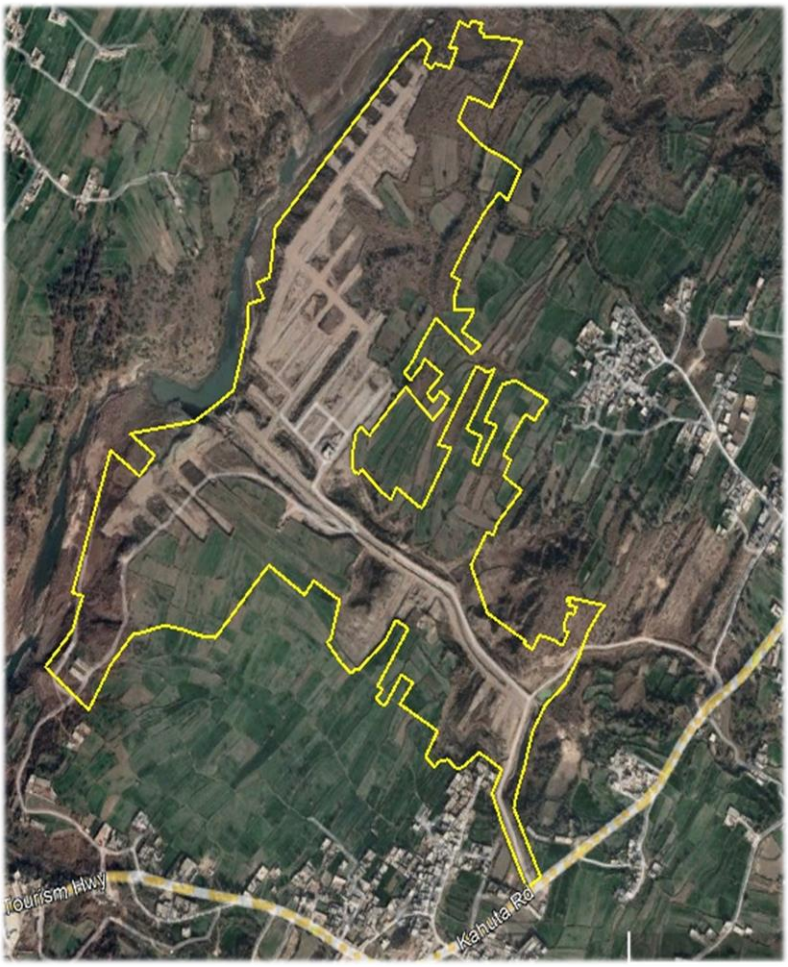
Environmental Impact Assessment (EIA) of Jinnah Garden (Phase-II), Mouza Chak Kaamdar, Jabbi Ghakhran, Nara Syedan, Kahutta Road, Zone-V Islamabad



PROPONENT: Federal Employees Cooperative Housing Society

Final Report

December 2024

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Executive Summary

Es-1. The “Environmental Impact Assessment of Jinnah Town Phase II”, provides a comprehensive analysis of the project’s environmental impacts, guiding decision-makers in their development choices.”

Es-2. The Pakistan Environment Protection Act of 1997 serves as the primary legislative instrument, authorizing the government to develop environmental regulations. This chapter provides an overview of the relevant environmental policies, laws, regulations, and standards pertinent to Jinnah Town Phase II, offering a comprehensive understanding of the regulatory landscape guiding environmental protection in this context.

Es-3. "Jinnah Town Phase II is a residential colony spanning 1170.19 Kanal, comprising various land allocations: 332.74 Kanal for residential plots, 39.96 Kanal for apartments, and smaller parcels for commercial use. The residential plots range from 25x50 to 50x90 feet, while apartment plots measure 220x200 and 120x196 feet. Commercial plots vary from 30x30 to 40x60 feet. Additionally, the colony has designated areas for Commercial and parking spaces (65.04 Kanal), Public buildings (84.11 Kanal), Open spaces and parks (124.05 Kanal), Graveyard (23.47 Kanal), Future reserved land (52.25 Kanal), Roads (448.57 Kanal).

Es-4. Three alternative management options were evaluated for the Jinnah Town Phase II project: the 'no project option', 'site alternative option', and 'build as proposed option'. After careful consideration, the most viable option was determined to be the 'build as proposed option', with the implementation of measures to mitigate potential negative impacts, ensuring a balanced approach to project development.

Es-5. This chapter examines the baseline environmental conditions of the project area, defined as the region within a 2-kilometer radius of the site. By assessing the existing environmental context, this study aims to identify potential impacts and inform the development of targeted mitigation measures, ensuring a comprehensive understanding of the project's environmental footprint.

Es-6. A proactive and inclusive approach was taken for stakeholder engagement, involving the public and relevant stakeholders from the outset of the project design phase. Consultations with the Pakistan Environmental Protection Agency (Pak EPA) were conducted to define the scope of the project. Public consultations were held during the planning and design stages, allowing stakeholders to share their perspectives and suggestions. These inputs were carefully considered and incorporated into the project design and Environmental Impact Assessment (EIA) report, where applicable, to ensure a collaborative and responsive approach.

Es7. Jinnah Town Phase II presents a mix of positive and negative impacts. On the positive side, it offers a well-planned living space in Nara Syedan and increased property values. However, it also raises concerns about traffic congestion, solid waste generation, and increased demands on water, energy, and drainage systems. Fortunately, these adverse effects can be mitigated through the implementation of strategic measures, including traffic management, solid waste management, and efficient resource use. By proactively addressing these challenges, the project can achieve a more sustainable and environmentally responsible outcome.

Es8. The project proponent, M/s Jinnah Town Phase II, will ensure the EPC contractor implements mitigation measures during the pre-construction and construction phases. This includes monitoring environmental parameters, inspecting waste management practices, and

engaging with local health authorities. Once the project is operational, the CDA will take over the responsibility of implementing and monitoring mitigation measures, guaranteeing the project's environmental sustainability and compliance.

Es-9. The comprehensive impact assessment, including the nature and magnitude of residual environmental impacts identified in this EIA, reveals that Jinnah Town Phase II will likely generate environmental impacts during both the construction and occupancy phases. Nevertheless, the proposed mitigation measures can effectively minimize these impacts. With no outstanding issues requiring further investigation, this EIA provides sufficient justification for the project from an environmental and social perspective, confirming its adequacy for informed decision-making.

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Chapter 1: Introduction

Jinnah Garden Phase II is a residential development project strategically located in Mouza Chak Kaamdar Jabbi Ghakhran Nara Syedan, along Kahutta Road in Zone-V of Islamabad. The project aims to address the housing needs of Islamabad's growing population by transforming the site into a state-of-the-art residential colony. The owner's vision is to create a modern, convenient, and amenity-rich living space, complete with advanced facilities, ample parking, and supporting infrastructure, offering a unique and desirable living experience.

The Project

The Project is the development of a residential colony named Jinnah Garden Phase II. The key map of the project location has been shown in Figure.

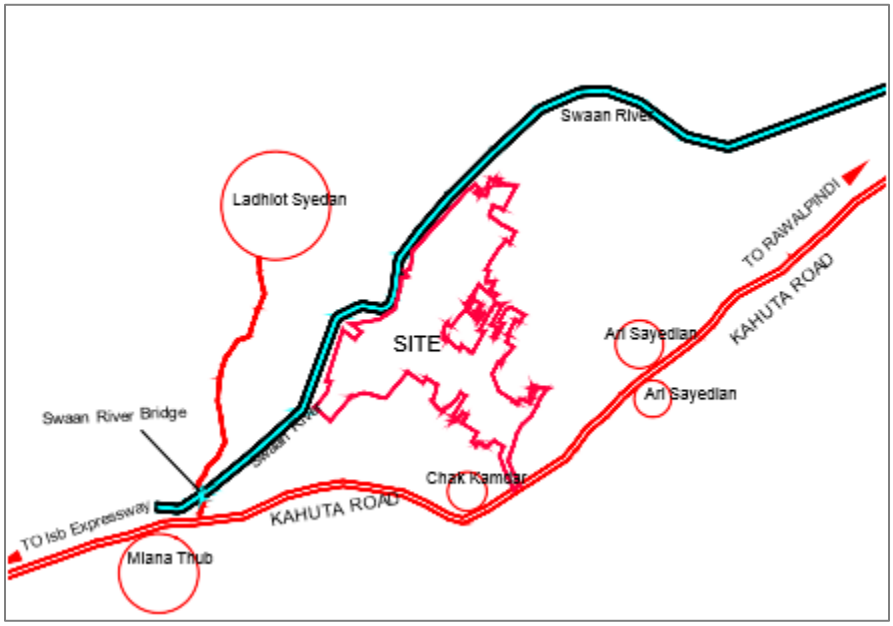


Figure 1 Key Map of the Project Location

1.2 Objective of the Project

The objective of the project is to develop a residential colony to facilitate the population of Islamabad and Rawalpindi with state-of-the-art housing with all the required facilities in one place.

1.3 An Overview of the Project

Situated in a prime location, the project covers an area of 1170.19 Kanal in Mouza Chak Kaamdar, Jabbi Ghakhran, Nara Syedan, along Kahutta Road in Islamabad's Zone-V. With a focus on eco-friendly development, the project aims to provide a safe and secure living environment for its residents. The site's accessibility from Kahutta Road and proximity to other sectors of Islamabad make it an attractive location for those seeking a convenient and sustainable lifestyle.

The Proponent

The proponent of the Jinnah Garden Phase II project is M/s Federal Employees Cooperative Housing Society (FECHS), represented by its President. Throughout this report, the term 'Proponent' will refer to FECHS. All necessary documents will be signed by the President of FECHS, acting on behalf of the Proponent, as required.

Name of the Organization Preparing the Report

M/s Contemporary Associates (shall be referred as “The Consultant” in this report) has prepared the Environmental Impact Assessment of Jinnah Garden Phase II Project. The list of names, roles of team members carrying out the EIA has been attached below.

Details of Project Study Team

Sr.	Name	Designation
01	Dr Ayesha Naveed Ul Haq	Senior Environmentalist/Focal Person
02	Dr Asad Gufran	Senior Ecologist
03	Mr. Salman Zafar	Sociologist
04	Ms. Iqra Khan	Deputy Manager Environment
05	Ms.Humna Ali	Assistant Manager Environment
06	Engr. Awais Khalid	Engineering Support

Contact Persons

The authorized representative of Jinnah Garden Phase II is the following:

Jinnah Garden Phase II	Environmental Consultant
Project Proponent FECHS Main Commercial, Street#9, Society Plaza, Near post Office, Korang Town, Islamabad. Focal Person: Mr. Rizwan 0321-6877772	Team Lead (Technical Team) Dr Naveed Ul Haq 03345223477 Team Lead (Environment Team) Dr. Ayesha Naveed Ul Haq H# PD 1096, Street 6, Cricket Stadium Road, Rawalpindi Ph#03335400681, ayesha.naveed.ul.haq@gmail.com

1.8 Environmental Impact Assessment

According to the Initial Environmental Examination (Review of EIA), Regulations 2000.

“No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Environmental Impact Assessment 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.”

1.9 Purpose of Environmental Impact Assessment Report

The Environmental Impact Assessment (EIA) is a comprehensive evaluation of the potential environmental consequences, both positive and negative, of a proposed project, policy, or program. This process identifies, predicts, and assesses the biophysical, social, and other relevant effects of a development project before major decisions are made and commitments are undertaken. The EIA report will facilitate the project owner's pursuit of environmental approval from the Pakistan Environmental Protection Agency (Pak-EPA) in Islamabad for the construction of Jinnah Garden Phase II. Ultimately, the purpose of the EIA is to ensure that environmental considerations are integrated into the decision-making process, enabling informed choices about whether to proceed with a project.

1.10 Scope of EIA

The project requires the Environmental Impact Assessment to identify environmental impacts of construction and operational phases of proposed project of Jinnah Garden Phase II.

The scope of EIA of Jinnah Garden Phase II 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.

1.11 Approach and Methodology

1.11.1 Approach for EIA

The EIA for the Jinnah Garden Phase II Project will be conducted in accordance with the regulatory framework established by the Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000. This structured approach will guarantee a thorough evaluation of the project's potential environmental impacts, aligning with national environmental regulations and standards.

1.11.2 Kick-off Meeting with the Proponent

The kick-off meeting was held between the consultants' team and Project Director of Jinnah Garden Phase II.

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

1.11.3 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 information:

Physical Environment: topography, geology, soils, seismic risk, major earthquake, 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 references of secondary data consulted during the EIA study is provided in Annexure.

1.11.5 Collection of Primary Data and Field Visit

The consultant team conducted a site visit and explored the surrounding areas to gain a comprehensive understanding of the project site's environmental conditions. Through field observations and the application of Rapid Social Appraisal methodology, the team gathered empirical data on the existing socio-economic and cultural context of the project area, focusing on communities within a 1-2 km radius. During the field survey, the team took care to observe local wildlife, including mammals, birds, and other species, without causing any disruption or disturbance to their natural habitats.

1.11.6 Analysis of Alternatives

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

1.11.7 Public Consultation

Public consultations were conducted with the community residing near the Jinnah Garden Phase II Project site, informing them about the proposed project's potential impacts on the physical, biological, and socio-economic environment. Their concerns, suggestions, and feedback were solicited and documented. Stakeholder meetings were also held with representatives from Pak-EPA, universities, Capital Development Authority, environmental practitioners, and developers. The insights gathered from the community and stakeholders were used to identify and address concerns and issues, which are subsequently highlighted and mitigated in the EIA report. A comprehensive list of individuals consulted is provided in the dedicated consultation chapter.

1.11.8 Review of Legislative Requirement

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.

1.11.9 Identification and Evaluation of Impacts

A comprehensive impact assessment was conducted for the Jinnah Garden Phase II Project, methodically identifying and evaluating potential environmental effects. Each impact was scrutinized for its likelihood and significance, with a focus on severity and

probability. Insignificant impacts were filtered out, while significant ones were prioritized based on their ecological effects, public concern, and regulatory compliance. The assessment considered various factors, including impact characteristics, magnitude, and duration. This rigorous evaluation process informed the development of the Environmental Management Plan, targeting the most critical impacts and ensuring effective risk management and mitigation strategies.

1.11.10 Identification of Impacts and Proposed Mitigation Measures

The primary goal of identifying mitigation measures is to determine effective practices, technologies, or activities that can prevent or minimize significant environmental impacts. This involves proposing physical and procedural controls to ensure the effectiveness of mitigation efforts. Following the impact evaluation, suggestions have been made for changes or improved practices in the planned activities to prevent and control unacceptable adverse impacts resulting from normal or extreme events. Additionally, monitoring requirements and institutional arrangements for monitoring have been established and recommended to ensure the ongoing effectiveness of mitigation measures.

1.11.11 Development of Environmental Management Plan (EMP)

A comprehensive Environmental Management Plan (EMP) has been established to ensure the effective implementation of mitigation measures for negative impacts throughout the project's pre-construction, construction, and operational phases. Additionally, an Environmental Monitoring Plan (EMP) has been developed to track the progress and achievement of the EMP's objectives during these phases. The EMP outlines procedures for operational phase activities, defines roles and responsibilities for all relevant personnel, and establishes reporting requirements to ensure ongoing environmental stewardship and accountability.

1.12 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 of 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 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 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 the conclusions.
The last chapter is followed by Annexures that provides supporting information.

Table 1.2: Summary of Methodologies and Activities to conduct EIA

Objectives	Steps of EIA	Activities
• To develop a detailed understanding of the planned activities • To obtain equipment-specific information • To obtain information on alternatives and best construction practices • To form the basis of impact identification and evaluation • To define normal conditions for various parameters • To define current and expected trends • To understand and define the nature and degree of impacts • To form the basis for developing a mitigation program • To compile all the information in one document • To submit a final report	Review of proposed alternatives ↓ Information on baseline Conditions ↓ Impact Assessment ↓ EIA Report	• Meetings and discussions • Review of secondary data • Collection of baseline data • Public consultation with the community and stakeholders • Analysis of data • Identification of impacts • Evaluation of impacts • Preparation of Environmental Management Plan • Compilation and finalization of the report • Feedback from Pak-EPA • Approval of EIA Report

Chapter 2: Legislative and Institutional Framework

2.1 Introduction

This Chapter provides a comprehensive overview of Pakistan's legal frameworks and environmental assessment processes, as well as a detailed list of key environmental legislation and guidelines relevant to the proposed Jinnah Garden Phase II project. As a signatory to various international treaties, Pakistan has established a robust set of environmental laws addressing pressing issues such as water pollution, air pollution, deforestation, biodiversity loss, inadequate waste management, and climate change. A well-defined policy and legislative framework, supported by detailed rules, regulations, and guidelines, is in place to ensure effective implementation and enforcement of environmental protection measures. This Chapter also reviews the compliance status of the Jinnah Garden Phase II project with respect to Pakistan's environmental legislation and international agreements, as described below.

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 Environment Protection Act, 1997[1] is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The policy laws, regulations and standards relevant to Jinnah Garden Phase II in context of environmental protection are described in the following sections.

2.3 Biodiversity Action Plan

As a signatory to the Convention on Biological Diversity, Pakistan is committed to developing a national strategy for biodiversity conservation. To this end, the Government of Pakistan has established a Biodiversity Working Group under the Ministry of Environment, Local Government, and Rural Development. Following an extensive consultative process, a draft Biodiversity Action Plan has been formulated. This Plan, designed to align with the National Conservation Strategy (NCS) and proposed provincial conservation strategies, identifies the key drivers of biodiversity loss in Pakistan and proposes a range of measures to conserve the country's biodiversity.

2.4 National Environmental Policy, 2005

The National Environment Policy (NEP)[2] aims to protect, conserve and restore Pakistan’s environment in order to improve the quality of life of the citizens through sustainable

[1] https://environment.gov.pk/SiteImage/Misc/files/Act/brf-act1997.pdf
[2] https://www.allaboutcsspms.com/environmental-science-notes/national-environemental-policy-2005#:~:text=The%20National%20Environment%20Policy%20aims,efficient%20management%20of%20environmental%20resources

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 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 enforcement 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[3] (the Act) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The Act is application to a brand 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 Environment Quality Standards (NEQS) specified by the Environmental Protection Agency (EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of Environmental Protection Agency (EPA), established under the Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014; 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.

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[4] (the Regulations) prepared by the Pakistan Environmental Protection 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 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:

[3] https://na.gov.pk/uploads/documents/Pakistan=Environmental-Protection-Act-1997.pdf
[4] https://environment.gov.pk/SiteImage/Misc/files/Regulations/IEE%20EIA%20Regulation%202000.pdf

- 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 the 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 submitting 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 the 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 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.
- The IEE/EIA approval will be valid for three years from the data 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 Jinnah Garden Phase II falls in schedule-II of the regulations. Hence, this type of project needs an IEE to be conducted.

2.5.3 Capital Development Authority

- Capital Development Authority is the regulator which approves layout plan and building plans before the start of the construction.
- Its salient functions include planning, development and maintenance of infrastructure like roads, bridges, streetlights, drains and water supply in Islamabad. Development and maintenance of parks and fire brigade.

2.6 National Environmental Quality Standards (NEQS), 2000

The NEQS, promulgated under the PEPA 1997[5], specifies the following standards:

- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources,

[5] https://environment.gov.pk/SiteImage/Misc/files/Act/brf-act1997.pdf

- For power plants operating 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.

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

The NEQS for liquid effluents discharged to inlands 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 Environment Quality Standards (NEQS), 2000, specify the following standards:

Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid 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 Effluents

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

Table 2.1: NEQS for Liquid Effluent Discharge

Parameters	Standards		
	Into Inland Water	Into Sewage Treatment	Into Sea
Temperature	=<3°C	=<3°C	=<3°C
PH Value	6-9	6-9	6-9
Biological Oxygen Demand (BOD)	80	250	80
Chemical Oxygen Demand (COD)	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
Sulphide (S')	1.0	1.0	1.0
Ammonia (NH)	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

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

Parameters	Source of Emission	Standards
Smoke	Smoke opacity not to exceed	40% or 2 Ringelmann Scale or equivalent smoke number
Particulate Matter	Boilers & Furnaces: Oil Fired Coal Fired Cement Kilns Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	300 500 300 500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10
Sulphur Oxides	Sulfuric Acid/sulphonic Acid Plants	5000 1700

	Other Plants except power plants operating an oil and coal	
Carbon Monoxide	Any	800
Lead	Any	50
Mercury	Any	10
Cadmium	Any	20
Arsenic	Any	20
Copper	Any	50
Antimony	Any	20
	Any	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit Other plants except power plants operation on oil or coal: Gas fired Oil fired Coal fired	3000 400 600 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	Maximum Measuring Method (permissible limits)
Smoke	40% or 2 on the Ringelmann Scale During engine acceleration mode	To be compared with Ringelmann 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 gas analyzer.
Noise	85 db (A)	Sound meter at 7.5 meter 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 for Pakistan	WHO Guidelines
Physical		
Color	< 15 TCU	< 15 TCU
Taste	Not acceptable	Not acceptable
Odor	Not acceptable	Not acceptable
Turbidity	< 5 NTU	< 5 NTU
Total hardness	< 500 mg/L	---------
TDS	<1000	<1000
pH	6.5- 8.5	6.5- 8.5

Chemical		
Essential Organic	**mg/L**	**mg/L**
Aluminum	< 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		
Cyanide	< 0.05	0.07
Fluoride 1.5	< 1.5	1.5
Lead	< 0.05	0.01
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
Radioactive Compounds		
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, 2010

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/m3)
		Effective from 1st January, 2013
Sulphur Dioxide	Annual Average* 24 hrs.**	80 120
oxides of Nitrogen (NO)	Annual Average* 24 hrs.**	40 40
O_3	1 hour	130
Suspended	Annual Average*	360

Particulate Matter	24 hours	500
Lead	Annual Average* 24 hrs.**	1 1.5
Carbon monoxide	8 hours	5mg/m3

*** Annual Arithmetic mean of minimum 40 measurements in a year taken twice a week 24 hourly at uniform interval*

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

Table 2.6: NEQS for Noise

Category of Area/ Zone	Effective from 1st July, 2012	
	Limits in dB(A) Leq	
	Day time	Night time
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 objectives of Ordinance[6], 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 statues are not repugnant to Sharia (PLD 1985 FSC 221).

Capital Development Authority is a statutory body is expected to deal with citizens fairly, and honestly and conduct its all actions transparently (2003 CLC1684).

WHEREAS it is expedient to establish a Capital Development Authority for making all arrangements for the planning and development of Islamabad within the framework of 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[7] of 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 desertification

[6] https://pakistancode.gov.pk/english/UY2FqaJw1-apaUY2Fqa-a5aabA%3D%3D-sg-jjjjjjjjjjjj

[7] https://pbit.punjab.gov.pk/system/files/National%20Rangeland%20Policy%202010.pdf

- 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[8] 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 developed to specially created agencies in cities, 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[9] 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:

2.11 Land Acquisition Act, 1984

The Land Acquisition Act (LAA) of 1894[10] amended from time to time has been the defacto 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.

[8] https://www.nation.com.pk/29-Sep-2009/cabinet-okays-national-drinking-water-policy
[9] http://waterinfo.net.pk/sites/default/files/knowledge/National%20Sanitation%20Policy%202006.pdf

[10] https://www.fao.org/faolex/results/details/en/c/LEX-FAOC065320/#:~:text=Pakistan-,Land%20Acquisition%20Act%2C%201894%20(Act%20I%20of%201894).,on%20account%20of%20such%20acquisition.

2.12 Building Energy Code of Pakistan, 2008

The scope of this code[11] 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

Criteria for determining compliance with these requirements.

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

2.13 Antiquity Act, 1975

The Antiques Act of 1975[12] 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 to 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 proponent 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 his behalf, cut fell or damage or cause to cut, fell or damage any tree[13]."

2.15 Protection of Trees and Bush wood Act, 1949

Section 3 of this Act states "No person shall, without the prior written approval of local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage ant tree[14]."

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

[11] https://www.pec.org.pk/downloads-documents/building-code-of-pakistan/
http://www.enercon.gov.pk/images/building%20code.pdf

[12] https://heritage.pakistan.gov.pk/SiteImage/Misc/files/annex-2doam.pdf

[13] http://extwprlegs1.fao.org/docs/pdf/pak64061.pdf

[14] http://extwprlegs1.fao.org/docs/pdf/pak64061.pdf

blasting at rocky/mountainous areas. Thus, these regulations will be applicable to the proposed project[15].

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 nay school established, assisted or recognized by Government[16]."

2.18 Factories Act, 1934

These clauses[17] relevant to the proposed project are those that address the health, safety and welfare of the workers, disposal of and effluents, and damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances. The Pakistan Environment 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 violation concerning pollution of air, water bodies and land[18]. 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 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 the Chief Executive of the Country. Other bodies include

[15] https://www.ajne.org/sites/default/files/document/laws/6973/explosives_act_1884.pdf
[16] http://www.na.gov.pk/uploads/documents/1335242011 887.pdf

[17] https://www.ma-law.org.pk/pdflaw/FACTORIES%20ACT%201934.pdf

[18] https://www.fmu.gov.pk/docs/laws/Pakistan%20Penal%20Code.pdf

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[19] Environmental Protection Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (EIAs and IEEs) of the proposed projects and provide their approval (or otherwise).
The Project is in 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 Guidelines

A set of Pak-EPA's Environmental Guidelines are reviewed here.

