such as population size, growth, economic demands and cultural practices or customs.

Natural vegetation includes scrub, forest, and plantation, which are about 38.15% in Islamabad in the year 2016. Bare soil covers more than 46%. The built-up area covers 15.14% of the total, while water is only 0.44%.

**Table 5.1: Temporal Variation of Land use**

Sr. No	Class	Area in Percentages (%)			
		1990	2000	2010	2016
1	Permanent Vegetation	24.27	34.35	36.199	38.15
2	Urban Area	03.70	3.84	7.125	15.144
3	Bare Soil	71.42	61.34	56.2	46.26
4	Water	0.60	0.46	0.45	0.44

**Source:** DIGITAL ENVIRONMENTAL ATLAS OF ISLAMABAD: Establishment of Geometric Centre for Climate Change and Sustainable Development Pakistan environmental Protection Agency Ministry of Climate Change

<sup>1</sup> DIGITAL ENVIRONMENTAL ATLAS OF ISLAMABAD: Establishment of Geometric Centre for Climate Change and Sustainable Development Pakistan environmental Protection Agency Ministry of Climate Change

### 5.3.4 Seismic Risk

Islamabad region can be divided into three major structural zones. The mountainous north, including Margalla Hills, is complexly folded and thrust along the Hazara Fault Zone. Southwards the mountains are a sloping piedmont bench that is truncated in sandstone and shale. The Soan River flows along the axis of Soan syncline. Islamabad lies just at the edge of Hazara Fault Zone that consists of an arc of thrust and folded rocks about 25km wide and 150 km long that is convex to the south and extends west-southward away from the Himalayan syntaxis. There are many thrust sheets in Islamabad area, some of these thrust faults are in front of Margalla Hills which extends north of Fatehjang and form Kala Chita Range.

### 5.3.5 Major Earthquakes

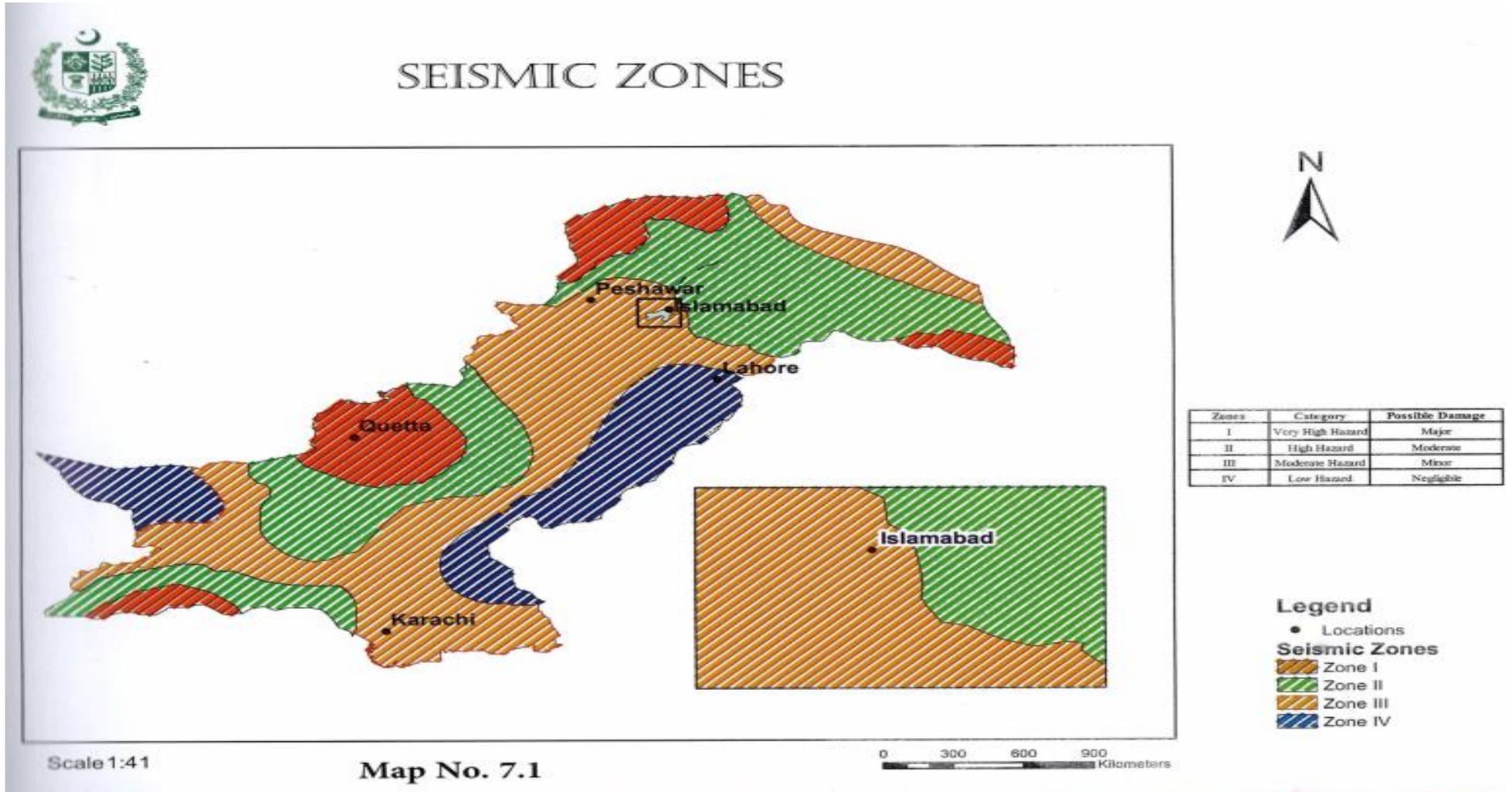
The Islamabad region lies in a tectonically active zone, where earthquakes have been frequenting in the recent geological history due to faulting and folding of the structure. Geological past shows that there were many activities of earthquakes in the past in the region. The Soan syncline is an asymmetric, faulted fold of regional extent, plunging west southward. Although earthquake shaking is not confined to areas near-surface faults, the risk of surface rupture is greater where the surface has been broken previously. Earthquakes in 2005 (7.6 magnitudes) resulted in large area destruction in Islamabad. Repeated earthquakes have been hitting the area almost every year.<sup>2</sup>

The Seismic Map of Islamabad is given in **Figure 5.1**.

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<sup>2</sup> *DIGITAL ENVIRONMENTAL ATLAS OF ISLAMABAD*: Establishment of Geometric Centre for Climate Change and Sustainable Development Pakistan environmental Protection Agency Ministry of Climate Change

Figure 5.1: Seismic Map of Islamabad



Source: DIGITAL ENVIRONMENTAL ATLAS OF ISLAMABAD (2016): Establishment of Geometric Centre for Climate Change and Sustainable Development Pakistan Environmental Protection Agency Ministry of Climate Change

### 5.3.6 Surface Water

The Soan and Kurang Rivers are the main streams draining the area. Their primary tributaries are the Ling River, draining north-westward into the Soan; Gumreh Kas, draining westward into the Kurang from the area between the Kurang and Soan; and Lei Nala, draining southward into the Soan from the mountain front and urban areas. The Kurang and Soan Rivers are dammed at Rawal and Sambli Lakes, respectively, to supply water for the urban area. Extensive forest reserves in the headwaters of the Kurang and Soan Rivers benefit the quality and quantity of supply.

There is no nullah or other surface water resource in the vicinity of the project site.

### 5.3.7 Ground Water

A supplemental network of municipal and private wells as deep as 200 meters (m) produces ground water primarily from Quaternary alluvial gravels. The altitude of the water table decreases from about 600 m at the foot of the Margala Hills to less than 450 m near the Soan River, so that the saturated zone generally lies 2–20 m below the natural ground surface (Ashraf and Hanif, 1980). Lei Nala carries most of the liquid waste from Rawalpindi and contributes greatly to the pollution of the Soan River below their confluence. Solid-waste disposal practices threaten the quality of ground-water reserves, particularly at the temporary solid waste dumping sites.

### 5.3.8 Traffic and Transportation

All major cities and towns are accessible through regular trains and bus services running mostly from the neighbouring city of Rawalpindi. Lahore and Peshawar are linked to Islamabad through a network of motorways which has resulted in a significant reduction in travelling times between these cities. M-2 Motorway is 367 km long and connects Islamabad and Lahore. M-1 Motorway connects Islamabad with Peshawar and is 155 km long. Islamabad is linked to Rawalpindi through the Faizabad Interchange; the cloverleaf interchange has a daily traffic volume of about 48,000 vehicles. Zero Point Interchange was completed in 2012; it is built at the intersection of Islamabad Highway, Kashmir Highway and Khayaban-e-Suharwardy.

### 5.3.9 Climate

Records for the Islamabad station of the Pakistan Department of Meteorology indicate a monsoonal climate of rainy hot summers and cool dry winters; precipitation is characteristic of the semiarid zone of Pakistan. The monsoon rains usually start in June, peak in August, and end by September. A much smaller winter monsoon peaks in March. The four monsoon summer months always have some precipitation, but any of the other months can be completely dry. Annual rainfall of only 249.1 was recorded in 2008. The high of 1,732 mm was recorded in 1983. The average for 1931–2006 was 1,055 mm. The maximum recorded temperature was 45.9 degrees Celsius (°C) in June 2014, and the minimum was –3.9°C in one year before 1961. Freezing temperatures are rare and have been recorded only in November, December, and January in mountainous areas of Islamabad.

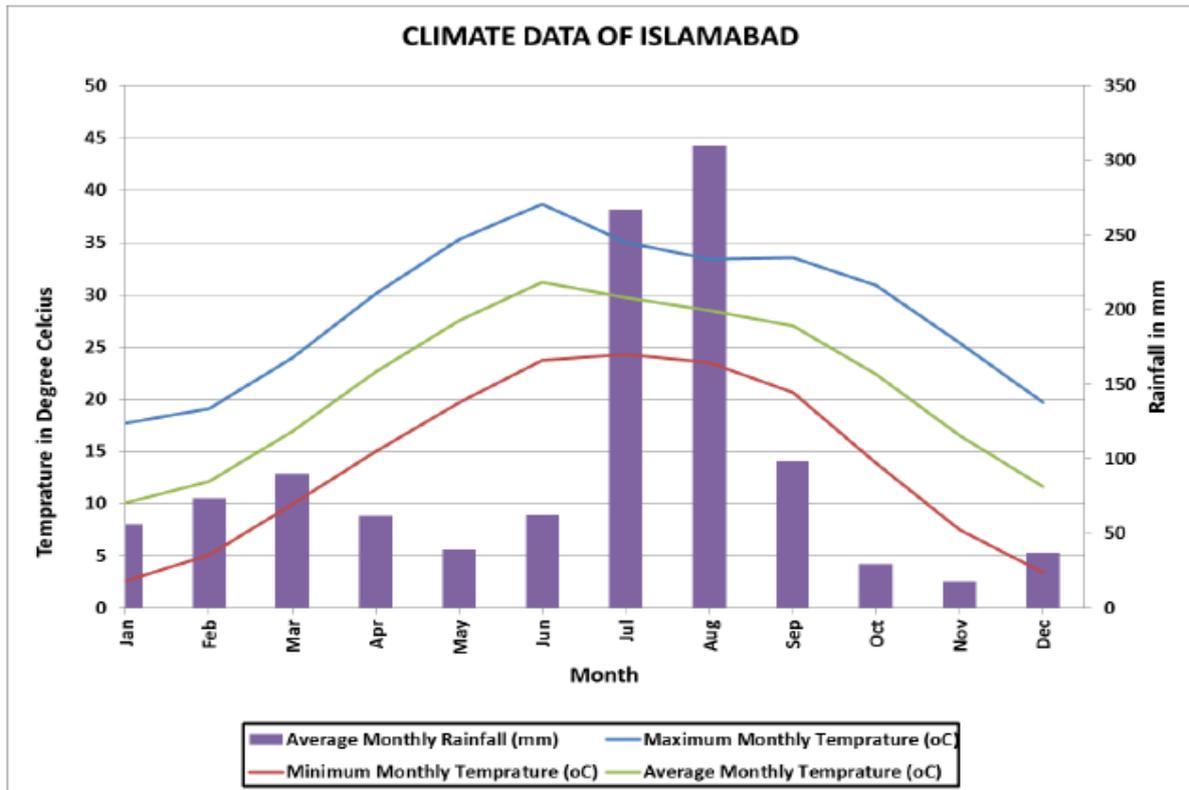
Islamabad has distinct seasons marked by wide variation in temperature. The climate remains very salubrious from April to October, but the winters get very cold due to snowfall. The coldest months are December, January, and February. The hottest months are June and July. Rainfall in April and May is occasional, but the heaviest rain is in July and August.

The temperature of capital territory Islamabad ranges between -1 °C to 46 °C. The coldest month is January when the mean maximum temperature is 18.3 °C, and the

mean minimum is 3.8 °C. From February to May the temperature rises at the rate of 5.0 °C per month. The highest temperature reached in May when the mean maximum temperature remains 39.1 °C. Humidity varies greatly in Islamabad.

Climate Data of Islamabad, including rainfall and mean minimum and maximum temperature is shown in **Figure 5.2**.

**Figure 5.2: Mean Monthly Meteorological Data of Islamabad<sup>3</sup>**



#### 5.4 Seasonal Ambient Air Data of Islamabad

To summarize the ambient air data, Air quality data of various projects in Islamabad, including parameters of SO<sub>2</sub>, NO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and CO, during different seasons was collected and analyzed. The ambient air quality monitoring was carried out by Pakistan EPA Certified laboratory, ESPAK.

<sup>3</sup> <https://www.worldweatheronline.com/lang/en-pk/islamabad-weather-averages/islamabad/pk.aspx>

**Table 5.2: Seasonal Ambient Air Data Islamabad**

Parameter	NEQS	Averaging Time	Unit	Spring	Summer	Winter	Autumn
SO <sub>2</sub>	120	24 h	µg/m <sup>3</sup>	20.27	21.27	20.29	21.8
NO	40	24 h	µg/m <sup>3</sup>	12.10	14.32	13.29	15.2
NO <sub>2</sub>	80	24 g	µg/m <sup>3</sup>	21.93	22.94	22.59	23.4
O <sub>3</sub>	120	1 h	µg/m <sup>3</sup>	4.04	7.11	4.23	8.85
PM <sub>2.5</sub>	35	24 h	µg/m <sup>3</sup>	28.74	29.47	15.97	25.4
PM <sub>10</sub>	150	24 h	µg/m <sup>3</sup>	142.29	119.52	129.02	127

### 5.5 Air Quality and Noise Level Monitoring- Project Site

The ambient air quality and noise level monitoring was conducted and compared against the National Environmental Quality Standards (NEQS) for Sulphur dioxide (SO<sub>2</sub>), Oxide of Nitrogen (as NO), oxide of Nitrogen (as NO<sub>2</sub>), Ozone (O<sub>3</sub>), Suspended Particulate Matter (as SPM), Respirable Particulate Matter (as PM<sub>10</sub>), Respirable Particulate Matter (as PM<sub>2.5</sub>), and Carbon monoxide (CO) during 24 hours at the project site.

The ambient air and noise level monitoring was conducted on 1<sup>st</sup> May to 2<sup>nd</sup> May 2021 for 24 hours at the project site of NAPFA.

The GPS coordinates of ambient air quality and noise level monitoring location are 33°40'45.75"N, 73° 04'20.68"E. The ambient air quality and noise monitoring was carried out by EPA Certified laboratory, ESPAK.

The laboratory report detailing the ambient air and noise level monitoring report is attached in **Annexure-6**.

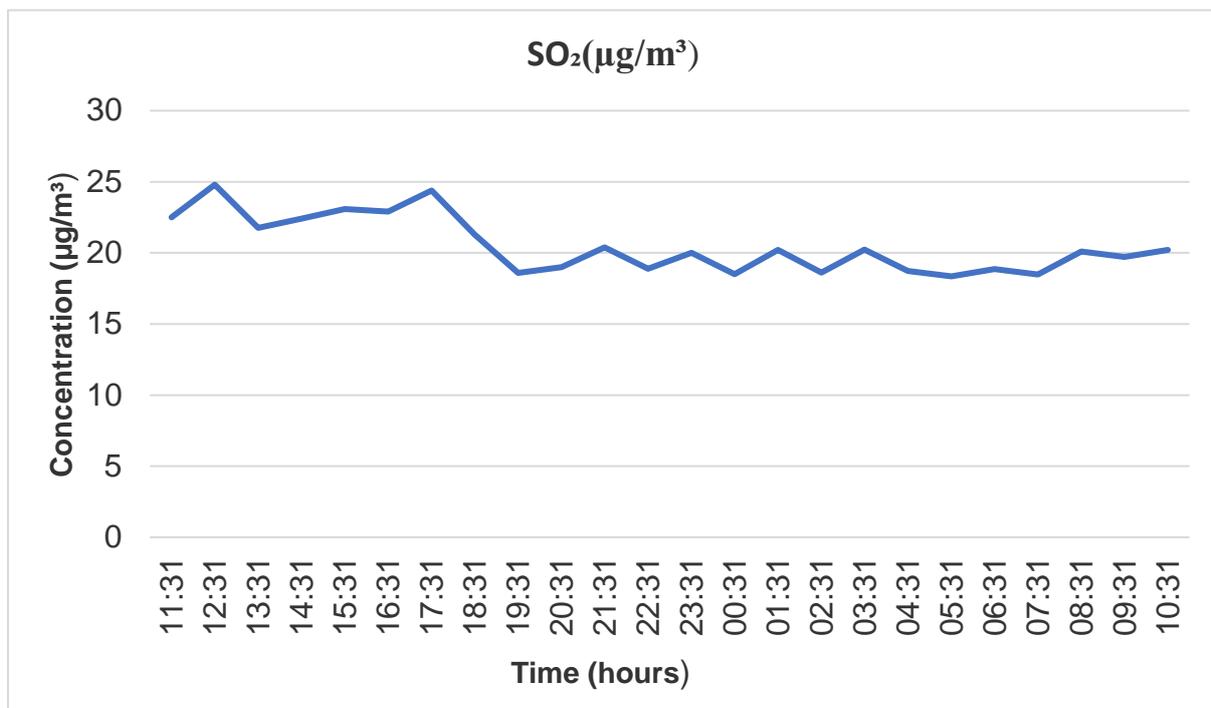
#### Ambient Air Quality Monitoring

**Sulphur dioxide (SO<sub>2</sub>):** Sulphur dioxide (SO<sub>2</sub>) is a colourless, poisonous gas with a strong odour. Coal and petroleum containing Sulphur compounds produce Sulphur dioxide after their combustion. It is one of the main contributors to acid rains because of oxidation of SO<sub>2</sub> in the presence of a catalyst such as NO<sub>2</sub> forms H<sub>2</sub>SO<sub>4</sub>. It irritates eyes, nose, and throat. It may impair lung function and aggravate respiratory diseases.

The 24h average concentration of SO<sub>2</sub> at the monitoring site was 20.499 µg/m<sup>3</sup> which is in compliance with the NEQS (120 µg/m<sup>3</sup>) of Pakistan.

The hourly variation graph shows that concentration of SO<sub>2</sub> varies between 18.352µg/m<sup>3</sup> to 24.799 µg/m<sup>3</sup> during 24 hrs monitoring. This is due to the fact that there is no major industry near the project site.

