

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT HOUSING SCHEME M/S NEW ALNOOR CITY



Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan

Prepared by



ENVIRONMENTAL SERVICES PAKISTAN (Pvt.) Ltd

Office No. 731, Block-2, Sector: D1, Shah Jilani Road,
Township, Lahore, 54770 Pakistan

Tel: +92 42 35154015-16

URL: www.espak.com.pk | Email: info@espak.com.pk

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List of Abbreviation

BHU	Basic Health Unit
BOD	Biological Oxygen Demand
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
DHQ	District Headquarter Hospital
EA	Environmental Approval
EHS	Environment, Health & Safety
EIA	Environmental Impact Assessment
EMMP	Environmental Management & Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPCCD	Environmental Protection & Climate Change Department
ESPAK	Environmental Services Pakistan Private Limited
IEE	Initial Environment Examination
LED	Light Emitting Diode
M & E	Monitoring & Evaluation
MEPCO	Multan Electric Supply Company
NEQS	National Environmental Quality Standards
OHS	Occupational Health & Safety
PEPA	Punjab Environmental Protection Act
PEQS	Punjab Environmental Quality Standards
PHED	Public Health Emergency Department
PM	Particulate Matter
PPEs	Personal Protection Equipment



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SRT	Salt Range Thrust
SWMP	Solid Waste Management Plan
TMA	Tehsil Municipal Authority
TSS	Total Suspended Solids
UNCED	United Nations Conference on the Environment and Development



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EXECUTIVE SUMMARY

Housing schemes play a vital role in Pakistan's socio-economic development. They provide organized, planned, and affordable living spaces to meet the country's rapidly growing population and urbanization needs. With increasing migration from rural to urban areas, the demand for housing has risen sharply. Housing schemes help address this shortage by offering structured communities with essential facilities such as roads, electricity, water supply, and sewage systems.

Moreover, housing schemes contribute significantly to economic growth by generating employment opportunities in construction, real estate, and allied industries like cement, steel, and transport. They also attract both local and foreign investments, enhance property values, and improve the overall standard of living.

The project for the commissioning of its objective and construction requires fulfilling the legal requirements of the Punjab Environmental Protection Act (amended act 2012), Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted.

TITLE AND LOCATION OF PROJECT:

"Development of housing scheme by M/s New Al-Noor City Located in Pakpattan"

Location:

Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan

PROJECT PROPONENT

Proponent: Rehmat Ali Chisti

CNIC No: 34602-4499557-9

Address: Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan



NAME OF ORGANIZATION PREPARING REPORT:



Environmental Services Pakistan Pvt. Ltd (ESPAK)

Office No. 731, Block 2, Sector D1, Shahjilani Road Township Lahore

Contact: 042-35154012, 0312-0849999

BRIEF OUTLINE OF PROJECT

The project, intends to develop a housing scheme titled “New Al-Noor City” in Pakpattan. The project covers a total area of **409 kanal, 14 Marla and 183 SFT** includes various land uses such as **residential plots, commercial areas, public buildings, open spaces and parks, masjid, graveyard and an extensive road network.**

Table E-1 Land Distribution

S#	Description	Area (K-M-SFT)	Area (%age)
1.	Residential	190-07-171	46.51
2.	Road/Parking	142-08-227	34.76
3.	Society Office	000-15-007	00.18
4.	Park	28-14-064	7.00
5.	Commercial	24-14-258	6.04
6.	Graveyard	08-04-54	2.00
7.	Public Building	12-06-141	3.00
8.	Solid Waste Management	00-10-008	0.12
9.	Disposal Station	01-01-070	0.25
10.	Wastewater Treatment Plant	00-12-000	0.14
Grand Total		409-14-183	100

The proponent of the New Al-Noor City engaged M/s **Environmental Services Pakistan Private Limited** to carry out the environmental for the development of aforesaid project in accordance with Punjab-EPA guidelines. The salient features of the project are given below:

Table E-2 Salient Features of the Project

1	Project Title	Housing Scheme by M/s New Al-Noor City
2	Proponent	Rehmat Ali Chisti
3	Project Location	Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan



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4	Co-ordinates	30°22'29.21"N 73°21'23.81"E
6	Land Use in Surrounding of area North: South: East: West:	North: Human Settlement/Open land South: Access Road East: Human Settlement West: Human Settlement
7	Consultant	Environmental Services Pakistan Private Limited
8	Total Area	409 Kanal 14 Marla and 183 SFT
9	Cost of Project	700 Million PKR
10	Tree Planation	Designated area as Parks, Play Grounds and Green Belts
11	Water Source	TMA (Tehsil Municipal Authority)
12	Status of Project	Open Land (Pre-Construction)
13	Nature of Area	Barren Land
14	Source of Power	Multan Electric Supply Company (MEPCO)

ENERGY AND WATER AVAILABILITY

For the New Al-Noor City housing scheme, adequate arrangements for energy and water supply have been planned to ensure smooth functioning during both construction and operational phases. The electricity supply for the project will be obtained from the **Multan Electric Supply Company (MEPCO)** through an approved connection, ensuring a reliable and continuous power source for residential, commercial, and public facilities.

Similarly, water for domestic and development use will be sourced from the **TMA (Tehsil Municipal Authority)** water supply network.

PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

Impact assessment is crucial for project initiation as it enables the identification and comprehension of a project's potential positive and negative effects. Understanding these impacts aids in tailoring the project to maximize benefits and minimize risks. Impact assessment assists in recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.



Table E-3 Possible Impacts and their Mitigation Measures

Possible Impact	Impact Magnitude	Mitigation Measures
<i>Developmental Phase</i>		
<i>Dust generation from excavation, vehicle movement, and material handling.</i>	Minor/Short Term	- Regular water sprinkling on dusty surfaces and unpaved roads. - Cover all trucks transporting construction materials. - Maintain low vehicle speeds (below 15 km/h).
<i>Oil spills from machinery and vehicles.</i>	Minor/Short Term	- Machinery and equipment to be regularly inspected and maintained. - Refueling and maintenance to be done in designated, and paved areas. - Keep spill kits on-site and train staff in spill response. - Collect and properly dispose of used oil through authorized vendors.
<i>Noise pollution due to machinery (mixers, tippers, excavators) and incoming vehicles.</i>	Minor/Short Term	- Install portable barriers or acoustic sheets around stationary noise sources. - Use well-maintained silencers on machinery. - Limit noisy activities to daytime hours. - Encourage operators to switch off engines when idle.
<i>Workers' accidents and occupational hazards during construction.</i>	Minor / Long Term but reversible	- Provide and enforce use of Personal Protective Equipment (PPE) such as helmets, gloves, boots, and high-visibility vests. - Conduct safety briefings and toolbox talks regularly.

Possible Impact	Impact Magnitude	Mitigation Measures
		• Maintain tools and machinery in sound working condition. • Provide first aid facilities and train designated first aide
<i>Waste generation (excavated soil, packaging, etc.)</i>	Minor/Short Term	• Segregate waste into recyclable and non-recyclable categories. • Dispose of construction debris at approved disposal sites. • Reuse excavated material for backfilling where feasible.
<i>Public safety (open trenches, temporary diversions)</i>	Minor/Short Term	• Provide barricades, safety tape, and warning signs around open excavations. • Ensure adequate lighting at night. • Assign flagmen for traffic management near active sites.
Operational Phase		
<i>Construction of houses – dust, noise, and waste generation.</i>	Moderate / Short Term	• Apply similar mitigation as during the developmental phase (dust control, proper waste disposal, PPE use). • Restrict construction activities to daytime hours. • Reuse or recycle construction debris where feasible. • Ensure construction materials are stored properly to avoid spills and littering. • Maintain well housekeeping practices at all plots.

Possible Impact	Impact Magnitude	Mitigation Measures
<i>Solid waste generation from residential and commercial units.</i>	Major / Long Term	• Provide an efficient waste collection and segregation system. • Conduct public awareness campaigns on waste minimization and recycling. • Coordinate with municipal authorities for timely waste disposal. • Promote composting and green waste management in parks.
<i>Noise from standby generator</i>	Minor/Long Term	• Install soundproof enclosures around generators. • Operate generators only during power outages. • Use mufflers and noise-insulated housing. • Plant trees and shrubs as natural noise barriers.
<i>Air emissions from standby generator</i>	Minor/ Short Term	• Undertake periodic emission testing. • Develop green belts and parks to improve air quality.
<i>Energy consumption and resource use</i>	Minor / Long Term	• Promote energy-efficient lighting and appliances in houses. • Encourage residents to use renewable energy options. • Adopt water conservation practices (low-flow taps, rainwater harvesting).
<i>Public health and sanitation</i>	Minor / Long Term	• Regular pest control in public areas. • Provide awareness sessions to residents about hygiene and environmental protection.

Possible Impact	Impact Magnitude	Mitigation Measures
<i>Landscaping and green area maintenance</i>	Positive / Long Term	• Develop and maintain green belts, parks, and roadside plantations • Choose native species to reduce water demand.

Environmental Monitoring Plan

The implementation of a monitoring plan within an EIA is crucial for several reasons. It serves as a fundamental tool to track and evaluate the actual environmental effects of a project against the predicted impacts outlined in the EIA report. By establishing a monitoring plan, it becomes possible to assess the accuracy of the initial predictions, ensuring compliance with environmental regulations and standards. This ongoing assessment aids in identifying any unforeseen or adverse impacts, enabling timely corrective measures or adjustments to the project to mitigate or prevent environmental harm, fostering sustainable development and ensuring the project's alignment with environmental conservation objectives throughout its lifecycle.



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Table E-3 Environmental Monitoring

Environmental Segment/Element	Monitoring Parameters	Reference Location/Monitoring Point	Monitoring Frequency
Construction Phase			
Water Quality	As prescribed by the National environmental Drinking Water Quality Standards	Main drinking water source and nearby boreholes	Quarterly
Ambient air emissions	Dust, Smoke, PM, SO _x , NO _x , CO	At excavation sites, material storage areas, and near machinery	Quarterly
Wastewater including Sewage	Ensure that all wastewater is treated to the level set by the PEQs.	Campsite sanitation area	Quarterly
Noise	The Levels prescribed as in PEQs.	Near construction machinery and boundary of site	Quarterly
Solid Waste Disposal	Compliance with legal disposal requirements.	Construction sites, camps, and storage yards	Quarterly
Operation Phase			
Water Quality	As prescribed by the Punjab environmental Drinking Water Quality Standards	Main Drinking Water Source	Quarterly

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Environmental Segment/Element	Monitoring Parameters	Reference Location/Monitoring Point	Monitoring Frequency
Ambient air emissions	Methane and carbon dioxide, PM, CO	Generator Area and exhausts of utilities	Quarterly
Wastewater including Sewage	Ensure that all wastewater is treated to the level set by the PEQS.	Main Disposal Site, drains	Monthly
Solid Waste Disposal	Proper collection and disposal per local regulations	Residential and commercial waste collection sites	Regularly in connection with environmental and safety grounds
Noise	Noise levels	Generator area, parking, and community edges	Once quarterly at all involved places

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1 INTRODUCTION

The proposed project is a residential development project by the New Al-Noor City, located in Pakpattan. The project aims to provide well-planned, affordable, and sustainable housing facilities to meet the growing demand for residential accommodation in the city. Covering a total area of 409 kanal 14 Marla and 183 SFT, the scheme comprises residential plots, commercial areas, public buildings, masjid, open spaces, parks, and an extensive road network.

1.1 PURPOSE OF THE REPORT

The report aims to ensure that environmental considerations are integrated into the planning and decision-making processes prior to the commencement of project activities. It provides a detailed analysis of the project's potential impacts on the physical, biological, and socio-economic environment during the construction and operational phases. Furthermore, this EIA outlines strategies and an Environmental Management Plan (EMP) to minimize adverse effects, enhance positive outcomes, and ensure compliance with the **Punjab Environmental Protection Act (PEPA), 1997**, and the **IEE/EIA Regulations, 2022**.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

The housing scheme to be developed by New Al-Noor City in Pakpattan.

Proponent detail as following:

Proponent: Rehmat Ali Chisti

CNIC No: 34602-4499557-9

Address: Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan

1.3 DETAILS OF CONSULTANTS



Environmental Services Pakistan Pvt. Ltd (ESPAK)

Office No. 731, Block 2, Sector D1, Shahjilani Road Township Lahore

Contact: 042-35154012, 0312-0849999

1.4 BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT

The proposed project titled "Housing Scheme by M/s New Al-Noor City" is a planned residential development aimed at providing organized, well-designed, and environmentally sustainable housing facilities. The project is located at Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, District Pakpattan, with geographic coordinates 30°22'29.21"N, 73°21'23.81"E. The project site currently comprises open, barren land, lying in an area characterized as an agricultural cum semi-commercial zone transitioning into urban development.

The total area of the housing scheme is 409 Kanal 14 Marla and 183 SFT, which will be developed into residential plots, internal road networks, utility corridors, parks, playgrounds, green belts, and community facilities. Essential utilities such as water supply will be provided through the Tehsil Municipal Authority (TMA), while electric power will be supplied by Multan Electric Supply Company (MEPCO). Areas have been designated for tree plantation, including green belts and recreational spaces to promote environmental sustainability.

The site is surrounded by human settlements/open land to the North, an access road to the South, human settlements to the East, and human settlements to the West, making it a suitable and accessible location for a residential housing scheme. The project is currently in the pre-construction stage, and all development activities will adhere to environmental, safety, and regulatory requirements through the implementation of a comprehensive Environmental Management Plan (EMP).

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Figure 1-1 Location of the Project

1.5 LIST OF NAMES, QUALIFICATIONS AND ROLES OF TEAM MEMBERS CARRYING OUT THE EIA STUDY

The proponent has assigned the task of preparing EIA report to M/s Environmental Services Pakistan Pvt. Ltd (ESPAK). The EIA study of the project has been conducted according to Environmental Assessment Procedures, 1997, Review of IEE and EIA Regulation 2022 as prescribed by the Punjab Environmental Protection Agency (Punjab EPA), Government of Pakistan. The study team of M/S Environmental Services Pakistan Pvt. Ltd (ESPAK) which completed the EIA report consists of following expert

Table 1-1 MEMBERS COMPLETED EIA PROCESS

Team & Qualification Environmental Team			
Sr. No	Names	Designation	Qualification
1.	Ali Ramzan	Lead Environmentalist	BS Environmental Science
2.	Nabia Farrukh Sohail	Environmentalist	MS Environmental Science
3.	Zainab Nadeem	Environmentalist	MS Environmental Science
4.	Aruba Imran	Reporting Manager	BS Environmental Science

**Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA study*

2 SCREENING OF THE PROJECT

Based on the Punjab Environmental Protection Act 2012 and the Review of IEE & EIA Regulations, 2022 for filing, reviewing, and approving environmental assessments, the present project is classified under **Schedule II class H (1)**. Following list shows the projects included in Class H.

H. Construction, urban development and tourism projects

- 1. Housing scheme more than 300 Kanal.**
2. Large scale tourism development projects.
3. Hospital more than 50 beds.
4. Hotels with more than 100 rooms.
5. Industrial estate (including export processing zones)



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3 SCOPING OF THE PROJECT

Scoping is a critical initial phase in the EIA process, serving as a roadmap for the comprehensive evaluation of potential environmental effects associated with a project. It is pivotal in defining the boundaries, objectives, and methodology of the EIA study. The scoping process allows for the identification and prioritization of key environmental issues, ensuring that the assessment focuses on the most relevant aspects of the project. This early stage engagement with stakeholders, including the public, governmental bodies, and experts, promotes transparency and inclusivity in decision-making. By clearly delineating the scope, the EIA process becomes more efficient, cost-effective, and targeted, streamlining the subsequent data collection and analysis phases. Ultimately, scoping enhances the overall effectiveness of the EIA, enabling a thorough examination of potential impacts, facilitating informed decision-making, and promoting sustainable development practices by integrating environmental considerations into the planning and decision-making processes.

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

The spatial boundaries of the project cover a total area of 409 kanal 14 Marla and 183 SFT, located within the Pakpattan. The project area includes residential plots, commercial zones, public buildings, open spaces, parks, and an internal road network developed. The surrounding vicinity, including nearby settlements, access roads, and natural drainage channels, may also experience indirect influence from project activities.

The temporal boundaries of the project comprise two major phases

- **The Developmental Phase**
- **The Operational Phase.**

The development phase will involve site preparation, earthworks, infrastructure development, and building activities, while the operational phase will focus on the occupation and maintenance of the housing facilities. These phases define the timeframe within which project-related activities and their potential environmental effects will occur.

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

During the stakeholder consultation process for the proposed New Al-Noor City Housing Scheme in Pakpattan, local residents and nearby community members raised several important concerns. The primary issues highlighted concerns about wastewater disposal and the possible contamination of nearby agricultural lands and surface water bodies if proper treatment systems were not installed. Additionally, participants emphasized the need for an efficient solid waste management system to prevent littering and environmental pollution in the surrounding areas.

Another major concern raised was related to increased traffic and dust generation during the construction phase, which could disturb the local community and affect air quality. Residents also pointed out the importance of green spaces and tree plantation within the housing scheme to maintain the ecological balance and improve the local environment. The community stressed that the project should provide employment opportunities for local labor and ensure the safety of workers and nearby residents during construction.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

The development of the project may result in several significant environmental and socio-economic impacts, which need to be carefully assessed and managed.