2.21.1 Environmental Protection Agency's Environmental Guidelines

The Pakistan 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,
- Pictorial 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 Environmental Guidelines.

2.21.2 Guidelines for the Preparation of IEE/EIA Reports

The GOP has also framed guidelines for the preparation of EIA of Projects in various developmental sectors.

2.21.3 Obligation under International Treaties

Pakistan is a signatory to various international treaties[20] 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.

[19] https://environment.gov.pk/SiteImage/Misc/files/Act/brf-act1997.pdf
[20] https://www.oas.org/legal/english/docs/Vienna%20Convention%20Treaties.htm

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 specie 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 the 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.

2.22 Islamabad Fire Fighting and Life Safety Regulations, 2010

The regulation was formulated to make more effective provisions 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 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 five hundred thousand rupees[21].

2.23 Implication of Legislations of the Project

The implication of the above-mentioned legislation to the pre-construction, construction and operational phase of Jinnah Garden Phase II Project would be as follows:
Jinnah Garden Phase II being the proponent of the project will ensure that the 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 establishment ambient standards for air, water or land.
- Section 13 prohibits hazardous waste
- Section 14 prohibits the handling of hazardous substances 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 being emitted in excess of the NEQS of the established ambient standard.

[21] https://cda.gov.pk/documents/docs/safety-regulation-2010.pdf

Chapter 3: Project Description

3.1 This document 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 Jinnah Garden Phase II, which falls in Schedule I of Pakistan Environmental Protection Agency (Review of EIA and IEE) Regulations 2000 under clause H (2) of schedule II.

3.3 Scope of Work

As per the master plan, the scheme envisages development of plots, commercial areas, roads, civil amenities like sewerage and sanitation network, waste collection and disposal services, hospital and community center, mosques, School, playground, Parks etc. The scheme envisions the development of different categories of plots, based on plot size and covered area both for residential and commercials.

3.4 Project Location and Accessibility

The project is located on Mouza Chak Kaamdar, Jabbi Ghakhran, Nara Syedan, Kahuta Road Zone-V of Islamabad. The project site is accessible from Kahuta Road, Islamabad. The site is 10 km away from Islamabad Expressway and 12 km away from Jinnah Garden Phase-I. The GPS coordinates of the project site are 33.5683836 N, 73.1758357 E. Overall, it is a central, highly suitable, convenient and approachable place from Islamabad.

The surrounding areas near the project are as follows:

East; Rawat/Kahuta Road

West; Nilor

North; Mouza Nara Syedan/ Soan Road

South; Kahuta

The location and accessibility of the project are shown in Figure

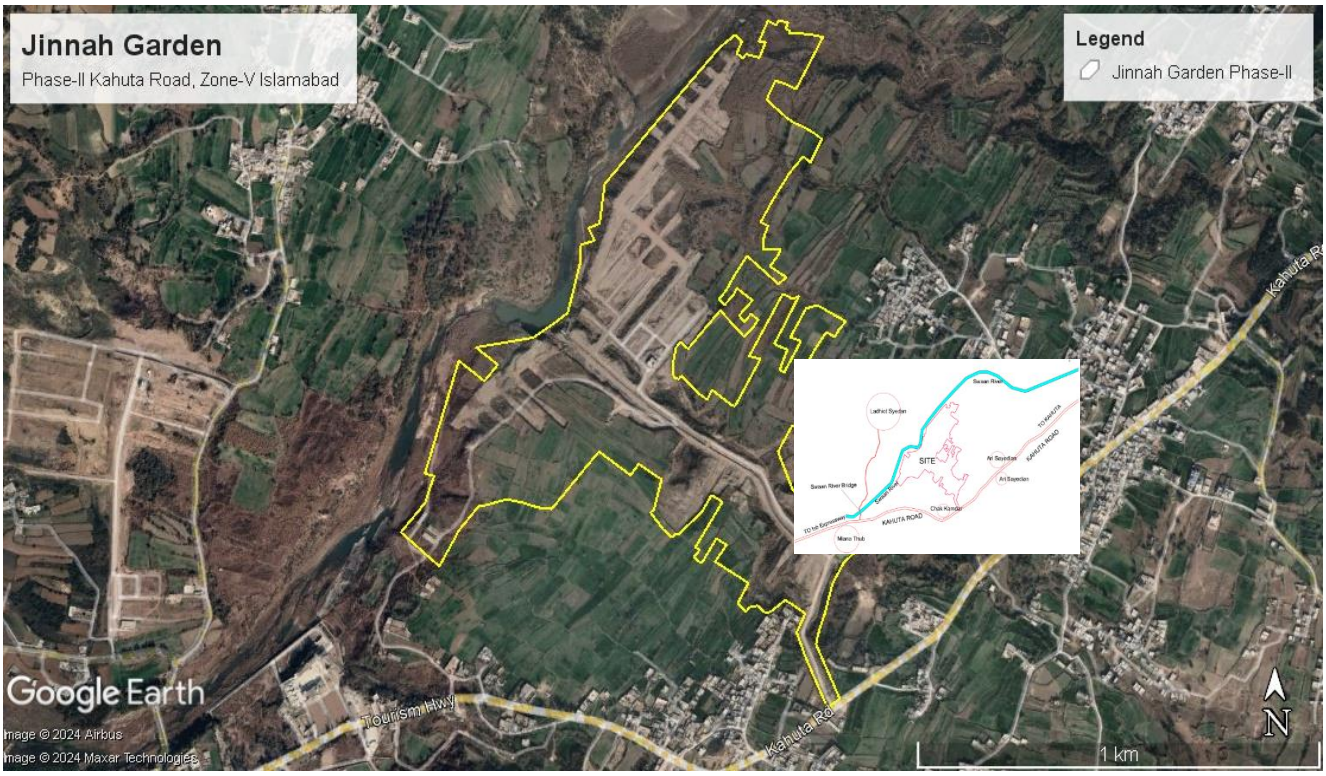


Figure 2 Location Map

3.5 Description of the Project

The project has been proposed on land measuring 1066 Kanal. The project will have 989 total plots out of which 878 are residential plots of land measuring, 25'×50' 30'×60', 35'×72', 40'×80', and 50'×90', 5 plots are for apartments with land measuring 220'×200' and 120'×196' and remaining 106 are commercial plots of land measuring 30'×30', 30'×40', 30'×50', 40'×60', Category II and odd plots.

The infrastructure development works of Jinnah Garden Phase II include Provision of roads, culverts, water supply network, sanitary sewerage network, stormwater drainage works sewerage treatment plant, electrification network, natural gas distribution network, lying of telephone lines, street lights, overhead and underground water tanks construction of tube wells etc.

Table 3.1 Number and Sizes of Plots in Jinnah Garden Phase II

Plot Size	Number of Plots
Residential Plots	
25'-50'	126
30'-60'	565
35'-72'	95
40'80'	70
50'-90'	22
Apartment Plots	
220'-200'	2

120’-196’	3
Total	**883**
Commercial Plots	
30’-30’	10
30’-40’	46
30’-50‘	20
40’-60’	23
Category II	3
Odd Plots	4
Total	**106**

For the development of Jinnah Garden Phase – II Project, the essential infrastructure works include storm drainage system, water supply, sanitary sewerage system, solid waste management system, electrification, streetlights, security, sui gas works, sanitation and external electrification by IESCO. FECHS will also provide soft and hard landscaping, parks, playground and other facilities in the sector. The total estimated cost of the development of Jinnah Garden – II Project is Rs 170 million. The time schedule for completion of the project is 3 years. The approved layout plan of Jinnah Garden Phase – II Project Islamabad from CDA has been shown in Figure 2.

Apartment Plots Detail

220'x200'	2	
120' x 196'	3	

Residential Plots Detail

Plot Size	Total No.of Plots	Notation
25' x 50'	126	
30' x 60'	565	
35' x 72'	95	
40'x 80'	70	
50' x 90'	22	

Commercial Plots Detail

Plot Size	Total No.of Plots	Notation
30' x 30'	10	
30' x 40'	46	
30' x 50'	20	
40' x 60'	23	
Category II	3	
Odd Plots	4	
Total	106	

Figure 3 Lay Out Plan of Jinnah Garden Phase II

3.5.1 Land Acquisition

The Land for Jinnah Garden Phase II has been owned by the proponent and a legal possession has been taken. Jinnah Garden Phase II has setup security check posts on the boundary of the project. FECHS has acquired the land and compensation of built-up structures and graveyard will be carried out as per relevant legislation.

3.5.2 Land Use Analysis

The development of Jinnah Garden Phase II Project, Islamabad will be carried out as per the master plan of Islamabad. A total of 1066 Kanal of land have been allocated for the development of Jinnah Garden Phase II, Kahuta road, Zone V, Islamabad.

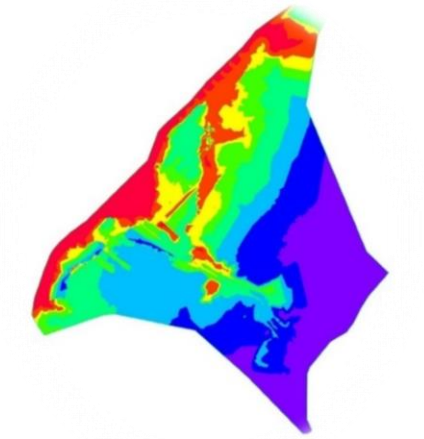
The distribution of land is such that around 32.76% of the total land has been designated for residential purposes while 6.62% of the total land will be allocated to commercial activities. As the project will follow the master plan of Islamabad and needs to follow the CDA standards, the provision of landscaping and beautification of the housing project is around 10.39% of the total land which includes parks, playgrounds and green belts. Roads and streets will cover 40.82% of land whereas 2.21% of the total land has been allocated for graveyard. The land distribution for Jinnah Garden Phase II Project, Islamabad is given in Table 1.

Table 1 Land use of Jinnah Garden Phase – II Project, Islamabad

Sr. No.	Description		Area in Kanals		Percentage allocation of Land	CDA Standards	Notations
1	Residential	Under Plots	320.71	349.28	31.85%	50%	
		Under Apartments	28.57				
2	Commercial/ Parking	Under Plots	43.92	70.52	4.12%	8%	
		Under Parking	26.60		2.50%		
3	Public Building		76.76		7.20%	7%	
4	Open spaces/Parks		110.72		10.39%	10%	
5	Graveyard		23.61		2.21%	2%	
6	Roads		435.11		40.82%	23%	
	Total		1066		100%		

3.5.3 Lay Out Plan Superimposed on Topography Survey

The site area is almost planned with a height difference of minimum 1742 meter at highest level to 1564 meter at lowest level with respect to Mean Sea Level. Overall, the gradient/slope of site area from North to South is about 2%. This slope is gentle for the smooth flow of storm water during the peak rainy season. Lay Out Plan of the site is superimposed on the topography survey and shown in the figure below:



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	1564.00	1599.99	876358.01	
2	1599.99	1614.00	913036.37	
3	1614.00	1622.00	885583.79	
4	1622.00	1628.00	1130492.85	
5	1628.00	1637.97	1881816.84	
6	1637.97	1650.00	1904139.24	
7	1650.00	1670.00	1673910.97	
8	1670.00	1742.00	2232311.65	

Figure 4 LOP Superimposed on Topography Survey

3.5.4 LOP Superimposed on Khasra Plan

The site is located partially in Mouza Chak Kaamdar, Jabi Gakhran and Nara Syedan. An area of 1374.78 Kanals is completely in possession of FECHS whereas some pockets are shown in LOP which are not currently owned by the society however land exchange agreements for the same are executed with the local land lords. The land under hatch area shall be cleared in next revision of the plan.

Boundary Details		
Sr.No	Description	Total Area (Kanal)
1	Over All Boundary	1374.78
2	Chak Kaamdar Pockets	97.47
3	Jabbi Ghakhran Pockets	211.31
4	Nara Syedan Pockets	0.00
5	LOP Boundary	1066.00

Figure 5 Lay Out Plan Superimposed on Khasra Plan

3.7 Occupancy of Jinnah Garden Phase II Project

It has been assumed that there will be 883 Plots in Jinnah Garden Phase II to estimate the population of the project. The estimated population of Jinnah Garden Phase II will be 14,778, assuming the household size of 6. The expected population is shown in Table.

Table 3.2: Expected Population of Jinnah Garden Phase II

Total plots		No. of Plots	No. of House	Household size	Population
Residential Units	Under Plots	878	1	6	5,268
	Under Apartments	5	-	6	
		Expected Population			**14,778**

Logic – Each plot comprises of 1 house building, with 1 family. The avg household size is 6.
No. of Plots × House No.
Total = Total × 6 (household size) = (total population)

3.6.1 Cost of the Project

The estimated cost of infrastructure development of Jinnah Garden Phase II Project is Rs170 million.

3.7 Project Components

Jinnah Garden Phase II will have state-of-the-art facilities as follows:

Water Supply System: The main source of water will be a combination of surface water and groundwater. Surface water in the project area is available in the form of springs, Nullahs and streams. The mainstream in the project area is Kurang Nullah. Some natural streams also flow in the area. According to the hydrology study report, ground water is also present at some parts of the project area. However, society cannot solely rely on groundwater alone. The water balance calculation shows that the maximum daily demand for Jinnah Garden Phase II is 900 gallons per day. Water will be stored in underground water tanks for the town.

Filtration Plant: Jinnah Garden Phase II will install water filtration plant at Town to provide safe drinking water facility to residents.

Sewerage Treatment Plant: In all houses of Jinnah Garden Phase II, it will be mandatory to construct a septic tank before connecting into the sewerage network of Jinnah Garden Phase II. This will considerably reduce pollution load of sanitary sewerage generated by project. Wastewater discharge from household will undergo through the septic tank. According to Jinnah Garden Phase II SOPs Foe Designing, Execution, Monitoring & Operations of building.

Septic Tanks must be provided of R.C.C in all residential Plots and shall be connected to the main sewer line. The sizes of septic tank shall be 4’ × 8’ × 4’. The sizes of septic tanks for commercial and public building shall be as per requirements of WASA/Public Health Engineering Departments.

Sanitary Sewerage System: Sewerage generated by the Project will be about 80% of the average daily water demand, i.e., about 1,154,448 GPD sewerage generated per day. Separate sanitary sewerage system will be provided.

Solid Waste Collection & Disposal: Solid waste from residential and commercial areas will be collected through containers placed at suitable locations. The average household size has been taken as 6 persons. The estimated population is 14,778 of Jinnah Garden Phase II, and average solid waste generation is 0.652kg per capita per day. A total of approximately 9.64 tons of solid waste per day will be generated.

The collection, transportation and disposal of municipal solid waste will be carried out by Jinnah Garden Phase II. The municipal solid waste will be collected in closed vehicles and disposed of at designated disposal site, which will be identified in consultation with MCI.

Solid waste will be collected, transported and dumped at a transfer station. At transfer station, segregation will take place where recyclables and non-recyclables will be segregated. The recyclable content of waste will be sold to contractors, and the non-recyclables will be disposed at MCI designated dumping site.

Roads: The roads constitute the area of 435.11 kanal (40.82%) of the total area. The Kahuta road connecting to Jinnah Garden Phase II is a single carriageway 30' wide road. The condition of the road has deteriorated over past few years and is in worst condition. There will be 100ft. /50ft. wide roads and walkways at Jinnah Garden Phase II. The profile of roads will be prepared for a design speed of 30 miles per hour. Fire Suppression System: Jinnah Garden Phase II has a comprehensive set of by-laws known as "Standard Operating procedures for Designing, Execution, Monitoring and Operations of Buildings 2018-2019" where section 10 of SOPs are dedicated to fire resistance and fire Precaution. Section 8 of SOPs state that "new building except residential buildings upto 3 stories in height shall be provided with sufficient means for extinguishing the fire as follows:

- All buildings shall have one multipurpose (A, B, C) dry chemical powder 6 kg fire extinguisher for each 2000 Kanal of floor area. At least two fire extinguishers of 6 kg each shall be placed on each floor (If size is less than 2000 Kanal)
- The maximum travel distance to a fire extinguisher shall not exceed 75ft. But for kitchen areas, this distance is 30ft.
- Firefighting Buckets
- An independent water supply system in pipes of steel or cast iron with adequate hydrants, pumps and hose reels.
- All Multistory buildings having four to ten floors shall have a pressurized internal fire hydrant system with an independent overhead water tank of minimum 7500 gallons and external underground water tank of 15000 gallons. In case, where building is over 10 stories high, it shall have an independent overhead water tank of 15000 gallons and external underground water tank of minimum 30,000 gallons. The underground water tank shall be accessible to the firefighting vehicles at all times.

This means that every public building will have sufficient measures to prevent and mitigate in the event of fire.

Electricity Supply: Jinnah Garden Phase II will get in touch with Islamabad Electric Supply Corporation (IESCO) to supply electricity to the town. Jinnah Garden Phase II intends to

use renewable energy i.e., solar lights for parks and streetlights at Jinnah Garden Phase II.

Sui Gas and Telephone arrangements: A gas pipeline is already passing through the project area from which connection will be obtained from Sui Northern Gas Pipeline Limited (SNGPL). Similarly, telephone facilities are also available in the vicinity of the Project area, and it is expected that these will be arranged without any interruption.

Traffic Plan and Transportation: A traffic plan will be prepared for Jinnah Garden Phase II.

- Traffic at the main gate will be controlled with the help of security guards. Traffic cones will be placed to direct the traffic in the desired direction. The speed breakers will control the speed of traffic within the town.
- To control the speed of traffic on roads, road blockers will be placed at about 500 meters. At some places, Speed breakers will be constructed at exits.
- During school timing, some roads will be closed, and a temporary one way will be created to avoid traffic jam.
- Traffic signs will be installed on all roads as per the requirement of smooth and safe traffic within the town.

3.8 Water Supply System

FECHS will develop its own water supply system that will be in line with the CDA requirements. The guidelines given by CDA are as follows:

Table 3.6 CDA Guidelines on Water Supply System

Avg. Water consumption per capita per day	60 gallons
Maximum daily demand	90 gallons
Peak hours flow	200 gallons
Consumption for non-residential area per acre/day	1000 gallons
Fire demand/G.P.M	2000 to 4000 gallons as per standards of national board of fire authorities of USA.
Hotel	600 gallons per 1000 sft. Per day
Offices	200 gallons per 1000 sft. Per day.
Mosques	3 gallons per “Namazi” for 20 % of total population of the scheme.

Total Residential Demand

The total Residential Water Demand would be calculated as follows:

Total Residential Water Demand = Total Population * Avg Water consumption per Capita per day

= 14778 * 60

= 886,680 GPD

The total water demand for the project, considering all the other specified uses as well, is 1,443,060 Gallons per Day.

3.9 Rain Water Harvesting Plan and Drainage

FECHS has completed and submitted a comprehensive hydrology report for all nullas within the project area. The project's drainage system includes a main drain with a width of 16 feet and a depth of 8 feet, designed to efficiently channel rainwater. All possible efforts will be made to capture rainwater within the project area and reuse it for horticulture purpose as per CDA Standards which are given below:

Table 3.7 CDA Guidelines for Design of Strom Water Sewer

Minimum Diameter of Storm Water Sewer	12 Inches
Impermeability factor	0.8
Maximum Rainfall Intensity for which the Storm Sewer System will be designed for	3 inches per hour

3.10 Solid Waste Management System

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

The unmitigated impacts related to the 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: High

Solid Waste Management will also be an important issue in the operation of Development of Jinnah Garden Phase – II. For solid waste management, FECHS shall make an Integrated Solid Waste Management Plan and ensure the provision of solid waste management system as per CDA standards. This plan also includes the identification of final dumping site for solid waste along with the details of dumping process.

3.10.1 Landfill Site

FECHS shall connect its Solid Waste system with the CDA's overall system for the city. Society will use the CDA's designated landfill site and will pay the applicable charges. According to CDA's regulations, the society must specify 1 kanal area for waste management per 1000 kanal. Jinnah Garden Phase-II has allocated 2 kanal area for waste management in the society. The exact location of the designated area is shown in the map below:

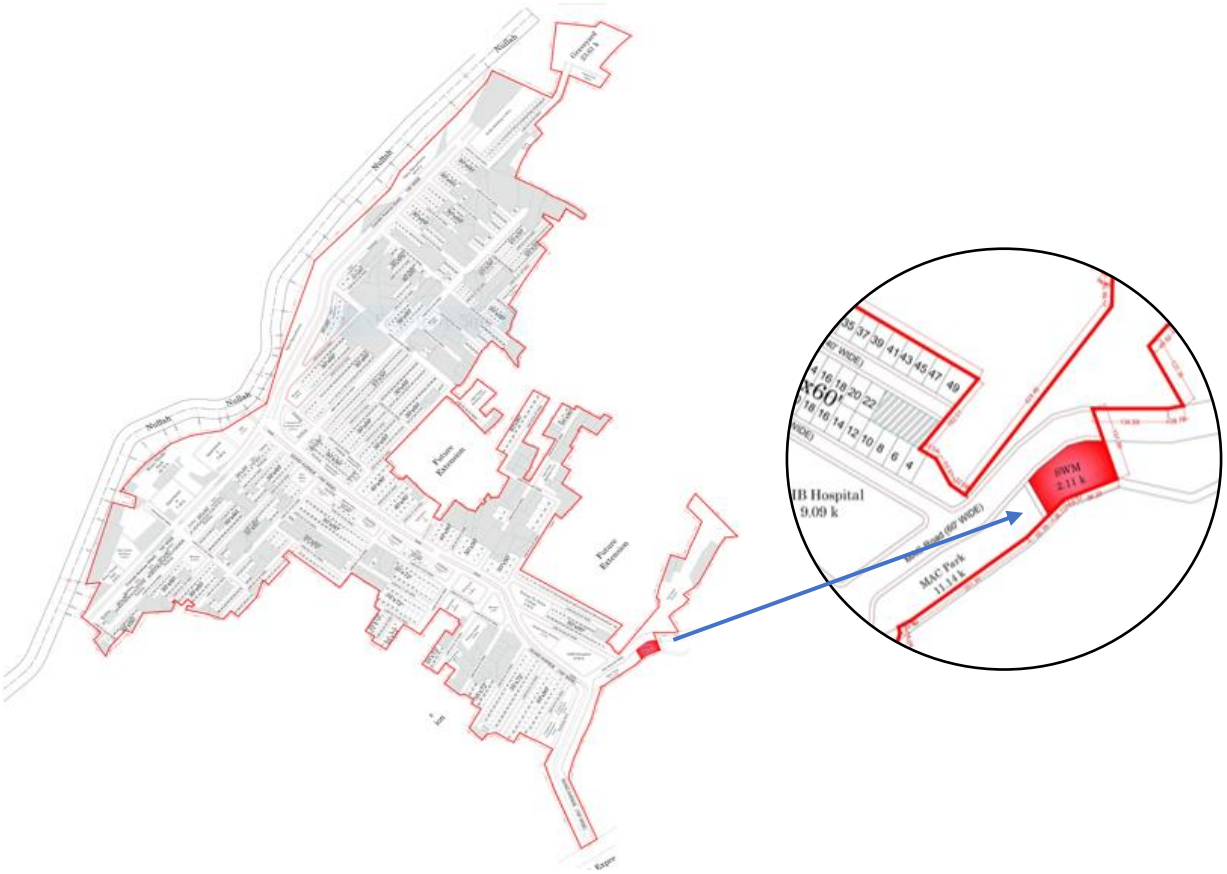


Figure 6 Location of Designated Plot for Solid Waste Management

3.10.2 Zone Wise Management of Solid Waste

The table below represents how the solid waste will be handled at different levels within the society:

Table 3.8 Solid Waste Management at Different Levels

Plot Level	Street Level	Block Level	Scheme Level

• Segregation at Plot Level • Providing separate bins for recyclables, organic waste, and non-recyclable waste • Install individual waste collection points • Conduct regular awareness programs to educate residents about waste management practices.	• Strategically placed waste collection bins along the streets • Regular collection and disposal of waste from the street bins • Implement a system for street sweeping and cleaning to maintain cleanliness • Placing large dumpsters or skip bins at strategic locations for bulk waste disposal.	• Set up centralized waste collection points within each block • Appoint block-level waste management representatives responsible for monitoring waste collection, segregation, and disposal. • Separate waste bins for recyclables, organic waste, and non-recyclable waste at the collection points.	• Establish a dedicated waste management team for overseeing the entire scheme's S.W.M. activities. • Collaborate with local waste management authority for waste collection and disposal services. • Encourage the use of innovative waste management technologies • Allocate designated areas within the housing scheme for composting organic waste.

3.10.3 Mitigation Measures

The implementation of composting program is also recommended. This will provide on-site recycling of the biodegradable waste and grass clippings. It will also provide natural fertilizer or green manure, to be used in the Jinnah Garden Phase – II landscapes.