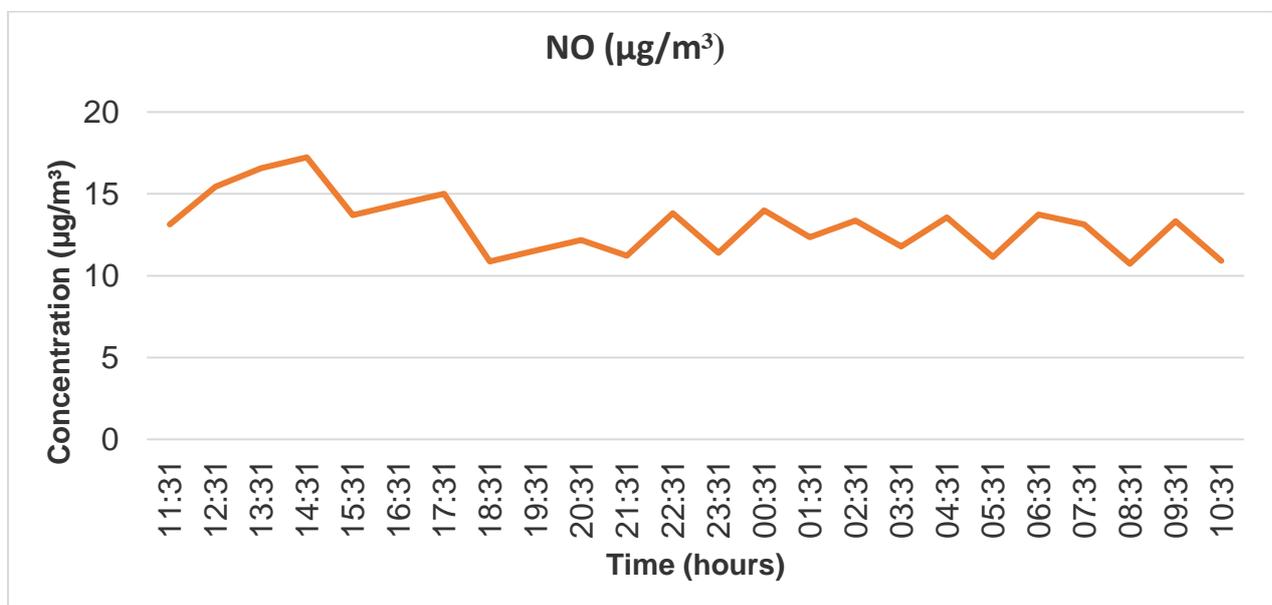
**Figure 5.3: Hourly Variation of Sulfur dioxide (SO<sub>2</sub>) at the Project Site**



**Nitrogen oxide (NO):** Nitric oxide (nitrogen oxide, nitrogen monoxide) is a molecular, chemical compound with a chemical formula of NO. One of several oxides of nitrogen, it is a colourless gas under standard conditions. It is also produced naturally by the extremely high air temperatures produced along the path of lightning in thunderstorms. Nitric oxide should not be confused with nitrous oxide (N<sub>2</sub>O), an anaesthetic, or with nitrogen dioxide (NO<sub>2</sub>), brown toxic gas and a major air pollutant, the latter being a product to which nitric oxide is rapidly oxidized in air.

The averaged (24h) concentration of NO (13.104 µg/m<sup>3</sup>) remained in compliance with NEQS (40 µg/m<sup>3</sup>) at the ambient air quality monitoring site.

**Figure 5.4: Hourly Variation of Oxide of Nitrogen (as NO) at the Project Site**



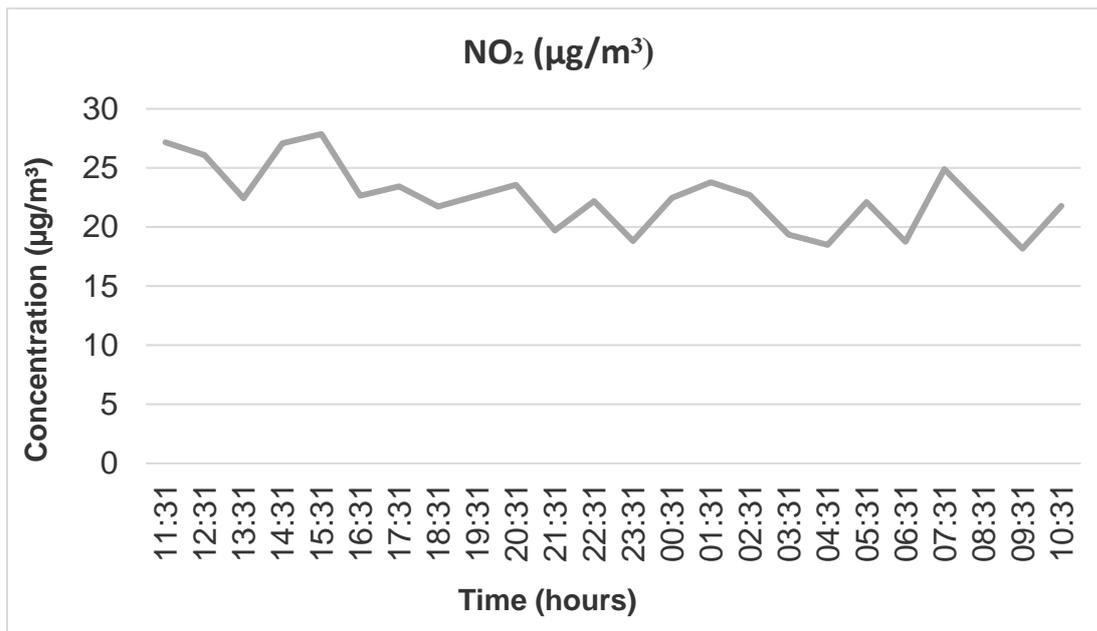
**Nitrogen dioxide (NO<sub>2</sub>):** Nitrogen dioxide (NO<sub>2</sub>) is a light brown gas that can become an important component of urban haze. It is likely that oxides of nitrogen are the second most abundant atmospheric contaminants in many cities, ranking next to Sulphur dioxide.

Nitrogen oxides usually enter the air as a result of high-temperature combustion processes, such as those occurring in automobiles and power plants.

The primary sources of Nitrogen oxides (NO<sub>x</sub>) are motor vehicles and thermal power generation. The averaged (24h) concentration of NO<sub>2</sub> (22.478 µg/m<sup>3</sup>) remained within in compliance with NEQs (80 µg/m<sup>3</sup>) at the ambient air quality monitoring site.

The highest hourly average concentration of Nitrogen dioxide was 27.864 µg/m<sup>3</sup> and the lowest concentration registered was 18.167 µg/m<sup>3</sup>.

**Figure 5.5: Hourly Variation of Oxide of Nitrogen (as NO<sub>2</sub>) at the Project Site**

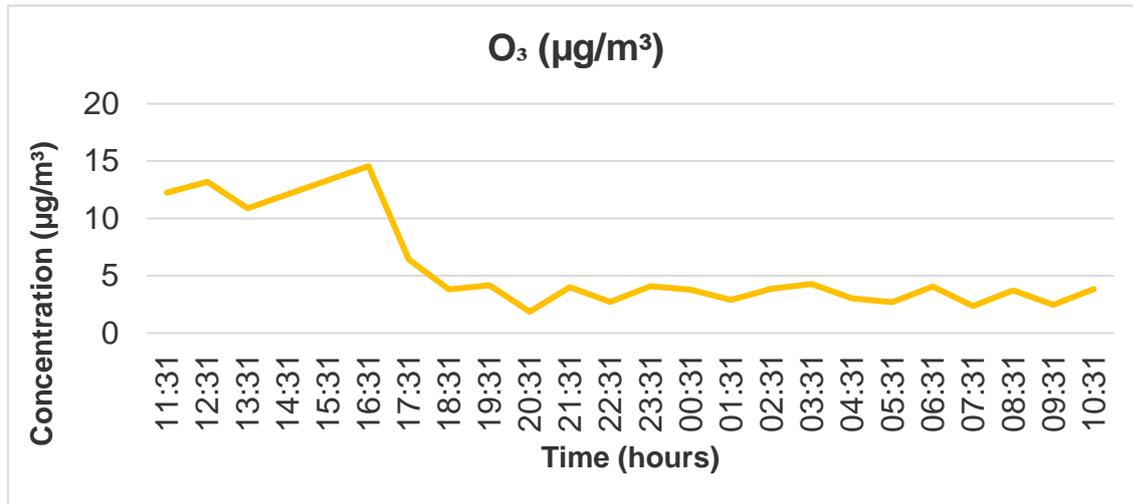


**Ozone (O<sub>3</sub>):** Ozone or tri-oxygen is an inorganic molecule with the chemical formula O<sub>3</sub>. It is a pale blue gas with a distinctively pungent smell. It is an allotrope of oxygen that is much less stable than the diatomic allotrope O<sub>2</sub>, breaking down in the lower atmosphere to normal oxygen.

The averaged (24h) concentration of O<sub>3</sub> (5.846 µg/m<sup>3</sup>) remained well within compliance limits of NEQS (120 µg/m<sup>3</sup>) at the project site. Ozone is formed indirectly by the action of sunlight on nitrogen dioxide.

The O<sub>3</sub> concentration varies from 1.863 µg/m<sup>3</sup> to 14.555 µg/m<sup>3</sup>. This figure shows the baseline concentration of O<sub>3</sub> is within the limit (120 µg/m<sup>3</sup>). The abrupt fall of the ozone value at night time can be justified by the fact that ozone is formed by the action of sunlight on NO<sub>2</sub>.

**Figure 5.6: Hourly Variation of Ozone (O<sub>3</sub>) at the Project Site**

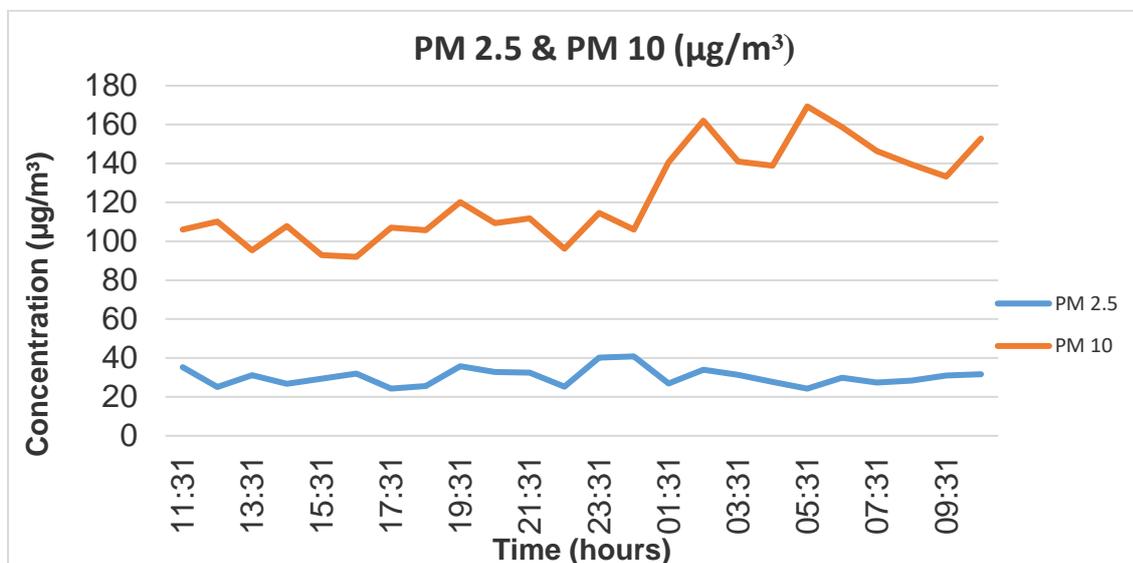


**Particulate Matter:** Particulate matter (PM) is solid matter from smoke, dust, fly ash, or condensing vapours that can remain suspended in the air for a long period of time. PM<sub>10</sub> means the particulate matter is having an aerodynamic diameter of 10 micrometres while PM<sub>2.5</sub> means the particulate matter is having an aerodynamic diameter of 2.5 micrometres or less. Particulates include an array of atmospheric materials, carbon-based matter such as soot, ashes, windblown dirt, sand, soil dust, metals, and plant matter such as pollens. The composition of particulate matter varies with the place, season, and weather conditions.

Fine PM can be sulfates, nitrates, organic matter (organic carbon compounds), elemental carbon (soot), and soil dust (crustal materials).

The time-averaged (24h) concentration of PM<sub>10</sub> is 123.26 µg/m<sup>3</sup> and PM<sub>2.5</sub> is 30.386, were in compliance with the NEQS of 150 µg/m<sup>3</sup> and 35 µg/m<sup>3</sup> respectively.

**Figure 5.7: Hourly Variation of Respirable Particulate Matter (as PM<sub>2.5</sub> & PM<sub>10</sub>) at Site**



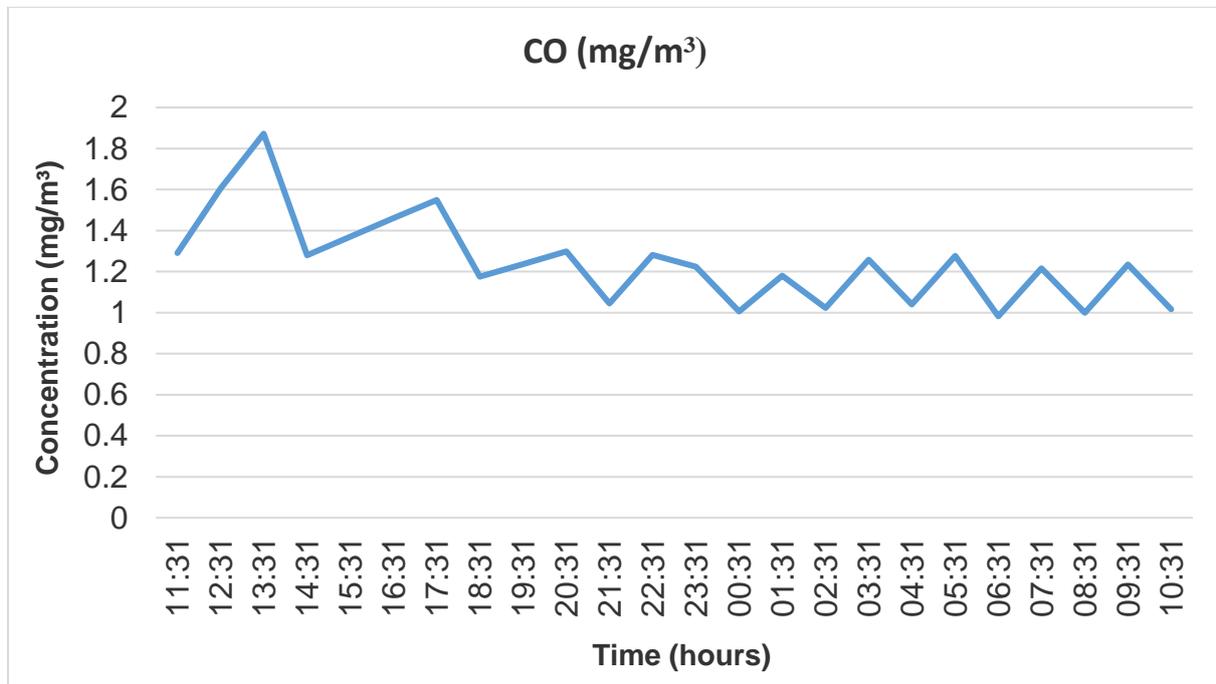
**Carbon monoxide (CO):** Carbon monoxide is an odourless, colourless and highly poisonous gas that has its major origin in the incomplete combustion of carbonaceous

materials. Although industrial processes contribute to CO pollution levels, however, the principal source of CO is automobiles.

Vehicles operating at colder temperatures (in winter, during engine warm-up or in stop-and-go traffic) produce significant quantities of this deadly gas and is of particular concern in urban areas.

The Carbon monoxide (CO) concentration was monitored for 24h at the selected site. The 24h averaged value of CO was compared with NEQS for ambient air. The averaged concentration of CO at the project site was found to be 1.2464 mg/m<sup>3</sup> which is within the NEQS (i.e. 5mg/m<sup>3</sup>) and is presented in **Figure 5.8**.

**Figure 5.8: Hourly Variation of Carbon Monoxide (CO) at the Project Site**



The SO<sub>2</sub>, NO, NO<sub>2</sub>, O<sub>3</sub>, SPM, PM<sub>10</sub> and PM<sub>2.5</sub> and CO concentrations meet the NEQS limits.

Therefore, it is concluded that presently there is no air pollution at the project site. Proper plantation around the site will help to maintain the air quality of the area in future.

### Noise Level Monitoring

Ambient noise levels were also continuously recorded at the project site for 24 hours. The sound pressure level (dB) were frequency weighted on A-curve (dB (A)) and time weighted (dB (A) L<sub>eq</sub>) on an hourly basis.

The averaged noise level during daytime was 57.266 dB and 42.620 dB during night time. The slight spike in noise levels can be attributed to the traffic on Street 8 and Jafer Khan Jamali Road. During the construction of the project, special care will be taken for noise and vibration.

### Summary of Ambient Air and Noise Monitoring

The concentrations of SO<sub>2</sub>, CO, NO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>, concentrations (i.e., 20.499 µg/m<sup>3</sup>, 1.246 mg/m<sup>3</sup>, 13.104 µg/m<sup>3</sup>, 22.478 µg/m<sup>3</sup>, 5.846 µg/m<sup>3</sup>, 123.26 µg/m<sup>3</sup>, and 30.386 µg/m<sup>3</sup>) meet the NEQS.

**Table 5.3: Summary of Ambient Air Quality and Noise Results at the Project Site**

Parameter	Averaging Time	NEQS	Unit	Value at project site
Sulphur dioxide (SO <sub>2</sub> )	24 h	120	µg/m <sup>3</sup>	20.499
Nitric Oxide (NO)	24 h	40	µg/m <sup>3</sup>	13.104
Nitrogen dioxide (NO <sub>2</sub> )	24 h	80	µg/m <sup>3</sup>	22.478
Ozone (O <sub>3</sub> )	1 h	130	µg/m <sup>3</sup>	5.846
Particulate Matter (PM <sub>10</sub> )	24 h	150	µg/m <sup>3</sup>	123.26
Particulate Matter (PM <sub>2.5</sub> )	24 h	35	µg/m <sup>3</sup>	30.386
Carbon monoxide (CO)	8 h	5	mg/m <sup>3</sup>	1.246
Noise level (Day time)	-	55	dB(A)	57.266
Noise Level (Night-time)	-	45	dB(A)	42.620

## 5.6 Biological Environment

### 5.6.1 Flora

The vegetation of project area around Islamabad is a representative of Dry Subtropical Scrub Forest which is dominated by *Acacia Modesta* (Phulai), *Ziziphus mauritiana* (Ber); *Ziziphus nummularia* (Mullah), etc. Other associates existing in varying proportions include *Prosopis cineraria* (Jand), *Melia azadirachta* (Dharek); *Morus alba* (Mulberry-Shahtoot); *Dalbergia sissoo* (Tahli-Shisham); *Acacia nilotica* (Kiker). In the undergrowth *Cannabis sativa* (Bhang), *Calotropis procera* (Desi Ak), *Parthenium hysterophorous* (Gandi Booti) and *Ocimum bacilicum* (Niazbo) are predominant.