The key factors to be determined include:

- ☞ Generation of dust and emissions from construction machinery, vehicular movement, and material handling.
- ☞ Potential impact on groundwater levels and quality due to increased water demand and wastewater generation.
- ☞ Elevated noise levels from construction equipment, vehicular traffic, and other project-related activities.
- ☞ Disposal of construction debris, domestic waste, and wastewater during construction and operation.
- ☞ Minor disturbance to local vegetation and wildlife due to land clearing and human activity.
- ☞ Increased traffic congestion along access roads during construction and after occupation.
- ☞ Employment opportunities, infrastructure development, and improved housing facilities for the local population.

3.4 DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT PLAN

An EMP will be developed to ensure that the potential environmental impacts identified during the assessment are effectively managed, minimized, and monitored throughout the construction and operational phases of the housing scheme. The EMP will outline the specific mitigation measures, implementation responsibilities, monitoring requirements, and reporting mechanisms necessary to achieve environmental compliance and sustainability.

The plan will include strategies for air, water, and noise pollution control, waste management, soil erosion prevention, occupational health and safety, and conservation of green areas. It will also define the roles of the proponent, contractors, and regulatory authorities in ensuring adherence to environmental standards and relevant laws, including the Punjab Environmental Protection Act (PEPA), 1997, and the IEE/EIA Regulations, 2022. Periodic environmental monitoring and audits will be conducted to evaluate the effectiveness of mitigation measures and to facilitate continual improvement in environmental performance. The EMP will thus serve as a practical framework for ensuring the project's environmentally sound and sustainable development.



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4 ALTERNATIVES OF THE PROJECT

The alternatives for the New Al-Noor housing scheme and their potential environmental impacts were evaluated to determine the most suitable and sustainable project option. The assessment aimed to identify the alternative that would achieve the project objectives while minimizing adverse environmental effects. The following alternatives were considered for the project:

Project Alternatives

- **No Project Option**
- **Alternative Site**
- **Alternative Design and Layout**
- **Technology Alternatives**

4.1 NO PROJECT OPTION / WORST SCENARIO OPTION

Analysis

❖ Strengths and Opportunities

The project presents several strengths and opportunities that make it a highly beneficial project for both the community and the region. It will provide planned and affordable residential facilities for the general public while contributing to employment generation during both developmental and operational phases, thereby supporting local economic growth. The project also promotes infrastructure development, including roads, drainage, sewerage, and electricity networks, which will enhance the overall living standards of residents.

❖ Weaknesses and Threats

However, the project also faces certain weaknesses and threats that require careful management. The developmental phase may result in temporary environmental impacts such as dust emissions, noise, and waste generation. If not properly managed, issues related to waste disposal, drainage, and traffic congestion could also arise, potentially affecting the local environment and community. Nonetheless, these challenges can be effectively mitigated through the implementation of a comprehensive EMP and regular monitoring.

Conclusion

In conclusion, after thorough analysis, the consultant finds that the New Al-Noor City housing scheme offers significant socio-economic and environmental advantages compared to the “No Project Option.” With



appropriate environmental safeguards in place, the project is deemed environmentally acceptable, socially beneficial, and conducive to sustainable urban growth.

4.2 LOCATION ALTERNATIVES

The project is proposed at Mouza 20/SP, Sahiwal Road, Tehsil Pakpattan, which is strategically suitable based on accessibility, availability of utility connections, and compatibility with surrounding land use.

4.2.1 Construction on Government Land

Using government-owned land was evaluated as a potential alternative.

Analysis

- Government land in the area is limited and already allocated for public utilities, agriculture, or future urban expansion.
- Acquisition of government land may involve lengthy legal processes, resettlement concerns, and higher social impacts.
- The selected private land is barren, underutilized, and free from settlements, making it more suitable for immediate development.
- Existing access roads and proximity to human settlements make the selected site more appropriate and cost-effective.

Conclusion

The proposed site is the most feasible option because it minimizes environmental disturbance, avoids displacement, ensures easy provision of utilities, and supports controlled residential growth. Therefore, alternative site selection is not preferred over the current location.

4.3 TECHNOLOGY ALTERNATIVE

Various technological approaches were assessed to ensure the project is environmentally sustainable during both development and operation.

Analysis

Use of energy-efficient construction equipment will minimize fuel consumption and air emissions.



Adoption of environmentally friendly construction materials, where feasible, reduces waste generation and enhances durability.

Implementation of modern drainage and sewage systems, including connections to municipal networks, ensures compliance with PEQS and prevents soil and water contamination.

Use of proper solid waste management practices, including segregation and recycling, minimizes long-term environmental burdens.

Electrical safety will be ensured through standardized MEPCO-approved systems and proper earthing measures.

Conclusion

The adoption of modern, resource-efficient, and environmentally sound technologies will significantly reduce pollution, improve safety, and enhance the sustainability of the housing scheme. This option is therefore considered the most feasible, cost-effective, and environmentally responsible choice.

4.4 ALTERNATIVE DESIGN AND LAYOUT

Analysis

Multiple layout options were evaluated to optimize land use, ensure smooth traffic flow, and maximize open and green spaces.

The selected design includes:

- Adequate road widths for safe traffic circulation
- Parks, playgrounds, and green belts for environmental enhancement
- Proper utility corridors for water, sewerage, electricity, and gas
- Separation of commercial and residential areas for better livability
- Alternate layouts with denser housing clusters were rejected as they would reduce green space and increase environmental load.

Conclusion

The selected design layout is the most environmentally compatible and socially beneficial. It optimizes land use, ensures compliance with planning standards, and enhances long-term sustainability.



5 DESCRIPTION OF THE PROJECT

5.1 OBJECTIVE OF THE PROJECT

The primary objective of the Housing Scheme is to provide planned, affordable, and sustainable residential facilities for the general public within Pakpattan. The project aims to address the growing housing demand by developing a well-structured and environmentally responsible housing community that ensures improved living standards and quality of life.

Specifically, the objectives of the project are to:

- ☞ Develop a well-planned residential area equipped with essential infrastructure such as roads, sewerage, drainage, electricity, and water supply systems.
- ☞ Provide affordable housing options to reduce the pressure on unplanned settlements and informal housing areas.
- ☞ Create employment opportunities during both the developmental and operational phases, contributing to local economic growth.
- ☞ Incorporate green spaces, parks, and community facilities to enhance environmental quality and promote a healthy lifestyle.

5.2 LOCATION AND SITE LAYOUT OF THE PROJECT

The site layout of the project has been attached as Figure 3-2.

5.3 LAND USE ON THE SITE

The proposed project site comprises barren and undeveloped land with no existing infrastructural development or built-up structures. The area has historically remained unused for residential, commercial, or industrial purposes and does not support any significant vegetation, agricultural activity, or human settlements. The land is primarily flat and open, making it suitable for planned urban development without requiring major land modification or displacement of communities.

Since the site lacks productive land use, the development of the housing scheme will not result in the loss of agricultural resources or livelihood impacts. Instead, the project will convert the underutilized barren land into a structured residential zone equipped with essential utilities, green spaces, and community facilities.

5.4 LAND DISTRIBUTION

The project, intends to develop a housing scheme titled “New Al-Noor City” in Pakpattan. The project covers a total area of 409 kanal, 14 Marla and 183 SFT includes various land uses such as residential plots, commercial areas, public buildings, open spaces and parks, masjid, graveyard and an extensive road network.

Table 5-1 Land Distribution

S#	Description	Area (K-M-SFT)	Area (%age)
1.	Residential	190-07-171	46.51
2.	Road/Parking	142-08-227	34.76
3.	Society Office	000-15-007	00.18
4.	Park	28-14-064	7.00
5.	Commercial	24-14-258	6.04
6.	Graveyard	08-04-54	2.00
7.	Public Building	12-06-141	3.00
8.	Solid Waste Management	00-10-008	0.12
9.	Disposal Station	01-01-070	0.25
10.	Wastewater Treatment Plant	00-12-000	0.14
Grand Total		409-14-183	100

5.5 ROAD ACCESS

The proposed housing scheme has excellent connectivity due to its proximity to major transportation routes. The Sahiwal-Pakpattan Road lies to the west of the project site, providing direct access to the project area. This main road ensures smooth connectivity to nearby towns, urban centers, and essential services, facilitating transportation of construction materials during the developmental phase and easy accessibility for residents during the operational phase.

Internal roads within the housing scheme will be constructed to ensure safe circulation, proper traffic flow, and connectivity to utilities and community facilities, complementing the accessibility provided by the main Sahiwal-Pakpattan Road.

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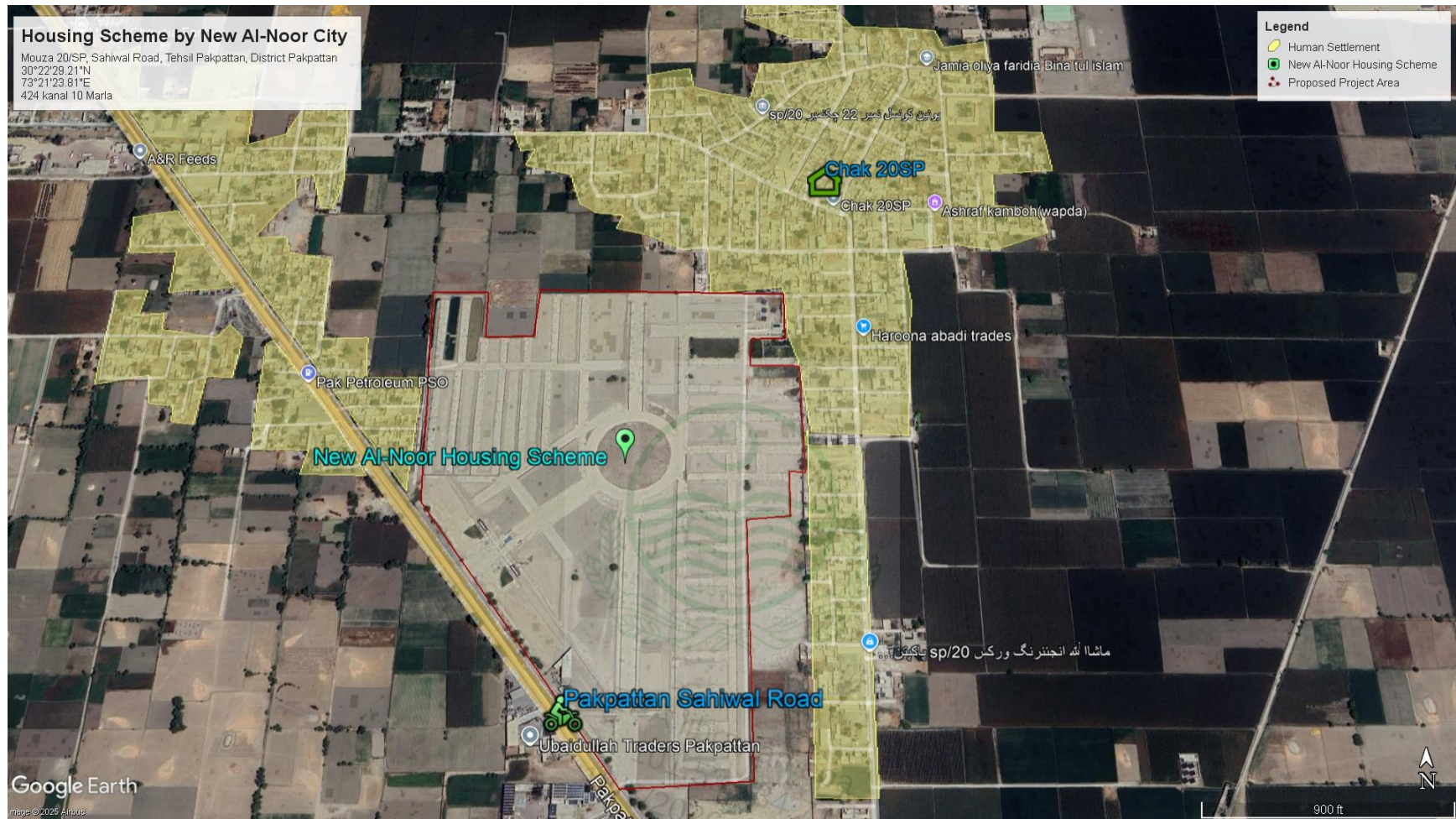


Figure 5-1 Road Access Near Project Area



5.6 VEGETATION FEATURES OF THE SITE

The proposed housing scheme site is currently barren land with very sparse or negligible natural vegetation. There are no significant trees, shrubs, or forests present within the project boundaries. The site may have some scattered wild grasses or small shrubs, but no protected or ecologically sensitive plant species have been observed during site surveys.

The absence of dense vegetation means that site development will not involve the removal of large trees or disturbance to significant natural habitats. Nevertheless, the project design includes planned tree plantation in parks, playgrounds, and green belts to improve the environmental quality, provide shade, and enhance the aesthetic and recreational value of the housing scheme.

5.7 COST AND MAGNITUDE OF OPERATION

The total estimated cost of the New Al-Noor City Housing Scheme is approximately **PKR 700 million**. The project covers an area of 409 Kanal 14 Marla and 183 SFT and will involve the construction of residential units, internal roads, parks, playgrounds, utility networks, and community facilities.

Table 5-2 Cost Breakdown

Sr. No.	Cost Component	Estimated Cost (PKR Million)	Remarks
1	Land Development and Site Preparation	200	Leveling, clearing, fencing, and initial landscaping
2	Internal Roads and Pavements	100	Construction of roads, footpaths, drainage channels
3	Commercial Buildings	150	Departmental Stores, Bakeries, Pharmacies etc.
4	Masjid	30	Religious Place
5	Utility Infrastructure	180	Water supply, sewerage, electricity, gas pipelines, street lighting
6	Parks, Green Belts, and Recreational Areas	30	Landscaping, tree plantation, playgrounds, walking tracks
7	Environmental Management Measures	10	Waste management (Collection, Storage and Disposal) Traffic Management (Signage etc.), Dust

Sr. No.	Cost Component	Estimated Cost (PKR Million)	Remarks
			control (Water Sprinkling etc.), noise mitigation, management, EMP implementation
Total Cost		700	

The project will be implemented in phases, with the developmental phase including site preparation, infrastructure installation (water, electricity, sewerage, gas), and construction of housing units, while the operational phase will involve the management and maintenance of the completed residential scheme.

The scale of the project is significant, capable of accommodating a substantial number of residential units and providing modern amenities to residents. The investment will also generate employment opportunities during both construction and operational phases, contributing to local economic growth.

5.8 SCHEDULE OF IMPLEMENTATION

The implementation of the housing scheme is planned to be carried out in phases to ensure systematic development and timely completion. The schedule has been designed to align with technical, financial, and environmental considerations. The key stages of the project implementation are outlined below:

Phase 1 – Design Stage

This phase will include detailed site surveys, finalization of design and layout plans, mobilization of machinery, and obtaining necessary approvals and clearances from relevant authorities.

Phase 2 – Development Stage

Major construction works such as road networks, drainage and sewerage systems, water and gas supply lines, electrical distribution, and building foundations will be completed. Residential and commercial structures will be developed progressively.

Phase 3 – Landscaping and Finishing

Green belts, parks, street lighting, and other community facilities will be developed. Final inspections and testing of utilities will be conducted to ensure compliance with environmental and safety standards.

Phase 4 – Operation Stage

The housing scheme will become operational, with residents gradually occupying the developed plots.



Routine maintenance and environmental monitoring activities will continue to ensure sustainable operations.

5.9 DESCRIPTION OF THE PROJECT

The proposed Housing Scheme, by the New Al-Noor City, is a planned residential development located in Pakpattan. The project has been designed to provide affordable, well-structured, and sustainable housing facilities for the general public, contributing to the organized urban expansion of the city.

The housing scheme will include all essential infrastructure and community facilities such as:

- ✻ **Road network:** A well-designed system of main and internal roads ensuring smooth traffic circulation.
- ✻ **Water and Gas supply and sewerage system:** Modern pipelines and treatment facilities for sustainable water management.
- ✻ **Public amenities:** Schools, healthcare centers, mosques, community halls, and commercial areas.
- ✻ **Green infrastructure:** Parks, playgrounds, and landscaped areas to enhance environmental quality and livability.