The integrated Solid Waste Management Plan of Islamabad should incorporate a Solid waste segregation facility. Where Solid Waste should separate into recyclable and non-recyclable waste. For this purpose, residents can be provided with different color waste bins for different waste materials

Solid waste generated by the residents of Jinnah Garden Phase – II shall be collected in the waste bins, placed at all houses and containers will be placed at various locations keeping in view the design criteria. The solid waste in the containers will be collected through the FECHS vehicles and finally will be disposed of in the proposed sanitary landfill site of Islamabad.

3.10.4 Residual Impact

The residual impacts after the implementation of the above measures will be low if the FECHS construct and operate Sewerage Treatment Plant and Solid Waste is collected and disposed of properly.

3.11 Sewage Plan

Society will have their own independent sewerage treatment system which will be capable of taking 80 % of the water consumption. Since the total water demand of society is 1,443,060 GPD, the Sewerage generated per day will be:

$$Sewerage\ Generated\ per\ Day = 0.8\ \times 1{,}443{,}060$$

$$Sewerage\ Generated\ per\ Day = 1{,}154{,}448\ GPD$$

3.11.1 Location of Sewage Treatment Plant

The sewage generated by the society must be treated before disposing it off. For this purpose, a Sewage Treatment Plant (STP) will be installed in the society. The exact location of the STP is shown in the map below:

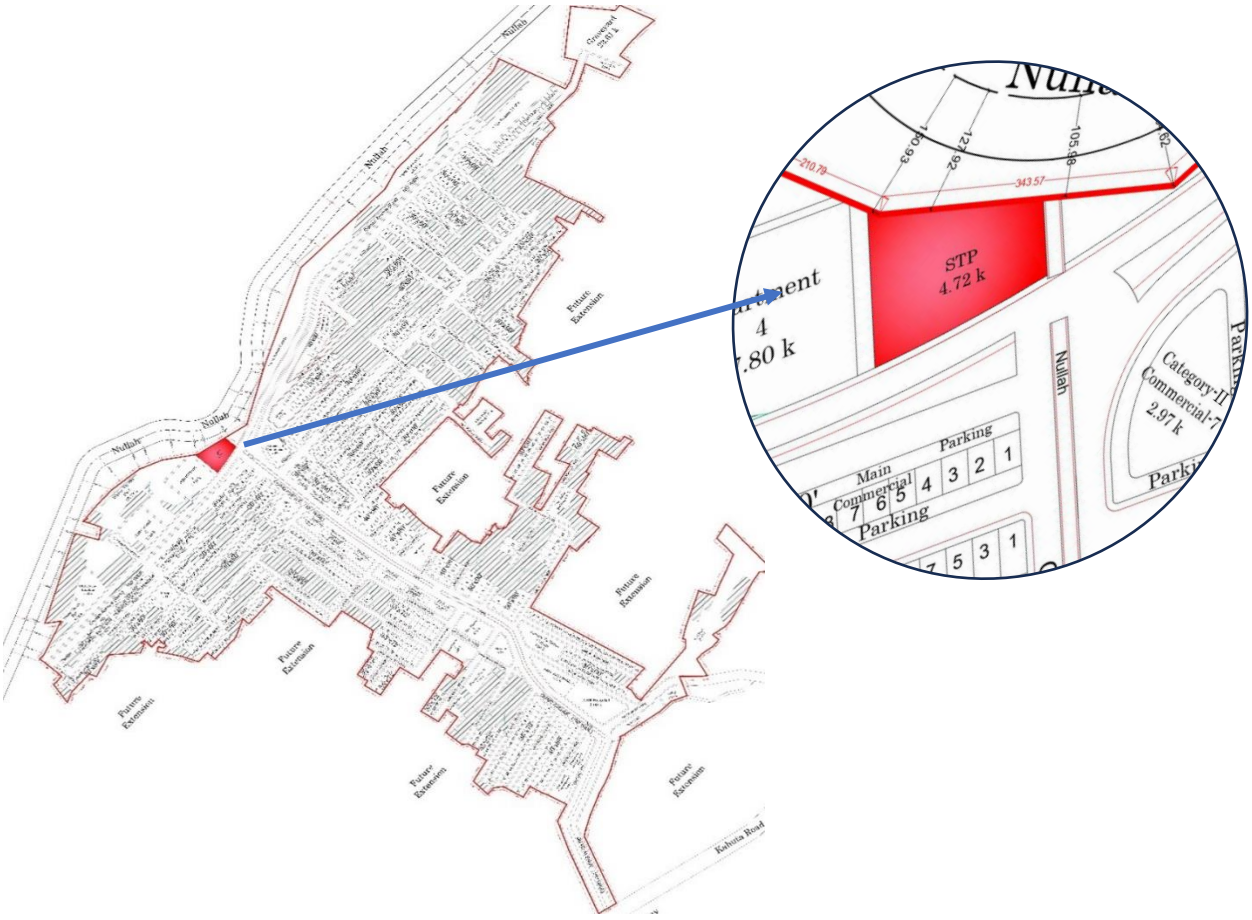


Figure 7 Location of STP in the Society

3.11.2 Sewage Conveyance and Disposal Plan

RCC pipes will be used for conveying the sewage from houses to the STP. The minimum diameter of the sewer will be 9 inches. The disposal of sewerage will be made through the trunk sewer, which will terminate at a sewerage treatment plant for primary treatment.

Moreover, septic tanks will be planted in all residential, commercial and institutional buildings of the project.

3.12 Traffic Impact Assessment of Project Area

3.12.1 Project Location

The project site is situated in Zone V of Islamabad along Kahuta Road, which is a single carriageway. The traffic volume on Kahuta Road is high including both LTV and HTV vehicles. The project site is also accessible by public transport.

Figure 8 Connecting Roads

3.12.2 Existing Traffic Load on Kahuta Road

The Project site has an access from Kahuta Road. Two survey points were selected to measure the traffic flow on Kahuta road i.e., Survey Point A and Survey Point B. The two represent the opposite directions of the road. The existing traffic flow of road, according to the survey, points out that the direction A (as shown in Figure 9) i.e., Kahuta to Islamabad Expressway has the maximum traffic counts in terms of PCUs (See Table 3.9). As per calculations, the traffic counts in terms of PCUs for the Direction A is 5,885 for 16 hours of the day. Whereas, in the case of Direction B i.e., from Islamabad Expressway to Kahuta, the traffic counts in terms of PCUs is 4,087.

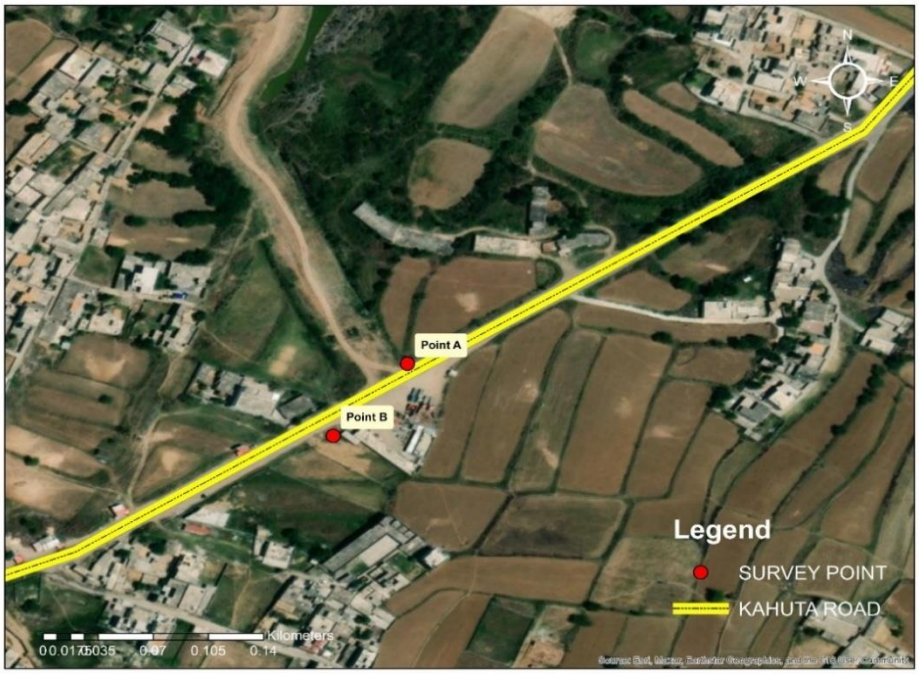


Figure 9 Survey Points on Kahuta Road

The data collected from these Survey points is enlisted in the table below:

Table 3.9 Traffic Count (PCUS) Towards Islamabad Expressway (Direction A)

Traffic Count (By Mode)																	
Calculated from	**Direction A (Kahuta to Islamabad Expressway)**																
Mode of Traffic	**Time (AM)**							**Time (PM)**									
	06 to 07	**07 to 08**	**08 to 09**	**09 to 10**	**10 to 11**	**11 to 12**	**12 to 01**	**01 to 02**	**02 to 03**	**03 to 04**	**04 to 05**	**05 to 06**	**06 to 07**	**07 to 08**	**08 to 09**	**09 to 10**	**Total**
Motor cycle	16	18	45	61	72	59	56	26	36	18	21	32	25	26	28	11	547
Car/Jeep	35	25	60	110	112	80	62	35	43	43	33	20	27	35	22	27	769
Van/ Minibus	20	34	84	102	174	136	40	36	20	30	20	60	62	62	46	24	950
Bus	25	42	133	112	333	70	35	28	18	14	49	53	133	74	32	32	1180
Truck	80	92	88	80	172	108	76	28	60	48	72	88	168	104	108	116	1488
Tractor / Trolley	100	60	20	48	120	28	52	20	40	8	48	56	104	88	88	72	952
Total Vehs. /Hr	276	271	430	513	982	481	321	173	216	161	243	309	519	389	324	282	5885

Table 3.10 Traffic Count (PCUS) Towards Kahuta (Direction B)

Traffic Count (By Mode)																	
Calculated from	**Direction B (Isb Expressway to Kahuta)**																
Mode of Traffic	**Time (AM)**							**Time (PM)**									
	06 to 07	**07 to 08**	**08 to 09**	**09 to 10**	**10 to 11**	**11 to 12**	**12 to 01**	**01 to 02**	**02 to 03**	**03 to 04**	**04 to 05**	**05 to 06**	**06 to 07**	**07 to 08**	**08 to 09**	**09 to 10**	**Total**

Motor cycle	12	15	42	47	39	23	47	24	59	62	39	37	16	12	16	17	502
Car/Jeep	13	32	44	53	82	79	98	28	77	103	95	78	103	114	115	65	1179
Van/ Minibus	14	44	66	48	106	46	66	44	76	46	46	26	24	26	8	16	702
Bus	42	25	63	49	84	28	67	60	186	28	42	28	25	25	25	42	816
Truck	32	12	16	12	8	8	28	12	8	48	52	76	72	48	68	88	588
Tractor / Trolley	8	20	32	28	16	16	32	32	12	8	20	28	8	8	12	20	300
Total Vehs. /Hr	121	147	263	237	335	200	338	199	418	295	294	273	248	232	244	248	4087

3.12.3 Traffic Generated from the Project

The Jinnah Garden Phase-II development is expected to generate a daily traffic volume of 4,224 PCUs, with peak hour traffic at 422 PCUs (Table). Analysis indicates this increase will not negatively impact the Level of Service (LOS) of the existing road network. The infrastructure can accommodate the additional traffic without causing unstable or forced conditions, ensuring smooth traffic flow. Currently, peak hour traffic on Kahuta Road is 997 PCUs. Post-project completion in 4-5 years, an additional 423 PCUs will bring peak hour traffic to 1,420 PCUs. The Volume Capacity ratio for peak hour traffic, before and after the project, is illustrated in Figure 10.

Table 3.11 Peak Hour Traffic when society is in functional phase.

Peak Hour Traffic						
Mode	**Occupancy**	**Modal Split**	**No. of Vehicles**	**PCU Factor**	**PCUS**	**Peak hour PCUS**
Motorcycle	1.2	33.43%	3,663	0.50	1,831	183
Car	2.2	31.05%	1,856	1.00	1,856	186
Van	13	13%	133	2.00	266	27
Public Transport-Bus and others	38	22%	77	3.50	271	27
Total	54.40	100%	5,729	7	4,224	**422**

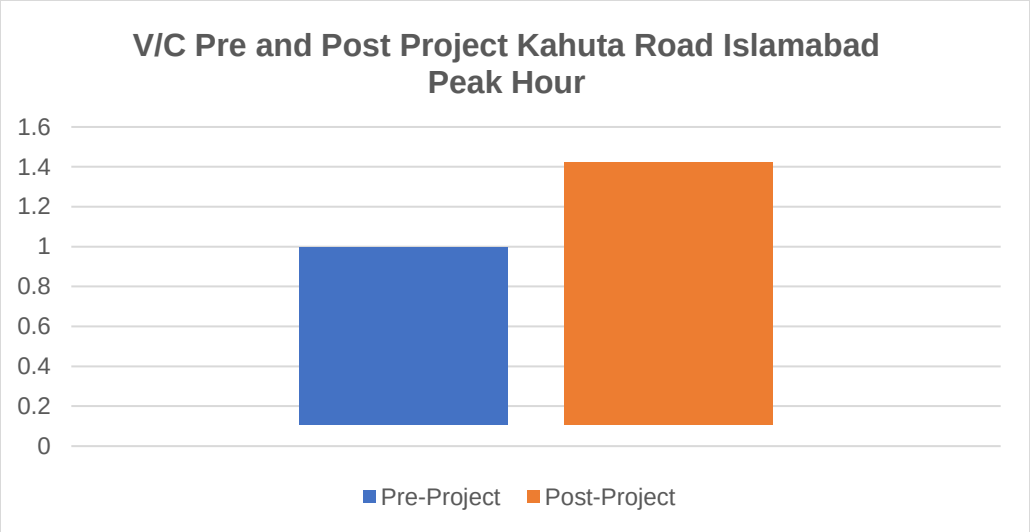


Figure 10 Volume Capacity Ratio for Peak Hour Traffic

Proponent has also applied for parking permits in the 200 ft wide land between Kahuta Road and Site.

3.13 Sustainable Features of the Project

Jinnah Garden Phase II is committed to be developed in a sustainable way. The following sustainable features have been provided in this project:

- The planning & design of Jinnah Garden Phase II will be carried out, keeping in mind the natural topography, sun and wind direction.
- Jinnah Garden Phase II will encourage its residents to use Oxo-biodegradable D2W plastic bags.
- Jinnah Garden Phase II will install Wastewater Treatment Plant for the project.
- Only 90,000Kanal area will be allowed for Jinnah Garden Phase II as per CDA approval to the Jinnah Garden Phase II.
- Jinnah Garden Phase II has allocated 10.39% (1066.00 kanal) for open spaces/ parks in the Town.
- Jinnah Garden Phase II has made guidelines for the establishment of a rainwater harvesting system for its allotee(s).

3.13 Manpower Requirement

During the construction phase of the project, a total of 75 staff would be engaged.

Table 3.12: Manpower requirement during construction Phase of Jinnah Garden Phase – II

Sr.No.	Type/ Profession	For execution (Number)
		Jinnah Garden Phase-II
1	Engineers Civil, Environmental, Public Health etc.	5
2	Project Managers and Administrators	10
3	Support & Service Staff (for office & site)	5
4	Skilled Workers (Technicians, Plumbers, Labours)	20
5	Unskilled labour/ helpers	30
6	Foreign Consultants (Specify fields of work)	None
7	Others	5
Total		75

During the operational phase of the project, a total of 35 staff would be engaged.

Table 3.13: Manpower requirement during operational phase of the project

Sr.No.	Type/ Profession	For Operation (Number)
		Jinnah Garden Phase-II
1	Engineers Civil, Environmental, Public Health etc.	5
2	Project Managers and Administrators	5
3	Support & Service Staff (for office & site)	5
4	Skilled Workers (Technicians, Plumbers, Labours)	5
5	Unskilled labour/ helpers	10
6	Foreign Consultants (Specify fields of work)	None
7	Others	None
Total		

3.14 Time Schedule

The development works for Jinnah Garden Phase II will be completed in a period of three years.

Table 3.14: Time Schedule for Construction Phase of the Project

No.	Description	1	2	3	4	5	6	7	8	9	10	11	12
1	Boundary Wall	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 3 months.											
2	Gate House & Security Pickets	Main Gate 80% completed as of now. Security Pickets Construction will start after the issuance of the NOC.											

3	Roads (VRS / Streets) Work	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 3 Year
4	Storm Water Drainage/Footpath Work	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 1 year
5	Protection Works	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 6 months
6	Sewerage System	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 1 year
7	Culverts	Culvert construction work is fully complete, ensuring site accessibility.
8	Water Supply & Rain Water Harvesting Works	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 1.6 Years
9	Sanitation Works	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 1 years
10	Landscaping (Soft + Hard)	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 3 years
11	E & M Works (Street Lights, Security System etc.)	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 4 months
12	Irrigation System	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 2 years
13	Demobilization & Handover	Construction begins immediately after the issuance of the NOC and is scheduled to complete within 3 years

3.15 Cutting of Trees

The exact number of trees to be cut during the construction phase will be known when the project site is fully demarcated as per the layout plan of Jinnah Garden Phase II. The main tree species include Chir pine, located in the upper reaches of the project site, along with Kahu / Wild Olive and Phulai. Among shrubs, species of Sanatha, Garanda and Bakerh are common. Wild Trees are rare in the project area but vegetation cover dominated by Sanatha, followed by Garanda, Pattaak and Phulai. Jinnah Garden Phase II will keep the record of tree cutting during the construction phase of the Project. Jinnah Garden Phase II will plant 10 trees for every tree cut under the project.

3.16 Government Approvals

Jinnah Garden Phase II has obtained the Layout Plan Approval from the Capital Development Authority Letter No.CDA/PLW-HS(RP)2(987)/2007-24/Vol-III/401 dated October 21, 2024. The Layout Plan approval letter has been attached in Annexure I.

3.17 Project Phases

The construction of Jinnah Garden Phase II will be implemented in three phases, i.e., Pre-construction/ Design, Construction, and Operation.

3.17.1 Pre-construction/ Design Phase

Topographic Survey: The topographical survey has been undertaken by the surveying consultant to demarcate the area and measure the ground elevation.

Site investigation: The geotechnical and soil investigation of the project site has been carried out for determining the suitability of a site to support the structures, and other development works.

Three (3) boreholes maximum down to 100 ft each were marked at different locations of the site. Seepage water was encountered at approx. 5' depth in borehole no. 1 & 2, and at 12' depth in borehole no 3. Allowable bearing capacity for the proposed site, at 10' depth from lowest existing surface is 1 TSF for raft footing.

Selection of Contractor: Once, the engineering details become available; Contractor will start to work on the project.

3.17.2 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.

Site Preparation: Usually, this activity involves the operation of heavy 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 up 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 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, sewage and storm drainage systems, junction boxes and providing connections to the building. Supervision of this whole activity will be carried out by the construction team.

Staffing: Construction crews will be the responsibility of the civil contractor and its petty contractor. It is estimated that a maximum of 40 personnel will be working at the site at a given time during the peak construction period.

These will essentially include masons, carpenters, electricians, painters, plumbers and general laborers. For unskilled employment, preference will be given to local residents of the project area.

The following steps will be taken for the effective management of construction crew:

- A complaint cell for the workforce will be established, where they can register their reservations related to work.
- A development of an effective system of communication/ consultation and will ensure that the staff concerns are addressed.
- Employees will be discouraged from working excessive hours and/ or missing break periods (this may involve a detailed job evaluation)
- Child labor will be avoided.
- Incidents of bullying, sexual and racial harassment will be monitored and, where necessary disciplinary actions will be taken.

- Clear job descriptions will be developed for the workforce, and it will be ensured that the individual is matched to them.

Construction Machinery:

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

- Dozer/ Loader
- Excavators/ Jack Hammer
- Concrete Mixing Plant
- Tractor Trolley
- Water tanker
- Water and concrete pumps
- Tower Crane

The exact number of the above equipment and vehicles will vary 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 local market. The Bills of Quantities of the material will depend upon the construction activities.

Cement Mixing Plant: With the construction and operation of the concrete mixing plant, air quality, noise nuisance, water quality and visual impact induced by the barge's transportation minimized significantly. All sensitive receivers around the project site and along the site would benefit from the reduction. Control discharge of highly alkaline wastewater, dust, and excess noise.

Concrete mixing plant combines various ingredients to form concrete. Some of these inputs include sand, water, aggregate, fly ash, potash, and cement. The plant has a variety of parts and accessories, including mixers, cement batches, aggregate batches, conveyors, radical stackers, aggregate bins, cement bins, heaters, chillers, cement silos, batch plant controls, and dust collectors (to minimize environmental pollution). The center of the concrete batching plant is the mixer. It is used to mix stiff consistency concrete, semi-stiff consistency concrete, and lightweight aggregate concrete and so on.

This machine can be used as a separate mixing machine or used as the supporting machine of the ready-mix concrete plant. When matched with the batching plant, they can form a simple mixing plant with more environmental benefits.

Disposal of Excavated Construction Waste: Construction waste will be recycled by the contractor if possible. Otherwise, it will be disposed of at CDA's designated site for excavated material/ construction waste.

Electricity: the project will get proper electricity connection from IESCO for the construction activities and camp.

Camp Supplies: Camp supplies will be procured from – and transported to the project site.

Camp Site Sanitation Facilities: Septic tank with a soakage pit at the construction will be constructed to treat sewerage generated by the campsite

Traffic Load during Mobilization (and Demobilization): All of the constructions equipment and vehicles will be transported to the site via--.

Traffic Load for Construction Materials Supplies: It is estimated that on average, 8-10 truckloads per day during the peak construction period will be supplying different types of construction materials to the project site during the peak construction period.
Other supplies Water: During the construction phase, a maximum of about – gallons per day of water will be required for construction activities and human consumption. The water supply will be arranged through water tankers.
Fuels: for the construction equipment and vehicle, diesel will be required. The peak consumption of diesel would be – liters per day during the peak construction period.

Table 3.15: Staff for construction Phase of the Project

No.	Description	For Construction
1.	Technical Staff	10
2.	Skilled Workers (Technicians, Plumbers, Labours)	40
3.	Unskilled Labour/ helper	25
Total		

3.17.3 Operational Phase

The Project Manager, Jinnah Garden Phase II will be responsible for the operation and maintenance of the project during the operational phase of the house.

3.18 Present Status of the Project Site

Cut and fill work is partially completed at the project site whereas no proper development work is started yet

Chapter 4: Project Alternatives

4.1 Background

An analysis of available alternative is necessary to establish that the most suitable management and technology opt for a project.

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

4.2 No Project Opinion

If the project is not pursued, the region will forfeit numerous benefits. Islamabad and Rawalpindi will miss the opportunity to develop a comprehensive residential colony complex, exacerbating the existing housing shortage. The project's cancellation would also result in lost employment opportunities during the design, construction, and operational phases, contributing to unemployment. Furthermore, the unmet demand for housing may lead to the proliferation of unauthorized and environmentally harmful developments. In light of these consequences, the "No Project Option" is not a viable choice.

However, implementing effective mitigation measures can minimize the expected negative impacts, making the project a more sustainable and beneficial option.

4.3 Build-As-Proposed Option

The proposed Jinnah Garden Phase II project aims to address the shortage of modern housing facilities in Islamabad and Rawalpindi by providing residential plots. This development will not only create employment opportunities during the construction and operational phases, boosting the local economy, but also encourage horizontal expansion, reducing the pressure for vertical development.

By implementing the recommended mitigation measures outlined in the EIA report, the potential negative impacts associated with the project's construction and operational phases can be significantly minimized, controlled, or eliminated, ensuring a sustainable and beneficial outcome for the region.

4.4 Site Alternatives

The project is located on Mouza Chak Kaamdar Jabbi Ghakhran Nara Syedan Kahutta Road Zone-V of Islamabad. The developers of the land have purchased this land for this project. Therefore, no alternative site has been considered for the project.

4.5 Economic Alternative

The proposed project is expected to yield immediate economic benefits, including the creation of employment opportunities and revenue generation. A diverse range of industries will benefit from direct and indirect job creation, spanning construction services, repair and maintenance, utilities (electricity, water, gas), retail sectors (hardware, building supplies, motor vehicles, gardening supplies), waste management, and various services (rental, cleaning, pest control, printing).

By implementing the mitigation measures outlined in the EIA report, the potential negative impacts associated with the project's construction and operational phases can be effectively minimized, controlled, and eliminated, ensuring a positive economic outcome.

4.6 Environmental Alternative

The proposed project site, situated in Mouza Chak Kaamdar, Jabbi Ghakhran, Nara Syedan, Kahutta Road Zone-V of Islamabad, boasts convenient access to major roads, including Kahutta Road and Expressway Islamabad. The project area currently comprises housing societies and villages. While potential environmental and human health impacts may arise during the construction phase, the project mitigates these risks through a dedicated sewerage treatment plant, efficient solid waste management system, and eco-friendly building features, such as energy-efficient elements.

Considering the environmental protection measures and sustainable features integrated into the project, it is likely that the proposed project will enhance the environment of the project area during the operational phase, particularly when compared to alternative scenarios.