A complete list of the flora of Islamabad/Tract has been provided in **Annexure-7**.

There are 203 trees at the project site. The project site has dense vegetation including mature trees of shisham, paper mulberry, toot / mulberry, loquat, bakain, bhang and arand/ caster oil.

**Table 5.4: Types of Trees at the Project Site**

Sr. #	Local Name of Plant	Scientific Name	Growth Status/Type	No. of Plants
1	Shisham	Dalbergia sissoo	Mature trees and under size plants	30
2	Paper mulberry	Broussonetia papyrifera	Mature trees and under size plants	150
3	Toot / mulberry	Morus alba	Mature trees and under size plants	7
4	Bakain/ China Berry	Melia azedarach	Mature trees and under size plants	12 mature trees
5	Loquat	Eriobotrya japonica		4
6	Bhang	Cannabis sativa		herb spread over 30% of the ground
7	Arand/ Caster oil	Ricinus communis	Shrubs/Plant	14

**Figure 5.9: Pictorial presentation of vegetation in the project area**



### 5.6.2 Fauna

In its original form, the Dry Subtropical Scrub Forest constituted the habitat of wild fauna consisting of a host of animals and birds. As the disturbance increased to a maximum level with complete inhabitation, wildlife abundance and diversity decreased to a minimum degree.

The fauna of Islamabad has been provided in **Annexure-8**.

### 5.7 Socio-Cultural Environment

This section provides a detailed discussion of the socio-economic and socio-cultural environment of the local community in the project area, Islamabad. This area may get direct positive or negative impacts from the construction of NAPFA Project. **Figure 5.10** shows the main environmental receptors within 500 m radius of the project.

Figure 5.10: Project Area Map of NAPFA project



## **Socio-Cultural Environment of Project Area**

### Location

The Sector H-8 is bounded by Srinagar Highway and G-8 to the north, Islamabad Expressway and Shakarparian to the east, I-8 to the south, Ninth Avenue and H-9 to the west. The proposed site is located in Sector H-8/4.

### Transportation

The private transport is common in Islamabad and the adjacent areas. The roads in the Project Area are metalled and public transport is easily available on Jaffer Khan Jamal Road. Taxis are also available readily all the time.

### Education

There are a number of private and public schools both for boys and girls in Sector H-8 such as Sheikh Zayed Academy, The City School, Roots International are located in Sector H-8.

### Public Health

Islamabad has both public and private medical hospitals. One of the the largest hospitals in Islamabad is Shifa International Hospital which is located at the south of the Project site.

### Drinking water supply

The H-8 and I-8 Sectors are facilitated by CDA Water Supply System. Moreover, residents have dug their own borewells for groundwater extraction.

### Other Facilities

Electricity, Natural Gas supply is available in the Sector. There are many banks, post office, telephone exchange, or any police post in the Sector I-8 Markaz, near to the Project Site.

#### **5.7.1 Sheikh Zayed International Academy**

Sheikh Zayed International Academy-Islamabad is a dynamic, private, non-profit academic institution that provides quality education of an international standard. Every student who graduates from our Academy is eligible for admission to any college or university around the world.

Externally, the School is very prolific in its participation in and success achieved at the multitude of national and international contests and competitions in which it enters throughout the academic year.

#### **5.6.2 Federal Board of Intermediate and Secondary Education**

The Federal Board of Intermediate & Secondary Education (FBISE) Islamabad established under FBISE ACT 1975, is an autonomous body of Ministry "Federal Education and Professional Training". It is empowered with administrative and financial authority to organize, regulate, develop and control Intermediate and Secondary Education in general and conduct examinations in the institutions affiliated with it.

The major responsibilities of FBISE are to affiliate institutions imparting SSC and HSSC education within Pakistan and abroad, prescribe courses of instructions for SSC and HSSC and ensure provision of requisite facilities in the affiliated institutions. Exam

conduct, appointment of examiners and supervisory staff are also the key responsibilities of FBISE.

### **5.6.3 Shifa College of Medicine**

Shifa College of Medicine has set as its mission to graduate physicians for the 21<sup>st</sup> century who abide by the rigor of scientific discipline and are altruistic, humane, knowledgeable, skillful and dutiful to their profession and the society at large. The Shifa College of Medicine has the following accreditations:

- Approved by the Pakistan Medical and Dental Council for MBBS.
- Affiliated with the Shifa Tameer-e-Millat University, Islamabad.
- Registered with the World Health Organization and included in the list of FAIMER International Medical Education Directory.

Shifa College of Medicine provides academic, cultural and social opportunities to enhance the intellectual development of serious, highly able and motivated students. It enables the students and the faculty with the latest developments in the field of medicine and in terms of quality it bears comparison with the best available in the world. The college sets a high priority in attracting faculty of repute and provides a truly rewarding learning experience.

### **5.6.4 Nokia Networks**

Nokia Fixed Networks solutions are used in the largest, fastest and most advanced fixed broadband networks in the world and these are the only equipment vendor with a leading market position in every region. Nokia is the innovation leader in every established and emerging fixed access technology, whether enabling gigabit broadband speeds over ordinary copper telephone lines, powering the world's first 10 gigabit fiber communities, or developing advanced CPE that realize the potential of the smart home.

## 6 Stakeholder Consultation

### 6.1 Approach to Public Consultation

The public consultation process with various stakeholders has been approached to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design phase of the project. The focus of attention has been the population near the proposed project site that may be affected by the project.

The viewpoints of the stakeholders have been taken into account, and their concerns and suggestions for possible improvements have been included in the EIA where appropriate.

Much of the public consultation process has revolved around concerns for the mitigation of construction stage impacts and possible traffic congestion on the during the operational phase of the project.

The stakeholders involved in the process were the proponent of NAPFA project, Federal Board of Intermediate and Secondary Education (FBISE), Shifa College of Medicine, Nokia Networks, officials of CDA-Environment Wing, Municipal Corporation Islamabad (MCI), Islamabad Electric Supply Corporation (IESCO), Environmental Practitioners and Real Estate Dealers.

### 6.2 Public Consultation

The community living within the project area was consulted during the EIA of the project. The project activities and their positive and negative impacts on the physical, biological, and socio-economic environment were highlighted to them. Stakeholders' concerns regarding various aspects, existing environment and impacts of the project are also included in the EIA report.

### 6.3 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the proposed projects. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision-making. The overall objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the construction of NAPFA project.

The main objectives of the Consultation process are:

- Information dissemination, education, and liaison;
- Identification of problems and needs;
- Reaction, comment, and feedback on the proposed project; and
- Documentation of mitigation measures proposed by the stakeholders.

### 6.4 Major Stakeholders and their Apprehensions

Meetings with major stakeholders were organized to discuss project-specific issues and its potential impacts on the local and regional environment. Officials of Sheikh Zayed International Academy were tried to consult but they did not respond. Stakeholders consulted, and their valuable suggestions and comments are described below:

Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
<p>Project Director PAAA, AGP and</p> <p>Mr Ali Bin Nayyer, Deputy Managing Partner, Development Consultancy Services</p>	Sector H-8/4	<ul style="list-style-type: none"> <li>▪ NAPFA project will provide office space, residencies and hostels for professional training of audit and finance related personnel with state-of-the-art facilities and peaceful office environment.</li> <li>▪ The mitigation measures proposed in the EIA Report will be adopted to avoid any environmental and social degradation during the construction and operational phases of the project.</li> <li>▪ AGP believe in sustainable development, and will adopt solar energy, green roof, and energy-efficient technologies. Furthermore, to conserve energy, the HVAC system will be installed. The HVAC System has been selected due to its low power consumption and the ability of modular expansion this system brings.</li> <li>▪ The building will be constructed according to the National and International Building Standards to resist any natural calamity, thereby ensuring a sustainable development.</li> </ul>
<p>Mr. Muhammad Ashraf Nadeem</p> <p>Assistant Secretary</p>	Federal Board of Intermediate and Secondary Education (FBISE)	<ul style="list-style-type: none"> <li>▪ Mr. Muhammad Ashraf Nadeem was of the view that the high-rise buildings in Islamabad are ruining the aesthetics of the capital.</li> <li>▪ The proposed project must have a rainwater harvesting system, drainage system and an appropriate solid waste management system</li> <li>▪ Renewable energy sources should be preferred.</li> <li>▪ The water resources are being exploited with the boom in construction industry which needs to be regulated or water scarcity will be an issue in the near future.</li> <li>▪ Proper waste management from source to final disposal must be in place along with an incineration facility in sharing with the neighbouring buildings.</li> <li>▪ Islamabad has been developed according to the Master Plan 1960. The facilities provided to the residents are according to the estimated population as per the land use of the sector.</li> <li>▪ Appropriate mitigation measures must be implemented during construction as well as operational phase of the project.</li> <li>▪ The proposed project will create job and business opportunities, contributing to the economy of the country.</li> <li>▪ A plantation plan should be part of the project, which would recommend plantation of indigenous trees and ornamental plants.</li> </ul>

Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
		<ul style="list-style-type: none"> <li>The construction site must be covered from all sides to contain the dust within the project site, and silencers should be used while using heavy machinery.</li> </ul>
Mr. Bilawal Hussain Admin Incharge	Shifa College of Medicine	<ul style="list-style-type: none"> <li>The proposed project will improve the infrastructure of Islamabad and will contribute in economic growth of the country.</li> <li>Solid and liquid effluents are part of the construction activities. The solid waste should be collected in dustbins and must be disposed of at designated dumping site. While the for the liquid effluents, a septic tank along with a soakage pit can be constructed which will be used during operational phase as well.</li> <li>All the environmental parameters must be considered during planning phase of the project.</li> <li>EPA should regularly monitor the implementation of the recommendations given in the EIA report.</li> </ul>
Mr. Asif Majeed, Director Environment (West) /Parks	CDA Environment Wing, F-9 Park	<ul style="list-style-type: none"> <li>A plantation plan must be recommended to compensate for the cut trees and clearing of shrubs during the project construction.</li> <li>CDA will allot land for plantation and the proponent will be bound to carryout plantation under the assistance of CDA Environment Wing.</li> <li>Furthermore, there should be a proper solid waste management plan in place during construction as well as operational phase of the project. There should be a collection point from where the sanitary workers of CDA will transport it for final disposal at designated dumping site.</li> <li>Solid waste collection system should be efficient.</li> <li>The proponent should contact MCI and CDA so as a site should be allocated for disposal of excavated material. The excavated material should be properly disposed of at the designated site.</li> </ul>
Mr. Mukhtiar Hussain Shakir Assistant Director	Emergency and Disaster Management, CDA	<ul style="list-style-type: none"> <li>Appropriate fire safety and firefighting arrangements should be in place while construction and operation of Highrise buildings. The necessary firefighting drills should be conducted regularly. The internal fire safety measures must be efficient enough to contain the fire until help arrives. We have allocated firefighting vehicles at different locations in Islamabad to decrease the response time.</li> <li>The proponent must incorporate the fire safety measures in the layout plan and submit it to the CDA-Emergency and Disaster Management Directorate for approval.</li> </ul>

Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
		<ul style="list-style-type: none"> <li>▪ Smoke detection and automatic sprinkler system must be installed as part of the fire safety plan.</li> <li>▪ In addition, there should be a Refugee Area within the building which should not be less than 15 square meter and must be protected against fire and other potential hazards to accommodate people until the help arrives.</li> <li>▪ Anti-shutter sheet should be used on glass work and battery-operated emergency lights should be installed along emergency exit routes.</li> <li>▪ The fire control room along with generators should be outside the building and should be properly protected if located inside the building.</li> <li>▪ MCI is aware that the proposed project might pose negative Environmental Health and Safety Impacts.</li> <li>▪ Emergency and Disaster Risk Management should be an integral part of the operational phase of the Project; however, it should also be considered during the construction phase of the Project.</li> <li>▪ Exit routes to be incorporated in the layout plan, following the Building code of Pakistan – Fire Safety Provisions 2016</li> <li>▪ Exit routes must be approved from MCI Directorate of Emergency and Disaster Management</li> <li>▪ MCI Firefighting department has a response time of 5-7 minutes which can sometimes increase up to 10-15 minutes due to traffic load.</li> </ul>
Mr. Sher Afzal, Deputy Manager Environment,	E&SS, IESCO	PMU, <ul style="list-style-type: none"> <li>▪ The proposed project will be provided with electricity connection from H-8 grid station.</li> <li>▪ There is a need for alternative source to meet the growing demand of electricity.</li> <li>▪ The investors of such huge projects should invest in renewable energy sources like solar panel system on roof top. The proponent should be able to reduce load on IESCO system at least 30 % of total demand. The people living in the outskirts of Islamabad are facing load shedding due to rising demand in the urban center.</li> <li>▪ The developer must be commended that Solar Panels will be installed in the roof as part of the environment-friendly feature of the project. By installing solar panels, the long-term benefit will go to the developer and environment, making the project environmentally and economically sustainable.</li> <li>▪ The electrical wiring system must be done carefully to avoid any short circuit, and fire safety with emergency exit must be part of the building layout plan duly approved by</li> </ul>

Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
		<p>the concerned departments. Any incident within the building can cause the loss of many lives.</p> <ul style="list-style-type: none"> <li>▪ The proponent should ensure appropriate Environmental, Occupational Health and Safety measures during construction phase of the project.</li> <li>▪ Rainwater harvesting and other sustainable features must be incorporated into the building design to ensure sustainability.</li> </ul>
Mr. Zain Ali Shah, CEO	ZIGG Engineers, Islamabad	<ul style="list-style-type: none"> <li>▪ Mr. Zain focused on the construction phase of the project and raised the point that contractors and environmental consultants should work together to achieve a sustainable development.</li> <li>▪ He further said that the EIA consultants should be part of the project execution phase to assist the civil works in an environment friendly manner. There should be cooperation between relevant stakeholders to achieve the desired results as per standards.</li> <li>▪ Land levelling and clearing activities can create dust which should be suppressed with the help of water sprinkling system and the water used for domestic purposes can be stored and used for sprinkling purposes.</li> <li>▪ In addition, there will be exhaust emissions from construction machinery which can deteriorate the air in the project area, which can be minimized by tuning the vehicles and machinery regularly and by using exhaust mufflers.</li> <li>▪ EPA guidelines should be followed during construction as well as operational phase of the project. If the construction activities involve cutting of trees than the cutting should be compensated with plantation of indigenous species against each cut tree.</li> </ul>

## 6.5 Consultation with the Communities

A series of roadside discussions were carried out with the residents and locals of Sector I-8, located 500 - 600 meters south and south-west of the project site.

During the public consultation, 20 people were consulted, and the communities were informed about the salient features of the project, its location, and activities.

The viewpoints of respondents are as follows:

- Some of the residents of Sector I - 8 had apprehensions about the construction phase of the project that it would cause dust and noise pollution. They also suggested that the construction phase should be carried out with great care to the nearby settlements.
- Generally, people were supportive of the project as it is necessary for the economic development of the country, creating jobs and new opportunities.
- Residents of the project area stated that a properly thought-out traffic management plan should be developed that ensures smooth access and egress of vehicles.
- According to respondents, they are not socially or environmentally threatened by the project, because proper mitigation measures will be in place during construction as well as operational phase of the project.
- Construction activity should be avoided during nighttime.
- The dust suppression measures should be adopted, such as water sprinkling of the project site. Similarly, other strategies for dealing with water and noise pollution should also be adopted.

**Figure 6.1: Pictorial Presentation of Public and Stakeholders Consultation**



**Exhibit 6.1:** Roadside Consultation with residents of Sector H-8/4



**Exhibit 6.2:** Consultation with a local near the project site



**Exhibit 6.3:** Consultation with the Admin Incharge of Shifa College Of Medicine



**Exhibit 6.4:** View of Shifa College of Medicine



**Exhibit 6.5:** View of FBISE Building near the project site



**Exhibit 6.6:** Consultation with the Assistant Secretary General FBISE



**Exhibit 6.7:** A view of Nokia Networks building near the Project Site



**Exhibit 6.8:** Consultation with the Admin Manager of Nokia Networks



**Exhibit 6.9:** Roadside consultation with the locals near the Project Site



**Exhibit 6.10:** Consultation with the Real State Businessman at the Sector I-8 Markaz



**Exhibit 6.11:** Street View pointing towards Street 8



**Exhibit 6.12:** Roadside consultation at the project site

## 7 Impact Assessment and Mitigation Measures

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### 7.1 Introduction

This chapter provides screening of potential environmental impacts of the proposed project, discusses the stakeholders' views, assesses the significance of the potential impacts, and recommends mitigation measures to minimize if not eliminate the potentially adverse impacts of the proposed activities.

### 7.2 Environmental Screening of the Project

An Environmental Screening Matrix has been developed as part of the present EIA study focusing on the potential environmental impacts of the project during construction and operational phases.

The matrix examines the intersection of project activities with various components of the environment. The impacts are broadly classified as physical, biological and social, and then each of these broad categories further divided into different aspects. The potential impacts have been predicted and are characterized as follows:

High negative (adverse) impacts,

Low negative impact,

Insignificant impact,

High positive (beneficial) impacts,

Low positive impact, and

No impact.

The Environmental Screening Matrix (unmitigated) is provided in **Table 7.1**.

The negative impacts predicted in this manner are the "unmitigated" impacts. Appropriate mitigation measures have been recommended as part of this EIA.

The occurrence possibility and severity of the potentially adverse impacts identified in **Table 7.1** will be reduced as a consequence of the incorporation of these mitigation measures into the project design/management. The negative impacts screened through this process are discussed in the Chapter.

**Table 7.1: Environmental Screening Matrix (un-mitigated) of NAPFA project**

Description	Physical			Biological		Social and Socio-economic				
	Soil	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
<b>Project Siting</b>										
Project Site, Land Use and Design	N	N	N	N	N	N	N	N	N	N
Visual Impacts	0	0	0	0	0	0	N	N	N	N
<b>Construction Phase</b>										
Land Acquisition	N	N	N	N	N	N	N	N	N	N
Contractor Mobilization	0	-1	0	N	0	-2	N	-1	0	N
Construction Camp Establishment	-1	-1	-1	-1	-1	-1	N	-1	+1	N
Construction Camp Operation	0	-1	-1	-1	-1	-1	N	-1	+1	N
Site Preparation	-2	-1	-1	-2	-1	-1	N	-1	+1	N
Construction Works	-1	-1	-1	-2	0	-2	N	-1	+1	N
Laying of Services	-1	-1	-1	-1	0	-1	N	-1	+1	N
Construction of Buildings	-1	-1	-1	0	0	-2	N	-1	+1	N
Construction Materials Supply	-1	-1	N	0	-1	-1	N	-1	+1	N
Construction Crew Transportation	0	-1	N	0	0	-1	N	-1	+1	N
Solid Waste Disposal	-1	-1	-1	-1	-1	N	N	0	0	N
Waste Effluent Disposal	0	-1	-2	-1	-2	N	N	-1	0	N

Description	Physical			Biological		Social and Socio-economic				
	Soil	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
Demobilization of Contractor	0	-1	0	0	0	-1	N	-1	0	N
<b>Operation Phase</b>										
Operation of NAPFA	N	-1	0	-1	-2	-1	N	0	+1	N
Solid Waste Disposal	-2	-1	-2	-1	-2	0	N	0	0	N
Waste Effluent Disposal	-2	-1	-2	-1	-2	N	N	0	0	N

**Key:** -2: High negative impact; -1: Low negative impact; 0: insignificant/negligible negative; +1: low positive impact; +2; High positive impact, N: no impact.