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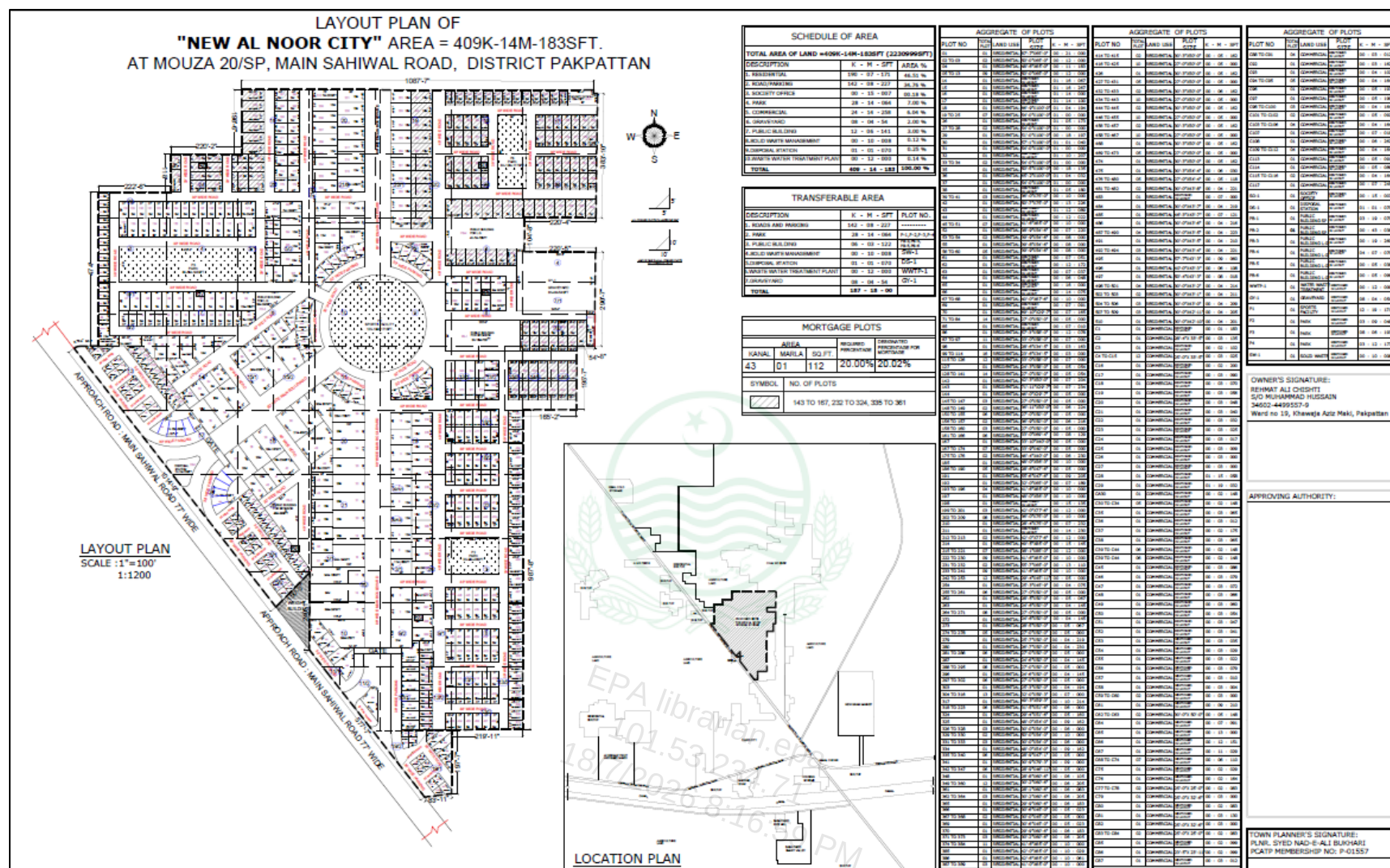


Figure 5-2 Project Layout

5.9.1 Area of the Land

The total area of the project covers **409 Kanal 14 Marla and 183 SFT**, which has been distributed among various land uses to ensure balanced development.

5.10 DEVELOPMENTAL ACTIVITIES

The developmental stage of the housing scheme involved a series of construction and infrastructure activities aimed at transforming the site into a fully functional residential area. The process began with land clearing, leveling, and grading to prepare the site, followed by the development of internal roads, drainage, sewerage, and water supply systems. Electricity, gas, and telecommunication networks were installed during this phase to ensure essential utilities for future residents. Development of residential plots, boundary walls, and community facilities such as parks, mosques, and commercial areas was carried out simultaneously. Environmental management measures, including dust suppression, waste disposal, and erosion control, will be implemented to minimize adverse impacts. The developmental stage concluded with landscaping, plantation, road surfacing, and installation of streetlights, which enhanced the overall aesthetics and livability of the housing scheme.



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5.11 RESTORATION AND REHABILITATION PLAN

The Restoration and Rehabilitation Plan for the housing scheme has been prepared to ensure that the project site and its surroundings are properly restored after the completion of construction activities and that any temporary environmental disturbances are effectively mitigated. The plan aims to maintain ecological balance, prevent land degradation, and promote long-term environmental sustainability.

During the construction phase, certain areas may experience temporary disturbances due to excavation, material storage, vehicular movement, and installation of utilities. Once these activities are completed, the proponent will undertake rehabilitation measures to restore the affected areas to their original or improved condition.

The key components of the restoration and rehabilitation plan include:

- ☞ All construction debris, unused materials, and waste will be removed and disposed of in an environmentally responsible manner at approved disposal sites.
- ☞ Disturbed areas and excavated zones will be leveled and re-graded to prevent water stagnation and soil erosion.
- ☞ Exposed soil will be stabilized through compaction and vegetation cover to reduce erosion and dust generation.
- ☞ Indigenous trees, shrubs, and grasses will be planted along road shoulders, green belts, and open spaces to restore greenery and enhance landscape aesthetics.
- ☞ Temporary drainage channels used during construction will be reshaped and integrated into the permanent drainage system to ensure proper stormwater management.
- ☞ Any damaged utilities, pavements, or boundary walls during construction will be repaired before project completion.

Post-construction, a maintenance program will be implemented to ensure the survival of planted vegetation and the upkeep of rehabilitated areas. The proponent will also monitor the restored zones regularly to ensure compliance with environmental standards and long-term sustainability of the site.

6 DESCRIPTION OF THE ENVIRONMENT

6.1 GENERAL

The baseline environmental conditions provide an understanding of the existing state of the environment before the commencement of the proposed project. This section forms the foundation for assessing potential environmental impacts by describing the current physical, biological, and socio-economic features of the project area. The baseline study for the proposed project in Pakpattan includes information on climate, topography, soil characteristics, water resources, air and noise quality, vegetation, wildlife, and the socio-economic profile of the surrounding communities. This data helps in identifying environmentally sensitive areas and provides a reference against which changes due to project activities can be evaluated.

6.2 PHYSICAL ENVIRONMENT

6.2.1 Settlements around the Project Area

The proposed site for the New Al-Noor City Housing Scheme is surrounded by human settlements, with Chak 20/SP located to the north of the project area. In addition to Chak 20/SP, other small residential clusters and scattered habitations are present around the project boundaries.

These surrounding settlements are primarily rural residential communities with associated small-scale agricultural and commercial activities. The proximity of these settlements necessitates careful planning and implementation of environmental management measures to minimize potential impacts such as dust, noise, and traffic disturbances during the developmental phase of the housing scheme.



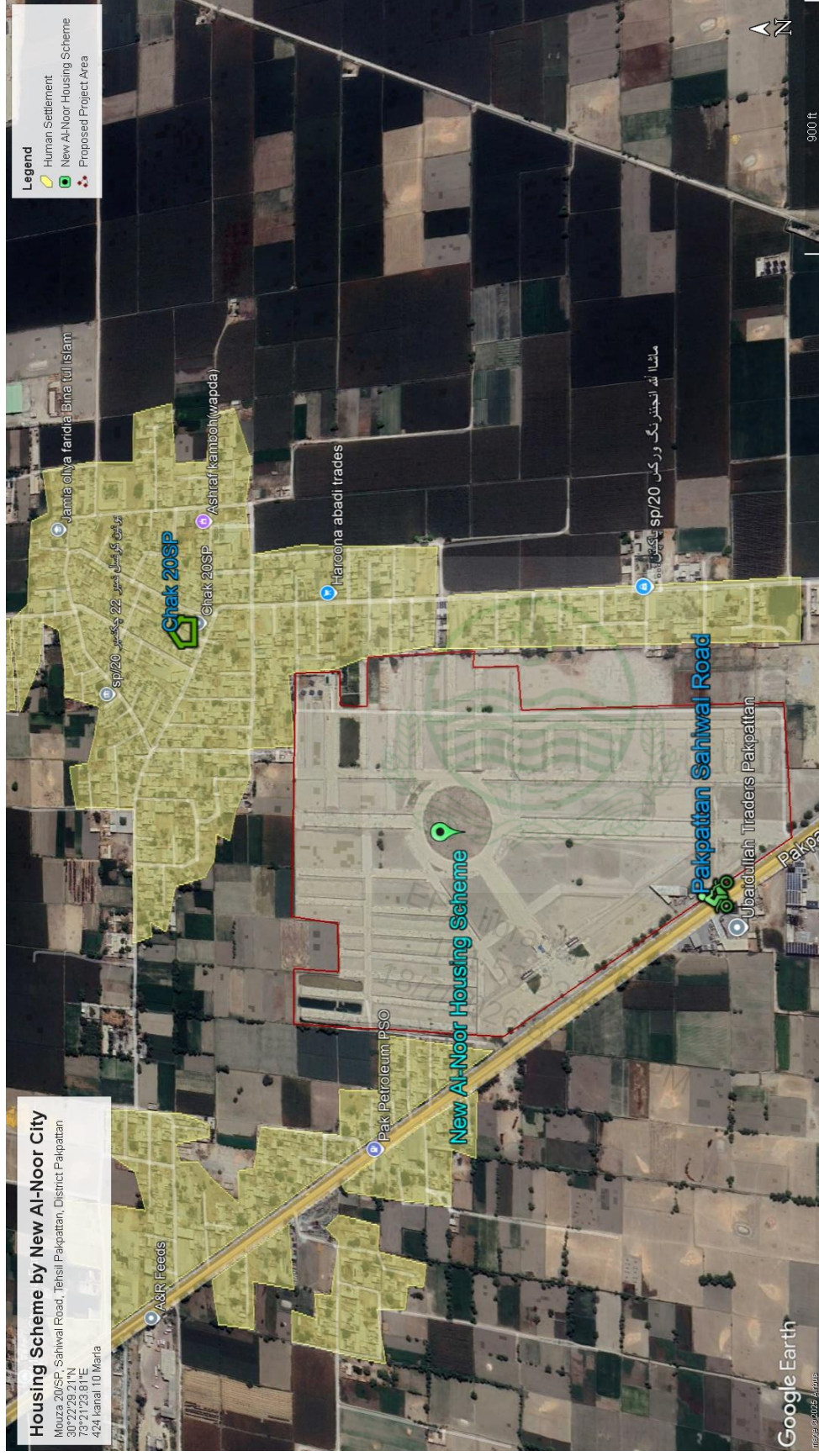


Figure 6-1 Settlements around the Project Area

6.2.2 Terrain of the Area

The topography of the project area in Pakpattan is generally flat and plain, typical of the southern Punjab region. The land is predominantly agricultural, with fertile alluvial soils deposited by the Sutlej River and its tributaries. The area has gentle slopes that facilitate natural drainage, and there are no major hills or elevated features within or near the project site. The flat terrain makes the land suitable for development activities such as housing and infrastructure construction. Overall, the topography supports ease of accessibility and provides favorable conditions for both agricultural and construction purposes.

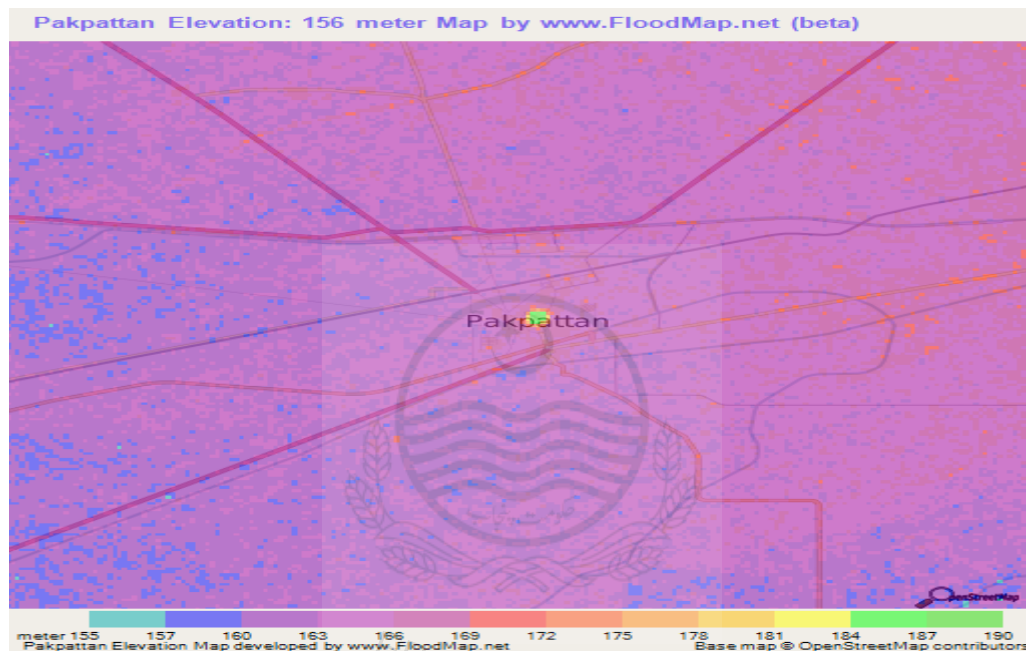


Figure 6-2 Topography of the project

6.2.3 Soils

The soils in the project area of Pakpattan District are alluvial in nature, developed from the deposits laid down by the Sutlej River and its tributaries over centuries. These soils are part of the vast Indus Plains, which are characterized by their high fertility and suitability for agriculture. The region's geomorphology has been shaped by fluvial processes, resulting in deep, well-developed soil profiles that support a variety of land uses.

The texture of the soil in the project area mainly ranges from sandy loam to clay loam, depending on the depth and location. The surface soils are generally sandy loam, which allows for good aeration and moderate water infiltration, while subsurface layers tend to be more clayey, helping retain moisture. The soil color varies from light brown to dark brown, reflecting variations in organic matter content.

The soil fertility of the area is considered high, primarily due to the presence of essential nutrients and organic content that have accumulated from natural alluvial deposits and continuous agricultural practices. These fertile soils support the cultivation of major crops such as wheat, sugarcane, rice, and cotton, which form the backbone of the local economy. Regular use of fertilizers and irrigation from canals and tube wells has further enhanced soil productivity.

However, certain areas of Pakpattan are prone to minor salinity and waterlogging, particularly in low-lying zones or areas with poor drainage systems. This issue arises from over-irrigation, high groundwater tables, and inefficient drainage infrastructure. The Electrical Conductivity (EC) and pH levels of the soils in such zones may show slight variations, generally indicating neutral to slightly alkaline conditions (pH 7.2–8.0), which are still within the acceptable range for most crops.

From a construction perspective, the soils in the project area are generally stable and suitable for building foundations due to their compact nature and moderate bearing capacity. However, detailed geotechnical investigations may be required at specific locations to confirm bearing strength and assess compaction characteristics before major structural activities commence.

In summary, the soils of Pakpattan District are fertile, well-drained, and agriculturally productive, with minimal environmental constraints for development. Proper soil management practices, including maintaining adequate drainage and avoiding excessive irrigation, will ensure sustainable land use and minimize the risks of salinization or soil degradation in the project area.

6.2.4 Climate and Meteorology

The climate of Pakpattan District is classified as semi-arid and subtropical, characterized by hot summers, mild winters, and a distinct monsoon season. The weather patterns are influenced by the southwest monsoon winds during the summer months and continental air masses during winter. The area experiences considerable seasonal variation in temperature, humidity, and rainfall.

Temperature:

The temperature in Pakpattan varies significantly throughout the year. The summer season, which extends from April to September, is extremely hot, with May, June, and July being the hottest months. During this period, maximum temperatures often range between 40°C and 46°C, while minimum temperatures stay around 25°C to 30°C. In contrast, the winter season (from November to February) is mild to cool, with



average daytime temperatures ranging between 15°C and 22°C, and nighttime temperatures occasionally dropping to around 5°C or lower during cold spells in January.

Rainfall:

Rainfall in the district is generally low to moderate, with the majority occurring during the monsoon season (July to September). The average annual rainfall ranges between 250 mm to 400 mm, though variations occur depending on the intensity of the monsoon. The monsoon showers are often accompanied by thunderstorms, which contribute significantly to groundwater recharge and agricultural productivity. Outside the monsoon period, rainfall is sporadic and light, and the region remains largely dry.

Humidity and Evaporation:

The relative humidity remains high during the monsoon months, averaging 65–80%, while during the dry months (April to June), it drops to 25–35% due to intense heat and low precipitation. Evaporation rates are high throughout the summer, often exceeding 200 mm per month, which can lead to moisture stress and increased irrigation demand in agricultural areas.

Wind Patterns:

The general wind direction during the summer is southwest to northeast, driven by monsoon currents, whereas in the winter months, winds generally blow from the north and northwest. Average wind speeds range between 5 to 15 km/h, but during thunderstorms or dust storms in summer, gusts can be much stronger. Dust-laden winds are common during the pre-monsoon season, which can temporarily reduce visibility and air quality.

Sunshine and Solar Radiation:

The area enjoys abundant sunshine throughout the year, with an average of 8 to 10 hours of sunshine per day, particularly in the dry months. The high solar radiation levels make the region favorable for solar energy generation and also influence evaporation and temperature levels.