4.7 Conclusion

Given the absence of a viable alternative site, failing to implement the project would result in the loss of all potential benefits associated with the housing development. Therefore, the most advantageous course of action is to proceed with the project as proposed, while implementing measures to mitigate its potential environmental and social impacts. This approach will enable the realization of the project's benefits while minimizing its negative consequences.

Chapter 5: Stakeholder Consultations

5.1 Introduction

Stakeholders were also involved in public consultation to know their Opinions, concerns, issues and suggestions. This chapter provides details of such public consultations at a different level.

5.2 Public Consultation

Public Participation is a mandatory requirement of the Environmental Impact Assessment exercise under Environmental Protection Act 1997[22] and the rules & regulations framed there. The public consultation & participation process provides an opportunity for those directly & indirectly affected by the project to express their concerns during the feasibility phase before the finalization of the project design. It aims to ensure that the EIA process is transparent and robust and enables sustainability in the design, implementation, operation & management of development projects.

The proposed project will create both positive and negative impacts in the project area that may affect the local population and other stakeholders both directly and indirectly. Therefore, public consultation with the community and stakeholder meetings were carried out. Different aspects and impacts of the proposed project were highlighted regarding their impact on the physical, biological, and socio-economic environment of the project area.

5.3 Objectives of Consultation

Public consultation plays a vital role in studying the effect of the project on the stakeholders and in the successful construction and operation of the proposed project. 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 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 project.

The important general objectives of the consultation process are:

- Information, dissemination, education and liaison;
- Identification of potential problems and needs,
- Collaborative problem solving,
- Management of water, wastewater and solid waste management during the construction and operational phase of the project; and
- Documenting mitigation measures, management of traffic during the construction and operational phase of the project.

[22] https://environment.gov.pk/SiteImage/Misc/files/Act/brf-act1997.pdf

5.4 Methodology

Rapid Social Appraisal (RSA) was applied to discover the facts, empirical verifiable observations or verifying the old facts, on the prevailing socio-economic and cultural conditions of the area. Furthermore, focus group discussions, and roadside consultations were held with people working in the project area.

The consultant carried out public consultations at various locations around the proposed project area, and the following strategy was adopted for public consultation:

- Selection of the stakeholder for consultation, reconnaissance of the proposed project site and initial discussions with the residents, office workers and pedestrians etc.
- Appraising the targeted stakeholders initially for the purposes of the consultation and designing a schedule for holding regular consultation meetings.
- Meetings for environmental consultants and social specialists with the stakeholders were held to the document their opinions expressed during the meeting.
- All the meetings were held in a friendly environment in which participants expressed their views freely.

5.5 Major Stakeholders Involved

The list of potential stakeholders is as follows:

- Local residents of the adjacent villages
- Estate Dealers
- Educational Institutions
- Governmental Organizations

5.6 Issues Discussed

The following issues were discussed during the stakeholder consultation:

- Overall activities of the project and their possible impacts;
- Possible impacts on natural vegetation, flora and fauna;
- Possible mitigation measures and
- Beneficial factors and involvement opportunities for the local people in the set of activities of Project.

5.7 Meetings with the stakeholders

The meetings were held with the selected Stakeholders to discuss major technical aspects of EIA for the project “Jinnah Garden (phase-II), Zone V, Islamabad”, Opinions/Concerns/Issues/Suggestions are summarized in table 5.1.

Table 5.1: Stakeholders Opinions/Concerns/Issues/Suggestions

Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
Mr Rizwan Shabir	Jinnah Garden Phase II	• Jinnah Garden Phase II is aware that the project has positive and negative impacts. As stated in environmental protection laws of Pak EPA. Jinnah Garden Phase II is undertaking an Environmental Impact Assessment study of the project before the start of development activities. • In Jinnah Garden Phase II, approximately 15% of the area is reserved for open space and parks. • In Jinnah Garden Phase II housing scheme project, almost twice the number of trees were planted as originally planned. Jinnah Garden Phase II has a very hardworking and efficient horticulture department which will be reasonable for the implementation of the plantation plan of this project. • Jinnah Garden Phase II will have all major environmental conservation features such as rainwater harvesting, application of building energy code of Pakistan and use of renewable energy.
Mr Nafees Ahmed Mirza	Environmental Protection cell, CDA, Islamabad	• The project may cause environmental impacts if environmental mitigation steps are not followed. Main environmental Impacts will be due to the poor solid waste management and discharge of untreated water into the freshwater body near the project site. • Water resources are depleting in Islamabad, and it is imperative that new housing schemes have the provision of rainwater harvesting and conservation of water. • The landscape plan should include plantation of native plants.
Mr Danish Sial	IESCO, Islamabad	• Development of such projects is very useful and better than unplanned growth. • Development of Jinnah Garden Phase II must be carried out according to the layout plan approved by CDA. The area allotted for this project has a high potential to serve as wind energy source. A study must be carried out to calculate the wind potential of the area in order to provide an alternative energy source for the residents of town. • Tree cutting should be minimized to the maximum extent possible through astute planning. For every tree cut, as many as 10 trees should be planted. • Local people should be employed in the development of the project.

		• Occupational health and safety measures may be adopted by the contractor during construction works for the safety of the workers.
Dr Sadiq Ullah Khan	Environmental Practitioner	• Fauna of the area must not be disturbed. There are several wild animals in the project area which need to be considered during the construction phase of the project. • Rhesus monkeys, Wild Bear, Wolf, Jungle Cat, Leopard Cat, Porcupine, Barking Deer, Grey Goral, are the species at the project area. • As a part of Corporate Social Responsibility, Jinnah Garden Phase II must arrange awareness campaign to provide knowledge to the local residents about the fauna of the project area. • There is a lack of awareness among the local residents regarding the presence of such fauna that hoe these animals are connected to the entire ecosystem of the area. • Several research studies had been carried out on fauna at the project site, and this should also be done by the Jinnah Garden Phase II to conduct search and surveys in these forests.
Prof Dr Aniq Asad (Arid Agriculture University)	Academia	• Jinnah Garden Phase II have a unique opportunity to establish an Integrated Resource Recovery Centre for proper treatment and disposal of solid waste. In an IRRC, the organic waste converted into compost. This compost can be used in kitchen gardening. This activity makes project sustainable. • Regulatory agencies such as Pak-EPA and CDA should ensure that development work is being carried out as per the approved layout plan and environmental approval of the project. • Jinnah Garden Phase II is a novel idea and similar schemes should be promoted so that sustainable development takes place.

5.8 Consultation with the Communities

Community engagement sessions were conducted through roadside discussions with local residents, informing them about the key aspects of the Jinnah Garden Phase II Housing Scheme, including its location and activities. The respondents expressed enthusiasm, citing the increased value of their land and anticipated improvements in their living conditions. They welcomed the project, feeling no social or environmental threats, and believed it would bring significant upgrades to their socio-economic and environmental circumstances upon completion.

The age distribution of the respondents showed that 40% were between 21-30 years old, while 26.67% fell within the 41-51 age range. Distribution of age of respondents involved in the roadside discussion of various age group is shown in fig 5.1.

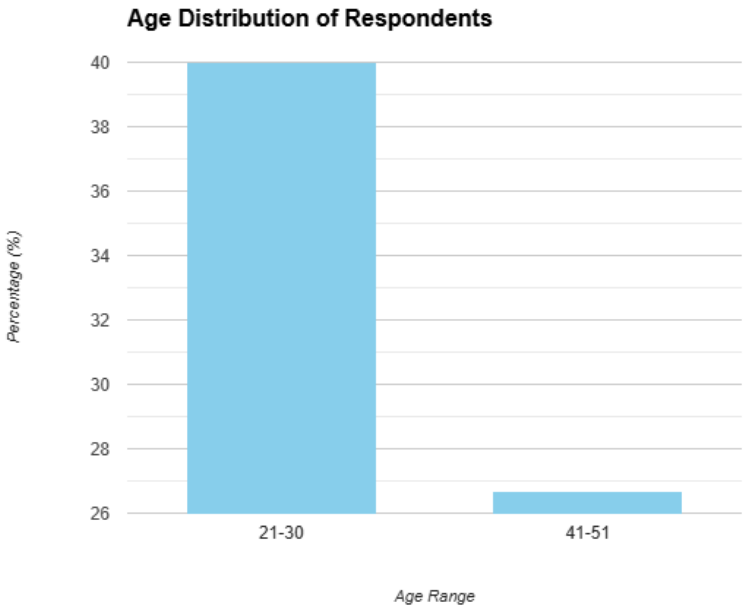


Figure 5.1: Age Distribution of people involved in Public Consultation

The respondents were both male (60%) and female (40%) belonging to a different occupation. The distribution of gender of the respondents involved in the roadside is discussion is shown in fig 5.2.

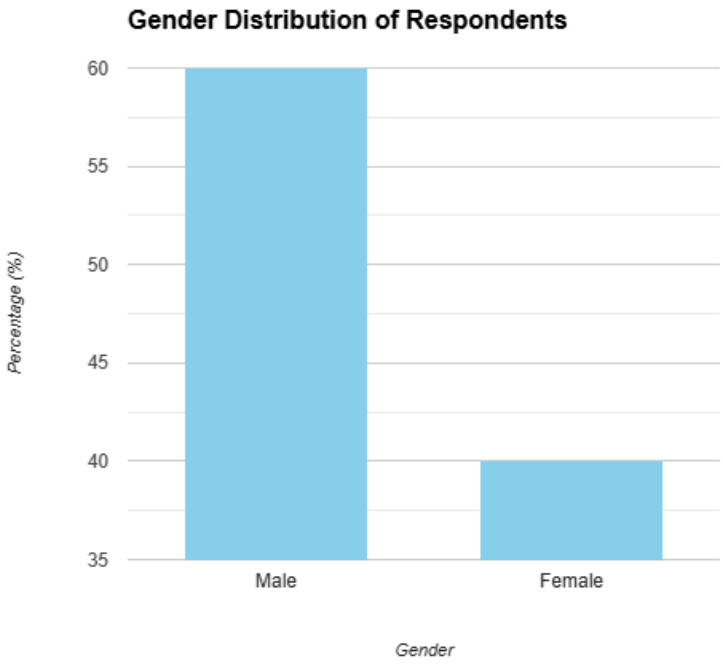


Figure5.2: Gender Distribution of Public involved in Public Consultation

33% of the respondents were graduate in different fields of education. Distribution of education of the respondents involved in the roadside discussion is shown in fig 5.3.

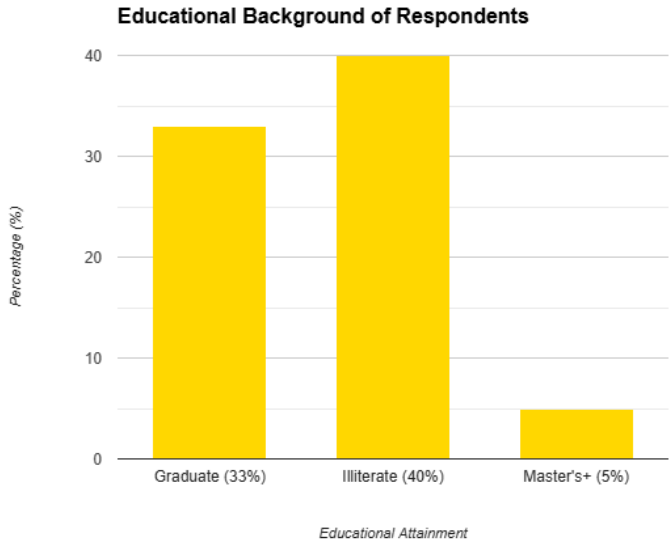


Figure 5.3: Educational Distribution Public involved in Public Consultation

Respondents of the survey reported the up-gradation in the following areas due to this project.

- Their land prices have increased and will continue to increase as there is a development of a number of projects in the project area.
- Children Literacy level will increase due to the availability of better educational institutions. Presently, there are two high schools for girls and boys in the area and students need to go to nearby area for the educational purpose. Residents hope that due to Jinnah Garden Phase II housing scheme, their kids will get higher education.
- This project would create job opportunities for the residents of adjacent villages. Hence, economic uplift will be anticipated at a high pace.
- There will be an increase in public transportation in Chak Kaamdar Jabbi Ghakhran Nara Syedan. Presently, very few public vans have routes in the area. With the development of Jinnah Garden Phase II, housing scheme, the routes will increase, which will benefit the local population.

Respondents of the survey put forward some recommendations, if followed, which will mark the high worth of the proposed project.

- Linking roads – roads which link Jinnah Garden Phase II housing scheme, to the surrounding villages-should be improved.
- Local residents of the adjacent areas should be given employment opportunities during the construction and operational phase of the project.
- Jinnah Garden Phase II should do welfare work in the surrounding villages of Jinnah Garden Phase II housing scheme site.
- The Kahutta Road has deteriorated over the years due to the passing of heavy machinery. Government Departments and management of Jinnah Garden Phase II should repair the road.
- Plantation of trees should be ensured in the premises of the project site to equate the deforestation.
- Proper steps should be taken in order to minimize noise and dust pollution during construction.
- Construction / Residential waste should be disposed of at a proper site that does not disturb humans and the surrounding environment.
- One of the major components of efficient solid waste management is segregation at the site. Jinnah Garden Phase II housing scheme will house learned residents who will probably understand the value of a clean environment. Jinnah Garden Phase II administration is encouraged to inform its residents to segregate solid waste at their home. By doing this activity, disposal, treatment and recycling become efficient.
- Provision of basic facilities, including natural gas, should be ensured in adjacent areas of the site so that they should also benefit from the project.
- Different recreational resorts should also be established to make this area favourable for tourist activities.
- Energy conservation equipment and techniques should be used. All the streetlights should be on solar energy.

5.9 Address of Concerns

Efforts have been made in the preparation of this Environmental Impact Assessment (EIA) Report to address all the concerns raised by the stakeholders during the consultation meetings.

Proper management plans have been proposed in the relevant sections to deal with all the issues related to biodiversity conservation, management and disposal of solid waste, wastewater disposal and safeguarding interests of the local people.

Chapter 6: Environmental Baseline

6.1 Introduction

The environmental baseline for this study is aimed to find out the overall ecological conditions those support the natural flora and fauna in the area. It mainly focusses on the biodiversity conditions in and around the project area. The study is based on the field survey aiming to achieve the documentation of the current/prevailing ecological conditions for the designated study area. Therefore, the project's development and construction phase, may take/consider measures to reduce the impacts; those carry effect on the overall environmental wellbeing of the local environment.

Hence, his section of the Ecological survey records and presents a detailed description of physical and biological environmental conditions of the study area. The data collection techniques are combination of both primary and secondary data collection methods/means by field verifications, observations, sampling and monitoring which was supplemented by review of published literature and previous studies in and around the study area. The base line data defines, elaborates and present physical environmental quality within the project surrounding. The field team, comprising of a senior Ecologist, 2 field assistants and a field photographer, relied on expertise in environment and ecology to provide advice and reliable field data on environmental baseline conditions.

6.2 Project Area Location

The study site mainly covering the Project area is located near Kahuta Road, at the right bank of the River Sawan. A desktop survey was undertaken on 26th and 27th, of August, 2024, before the site visits, in order to analyse the current plant cover and vegetation diversity at the proposed project site. The site visits were performed in the following days, to record biodiversity along the right bank of the River as mentioned above.

Study Area at Sawan River near Kahuta Road shown in fig 6.1.

6.3 Geography

Islamabad is the capital of Pakistan. It is located at 33.6844N 73.0479E[23] at the edge of the Potohar Plateau at the foot of the Margalla Hills in Islamabad Capital Territory. Its elevation is 507meters (1,663ft) the height being 1,584 m (5,196ft). The modern capital and the ancient Gakhar city of Rawalpindi stand side by side and are commonly referred to as twin cities. To the east of the city lie Murree and Kotli Sattian. To the north lies the Haripur District of Khyber Pakhtunkhwa. Kahuta lies on the northeast, Taxila, Wah Cantt, and Attock District to the northwest, Gujar Khan, Kallar Syedan, Rawat, and Mandrah on the northeast, and Rawalpindi to the southwest. Islamabad is located 120 kilometres (75 mi) SSW of Muzaffarabad, 185 kilometres (115 mi) east of Peshawar, 295 kilometers (183 mi) NNE of Lahore.

6.4 Islamabad

Islamabad Capital Territory[24] is the capital and the ninth-largest city in the country spread over an area of 908 sq. km and is divided into three segments; namely, (i) Islamabad Urban Area, including institutional and industrial area, covering 220 sq. km, (ii) Islamabad rural area measuring 446 sq. km.

Islamabad Capital Territory is divided into eight zones[25]: 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 Fat 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.

The area of Islamabad is 906 square kilometers (350 sq. mi). A further 2,717 square kilometers (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.

The map of Islamabad has been provided in Figure 5.1.

[23] https://www.dawn.com/news/1700892
[24] http://www.cda.gov.pk/about_islamabad/vitalstats.asp.
http://www.ictadministration.gov.pk/
[25] https://ead.gov.pk/SiteImage/Misc/files/AboutIslamabad

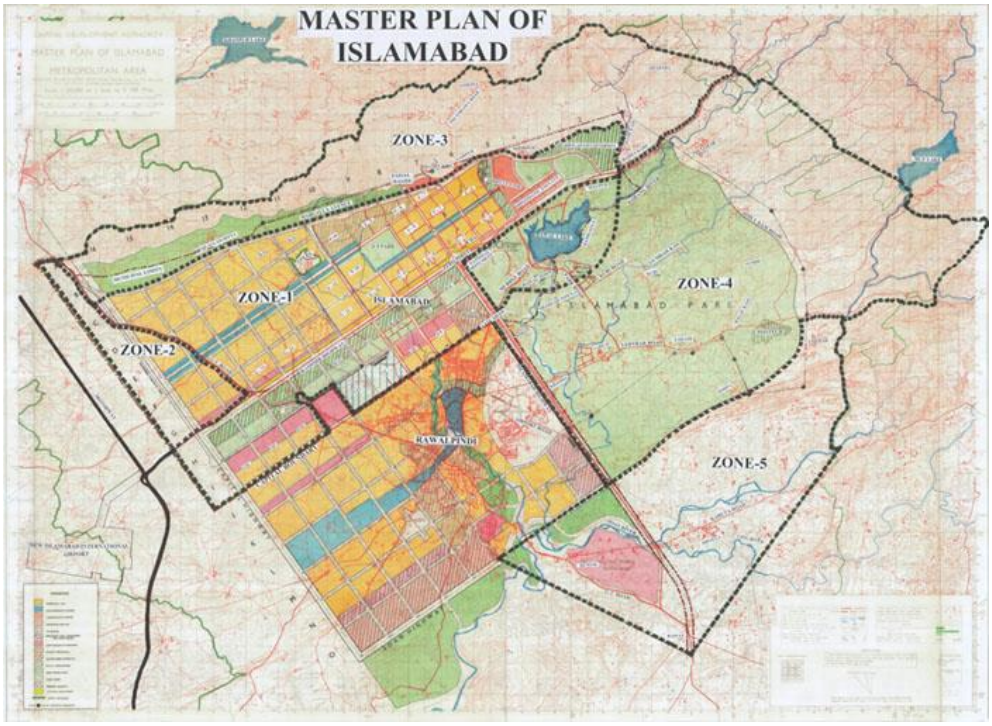


Figure 11 Zonal Map of Islamabad

6.5 Physical Environment

The following aspects of the physical environment are studied.

6.5.1 Topography

Islamabad Capital Territory is situated on the border of the Potohar Plateau and lies at the base of the Margalla Hills. The Potohar Plateau exhibits an uneven topography, gradually ascending from an elevation of 500 to 600 meters above sea level, with the highest point reaching 1,600 meters above mean sea level. The land gently slopes towards the south and consists of either alluvial deposits such as clay and silt or gravel caps. The plains are formed by varying thicknesses of alluvial sediments deposited by past and present river systems. The region is characterized by undulating terrain, with several areas being heavily eroded by gullies and ravines. Rawal Lake, created by damming the Korang Stream, and Simly Lake, formed by a dam on the Soan River, are prominent water bodies in the area. The Potohar Plateau is a distinct physiographic unit in Pakistan, bounded by the Kala Chitta and Margalla hills to the north, the Salt Range to the south, the Indus River to the west, and the Jhelum River to the east. It covers an approximate area of 11,200 km² and features undulating topography with scattered gullies and gorges formed by active water erosion.

The topography[26] of Islamabad exhibits a combination of plains and mountains. The northern part of the city encompasses the mountainous terrain of the Margalla Hills, while Rawal Lake is situated in the northeastern region just below the hills. The southern portion consists of an undulating plain traversed by the Korang River and its tributaries. Towards the east, the landscape is relatively flat, characterized by barren soil and human settlements.

[26] https://www.dawn.com/news/1700892
http://www.dawn.com/news/1301912

6.5.2 Geology and Soils supporting local biodiversity

In the project region, usually the slopes are gentle starching from north to south and from the Kahuta road till the River Sawan. While the slopes along (the opposite side of the project - lying outside boundary of study site) right bank of River are steeper, with a thicker, shrubby plant cover, whereas the Left (project adjacent) side has comparatively gentler slopes with dips in upstream direction. Rocks are very rarely schist or igneous in this area. Hence, the Dominant rock formation is the limestone in nature with some areas representing the sedimentary rocks. They are brownish to grey in colour, moderately hard, thinly to medium bedded, sparsely jointed, as well as sparsely fragmented, fresh to slightly weathered on exposed surfaces.

Some narrow strips of land occur as slightly raised terraces just above the river, along straight sections of the river or on the inside of bends. These areas contain small to medium sized boulder, beds and alluvial deposited soils. In some areas deposits have been covered by landslides. Soils are either mixtures of the young and poorly formed stony/sandy soils or are composed of infertile skeletal soils derived from landslides. Small terrace remnants above the lower slopes of the River are predominantly of alluvial as well colluvial origin occasionally, and of low to moderate fertility. The soils are predominantly affected by drought in the study area, with less vegetation cover as well as not very suitable for the cultivation of the major crops, being completely rainfed, with very high (42 degree C) in summer and (-2 C in winters). In some villages springs are channelled to these areas for very limited irrigation systems.

The range of crops including maize and wheat, with some fodder cultivation. The terraces are not common, of so these are rarely subdivided into small farming areas. Lower and middle terrace areas rise to upper valley slopes, especially to the western side, which is outside the project area, while the eastern side of the river bank are devoid of the terrace agriculture.

6.5.3 Land Use

Over time, land use in Islamabad has undergone changes, shaped by a combination of environmental and physical elements such as landforms[27], climate, and water resources, along with human factors like population size, growth, economic requirements, and cultural norms. These factors have played a significant role in shaping the patterns of land utilization within the city.

The project site is non-agricultural land near Chak Kaamdar Jabbi Ghakhran Nara Syedan along Kahutta Road. The entire project area consists of a semi-rural landscape.

6.5.4 Seismic Risk

The Islamabad region can be divided into three main structural zones. In the mountainous north, which includes the Margalla Hills, there are complex folds and thrusts along the Hazara Fault[28] Zone. Moving southwards, the mountains transition into a gently sloping piedmont bench made of sandstone and shale. The Soan River runs along the axis of the Soan syncline. Islamabad is located at the edge of the

[27] https://www.dawn.com/news/1796974

[28] https://pjhr.org.pk/index.php/pjhr/article/download/167/155/
https://pubs.usgs.gov/bul/2078/B2078_chapter_G.pdf

Hazara Fault Zone, which is an arc of folded and thrust rocks. This fault zone stretches about 25 km wide and 150 km long, curving southward and extending west southward from the Himalayan syntaxis. There are multiple thrust faults in the Islamabad area, with some occurring in front of the Margalla Hills, which continue north of Fateh Jang and form the Kala Chita Range.

The Islamabad region is situated in a tectonically active zone, experiencing frequent earthquakes in recent geological history due to faulting and folding of the structure. The geological record indicates a history of significant earthquake activity in the region. The Soan syncline is a faulted fold of regional extent, plunging west southward. Although earthquake shaking can occur beyond areas near surface faults, the risk of surface rupture is higher in places where the surface has previously been fractured. The devastating earthquake of 2005, with a magnitude of 7.6, caused extensive destruction in Islamabad.

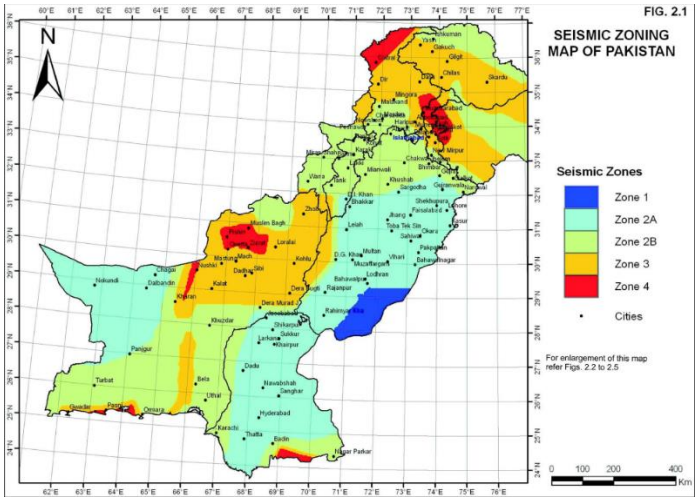


Figure 12 Seismic Zones of Pakistan

The project area is classified as seismic Zone 2B, representing a high hazard level and a moderate damage zone.