### 7.3 Environmental Impact Characterization

During the environmental impact assessment process of NAPFA project, the predicted impacts were characterized. Various aspects of the impact characterization include:

- Nature (direct/indirect)
- Duration of impact (short term, medium-term, long-term)
- Geographical extent (local, regional)
- Timing (Project phase)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely)
- Impact consequence severity (severe, moderate, mild)
- Significance of impact (High, medium, low)

The above aspects of environmental characterization are defined in **Table 7.2**.

**Table 7.2: Impact Characterization of NAPFA project**

Categories	Characteristics
Nature	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter changes because of a change in another parameter.
Duration of impact	Short-term: Lasting only for the duration of the project, such as noise from the construction activities. Medium-term: Lasting for a period of few months to a year the project before naturally reverting to the original condition such as loss of vegetation due to the clearing of the campsite, contamination of soil or water by fuels or oil. Long-term: Lasting for a period much greater than medium-term impact before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical extent	Local, regional (spatial dimension)
Timing	Construction and operation
Reversibility of impact	Reversible: When a receptor resumes its pre-project condition. Irreversible: When a receptor does not or cannot resume its pre-project condition.
Likelihood of the impact	Almost Certain: Impact expected to occur under most circumstances. Likely: Impact will probably occur under most circumstances Possibly: Impact may possibly occur at some time Unlikely: Impact could occur at some time Rare: Impact may occur but only under exceptional circumstances

Categories	Characteristics
Impact consequence severity	<p>Major: When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has long-term effects (period of years) on socio-economic activities of significance or regional level.</p> <p>Moderate: When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or fauna; has short-term effects (period of months) on socioeconomic activities of significance on a regional level.</p> <p>Minor: When an activity causes short-term (period of few months) reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period; has short-term (period of months) effects on socio-economic activities of local significance.</p> <p>Negligible: When no measurable damage to the physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative or statutory requirements.</p>
Significance of impact	<p>Categorized as High, Medium, or Low</p> <p>Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative or statutory requirements.</p>

Subsequent to the characterization, appropriate mitigation measures were identified, in order to minimize, if not completely eliminate, the adverse impacts associated with project activities. Finally, residual impacts were identified.

The impact characterization of the predicted impacts, mitigation measures and residual impacts are discussed below:

## 7.4 Pre-Construction/Design Phase Impacts

### 7.4.1 Project Siting Impacts

The impacts associated with the project siting are those which relate to its location at the designated site in the Sector H-8/4, Islamabad. These impacts are different from those which are associated with the project's construction and operation phases, in the sense that the construction and operation impacts are associated with the activities such as land clearing, waste disposal, whereas the siting impacts relate to the mere presence of a facility at the given location.

For the proposed project, the

- The project site, land use and design
- Visual Impacts

These are characterized in **Table 7.2**, and discussed below:

### Project Site, Land Use, and Design

The project site of NAPFA project should be in line with the Master Plan of Islamabad for official buildings. The land use and design should be in accordance with the building codes and bye-laws of CDA for the construction of high rise buildings in Islamabad.

The design of NAPFA project should be able to withstand the risks due to seismic activity, and necessary arrangements are in place for the health and safety of the occupants. The project will increase energy consumption and will put the burden on the already existing energy crisis in the country.

The unmitigated impact associated with not following the Master Plan of Islamabad or its design does not meet the minimum requirement of CDA for construction of high rise building in Islamabad are characterized as follows:

Nature :	Indirect
Duration :	Long-term
Geo extent :	Local
Reversibility:	Irreversible
Likelihood:	Possibly
Consequence:	Severe
Impact significance:	High.

### Mitigation Measures

**Project Site:** According to the Master Plan of Islamabad, the plot is reserved for development of offices, schools and colleges. Therefore, the project site is located in the designated area of Islamabad.

**Land Use:** The land use of NAPFA project will be in accordance with the CDA Building bye-laws. The land-use plan of NAPFA project is line with land use of the sector. There are multiple offices buildings in the vicinity of the proposed project site.

**Design:** The proposed structure of NAPFA project will be in accordance with existing building bylaws, and its design will be approved by CDA. The following mitigation measures are proposed for earthquake and firefighting:

- The Building Bye-Laws and Codes of CDA will be strictly adopted.
- Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the building.
- The adequate internal and external water distribution system will be designed, with a standby system for sufficient water, which could also supply adequate quantity for firefighting.
- Adequate space will be provided for parking firefighting vehicle at the front and backside of the NAPFA project. The designated space will be able to withstand the load of the firefighting vehicle, which is 30-40 tons.
- Sufficient access points should be provided for access of firefighting staff to enter into NAPFA project.
- Provision for pumping out water from the basement will be kept, to meet any emergency in case of water flooding the basement.
- CDA water supply system will fulfil the water supply.
- The solid waste reduction, reuse and recycling will be encourage during operational phase of the project.

- Adequate water storage for firefighting will be provided in the building. The pumps for firefighting will maintain constant pressure in the system.
- Orifice plates will be provided at the hose cabinets to control pressure at required level as per manufacturer's requirements.

### **Visual Impacts**

The NAPFA project can potentially damage the natural landscape, and visual impact will be impacted. The unmitigated impact associated with the aesthetic value of the area is characterized as follows:

Nature:	Direct
Duration:	Long-term
Geo extent:	Local
Reversibility:	Irreversible
Likelihood:	Possibly
Consequence:	Severe
Impact significance:	High

### **Mitigation Measures**

For the project, the visual impact has been minimized at different levels, as described below:

- First of all, the design of the sector should be adopted in a manner that minimizes the changes in the topography, landscape and damage to the natural vegetation.
- A plantation plan has been proposed for NAPFA project which should be followed.
- Certain areas must be marked and left untouched to preserve natural vegetation.

### **Residual Impacts**

As a result of the above mitigation measures, the visual impacts of the project will be greatly reduced. There will be some residual impact; however, its significance is expected to be low.

## **7.5 Construction Phase Impacts**

The construction phase will be by far the most significant part of the project with respect to environmental considerations since most of the impacts are likely to take place during this period. Various construction activities will invariably create environmental disturbances, which may have impacts on the physical, biological and social environment of the area and nearby community. Such impacts include the following:

### **Physical Environment**

- Soil degradation and contamination
- Air quality deterioration
- Surface and groundwater contamination
- Solid Waste Management

### **Biological Environment**

- Loss of/damage to the floral resources (natural vegetation) of the area
- Loss of/damage to faunal resources (wildlife) of the area

### Social Environment

- Compensation for land acquisition
- Noise and vibration
- Safety hazards
- Public health and nuisance issue
- Sites of Archaeological or Historical Significance

These impacts are characterized in **Table 7.2** and can be readily pre-empted and mitigated.

The mitigation measures recommended in this section will need to be incorporated into the construction of the project.

These impacts and their respective mitigation measures are discussed below:

#### 7.5.1. Soil Degradation and Contamination

The soil-related issues include soil erosion, slope stability, and soil contamination. These may be caused by the land clearing, levelling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles.

Soil may be contaminated as a result of fuel/oils/chemical spillage and leakage, and inappropriate waste (solid as well as liquid) disposal.

Extraction of stone and gravel from the area may potentially lead to soil erosion.

The unmitigated impacts related to soil erosion and contaminations are characterized below.

Nature:	Direct
Duration:	Long-term
Geo extent:	Local
Reversibility:	Irreversible
Likelihood:	Certain
Consequence:	Moderate
Impact significance:	High

### Mitigation Measures

The followings mitigation measures will minimize soil erosion and contamination:

- Land clearing, levelling and grading be minimized and carried out in a manner to minimize soil erosion.
- Good management of topsoil should be done to prevent the loss of soil fertility.
- Excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (i.e. Stone pitching). Temporary measures, such as the construction of temporary walls

reinforced with brick lining bordering the construction areas to contain debris and spoil, will also be undertaken to avoid soil erosion and water contamination.

- The stone and gravel will not be extracted from Islamabad.
- Vehicles and equipment will not be repaired at the project site. If unavoidable, impervious sheathing will be used to avoid any soil contamination.
- For the domestic sewage from the contractor's camp, septic tanks with soaking pits will be constructed having adequate capacity. Waste oils (if any) will be collected in drums and sold to the recycling contractors.
- The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractors, or where appropriate reuse/recycle it.
- The hazardous waste should be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked.
- Domestic solid waste will be disposed of in a manner that does not cause soil contamination/water contamination.

### Residual Impacts

Appropriate construction practices and management actions as listed above, will greatly minimize the soil erosion and contamination. The significance of the residual impacts is therefore expected to be 'low'.

#### 7.5.2. Air Quality Deterioration

Construction machinery and project vehicles will release exhaust emissions, containing Carbon Monoxide (CO), Oxides of Sulfur (SO<sub>x</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and Particulate Matter (PM).

These emissions can deteriorate the ambient air quality in the immediate vicinity of the project site. Furthermore, construction activities such as excavation, land levelling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions.

The unmitigated impacts related to air quality deterioration are characterized below:

Nature:	Direct
Duration:	Short-term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Likely
Consequence:	Minor
Impact significance:	Medium.

### Mitigation Measures

The following mitigation measures will minimize the emission and their impacts:

- Construction machinery and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.

- Fugitive dust emissions will be minimized by spraying water on the soil, where required and appropriate.

### Residual Impacts

The above measures will reduce the magnitude of the adverse impacts on ambient air quality. The significance of the residual impacts on air quality is expected to be low.

#### 7.5.3. Noise and Vibration

Noise and vibration will be generated by the construction machinery and vehicles during construction activities.

The unmitigated impacts related to the noise and vibrations caused by the project are characterized as follows:

Nature:	Direct
Duration:	Short-term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Certain
Consequence:	Moderate
Impact significance:	High

### Mitigation Measures

- Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation.
- Noise monitoring will be done at the project site, and if found more than 55 dBA, appropriate sound reduction mechanism (such as a noise barrier) will be put in place.
- Blasting will not be allowed as part of the proposed construction activities.

### Residual Impact

With the implementation of the above mitigation measures, the residual noise impact will be low to medium.

#### 7.5.4. Surface Water and Groundwater Contamination

The project activities that can contaminate soil may also contaminate the surface water and groundwater. These include.

- Solid waste disposal
- Sewerage disposal
- Equipment/ vehicles maintenance
- Spillage/ leakage of fuels, oils and chemicals
- Campsite sanitation facilities

The unmitigated impacts of the proposed construction activities on the water resources of the area characterized below:

Nature:	Direct and indirect
Duration:	Short to medium term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Likely
Consequence:	Major
Impact significance:	High

### **Mitigation Measures**

The mitigation measures recommended to forestall soil contamination will also prevent surface and groundwater contamination.

### **Residual Impacts**

If the recommended mitigation measures are effectively employed, the residual impacts of the project activities on the water resources of the area will be negligible.

#### **7.5.5. Loss of Vegetation**

The project site has dense vegetation. The site preparation and construction activities may necessitate the removal of trees and shrubs. Damage and/or loss of vegetation and clearing of other indigenous and introduced species, as well as undergrowth species which comprising bushes, grass, etc., will also lose.

The construction crew can also indulge in tree/shrub cutting to obtain fuelwood for the camp.

The unmitigated impacts of the proposed activities on the floral resources of the area are characterized below.

Nature:	Direct
Duration:	Medium to long-term
Geo extent:	Local
Reversibility:	Irreversible (reversible in medium to long-term)
Likelihood:	Certain
Consequence:	Severe
Impact significance:	High

### **Mitigation Measures**

The follows mitigation measures will further minimize any negative impacts on the floral resources of the area:

- Endeavours will be made to compensate for the loss by enhancing the environment, through a plantation of trees and ornamental plants.
- A plantation plan for NAPFA project has been prepared. The plan has a mix of appropriate trees/bushes which will be raised within the available open spaces within the premises of NAPFA project.
- All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect soil fauna and ensure microbial activity.

- Cutting of trees and other natural vegetation will be minimized as far as possible through astute planning.
- A record will be maintained for any tree cutting.
- The construction crew will be provided with LPG as cooking (and heating, if required) fuel. Use of fuelwood will not be allowed at the contractor camp.

### Residual Impact

The trees planted under the plantation plan will take some time to grow and mature. Therefore, there will be some reduction of vegetation cover in the area. However, no vegetation will be possible in the built-up area. This impact cannot be fully mitigated, and the residual impact would be medium; at least in the medium term. In the longer run, however, the planted trees and vegetation will be more than compensate for any vegetation loss.

### 7.5.6. Damage to Wildlife

The project site is located in the Street 8, Sector H-8/4, Islamabad, which provides minor habitat for wildlife. The construction activities will have limited adverse impact considering the mitigation measures are implemented during project execution. The loss of natural vegetation discussed above and other project activities will potentially have adverse impacts on the faunal resources and habitats of the area as well. Smoke, chemicals, dust particles, and noise generated by heavy machinery are a scaring factor for wildlife. Rodents, hedgehogs, porcupines would lose their abode.

The unmitigated impacts of the proposed activities on the faunal resources of the area are characterized below:

Nature:	Direct
Duration:	Medium to long-term
Geo extent:	Local
Reversibility:	Irreversible (reversible in medium to long-term)
Likelihood:	Certain
Consequence:	Low
Impact significance:	Low

### Mitigation Measures

- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- Special measures will be adopted to minimize impacts on birds, such as avoiding noise-generating activities.
- Solid waste from the contractor's site office and construction waste will not be left in the open and be disposed of properly.
- The measures to restore natural vegetation loss in the area will benefit the area's fauna as well.
- The project staff will not be allowed to indulge in any hunting or trapping activities.
- Illumination levels at the site will be minimized, as far as possible.

- Appropriate diffusers should be used to restrict the illumination within the project site.
- Blasting should not be undertaken at the site for excavation purposes.
- Porcupine population has increased, as it is not palatable because of its quills. Destruction of habitat and consequent check on the population of this pest may prove to be boon to maintain ecological balance.
- Developmental activities and establishment of the project site would be a positive step to keep down the number of this undesirable species at the desirable level from the human point of view.

### Residual Impact

Despite the above mitigation measures, there will be some residual impacts of the project on the faunal resources of the area. The significance of these residual impacts is expected to be medium.

#### 7.5.7. Disposal of Construction Waste/Excavated Material

Dumping of construction wastes/excavated material, in the surrounding area, may limit the use of land in the project area. The solid waste may be generated due to different construction activities, and it will mainly include surplus excavated and construction material. It may also be generated from the construction camp.

The indiscriminate disposal of solid waste may cause dust emissions due to the wind blowing thereby affecting the health of the workers working or passing in the immediate vicinity of solid waste heaps. The impacts of solid waste would be temporary and minor negative in nature.

The unmitigated impacts of the proposed activities area are characterized below:

Nature:	Direct
Duration:	Medium to long-term
Geo extent:	Local
Reversibility:	Irreversible (reversible in medium to long-term)
Likelihood:	Certain
Consequence:	Severe
Impact significance:	Moderate

### Mitigation Measures

- Management of construction activities will be done in a way to ensure minimal degradation to the soil around the project site
- Dumping of excavated waste and waste generated from the construction camp will be done at a designated site approved by CDA.
- The contractors will be bound by contractual obligations to take care of the waste generated from the construction activities.

#### 7.5.8. Traffic Management

During the construction phase, the movement of heavy machinery and transportation of construction material and equipment may cause traffic problems on Street 8 road.

As a result, the normal traffic may be disturbed, which will require proper mitigation measures. This impact is temporary and minor negative in nature.

### Mitigation Measures

- A traffic management plan will be prepared to avoid traffic jams/public inconvenience.
- Movement of vehicles carrying construction materials will be restricted during the night time to reduce traffic load and inconvenience to the local residents.
- The management is required to maintain liaison between the Traffic Police, local residents/ travellers and the contractor to facilitate traffic movement during the construction stage.

### 7.5.9. Safety Hazards, Public Health and Nuisance

The public health issues related to the project location are the possibility of contamination of local drinking water resources and dust emissions during the construction phase. The anticipated health impacts are classified into the following categories:

Dust and Pollen Allergy: One of the main problem people are facing here is of dust and pollen allergy.

Eye and Respiratory Diseases: Construction workers may be susceptible to the eye and respiratory diseases due to their routine exposure to dust and exhaust emissions on site. These effects could possibly be mitigated by routine health screening and training of contractor's employees.

Physical Injuries: Injuries could happen primarily by occupational-related accidents, animal bites, etc. Activities such as land clearing, tree felling, earthworks, and construction of facilities present various occupational hazards to the workers on site. These risks can be mitigated through the provision of appropriate training and emergency response procedures.

Psychological Disorders: Some workers may suffer from depression and anxiety disorders due to working and accommodation conditions, and their relationship with fellow workers. The psychological wellbeing of some members of the community may be affected due to disturbances created by the project activities. Mitigation measures for workers include the devotion to standards regarding working conditions.

Excessive illumination at the construction site may potentially cause light pollution, creating a public nuisance.

The unmitigated impacts related to the safety hazards; public health and nuisance are characterized as follows:

Nature:	Direct and indirect
Duration:	Short to medium term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Likely
Consequence:	Major
Impact significance:	High.

## Mitigation Measures

- Protected fencing will be fixed around the construction site. Unauthorized access within the construction area will not be allowed.
- The local community will be educated regarding the safety hazards at the site.
- The mitigation measures discussed under air quality deterioration, soil and water contamination will address the public health concerns as well.
- Defensive driving practices will be inculcated in the project drivers through training, posters and other similar measures.
- Vehicle speeds of 15 km/hr at the project site will be implemented.
- Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.
- A traffic management plan will be prepared and implemented during the construction phase to control the accidents.
- The contractor will ensure better working conditions for its employees.
- Regular routine health screening of the staff should be carried out.
- Firefighting equipment will be made available at the camp.
- The camp staff will be provided with firefighting training.
- The construction camps and site offices will have first-aid kits.
- The construction crew will be provided with an awareness of the transmissible diseases (such as HIV/AIDS, hepatitis B, and C).
- All safety precautions will be taken to transport, handle and store hazardous substances such as fuel.
- Road signage will be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic.

## Residual Impacts

There will be a moderate level of the residual impact of safety hazard associated with the vehicular traffic and construction activities.

The residual public health and nuisance issues will be quite negligible after the effective implementation of the mitigation measures.

### 7.5.10. Sites of Archaeological or Historical Significance

There are no reported sites of archaeological or historical significance at the land acquired for the project. However, in case an artifact of such significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.

## 7.6. Operational Phase Impacts

The operation of NAPFA project will interact with different components of the environment. This interaction may result in the following adverse impacts:

- Soil contamination
- Contamination of Surface and Groundwater

- Safety hazards, public health and nuisance

However, the magnitude of some of the above impacts is likely to be lesser as compared to the construction phase impacts.