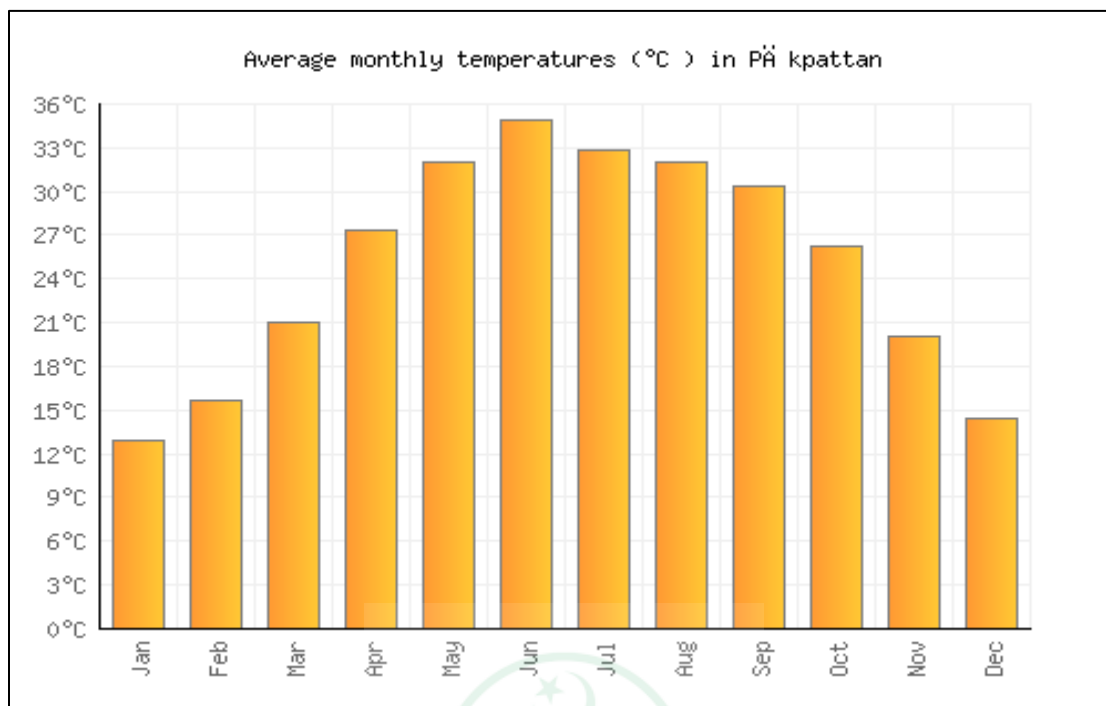


Figure 6-3 Average Temperature of the Area

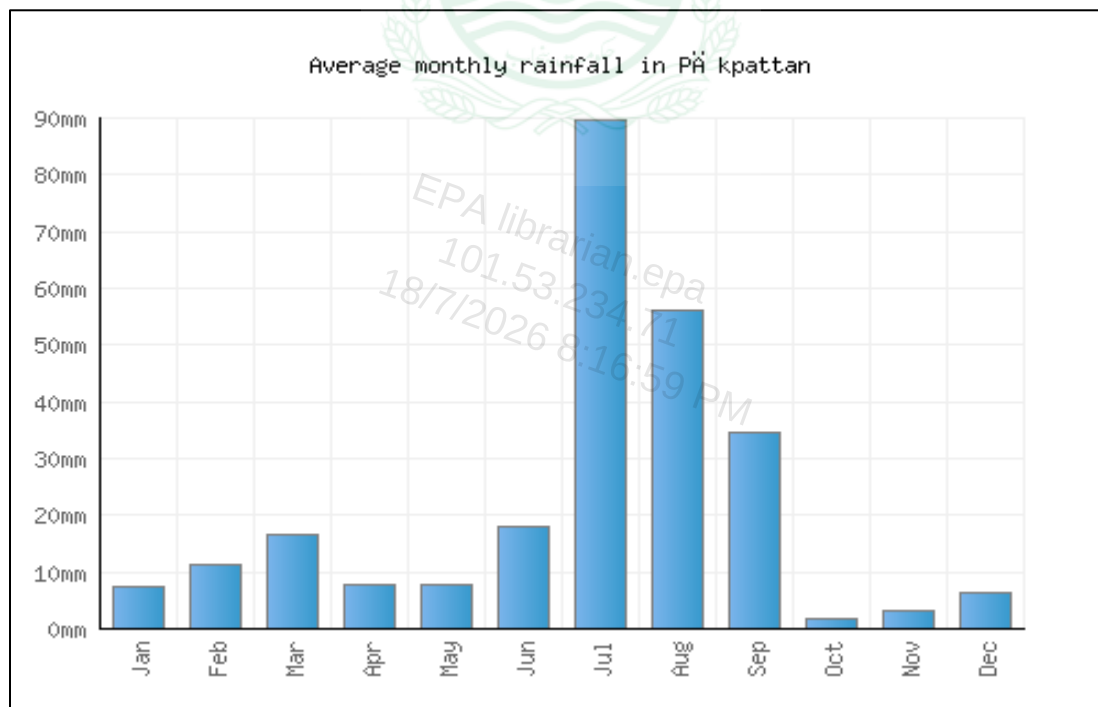


Figure 6-4 Average Rainfall of the Area

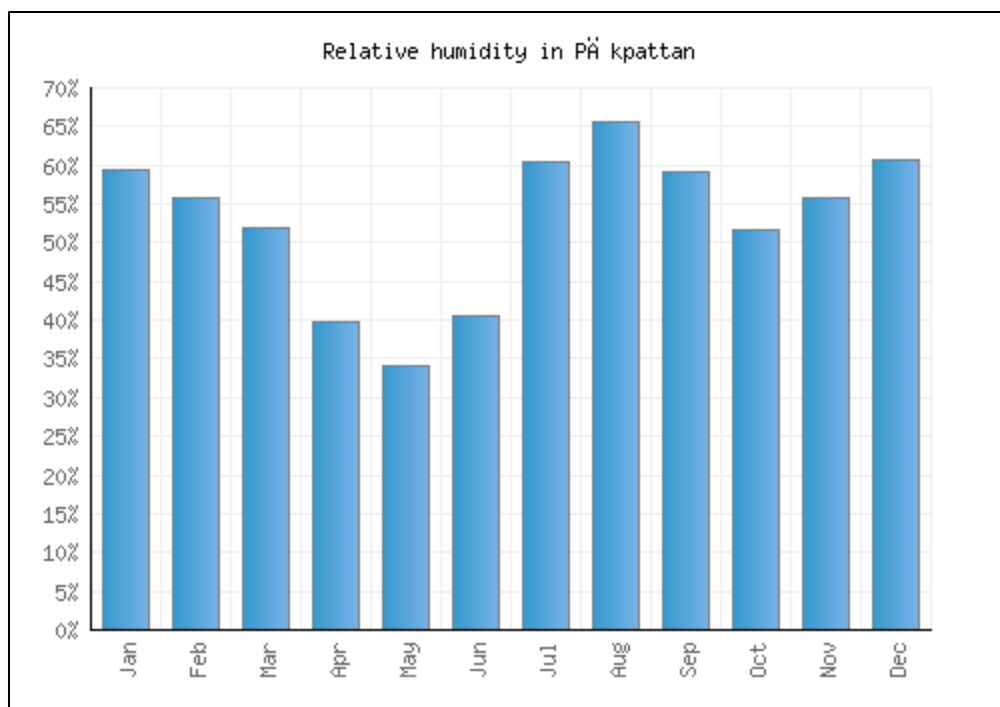


Figure 6-5 Average Relative Humidity

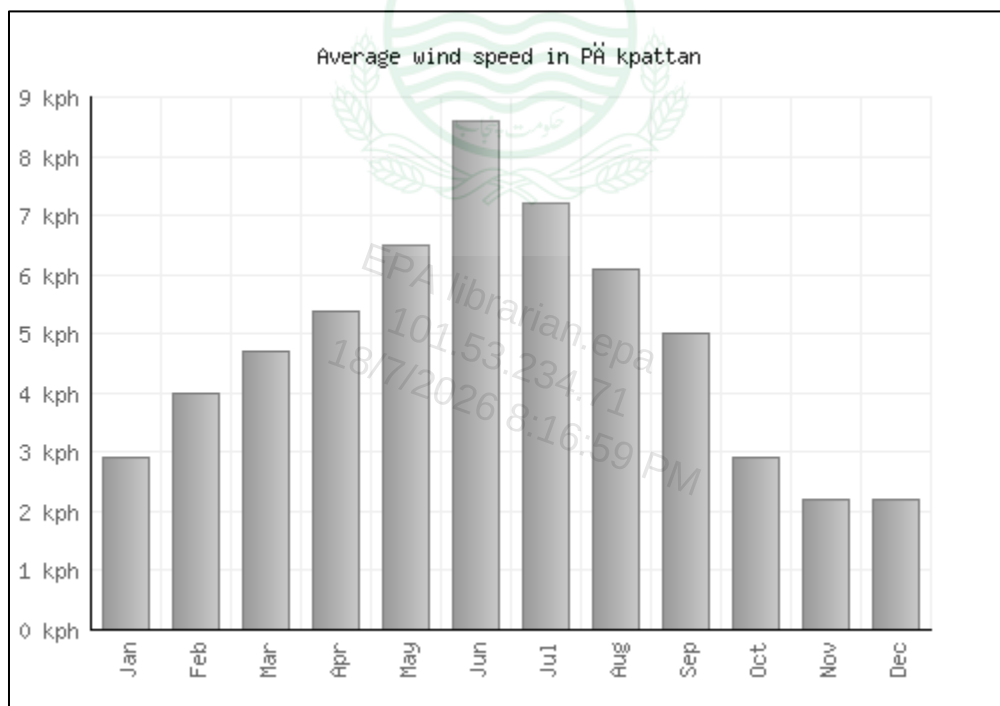


Figure 6-6 Average wind speed in Pakpattan

6.2.5 SURFACE AND GROUND WATER

The surface and groundwater resources in Pakpattan District play a vital role in sustaining the local agriculture, domestic water supply, and overall socio-economic activities of the area. The district lies within the Sutlej River Basin, and its water availability is primarily dependent on canal irrigation systems and groundwater extraction through tube wells.

Surface Water

The principal surface water source in Pakpattan is the Sutlej River, which flows along the southern boundary of the district. Although the river's flow has significantly declined over the years due to reduced upstream inflows and water diversion under the Indus Water Treaty, it still serves as an important hydrological feature in the region. The river and its associated irrigation network contribute to groundwater recharge and support the agricultural productivity of surrounding lands.

The area is well-served by a network of irrigation canals, mainly derived from the Upper Pakpattan Canal and Fordwah Canal systems, which originate from the Sutlej River. These canals are part of the extensive irrigation infrastructure of southern Punjab, providing water for agricultural use throughout most of the year. Seasonal variations in water availability occur, with higher flows during the monsoon season and reduced discharge during the dry months.

In terms of surface drainage, the area is generally flat with gentle slopes, and runoff from rainfall is minimal. Surface water bodies such as ponds and small water channels (locally known as warras or dhars) are used for local irrigation and livestock watering. However, poor drainage and over-irrigation in some parts have led to waterlogging, particularly in low-lying areas, during monsoon months.

Groundwater

Groundwater serves as the primary source of drinking water and an essential source for irrigation in the district. It is typically accessed through shallow and deep tube wells, both privately and publicly operated. The depth of groundwater varies across the district, generally ranging from 60 to 120 feet, depending on the topography and proximity to irrigation channels.

The quality of groundwater in most parts of Pakpattan is suitable for domestic and agricultural use, with Total Dissolved Solids (TDS) and salinity levels within acceptable limits. Regular monitoring by the Irrigation

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Department and Public Health Engineering Department (PHED) indicates that while most groundwater sources are potable.



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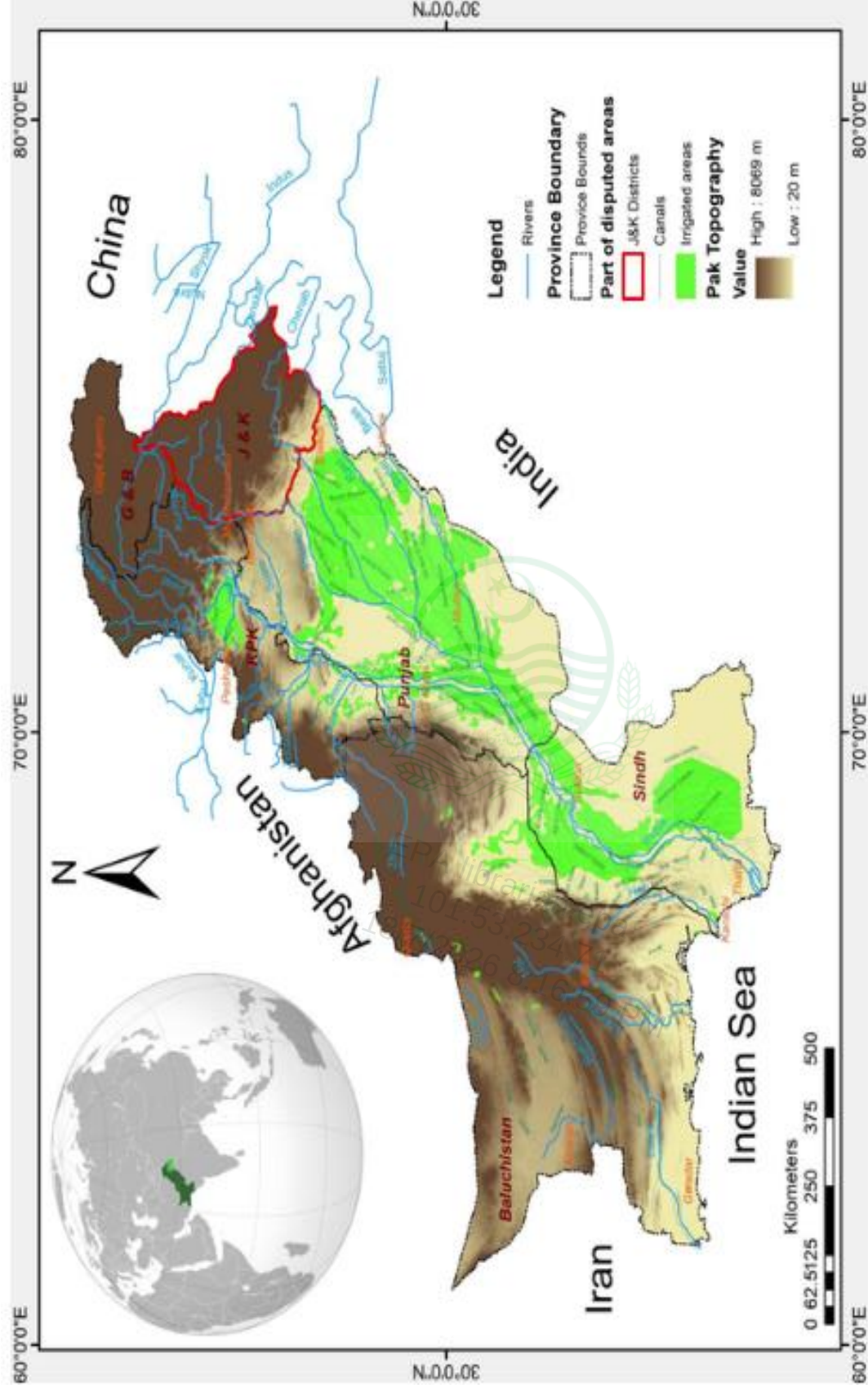


Figure 6-7 Surface and Ground Water

6.3 SEISMOLOGY

The area falls under Seismic Zone 2A as per the Building Code of Pakistan (Seismic Provisions 2007), which corresponds to low to moderate seismic risk. This classification indicates that while minor tremors may occasionally be felt, the likelihood of a significant destructive earthquake is minimal.

Regional Seismic Setting

Pakistan lies at the convergence of the Indian and Eurasian tectonic plates, resulting in active fault zones mainly concentrated in the northern and western parts of the country. The Himalayan Frontal Thrust (HFT), Salt Range Thrust (SRT), and Chaman Fault System are the major fault lines responsible for high seismic activity in areas such as northern Punjab, Khyber Pakhtunkhwa, and Balochistan.

Pakpattan, located in the southern alluvial plains of Punjab, is situated far from these active tectonic boundaries. The nearest significant structural feature influencing the area is the Sulaiman Fold Belt, located several hundred kilometers to the west, which exerts minimal tectonic influence on the district. Therefore, seismic vibrations in Pakpattan are typically of low intensity and infrequent.

Seismic History

Historically, Pakpattan District and its surrounding regions have not experienced any major earthquake events.