The Seismic Map of Pakistan is given in **Figure 5**.

6.5.5 Major Earthquakes

Islamabad has experienced several major earthquakes[29] throughout its history. Here are some notable earthquakes that have occurred in the region:

1. 1905 Kangra Earthquake: This earthquake, also known as the Kangra Valley earthquake, had an estimated magnitude of 7.8. While the epicenter was in the Kangra region of present-day Himachal Pradesh, India, its effects were felt in Islamabad and other parts of Pakistan. The earthquake caused significant damage and loss of life in the area.
2. 2005 Kashmir Earthquake: One of the most devastating earthquakes in the history of Pakistan, the 2005 Kashmir earthquake occurred on October 8, with a magnitude of 7.6. The epicenter was located near Muzaffarabad in Azad Kashmir, but the impact was widespread, including Islamabad. The earthquake caused widespread destruction, resulting in the collapse of buildings, loss of

[29] https://www.britannica.com/list/6-deadliest-earthquakes

infrastructure, and a significant loss of life. It is estimated that over 73,000 people were killed and many more were injured.

3. Other Earthquakes: The region around Islamabad is in a seismically active zone due to its proximity to the Himalayan Mountain range. As a result, there have been numerous smaller earthquakes in the area over the years. These earthquakes, although not as severe as the ones mentioned above, still contribute to the overall seismic activity in the region.

It's important to note that seismic activity is an ongoing phenomenon, and there is always a possibility of future earthquakes in the Islamabad region. Efforts have been made to enhance building codes and disaster preparedness to minimize the impact of earthquakes and ensure the safety of the population.

6.5.6 Water Resources

The city of Islamabad relies on both surface and groundwater to meet its water demand. The two major surface water sources are Simly Dam and Khanpur Dam while the groundwater is being extracted from the underlying unconfined aquifer through a number of tube wells installed by CDA. In addition, private tube wells also exist installed by commercial, industrial and individual homeowners.

The groundwater table of the project area has great variation. In some localities, the water table is shallow while in others, it is at a considerable depth. The bore-wells are common in the project area for drinking and household water consumption.

a) Surface Water

There are no major rivers directly adjacent to the project site. One of the water storage dams, Khanpur Dam is about 16.5 km north, and Soan River is about 23.2 km southeast of the project site. The area near Kahuta Road, including places like Naran Syedan and Jabbi Ghakran, generally relies on groundwater for water supply, as surface water sources are limited. In the broader Kahuta region, some new water supply schemes are being developed, like the Dhapri Water Supply Scheme, which could improve access to water for nearby areas. However, due to limited surface water options, many of these areas depend on boreholes and tube wells for their water needs.

b) Ground Water

The groundwater situation around Naran Syedan, Jabbi Ghakran, Kahuta Road, Islamabad is influenced by the area's overall hydrogeological profile. Groundwater availability is generally moderate to low in these regions due to the rocky terrain, with many households relying on borewells or tube wells to access it. However, drilling depth varies, and the water table in some locations can be deeper due to the natural topography.

The nearby Soan River basin contributes surface water to recharge groundwater sources, and natural springs are sometimes found in areas closer to the Margalla and Rawat hills. However, groundwater in these areas might not be as readily available as in flat, plain regions like the Potohar Plateau.

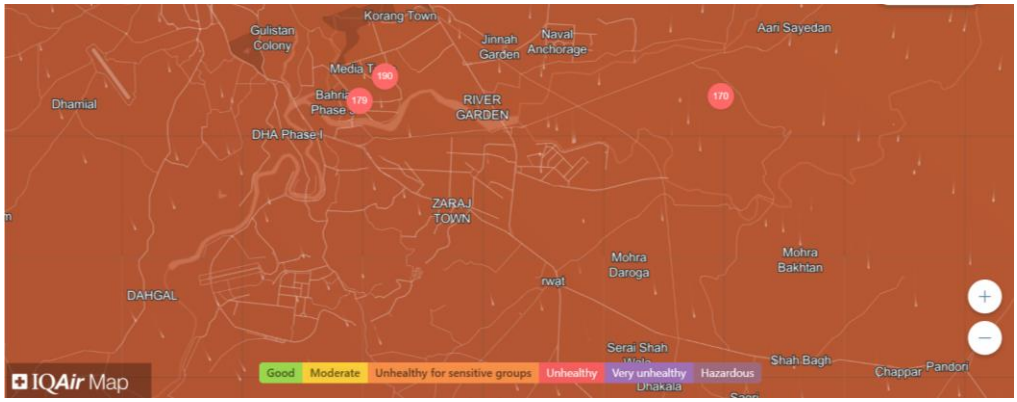
For agricultural or construction purposes, it may be necessary to invest in deeper boreholes or rainwater harvesting systems to supplement the groundwater.

6.5.7 Air Quality and Noise

The Figure 7[30] shows condition of air quality in the project as captured on Aug 23rd, 2024 at 12:08 PM. IQ air map consist of following parameters.

- PM1: Ultra fine dust
- PM2.5: Fine dust
- PM10: Coarse dust
- Temperature:
- Relative humidity:
- Barometric pressure:
- CO2

The overall impact of project on air quality and noise pollution aspect, throughout project cycle i.e., pre, during and post construction period is significant, reversible and localized in nature.



Air Quality Islamabad

6.5.8 Climate

The climate of Islamabad is subtropical, with mild, quite rainy winters and hot, very rainy summers due to the Indian monsoon. The city is the capital of Pakistan and is located in the north of the country, on the Potohar plateau, at an altitude of 500 meters (1,650 feet) and 33 degrees north latitude. Nearby is the city of Rawalpindi, which is effectively merged with Islamabad. Just north of the city are the Margalla Hills, whose highest peak is Tilla Charouni, 1,604 meters (5,262 feet) high. Sometimes, on these hills in winter it can snow above 1,000 meters (3,300 feet). To the north-east is the Pir Panjal Mountain Range. The proximity of the mountains makes the climate rainier than in the other cities of Pakistan, as regards to the disturbances that arrive in winter and spring, but especially in July and August, when the rains brought by the monsoon are very abundant. In winter, from December to February (but sometimes also in November and March), nights are often cold. On the coldest nights of the year, the temperature can drop to the freezing point or a little below. Also, from November to February, fog can form at night and in the early morning. Generally, the fog dissolves during the day, however, in these situations, especially from mid-December to mid-

[30] https://www.iqair.com/air-quality-map/pakistan/islamabad

January, it can sometimes be cold even during the day, and there may be periods in which the maximum remain around 8/10ºC (46/50ºF). On the other hand, from mid-April to early July, before the monsoon, it is very hot, though less than in the cities of Pakistan located at sea level. In the hottest periods, the temperature can reach 45/46 °C (113/115 °F).

Metrological data of Islamabad, including average min. and max. rainfall are shown in **Figures 5.3**.

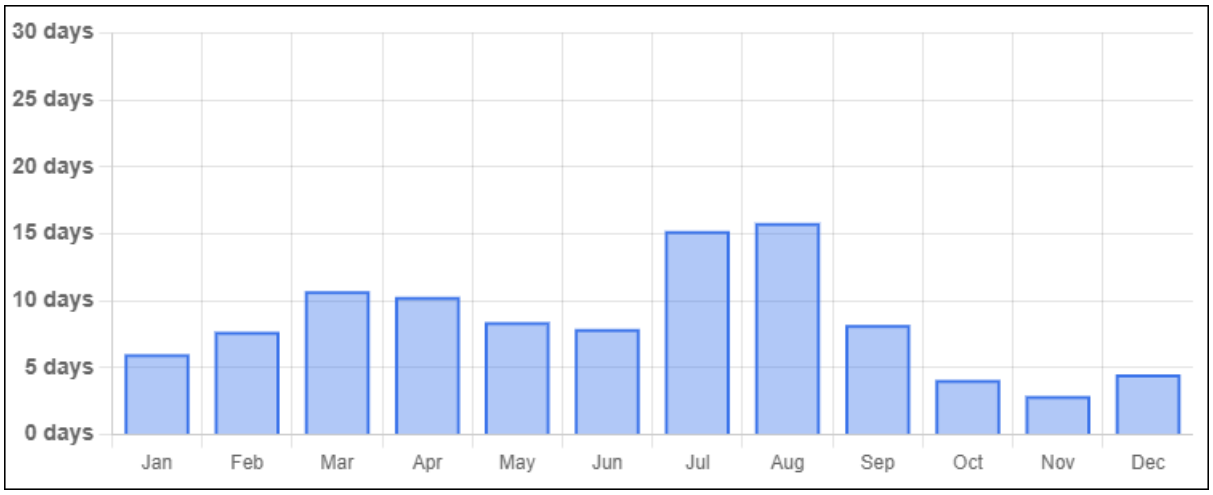


Figure 13 Rainfall Averages for Islamabad

6.5.9 Temperature

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 in Murree and surrounding areas. The winters are coldest in December, January and February. The hottest months are June and July. The average temperature of the coldest month (January) is of 10.8 °C (51.5 °F), that of the warmest month (June) is of when the mean maximum temperature remains 48 °C. From February to June the temperature rises at the rate of 5.0 °C per month. Here are the average temperatures.

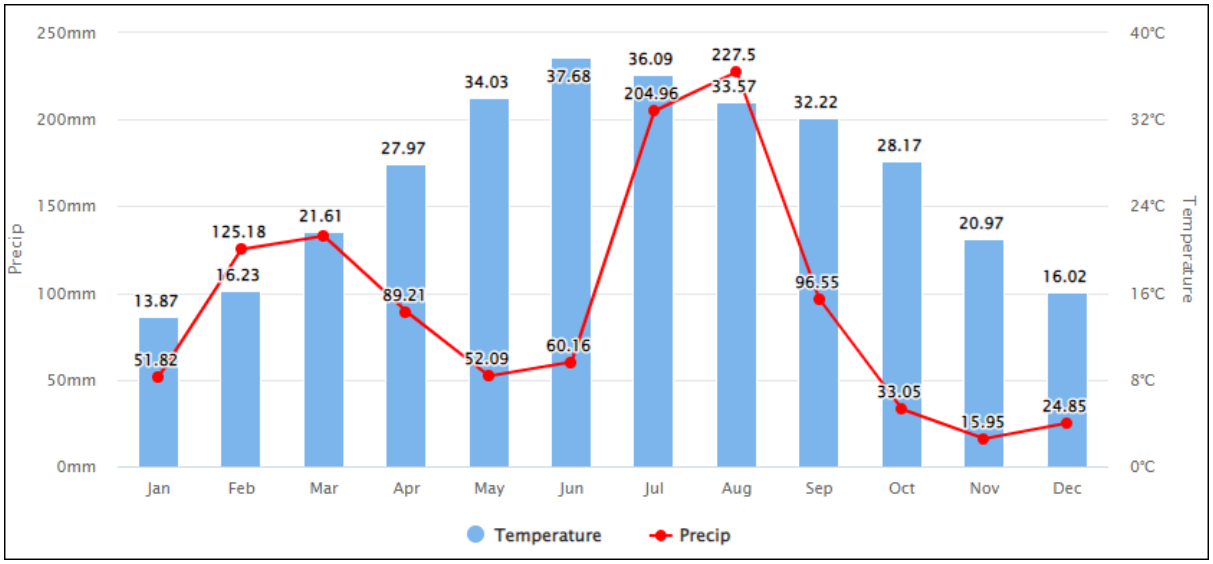


Figure 14 Average Temperature in Islamabad

6.5.10 Traffic and Transportation

The project site is situated in Zone V of Islamabad along Kahutta Road, which is a dual-carriageway. The traffic volume on Kahutta Road is high including both LTV and HTV vehicles. The project site is also accessible by public transport.

Figure 7 Connecting Roads

Proponent has also applied for parking permits in the 200 ft wide land between Kahutta Road and Site.

6.6 Biological Environment

Biological environment of the project area is given below:

6.6.1 Terrestrial Biodiversity

The terrestrial biodiversity in the Project area highlights major plant species, mammalian, bird, herpetofauna, and fish species. The baseline status of biological resources in the study area was determined using information from published material, research articles, and departmental reports of forest and wildlife department. The task was accomplished by a thorough desktop survey. The baseline survey in this study area was undertaken along the road side, and to the slopes, main road leading to left bank of River Sawan, as well as the entire area of the proposed housing project, influencing an area of 100m to 200m alignment along right (bank) said river.

The entire stretch of the project area can be classified as modified habitat due to anthropogenic activities in surrounding areas, and within project boundary some human-induced changes to land use and to the native vegetation are observed too. There is no designated forest, or wildlife sanctuary/conservation area, located within the project boundary, however the areas associated to the riverbank are less prone to anthropogenic activity, being away from the population as well as main road.

Largely the project area boundaries near riverbank, as well as associated slopes are rich in vegetation diversity and native wildlife. Some herpetofauna and many bird species are also represented in such places. Some of the local informants indicated that major wildlife species, like wild boar, and Canidae including jackals and fox are

common in the region, with occasional snake and lizard species, small to medium sized rodents, like mangos, hedge hogs and rarely pangolins are reported.

The project area is located on the lowest slopes in the area. The areas located higher than the project site are characterized by plants, shrubs and small trees like Acacia sp., Olea cuspidata and other large shrubs like Justicia adhatoda, Dodonia viscosa, lantana camara and Carrisa opaqa, which provides an ample refuge to the local animal biodiversity. The wildlife is being promoted by variations in altitude, topography and climate providing limited habitats for several species of wildlife. The fauna of the project area consists of mammals, reptiles, amphibians, occasionally fish, and birds.

6.6.2 Riparian area and allied Vegetation

Among herbaceous species mainly Cannabis sativa, Conyza sp., Sasuria sp., and an important invasive species named Parthenium hysterophorus are the predominant plant species in the riparian zone of the study area, some less diverse species like Taraxicum sp., Cynodon dactylone, Riccinus communis, Sida cordata, Amaranthus viridy, Rumex dentatus with Conyza canadensis are also found during the survey. Other than the invasive species, many of these less common native plant species are vulnerable to grazing along the riverbanks, which are widely accessible to the neighborhood, further deteriorate the native plant cover scenario. Some planted tree species including fruit trees, Date palm, Figs, Jambolana, Terminalia arjuna, Eucalyptus sp., and several small to medium sized trees were observed, however towards the outer areas along project boundaries the only dominant species was Acacia tree.

6.6.3 Terrestrial Flora

The dominant species in local subtropical dry conditions are shrubby and thorny species of small to medium sized trees. Based on habitat type different species were identified as dominant vegetation in different parts of the study area. Mainly grasses and herbaceous plant cover, with small shrubby species was identified in the main project area along riverbank, whereas the boundaries of the main project site were represented with some variation in the local flora, e.g. to the roadside there was led plant cover however slightly more number of tree species. Therefore, it is assumed that these are result of the roadside plantations and may be as a result of the agroforestry as well as fruit and shade trees cultivation along human settlement. In agricultural habitat along the river (study area) the dominant species manly include Eucalyptus sp., Olea sp., and Acacia sp.

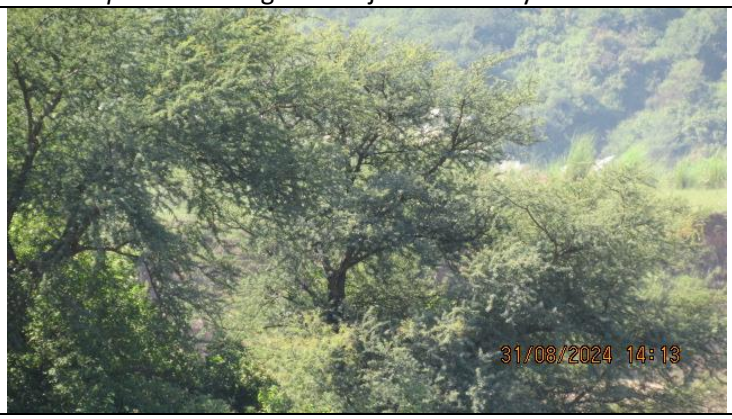
A few of invasive species were reported in the study area including Shrubs like Lantana Camara, Trees like paper mulberry (occasionally present), herbs like Parthenium sp., Conyza sp. and Cannabis sative. The most obnoxious among these weeds is Parthenium hysterophorus for which complete removal is suggested in order to enable the local herbaceous and shrubby vegetation to restore a healthy cover. Other common Weed include Sassuria, Erigeron, and other members of Asteraceae, while major grasses include Phragmites karka, and Caryx sp., Poa annua, Cymbopogon sp. and Saccharum sp. being most dominant. The Riparian (Farm based agriculture) environment has been identified as the most impotent feature of the local vegetation cover, and several places escape (plants from field) were found growing in the natural environments including wheat and some minor crop species. Analysing the natural flora and especially local environment, Parthenium remain the dominating

species in this agro-habitat category, and it spreads in all project area as well as its surroundings, mainly due to human activities e.g. exploitation of natural resources, grazing, land use patterns and several other anthropogenic disturbances. This also shows that the riparian habitat is affecting the local vegetation cover.

Figure 8: Floral diversity across the River Sawan study area

Parthenium hysterophorus

Saccharum sp. Grass along the Project Boundary towards river Swan



Acacia sp. along the Project western edge near river Swan

Saccharim sp. and other grass species at study site

Local Grass and herbaceous species as fodder fro the livestock

Dodonia sp., Justicia sp. and Carrisa sp., representing major Shrub cover on River bank

Accasia sp., representing major tree cover at site

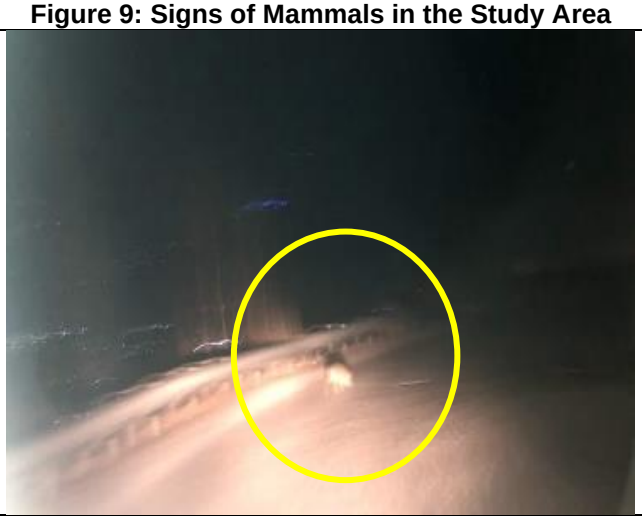
6.6.4 Mammals

According to local informants, the region is frequently home to wild boar due to agricultural activities, while local fox species is also reported, and Asian jackal is also present in and around the project site. It is also mentioned that along river Sawan, occasionally (in winters) common leopard (migrating from mountain forest area in search of prey) is also observed by locals, same is true for the wolf species which are even less frequent to be observed. The informants also underlined; how detrimental wild boar are to agriculture. Among them, the Asiatic Jackal, and Common Leopard, wolf, and wild boar were reportedly dangerous to cattle, hence this becomes a concern for the local people to protect their livestock from compotator as well as predator species. This makes the local wildlife species vulnerable, meanwhile the project activities are supposed to involve more labor and related human intervention at site, hence it is recommended that the project activities close to the riverbank are to be restricts, especially at dawn and Dust so as to pose no threat to the wildlife.

Other mammalian species are represented by Mongoose, field rats, squirrels, and Hedgehog, which are mainly associated to the cornfields and are surely damaging the crops however represent a noticeable population in the natural habitats/condition. Another very important mammalian species which used to exist, is Pangolin, which do not exist in the study are anymore.

An Asian jackal was spotted on the road next to the river during the dusk survey dated 31st August 2024. No small mammals were trapped during the surveys carried out on the same date as part of the assessment Project. No sightings or signs of small mammals were found either, however their presence has been repeatedly confirmed by the local informants.

Figure 9: Signs of Mammals in the Study Area



Asian jackal

During dusk, a rat trap was set up to assess small rodents, close to the trash dump site near Sawan River; during the dawn inspection, a stray dog's foot was noticed, indicating no frequent wild mammalian species in the area

6.6.5 Birds

There are species of resident as well as migratory birds, mostly native bird species come from the Palearctic zoogeographical origin those have a widespread range around the study Area. For the end of the rainy season, and onset of autumn, several bird species that nest in the Palearctic go south to Pakistan and India. When the weather turns really cold, the northern mountain bird species begin to decline. These species generally remain in the lower valleys and adjacent plains throughout the winter. They go to their breeding habitats in the northern latitudes in the spring. Based on the survey for avifauna carried out as part of the ecological studies of Project few species were reported during the dawn and dusk survey. These bird species include the Common Raven Corvus corax, the Bank Myna Acridotheres ginginianus, the White cheeked Bulbul Pycnonotus leucotis, Black Drongo Dicrurus macrocercus, and Great Tit Parus, White throated Kingfisher, Owlet, and White-capped redstart.

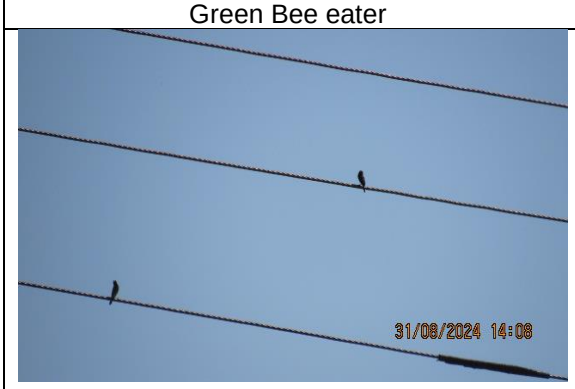
Figure 4.4: Avifuana observed in the Study Area

White Shoulder Kite

Acridotheres ginginianus (Common Myna)

Green Bee eater

White throated Kingfisher



Common Swift

Cattle Egret.

Lapwing

White-capped redstart.

Common Crow

Common Dove

Common Sparrow and Bablers

6.6.6 Herpetofauna Fauna

The term "herpetofauna" refers to reptiles and amphibians together hence representing a diverse class/category of the fauna. Frogs and toads are the representatives of amphibians in Pakistan, whereas crocodilians (crocodiles), chelonians (turtles and tortoises), lacertilians (lizards), and serpents (snakes) are the representatives of reptiles. Among the vertebrates, amphibians and reptiles are very significant that are essential to the functioning of any living system. They might function as superior biological markers within any given environment, as their presence assures the running and as well as proper function of a food chain. Common lizards, garden lizard, Gecko, and monitor Lizard are found in the study area. Some of the snake species like Krait and Naga sp. genus are also found in the study area.

Krait (Margalla and allied hilly areas)

Indian Cobra (*Naja naja*)

6.6.7 Fish Species

The local fish species, that has been commonly promoted/spread as seed in Simly dam, by the fisheries department include Rahu (Labeo rohita). Some fishing activity has been done along as the river bank but not inside project boundary.


Rahu fish *Labio Rohita and its habitat*

6.6.8 Protected Areas/National Sanctuaries

Margalla Hills are located north of the Project Site, Margalla hills[31], Islamabad have been declared as a National Park since 1980 to conserve the existing flora and fauna. The selection of trees and shrubs species for plantation in Margalla Hills is limited to natural trees and plants species which include a bi variety of local flora e.g., Chir Pine *(Pinus roxburghii)* wild Olive *(Olea caspidata) Accacia sp*. and many other native species. The National Park is located approx.10 Km north and northwest of the Project site, however this section of the park, is the west most section of the NP, which is relatively dryer, less in altitude and with most of human/anthropogenic activity, hence biological diversity is lo at this section of park. While it is important to note that it's being designated as a major conservation area of the Islamabad region, which needs management and increased attention from local authorities and environmental agencies.

No major Water body runs near the project site, while towards North at a distance of 2.5 Km a Seasonal drain named Bahudra Kas (stream) flows in East West direction, no designated forest or reserve forest or Rakh/rangeland is present in the vicinity of the project area.

Shahpur dam is an important water body, however it is located at a greater distance of 17 to 18 Km towards South.

6.7 Socio-Economic & Cultural Environment

The section describes the socio-economic and cultural environment of the project area. There are only residential housing societies, villages and their commercial area in the radius.

Population: Chak Kamdar has a population of around 6,000 people. Population numbers for small villages like Chak Kamdar can vary depending on local events, migration, and other factors. For the most current and detailed population information, it would be ideal to consult local government records or recent census data.

Ethnic Structure: The Chak Kamdar comprises of people belonging to different ethnic groups such as Punjabi, Pathan and Saraiki. Apart from these groups there are various small ethnic groups found in the Chak Kamdar. The people living in the village have

[31] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9293027

come from different provinces of Pakistan with diverse cultures and ethnic background. A Darbar of Pir Walayet Ali Shah Gillani is also located there.

Agriculture: The project area has been developed according to the master plan therefore a dense settlement is found in the village. There are very few people who rely on agricultural activities.