To ensure the harmony of the project with the environment, the management will implement sound environmental management practices to handle the basic environmental issues effectively

- Landscaping and plantation
- Noise and another public nuisance abatement.

The potential environmental impacts of NAPFA project during operational phase are discussed below:

### 7.6.1. Solid Waste Management

The solid waste generated during construction activities will be safely disposed at an approved waste disposal site in Islamabad. The management will prepare a solid waste management plan which details municipal waste collection and disposal as well as promotes recycling.

The unmitigated impacts related to solid waste management caused by the project are characterized as follows:

Nature:	Direct to indirect
Duration:	Medium-term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Certain
Consequence:	Moderate
Impact significance:	Medium

### Mitigation Measures

Solid Waste Management will also be an important issue during the operational phase of NAPFA project.

- A small secondary point should be available at the project site where segregation of recyclable and non-recyclable waste can take place. For this purpose, residents can be provided with different colour waste bins for different waste materials.
- All the solid waste from the building will be collected at one location and will be transported by MCI for disposal and the designed dumping site at Islamabad.

### Residual Impact

The residual impacts of the implementation of the above measures will be low if Solid Waste is collected and disposed of properly.

### 7.6.2. Contamination of Surface and Groundwater

The nature of the impact of the project's operation activities on the surface and groundwater quality is expected to be quite similar to those predicted for the construction phase, except that the magnitude is likely to be lesser.

The unmitigated impacts on the surface and groundwater resources of the area are characterized below:

Nature:	Direct
Duration:	Short-term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Likely
Consequence:	Major
Impact significance:	High

### **Mitigation Measures**

The mitigation measures against soil contamination discussed above for the operation activities will forestall any possible water contamination as well.

### **Residual Impact**

After the effective implementation of the above measures, the residual impacts of the operation of the NAPFA project on the water resources of the area will be negligible.

### **7.6.3. Safety Hazard, Public Health and Nuisance**

The nature impacts of the project's operation activities relating to safety hazards, public health and nuisance are expected to be quite similar to those predicted for the construction phase.

These unmitigated impacts are characterized below:

Nature:	Direct and indirect
Duration:	Short-term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Likely/possible
Consequence:	Moderate
Impact significance:	High to medium.

### **Mitigation Measures**

The following mitigation measures will forestall any possible impact during the operation phase:

- The mitigation measures discussed under air quality deterioration, soil and water contamination will address the public health concerns as well.
- Appropriate solid waste disposal mechanisms will be implemented, as described earlier.
- Appropriate light diffusers and reflectors will be used where required to minimize the public nuisance caused by light pollution.
- Provision of firefighting arrangements in each floor of the NAPFA project.

- Provision of emergency health facilities.

## Residual Impact

After the effective implementation of the above-mentioned measures, the residual impacts of the estate operation activities relating to safety hazards, public health and nuisance will be negligible.

### 7.7 Positive Impacts of the Project

The positive impacts of the NAPFA project are as follows:

The NAPFA project will provide office spaces, residencies and hostels for professional training of personnel in the field of accounts and finance with state of the art facilities and a peaceful work environment.

Keeping in view the rapid growth in population and the expansion of Islamabad as a result, the vertical expansion will save space and accommodate more people as compared to horizontal expansion, which has a very large footprint.

Training would make the personnel expert in their fields and private or government firms prefer experienced or trained professionals, which will increase the chance of personnel to get hired.

The multi-dimensional impact of the proposed project will be to

- Provide sustainable development
- Provide more accommodation while covering less land.
- Enhance economic activities and contribute to the promotion of skill applications and improved business practices.

#### 7.7.1 Business Opportunity

With the start-up of operation of NAPFA project, accountancy and audit firms will also aim to have their offices near the NAPFA building, so business opportunities in the area will be enhanced, thus, boosting up the local economy.

#### 7.7.2 Employment

The operation of NAPFA project will improve the employment opportunities in the project area. It is anticipated that the local community will get direct or indirect employment due to the project. Employment will have a positive impact on the local economy.

### 7.8 Summary of Impacts and their Mitigation Measures

The impacts, mitigation measures have been developed to minimize the likelihood, extent or duration of their occurrence and any associated adverse effects. **Table 7.3** summarizes potential impacts and proposed avoidance and mitigation measures associated with construction camps.

**Table 7.3: Summary of Impacts and Mitigation Measures**

Impact	Mitigation Measures
<b>Pre-construction Phase Impacts</b>	
Project Site, Land Use, and Design	NAPFA is being developed in an area which is located in an urban area and is accessible by Road. The land use and design of the project will be in line with the existing Capital Development Authority's by laws.
<b>Construction Phase Impacts</b>	
Air Quality Deterioration	The project site should be monitored throughout to keep a record of air quality and any change in it. Vehicular traffic on unpaved track will be avoided as far as possible, and the track will be sprinkled with water to control dust.
Surface Water and Groundwater Contamination	Protection of the groundwater reserves from any contamination. Excavation should be done in the supervision of the site engineer so he can decide up to which limit excavation should be done. Prohibit the washing of vehicles and machinery in the project area.
Noise and Vibration	To mitigate these impacts noise barriers should be constructed in sensitive areas. Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation. Premix Concrete will be hauled in the reduce the noise that is generated due to preparation of concrete at the site.
Safety Hazards, Public Health and Nuisance	There should be proper check and balance on construction activities. There should be proper control on oil spillage and leakage of vehicles. Firefighting equipment will be made available at the camps. The camp staff will be provided for firefighting training.
Sites of Archaeological or Historical Significance	There are no reported sites of archaeological or historical significance at the land acquired for the project. However, in case an artefact of such significance is found during the construction activities, the Archaeology Department, Government of Pakistan will be informed.
<b>Operational Phase</b>	
Contamination of Surface and Ground Water	The mitigation measures against soil contamination discussed above for the operation activities will forestall any possible water contamination as well.
Solid Waste Management	NAPFA project will have chute system for collection of solid waste. The Solid Waste will be handed to MCI officials for treatment and disposal.

## 8. Environmental Management Plan

### 8.1. Introduction

The EIA report has identified the potential impacts that are likely to arise during the project. The EIA report has identified both positive and negative impacts at each stage of the project.

To minimize the effects of adverse impacts, the EIA has recommended the mitigation measures. These mitigation measures include the use of alternative technologies, management and physical control or compensation in monetary terms. The proposed mitigation measures have been based on the understanding of the sensitivity and behaviour of environmental receptors in the project area. The legislation controls that apply to the project and a review of good industry practices while operating in sensitive environments.

For residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the EIA stage, monitoring measures have been recommended ascertain these impacts during the course of the project.

For the effective implementation and management of mitigation measures, an environmental management plan (EMP) has been prepared. The EMP satisfies the requirement of the Pakistan Environmental Protection Act, 1997.

This chapter outlines the implementation mechanism for the EMP and defines the institutional arrangements required for the implementation of the plan. The EMP provides the implementation mechanism for the mitigation measures identified during the EIA.

### 8.2. Purpose and Objectives of EMP

An Environmental Management Plan (EMP) provides a delivery mechanism to address the adverse environmental impacts of a project during its execution, to enhance project benefits, and to introduce standards of best practices to be adopted for all phases of the project.

The primary objectives of the EMP are to:

- Facilitate the implementation of identified mitigation measures.
- Develop a proper monitoring mechanism and identify requisite monitoring parameters to confirm the effectiveness of the proposed mitigation measures.
- Define the responsibilities of the project proponent, design & supervision consultant and contractor, and provide a means of effectively communicating environmental issues among themselves.

### 8.3. Management Approach

#### 8.3.1. Pre-Construction and Construction Phase

The organizational roles and responsibilities are summarized below:

- a) Auditor General Pakistan/Pakistan Public Works Department

The overall responsibility for compliance of with the Environmental Management Plan rests with the project proponent, Auditor General Pakistan.

Pak PWD, being executing agency of the project, will ensure implementation of Environmental Monitoring Plan on behalf of AGP. Pak PWD has an environmental and public health section which will monitor the implementation of Environmental Management Plan on behalf of AGP.

b) Engineers, Contractor / Sub Contractors

The contractor will carry out field activities as part of their contract agreement. The contractor will be responsible for implementing various mitigation actions prescribed in the EIA report relevant to the contract. The contractor will also be subject to certain liabilities under the environmental laws of Pakistan, and under their contracts with the Pak PWD. The Project Consultant i.e. Development Consultancy Services will monitor the contractor and ensure implementation of the EMP and the EIA report.

c) Pakistan Environmental Protection Agency

The Pak EPA will periodically visit the project site to monitor the compliance of environmental protection measures detailed in the EIA report.

### Operational Phase

During the operational phase of the project, environmental management will become a routine function. The institutional set up for the operational phase should include AGP staff involved with the main responsibility for the environmental performance of the NAPFA project.

## 8.4. Organizational Structure and Responsibilities

### 8.4.1. Construction Phase

The organisational structure for the construction phase EMP is described as follows:

Primary Responsibilities: The primary responsibilities for the environmental performance of the project proponent, design and consultant and the contractor will be assumed by their respective highest-ranking officers during the project.

The Project Manager, NAPFA project, will be responsible for the compliance with the EMP of the project.

Project Consultant will be responsible for monitoring and ensuring the implementation of the EMP and EIA of the project.

Site Engineer of the Contractor will be responsible for the implementation of the EMP and EIA on the ground.

Field Management and Quality Control: The construction activities will be carried out in an environmentally sound manner during the construction phase of the project and will be the responsibility of the Site Engineer of the contractor. He will be responsible for implementing EMP and EIA recommendations.

The Project Consultant will be responsible for ensuring the overall environmental soundness of all construction activities. He will ensure the implementation of EMP and EIA.

Environmental Monitoring: Pak PWD on behalf of AGP will make the necessary arrangements to monitor the key environmental data during the construction phase.

These will include the number of trees cut, quantity of water used, record of waste produced, a record of waste disposal and project-related vehicular traffic.

#### **8.4.2. Operational Phase**

AGP management staff will assume the main responsibility for the environmental performance of the building during the operational phase.

An environmental monitoring plan has been developed as part of AGP management system. The key environmental parameters, such as water consumption, waste disposal, water quality, traffic count, noise, and status of implementation of the plantation plan, will be monitored on a regular basis. The environmental monitoring reports will be produced and shared with the Pak-EPA and Finance Division AGP management.

The Project Manager of AGP will be the focal point for all environmental matters associated with the operation of the facility. He will coordinate with the Pak-EPA, for any monitoring and/or reporting requirement.

#### **8.5. Legislation and Guidelines**

The EIA of NAPFA project has discussed national and international legislation and guidelines that are relevant. The proponent will ensure that his staff and all its assigned design & supervision consultant and contractor are aware of this legislation and guidelines prior to the start of the project activities.

The Pakistan Environmental Protection Act, 1997 is the basic environmental legislation. The act also requires that no person shall emit pollutants or noise in amount, concentration or level that exceeds the National Environmental Quality Standards (NEQS). The NEQS will be followed throughout the construction and operational phases of the project.

#### **8.6. Environmental Improvement Cell and Responsibilities**

NAPFA project will form up an Environmental Improvement Cell, which will be responsible for the environmental management and supervisory affairs during the construction and operational phases of the proposed Project.

The responsibilities of the Environmental Improvement Cell are as follows:

- To ensure implementation of all the proposed mitigation measures during and after the proposed project.
- Capacity building of the staff regarding environmental improvement and awareness.
- To develop operational guidelines and implementation schedule.
- Receiving complaints from the local community and other people and assisting the local environmental authority.
- To ensure that the proposed project is implemented in an environmentally friendly manner, causing the least harm to the existing environment, including flora and fauna.
- To make sure that the business and affecters of the proposed project are relocated or compensated in the most judicious manner.

### **8.6.1. Approvals**

The management and project contractor will obtain all the relevant clearances and necessary environmental approvals required by the Pakistan Environmental Protection Agency, Islamabad.

### **8.6.2. Contractual Provisions**

Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors, and thus EMP will form part of their contracts with the management of Development Consultancy Services.

The contractor shall be responsible for implementing the mitigation measures and monitoring of various environmental parameters. The management shall monitor the contractor's performance with respect to EMP implementation.

### **8.7. Environmental Mitigation Matrix**

For NAPFA project, an Environmental Management Matrix has been developed, which is given in **Table 8.1**.

This mitigation matrix provides details about the type of activity of the project, type of impact, the potential of the impact, location or extent of the impact, duration of the impact, its magnitude, and possible mitigation measures for the impact, and the institutional responsibilities for the implementation and supervision for each of the activity of the project.

**Table 8.1: Environmental Matrix of NAPFA project**

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
<b>Pre-construction/Design Stage</b>									
Drainage	Environmental	Aesthetic, water pond, a breeding ground for mosquitoes	At NAPFA Project	During and after rains	Major	Properly designed drains along the roads to avoid the formation of water ponds.  Proper design and maintenance.	Project Consultant	Pak PWD	Stormwater runoff
Cultural Properties	Impact on Mosque, Graveyard, and archaeological sites	Social Impacts	To be checked at the project site	At the planning stage	-	Construction activities avoid any interference with cultural heritage sites.	Project Consultant	Pak PWD	Social issues
Location in an area with the seismic background	Seismic activities may damage structures, environment, health, and lives	Health, food quality, safety jobs,	At NAPFA Project	After an earthquake with intensity higher than design.	Can be serious at times	NAPFA Project will be designed in accordance with the revised seismic code for Islamabad.	Project Consultant	Pak PWD	Land
<b>Construction Phase</b>									
<b>Site Office and construction works</b>									

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Site selection of construction site office, materials storage, human activities on-site, travel to and from the construction camp	Socio-cultural, environmental,	Sanitary disposal, (kitchen) disposal, leakage, and traffic, usage and pollution waste solid waste fuel noise additional water and	Contractor's Site Construction	Throughout the construction period	Minor Recommendations are followed	Camp Site construction to be supervised. Proper storage and fencing, locking of storage rooms containing hazardous material. Construction site office will be located in a stable and flat area, requiring minimal removal of vegetation and levelling. Camp Site construction to be supervised. Proper storage and fencing, locking of storage rooms containing hazardous material.	Contractor	Project Consultant	Land Analysis

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Sanitation and waste disposal facilities at the campsite	Sanitation and waste disposal problems	Workers health may impair which may result in slow progress	At all solid and liquid waste collection areas, latrine sites of camp	Throughout the construction period	Moderate	Contractor to provide a proper waste management plan for campsite waste.  Sewerage system at the site office to be properly designed (septic tank with soakage pit) to receive all sanitary wastewaters.	Contractor	Project Consultant	Waste Management
Movement of vehicles in a construction site and along haulage routes	Environmental impact, impacts from the temporary haul and access roads	Soil compaction and alteration of percolation and vegetation pattern, Dust emissions	At the project site	During the construction period	Low	Construction vehicles, machinery, and equipment shall move or be stationed in the designed right-of-way to avoid unnecessary soil compaction.  Air, water, and soil quality to be regularly monitored as in EMP.  The existing road will be used to the extent possible for hauling materials	Contractor	Project Consultant	Air and Soil Quality
Movement, maintenance, and fuelling of construction vehicles	Environmental pollution and contamination	Contamination of soil, surface and groundwater from fuel and lubricants, air pollution due to dust and exhaust from vehicles movement	Fuelling and maintenance sites near construction camp, seasonal waterways present near the project site	During the construction period	Low	Slopes of the embankment to be designed so that pollutants do not enter water bodies.  Construction vehicles and equipment to be properly maintained and fuelled so that oil and diesel spillage does not contaminate the soil.	Contractor	Project Consultant	Air, Soil and Water Quality



Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
						Fuel storage and refuelling sites to be kept away from drainage channels. Oil and grease traps to be provided at fuelling locations to prevent contamination of water. Unusable debris shall be dumped at the designated site in Islamabad.			
Creation and burning of waste at/near the campsite	Solid waste generation and air pollution associated with burning	Eyes irritation for workers and public, nuisance, deteriorated air quality, smell from organic wastes	Around Campsite	Throughout the construction period	Moderate	Devise a plan for safe handling, storage, and disposal of harmful materials. Waste burning not allowed. Introduce re-use and/or recycle. Discourage use of disposables	Contractor	Project Consultant	Solid Waste Management
Health and safety at the workplace	Health risks for workers if unfavourable working conditions prevail	Workers progress may impair which will result in the slow progress of the project	Throughout construction area and construction campsite	Throughout the construction period	High	Obligatory insurance against work accidents for labourers Provide basic medical service and supplies to workers. Layout plan for a campsite is indicating safety measures taken by the contractor (e.g., firefighting equipment, safe storage of hazardous materials, first aid, security, fencing, and contingency	Contractor	Project Consultant	Workers Health

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
						measures in case of accidents). Work safety measures and good workmanship practices to ensure no health risk for labourers. Proper maintenance of facilities for workers. Regular pest control measures in the site camp.			
<b>Soil and Burrow Material, Blasting and Cutting, Cut and Fill</b>									
Disposal of Surplus material, storing material for reuse	Physical environment	Water pollution from runoff of discarded asphalt, loss of productive land due to dust	Along the full length of the service roads around NAPFA	At the start of construction	Low	Construction waste to be collected for reuse. Waste disposed of in existing Dump Site. Water spraying to reduce dust.	Contractor via bid documents	Project Consultant	Water
Excavation for the foundation of the building	Changes of topographic characteristic, loss of topsoil, soil erosion, loss of vegetation, loss of habitat	Aesthetic, water storage, seepage, soil erosion, water contamination, vegetation clearing, loss of habitat for various faunal species	Designated Borrow areas, and at all sites where high embankment s are required	Long-lasting	Medium	Remove topsoil and reintroduce for returning to nature. Concrete retaining walls at high embankments in critical areas.	Contractor	Project Consultant	Soil erosion and Water

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Acquisition of construction materials	Landscape degradation by use of quarries and borrow areas in the immediate vicinity of the Project site.	Accelerate erosion at the site	Quarries and borrow areas	Long-term effects	Low	No use of any quarries for construction material from inside Islamabad.	Contractor	Project Consultant	Soil erosion
Storage, handling, and transport of hazardous construction materials	Work safety and human health risk	Health risk for workers, impair their progress	At all construction sites NAPFA Project	Throughout the construction period	Low	Provision of protective items for labourers handling hazardous materials (e.g., helmets, adequate footwear for bituminous pavement works, protective goggles, gloves, etc.).  Proper training for workers by HSE staff.	Contractor	Project Consultant	Construction material storage
Creation of construction waste material and spoil management	Contamination of soil and water from waste and/or quarry materials, and impact on landscape value	Air, water, and solid waste generation	All construction site.	During construction	High	All spoils to be disposed of in an environmentally friendly manner and sites to be restored to original conditions.	Contractor	Project Consultant	Water and Soil analysis
Transporting materials to the site	Physical environment	Creation of noise, fumes, and dust	Throughout the Project	During construction	Medium	All vehicles are carrying loose, friable material to be properly covered.	Contractor	Project Consultant	Noise and Air Quality