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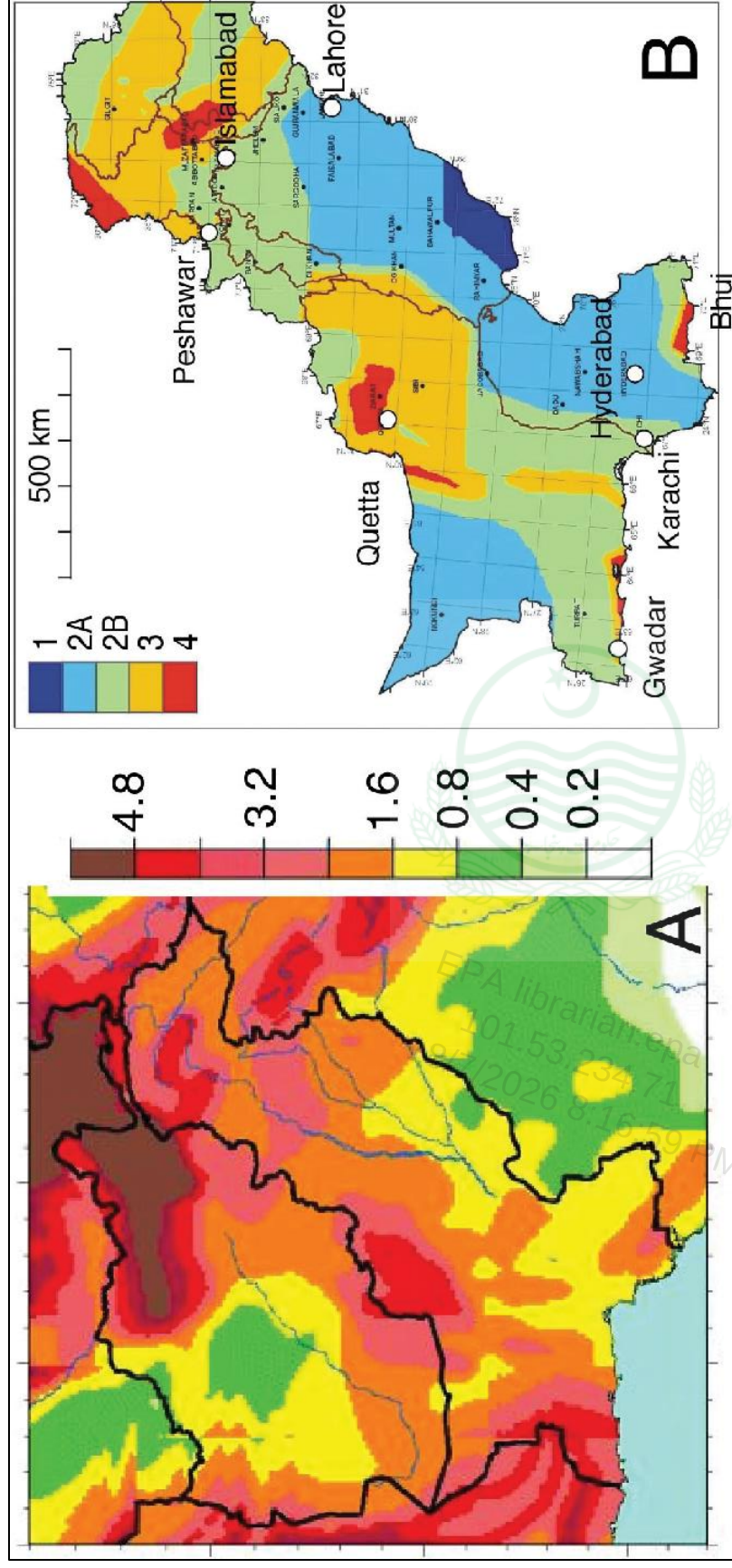


Figure 6-8 Seismic Zones of Pakistan

6.4 ECOLOGICAL RESOURCES

The ecological environment of Pakpattan District is representative of the southern Punjab plains, consisting mainly of agricultural landscapes, scattered vegetation, and limited natural habitats. The ecology of the area has been significantly shaped by human activities, particularly agriculture, livestock rearing, and settlement expansion, which dominate the land use pattern. Despite extensive cultivation, certain patches of natural flora and fauna still exist, particularly along irrigation canals, water bodies, and roadside plantations.

6.4.1 Flora

The natural vegetation of the area falls under the category of tropical thorn forest, though much of the original cover has been replaced by agricultural crops and planted species. The soils and semi-arid climate support vegetation adapted to dry conditions and periodic irrigation. No rare, endangered, or protected plant species have been reported within or near the project area.

Table 6-1 Flora of the Project Area

Tree Species		
Sr. No.	Common Name	Scientific Name
1.	<i>Acacia nilotica</i>	Kikar
2.	<i>Dalbergia sissoo</i>	Shisham
3.	<i>Morus alba</i>	Toot
4.	<i>Eucalyptus camaldulensis</i>	Sufaida
5.	<i>Azadirachta indica</i>	Neem
6.	<i>Ficus religiosa</i>	Peepal
7.	<i>Prosopis juliflora</i>	Mesquite
Shrubs		
8.	<i>Calotropis procera</i>	Aak
9.	<i>Withania somnifera</i>	Asgandh
10.	<i>Achyranthes aspera</i>	Puthkanda

Grass		
11.	<i>Cynodon dactylon</i>	Doob grass
12.	<i>Sorghum halepense</i>	Johnson grass



Figure 6-9 Flora of the proposed project

6.4.2 Fauna

Due to extensive human activity and conversion of land to agriculture and settlements, the wildlife population in the project area is limited. The fauna mainly consists of species that are adaptable to disturbed or semi-urban environments.

Table 6-2 Fauna of the proposed project

Common Name	Scientific Name
Mammals	
<i>Herpestes edwardsii</i>	Indian mongoose
<i>Funambulus pennantii</i>	Five-striped palm squirrel
<i>Lepus nigricollis</i>	Indian hare
<i>Rattus rattus</i>	House rat

Bird	
<i>Passer domesticus</i>	House sparrow
<i>Corvus splendens</i>	House crow
<i>Milvus migrans</i>	Black kite
<i>Pseudibis papillosa</i>	Black ibis
<i>Egretta garzetta</i>	Little egret



Figure 6-10 Fauna of the proposed project

6.4.3 Endangered Species

The endangered plant in Pakistan is the Elm i.e., *Ulmus wallichiana* which is not found here. No endangered species exist in the project area.

6.5 SOCIO-ECONOMIC ENVIRONMENT

6.5.1 History

Pakpattan is one of the historically and culturally significant districts of southern Punjab, Pakistan, with a rich legacy dating back several centuries. The district derives its name from the term “Pak Pattan”, meaning “Holy Ferry,” in reference to its spiritual and historical importance as a crossing point along the Sutlej River. The area has been historically renowned for its Sufi heritage, particularly as the site of the Shrine of Baba Farid (Fariduddin Ganjshakar), a revered 12th-century Sufi saint whose teachings significantly influenced the spiritual and cultural life of the region.

Throughout history, Pakpattan has been part of several major empires and dynasties, including the Delhi Sultanate, Mughal Empire, and later under British colonial administration. During these periods, the district developed as an important agricultural and trade center, benefiting from fertile alluvial soils and its strategic location along riverine trade routes.



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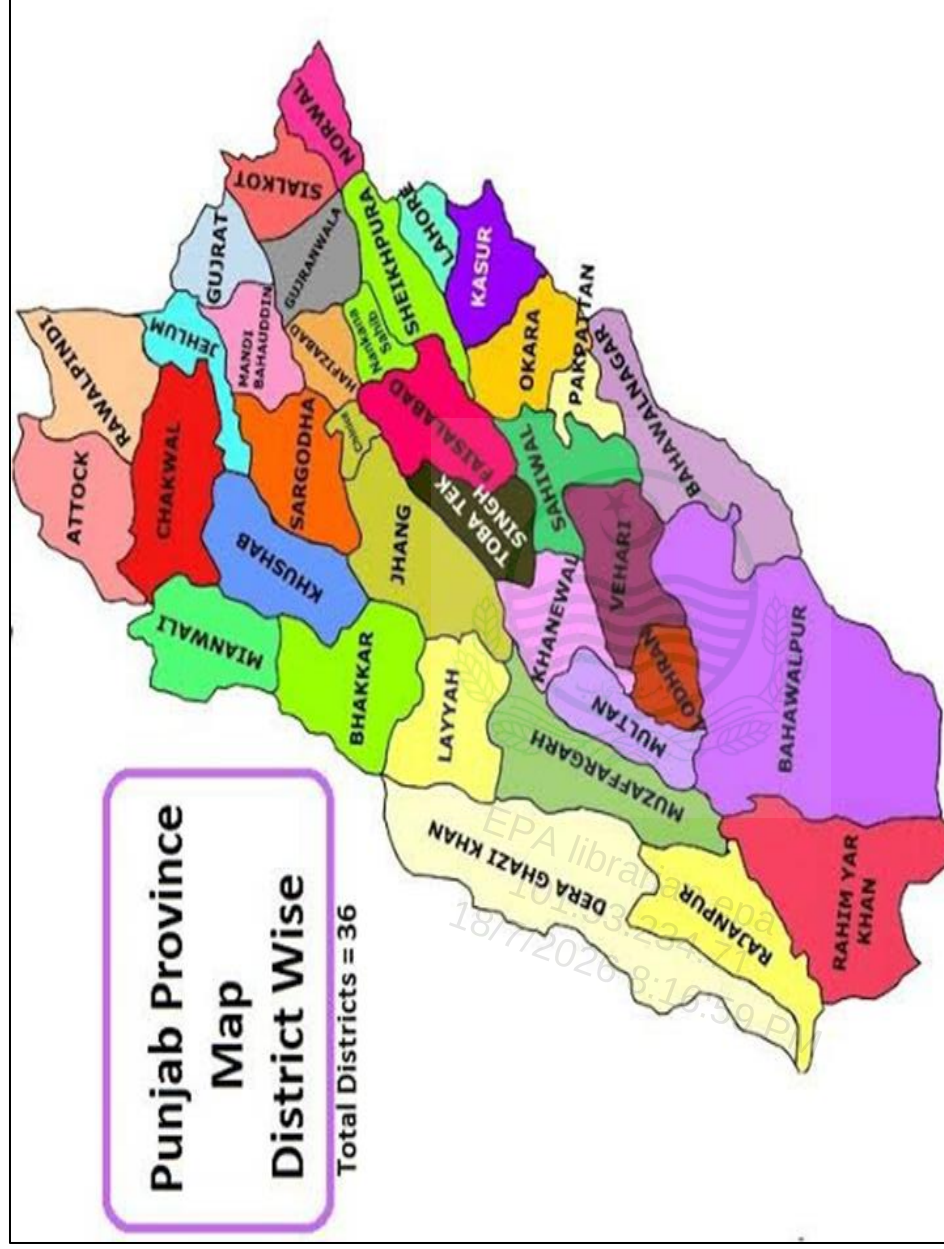


Figure 6-11 District Map of Pakpatan

6.5.2 Political Set Up

Pakpattan District is part of the Punjab Province of Pakistan and operates under the administrative framework of the provincial and local government system. The district is divided into tehsils (sub-districts), union councils, and wards, which form the basis of local governance and public administration. The key administrative units in the district include Pakpattan Tehsil, Arifwala Tehsil, and Habibabad Tehsil, each overseen by a Tehsil Municipal Administration (TMA) responsible for municipal services, local development, and regulatory functions.

At the provincial level, Pakpattan is represented in the Punjab Provincial Assembly, while at the national level, it falls under specific constituencies of the National Assembly of Pakistan. Elected representatives from these constituencies play a crucial role in legislation, resource allocation, and infrastructure development in the district.

The local government system is structured to provide administrative, social, and development services at the grassroots level. Union councils serve as the lowest administrative tier, responsible for basic civic services, record-keeping, and local dispute resolution. Municipal committees and TMAs oversee urban planning, water supply, sanitation, solid waste management, and maintenance of public infrastructure. The district administration is headed by a Deputy Commissioner, who coordinates among various departments, including health, education, revenue, and public works, ensuring law and order and implementing government policies.

Politically, the district has a stable governance environment, with local authorities actively involved in managing development projects and community welfare initiatives. Political engagement in Pakpattan is influenced by traditional leadership structures, landholding patterns, and community organizations, which shape local decision-making and development priorities.

6.5.3 Economic Activities

The economy of Pakpattan District is predominantly agriculture-based, with farming serving as the primary source of livelihood for the majority of the population. The fertile alluvial soils and extensive irrigation canal network support the cultivation of a variety of crops throughout the year. Major crops include wheat, sugarcane, rice, cotton, maize, and various vegetables, which contribute significantly to both local consumption and regional trade. Cash crops such as sugarcane and cotton play an important role in generating income for farmers and sustaining agro-based industries in the region.

In addition to agriculture, livestock rearing is another critical economic activity. Many households rear cattle, buffalo, goats, sheep, and poultry, which provide milk, meat, eggs, and hides, supplementing household income and contributing to local markets. Dairy farming, in particular, has grown as a small-scale but important enterprise, supported by local milk collection centers and small-scale processing units.

Trade and commerce also contribute to the district's economy. Pakpattan city and surrounding towns host retail shops, wholesale markets, and small commercial centers, which cater to the needs of the local population. The district has a thriving market for agricultural produce, with farmers selling surplus crops to traders and wholesalers. Small businesses, workshops, and service providers form part of the informal economy, employing a portion of the local population.

Cottage industries and home-based enterprises are present, though on a limited scale. These include handicrafts, embroidery, weaving, and small-scale food processing. Such activities provide supplementary income for women and contribute to socio-economic stability in rural areas.

Employment in government and public services is also notable. Local residents are employed in education, healthcare, administration, law enforcement, and municipal services, providing stable income sources for families. Additionally, remittances from family members working in other parts of Pakistan or abroad play a role in household finances, particularly in semi-urban and rural areas.

6.6 QUALITY OF LIFE VALUES

6.6.1 Demographic Survey

The population of Pakpattan District has shown a steady increase over the past several decades. In 1951, the district had a population of approximately 380,678, which grew to 440,091 in 1961. By 1972, the population reached 615,742, and further increased to 843,623 in 1981. The upward trend continued with the population recorded at 1,286,680 in 1998, and 1,824,228 in 2017. The most recent estimates indicate that by 2023, the population of Pakpattan District has risen to around 2,136,170. This consistent population growth reflects the district's socio-economic development, expansion of settlements, and increasing demand for infrastructure, housing, and public services.

Table 6-3Demography

Year	Population
2023	2,136,170
2017	1,824,228
1998	1,286,680
1981	843,623
1972	615,742
1961	440,091
1951	380,678

6.6.2 Religion

The population of Pakpattan District is predominantly Muslim, comprising approximately 99.49% of the total population. Christianity is the second-largest religion in the district, representing about 0.5% of the population.

Table 6-4Religion

Religion	% Population
Islam	99.49%
Christianity	0.5%

6.6.3 Cultural and Social Status

Pakpattan District has a rich cultural and social heritage deeply rooted in Sufi traditions, local customs, and rural lifestyles. The district is widely known for the Shrine of Baba Farid, a major spiritual and cultural landmark that attracts thousands of devotees and visitors annually from across Pakistan and abroad. This spiritual legacy shapes the cultural identity of the local population and influences social norms, community interactions, and local festivals.

The social structure in Pakpattan is largely rural and agrarian, with extended family systems playing a central role in community life. Landholding families, village elders, and local religious leaders often influence decision-making at the community level. Social cohesion is generally strong, and communities rely on traditional forms of cooperation for agricultural, social, and religious activities.

Cultural activities in the district include folk music, poetry, traditional fairs (melas), and religious festivals, which reflect the blend of Punjabi traditions and Islamic values. The district celebrates both religious events such as Eid, Muharram, and Urs of Baba Farid, as well as cultural fairs that showcase local handicrafts, food, and music. These events foster social interaction, strengthen community bonds, and contribute to local tourism and economic activity.

Education and literacy levels are gradually improving, with a growing number of schools, colleges, and vocational training centers in urban and peri-urban areas. However, in rural parts of the district, traditional practices, gender roles, and limited access to modern facilities still influence social dynamics. Women's participation in education, employment, and public life is increasing but remains comparatively lower than men, reflecting broader socio-cultural trends in the region.

6.6.4 Institutions

Pakpattan hosts a variety of educational institutions, including government and private schools, colleges, and vocational training centers. These institutions provide primary, secondary, and higher education, contributing to increasing literacy rates and skill development in the district. Key institutions include government high schools, degree colleges, and technical training institutes, which serve both urban and rural populations.

6.6.5 Health Facilities

Health services in the district are provided through a network of hospitals, clinics, and basic health units (BHUs). The District Headquarters Hospital (DHQ) in Pakpattan city is the main tertiary healthcare facility, complemented by smaller rural health centers and dispensaries. Non-governmental organizations (NGOs) and community health programs also play a role in improving maternal and child health, vaccination coverage, and public health awareness in the district.



Figure 6-12 Health Facilities

6.7 ARCHEOLOGICAL SITES

The proposed housing scheme site is located at a sufficient distance from the Shrine of Baba Farid and other historical or archaeological structures in Pakpattan District. There are no known heritage or archaeological sites within the boundaries of the project area, ensuring that construction and operational activities will not directly impact these cultural resources. Appropriate precautions will still be taken to avoid any indirect effects, such as noise, dust, or visual intrusion, on nearby historical landmarks.



Figure 6-13 Shrine of Baba Farid

6.8 SITE SUITABILITY

The proposed project site in Pakpattan District has been assessed for its suitability for the construction of a housing scheme based on physical, environmental, and socio-economic factors. Considering the physical, environmental, and socio-economic conditions, the proposed site in Pakpattan is highly suitable for the housing scheme. The flat topography, stable soils, low seismic risk, adequate drainage, and proximity to infrastructure make it favorable for sustainable development. With appropriate planning and implementation of environmental safeguards, the project can proceed without significant adverse impacts on the surrounding environment or community.



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7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 GENERAL

The importance of impact assessment in EIA cannot be overstated, as it serves as a fundamental tool for evaluating and understanding the potential effects of a project on the environment. Impact assessment systematically identifies, predicts, and evaluates the anticipated positive and negative consequences of a project, considering various environmental aspects such as air and water quality, biodiversity, soil health, and community well-being. This process is pivotal in informed decision-making, enabling stakeholders to assess the trade-offs and make choices that balance development with environmental conservation. The impact assessment phase provides a comprehensive understanding of the project's potential impacts, allowing for the development of effective mitigation measures and strategies to minimize or eliminate adverse effects. Additionally, it fosters transparency and accountability by providing a basis for public consultation and engagement, ensuring that the concerns and perspectives of affected communities are considered. Overall, impact assessment in EIA is essential for promoting sustainable development practices, preventing environmental degradation, and fostering responsible and informed decision-making in the planning and execution of projects.