Transportation: The public transport is more common in Chak Kamdar. The roads in the village are not in very good condition and are congested. The streets are still not metaled. Most of the residents have their own vehicles.

Education: In Chak Kamdar, there is "Trillium Montessori School" and Shah Academy Educational System, DIL Community Model School, Harris Nawaz Shaheed Model School for Boys, Masjid Hazrat Ali (R.A) and Masjid Qadria Jilania.

Table 6.2: Educational Institutes

Gender	Montessori School	Middle	High	College	Madrassa	Academy
Boys			1			
Combined	1	-	1	-	-	1

Languages: More frequent languages in Chak Kamdar are Urdu, Punjabi Saraiki.

Public Health: Instead of the fact that there are more than 5000 people in the village, there is no hospital there. Some small clinics and dispensaries are however available. In the project area, two main hospitals are located where the people of the surrounding area go for health concerns. The main hospital in the project area is National Institute of Health.

Drinking Water Supply: The source of drinking water in the Chak Kamdar is groundwater as many tube wells and bore have been installed at various locations through-out the Chak. Groundwater is available at 150 ft.

Employment: Being a rural or semi-rural locality, many residents may be engaged in agriculture or related activities. Local shops, markets, and small-scale enterprises often provide employment. Residents may also commute to nearby urban centers (like Islamabad) for various jobs in the public and private sectors. Employment in local schools, health centers, or administrative offices.

Communication and Utilities: Electricity and Sui Gas supply is available in the village. There are many banks, post offices, telephone exchange, or any police post in the area.

Type of Housing: Traditional Rural Houses are often constructed using locally available materials such as mud, bricks, or stone. They may have thatched or tiled roofs, depending on the resources available and the weather conditions. These houses are typically single-story and might include a courtyard.
With the development and urbanization in the surrounding areas, you might also find modern houses made from bricks and cement. These houses usually have multiple

rooms and are built with concrete and steel, offering more durability. Some may be single-story, while others could be double-story.

Given the rural setting, some residents may live in farmhouses. These can vary in size and complexity, from simple structures near agricultural fields to more elaborate homes for those engaged in farming or livestock rearing.

As the area around Islamabad, including Chak Kamdar, continues to develop, you might also find plots of land reserved for future construction or houses in various stages of construction.

Some properties may have a walled compound with multiple buildings within it, including a main house and additional structures for storage, livestock, or extended family.

Family System: In Chak Kamdar, as in many rural and semi-rural areas of Pakistan, the family system is typically characterized by a joint family structure. Multiple generations live together, sharing responsibilities and resources. This setup provides a support system where family members can depend on each other for financial and emotional support, childcare, and care for the elderly. The family system is generally patriarchal, with the eldest male (usually the grandfather or father) being the head of the household. He makes major decisions related to family matters, finances, and social obligations.

Community Based Organization (CBOs) and NGOs:

- Rural Support Programs (RSPs): These are large-scale NGOs that work in rural development across Pakistan, often collaborating with local CBOs to implement programs.
- Health and Education NGOs: Organizations like The Citizens Foundation (TCF) and Edhi Foundation might run educational or health programs in nearby areas.
- Women's Rights Organizations: NGOs such as Aurat Foundation work to promote gender equality and women's rights, which may extend their programs to rural communities.
- Environmental NGOs: Groups like WWF-Pakistan may engage in environmental awareness and conservation projects that could affect local communities like Chak Kamdar.

Chapter 7: Impact Assessment and Mitigation Measures

7.1 Introduction

The Environmental Impact Assessment (EIA) for the Jinnah Town Phase II Project has identified potential impacts that are likely to arise during construction and operational phases of the Project. The EIA has been carried out to identify both the negative and positive impacts of the Project.

This Chapter discusses the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact, assesses significance, recommends mitigation measures to minimize adverse impacts, and identifies the residual impacts of the proposed project.

The nature and the significance of the potential impact depend on the nature and magnitude of the different activities and also on the type of pollution control technologies to control or minimize the pollution-related with the different activities of the project.

7.2 Project and Study Area (Area of Influence)

Before proceeding with the environmental analysis of the project, it is imperative to delineate the project area and study area.

7.2.1 Project Area

The project area is that which will be directly impacted by the project. It includes areas where major construction activities are going to take place for the project structures, the establishment of construction camps, borrowing, quarrying and spoils disposal areas, etc.

Strictly speaking, the project area is directly related to the circumstances where land is to be acquired; people are affected as far as their physical displacement or relocation is concerned. Likewise, the removal of vegetative cover for construction may also be considered a primary impact.

7.2.2 Study Area

Besides the project area referred to above, construction-related and subsequently traffic- borne noise and air pollution may influence areas at large distances away from the primarily affected areas. The project construction, as well as operational activities, may have a variety of direct and indirect effects on the physical, biological, and human resources of the project area and its environment. For the proposed project, the study area will be up to 2 km in radius.

The study area depends on many factors relating to the environmental settings, type of resources and project-related parameters. The situation becomes even more complicated when the indirect impacts are also taken into consideration.

7.3 Environmental Screening of the Proposed Project

For the Jinnah Garden Phase II Project, potential environmental impacts during pre-construction, construction and operational phases were identified and predicted. These impacts are broadly classified as physical, biological, and socio-economic, and

then each of these broad categories further divided into different aspects. The potential impacts thus predicated are characterized as follow:

- High negative (adverse) impact,
- Low negative impact,
- Insignificant impact,
- High positive (beneficial) impact,
- Low positive impact, and
- No impact.

The negative impacts predicted in this manner are the unmitigated impacts, discussed later in the chapter. The screening matrix of unmitigated impacts during the construction and operational phases of the Project is provided in the **Table 7.1**.

Table 7.1 Impact Matrix – Residual Impacts (Un-mitigated)

Project Activities	Physical Environment			Biological Environmnet		Socio-economic Enviromnnet					
	Soil erosion and degradation	Air quality deterioration and dust	Impact on groundwater	Loss of vegetation	Damge to wildlife	Solid waste	Noise	Vibration	Traffic congestion	Safety hazards, public health and nuisance issues	Sites of archeological/historical significance
Construction Phase											
Project sitting/demolition/ land clearence	-1	-1	-1	-1	-1	0	-1	-1	0	-1	N
Construction of labour camp	-1	-1	-1	N	-1	-1	-1	-1	N	-1	N
Labour camp operation	0	-1	0	N	-1	-2	-1	-1	0	-1	N
Foundations construction	-1	-1	-1	N	N	-1	-1	0	0	-1	N
Construction of building	0	-1	-1	N	N	-1	-1	-1	-1	-1	N
Storage of construction material	N	0	0	N	N	0	0	0	0	N	N
Disposal of construction waste	N	-1	-1	N	N	-1	N	0	0	-1	N
Disposal of wastewater	N	N	-1	N	N	0	0	0	0	0	N
Cleaning and restoration	N	-1	0	N	N	-1	-1	0	0	-1	N
Operation Phase											
Solid waste disposal	-1	-1	0	N	N	-1	N	N	N	-1	N
Wastewater Disposal	0	0	-1	N	N	N	N	N	N	-1	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*.

7.4 Impact Characteristics[32] (Assessment of Significance)

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)
- Signification of impact (high, medium, low)

The above aspects of environmental characterization are defined in Table 6.2.
The criteria for determining significance are specific for each environmental and social aspect but generally, the magnitude of each impact is defined along with the sensitivity of the receptor. Generic criteria for defining magnitude and sensitivity are summarized below:

7.4.1 Magnitude

The assessment of magnitude will be undertaken in two steps. Firstly, the key issues associated with the Project are categorized as beneficial or adverse. Secondly, impacts will be categorized as major, moderate, minor, or negligible based on consideration of the parameters such as:

- Duration of the impact
- The spatial extent of the impact
- Reversibility
- Likelihood (something probable)

The magnitude of impacts will generally be identified according to the categories outlined in Table – 7.2.

Table - 7.2: Impact Characteristics Criteria

Category	Characteristics
Nature of the Impact	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter changes as a result of the change in another parameter.
Duration of the impact	Short term: Lasting only till the duration of the project, such as noise from the construction activities. Medium-term: Lasting for a period of a few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil.

[32] Source: Handbook of Environmental Impact Assessment, Volume II, Judith Petts, 1999. Blackwell Science Ltd.

	Long term: Lasting for a period much greater than medium-term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical Location of the impact	Local: Within the area of the project i.e., operation site and access road. Regional: Within the boundaries of the project area. National: Within the boundaries of the country.
Timing	Construction 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	Qualitatively measured on a scale of: Almost certain: Impact is expected to occur under most circumstances. Likely: Impact will probably occur under most circumstances. Possibly: Impact may occur at some time. Unlikely: Impact could occur at some time. Rare: Impact may occur but only under exceptional circumstances
Impact consequence severity	Major: When an activity causes irreversible damage to a unique environmental feature; affects an entire population or species of flora or fauna in sufficient magnitude so as to cause a decline in abundance or change in distribution over more than one generation; has long-term effects (years) on socio-cultural or economic activities of regional significance. Moderate: When an activity causes long-term (period of years) reversible damage to a unique environmental feature; affects a portion of a population of flora or fauna causing reversible damage or change in abundance or distribution over one generation; has short term effects (months) on socio- cultural or economic activities of regional significance. 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 of time; has short-term (months) effects on socio-cultural or economic activities of local significance. Negligible: When no measurable damage to the physical, socio-economic, or biological environment above the existing level of impacts occurs.

Significance of the impact	Categorized as High, Medium, or Low Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.

7.4.2 Sensitivity

The sensitivity of a receptor will be determined based on the review of the population (including proximity/numbers/vulnerability) and the presence of strategic/sensitive features on the site or in the surrounding area. Criteria for determining the sensitivity of receptors are outlined in Table 7.2. Each assessment will define sensitivity about the topic.

7.5 Screening of Environmental Impacts for Pre-construction Phase

During the pre-construction phase the project sitting, alternatives for building design and equipment are considered. The pre-construction phase impacts are mostly related to the building design, systems, and equipment. Such impacts are the following;

- Project sitting impacts
- Energy efficient building envelope
- Insulation strategies
- Interior finishes
- Lightning system
- Fire protection

7.5.1 Project Sitting Impacts

The impacts associated with the project sitting are those which related to its proposed location on Kahutta Road near Nara Syedan, Zone V, Islamabad. These impacts are different from those which are associated with the project's construction and operational phases, in the sense that the construction and operational impacts are associated with the activities such as land clearing, waste disposal, whereas the sitting impacts relate to the mere presence of a facility at the given location.

For the proposed project, the following two aspects of the project sitting were considered:

- Project site, land use and design
- Visual Impacts (aesthetic value)

These are characterized in Table 7.2, and are discussed below

Project Site, Land Use, and Design

The project site of the Jinnah Town Phase II should be in line with the CDA regulations. The land use and design should be in accordance with the building codes and by laws for the construction of buildings in Islamabad. The entrance to the project site will be directly from Kahutta Road, which can cause traffic congestion.

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

The unmitigated impacts associated by not following design codes for construction are characterized as follows:

- Nature: Indirect
- Duration: Long term
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood: Possible
- Consequence: Severe
- Impact significance: Low

Mitigation Measures

Project Site: Jinnah Garden Phase II is developing project present at Chak Kaamdar Jabbi Ghakhran Nara Syedan Kahutta road zone-v Islamabad.

Land Use: The land use of the project site is approved by the Capital Development Authority. The project site, land use and its design will be in line with the relevant bye-laws of the Capital Development Authority for housing projects.

The negative environmental impacts related to the land-use change could be effectively minimized by making provisions for plantation of trees and landscaping of the surrounding areas.
Careful selection and management of the borrow areas will be to avoid adverse impacts and to avoid obvious scars and blemishes on the landscape. Re-vegetation and landscaping of borrow areas and disposal sites consistent with acceptable aesthetic values for the surrounding landscape.

Design: Jinnah Garden Phase II Housing Scheme designs according to CDA bylaws for housing projects and all utilities like water. Natural gas, sewerage system, drainage and electrification would be provided as per respective design standard being followed by the CDA.
Jinnah Garden Phase II intends to construct a Sewerage Treatment Plant which will treat the sewage generated from the residential and commercial areas of Jinnah Garden Phase II Housing Scheme.
To overcome the electricity shortage problem and acquiring energy, solar panels would be installed in public buildings.
Rainwater harvesting mechanism will be incorporated in the design to conserve rainwater, and that can be used for horticulture purpose, thus reducing the pressure on already existing water resources in the area.

Visual Impact

Jinnah Garden Phase II Scheme is being developed in an area with a rural setting. There is a need to maintain much of its natural landscape and vegetation. The natural landscape has an aesthetic value, although not very significant, indeed is a valuable asset of the area. The development of the proposed project can potentially damage the natural landscape, and visual impact will be impacted.

The natural landscape has an aesthetic value, and any developmental activity would cause damage to it. As far as the Project site is concerned, it does not preserve the natural features in its entirety because of the past human interference in the form of large-scale agricultural operations and construction of houses, in the villages of the surrounding project area.

It is thus likely that an impact of low intensity, i.e., low negative will occur, as a result of development. However, with the establishment of the modern housing society, the aesthetic value of the area will increase.

The unmitigated impact associated with the aesthetic value of the area is characterized as follows:
Nature:

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

Mitigation Measures
The negative visual impact of the project will be minimized at different levels as follow:

- Jinnah Garden Phase II will preserve the character of the area as much possible. This will help in maintaining the existing natural cover of the project area.
- The design of the proposed project would be adopted in a manner that minimizes the changes in the topography, landscape and damage to the natural vegetation.
- The selected open areas and parks must be marked and left untouched to preserve natural vegetation.

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

Impacts associated with project sites are those which relate to the placement of Jinnah Garden Phase – II at the designated sites. These impacts are different from those which are related to construction and operational activities i.e., land clearing and waste disposal. Major aspects considered are:

- Aesthetic Value
- Cumulative Impacts

a. <u>Aesthetic Value:</u> The natural landscape has an aesthetic value and any developmental activity would cause damage to it. So far as the project site is concern, it does not preserve the natural features in its entirety because of the past human interference in the form of construction of semi pacca houses. It is thus

likely that an impact of low intensity i.e., low negative will occur, as a result of development.

Mitigation Measures

- It is understood that under the Master Plan, minimum changes will be done to the topography, landscape and natural vegetation.
- The residents of the Kachhi Abadi will be provided compensation for their houses.
- An appropriate landscape and afforestation plan would be developed to compensate and even improve the loss inflicted to the site.

b. <u>Cumulative Impacts:</u> It is apprehended that as a result of the development of Jinnah Garden Phase – II, a cumulative negative impact on the site will occur, involving large scale land clearing, loss of natural vegetation, loss of wildlife, increased load on the natural resources of the area and population influx to the project site.

Mitigation Measures

Development of housing societies for housing and commercial purposes is governed by CDA policy. Hence, this process cannot be stalled or put to end. However, in order to mitigate the negative effects, measures as proposed in the foregoing paras, should be adopted. In this context a careful planning, implementation of environmental legislation, adequate integrated solid waste management, etc. should be ensured.

7.5.2 Energy-Efficient Building Envelope

Energy is the foundation for green building. Energy codes define the minimum acceptable standards for a climate zone. In today's world of climate change and high energy prices, it is important to utilize efficient energy sources in the buildings.

Because the building envelope is typically responsible for 50 to 60% of the total energy losses in a building, focusing on this area of design can help to reduce energy consumption in buildings.

Mitigation measures

- Insulation in the walls and ceiling shall be increased to reduce heat loss and gain and improve comfort.
- Energy efficiency requires a systems-based approach for designing and building. All elements of the building shell; foundation, framing, roof structure and windows, mechanical equipment sized to the actual loads, natural day lighting and ventilation play key roles in defining the potential energy savings for a building. All these need to be considered in the early design stages to maintain cost effectiveness.

7.5.3 Insulation Strategies

Energy-efficient building design starts with implementing optimum insulation levels. Evaluating the cost-effectiveness of varying insulation R-values allows maximizing long-term benefits.

- When selecting insulation levels, refer to ASHRAE Standard 90.1. R-values.

- Carefully research insulation products for stability of R-value over time, and make comparisons based on the average performance over the service life.

Different options can be considered for insulation is:

- Cellulose,
- Rock Wool,
- Fiberglass,
- Perlite,
- Polystyrene,
- Urea formaldehyde, and
- Urethane

For insulation of the building, roof treatment with bitumen coat and polythene sheet earth layer has been proposed.

7.5.4 Interior Finishes

Light colors should be selected for interior walls and ceilings to increase light reflectance and reduce lighting and day lighting requirements. The **Table 4** shows different paint color and their reflection percentage. Consider the color and finish of interior walls and ceilings. When placed incorrectly, light-colored, glossy finishes can create glare problems that negatively impact visual comfort.

Table 2 Different Paint Color and their Reflection Percentage

Sr. No.	Colour	Reflectance
1	Semi-gloss white	70 %
2	Light Green	53
3	Kelly Green	49
4	Medium Blue	49
5	Medium yellow	47
6	Medium orange	42
7	Medium Green	41
8	Medium red	20
9	Medium brown	16
10	Dark blue-gray	16
11	Dark brown	12

- Select light colours for interior walls and ceilings to increase light reflectance and reduce lighting and day lighting requirements.
- Consider the colour and finish of interior walls and ceilings. When placed incorrectly, light-coloured, glossy finishes can create glare problems that negatively impact visual comfort.

7.5.5 Lighting Systems

A well-designed lighting system plays a vital role in creating a comfortable, sustainable, and energy-efficient building environment. By employing smart lighting strategies, architects can minimize glare while achieving optimal illumination, resulting in a high-performance building. Lighting consumes a substantial portion of a building's energy budget (25%-40%), making it a prime target for energy savings. An energy-efficient lighting system can yield significant annual savings, potentially reaching millions of rupees. By reducing energy demands for lighting and air conditioning, advanced controls like daylight and occupancy sensors can optimize energy efficiency. By leveraging these technologies, the design team can craft a high-quality, energy-efficient lighting system that enhances occupant comfort while minimizing environmental impact.

7.5.6 Fire Protection

The building materials should be of appropriate fire resistance standard. Wood shall not be used for any purpose, excluding artificial wood products, which are flame resistant. The materials which have zero surface burning characteristics need to be used.

The electrical systems shall be provided with automatic circuit breakers activated by the rise of current as well as activated by over current. The design shall include provision for the following;

- Fire prevention measures,
- Fire control measures,
- Fire detection systems,
- Means of escape
- Access for fireman, and
- Means of fire fighting

All aspects of fire prevention and control shall be dealt in close collaboration with the Fire Fighting Directorate of the Capital Development Authority.

7.6 Screening of Environmental Impacts for Construction Phase

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. Such impacts include the following:

<u>Physical Environment</u>

- Soil erosion and degradation
- Air quality deterioration, and dust
- Contamination of surface and ground water

<u>Biological Environment</u>

- Damage to Flora and Fauna

<u>Socio-economic Environment</u>

- Generation of Solid waste
- Noise pollution
- Vibrations
- Traffic congestion
- Safety hazards, public health and nuisance issues,
- Sites of archaeological/historical significance.

These impacts and their respective mitigation measures are discussed below.

7.6.1 Soil Erosion and Degradation

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. Reduction in vegetation cover and increase in the built-up area will also increase the rainwater runoff. Potential increase in soil erosion rates would occur during site clearance and endure until restoration and reinstatement measures are taken.

The project area is recognized to have differential erosion in which the harder rock beds make ridge (ribs) and softer ones make depressions. The undermining of soft bed by running water makes the hard beds fall down or tilted downwards due to its own weight.

Soil may be contaminated as a result of fuel/oils/chemicals spillage and leakage, and inappropriate waste (solid as well as liquid) disposal. The contaminated soil may adversely impact the natural vegetation in the area. This unmitigated impact is likely to take place at all project locations supporting natural vegetation.

Soil erosion may affect (i) road stability, (ii) increase flooding risk due to more rapid and higher levels of runoff and silting of water bodies, (iii) siltation in the nearby water bodies (iv) safety issues.

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 following mitigation measures should be adopted to minimize the soil erosion and contamination:

- Proper management of topsoil to prevent loss of soil fertility. Topsoil can be preserved for reuse in Jinnah Garden Phase II Scheme.
- Appropriate slope stabilization measures, e.g., stone pitching, riprap and use Geotextile;
- Measures for proper runoff of precipitated water;
- Minimization of exposed soil/time it is exposed;
- Terracing of exposed slopes;

- Construction activities carried out in a manner to minimize soil erosion;
- Construction of houses in accordance with existing contours and not on the fill slopes.
- Grass seeding/lining of cut slopes during the early stages of construction;
- Provision of fast-growing vegetation on road embankments to prevent scouring and encourage stabilization.
- Soil contamination by bitumen, fuel, and chemical storages shall be minimized by placing these facilities on an impervious base, within a bounded area, and secured by fencing.
- Low embankments should be protected from erosion by planting indigenous grasses that can flourish under relatively dry conditions.
- After the completion of the construction works, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage should be left behind.
- Vehicles and equipment will not be repaired at the project site. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.
- For the domestic sewage from the construction camps and offices, appropriate treatment and disposal system, such as septic tanks and soakage pits, will be constructed of adequate capacity.
- Domestic solid waste from the contractor's camp shall be disposed of in a manner that will not cause any type of soil contamination.
- Soil erosion shall be minimized by the adoption of good engineering practices which would not allow land clearing, levelling and grading beyond the prescribed limits.
- Excavated slope stabilization measures will be adopted as per design.
- Plantation of soil binding plant species, shrubs and tufting with grasses will be resorted to over slopes.
- All preventive measures will be adopted to restrict the spillover and other effluents on the ground to protect soil organisms and to ensure microbial activity; e.g., by using an impervious sheath, while repairing vehicles, appropriate storage and control of toxins, dumping of construction material in natural depressions with pre-laid impervious liners, covered with soil material.

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 “very low”.

7.6.2 Air Quality Deterioration and Dust

Construction machinery and Project vehicles will release exhaust emissions, containing carbon monoxide (CO), carbon dioxide (CO_2), Sulphur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM) especially due to excavation and construction activities. These emissions can deteriorate the ambient air quality in the immediate vicinity of the Project site. Furthermore, construction activities such as excavation, levelling, and filling and vehicular movement may also cause fugitive dust emissions, which become significant as the Project is located in Islamabad.

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

Nature:	Direct
Duration:	Short term
Geo Extent:	Local
Reversibility:	irreversible
Likelihood:	Likely
Consequence:	Minor
Impact significance:	Medium

Mitigation Measures

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

- Construction machinery and vehicles should be kept in good working condition and properly tuned, in order to minimize the exhaust emissions in accordance with NEQS.
- Fugitive dust emission should be minimized by spraying water on soil, where required and appropriate.
- Protective Personal Equipments (PPE) should be provided to workers during construction phase.
- Provide tarpulin cover on the transport of construction material like sand etc.

Residual Impacts

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

7.6.3 Contamination of Surface and ground water

The Project activities that can contaminate soil may also contaminate the water. These include:

- Solid waste disposal
- Wastewater disposal
- Equipment/vehicle maintenance

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

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

Impact significance: Medium

Mitigation Measures

- The mitigation measures recommended to forestall soil contamination will also prevent surfce and ground water contamination.
- The equipment and vehicles should be properly tuned and maintained out of the Project area.
- Waste automobile or construction machine oil should be collected in drums and sold to the recycling contractor.
- Introduce dual pipeline for water supply and separate lines for gray and black water to reduce the risk of water contamination.

Residual Impact

If the recommended mitigation measures are effectively employed, the residual impacts of the Project activities on the water resources of the area will be “low”.

7.6.4 Loss of Vegetation

The project area has a natural vegetation cover. The site preparation and construction activities may necessitate the removal of the natural vegetation from the areas where roads, culverts and other public buildings will be constructed.
Damage and/or loss of vegetation and clearing of other indigenous and introduced species, as well as undergrowth species comprising bushes, grass, etc. will also lose. The construction workforce can also indulge in tree/shrub cutting to obtain fuel wood for the camp.

Nature:	Direct and indirect
Duration:	Medium-to-long term
Geo extent:	Local
Reversibility:	Irreversible
Likelihood:	Certain
Consequence:	Sever
Impact significance:	High

Mitigation Measures

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

- Jinnah Garden Phase II will maintain existing plantation cover and aesthetic beauty of the areas.
- Endeavors will be made to compensate the loss by enhancing the environment, through a plantation of trees and ornamental plants.
- Jinnah Garden Phase II to take utmost care to avoid unnecessary cutting of trees to the extent possible and pledge to realign the road and adjust the location of buildings, if required, in case of any trees coming in the way.
- To keep the surrounding forest protected due to human activity in the area, a thick vegetation strip is also recommended as a buffer zone in the outer area of the whole project site. This may be composed of a total of five rows of plants

having three outer rows of Pinus roxburghii (Chir Pine) and inner four of Olea europaea (Zaitoon) and Phyllanthus emblica (Amla).