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Planting trees	Ecological	Introduction of Indigenous species	In green areas and green belts	After construction	Medium	Implement Plantation Plan.	Contractor	Project Consultant	Site restoration
<b>Closure Plan</b>									
Clearing site	Damage not restored on departure	Air, soil and water pollutions in future, a nuisance for the residents	where construction took place	After completion of construction activities	Low	Construction site should be restored according to the proper Site Restoration Plan.  Compliance monitoring of the restoration.	Contractor	Project Consultant & Pak PWD	Site restoration
<b>Utility Disruption</b>									
No utility except electricity available	Affected utilities create a disruption of public services and economics	Disruption in utilities may create problems for adjoining buildings	To be checked	Construction period	None, if organized in a timely manner and implemented; otherwise Intermediate.	Timely notifications and consultations with respective departments, especially with IESCO.	Contractor	Project Consultant	Electricity supply management
<b>Water Issues</b>									
Use of water for construction and consumption for human use	Conflict with local water demand very limited supply	Water shortage	In the immediate vicinity of the project site	During construction	Low	The contractor will arrange required water for construction in such a way that water availability and supply nearby to the community remain unaffected.	Contractor	Project Consultant	Water management

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Spillage of liquid waste	Environmental and Social Impacts	Risk of polluting surface and groundwater from spillage, drainage, and runoff from construction sites.	NAPFA project site	During construction	Low	Regular water quantity monitoring according to the determined sampling schedule.  Contractor shall ensure that construction debris does not find its way into the drainage.	Contractor	Project Consultant	Water quality
Earthwork, stonework, and, other construction activities	Environmental and Social Impacts	Contamination of water due to construction waste, health risks for public	NAPFA project site	During construction	Low	Construction works close to water bodies to be avoided, especially during the monsoon period.  Waste must be collected, stored, and taken to the existing Dump Site.	Contractor	Project Consultant	Social Issues
<b>Air Pollution Control</b>									
Vehicular movement and operation of machinery	Environmental and Social Impacts	Emission from construction vehicles and machinery, causing a public health risk, nuisance, and other impacts on the biophysical environment	Workshops of contractor construction site, Construction sites	Throughout the construction period	Low	All temporary service and access roads to be regular water sprayed be carried out to minimize the dust generation.  All vehicles, equipment and machinery used for construction to be regularly maintained to ensure that pollution emission levels conform to National Environmental Quality Standards (NEQS) of Pakistan.	Contractor	Project Consultant	Air Quality

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
						Air quality parameters to be monitored, as determined.			
Transportation of materials and other construction activities that create dust and emissions	Environmental and Social Impacts	Dust and emissions from machines causing a health risk to operators; Impacts on the biophysical environment	Street 8 and Jafer Khan Jamali Road	During construction	Low	<p>Vehicles are delivering loose and fine materials, like sand and fine aggregates, shall be covered to reduce spills on the existing road.</p> <p>Ambient air quality monitoring will be carried out in accordance with the EMP.</p> <p>If monitored parameters are above prescribed NEQS limits, suitable control measures must be taken.</p>	Contractor	Project Consultant	Air quality and workers health
<b>Noise Pollution</b>									
Operation of construction machinery,	Noise from vehicles, asphalt plants, and equipment;	A nuisance for workers and public	At construction site; built-up areas;	During construction	Medium	<p>Vehicles, and equipment to strictly conform to NEQS specified noise standards.</p> <p>Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained.</p> <p>In accordance with EMP, noise measurements to be carried out at locations and schedules specified to ensure the effectiveness of mitigation measures.</p>	Contractor	Project Consultant	Noise
<b>Fauna and Flora</b>									



Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
No sensitive area is present	Ecological Impacts	Disturbance to Local flora and fauna	Throughout the proposed project	Throughout the construction period	Low	Use of firewood for cooking and execution of work to be prohibited. No open fire is allowed. Restoration of damaged vegetated areas. Strict instructions to contractors' staffs (particularly the cooks) with respect to poaching wildlife. Assist in the public awareness program.	Contractor	Project Consultant	Ecological sensitive area
<b>Road Safety and Community Life</b>									
The risk associated with construction activities	Accident and health risks, Social Impacts	Road accidents may occur to general public and workers; social problems may arise, the progress of the project may impair	Project Site	Throughout the construction period	Low	Ensure safety code for work staff is observed, including the provision, and wearing of safety equipment required for specific works (e.g., helmets, dust masks, earmuffs, safety goggles, etc.). At the construction site, a readily available and fully equipped first aid unit to be provided. Elaboration of contingency planning in case of major accidents. Adequate signage, lighting devices, barriers, persons with	Contractor	Project Consultant	Health and safety of workers



Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
						flags during construction to manage traffic at a construction site.			
<b>Archaeological Sites</b>									
Encountering archaeological sites during earthworks and construction	Impacts of historically important sites and damage to fossils, artifacts, tombs, structure, and others, as defined in the Antiquity Act of 1975	If sites of special interest not identified and flagged, contractors may inadvertently cause damage	Near Project site	Throughout the construction period	Low	In case of finding any archaeological artifact structure, tomb, etc., the contractor must immediately halt all works and contact the Archaeological Department.  In the event of such finding, the contractor has the duty to secure the site against any intrusion until an archaeological expert decides for further action.	Contractor	Project Consultant	Sensitive area
<b>Operation Phase</b>									
<b>Water and Soil</b>									
Drainage of runoff from roads into water bodies	Physical and Environmental Impacts	Physical congestion of drainage structures, Localized flooding, water and soil contamination	At natural drainage points in and around the Project site.	When road operates in the rainy season, as required	Medium	Adopt performance specified maintenance contracts.  Ensure proper cleaning scheme for keeping the drainage structure clear of debris and blockage.	NAPFA Building Project Management	AGP	Stormwater runoff
Vehicular movement	Environmental Impacts	Contamination from spills due to traffic and accidents	Project Site	As incidents occur	Medium	Accidental spillage to be cleared and disposed of immediately and properly.	NAPFA Building Project Management	AGP	



Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
<b>Ambient Air Quality</b>									
Induced vehicular traffic movement	Environmental and Social Impacts	Adverse effects on public health risk, nuisance, and other impacts on the biophysical environment	Project area	At operation	Medium traffic generation will be for a short duration	Roadside tree plantation as applicable and feasible under harsh climatic condition; plants should be selected according to their abilities to absorb emissions.  Regular road maintenance to ensure the good surface condition.  Regular vehicle checks to control and ensure compliance with NEQS.	NAPFA Building Project Management	AGP	Air Quality
<b>Noise Level and Vibrations</b>									
Induced vehicular traffic movement	Environmental and Social Impacts	Traffic-related noise pollution and vibrations from engines, tires, and use of (pressure) horns	Project area	At operation stage	Medium traffic generation will be for a short duration	Noise measurements to be carried out to ensure the effectiveness of mitigation measures, (e.g., speed limits at the Project site).	NAPFA Building Project Management	AGP	Noise
<b>Flora and Fauna</b>									

Project Activities	Type(s) of Impact	Potential Impacts on Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impacts	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	
Roadside right-of-way plantation	Environmental and Social Impacts	Soil erosion if site not vegetated acts as a sound barrier against noise and dust, aesthetically valuable,	Along with service roads along NAPFA project	Operation stage	Low	Plantation/Vegetative barriers to lessen visual and other impacts.  Monitoring of survival of trees at the specified rate and suitable measures should be taken to protect trees.  Indigenous flora should be preferred.	NAPFA Building Project Management	AGP	Plantation
<b>Road Safety</b>									
Vehicular movement	Social Impacts	Road accidents may occur, life risk of the general public	Near populated areas	Operation stage	Low	Traffic management plan to be developed.  Traffic control measures, including speed limit, to be enforced.  Mass awareness regarding traffic rules.	NAPFA Building Project Management	AGP	Social Issues

## 8.8. Solid Waste Management Plan

Construction Phase: Several solid waste bins will be placed at the site camp for the collection of solid waste.

Development Consultancy Services will contract MCI for collection, transportation and disposal of solid waste generated by Development Consultancy Services.

Empty chemical drums, iron cuttings, etc. will be collected separately at the project site within an area marked as "Scrap Yard". After a suitable timeframe, scrap will be sold to a recycling contractor.

The construction waste generated will be recycled to the extent possible. Open burning of solid waste will not be allowed.

Operational Phase: The internal collection of solid waste will be carried out by NAPFA project management. NAPFA project Management will contract MCI for collection, transportation and disposal of solid waste generated by NAPFA project.

The internal collection of waste will be carried out by NAPFA project Management. The waste will be collected daily and stored at a designated site where MCI collection crew will take the waste.

A garbage room shall be provided to receive the daily waste material for final dispose-off through garbage vans.

Solid waste will be handed over to Metropolitan Corporation Islamabad (MCI) for further disposal. For recyclables, the contractor shall be hired to sell this waste. The solid waste will be collected by MCI staff, and they will dispose of waste at a designated disposal site in Islamabad. The estimated solid waste generated during operational phase is 0.479 ton/day.

## 8.9. HSE Management Plan

- Health Safety and Environment (HSE) induction/orientation will be provided to all workforce at the project site.
- Assembly point will be established for the gathering of workforce regarding daily HSE Toolbox Talk at the project site.
- HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.
- Special education sessions will be conducted properly at the site.
- The daily walkthrough will be conducted at the project site
- All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special, Safety Gloves, Masks etc.).
- Proper and safe scaffolding will be provided at the site for safe work at height.
- All the machinery will be inspected properly at the site.
- Inspection & Tagging system will be maintained at the project site.
- Safety signage will be provided at the project site.
- Fire posts will be established at the project site at easy approach location.
- Waste will be maintained properly.

- HSE Signboard will be installed at the project site for an Emergency response.
- Rest area & smoking zones will be established at the site.
- Regular First Aid Center, along with all required medicines 24/7, will be available at the project site.
- Paramedic (dispensers) will be deployed at the first-aid post for day & night shift
- Fully equipped Ambulance will be made available at the site for 24/7
- In-house training will be conducted on the project site.

The contractor will develop his HSE policy, roles, and responsibilities of HSE Manager and staff. It also provides information about HSE objectives, Personal Protective Equipment (PPE's) to be used at the site, first aid training and communication and documentation regarding HSE.

- First Aid Boxes : First aid boxes will be provided at all active construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plast, healing balms, pyodine, spirit, painkiller, etc.
- Dispensaries: Medical facilities will be established by the contractor. A dedicated room will be established as a dispensary and first aid services at the construction site.
- PPEs: Site Engineer and HSE Manager will be responsible for providing PPE to all workers.
- Safety Signs: Relevant safety signboards will be displayed on the worksites and labour camps to make aware / train workers about safety rules. Mainly safety signs include signs of speed limits, electric spark, etc.
- TBTs: Tool Box Talks (TBTs) will be delivered on a regular basis and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.
- Water Sprinkling: Dust pollution will be controlled with water sprinkling and minimizes the risk of adverse impacts of dust on workers and surrounding areas. Water sprinkling will be carried out regularly to minimize dust pollution and avoiding creating slush.
- Barricading: The contractor will put up barricade tape at all the active work sites. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet. Training : Safety training will be delivered by the HSE Manager to achieve its objectives. Training will be conducted for capacity building of employees/workers/labour/sub-contractors to make them well effective to respond to any kind of emergency situation.

The breakup cost for the safety of workers is described in **Table 8.2**.

**Table 8.2: Estimated Cost for the Implementation of Environmental Monitoring Plan for NAPFA project**

Sr No	Item	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
<b>Personal Protective Equipment (A)</b>				
1	Dust Masks	7,200	10	144,000
2	Safety Shoes	150	2000	3,00,000
3	Gloves	1800	200	360,000
4	First Aid Box	1	3000	3,000
5	Ear Plugs	900	50	45,000
6	Safety Helmets	150	1000	150,000
7	Safety Jackets (Hi Vis)	175	500	75,000
<b>Others (B)</b>				
8	Provision of Dust Bins	15	1000	15,000
9	Warning Tape	10	500	5,000
10	Safety Cones	10	1000	10,000
11	Safety Sign Boards	10	1000	10,000
12	Raincoat	50	1000	50,000
<b>Total (A + B)</b>				<b>2,020,000</b>

Time Required for Construction Period = 4 years

Number of Labor Required for Construction = 100

Personal Protective Equipment PPEs

Dust Mask : 1 Dust Mask to be used in a week by each labourer

Safety Shoes: 1 Safety shoe for twelve months for each labourer

Gloves: A pair of gloves for each labourer for a month

First Aid Box 1 first aid box for every 50 labourers

Ear Plug 1 set of the earplug to be used for 2 months for each labourer

Safety Helmet 1 safety helmet for each labourer for 12 months

Safety Jackets 1 safety Jacket (Hi-Vis) for each labourer for 12 months

Dust Bin : Rough estimate

Water Sprinkling the whole construction period

Rain Cost: 1 Rain Coat for each labourer

(The calculations are made by considering the average number of workers working at a time)

### 8.10. Traffic Management and Construction Material Transportation Plan

- All the contractor's construction material will be transported to the project site via Street 8 and Jaffer Khan Jamali Road.
- 5 km speed limited is being maintained at the project site.
- All the light vehicles cars, jeep etc. are being parked in a designated area.
- Speed breakers will be followed properly.
- All the experienced and license holders (drivers & operators) will be hired for transportation.
- All the heavy machinery will be checked properly and inspected on a regular basis.
- Speed limit signboards have been installed at the project site.

- All the (headlights, backlights, Indicator etc.) will be checked and maintained regularly.
- All the warning light, reverse back alarms will be maintained properly.
- All the routes within the project site will be marked and designated properly.

#### **8.11. Emergency Preparedness, Response and Site Evacuation Plan**

- The Contractor will always be ready for response in any kind of emergency at the project site.
- Special assembly points will be established at the project site (offices & site).
- The emergency siren will be installed at assembly points.
- Contact numbers of emergency response team will be circulated at the project site.
- Close coordination will be carried out in Rescue 15 in the case of any serious injury/accident.
- Close coordination will be carried out by all law enforcement agencies (police) in case of an aggressive mob of people in the shape of any kind of protest.
- Emergency response drill will be carried out once in a month for provision of awareness to the workforce at the project site.
- First Aid Boxes will be available at the project site around the clock.
- Experienced and qualified paramedic staff will be available at First Aid Post at the site under the command of HSE Manager.
- Fully equipped Ambulance will be available at the project site along with all mandatory items (Oxygen cylinder, Statures & First Aid Box)
- All the new entrants will be oriented by HSE Manager regarding the required awareness towards the hazardous and risky situation and control.
- The entire workforce will be provided with the all mandatory PPEs for the risk-free environment.
- Special in-house training (TBT) will be conducted by the HSE Manager regarding the awareness towards any emergency condition and control.
- Proper water sprinkling will be carried out on service road along with the project site for dust control.

#### **8.12. Fire Fighting Plan**

The construction site will be equipped with fire extinguishers as well as communication equipment for contacting the appropriate emergency response teams.

Throughout the construction site, emergency alarms will be installed. Persons will be nominated to ring the emergency alarm in case of an emergency or any emergency risk.

All the camp residents will be trained and well communicated how to respond to the emergency alarm and reach assembly point immediately. Workers will be trained to respond to an emergency alarm, as discussed below:

- If the alarm rings for 20 seconds, only once, then it is a less severe emergency;

- If it rings for 20 seconds thrice after intervals, then it is medium to a severe high emergency, but it can be much severe; and
- If it rings for 60 seconds or more continuously, then the emergency situation is most difficult so, everyone should respond to it immediately, evacuate the workplace and move towards the assembly point.

Proper evacuation routes will be designated, nominated, and well communicated to all. All the workers will be trained to follow the evacuation routes and reach the assembly point in case of an emergency.

### 8.13. Plantation Plan

There are trees at the project site, along the south-eastern boundary; however, these trees will not be cut, instead they have been incorporated into the building design. Furthermore, there are wild bushes and grass at the project site; which will be cleared during the construction phase.

The practice of plantation of mature plants will be effective compensation against the expected damages to the existing vegetation. In this regard, CDA Environment Wing has made a policy, according to which, the proponents of development projects will plant trees on public lands allocated for plantation, thereby contributing towards Prime Minister Billion Trees Tsunami Project.

AGP being a responsible and environment conscious proponent, will plant 2,000 trees in open spaces under the assistance of CDA Environment Wing.

A plantation plan has been prepared for NAPFA project. The plan has a mix of appropriate trees /bushes which will be raised within the available open spaces of NAPFA project. Ornamental trees, bushes and climbers have been included to improve the scenic and aesthetic value of the building.

AGP will ensure the provision of staff and budget for the implementation of the plantation plan at the project site.

The following species of Trees, Shrubs and Indoor Plants are recommended for green areas, parking, and gardens at the entrance of NAPFA project:

**Table 8.3: Recommended Plants for NAPFA project**

No.	Scientific Name	Common Name	Description
1	<i>Pinus roxburghii</i>	Cheer	Highly recommended for Islamabad regions, grows very well in
2	<i>Pongamia glabra</i>	Sukh Chain	Evergreen and historical shade tree
3	<i>Cupressus sempervirens</i>	Saroo	Tall, hardy tree
4	<i>Cassia fistula</i>	Amaltas	The beautiful flowering tree grew in this region
5	<i>Cassia gulaca</i>	Small amaltas	Beautiful yellow flowers almost all year
6	<i>Thevetia peruviana</i>	Peeli Kanair	Thick foliage shrub with yellow leaves
7	<i>Juniper Spp.</i>	Junipers	Different varieties, do very well in high landscape areas

### 8.14. Plantation Plan Cost

The cost of plantation includes the cost of equipment, initial planting, and maintenance cost for the first four years of plantation. The total estimated cost of implementation of plantation (including both indoor and outdoor plants) plan is **Rs. 1.95 million**.

**Table 8.4: Tentative Cost of Equipment**

Sr.	Equipment	Numbers	Cost in PKR
1	Grub hoe (earth digging tool) and others	Lump sum	100,000
<b>Total cost of equipment</b>			<b>100,000</b>

The cost break-up of plantation and maintenance for a period of four years is mentioned in **Table 8.5** to **Table 8.10**.