7.2 PROJECT AREA OF INFLUENCE

The project area of influence refers to the geographical zone likely to be affected, directly or indirectly, by the

7.3 METHODOLOGY FOR IMPACT ASSESSMENT

The methodology for impact assessment was based on a systematic approach to identify, predict, and evaluate the potential environmental and social impacts of the project during its developmental and operational phases.

The assessment was carried out using both primary data and secondary data.

- Primary data collected through site visits, field observations, and stakeholder consultations.
- Secondary data obtained from relevant literature, government reports, and previous studies.

Each project activity was analyzed to determine its potential interaction with various environmental components such as air, water, soil, noise, ecology, and the socio-economic environment. Impacts were



categorized as positive or negative, direct or indirect, short-term or long-term, and their magnitude and significance were evaluated using qualitative and quantitative criteria. A baseline–impact comparison approach was adopted to assess changes from existing environmental conditions. The Environmental Impact Matrix method was used to relate project activities with potential environmental parameters. Mitigation measures were opted to avoid, minimize, or offset adverse impacts. This methodology ensured that all potential effects were identified and addressed systematically, promoting sustainable development and environmental protection throughout the project’s lifecycle.

7.4 IMPACTS DURING DEVELOPMENTAL PHASE

The detailed risk Matrix of developmental phase is shown in the table.

		Impact →				
		Negligible	Minor	Moderate	Significant	Severe
Likelihood ↑	Very Likely	Low Med	Medium	Med Hi	High	High
	Likely	Low	Low Med	Medium	Med Hi	High
	Possible	Low	Low Med	Medium	Med Hi	Med Hi
	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
	Very Unlikely	Low	Low	Low Med	Medium	Medium

Figure 7-1 Risk Assessment Matrix

Table 7-1 Screening of Possible impacts during Developmental Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Soil Erosion due to excavation and leveling works	Likely	Minor	Low-Medium

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Land Contamination from improper disposal of construction materials	Likely	Minor	Low-Medium
Soil Contamination from oil or fuel leakage from machinery	Likely	Minor	Low-Medium
Solid Waste generation from construction debris and packaging materials	Possible	Moderate	Moderate
Contractor Camp waste and sanitation issues	Likely	Minor	Low-Medium
Dust emissions from excavation, vehicle movement, and material handling	Likely	Minor	Low-Medium
Noise from construction machinery and transport vehicles	Likely	Minor	Low-Medium
Workers' Health and Safety Risks	Likely	Major	Significant

7.4.1 Soil Contamination

During the developmental phase, soil contamination can occur due to the leakage and spillage of oils, fuels, and lubricants from construction machinery, generators, and vehicles. Improper disposal of construction

debris, cement residues, paints, and chemicals may also lead to localized soil pollution. Wastewater discharge and poor sanitation practices at labor camps can further deteriorate soil quality and pose potential risks to nearby land and groundwater.

Mitigation Measures

- ☞ Carry out regular maintenance of construction machinery and vehicles to prevent fuel and oil leaks.
- ☞ Designate a specific fueling and maintenance area with an impermeable surface and oil collection trays.
- ☞ Store oils, lubricants, and other hazardous materials in sealed, clearly labeled containers under covered areas.
- ☞ Collect and dispose of all used oils, filters, and chemical containers through licensed waste contractors.
- ☞ Avoid washing of machinery or vehicles directly on soil surfaces.
- ☞ Prohibit dumping of construction debris or waste materials on bare ground; dispose of them only at approved disposal sites.
- ☞ Provide adequate sanitation facilities for workers to prevent open defecation or wastewater discharge onto soil.
- ☞ Conduct regular site inspections to identify and promptly clean up any spills or leaks.

7.4.2 Land Contamination

During the developmental phase of the housing scheme, land contamination may result from improper disposal of construction materials such as concrete, asphalt, metal scraps, packaging materials, and excavated soil. Uncontrolled dumping of solid waste from construction sites and labor camps can cause visual degradation, block drainage channels, and attract pests. In addition, accidental spillage of fuels, lubricants, or chemicals can degrade land quality and reduce its suitability for landscaping or future development.

Mitigation Measures

- ☞ Establish designated waste collection and storage areas with clear segregation of recyclable and non-recyclable materials.
- ☞ Ensure that all construction and domestic waste is transported to the approved municipal disposal sites.

- ☞ Prohibit open dumping and burning of solid waste at or near the project site.
- ☞ Reuse excavated material for backfilling and leveling wherever possible to minimize waste generation.
- ☞ Store construction materials such as cement, paints, and chemicals on paved surfaces and under proper cover to prevent leakage onto the ground.
- ☞ Maintain oil spill kits at machinery and fueling areas for immediate cleanup in case of accidental spillage.
- ☞ Conduct regular housekeeping and inspection of the site to ensure cleanliness and compliance with waste management practices.
- ☞ Train construction workers and contractors on proper waste handling and environmentally responsible practices.

7.4.3 Soil Erosion

During the development phase, soil erosion may occur due to excavation, land leveling, trenching for installation of utility lines (gas, water, sewerage, and electricity), and construction of roads and drainage channels. The removal of topsoil and vegetation cover exposes the soil to wind and water erosion, which can lead to sedimentation in nearby drains, reduced soil fertility, and dust generation affecting nearby residents and vegetation.

Mitigation Measures

- ☞ Minimize the area of exposed soil by scheduling excavation and grading activities in phases.
- ☞ Reuse excavated soil for backfilling and site leveling to reduce erosion and waste.
- ☞ Stabilize cleared areas immediately after construction using vegetation, grass cover, or stone pitching.
- ☞ Avoid excavation activities during heavy rains to prevent runoff and soil loss.
- ☞ Install temporary drainage channels and silt traps to control surface runoff.
- ☞ Water the exposed surfaces and haul roads regularly to reduce dust emissions.
- ☞ Store topsoil separately and reuse it for landscaping and greenbelt development after construction.

7.4.4 Impacts of Dust Emissions

During the developmental phase, significant dust emissions may be generated from excavation, land leveling, movement of heavy vehicles, transportation of construction materials, and operation of machinery.



Stockpiling of sand, gravel, and soil in open areas can further contribute to windblown dust. These emissions can temporarily reduce ambient air quality, cause respiratory discomfort to workers and nearby residents, and settle on nearby vegetation, affecting plant growth and aesthetics.

Mitigation Measures

- ☞ Sprinkle water regularly on exposed soil surfaces, access roads, and material stockpiles, especially during dry and windy conditions.
- ☞ Cover all vehicles transporting construction materials such as sand and soil to prevent dust dispersion.
- ☞ Limit the speed of construction vehicles and machinery within the site to minimize dust generation.
- ☞ Store fine materials such as cement, sand, and aggregates in covered or enclosed areas.
- ☞ Avoid excessive excavation and earthwork activities during high wind conditions.
- ☞ Use ready-mix concrete instead of on-site mixing where possible to reduce dust.
- ☞ Establish green barriers or tree belts along the site boundary to help trap airborne dust particles.
- ☞ Provide dust masks or respirators to workers involved in dusty activities.
- ☞ Ensure that construction equipment and vehicles comply with NEQS for air emission

7.4.5 Impact of Noise

During the developmental phase, noise will be generated from the operation of heavy machinery, vehicles, concrete mixers, compactors, and other construction equipment. Continuous movement of trucks for material delivery and excavation activities may increase ambient noise levels around the project area. Prolonged exposure to high noise levels can cause hearing discomfort and stress among workers, disturb nearby residents, and temporarily affect local fauna.

Mitigation Measures

Following measures should be adopted to minimize the noise levels;

- ☞ Ensure all construction machinery and vehicles are fitted with efficient silencers and regularly maintained to minimize noise emissions.
- ☞ Restrict noisy construction activities to daytime hours only (preferably between 8:00 a.m. and 6:00 p.m.).

- ⌘ Provide workers with appropriate Personal Protective Equipment (PPE), such as earplugs or earmuffs.
- ⌘ Avoid simultaneous operation of multiple high-noise equipment in the same area where possible.
- ⌘ Install temporary noise barriers or acoustic screens around high-noise machinery, generators, or along site boundaries near residential areas.
- ⌘ Establish a complaint redressal mechanism to address any noise-related grievances from nearby residents.
- ⌘ Regularly monitor noise levels at the site boundary to ensure compliance with NEQS for ambient noise.
- ⌘ Ensure construction vehicles follow designated routes to minimize disturbance to sensitive receptors such as schools, hospitals, and residential areas.

7.4.6 Impact of Solid Waste and Sewerage Generation

During the developmental phase, solid waste will be generated from construction activities such as excavation, concreting, plumbing, wiring, packaging, and workers' camps. The waste may include soil, concrete debris, metal scraps, plastics, and other non-biodegradable materials. In addition, the presence of a labor workforce on-site will generate domestic waste and sewage. Improper handling and disposal of these wastes can lead to land contamination, blockage of drains, odor nuisance, and the spread of diseases. If not managed properly, wastewater from temporary labor camps can infiltrate the soil or contaminate nearby surface water bodies.

Mitigation Measures

- ⌘ Segregate solid waste at the source into recyclable (metal, plastic) and non-recyclable fractions.
- ⌘ Reuse excavated soil and construction debris for backfilling and leveling wherever feasible.
- ⌘ Dispose of non-recyclable construction waste only at approved disposal sites designated by the local authority.
- ⌘ Prohibit open dumping and burning of waste on or near the construction site.
- ⌘ Provide sufficient covered waste bins at the construction and labor camp areas.
- ⌘ Arrange regular waste collection and transportation through authorized municipal contractors.
- ⌘ Install temporary sanitary facilities (toilets and soak pits) for workers to manage domestic sewage safely.
- ⌘ Ensure that sewage and wastewater from labor camps are not discharged on open land and are properly disposed of through septic tanks or municipal drainage.

- ☞ Conduct environmental awareness sessions for workers on maintaining hygiene and waste segregation.
- ☞ Designate a site supervisor responsible for daily inspection and recordkeeping of waste handling and disposal.

7.5 IMPACTS DURING OPERATIONAL PHASE

The detailed risk Matrix of operational phase is shown in the table.

Table 7-2 Screening of possible impacts during operational phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Air Quality (dust from landscaping, vehicle movement, generator emissions)	Likely	Minor	Low
Noise (standby generators, traffic, community activities)	Likely	Minor	Low
Water Quality (domestic wastewater, runoff from landscaping)	Likely	Moderate	Medium
Soil Quality (domestic wastewater seepage, improper solid waste disposal)	Likely	Minor	Low
Safety Hazard (slips, trips, falls, electrical)	Likely	Moderate	Medium

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
hazards, traffic in the community)			
Public Health (vector-borne diseases from improperly managed wastewater or solid waste)	unlikely	Major	Medium

7.5.1 Air pollution

- ☞ Emissions from standby generators used during power outages, including smoke, CO, and particulate matter.
- ☞ Dust from internal roads, landscaping activities, and occasional vehicular traffic within the housing scheme.
- ☞ Odors or particulate matter from improperly managed solid waste or treated wastewater discharge points.
- ☞ Localized reduction in ambient air quality affecting residents and green spaces if preventive measures are not implemented

Mitigation Measures

- ☞ Maintain standby generators and maintenance vehicles regularly to minimize exhaust emissions.
- ☞ Ensure all emissions comply with PEQS ambient air quality standards.
- ☞ Implement green belts and tree plantations along roads, parks, and site boundaries to act as natural air filters and reduce dust dispersion.
- ☞ Conduct periodic air quality monitoring at sensitive points such as residential plots, playgrounds, and near wastewater discharge areas.

- ☞ Promote good housekeeping and proper waste management to prevent dust, odors, and particulate emissions from solid waste and wastewater.
- ☞ Educate residents on best practices for minimizing air pollution, such as proper storage of fuels and reduced idling of vehicles.

7.5.2 Water pollution

- ☞ Discharge of domestic wastewater from residential units, including kitchen, bathroom, and laundry effluent.
- ☞ Contamination of surface water or groundwater due to leaks from septic tanks, sewer lines, or untreated wastewater.
- ☞ Runoff from landscaping and green areas, potentially carrying fertilizers, pesticides, or sediments into drainage systems.
- ☞ Potential contamination from improperly managed solid waste, which can leach into drains or soak into the soil

Mitigation Measures

- ☞ Install a wastewater treatment plant (WWTP) or ensure connection to municipal sewerage systems to treat all domestic wastewater to PEQS standards before discharge.
- ☞ Conduct regular maintenance and inspection of septic tanks, sewer lines, and drainage networks to prevent leaks and blockages.
- ☞ Use treated wastewater for irrigation of parks, green belts, and landscaping areas to reduce freshwater demand.
- ☞ Prevent solid waste and chemicals from entering drainage channels by ensuring proper waste collection and disposal.
- ☞ Conduct periodic water quality monitoring at key points (WWTP outlet, main drains, and water supply points) to ensure compliance with standards.
- ☞ Promote resident awareness programs on proper use and disposal of household chemicals, detergents, and oils.

7.5.3 Soil contamination

- ☞ Leakage or spillage of fuels, lubricants, and oils from standby generators, maintenance vehicles, and landscaping equipment.
- ☞ Improper disposal of solid waste, garden chemicals, or construction debris can degrade soil quality.
- ☞ Accidental discharge of untreated or partially treated wastewater from household septic systems or the wastewater treatment plant

Mitigation Measures

- ☞ Conduct regular maintenance and inspections of generators, vehicles, and equipment to prevent leaks or spills.
- ☞ Store fuels, oils, and chemicals in sealed containers and designated areas with impermeable flooring.
- ☞ Dispose of solid waste and hazardous materials through authorized municipal or licensed contractors.
- ☞ Prevent wastewater leakage by maintaining septic systems and sewer lines, and ensuring the WWTP operates efficiently.
- ☞ Use treated wastewater for irrigation only after confirming it meets PEQS discharge standards.
- ☞ Educate residents on safe handling and disposal of household chemicals and garden fertilizers.
- ☞ Implement spill response protocols and maintain spill kits for immediate cleanup in case of accidents.
- ☞ Periodically monitor soil quality in landscaped areas and near wastewater discharge points.

7.5.4 Noise pollution

- ☞ Noise generated from standby generators, maintenance vehicles, and landscaping equipment.
- ☞ Increased noise from resident vehicles and occasional construction or repair activities within the housing scheme.
- ☞ Disturbance to residents, nearby communities, and local wildlife due to elevated noise levels.

Mitigation Measures

- ☞ Ensure all standby generators and vehicles are well-maintained and equipped with mufflers or silencers to reduce noise emissions.



- ⌘ Operate generators only during power outages and limit unnecessary use of high-noise equipment.
- ⌘ Schedule maintenance and landscaping activities during daytime hours to minimize disturbance.
- ⌘ Establish green belts, tree plantations, and buffer zones around high-noise areas to absorb and reduce noise propagation.
- ⌘ Monitor noise levels periodically at sensitive locations such as residential plots, playgrounds, and near generators to ensure compliance with PEQS standards.
- ⌘ Educate residents on minimizing noise from vehicles, outdoor activities, and community events

7.5.5 Safety Hazard

- ⌘ Risks of slips, trips, and falls in common areas, roads, sidewalks, and landscaped areas.
- ⌘ Electrical hazards from faulty wiring, exposed cables, or malfunctioning standby generators.
- ⌘ Accidents from vehicular traffic within the housing scheme, including roads and parking areas.
- ⌘ Health and safety risks associated with improper handling of household chemicals, solid waste, or landscaping equipment.

Mitigation Measures

- ⌘ Ensure proper lighting in all roads, sidewalks, parking areas, and common areas to prevent slips and falls.
- ⌘ Implement traffic management measures, such as speed limits, clear signage, and designated pedestrian paths within the community.
- ⌘ Educate residents on safe handling of household chemicals, cleaning agents, and gardening tools.
- ⌘ Provide fire extinguishers, first aid kits, and emergency response procedures at strategic locations.
- ⌘ Conduct periodic safety audits and drills to assess and improve safety practices.
- ⌘ Ensure waste is collected and disposed of promptly, preventing tripping hazards or health risks from decaying waste.
- ⌘ Designate a safety officer or management team responsible for monitoring safety compliance and responding to incidents.

7.6 POTENTIAL ENVIRONMENTAL ENHANCEMENT PROCEDURES

Numerous potential measures have been proposed to enhance the overall sustainability and well-being of the residential area. The introduction of a package waste treatment plant signifies a commitment to

responsible waste management, addressing concerns related to the disposal of household waste. Additionally, the inclusion of tree plantation initiatives not only adds to the visual appeal of the community but also contributes to environmental health by mitigating air pollution and fostering biodiversity. The proposal for parks serves as a key element in promoting recreational spaces and building a sense of community. Furthermore, a comprehensive solid waste management plan underscores the importance of systematic waste disposal, reducing the environmental impact of accumulated waste. Collectively, these measures reflect a holistic approach to creating a sustainable and eco-friendly residential environment, emphasizing the importance of environmental stewardship and community engagement.