- Proper record of tree cutting will be maintained during the construction phase, and for every tree cut, as many as 10 trees will be raised/planted.
- Selection of species to be planted may not be strictly confined to the proposed plantation plan, as local factors such as the available quantity of water and edaphic limitations will also govern the choice of plants.
- A plantation cover of appropriate trees/ bushes preferably evergreen will be raised within the open green areas and along avenues, as well as medians. Unless the performance of an exotic species is put to repeated tests, it is always safe to plant indigenous trees.
- An average space of 10 ft. x 10 ft. will be maintained. However, the plant-to-plant distance might vary depending upon the site conditions and/or the growth characteristics of the tree's species.
- 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 in accordance with NEQS.
- If cutting of trees is unavoidable, a plantation of local species will be undertaken at an appropriate location. The number of trees thus planted will be at least ten times the ones that are cut.
- The construction workforce will be provided with LPG as cooking (and heating, if required) fuel. Burning of wood will be strictly prohibited.
- Some grass species should also be introduced in the project area due to their soil binding capacity.

Residual Impact

The proposed tree plantation will take some time to grow and mature; there will, therefore, be some reduction of trees and natural vegetation 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 more than compensate for any vegetation loss.

7.6.5 Damage to Faunal Resources

The project site is located on Kahutta Road near Chak Kaamdar Jabbi Ghakhran Nara Syedan Kahutta road Zone-v Islamabad, which provides habitat for wildlife. 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.

Impacts on wildlife may arise from the following project activities:

- Noise generated from project activities;
- Movement of personnel and vehicles;
- Lights used at the project facilities;
- Clearing of vegetation; and
- Improper disposal of wastes.

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
Likelihood:	Certain (reversible in medium to long term)
Consequence:	Severe
Impact significance:	High

Mitigation Measures

The following mitigation measures will further minimize any negative impacts on the floral resource of the area:

- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- Solid waste from the site camp 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.
- Nighttime construction works will not be undertaken.
- Illumination levels at the site will be minimized, as far as possible.
- Appropriate diffusers will be used to restrict the illumination within the project site.

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.

7.6.6 Noise and Vibration

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

The characterization of the unmitigated impacts associated with the noise and vibration due to vehicular traffic and construction machinery is provided below.

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

The measures will be localized, short term and low in magnitude by adopting following mitigation measures.

Mitigation Measures

- Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation.

- Construction activities will not be carried out during the night.

Residual Impact

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

7.6.7 Land Acquisition

The affected people of land falling in Jinnah Garden Phase – II will be compensated for land as well as built up property.

The unmitigated impacts related to land acquisition and resettlement are characterized below.

Nature:	Direct
Duration:	Medium term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Certain
Consequence:	Severe
Impact significance:	High

Mitigation Measures

- CDA should implement the award of land sharing to the affectees.as per the relevant legislations.

Residual Impact

With the implementation of above mitigation measures, the residual land acquisition and resettlement impact will be “low”.

7.6.8 Traffic Congestion

The access to the Project area is provided from the Kahutta Road. The construction phase can potentially increase the traffic load on this road, thus creating traffic congestion.

The characterization of the unmitigated impacts associated with the vehicular traffic is provided below.

Nature:	Direct
Duration:	Short term
Geo extent:	Local
Reversibility:	Reversible
Likelihood:	Certain
Consequence:	Mild
Impact significance:	Medium

Mitigation Measures

- The vehicular traffic will be staggered as far as possible, to avoid traffic congestion.
- The supply of construction material will be carried out during evening or weekends so as to minimize taffic congestion.

- Properly maintained and tuned vehicles must be used for transportation.
- Vehicles carring construction material like sand etc should be covered with tarpulin to avoid spill or accidents.
- Proponent will develop a detail traffic mangment plan and share it with the traffic mangement, who can assist them in implementation of tarffic mangment plan.

Residual Impact

At present the area is surrounded by commercial market and offices. The traffic at present is minimum. Besides that, with the implementation of above mitigation measures, the residual traffic impact will be “negligible”.

7.6.9 Safety Hazards, Public Health and Nuisance

The project is located close to the communities may pose some safety hazards to the local population living nearby. 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 project area encompasses open undulated land. People living there are enjoying good health as they receive fresh vegetables and fruits. The anticipated health impacts are classified into the following categories:

Dust Allergy: One of the main problem people are facing there is of dust 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 the workforce.

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 well-being of some members of the communities may be affected due to disturbances created by the project activities. Mitigation measures for workers include the devotion to standards regarding working conditions.

Accidents: During the operational phase, as the traffic will increase, it may cause accidents and become a safety problem.

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:	Certain
Consequence:	Major
Impact significance:	Medium

Mitigation Measures

- 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.
- Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.
- Proper traffic plan will be prepared and implemented during the operational phase; it will control the accidents problems in the area.

Residual Impacts

There will be a moderate level of 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. With the implementation of above mitigation measures, the residual noise impact will be “low”.

7.6.10 Sites of Archaeological/ Historical Significance

There are no reported sites of archaeological or historical significance at the land being acquired for the project. In case any artefact of such significance if found during the construction activities, the Archaeology Department, Islamabad will be contacted.

However, in case any artifact of such significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.

Mitigation Measures

- The community living in the Katchi Abadis will be compensated as per relevant law.
- Shifting of graveyards will be done to Islamabad graveyard according to the laws.
- Compensation will be provided to the people living at the project site.

Residual Impacts

There will be a moderate level of residual impact associated with the archaeological sites and construction activities.

7.7 Screening of Environmental Impacts for Operational Phase

The operation of the proposed project activities will interact with different components of the environment, as shown in Table 7.1. This interaction may result in the following adverse impacts:

- Contamination of Surface and Ground Water
- Damage to Flora and Fauna

- Soil Contamination

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

The potential environmental impacts of the proposed project during the operational phase are characterized in Table 7.3 and discussed below:

7.7.1 Surface and Groundwater Contamination

The he nature of the impact of the project operational activities on the surface and groundwater quality is expected to be quite low as compared to the construction phase. A sewerage treatment plant will be constructed for the treatment of sewerage generated by Jinnah Garden Phase II.

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 proposed project on the water resources of the area will be negligible".

7.7.2 Damage to Flora and Fauna

The impacts of the development of the proposed project on the natural vegetation of the areas are likely to be comparatively less than those who would be encountered during the construction phase.

Most of the potential impacts of the proposed project operation on the faunal resources are associated with the damage to the natural vegetation and habitat. In addition, the wildlife may be disturbed by noise, illumination, and the mere presence of the people.

These impacts are characterized as follows.

Nature:	Direct or Indirect
Duration:	Medium to Long term
Geo extent:	Local
Reversibility:	Mostly Irreversible
Likelihood:	Likely
Consequence:	Sever
Impact significance:	High

Mitigation Measures

- Most of the mitigation measures for protecting the biological resources during the construction phase would be applicable during the operation as well. Proper maintenance of the plants grown will reduce the impact due to project operation.

Residual Impact

With the help of the mitigation measures, the impact of the development of the proposed project on the biological resources of the project area will be greatly reduced, and the residual impacts are expected to be low to medium.

7.7.3 Soil Contamination

The soil may be contaminated as a consequence of inappropriate waste (solid as well as liquid) disposal.

Their impacts are characterized as follows:

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

Mitigation Measures

- The solid waste generated by the residents of the proposed project shall be collected in the waste bins to be placed at all houses and containers will be placed at various locations keeping in view the designing criteria.
- The solid waste in the containers will be collected through the hydraulic compacters and separation done at source to separate organic waste for composting and other waste materials for recycling etc. and finally residual solid waste will be disposed of at the designated disposal site which will be identified in consultation with Metropolitan Corporation Islamabad.
- A Sewerage Treatment Plant will be constructed at Jinnah Garden Phase II Housing Scheme. The effluent generated by Jinnah Garden Phase II will be treated by Sewerage Treatment Plant in accordance with National Environmental Quality Standards (NEQS) for discharging of into public water bodies. Furthermore, the treated effluent will be used for horticultural purposes at open area and parks so as to achieve zero effluent discharge.
- The solid waste generated during construction activities will be safely disposed at an approved waste disposal site.
- Solid waste segregation facility shall be established that should separate the recyclable and non-recyclable waste. For this purpose, residents can be provided with different colour waste bins/bags for different waste materials.

Residual Impact

The residual impacts after the implementation of the above measures will be low if the Jinnah Garden phase II, construct and operate the Sewerage Treatment Plant, and Solid Waste is collected and disposed of properly.

7.7.4 Solid Waste Management

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

The unmitigated impacts related to the 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:	High

Mitigation Measures

Solid Waste Management will also be an important issue in the operation of Development of Jinnah Garden Phase – II. For solid waste management, FECHS shall make an Integrated Solid Waste Management Plan

The implementation of composting programme is also recommended. This will provide on-site recycling of the biodegradable waste and grass clippings. It will also provide natural fertilizer or green manure, to be used in the Jinnah Garden Phase – II landscapes.

The integrated Solid Waste Management Plan of Islamabad should incorporate a Solid waste segregation facility. Where Solid Waste should separate into recyclable and non-recyclable waste. For this purpose, residents can be provided with different color waste bins for different waste materials

Solid waste generated by the residents of Jinnah Garden Phase – II shall be collected in the waste bins, placed at all houses and containers will be placed at various locations keeping in view the design criteria. The solid waste in the containers will be collected through the FECHS vehicles and finally will be disposed of in the proposed sanitary landfill site of Islamabad.

Residual Impact

The residual impacts after the implementation of the above measures will be low if the FECHS construct and operate Sewerage Treatment Plant and Solid Waste is collected and disposed of properly.

7.8 Rapid Environment Assessment (REA) Checklists

A rapid environment assessment of the project area was carried out as depicted in Table - 7.3

Table - 7.3

Instructions:

• This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department

• This checklist is to be completed with the assistance of an Environment for an informed decision.

• This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.

Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Environmental			
	Is the subproject in an eco-sensitive area or adjoining an eco-sensitive area or monument? (Yes/No) If Yes, which is the area? Elaborate impact accordingly.	No	
1.	Will the project create significant/limited/no environmental impacts during the construction stage?	Yes	The project will have limited impacts during construction activity such as noise, traffic congestion etc. which will be managed by effective implementation of ESMP.
2.	Clearance of vegetation/tree-cover/other.	No	Project land is non-agricultural, un-inhabited piece of land.
3.	Direct discharge of construction run-off, improper storage, and disposal of excavation spoils wastes and other construction materials adversely affecting water quality and flow regimes.	No	Proper measures would be taken to ensure timely shifting of excavation & waste material by the contractor.
4.	Flooding of adjacent areas.	No	
5.	Improper storage and handling of substances leading to contamination of soil and water.	No	For placement of construction material, impermeable base would be provided to control contamination of soil & water by the contractor.
6.	Elevated noise and dust emission.	Yes	The extent of impact is too limited as the area is already very busy area.
7.	Damage to existing infrastructure, public utilities, and amenities.	No	No such kind of infrastructure exists within project site.
8.	Possible conflicts with and/or disruption to local community.	No	No such situation exit

9.	Will the subproject create significant/limited/no environmental impacts during the operational stage? (Significant / limited / no impacts) • Flooding of adjacent areas • Impacts to water quality due to effluent discharge • Gas emissions • Safety hazards • Other, specify.	No	ESMP as part of EIA will be developed to suggest management plan for effective implementation of measures to avoid environment impacts during construction.
10	Does the subproject involve any prior clearance from any Department? (Yes/No). If yes, which?	No	
CULTURAL HERITAGE			
1.	Will the subproject create significant/limited/no cultural properties impacts?	No	No cultural properties exists there.
2.	Involve significant excavations, demolition, and movement of earth, flooding, or other major environmental damages.	No	
3.	Is located within or in the vicinity of a recognized cultural property conservation area or heritage site	No	
4.	Other, specify		
5.	Does the subproject involve any prior clearance from the Archeology Department for either the conservation or management of heritage sites or vicinities? (Yes/ No). If yes, which?	No	
SOCIAL			
1.	Will the subproject create significant/limited/no social impacts?	Yes	It will bring positive impacts by creating jobs for the local community.
2.	Land acquisition resulting in loss of livelihood from agricultural land, plantation, economic activity, or other existing land uses.	No	• Public owned land free from all kind of encumbrances has been acquired. • No commercial/business activity is performed here.
3.	Impact on livelihood and socio-economic activity.	Yes	It will bring positive impacts by creating jobs for the local community.
4.	Land acquisition resulting in relocation of titled and non-titled households.	No	Public owned land free from all kind of encumbrances has been acquired.
5.	Any reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood).	No	
6.	Displacement or adverse impact on Indigenous settlement(s) (if any).	No	No indigenous displacement involved.
7.	Adverse impacts to women, including economic and safety concerns.	No	Training to workforce regarding privacy issues will be given.

8.	Will the subproject create significant impact on vulnerable group of population (Women, Children, Elders above 60 years of age)	No	
9.	Impact on infrastructure (roads, water supply, any other type of infrastructure) Other, specify.	No	

7.9 Positive Impacts of the Project

Positive impacts of the project are given below

7.9.1 Provides Residential plots

The development of the proposed Project will provide residential plots for all income groups.

7.9.2 Reduce Dependency on private schemes to provide housing

There is a considerable shortage of housing in the area. The private sector is fulfilling this demand through building schemes in the outskirts of Islamabad.

7.9.3 Provides Infrastructure

This project will provide basic infrastructure facilities in the area like Roads, Drainage, Water Supply and Sanitary Sewerage System Community Center School, Parks, etc.

7.9.4 Reduce the housing problem in Islamabad

This project will facilitate reducing the pressure on already overcrowded housing in Pakistan, particularly in Islamabad.

7.9.5 Provide Employment Opportunities

This project will provide employment opportunities both direct (workers and employees) and indirect by accelerating the business activities in the project area, especially for the locals.

7.9.6 Improve Living Standards and Strengthen the Economy

Indirectly the project will improve the living standards of the people by strengthening the micro economy.

7.10 Summary of Impacts and 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 7.4 summarizes potential impacts and proposed avoidance and mitigation measures associated with construction camps.

Table 7.4: Summary of Impacts and Mitigation Measures

Impact	Mitigation Measures
Pre-construction Phase Impacts	
Project Site, Land Use, and Design	▪ Jinnah Garden Phase II is developing project located at Nara Syedan. ▪ The land use of the project site is approved by the Capital Development Authority. The project site, land use and its design will be in line with the relevant legislation. ▪ The negative environmental impacts related to the land-use change could be effectively minimized by making provisions for plantation of trees and landscaping of the surrounding areas. ▪ Careful selection and management of the borrow areas will be to avoid adverse impacts and to avoid obvious scars and blemishes on the landscape. Re-vegetation and landscaping of borrow areas and disposal sites consistent with acceptable aesthetic values for the surrounding landscape. ▪ All utilities like water, natural gas, sewerage system. Drainage and electrification would be provided as per respective design standard being followed by the CDA. ▪ Jinnah Garden Phase II intends to construct a Sewerage Treatment Plant which will treat the sewage generated from the residential and commercial areas of Jinnah Garden Phase II. ▪ To overcome the electricity shortage problem and acquiring energy, solar panels would be installed in public buildings.
Visual Impact	▪ Jinnah Garden Phase II will preserve the character of the area as much possible. ▪ The design of the proposed project would 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 Jinnah Garden Phase II Housing Scheme which will be implemented. ▪ The selected green areas/parks must be marked and left untouched to preserve natural vegetation.
Construction Phase Impacts	

Soil Degradation and Contamination	▪ Proper management of topsoil to prevent loss of soil fertility. ▪ Topsoil can be preserved for reuse in Jinnah Garden Phase II Housing Scheme. ▪ Appropriate slope stabilization measures, e.g stone pitching, riprap and use of geotextile. ▪ Measures for proper runoff of precipitated water. ▪ Minimization of exposed soil/time it is exposed. ▪ Terracing of exposed slopes ▪ Construction activities carried out in a manner to minimize soil erosion. ▪ Construction of houses in accordance with existing contours and not on the cut and fill slopes. ▪ Grass seeding/lining of cut slopes during the early stages of construction ▪ Provision of fast-growing vegetation on road embankments to prevent scouring and encourage stabilization. ▪ Soil contamination by bitumen, fuel, and chemical storages shall be minimized by placing these facilities on an impervious base, within a bounded area, and secured by fencing. ▪ Low embankments should be protected from erosion by planting indigenous grasses that can flourish under relatively dry conditions. ▪ After the completion of the construction works, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage should be left behind. ▪ Vehicles and equipment should not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. ▪ For the domestic sewage from the construction camps and offices, appropriate treatment and disposal system, such as septic tanks and soakage pits, are being constructed having adequate capacity. ▪ Domestic solid waste from the contractor's camp shall be disposed of in a manner that will not cause any type of soil contamination. ▪ Soil erosion shall be minimized by the adoption of good engineering practices which would not allow land clearing. Levelling and grading beyond the prescribed limits. ▪ Excavated slope stabilization measures will be adopted as per design. ▪ Plantation of soil binding plant species, shrubs and tufting with grasses will be resorted to over slopes. ▪ All preventive measures will be adopted to restrict the spillover and other effluents on the ground to protect soil organisms and to ensure microbial activity, e.g., by using an impervious sheath, while repairing vehicles, appropriate storage and control of toxins, dumping solid waste material in natural depressions with pre-laid impervious liners, covered with soil material.
Air Quality Deterioration	▪ 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.
Surface Water and Groundwater Contamination	▪ The mitigation measures recommended forestalling soil contamination will also prevent surface and groundwater contamination.
Loss of Vegetation	▪ Jinnah Garden Phase II will maintain existing plantation cover and aesthetic beauty of the areas. ▪ Endeavours will be made to compensate the loss by enhancing the environment, through a plantation of trees and ornamental plants. ▪ Jinnah Garden Phase II to take utmost care to avoid unnecessary cutting of trees to the extent possible and pledge to realign the road and adjust the location of buildings, if required, in case of any trees coming in the way. ▪ A plantation plan of appropriate trees /bushes has been prepared. Ornamental trees, bushes and climbers have been included to improve the scenic and aesthetic value of the proposed project. A mixture of shady trees with heavy foliage species will be required to counter the air and noise pollution, possibly along the roads, where underground or overhead cables do not interfere with the plantation plan. ▪ Selection of species to be planted may not be strictly confined to the proposed plantation plan, as local factors such as the available quantity of water and edaphic limitations will also govern the choice of plants. ▪ A plantation cover of appropriate trees/ bushes preferably evergreen will be raised within the open green areas and along avenues, as well as medians. Unless the performance of an exotic species is put to repeated tests, it is always safe to plant indigenous trees. ▪ An average space of 10 ft. x 10 ft. will be maintained. However, the plant-to-plant distance might vary depending upon the site conditions and/or the growth characteristics of the trees species. ▪ 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 in accordance with NEQS promulgated under the Pakistan Environmental Protection Act 1997. ▪ If cutting of trees is unavoidable, a plantation of local species will be undertaken at an appropriate location. The number of trees thus planted will be at least ten times the ones that are cut. The trees to be planted should be an appropriate mix of fast and slow-growing trees. ▪ The construction workforce will be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood will not be allowed. ▪ Some grass species should also be introduced in the project area due to their soil binding capacity.

Damage to Faunal	▪ The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area. ▪ Solid waste from the site camp and construction waste should 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 should not be allowed to indulge in any hunting or trapping activities. ▪ Nighttime construction works not be undertaken. ▪ Illumination levels at the site should be minimized, as far as possible. ▪ Appropriate diffusers should be used to restrict the illumination within the project site.
Noise and Vibration	▪ Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation. ▪ Construction activities will not be carried out during the night.
Safety Hazards, Public Health and Nuisance	▪ 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. ▪ Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution. ▪ Proper traffic plan will be prepared and implemented during the operational phase; it will control the accidents problems in the area.
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 any artefact of such significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.
Operational Phase	
Damage to Flora and Fauna	▪ Most of the mitigation measures for protecting the biological resources during the construction phase would be applicable during the operation as well. Proper maintenance of the plants grown will reduce the impact due to project operation.
Soil Contamination	▪ The solid waste generated by the residents of the proposed project shall be collected in the waste bins to be placed at all houses and containers will be placed at various locations keeping in view the design criteria. ▪ The solid waste in the containers will be collected through the hydraulic compacters and separation done at source to separate organic waste for composting and other waste materials for recycling etc. and finally residual solid waste will be disposed of at the designated disposal site which will be identified in consultation with MCI. ▪ Sewage from the proposed project will be treated at a Sewerage Treatment Plant which will meet the NEQS requirement of Pakistan for the discharge of effluent into public water bodies. ▪ The solid waste generated during construction activities will be safely disposed at an approved waste disposal site in Islamabad. Solid waste segregation facility shall be established that should separate the recyclable and non-recyclable waste. For this

	purpose, residents can be provided with different colour waste bins/bags for different waste materials.
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.

Chapter 8: Environmental Management Plan

8.1 Introduction

The Environmental Impact Assessment (EIA) report has comprehensively identified potential impacts associated with the project, encompassing both positive and negative effects at each stage.

To mitigate adverse impacts, the EIA recommends measures based on an understanding of environmental receptor sensitivity and behavior in the project area, as well as relevant legislation and industry best practices. For residual impacts or those with uncertain predictions, monitoring measures have been suggested to assess and address them during the project's progression.

An Environmental Management Plan (EMP) has been developed to ensure effective implementation and management of mitigation measures, aligning with the requirements of the Pakistan Environmental Protection Act, 1997.

This chapter outlines the implementation framework for the EMP, defining institutional arrangements necessary for plan execution. The EMP serves as a mechanism for implementing the mitigation measures identified in 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 means of effectively communicating environmental issues among themselves.

8.3 Management Approach

Pre-Construction and Construction Phase

The organizational roles and responsibilities are summarized below:

a) Project Proponent

The overall responsibility for compliance with the Environmental Management Plan of Jinnah Garden Phase II project rests with the project proponent, President FECHS.

b) Engineers, Contractors/Subcontractors

The contractors will carry out field activities as part of their contract agreement. The contractors will be responsible for implementing various mitigation actions prescribed in the EIA report. The contractors will also be subject to certain liabilities under the environmental laws of Pakistan, and under their contracts with , President FECHS. Furthermore, the Project Manager of the contractor will implement the Environmental Monitoring Plan, which has been prepared for the construction phase.

The Project Engineer will monitor the contractors and ensure the implementation of the EMP and the EIA.

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 President FECHS's staff involved with the main responsibility for the environmental performance of the Jinnah Garden Phase II.

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, Jinnah Garden Phase II, will be responsible for the compliance with the EMP of the project.

Project Engineer, Design & Supervision 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 Engineer, Design & Supervision 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: President FECHS 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

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 President FECHS.

The Project Manager of Jinnah Garden Phase II 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 Jinnah Garden Phase II 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[33] 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

Jinnah Garden Phase II 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.

8.7 Approvals

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

8.8 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 President FECHS.

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.

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[33] https://environment.gov.pk/SiteImage/Misc/files/Act/brf-act1997.pdf

8.9 Environmental Mitigation Matrix

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. Pakistan Environmental Protection Agency is entrusted with the overall responsibilities of monitoring the environment in Islamabad.