**Table 8.5: Estimated Cost of Unit Plantation (2,000 Plants) for 1<sup>st</sup> Year**

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Clearance of Site (2,000 plants)	2,000	5/plant	10,000
2	Layout/ unit	2,000	2/plant	4,000
3	Digging of Pits	2,000	50/pit	100,000
4	Average cost per unit plant	2,000 plants	215/plant	430,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	2,000 plants	10/plant	20,000
6	Plantation of plants with ball of earth/unit	2,000	30/plant	60,000
7	Addition of Manure 1 cft. / pit	2,000 cft.	Lump Sum	50,000
8	Hand watering 100 times Approx. x2,000=200,000	200,000	1/watering	200,000
9	Weeding 4 times 2,000x4=8,000	8,000	5/plant	40,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
<b>Total Say</b>				<b>964,000</b> <b>970,000</b>

**Table 8.6: Estimated Unit Cost of Plantation of (400 Plants) & Maintenance for 2<sup>nd</sup> Year in case of 20% Mortality**

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
3	Re-Digging of Pits	400	50/pit	20,000
4	Average cost per unit plant	400 plants	215/plant	86,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	400 plants	10/plant	4,000
6	Plantation of plants with ball of earth/unit	400	30/plant	12,000
7	Addition of Manure 1 cft. / pit	1,000 cft.	Lump Sum	25,000

8	Hand watering 100 times Approx. x2,000=200,000	200,000	1/watering	200,000
9	Weeding 4 times 2,000x4=8,000	8,000	5/plant	40,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
<b>Total</b>				<b>437,000</b>
<b>Say</b>				<b>440,000</b>

**Table 8.7: Estimated Cost of Plantation (200 Plants) & Maintenance for 3<sup>rd</sup> Year**

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
3	Re-Digging of Pits	200	50/pit	10,000
4	Average cost per unit plant	200 plants	215/plant	43,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	200 plants	15/plant	3,000
6	Plantation of plants with ball of earth/unit	200	30/plant	6,000
7	Addition of Manure 1 cft. / pit	1,000 cft.	Lump Sum	25,000
8	Hand watering 50 times Approx. x2,000=100,000	100,000	1/watering	100,000
9	Weeding 3 times 2,000x3=6,000	6,000	5/plant	30,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
<b>Total</b>				<b>267,000</b>
<b>Say</b>				<b>270,000</b>

**Table 8.8: Estimated Cost of Maintaining 2,000 plants for 4<sup>th</sup> Year**

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Hand watering 50 times 2,000x50=100,000	100,000	1/time	100,000
2	Weeding	2,000	5/unit	10,000
3	Trimming/pruning of plants	2,000	5/unit	10,000
4	Miscellaneous			50,000
<b>Total</b>				<b>170,000</b>

**Table 8.9: Total Cost of Plantation Plan for Four years**

Activity	Amount (PKR)
Estimated Cost of Unit Plantation (2,000 Plants) for 1 <sup>st</sup> Year	970,000
Estimated Unit Cost of Plantation of (400 Plants) & Maintenance for 2 <sup>nd</sup> Year in case of 20% Mortality	440,000
Estimated Cost of Plantation Unit (200 Plants) & Maintenance for 3 <sup>rd</sup> Year	270,000
Estimated Cost of Maintaining 2,000 plants for 4 <sup>th</sup> Year	170,000
<b>Total</b>	<b>1,850,000</b>

**Table 8.10: Final Cost per Tree Planted**

Activity	Amount (PKR)
Cost for maintenance of cultivated plants for 4 years	1,850,000
Cost of equipment	100,000
Total cost	1,950,000
<b>Cost for raising one plant and its maintenance for 4 years</b>	<b>975</b>

### 8.15. Restoration and Rehabilitation Plan

Restoration of the project site and associated facilities including access tracks and contractor's camp after construction activities is of utmost importance. Improper disposal of the waste left at the end of the construction activities would lead to extensive disturbance to the environment.

Following measures will be adopted for site restoration and rehabilitation:

- All equipment and machinery at the project site will be de-mobilized.
- All waste at the project site will be disposed of according to the requirement of EIA.
- Septic tank with soakage pit will be properly dismantled.
- All temporary concrete structures at the project site will be dismantled, and construction and demolition material will be handed over to MCI for reuse or disposal.
- All the un-necessary pits at the project site will be backfilled.

### 8.16. Grievance Redressal Mechanism

An attempt has been made during the present EIA to identify all potential impacts of the proposed project, to provide mitigation measures to address the potential impacts, and to chart out a mechanism to implement these mitigation measures.

Although this program does not involve any voluntary land acquisition, some social and environmental issues/grievances/disputes are likely to arise during the construction and operational phase of the project.

The proposed mechanism will be based on a simple grievance redress committee—Members included in the committee will be from high officials of Pak PWD on behalf of AGP. There will be a complain box to address any complaints or conflict arise during construction, and operational phase of the project and the quarrels will be sorted out by the project manager of the project as a part of the redressal committee. If the issue could not be resolved at a lower level, then it will be addressed by the higher officials of the Pak PWD.

The proposed GRM will help to achieve the objectives of sustainability by dealing with the environmental and social issues of the Project in a timely manner.

### 8.17. Project Monitoring

Pak PWD will make the necessary arrangements to monitor the key environmental data during the construction and operational phases. These will include the number of trees cut as part of the project work, the quantity of water used, a record of waste produced, a record of waste disposal, and project-related vehicular traffic.

The Project Director of NAPFA project shall monitor project activities while working in the project area. He will keep a record of all non-conformance observed and report these along with actions to Pak PWD for further action. He will also have to report any impacts anticipated, along with his recommendations for further action.

### 8.18. Environmental Monitoring Plan

Environmental Monitoring is normally undertaken during both the construction and operational phases of the project to ensure the effectiveness of the proposed mitigation measures.

In order to respond to unanticipated environmental concerns at an early stage and to determine the accuracy of impact, predictions are also required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements.

The various purposes of the environmental monitoring plan are:

- To evaluate the effectiveness of mitigation measures.
- To respond to the unanticipated environmental impacts when the project is under implementation.
- To make regulations and improve management and environmental controls based on the monitoring data. Pak-EPA is entrusted with the overall responsibilities of monitoring the environment in Islamabad.

An Environmental Monitoring Plan for NAPFA project has been provided in **Table 8.11**. The plan will be used as a management and monitoring tool for the implementation of

the mitigation measures required by the EIA. The plan entails the required mitigation measures recommended in the EIA.

Table 8.11: Environmental Monitoring Plan for NAPFA project

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards	Implementing	Supervision
Ambient air quality	Construction	SO <sub>2</sub> , NO <sub>x</sub> , CO PM <sub>10</sub>	At the project site	PM <sub>10</sub> , for continuous 8 hours, on a monthly schedule	NEQS	Contractor	Project Consultant
Ground Water Quality	Construction	pH, TDS, TSS, DO, coliforms, hardness, nitrate, chloride, sulphate	At the project site	Quarterly	WHO and NEQS	Contractor	Project Consultant
Noise Levels	Construction	dB (A)	At the project site	Twice in 8 hours at a selected site on a quarterly basis	EPA Ambient Noise standards	Contractor	Project Consultant
Roadside Plantation	Construction	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out on service roads and inside of the NAPFA project.	(1) One month after plantation (2) One year after plantation 1 month, 3 months, 6 months, and 12 months after planting	75 % survival rate	Contractor	Project Consultant
Indoor Plantation+	Operation	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out	(1) 2.5 years after plantation	75% survival rate	NAPFA Project Management	AGP
Safety Rules Compliance	Operation	(1) Faulty, overloaded and speeding vehicles (2) Inspection of signage	All along with the estate, with spot check at accident-prone black spots	Quarterly basis, for 3 years	To be determined	NAPFA Project Management	AGP

**Key:**

**dB** = decibels (measured in the audible range)  
**NEQS** = National Environmental Quality Standards  
**ROW** = Right-of-Way  
**TSS** = Total Suspended Solids

**EPA** = Environmental Protection Authority,  
**PM10** = Particulate Matter smaller than about 10 micrometers,  
**SPM** = Suspended Particulate Matter



**Table 8.12** shows the estimated cost for the EMP.

**Table 8.12: Cost Estimates for Environmental Monitoring during the construction phase**

Environmental Activities	Monitoring	No. of Samples	Unit specification	Cost	Cost (Rs)
<b>Construction phase</b>					
Ambient air quality monitoring Quarterly basis		12	@ 50,000 per sample for 24 hr monitoring.		600,000
Ambient water quality monitoring Quarterly basis		12	@ 20,000 per sample		240,000
Noise levels monitoring on Quarterly basis		12	@ 5,000 per sample		60,000
<b>Total (a-c)</b>					<b>900,000/-</b>
Consultant for Quarterly Environmental Monitoring Report		12 QEMRs	@ 150,000		1,800,000
<b>G Total</b>					<b>2,700,000/-</b>

Source: Environmental Consultant Estimates, 2021

### 8.19. Training Program

Training programs are a necessary agenda that must be implemented to implement Environmental Management & Monitoring Plan effectively. The Environment, Health & Safety Officer will impart training to the contractor's staff. The key objective of the training program is to ensure that the requirement of EMP is clearly understood and followed throughout the project. The training shall cover the following areas:

- Environmental sensitivity of the project area.
- EMP communication and documentation requirement.
- Vegetation and community issues and their mitigation measures.
- Safe construction practices
- Use of personal protective equipment (PPEs)
- Environmentally sound construction practices
- Vehicular safety.
- Site restoration requirement.
- Solid Waste Disposal

Pak PWD will be primarily responsible for providing training to all project personnel. Lump-sum fees of Rs. 500,000/= should be kept for the training management plan. Framework for the environmental and social training program is being provided in **Figure 8.13**.

**Table 8.13: Framework for Environmental & Social Training Program of NAPFA project**

Type of Training	Training Description	Period	Duration	Training By	Trainee
Occupational Health and Safety staff	Training should be provided to aware staff to conform to safety codes	Before Commencement of Project Activities	Full day	External Sources	EHS Manager
Environment & Social Laws, Regulations, procedure and guidelines of the government	The training should detail the laws and regulation concerning the environment, Labour laws and compliance with government regulation.	Before Commencement of Project Activities	Full day	External Sources	EHS Staff, Site Supervisors, Site Engineers.
Occupational Health & Safety for workers	Health, safety and hygiene. Proper usage of Personal Protective Equipment (PPE's), Precautions to be taken for working in confined areas.	Before Construction Activities	Full Day	EHS Manager	Workers
Solid Waste Management	Waste segregation, identification of Hazardous Waste, Use of PPEs and waste Handling	Before Commencement of Project Activities	Full Day	External Sources	Relevant workers and staff
Vehicular safety	Safe operation and maintenance of all vehicles, insurance in accordance with the applicable local and federal laws	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Vegetation and community issues and their mitigation measures	To analyze the community problems and how to cater to serious issues relevant to vegetation and agricultural land of the community	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Safe construction practices	To upgrade local craftsmen's skill in quality construction and develop skilful working human resources in hazard-resistant construction	Before Commencement of Project Activities	Full Day	EHS Manager	Relevant workers and staff
Health Safety and Environmental Auditing	Health Safety and Environmental Audits, Reporting Requirements	Before Commencement of Project Activities	Full Day	External Sources	Relevant Department
Implementation of environmental management and monitoring plan	Explanation of Environment Management and Monitoring Program	Quarterly. As soon as the project activities start	Full Day	External Sources	EHS Staff

## 8.20. Environmental Monitoring & Mitigation Cost

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

The summary of the cost of monitoring environment and mitigation cost is shown in **Table 8.14**.

**Table 8.14: Summary of Environmental Mitigation & Monitoring Cost**

Activity	Basis	Cost (Rs)
Environmental Monitoring Cost	Ambient Air, Noise and Water Quality Monitoring & Cost of Hiring Environmental Engineer for 36 Months	2,700,000
Plantation Plan	Implementation of plantation plan	1,950,000
Health & Safety of Workers	For 50 employees for the provision of dust masks, safety shoes, gloves, first aid box, ear plugs, safety helmets and safety jackets (Hi-Vis) and Provision of dustbins, warning tap, safety cones, safety signboards and water sprinkling	2,020,000
Cost of Environmental Training	For the whole construction period	500,000
<b>Grand Total</b>		<b>7,170,000</b>

## 8.21. Communication and Documentation

An effective program for storing and communicating environmental information during the project is an essential requirement of an EMP. This activity will be done by an independent monitoring consultant. The key features of such a mechanism are:

- Precise recording and maintenance of all information generated during the monitoring in a predetermined format.
- Communicating the information to a central location
- Storing the raw information in a central database
- Processing the information to produce periodic reports

**Data recording and maintenance:** All forms will be numbered, and a tracking system will be developed for each. Whenever a form is released for use in the field, its number will be recorded. The monitors will be required to account for each form after completion. In this manner, it will be ensured that all forms are returned to the office, be they filled, unused or discarded.

**Storage of information:** A database for information collected during the project will be prepared. The database may include information on training programs, staff deployment, non-compliance, corrective actions, water resources, results of effects monitoring.

Meeting: For effective monitoring, management and documentation, of the environmental performance during the operation, environmental matters will be discussed during a daily meeting held on-site. Environmental concerns raised during the meetings will be mitigated after discussions with the proponent site representatives.

Reporting: Monitoring body will produce daily, weekly, monthly and another periodic report, as well as a final report of the project based on the information collected. The proponent site representative and the contractors will also prepare a weekly environmental report. Copies of the proponent will be provided to the proponent and contractor's higher management.

## **8.22. Post Project Monitoring**

The Project Director of the NAPFA project or his representative shall prepare a brief post-project report describing the conduct of the actual operation, any changes from the operation for which approval was obtained, the degree to which the recommendations of the EIA were adhered to, any damages to the environment and the mitigation or compensation provided and monitoring information of scientific or environmental interest that is not propriety in nature. This report should be submitted to the Pakistan Environmental Protection Agency.

## 9. Conclusion and Recommendations

### 9.1. Introduction

This chapter presents the assessment of the possible environmental impact of NAPFA project at Street 8, Sector H-8/4, Islamabad. The study presents the purpose of the EIA as to the description of the site, the impact of the project during and after implementation, the mitigation measures and residual impacts.

The EIA also includes the justification and detailed description of the project, with an evaluation of the potential impacts and effects on the environment, including economic and social consequences. This chapter describes the conclusion and recommendation of the EIA study of the project.

### 9.2. Conclusions

The major conclusions of the EIA are:

- Auditor General Pakistan intends to establish National Academy of Public Finance and Accountancy (NAPFA).
- The objective of the Project is to provide office and residential space for professional trainings in order to award diploma/degree in public accounting and auditing and to work as degree awarding institution in financial management, accounting, auditing, etc fields.
- The Sector H-8/4 has been allocated for public / private sector offices and the proposed project will be constructed exclusively for audits and accounts offices and residential purposes i.e., academy and residencies will be part of the proposed project.
- The project site is located in Street 8 of Sector H-8/4, Islamabad, on a piece of land measuring 160,000 sq. ft. The project site can be accessed from Jaffer Khan Jamali Road from the northeast.
- The project includes one Category-1 house, basketball badminton court and extra foundation for future extension.
- NAPFA building shall has several environmental friendly features such as central HVAC system, component of renewable energy on rooftop. The building will be constructed in accordance with the Capital Development Authority bye-laws which are currently applicable in Islamabad.
- The estimated population of NAPFA project will be 766. The source of water will be CDA supply line and IESCO will provide the electricity connection.
- The total cost of the project is Rs. 3.605 billion and will be completed by Year 2024.
- The project construction phase can potentially affect the natural resources of the area. These adverse impacts can be largely reduced by implementing the appropriate mitigation measures, which has been discussed in this report.
- The project siting is likely to result in some aesthetic issues, which can be reduced with the help of astute planning.

- The potential impacts during construction phase include increased traffic load on Street 8 Road and Jaffer Khan Jamali Road, deterioration of ambient air quality caused by the exhaust emission and kicked up dust, noise pollution, safety hazards and public health concerns for the nearby community.
- The significant environmental management issues during the operation phase include solid waste and vehicular traffic.
- The mitigation measures have been identified in chapter 6 for impacts expected during the different phases of the project.
- Based on the recommended mitigation measures in chapter 7, the impacts identified will be reduced with residual impacts having insignificant levels. **Table 9.1** presents the assessment of the residual impacts (mitigated).

### 9.3. Recommendations

- A plantation plan has been proposed in the EIA report, which must be developed and implemented for NAPFA project.

On the basis of the overall impact assessment, more specifically, nature and magnitude of the residual environmental impacts identified during present EIA, it is concluded that NAPFA project is likely to cause environmental impacts mainly during its construction phase. However, these impacts can be mitigated provided the proposed activities are carried out as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented.

There are no remaining issues that warrant further investigation. This EIA is considered adequate for the environmental and social justification of the project.

Table 9.1: Impact Matrix – Residual Impacts (Mitigated) of NAPFA project

Description	Physical			Biological		Social and Socio-economic				
	Soil	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
<b>Project Siting</b>										
Project Site, Land Use and Design	N	N	N	N	N	N	N	N	N	N
Visual Impacts	N	N	N	N	N	N	N	N	N	N
<b>Construction Phase</b>										
Land Acquisition	N	N	N	N	N	N	N	N	N	N
Contractor Mobilization	0	0	0	N	N	-1	N	0	0	N
Construction Office Operation	0	0	0	0	-1	0	N	0	+1	N
Site Preparation	-1	0	0	-1	-1	-1	N	0	+1	N
Construction Works	0	0	0	0	0	-1	N	-1	+1	N
Laying of Services	0	0	0	0	0	-1	N	-1	+1	N
Construction of Buildings	0	0	0	0	0	-1	N	-1	+1	N
Construction Materials Supply	0	0	N	0	-1	-1	N	-1	+1	N
Construction Crew Transportation	0	0	N	0	-1	-1	N	-1	+1	N
Solid Waste Disposal	-1	0	-1	-1	-1	N	N	0	0	N
Waste Effluent Disposal	0	0	-1	0	0	N	N	0	0	N
Demobilization of Contractor	0	0	0	0	0	-1	N	0	0	N

Description	Physical			Biological		Social and Socio-economic				
	Soil	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
<b>Operation Phase</b>										
Operation of NAPFA project	N	0	0	0	-1	0	N	0	+1	N
Solid Waste Disposal	-1	0	-1	-1	-1	N	N	0	N	N
Waste Effluent Disposal	-1	0	-1	-1	-1	N	N	0	0	N

Key: -2: High negative impact; -1: Low negative impact; 0: insignificant/negligible negative; +1: low positive impact; +2; High positive impact, N: no impact

## Annexure-1: List of Names, Qualification and Roles of EIA Team Members

Name	Project Position	Qualification and Experience	Tasks Assigned
Mr Saadat Ali	Team Leader/ Environmental Engineer	Postgraduate Diploma in Sanitary Engineering, International Institute for Hydraulic and Environmental Engineering, 1984  B. Sc. Civil Engineering, Engineering College, University of Peshawar, 1978	<ul style="list-style-type: none"> <li>▪ Overall management of the project (Supervision, site visits, guidance, inputs and suggestion, recommendation and discussion and report presentations).</li> <li>▪ To review overall environmental issues and mitigation measures.</li> <li>▪ To finalise the draft and final study reports.</li> </ul>
Mr Ali Abdullah	Environmental Civil Engineer	M. Sc. Environmental Engineering, Newcastle University (2016)  B. Sc. Civil Engineering, The University of Lahore, Lahore (2010-2014)	<ul style="list-style-type: none"> <li>▪ To overview draft report</li> <li>▪ Suggest mitigation measures for impacts that affect the environment.</li> <li>▪ Identification of site for baseline data collection for water, wastewater, noise, soil, traffic and ambient air quality.</li> </ul>
Mr Ehsan Mustafa	Environmental Engineer	MS in Environmental Engineering, National University of Science and Technology (NUST) H-12, 2019  Bachelor's in Environmental Engineering, University of Engineering And Technology (UET) Taxila, 2016	<ul style="list-style-type: none"> <li>▪ Secondary data collection for desk review</li> <li>▪ Research tools preparation for field study</li> <li>▪ Fieldwork for baseline data collection in the area under study</li> <li>▪ Public Consultation</li> </ul>
Ms Fehimda Rafi	Environmental Scientist	MS in Integrated Water Resources management, Mehran University of Sciences and Technology, Jamshoro, 2019-2021  Bachelor's in Environmental Sciences, International Islamic university, Islamabad (2014-2018)	<ul style="list-style-type: none"> <li>▪ Fieldwork for baseline data collection in the area under study</li> <li>▪ Stakeholders consultation</li> <li>▪ Secondary data collection</li> </ul>

## **Annexure-2: Terms of Reference**

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An EIA will be carried out for all stages of the projects, i.e. preconstruction, construction and post-construction with the following objectives:

- Establishing the environmental baseline in the study area and identifying any significant environmental issue.
- Assessing these impacts and providing for the requisite avoidance, mitigation and compensation measures.
- Integrating the identified environmental issues in project planning and design.
- Developing appropriate management plans for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested.
- Give presentation during a public hearing of the EIA of the NAPFA Project and respond to queries generated by Pak-EPA until issuance of the NOC.