7.6.1 PACKAGE WASTEWATER TREATMENT PLANT SPECIFICATIONS

The M/s New Al-Noor City has allocated a space of **12 Marla** for the installation of Wastewater Treatment Plant. The housing scheme will be served by a pre-manufactured package wastewater treatment plant designed to treat an average daily flow of 200 m³/day, accommodating wastewater generated from both residential and commercial areas. Package plants are ideal for small communities and individual developments, offering compact, pre-engineered, and efficient wastewater treatment solutions. The plant has been designed to ensure effective removal of solids, organic matter, and pollutants, producing treated effluent that meets national discharge standards and supports environmental protection within the scheme.

7.6.1.1 Inlet Bar Screen

At the influent port, a bar screen will intercept unusually large solids to prevent damage and clogging within downstream treatment units. The bar screen will consist of 1/2" diameter bars spaced 1" apart, sloped to facilitate cleaning of accumulated debris. A drying deck will allow collected solids to dewater, and all surfaces will be coated to match the protective specifications of the plant.

7.6.1.2 Flow Equalization Chamber

A flow equalization chamber will buffer flow variations, handling 25% to 100% of the daily design flow, thereby maintaining consistent hydraulic loading to subsequent treatment stages. This chamber has a diameter of 10'-0" and ensures that peak inflows during high-usage periods do not compromise treatment efficiency.

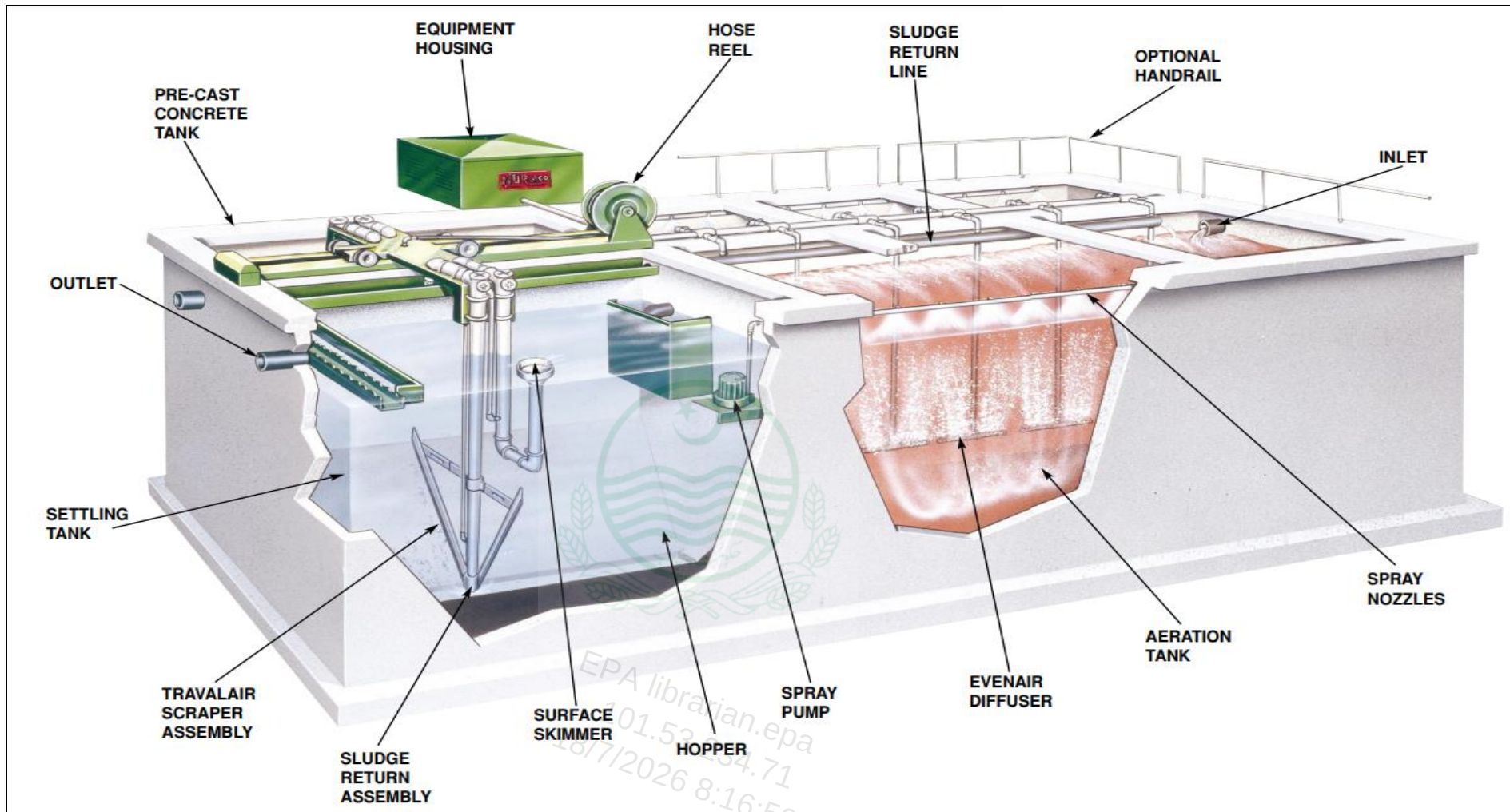


Figure 7-2 Wastewater Treatment Plant

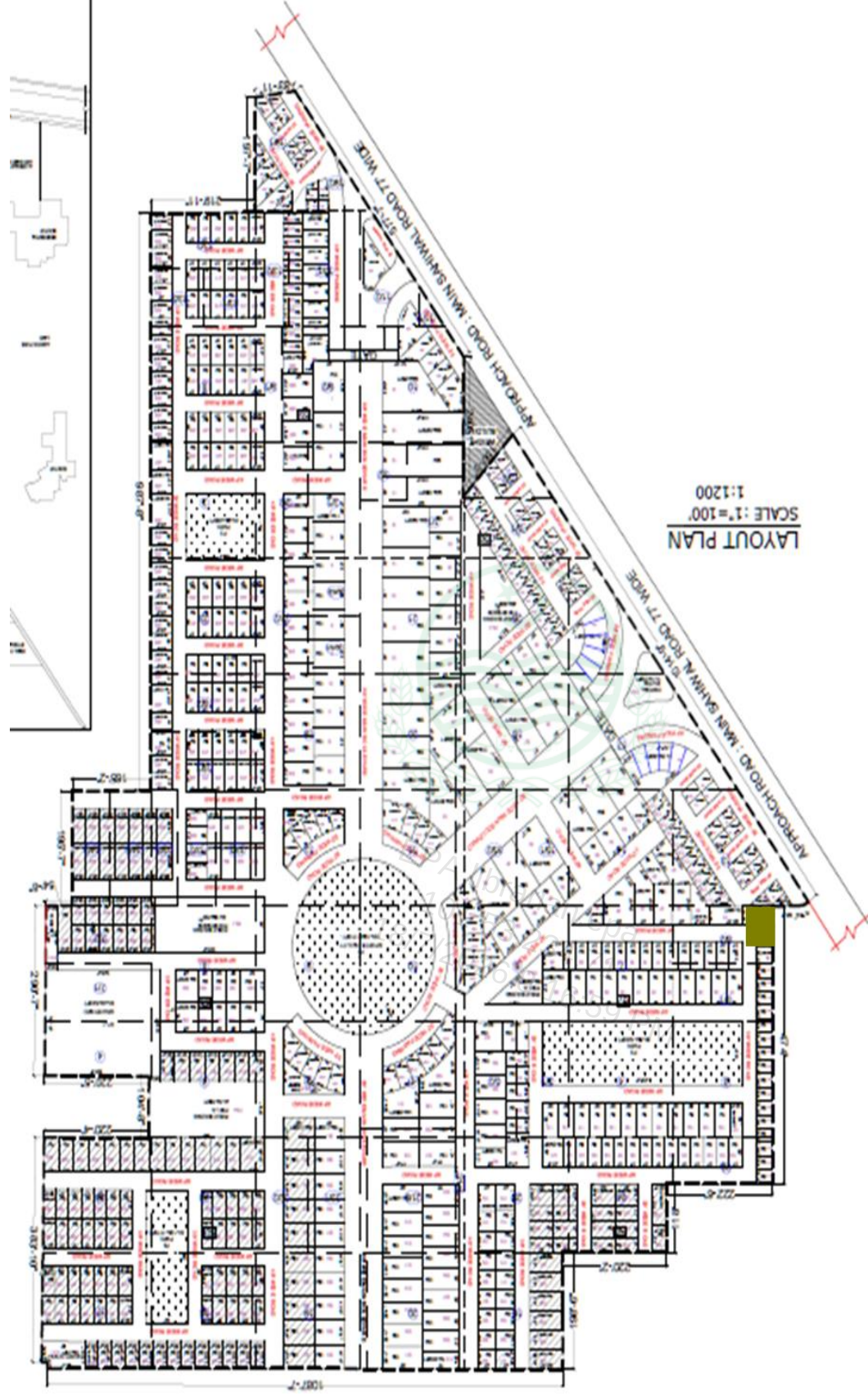


Figure 7-3 Location of WWTP

7.6.1.3 Sludge Holding Chamber

The aerated sludge holding chamber is sized based on 3 cubic feet per capita, accommodating sludge accumulation from the population served. Diffused air will be provided at 30 CFM per 1,000 cubic feet of tank volume, ensuring aerobic conditions and preventing anaerobic odor generation. Piping, valves, and a fixed supernatant decant pipe are pre-installed within the chamber for operational efficiency. The chamber diameter is 2'-0".

7.6.1.4 Aeration Chamber

The aeration chamber is the core biological treatment unit, providing minimum 24-hour hydraulic retention for the average daily flow. It is designed to maintain a maximum loading of 15 pounds of BOD5 per 1,000 cubic feet of aeration tank volume, ensuring sufficient removal of organic matter. The chamber includes longitudinal air diffusers, top and bottom fillets, and flow control baffles to promote uniform circulation, prevent short-circuiting, and maximize oxygen transfer efficiency. Its diameter is 11'-9", and the width-to-depth ratio is maintained below 1.33:1 to optimize flow velocity and prevent sludge settling at the tank bottom.

7.6.1.5 Clarifier Chamber

Following aeration, the clarifier chamber provides minimum 4-hour retention, allowing solids to settle and clear effluent to exit the system. Proper baffling ensures uniform flow distribution and prevents short-circuiting. The clarifier chamber has a diameter of 6'-0".

7.6.1.6 Air Diffusion System

An air distribution manifold constructed of rectangular hollow steel tubing will run longitudinally along the side of the plant. Each diffuser assembly includes air regulation and shut-off valves, a disconnecting union, and diffuser bars with air nozzles mounted near the base of the chamber. This system ensures optimal oxygenation, mixing, and biological treatment efficiency throughout the aeration and sludge holding chambers.

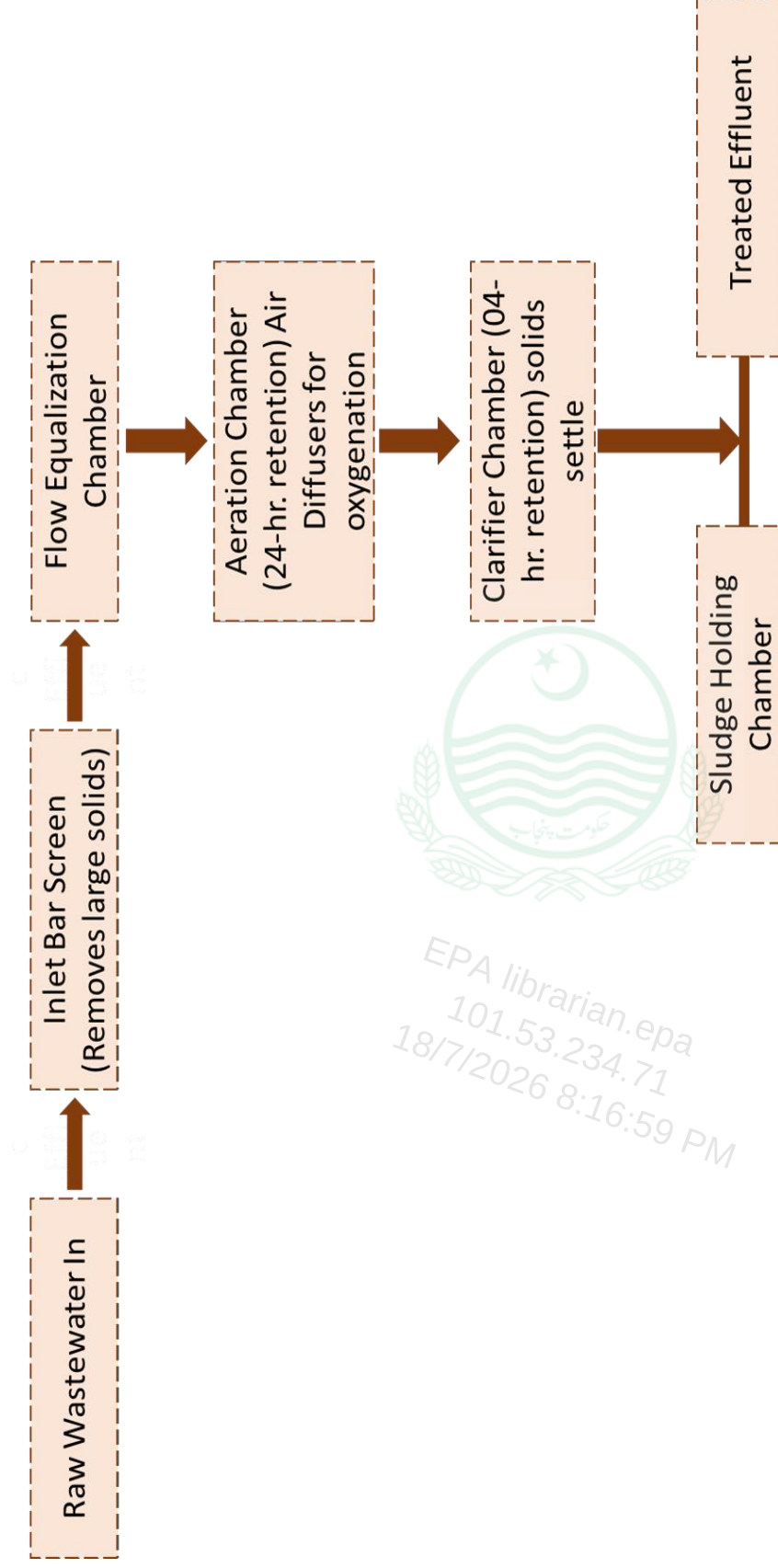


Figure 7-4Flow Diagram of Wastewater Treatment Plant

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

An Environmental Management and Monitoring Program (EMMP) is a crucial component of an EIA because it serves as a systematic framework to ensure the effective implementation of mitigation measures and compliance with environmental regulations. The EIA process identifies potential environmental impacts of a proposed project, and the EMMP is designed to address and manage these impacts throughout the project's lifecycle. By establishing a comprehensive monitoring program, authorities can track the environmental performance of the project in real-time, allowing for timely identification and response to any unforeseen adverse effects. Additionally, the EMMP provides a mechanism for ongoing evaluation and adjustment of mitigation measures, contributing to adaptive management strategies. This proactive approach enhances environmental sustainability, helps prevent or minimize negative impacts, and fosters continuous improvement in environmental performance, thereby promoting responsible and sustainable development practices.

8.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of an Environmental Management Plan (EMP) generally revolve around the following key goals:

- ☞ To ensure compliance with national and provincial environmental regulations, including the Pakistan Environmental Protection Act and relevant PEQs.
- ☞ To minimize adverse environmental impacts arising during the operation of the housing scheme, such as water pollution, noise, waste generation, and traffic movement.
- ☞ To provide a structured framework for environmental monitoring, reporting, and performance evaluation throughout the project's operational life.
- ☞ To protect the health, safety, and well-being of residents, workers, and surrounding communities through effective environmental and safety management.
- ☞ To promote sustainable resource use, including efficient water consumption, energy use, and proper waste handling.
- ☞ To ensure proper functioning of environmental infrastructure, such as sewerage systems, solid waste management systems, drainage networks, and green belts.
- ☞ To enhance the aesthetic and ecological value of the project site through landscaping, green areas, and pollution prevention practices.

- ☞ To define clear roles and responsibilities for the proponent, environmental manager, and relevant authorities for effective implementation of mitigation measures.

8.2 INSTITUTIONAL CAPACITY

In the proposed monitoring and evaluation framework, the Project Proponent assumes a central role in overseeing the environmental aspects of the project. The Project Proponent will be responsible for the overarching Monitoring and Evaluation (M&E) process. This includes integrating environmental considerations into the main monthly reports of the project, emphasizing a holistic approach to project reporting.

To ensure a detailed and on-the-ground assessment of EMP implementation, the Project Proponent designates the Environment Consultant, who is part of the proponent's team. This consultant will be actively involved in field monitoring, observing the day-to-day activities related to environmental management, and reporting findings to the Project Proponent. This approach ensures a real-time understanding of the project's environmental performance.

For a comprehensive evaluation at the conclusion of the project, an Environment Specialist from the Supervision Consultant will conduct a final assessment. This specialist will review the overall effectiveness of the EMP throughout the project's lifecycle, providing valuable insights into the long-term impact and sustainability of environmental management measures.