An Environmental Monitoring Plan for Jinnah Garden Phase II Housing Scheme has been provided in Table 8.1. 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 8.1 Environmental Mitigation Matrix of Jinnah Garden Phase II

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	
Pre-construction/Design Stage									
Drainage	Environmental	Aesthetic, water pond, a breeding ground for mosquitoes	At Jinnah Garden Phase II	During and after rains	Major	Properly designed drains along the roads to avoid the formation of water ponds. Proper design and maintenance.	Engineering Consultant	President FECHS	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.	Design & Supervision Consultant	President FECHS	Social issues
Location in an area with the seismic background	Seismic activities may damage structures, environment, health, and lives	Health, food quality, jobs, safety	At Jinnah Garden Phase II	After an earthquake with intensity higher than design.	Can be serious at times	Jinnah Garden Phase II shall be designed in accordance with the revised seismic code for Islamabad.	Engineering Consultant	President FECHS	Land
Construction Phase									
Site Office and construction works									

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 waste disposal, solid (kitchen) waste disposal, fuel leakage, noise and additional traffic, water usage and pollution	Contractor's Site for Construction	Throughout the construction period	Minor if 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	Engineering 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	Engineering 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	Engineering Consultant	Air and Soil 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	
Creation and burning of waste at/or near the campsite	Solid waste generation and air pollution associated with burning	Eyes irritation for workers and public, noisance, deteriorated air quality, smell from organic wastes	Around campsite	Throughout the construction period	Moderate	Device a plan for safe, handling, storage and disposal of harmful materials. Waste burning not allowed. Introduce reuse or recycle. Discourage use of disposables	Contractor	Engineering consultant	Solid waste Managment
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. Fuel storage and refueling sites to be kept away from drainage channels. Oil and grease traps to be provided at fueling locations to prevent contamination of water. Unusable debris shall be dumped at the designated site in Islamabad.	Contractor	Engineering 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	
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. Work safety measures and good workmanship practices to ensure no health risk for labourers. Regular pest control measures in the site camp.	Contractor	Engineering Consultant	Workers Health
Soil and Burrow Material, Cut and Fill									
Disposal of demolish 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 GT road	At the start of construction	Low	Demolish and Construction waste to be collected for reuse. Waste disposed of in existing Dump Site. Water spraying to reduce dust.	Contractor via bid documents	Engineering 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 embankments are required	Long-lasting	Medium	Remove topsoil and reintroduce for returning to nature. Concrete retaining walls at high embankments in critical areas.	Contractor	Engineering 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	
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 At Jinnah Garden Phase II	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	Engineering Consultant & President FECHS	Construction material storage
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	Engineering Consultant & President FECHS	Noise and Air Quality
Acquisition of construction materials	Landscape degredation by use of quirries and borrow areas in the immediate vicinity of the project site.	Accelration errosion at the site	Quarries and borrow areas	Long-term effects	Low	No use of any quarries for construction material from inside islamabad.	Contractor	Engineering Consultant & President FECHS	Soil Errosion
Creation of construction waste material and spoil managmet	Contaimination of soil and water from waste and/or quarry materials, and	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 re-stored to original conditions.	Contractor	Engineering Consultant & President FECHS	Water and Soil 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	
	impact on landscape value								
Planting trees	Ecological	Introduction of Indigenous trees species	In green areas and green belts	After construction	Medium	Implement Plantation Plan.	Contractor	Engineering Consultant & President FECHS	Site restoration
Closure Plan									
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	Engineering Consultant & President FECHS	Site restoration
Water Issues									
Use of water for construction and consumption for human use	Conflict with local water demand under 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	Engineering Consultant & President FECHS	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.	Jinnah Garden Phase II 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	Engineering Consultant	Water quality
Air Pollution Control									
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. Air quality parameters to be monitored, as determined.	Contractor	Engineering Consultant	Air Quality
Noise Pollution									

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	
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	Plants, Vehicles, and equipment to strictly conform to NEQS specified noise standards. Vehicles and equipment used will be fitted, as applicable, with silencers and properly maintained. In accordance with EMP, noise monitoring to be carried out at locations and schedules specified to ensure the effectiveness of mitigation measures.	Contractor	Engineering Consultant & President FECHS	Noise
Fauna and Flora									
No sensitive area is present	Ecological Impacts	Disturbance to Local flora and fauna	Throughout the proposed project	Throughout the construction period	Low	Restoration of damaged vegetated areas. Clearing of natural vegetation will be minimized as far as possible during the construction works. Assist in the public awareness program.	Contractor	Engineering Consultant & President FECHS	Ecological sensitive area
Road Safety and Community Life									

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	
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	Adequate signage, lighting devices, barriers, persons with flags during construction to manage traffic at a construction site. 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.	Contractor	Engineering Consultant & President FECHS	Health and safety of workers
Operation Phase									
Water and Soil									
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 and 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.	Mr Mujahid Khan ’s Project Management	President FECHS	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.	President FECHS’s Project Management	President FECHS	
Flora and Fauna									

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 GT road along Jinnah Garden Phase II	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.	President FECHS's Management	President FECHS	Plantation
Road Safety									
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.	President FECHSBuilding Project Management	President FECHS	Social Issues

Project Activities	Types(s) of Impact	Potential Impacts Environment	Where the impact is likely to happen	When the impact is likely to occur	Magnitude of impact	Mitigation Measures	Institutional Responsibility		Parameters for Monitoring
							Implementation	Supervision	

Ambient Air Quality									
Induced Vehicular traffic movement	Environmental and Social impacts	Adverse effects on PIMS and public health risk, nuisance and other impacts	Project area	At Operation Stage	Medium Traffic generation will be for short time	Roadside tree plantation as applicable and feasible under harsh climatic conditions, 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.	President FECHSBuilding Project Management	President FECHS	Air Quality
Noise Level and Vibrations									
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 short time	Noise measurements to be carried out to ensure the effectiveness of mitigation measures, (e.g., speed limits at the project site).	President FECHSBuilding Project Management	President FECHS	Noise

8.10 Solid Waste Management Plan

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

Jinnah Garden Phase II will contact MCI for collection, transportation and disposal of solid waste generated by Jinnah Garden Phase II Housing Scheme. Empty chemical drums, iron cuttings, etc. will be collected separately at the project site within an area marked as "Scrap Yard". After a suitable time frame, 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 Jinnah Garden Phase II's Management. The waste collected by Jinnah Garden Phase II Management will be collected at a temporary storage point where the solid waste will be segregated into recyclable and non-recyclable waste.

Non-recyclable 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.

8.11 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 Jinnah Garden Phase II

Sr No	Item	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Personal Protective Equipment (A)				
1	Dust Masks	20,800	10	208,000
2	Safety Shoes	400	2000	8,00,000
3	Gloves	4800	200	960,000

4	First Aid Box	2	3000	6,000
5	Ear Plugs	2400	50	120,000
6	Safety Helmets	400	1000	400,000
7	Safety Jackets (Hi Vis)	400	500	200,000
Others (B)				
8	Provision of Dust Bins	20	1000	20,000
9	Warning Tape	20	500	10,000
10	Safety Cones	10	1000	10,000
11	Safety Sign Boards	20	1000	20,000
12	Raincoat	100	1000	50,000
Total (A + B)				**2,804,000**

Time Required for Construction Period = 3 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)

8.12 Traffic Management and Construction Material Transportation Plan

- All the contractor's construction material will be transported to the project site via Kahutta 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.

8.13 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.

8.14 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.

8.15 Plantation Plan

Trees and shrubs play major role in improving the urban landscape and help protect the city environment. Trees and shrubs meet different needs for food, shelter, energy and aesthetic in the city. Urban woodlands and forest areas beyond the city offer respite if only for a while, from the pressure of the daily life. The skillful choice of trees and shrubs together with manipulation and design of space in urban development and land management for people or wildlife leads to the creation of stimulus environment. Trees growing in their natural environment survive without our help but trees grown near building or roads need skillful selection of species and good care to make them worth and safe for the life and property. The selection of trees and shrubs species for suburban (Margalla Hills) and Urban (Islamabad city) Areas essentially depend on the objectives of tree and shrub plantation plan as under: The following are the best choice of species for different green sites in Islamabad.

Greenbelts - Trees: Siris (Albizia lebbek,) Jacaranda (Jacaranda mimosifolia), Sapium chinensis), Kachna (Buahinia variegate), Amatas (Casia fistula), Gul Nishter (Erithrina indica), Silver Oak (Grevilea robusta) Arjun, Ficus Pelicon (Ficus pelican), Sukh Chain, Dhak (Butea frondosa), and Pear (Pyrus pasha), and Plum Peaches (Prunus padus) Shrubs: Tecoma stans, Holmskiodia.

Median Strips - Trees: -Gab, Alstonia, Amaltas, Kachnar, Largestromia, Stercolia, Brochicotton, Citrus, Washingtonia Palms

Shrubs: - Ficus hawi, Bougainvillea, Casia glauca, Plambago, Hypericum, Hamelia pattens, Jatropha, Erithrina blacki, Hibiscus, Psuedonia, Silvery, Duranta, Roses.

Avenues - Chir pine, Jacaranda, Amaltas, Kachnar, Fiddle wood, Kanak champa

Streets - Celtis, Arjun, Silver Oaks, Ficus Pelicon.

Parks/Playfields - Ficus pelican, Sukh chain, Michelia, Hibiscus, Fics Green, Ficus hawi • Parking Areas - Bakain, Sukh Chain, Ficus Retusa, Bischofia • Nullahs - Salix, Poplar, Jaman, Arjun

House Fronts - Alstonia, Plumaria Obtusa, Magnolia, Ponsitea, Ashok, Peaches, Moraya, Palms

Grills/Walls - Chlorodendron, Bougainvillea, Honey Suckle, Rangoon creeper, Bomentia, Tecoma grandi flora.

Rockeries - Phoenix, Yucca, Agave, Asparagus, Cactus, Begonia, Juniper, Ruselia, Duranta, Iresine.

Indoor - Aglaonema, Aucuba, Beaucarnea, Cladium, Coleus, Cycas, Dracaena, Dieffenbachia, Ficus benjmina, Pilea, Scheflera.

Table 8.3 Recommended Plants for – Jinnah Garden Phase II

No.	Scientific Name	Common Name	Description
1	*Pinus rxburghii*	Cheer	Highly recommended for Islamabad regions, grows very well in
2	*Bauhinia variegata*	Kachnar	The tree is extremely handsome in flowers
3	*Cassia fistula*	Amaltas	The beautiful flowering tree grew in this region
4	*Eugenia Jambolana*	Jaman	It is an evergreen fruit tree with good quality timber wood
5	*Olea europaea*	Zaitoon	Commonly known as Olive tree
6	*Moringa oleifera*	Sohanjna	A medical plant o the arid and semi-arid region having a lot of nutritious value
7	*Albizia lebbek*	Siris	A very fast-growing deciduous tree with an open, large, spreading crown

Table 8.4: Recommended Shrubs Jinnah Garden Phase II Housing Scheme

No.	Scientific Name	Common Name	Description
1	*Cassia gulaca*	Small amaltas	Beautiful yellow flowers almost all year
2	*Thevetia peruviana*	Peeli Kanair	Thick foliage shrub with yellow leaves
3	*Juniper Spp.*	Junipers	Different varieties, do very well in high landscape areas
4	*Vinca difformis*	Periwinkle	An evergreen, flowering subshrub
5	*Lavandula spica*	Lavenderle ft) shrubs	ornamental plants for garden and landscape use
6	*Gulphinum*	Gulphinium	Nice small shrub with a lot of flowers in season
12	*Epipremnum aureum*	Jade plant or money plant	An evergreen flowering vine
13	*Asparagus aethiopicus*	Asparagus Fern	An indoor ornamental plant
14	*Saintpaulia*	African violet	Indoor plant for decorative purposes
15	*Ficus elastica*	Rubber tree	An ornamental indoor plant
16	*Spathiphyllum*	Spath/ peace lilies	Evergreen herbaceous perennial plants with large leaves
17	*Aglaonema hybrids*	Chinese evergreen plant	An adaptable plant, and grow in low light and dry air

18	*Phoenix roebelenii*	Pygmy Date Palm	Medium size, slow-growing shady plant
19	*Aphelandra squarrosa*	Zebra Plant	Exotic, emerald green leaves with dramatic white veins

Table 8.5: Recommended Indoor Plants for Jinnah Garden Phase II

No.	Scientific Name	Common Name	Description
1	*Epipremnum aureum*	Jade plant or money plant	An evergreen flowering vine
2	*Asparagus aethiopicus*	Asparagus Fern	An indoor ornamental plant
3	*Saintpaulia*	African violet	Indoor plant for decorative purposes
4	*Ficus elastica*	Rubber tree	An ornamental indoor plant
5	*Spathiphyllum*	Spath/ peace lilies	Evergreen herbaceous perennial plants with large leaves
6	*Aglaonema hybrids*	Chinese evergreen plant	An adaptable plant, and grow in low light and dry air
7	*Phoenix roebelenii*	Pygmy Date Palm	Medium size, slow-growing shady plant
8	*Aphelandra squarrosa*	Zebra Plant	Exotic, emerald green leaves with dramatic white veins

8.15.1 Plantation Plan Cost

The cost of plantation includes the cost of equipment, initial planting, and maintenance cost for the first three years of plantation. The total estimated cost of implementation of plantation (including both indoor and outdoor plants) plan **is Rs. 9.770 million.**

Table 8.6 Tentative Cost of Equipment

Sr.	Equipment	Numbers	Cost in PKR
1	Grub hoe (earth digging tool) and others	Lump sum	100,000
2	Lift Pump for water	3	150,00
3	Others	Lump sum	50,000
	Total cost of equipment		**300,000**

The cost break-up of plantation and maintenance for a period of three years is mentioned in **Table 8.7** to **Table 8.12.**

Table 8.7 Estimated cost of unit Plantation (10,000 Plants) for 1st year

Sr.	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Clearance of Site (2,000 plants)	10,000	5/Plants	50,000
2	Layout/ unit	10,000	2/plants	20,000
3	Digging of Pits	10,000	50/pit	5,00,000
4	Average cost per unit plant	10,000	215/plant	2,150,000
5	Camage/unit of plants from Nursery to Site including loading/unloading	10,000 Plants	10/plant	100,000

6	Plantation of plants with ball of earth/unit	10,000	30/plant	300,000
7	Addition of Manure 1 cft. /Pit	10,000 cft.	Lump-sum	250,000
8	Hand watering 100 times Approx. ×10.000-1.000.000	1,000,000	1/watering	1,000,000
9	Weeding 4 times 10.000x440,000	40,000	5/ plant	200,000
10	Miscellaneous/ Contingencies	Nil	Lump sum	250,000
Total				**4,8200**
Say				**5,000,000**

Table 8.8: Estimated Unit Cost of Plantation of (2,000 Plants) & Maintenance for 2nd Year in case of 20% Mortality

Sr.	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Re-Digging of Pits	2000	50/Pit	100,000
2	Average cost per unit plant	2000 Plants	215/plants	430,000
3	Carriage/unit of plants from Nursery to Site including loading/unloading	2000 Plants	10/plant	20,000
4	Plantation of plants with ball of earth/unit	2000	30/plant	60,000
5	Addition of Manure 1 cft. /Pit	1000 cft.	Lump-sum	125,000
6	Hand watering 100 times Approx. x10,000-1,000,000	1,000,000	1/watering	1,000,000
7	Weeding 4 times 10.000x4 = 40,000	40,000	5/ plant	200,000
8	Miscellaneous/ Contingencies	Nil	Lump sum	250,000
Total				**2,185,000**
Say				**2,220,000**

Table 8.9: Estimated Cost of Plantation Unit (1,000 Plants) & Maintenance for 3rd Year

Sr.	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Re-Digging of Pits	1000	50/Pit	50,000
2	Average cost per unit plant	1000 Plants	215/plants	215,000
3	Carriage/unit of plants from Nursery to Site including loading/unloading	1000 Plants	15/plant	15,000
4	Plantation of plants with ball of earth/unit	1000	30/plant	30,000
5	Addition of Manure 1 cft. /Pit	1000 cft.	Lump-sum	125,000
6	Hand watering 50 times Approx. x10,000=500,000	500,000	1/watering	500,000
7	Weeding 3 times 10,000x3 = 30,000	30,000	5/ plant	150,000
8	Miscellaneous/ Contingencies	Nil	Lump sum	250,000
Total				**1,335,000**
Say				**1,400,000**

Table 8.10: Estimated Cost of Maintaining (10,000 Plants) for 4th Year

Sr.	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Hand watering 50 times Approx. x10,000=500,000	500,000	1/time	500,000
2	Weeding	10,000	5/ unit	50,000
3	Trimming/pruning of plants	10,000	5/ unit	50,000
4	Miscellaneous/ Contingencies			250,000
Total				**850,000**

Table 8.11: Estimated Cost of Plantation Plan for Four Year

Activity	Amount (PKR)
Estimated Cost of Unit Plantation (1,000 Plants) for 1st Year	5,000,000
Estimated Unit Cost of Plantation & Maintenance for 2nd Year in case of 20% Mortality	2,220,000
Estimated Cost of Plantation Unit & Maintenance for 3rd Year	1,400,000
Estimated Cost of Maintaining 10,000 plants for 4th Year	850,000
Total	**9,470,000**

Table 8.12 Final Cost per Tree Planted

Activity	Amount (PKR)
Cost for maintenance of cultivated plants for 4 years	9,470,000
Cost of equipment	300,000
Total cost	9,770,000
Cost for raising one plant and its maintenance for 4 years	977

8.16 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.

8.17 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 which will comprise of the following members:

- Project Proponent
- Involved Contractors
- Village Elders

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.

This will also enhance local ownership of the project. The local participation will further build local capacity in dispute resolution and decision-making and provide leadership support in the implementation of the project.

8.18 Project Monitoring

President FECHS 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 Jinnah Garden Phase II 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 President FECHS for further action. He will also have to report any impacts anticipated, along with his recommendations for further action.

8.19 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 Jinnah Garden Phase II has been provided in **Table 8.13**. 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 8.13 Environmental Monitoring Plan for Jinnah Garden Phase II

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards	Implementing	Supervision
Ambient air quality	Construction	SO_2, NO_x, CO, PM_{10} , $PM_{2.5}$, Pb and O_3	At the project site	PM_{10}, for continuous 8 hours, on a monthly schedule	WHO/USEPA guidelines, PEQS	Contractor	Jinnah Garden Phase II
Ground Water Quality	Construction	pH, TDS, TSS, BOD, COD, DO, hydrocarbon, coliforms, hardness, nitrate,chloride, sulphate	At start and end of the project	Quarterly	WHO and PEQS	Contractor	Jinnah Garden Phase II
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	Jinnah Garden Phase II
Roadside Plantation	Construction	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out on GT road and inside of the Jinnah Garden Phase II	(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	Jinnah Garden Phase II
Tree cutting for land clearing	Construction	Record of all cutting of trees	Throughout Project site	When a decision of tree cutting is made	-	Construction	Jinnah Garden Phase II
Noise levels	Construction	Db (A)	At the project site	Twice in 8 hours at a selected site on a quaterly basis	EPA Ambient Noise standards	Construction	Jinnah Garden Phase II

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards	Implementing	Supervision
Plantation	Operational	Visual inspection of plant species survival rate and status of maintainance	At site where Plantation carriedout	2.5 years after Plantation	75% survial rate	Contractor	Jinnah Garden Phase II
Safety and Traffic Rules Complience	Operational	Faulty overloaded and speedy vehicles Inspection of signage	All along the Jinnah Garden Phase II with spot check at accident-prone bleck spots	Quarterly basis, for 2 years	To be determined	Project Manager	Jinnah Garden Phase II
Sewerage Treatment plant	Operational	NEQs Parameters for liquid effluents	At sewerage treatment plant	Once in month by the in-house laboratory	NEQS	Project Manager	Jinnah Garden Phase II

Key:

dBA = decibels (measured in the audible range)

EPA = Environmental Protection Authority,

NEQS = National Environmental Quality Standards

PM10 = Particulate Matter smaller than about 10 micrometers,

ROW = Right-of-Way

SPM = Suspended Particulate Matter

TSS = Total Suspended Solids

WHO= World Health Organization

USEPA = United State Environmental Protection Agency

The estimated cost for the environmental monitoring of the project during construction phase is shown in Table 8.14.

Table 8.14 Cost Estimates for Environmental Monitoring During the Construction Phase

Environmental Monitoring Activities	No. of Samples	Unit Cost specification	Cost (Rs)
Construction phase			
Ambient air quality monitoring Quarterly basis	12	@ 50,000 per sample for 24 hr monitoring.	800,000
Ambient water quality monitoring Quarterly basis	32	@ 20,000 per sample	640,000
Noise levels monitoring on Quarterly basis	48	@ 6,000 per sample	288,000
Environment, Health and safety specialist	48 months	@ 50,000	2,400,000
		Sub-Total	**4.128,000**
Operational phase			
Plantation maintainance	Monitoring by Horticultural Saff		
Monitoring of Sewerage Treatment Plant	In house Monitoring by Plant Operator of STP		

Source: *Estimates, 2023*

8.20 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

Supervision and Design Management will be primarily responsible for providing training to all project personnel. Lump-sum fees of Rs. 100,000/= should be kept for

the training management plan. Framework for the environmental and social training program is being provided in **Table 8.15.**

Table 8.15 Framework for Environmental & Social Training Program of Jinnah Garden Phase II

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

8.21 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 8.16**.

Table 8.16 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	4,128,000
Plantation Plan	Implementation of plantation plan	9,770,000
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	2,804,000
Cost of Environmental Training	For the whole construction period	100,000
Grand Total		**17,702,000**

8.22 Corporate Social Responsibility

Corporate Social Responsibility (CSR) is a self-regulating business model that helps a company be socially accountable to itself, its stakeholders, and the public. By practicing corporate social responsibility, also called corporate citizenship. Companies can be conscious of the kind of impact they are having on all aspects of society, including economic, social, and environmental.

It is a reality that with the construction and development of Jinnah Garden Phase II Housing Scheme Project, various environmental issues will be raised, including, wildlife habitat losses, loss of vegetation cover, and more important is that local ecosystem will become fragile. Although mitigation measures proposed are likely to minimize these impacts, but nonetheless, a good CSR activity is likely to enhance the mitigation measures.

To engage in CSR means that, in the ordinary course of business, a company is operating in ways that enhance society and the environment, instead of contributing negatively to them.

Jinnah Garden Phase II has always supported and contributed to the growth and development of the adjoining communities. Their expansion plans, a new initiative and entry into the new locations are always welcomed because of the trust, relationships and goodwill that they have built with the local community members.

Keeping the trend of supporting and helping the local community in adjoining areas of the development project, Jinnah Garden Phase II intends to build open and collaborative relationships with the local community of Jinnah Garden Phase II Housing Scheme by providing the following services:

- Infrastructure development of Kahutta Road leading to the Project Area.
- Installation of Water filtration plant for the local community in the Project area.
- Research funding on wildlife for university students who are working in the project area.

8.23 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.

8.24 Post Project Monitoring

The Project Director of the Jinnah Garden Phase II 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.

Chapter 9: Conclusion and Recommendations

This chapter summarizes the environmental impact assessment of the Jinnah Garden Phase II Housing Scheme in Islamabad. The EIA aims to describe the project site, assess its impacts during and after implementation, and propose mitigation measures. The study provides a detailed project justification, evaluation of potential environmental and social impacts, and economic and social consequences. Following the impact evaluation in Chapter 7 and the presentation of mitigation measures through the Environmental Management Plan in Chapter 8, this chapter concludes the report with recommendations.

9.1 Conclusion

The major conclusion of the EIA, are herein:

- The objective of the project is to develop a residential complex to facilitate the population of Rawalpindi and Islamabad with state-of-the-art housing with all the required facilities in one place.
- Jinnah Garden Phase II is Residential Colony having 878 Residential plots of land measuring 25'×50' to 50'×90', 5 apartment plots having area of 220'×200' and 120'×196', and 100 commercial plots having area of 30'×30' to 40'×60'. Area reserved for Commercial/Parking is 70.52Kanal, Public Building 76.76Kanal, Open spaces/park 110.72Kanal, Graveyard 23.61Kanal, and Roads 435.11Kanal.
- The infrastructural development works include provision of parking, water supply network, drainage and sewerage network, electrification and multi-bin solid waste management.
- The development of the infrastructure of Jinnah Garden Phase II will start after issuance of NOC from Pak-EPA. The total estimated cost of the project is Rs. 170 million.
- The potential impacts during construction phase include soil erosion and possibility of water/soil contamination, and 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 communities.
- The significant environmental management issues during operational phase includes sewage disposal, solid waste management, noise pollutions, vehicular traffic and water consumption.
- The project construction and operational activities can potentially affect the availability of resources i.e., Water, Energy. By the implementation of appropriate mitigation measures, which has been discussed in this report, these resources can be managed effectively.
- The project design is likely to result in some issues, which can be reduced with the help of incisive planning.
- The mitigation measures have been identified in chapter 7 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).

Table 9.1 Impact Matrix- Residual Impacts (Mitigated) of Jinnah Garden Phase II Project

Project Activities	Physical Environment			Biological Environmnet		Socio-economic Enviromnnet				
	Soil	Air quality	Surface and Ground water resources	Loss of Flora	Damge to Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public heath and Noisance	Employment	Sites of archeological/historical significance
Project Sitting										
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
Construction Phase										
Land Acquisition	N	N	N	N	N	N	N	N	N	N
Work force Mobilization	0	0	0	N	N	-1	N	0	0	N
Construction Camp Establishment	-1	0	0	-1	-1	0	N	0	+1	N
Construction Camp Operation	0	0	0	0	-1	0	N	0	+1	N
Site Preparation	-1	0	0	-1	-1	-1	N	0	+1	N
Construction of Road	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 of Material 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

Sewage Disposal	0	0	-1	0	0	N	N	0	0	N
Demobilization of Contractor	0	0	0	0	0	-1	N	0	0	N
Opeational Phase										
Operation of Jinnah Garden Phase II Housing Scheme	N	0	0	0	-1	0	N	0	+1	N
Solid Waste Disposal	-1	0	-1	-1	-1	N	N	0	N	N
Sewerage 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

9.2 Recommendations

- A plantation plan has been proposed in the EIA report, which will be developed and implemented by Jinnah Garden Phase II.
- Jinnah Garden Phase II will construct a Sewerage Treatment Plant to treat the sewage generated by Jinnah Garden Phase II Housing Scheme.
- The provision for rainwater harvesting will be made, which will adequately replenish the local aquifer. Hence, no further measures are needed other than proper and regular maintenance of such facilities.
- Jinnah Garden Phase II will implement a Solid Waste Management Plan for Jinnah Garden Phase II Housing Scheme.

On the basis of the overall impact assessment, more specifically, nature and magnitude of the residential environmental impacts identified during EIA, it is concluded that Jinnah Garden Phase II Project, is likely to cause environmental impacts mainly during its construction phase. However, some impacts will be in operation phase after occupancy. These impacts can be mitigated by the implementation of proposed mitigation measures. Management of Jinnah Garden Phase II will ensure the effective implementation of mitigation measures.

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

ANNEXURE I CDA Approval of LOP