## Annexure-3: References

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## Annexure-4: Glossary

<b>Air pollution</b>	Air is made up of a number of gases, mostly nitrogen and oxygen and, in smaller amounts, water vapour, carbon dioxide and argon and other trace gases. Air pollution occurs when harmful chemicals and particles are emitted to the air – due to human activity or natural forces – at a concentration that interferes with human health or welfare or that harms the environment in other ways.
<b>Ambient air quality</b>	Ambient air quality refers to the quality of outdoor air in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution.
<b>Archaeology</b>	The study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.
<b>Biodiversity</b>	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.
<b>Bye-law</b>	A rule made by a local authority to govern activities within the area it controls. Examples include bye-laws covering waste disposal, traffic or public events or signs.
<b>Carbon dioxide (CO<sub>2</sub>)</b>	A colourless gas that is naturally produced by animals and people in the exhaled air and the decay of plants.
<b>Carbon monoxide</b>	A highly poisonous, odourless, tasteless and colourless gas that is formed when carbon material burns without enough oxygen.
<b>Climate</b>	The pattern of weather in a particular region over a set period of time, usually 30 years.
<b>Conservation</b>	Preserving or protecting animals and resources such as minerals, water and plants through planned action (such as breeding endangered species) or non-action (such as not letting taps run unnecessarily).
<b>Effluent</b>	Liquid wastes such as sewage and liquid waste from industries.
<b>Energy efficiency</b>	Actions to save fuels, for example, better building design, changing production processes, developing better transport policies, using better road vehicles and using insulation and double glazing in homes.
<b>EIA</b>	An environmental impact assessment (EIA) is an analytical process that systematically examines the possible environmental consequences of the implementation of projects, programs and policies.
<b>EMP</b>	An environmental management plan (EMP) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.
<b>Fauna</b>	The animals of a particular region, habitat, or geological period.
<b>Flora</b>	The plants of a particular region, habitat, or geological period.
<b>Habitat</b>	The area occupied by a community or species (a group of animals or plants), such as a forest floor, desert or seashore.
<b>Initial Environmental Examination</b>	Initial environmental examinations describe the environmental condition of a project, including potential impact, formulation of mitigation measures, and preparation of institutional requirements and environmental monitoring.
<b>Landfill</b>	A site that is specially designed to dispose of waste and operates with a license granted by the Environmental Protection Agency (EPA).

<b>NEQS</b>	The Pakistan Environmental Quality Standards (NEQS) are quality standards to regulate the air emissions and effluents of industry and other big polluters.
<b>Noise Pollution</b>	Noises that disturb the environment and people's ability to enjoy it, for example, continually sounding house alarms, loud music, air conditioning or other electrical units and aircraft or motor engines.
<b>Seismology</b>	The branch of science concerned with earthquakes and related phenomena.
<b>Topography</b>	The arrangement of the natural and artificial physical features of an area.

## Annexure-5: List of People Met During the EIA

No.		Name of Person	Designation			
1.	<b>Stakeholders</b>	Mr. Ali Nayyer	Deputy Managing Director, Project Consultant (Development Consultancy Services)			
2.		Mr. M Ashraf Nadeem	Assistant Secretary, FBISE			
3.		Mr. Bilawal Hussain	Admin Incharge, Shifa College Of Medicine			
4.		Mr Asif Majeed	Director, Environment Wing, CDA			
5.		Mr Mukhtiar Hussain Shakir	Assistant Director, Emergency and Disaster Management Directorate, MCI			
6.		Mr. Sher Afzal	Deputy Manager Environment, E&SS, PMU, IESCO			
7.		Mr. Zain Ali Shah	CEO, ZIGG Engineers			
		Name	Age	Gender	Education	Profession
8.	<b>Public Consultation</b>	Mr. Hussain	51	Male	Masters	Project Manager
9.		Mr. Danyal	43	Male	Primary	Private Job
10.		Ms. Shahzaib	23	Male	F. Sc	Student
11.		Mr. Shan Ahmad	68	Male	Primary	Unemployed
12.		Mr. Imtiaz Afzal	70	Male	Illiterate	Unemployed
13.		Ms Samina	28	Female	F. A	Housewife
14.		Mr. Irfan	70	Male	Illiterate	Unemployed
15.		Ms. Bushra	25	Female	Illiterate	Sanitary worker
16.		Ms. Shanza	40	Female	Illiterate	Sanitary Worker
17.		Mr. Saddam Khan	36	Male	B. Com	Business
18.		Mr. Anwar Hussain	31	Male	Graduation	Business
19.		Ms. Asma	40	Female	B. A	Housewife
20.		Mr. Kashif	28	Male	Graduation	Private Job

## Annexure-6: Lab Reports of Ambient Air Quality and Noise Monitoring




# ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA & PUNJAB EPD CERTIFIED

### CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)



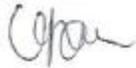
Reference Number:	ESPAK/198/21/AA/1317/00133	Date:	19/05/2021
Name of Industry/Client:	Project Procurement International		
Address:	Office #26, 2nd Floor, Silver City Plaza, G11 Markaz, Islamabad		
Telephone No.:	---		
Nature of Sample:	Ambient Air	Monitoring Location:	National Academy of Public Finance and Accountancy Street 8, Sector H8/4, Islamabad.
Date of Sample Collection:	01/05/2021	Grab / Composite:	Continuous - 24 Hours
Sample Collected/Sent By:	Shahzaib Ali, Field Officer, ESPAK		
Date of Completion of Analysis:	02/05/2021		

S. No	Parameters	Limit Values (NEQS)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	10 mg/m <sup>3</sup> (1 Hour)	1.0-1.9 mg/m <sup>3</sup>	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Carbon Monoxide (CO)	5 mg/m <sup>3</sup> (8 Hours)	1.1-1.5 mg/m <sup>3</sup>	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
3	Sulfur Dioxide (SO <sub>2</sub> )	120 µg/m <sup>3</sup>	20.5 µg/m <sup>3</sup>	UV Fluorescence (UVF)	Within Prescribed Limits
4	Ozone (O <sub>3</sub> )	130 µg/m <sup>3</sup> (1 Hour)	1.9-14.6 µg/m <sup>3</sup>	Non Dispersive UV Absorption	Within Prescribed Limits
5	Oxides of Nitrogen as NO	40 µg/m <sup>3</sup>	13.1 µg/m <sup>3</sup>	Chemiluminescence Detection	Within Prescribed Limits
6	Oxides of Nitrogen as NO <sub>2</sub>	80 µg/m <sup>3</sup>	22.5 µg/m <sup>3</sup>	Chemiluminescence Detection	Within Prescribed Limits
7	Particulate Matter PM <sub>2.5</sub>	95 µg/m <sup>3</sup>	30.4 µg/m <sup>3</sup>	Particulate Sensor	Within Prescribed Limits
8	Particulate Matter PM <sub>10</sub>	150 µg/m <sup>3</sup>	123 µg/m <sup>3</sup>	Particulate Sensor	Within Prescribed Limits
9	Suspended Particulate Matter (SPM)	500 µg/m <sup>3</sup>	229 µg/m <sup>3</sup>	Particulate Sensor	Within Prescribed Limits

NEQS: Pakistan National Environmental Quality Standards for Ambient Air, 2010  
 • Uncertainty of Measurement (UoM) data will be provided on request, if applicable.

**Note:**

- The report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of this report lies with the client.
- The values represent sample conditions when monitoring/testing was carried out.
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# ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA &amp; PUNJAB EPD CERTIFIED

## NOISE MONITORING REPORT



Reference Number: ESPAK/198/21/N/1319/00118 Date: 19/05/2021  
 Name of Industry/Client: Project Procurement International  
 Address: Office #26, 2nd Floor, Silver City Plaza, G11 Markaz, Islamabad  
 Telephone No.: ----  
 Nature of Sample: Noise  
 Date of Sample Collection: 01/05/2021 Grab / Composite: Continuous - 24 Hours  
 Sample Collected/Sent By: Shahzaib Ali, Field Officer, ESPAK  
 Date of Completion of Analysis: 02/05/2021  
 Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (NEQS-24Hours)	Noise Level in dB(A) Leq	Remarks
1	National Academy of Public Finance and Accountancy Street B, Sector H8/4, Islamabad. - Day Time	65 dB(A)	57 dB(A)	Within Limits
2	National Academy of Public Finance and Accountancy Street B, Sector H8/4, Islamabad. - Night Time	55 dB(A)	42 dB(A)	Within Limits

NEQS: National Environmental Quality Standards for Noise in Commercial Area, 2010 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am)

• Uncertainty of Measurement (UoM) data will be provided on request, if applicable.

### Note:

- The report should be reproduced as a whole and not in parts.
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- Only parameters marked with asterisk (\*) are ISO 17025:2017 accredited.

1. Sample Analyzed By: Shahzaib Ali  
Field Officer
2. Name of Chief Analyst with Seal: Muhammad Arfan 
3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Malik  
General Manager

Date: 19/05/2021



----- End of Report -----

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## Annexure-7: Flora of Islamabad/Tract

No	Botanical Name	Family	Life type	Status	Habitat type		
					Agri. Land	Eroded Shrub Land	River Bed
1	Acacia nilotica	Mimosaceae	Tree	C	✓	✓	
2	Acacia modesta	Mimosaceae	Tree	C	✓	✓	
3	Achyranthes aspera	Amaranthaceae	Herb	C	✓	✓	✓
4	Acrachne ramosa	Poaceae	Grass	C	✓	✓	
5	Amaranthus viridis	Amaranthaceae	Herb	C	✓	✓	✓
6	Aristida mutabilis	Poaceae	Grass	C	✓	✓	✓
7	Artemisia scoparia	Asteraceae	Herb	C	✓	✓	✓
8	Boerhaavia procumbens	Nyctaginaceae	Herb	C	✓	✓	
9	Broussonetia papyrifera	Moraceae	Tree	R	✓	✓	
10	Calotropis procera	Asclepiadaceae	Shrub	C	✓	✓	✓
11	Sepium sebiferum	Euphorbiaceae	Tree	Cult.	✓		
12	Chenopodium album	Chenopodiaceae	Herb	C	✓	✓	
13	Alternanthera sessilis	Amaranthaceae	Herb	C	✓	✓	
14	Convolvulus arvensis	Convolvulaceae	Climber	C	✓	✓	
15	Rumex nepalense	Polygonaceae	Herb	C	✓		✓
16	Cannabis sativus	Cannabaceae	Herb	C	✓	✓	
17	Cassia fistula	Caesalpiniaceae	Tree	LC	✓		
18	Asphodelus tenuifolius	Liliaceae	Herb	C	✓		
19	Conyza Canadensis	Asteraceae	Herb	C	✓	✓	✓
20	Thuja orientalis	Cupressaceae	Shrub	LC	✓		
21	Chenopodium ambrosioides	Chenopodiaceae	Herb	VC	✓	✓	✓
22	Bauhinia variegata	Caesalpiniaceae	Tree	C	✓		
23	Cordia myxa	Boraginaceae	Tree	LC	✓		
24	Jasminum humile	Oleaceae	Shrub	LC	✓	✓	
25	Fumaria indica	Fumariaceae	Herb	C	✓	✓	✓
26	Albizia lebbek	Caesalpiniaceae	Tree	LC	✓	✓	
27	Pinus roxburghii	Pinaceae	Tree	LC	✓		
28	Ricinus communis	Euphorbiaceae		C	✓	✓	✓
29	Cynodon dactylon	Poaceae	Grass	VC	✓	✓	✓
30	Silybum marianum	Asteraceae	Herb	VC	✓	✓	✓
31	Leucaena leucantha	Mimosaceae	Tree	C	✓	✓	
32	Cyperus rotundus	Cyperaceae	Sedge	C	✓		✓
33	Bambusa indica	Poaceae	Grass	LC	✓		
34	Dactyloctenium scindicum	Poaceae	Grass	VC	✓	✓	✓
35	Dalbergia sissoo	Papilionaceae	Tree	C	✓	✓	
36	Cassia occidentalis	Caesalpiniaceae	Herb	C	✓	✓	✓
37	Desmostachya bipinnata	Poaceae	Grass	VC		✓	✓
38	Eriobotrya japonica	Rosaceae	Tree	Cult.	✓		
39	Dicanthium anulatum	Poaceae	Grass	C	✓	✓	
40	Eragrostis japonica	Poaceae	Grass	C		✓	✓
41	Eucalyptus globulus	Myrtaceae	Tree	Cult.	✓		
42	Ficus virgata	Moraceae	Shrub	C	✓	✓	
43	Ipomoea carnea	Convolvulaceae	Shrub	C		✓	✓
44	Imperata cylindrica	Poaceae	Grass	C		✓	
45	Lantana camara	Verbenaceae	Shrub	VC	✓	✓	
46	Dodonaea viscosa	Sapindaceae	Shrub	C		✓	
47	Launaea procumbens	Asteraceae	Herb	C	✓	✓	✓
48	Euphorbia helioscopia	Euphorbiaceae	Herb	C	✓	✓	✓
49	Pongamia pinnata	Papilionaceae	Tree	Cult.	✓		
50	Malva sylvestris	Malvaceae	Herb	C	✓	✓	✓

No	Botanical Name	Family	Life type	Status	Habitat type		
					Agri. Land	Eroded Shrub Land	River Bed
51	Malvastrum coromendelianum	Malvaceae	Herb	C	✓	✓	✓
52	Melia azadirach	Meliaceae	Tree	Cult.	✓		
53	Morus alba	Moraceae	Tree	C	✓	✓	
54	Sonchus asper	Asteraceae	Herb	C	✓	✓	✓
55	Ochthocloa compressa	Poaceae	Grass	C	✓	✓	
56	Parthenium hysterophorus	Asteraceae		VC	✓	✓	✓
57	Persicaria glabra	Polygonaceae	Herb	C			✓
58	Echinops echinatus	Asteraceae	Herb	LC		✓	✓
59	Phoenix sylvestris	Palmae	Tree	Cult.	✓		
60	Populus euphratica	Salicaceae	Tree	Cult.	✓	✓	
61	Tecomella undulata	Bignoniaceae	Shrub	LC		✓	
62	Psidium guajava	Myrtaceae	Tree	Cult.	✓		
63	Tamarix aphylla	Tamaricaceae	Tree	R		✓	✓
64	Saccharum bengalense	Poaceae	Grass	C		✓	✓
65	Saccharum spontaneum	Poaceae	Grass	C		✓	✓
66	Trichodesma indicum	Boraginaceae	Herb	LC		✓	✓
67	Salvia moorcroftiana	Labiatae	Herb	C		✓	✓
68	Solanum nigrum	Solanaceae	Herb	C	✓	✓	✓
69	Sorghum halepense	Poaceae	Grass	C	✓	✓	✓
70	Withania somnifera	Solanaceae	Herb	C	✓	✓	✓
71	Xanthium strumarium	Asteraceae	Herb	VC	✓	✓	✓
72	Salix babylonica	Salicaceae	Tree	LC			✓
73	Zaleya pentandra	Aizoaceae	Herb	C	✓		
74	Ficus elastica	Moraceae	Tree	LC	✓		
75	Ziziphus nummularia	Rhamnaceae	Tree	C	✓	✓	
76	Eugenia jambolana	Myrtaceae	Tree	Cult.	✓		
77	Euphorbia royleana	Euphorbiaceae	Shrub	Cult.	✓		
78	Carica papaya	Caricaceae	Tree	Cult.	✓		
79	Solanum surrattense	Solanaceae	Herb	LC		✓	✓
80	Datura innoxia	Solanaceae	Herb	LC		✓	✓
81	Toona sinensis	Meliaceae	Tree	Cult.	✓		
82	Ligustrum sp.	Oleaceae	Shrub	Cult.	✓		
83	Canna indica	Cannaceae	Herb	Cult.	✓		
84	Citrus acida	Rutaceae	Shrub	Cult.	✓		
85	Aloe vera	Liliaceae	Herb	Cult.	✓		
86	Callistamon lanceolatus	Myrtaceae	Tree	Cult.	✓		
87	Yucca sp.	Agavaceae	Herb	Cult.	✓		
88	Albizia sp.	Caesalpiniaceae	Tree	Cult.	✓		

**Note:****C =** Common**VC =** Very Common**LC =** Less Common**R =** Rare**Cult =** Cultivated

## Annexure-8: Fauna of Islamabad/Tract

No.	Scientific Name	Common Name	Status				Occurrence	
			Abundant	Common	Less Common	Rare	Migratory	Resident
1	Trachybaptus ruficollis	Little Grebe		x				x
2	Coturnix coturnix	Common Quail		x				x
3	Columba livia	Rock Pigeon		x				x
4	Psittacula krameri	Parakeet		x				x
5	Centropus sinensis	Common crow		x				x
6	Alcedo atthis	Kingfisher		x				x
7	Merops orientalis	Blue tailed ant eater		x				x
8	Coracias benghalensis	Indian roller/ Blue jay		x				x
9	Pycnonotus cafer	Red vented, Bulbul		x				x
10	Saxicola caprata	Pied bush		x				x
11	Dicrurus macrocercus	King crow	x				x	x
12	Acridotheres ginginianus	Myna		x				x
13	Francolinus francolinus	Black Partridge			x			x
14	Streptopelia decaocto	Collared dove		x				x
15	Francolinus pondecerianus	Grey Partridge	x					x
16	Corvus splendens	House Crow	x					x
17	Passer domesticus	House Sparrow	x					x
18	Acridotheres tristis	Indian Myna		x				x
19	Streptopelia senegalensis	Little Brown Dove		x				x
20	Pycnonotus leucogenys	White cheeked Bulbul		x				x

### Mammals

No.	Scientific Name	Common Name	Status				Occurrence	
			Abundant	Common	Less Common	Rare	Migratory	Resident
1	Canis aureus	Asian Jackal		x				x
2	Canis lupus	Wolf		x				x
3	Felis chaus	Jungle Cat		x				x
4	Herpestes javanicus	Grey Mangoos		x				x
5	Hystrix indica	Indian Porcupine		x				x
6	Lepus nigricollis	Indian Hare, Wild Hare		x				x
7	Sus scrofa	Indian Wild Boar		x				x

**Reptiles**

No	Scientific Name	Common Name	Status				Occurrence	
			Abundant	Common	Less Common	Rare	Migratory	Resident
1	Calotes versicolor	Garden Lizard		x				x
2	Echis carinatus	Saw scaled viper			x			x
3	Spalerosophis diadema	Diadem Snake			x			x
4	Uromastix hardwicki	Spiny Tailed Lizard			x			x
5	Varanus bengalensis	Indian Monitor			x			x