Recognizing the importance of external validation, the Project Proponent commits to engaging an independent agency for 3rd party validation of EMP implementation. This external entity, whether an NGO, an academic institute, or an individual consultant, will provide an unbiased and objective evaluation, adding credibility to the environmental performance assessment.

At the district level, the District Office of the Environmental Protection and Climate Change Department (EPA) will play a crucial role in monitoring the overall activity at the project site. This involvement ensures that the project aligns with regional environmental regulations and standards. The district-level monitoring adds an extra layer of oversight, promoting accountability and adherence to local environmental guidelines.

In summary, the proposed framework establishes a multi-tiered approach to environmental monitoring and evaluation. It leverages internal expertise, engages external validation for impartial assessments, involves EPA offices for regulatory compliance, and integrates findings into regular project reporting. This

comprehensive strategy aims to ensure the effective implementation of the EMP, fostering environmental sustainability throughout the project's lifecycle.

8.3 SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP will be implemented throughout the operational phase of the housing scheme to ensure that all environmental mitigation and monitoring measures are effectively carried out. The schedule for EMP implementation is outlined below:

☞ Developmental Phase

1. Appointment of Environmental Manager / HSE Officer.
2. Completion of landscaping and greenbelt development.
3. Installation and testing of sewerage network, STP (if applicable), and stormwater drainage.
4. Provision of solid waste collection points and bins.
5. Installation of signboards for safety, speed limits, and designated waste areas.
6. Baseline environmental monitoring (air, water, noise).

☞ Operational Phase (Continuous / Regular Activities)

The following EMP components will be implemented throughout the operational life of the housing scheme:

A. Air Quality Management

1. Water sprinkling on internal roads (monthly or as needed).
2. Maintenance of generators and vehicles (quarterly).

B. Water Pollution Control

1. Regular inspection of sewerage lines (monthly).
2. Proper functioning of drainage system (continuous).
3. Maintenance of STP or septic tanks (quarterly / bi-annual).

C. Solid Waste Management

1. Daily collection of solid waste.
2. Transportation to municipal disposal site (daily).
3. Awareness campaigns for residents (quarterly).

D. Noise Management

1. Maintenance of DG sets and pumps (quarterly).
2. Ensuring compliance with noise limits (monthly monitoring).

E. Soil Protection



1. Proper handling of oils, lubricants, and chemicals (continuous).
2. Immediate cleanup of spills (as needed).

F. Health and Safety

1. Emergency response drills (annually).
2. Inspection of electrical systems and earthing (quarterly).
3. First aid availability and fire extinguisher inspection (monthly).

☞ **Environmental Monitoring Schedule**

1. Air, Noise, Water Quality Monitoring: Twice a year or as per EPA requirements.
2. Internal inspections: Monthly by Environmental Manager.
3. Annual Environmental Report: Submitted to EPA.

☞ **Review and Corrective Actions**

1. Annual review of EMP effectiveness.
2. Updating EMP based on monitoring results and EPA feedback (annually or as required).

8.4 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP outlines the measures required to prevent, minimize, and control the potential environmental impacts associated with the project. The EMP is divided into two key phases:

☞ **Developmental Phase**

☞ **Operational Phase**

8.4.1 Developmental Phase

During the developmental phase of the housing scheme, the EMP focuses on managing all construction-related activities to avoid adverse environmental impacts. This includes land preparation, excavation, installation of utilities, and infrastructure development.

The scope of the EMP for this phase includes:

☞ **Site Preparation and Land Clearing**

1. Management of vegetation removal and topsoil conservation.
2. Prevention of unnecessary land disturbance.

☞ **Earthwork and Excavation**

1. Control of soil erosion and sedimentation.
2. Safe handling and disposal of excavated materials.



☼ **Installation of Utilities**

1. Environmental measures during laying of water supply pipelines, sewerage lines, gas pipelines, and electrical cables.
2. Protection of soil and water from contamination during utility installation.

☼ **Construction of Roads and Internal Infrastructure**

1. Dust control during road construction.
2. Noise management from construction equipment.
3. Safe movement of construction vehicles.

☼ **Construction Material Handling**

1. Proper storage, transport, and use of construction materials (cement, sand, aggregate, steel).
2. Prevention of spills, scattering, or contamination from materials.

☼ **Construction Waste and Solid Waste Management**

1. Identification, collection, and disposal of construction debris.
2. Placement of designated waste storage areas.

☼ **Air and Noise Pollution Control**

1. Measures to reduce dust emissions from excavation and transportation.
2. Ensuring machinery complies with noise standards.

☼ **Worker Health and Safety**

1. PPE provision, safety supervision.
2. Ensuring safe excavation, confined space works, and electrical safety.

☼ **Community Safety and Traffic Management**

1. Traffic control measures around the project site.
2. Avoiding inconvenience to nearby residents and road users.

☼ **Environmental Monitoring**

1. Monitoring air quality, noise levels, and water quality as required during construction.
2. Documentation and reporting of environmental performance

8.4.2 Operational Phase

During the operational phase of the housing scheme, the EMP focuses on managing environmental impacts associated with the routine functioning of the residential area once the construction and development works are completed. The scope includes measures to maintain environmental quality, ensure community safety, and sustain infrastructure performance.



The scope of the EMP for this phase includes:

☞ **Water Supply and Wastewater Management**

1. Ensuring the quality of drinking water meets PEQS.
2. Monitoring the performance of the sewerage network and preventing leakage, blockages, or contamination of nearby soil and water bodies.

☞ **Solid Waste Management**

1. Implementation of a solid waste collection system for households.
2. Ensuring proper segregation, temporary storage, and timely disposal of municipal solid waste in accordance with local authority requirements.

☞ **Air Quality Management**

1. Control of emissions from backup generators, vehicular movement, and household activities.
2. Monitoring air pollutants to ensure compliance with PEQS.

☞ **Noise Management**

1. Monitoring and minimizing noise from generators, traffic movement, and community facilities (e.g., commercial areas).
2. Ensuring backup generators are installed with silencers and placed in acoustic enclosures.

☞ **Soil Quality Protection**

1. Prevention of soil contamination from household waste, wastewater leakage, oil spills from generators/vehicles, and improper chemical handling.
2. Ensuring proper landscaping and greenbelt maintenance to reduce soil erosion.

☞ **Energy and Resource Efficiency**

1. Promotion of energy-efficient appliances, LED lights, and responsible energy use.
2. Encouraging water conservation through awareness campaigns and water-efficient fixtures.

☞ **Safety and Emergency Preparedness**

1. Ensuring well-maintained earthing systems, electrical safety, and protection from fire hazards.
2. Availability of emergency response plans, fire extinguishers, and first-aid services.

☞ **Traffic and Community Management**

1. Maintaining safe road conditions and proper signage.
2. Ensuring smooth traffic flow within residential and commercial areas to avoid congestion.

☞ **Landscaping and Green Areas**

1. Regular maintenance of parks, plantations, and green belts.



2. Enhancing the aesthetic and environmental quality of the housing scheme.
- ☞ Environmental Monitoring and Reporting
1. Scheduled monitoring of air, water, soil, and noise as per PEQS.
 2. Maintaining records and reporting environmental performance to relevant authorities.

8.5 MITIGATION PLAN FOR CONSTRUCTION AND OPERATION PHASE



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Table 8-1 Environmental Management Plan (EMP) for Constructional Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
1	Site Clearing and Excavation – Soil Erosion Removal of vegetation and topsoil can lead to soil erosion. Loosened soil may be washed away during rainfall, affecting nearby land and drainage. Sediments may enter natural drains or low-	Restrict excavation to designated and approved areas only. Provide temporary drainage channels, silt fences, and sedimentation traps to control runoff. Stabilize exposed soil using temporary coverings or compaction. Avoid major earthwork activities during the monsoon season. Stockpile excavated soil away from drainage paths.	Contractor	Proponent and Contractor

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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Implementation	Monitoring	Responsibility
Developmental Phase					
	lying areas, causing siltation.				
2	Earthwork, Material Handling & Vehicle Movement – Dust Emissions Movement of construction vehicles and excavation activities generate dust. Dust may disturb nearby communities, workers, and reduce visibility on-site.	Regular water sprinkling on unpaved roads, excavation zones, and material stockpiles. Load-carrying trucks must be covered with tarpaulin. Maintain appropriate speed limits for vehicles to reduce dust. Install temporary barriers or sheets around high-dust areas. Provide dust masks to all workers.	Contractor		Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	Dust particles (PM ₁₀ , PM _{2.5}) may contribute to temporary air quality deterioration.			
3	Construction & Machinery Equipment Operation – Noise Pollution Operation of machinery like excavators, rollers, generators, and transport vehicles creates noise.	Use well-maintained and low-noise machinery. Restrict noisy operations to daytime hours. Install temporary noise barriers around high-noise equipment. Provide ear protection such as earplugs or earmuffs to workers. Regularly monitor noise levels to comply with PEQS.	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	High noise levels may affect workers and nearby communities. Continuous exposure may cause hearing discomfort or stress.			
4	Machinery Maintenance, Fuel Storage & Handling – Soil and Land Contamination Oil spills, fuel leakage, or improper disposal of lubricants can contaminate soil.	Refueling and maintenance activities must be done only in designated areas. Store oil/fuel drums on impervious flooring with containment trays. Ensure availability of spill-control kits at fuel storage locations. Train workers on safe handling of fuel and lubricants.	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	Hazardous substances may affect soil quality and pose environmental risks. Improper storage of chemicals/fuel may cause land contamination in case of spills.	Immediately clean any accidental spills using absorbent materials. 		
5	Construction Waste & Excavated Material - Solid Waste Generation Construction activities generate waste such	Establish a waste management plan for segregation, collection, and disposal. Reuse excavated material for backfilling where possible. Dispose of non-recyclable waste at approved municipal dumping sites.	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	as debris, packaging, scrap, and excess soil. Improper disposal may cause visual pollution, block drainage, or degrade land. Waste accumulation may attract pests or pose safety hazards.	Provide designated waste bins at all work zones. Prohibit open burning of waste on-site		
6	Labor Camps - Domestic Wastewater & Household Waste Workforce generates sewage, greywater,	Provide portable toilets or construct septic tanks for sewage disposal. Ensure all domestic wastewater is properly contained and disposed of.	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	and domestic solid waste. Improper disposal can contaminate soil and water, or create unhygienic conditions. Foul odor and vector breeding may occur.	Provide covered waste bins and ensure regular collection and disposal. Maintain cleanliness through daily housekeeping routines. Prohibit disposal of domestic waste in open areas.		
7	Installation of Utilities (Water, Sewerage, Electric, Gas Lines) – Water Quality Impacts Construction activities near drains may lead	Prevent construction materials from entering natural drainage channels. Ensure no sewage or wastewater is discharged untreated at any stage. Properly test and seal sewer lines before backfilling.	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Developmental Phase				
	to contamination if material enters water channels. Leakage from sewer line laying during testing may contaminate soil and nearby water bodies. Uncontrolled wastewater from curing or washing may pollute surrounding areas.	Use sedimentation pits to settle wastewater from construction activities. Store chemicals/materials away from water bodies		
8	Worker Activities, Machinery Operation	Provide mandatory PPE (helmets, gloves, high-visibility vests, and safety boots).	Contractor	Proponent and Contractor



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Implementation	Responsibility
Developmental Phase				
	& Traffic – Safety Hazards	Conduct tool-box talks and safety training regularly.		
	Risk of accidents, injuries due to machinery movement.	Display safety signage and ensure controlled site entry.		
	Falling objects, slips, or collisions may occur.	Maintain first-aid kits and trained staff on-site.		
	Electrocution risk from temporary power connections.	Follow safe electrical practices; ensure proper earthing of temporary supplies.		
	Fire hazard due to fuel handling	Develop an emergency response plan for accidents, fires, an		

Table 8-2 Environmental Management Plan (EMP) for Operational Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
1	Air Pollution Emissions from standby generators (CO, NOx, PM) can deteriorate ambient air quality. Increased vehicular movement within the housing scheme contributes to localized pollution. Dust may be generated from unpaved internal roads or open plots.	Ensure regular maintenance of generators and vehicles to reduce emissions. Install proper exhaust stacks and silencers on all standby generators. Develop and maintain green belts, parks, and roadside plantations to improve air quality. Pave internal roads and suppress dust in open vacant plots where necessary. Encourage residents to adopt environment-friendly practices (e.g., carpooling, efficient vehicles).	EHS Officer	Proponent/EHS Officer

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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
2	Water Pollution Domestic wastewater from houses may contaminate the environment if the sewerage system is not properly maintained. Leakage or blockage in sewer lines may cause wastewater overflow, creating odor and hygiene issues.	Maintain an efficient sewerage network with regular inspections and desilting. Ensure wastewater is properly treated and meets PEQS before final disposal. Prevent connection of stormwater drains to sewerage lines. Conduct periodic water quality monitoring. Educate residents on responsible water use and proper disposal of household chemicals.	EHS Officer	Proponent/EHS Officer
3	Soil Contamination	Provide adequate waste bins and ensure daily collection and disposal at approved municipal sites.	EHS Officer	Proponent/ EHS Officer



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
	Improper disposal of solid waste may contaminate soil. Leakage from sewer lines may saturate and pollute the surrounding soil. Oil drips from generators or maintenance activities can impact soil quality.	Immediately repair any sewer line leakage or overflow. Maintain generator areas properly to prevent oil leakage; use drip trays and spill kits. Prohibit dumping of household waste or construction waste in open plot		
4	Noise Pollution Standby generators produce continuous noise	Install acoustic enclosures or soundproof housing around generators. Maintain greenery and plantation buffers to reduce noise propagation.	EHS Officer	Proponent/ EHS Officer



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
	affecting nearby residents. Vehicular movement, commercial activities, and community events may increase noise levels. Maintenance works and repair activities may cause short-term noise annoyance.	Restrict loud community activities and generator operation during night hours. Ensure compliance with PEQS for noise through periodic monitoring		
5	Safety Hazards Risk of electric shock if earthing systems, wiring,	Ensure proper earthing and routine inspection of electrical systems in community areas. Install fire extinguishers, emergency signage, and functional hydrants in common areas.	EHS Officer	Proponent/ EHS Officer



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Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
	or panels are not maintained. Fire hazards due to electrical faults Traffic-related safety hazards for residents, especially children and elderly. Slip, trip, and fall hazards in common areas.	Implement traffic safety measures such as speed breakers, signage, and designated pedestrian paths. Maintain well-lit streets and common areas to prevent accidents. Conduct awareness campaigns on home safety and emergency preparedness.		



8.6 ENVIRONMENTAL MANAGEMENT TEAM ALONG WITH THEIR ROLES AND RESPONSIBILITIES

The project proponent bears the responsibility for overseeing all the project activities. To cater to the varying requirements during operational phase, the proponent will hire personnel specifically dedicated to environmental management at the project site. This step is crucial to ensure the effective implementation and operations of the EMP.

Assigning the responsibilities to designated individuals is paramount to uphold accountability in the event of any oversight or mishap. Each appointed person will have specific duties outlined within the EMP. These responsibilities will be tailored to their roles, ensuring they are accountable for the successful execution of environmental protocols and procedures.

By delineating and assigning these responsibilities to individuals, the project proponent establishes a framework where each person understands their role and obligation within the broader context of environmental management. This structuring allows for a more efficient response to any environmental issue. This approach aims to create a clear chain of accountability, ensuring that the implementation of EMP is conducted diligently and that there are identifiable points of contact for any concerns or queries related to environmental management during the project's operational phase.

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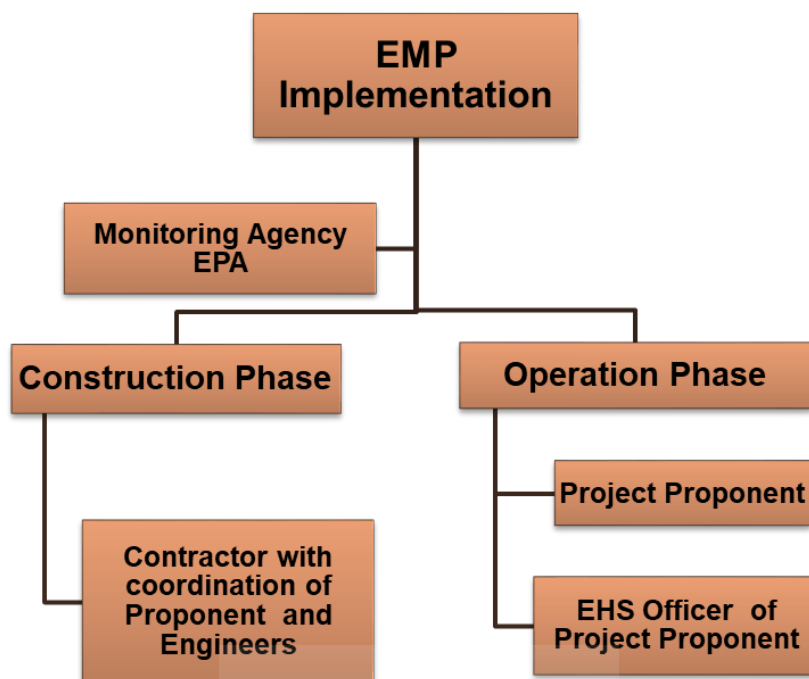


Figure 8-1 Organogram for implementation Environmental Management Plan (EMP)

8.7 ENVIRONMENTAL MONITORING PROGRAM

The Environmental Monitoring Program is an essential component of the EMP and ensures that all mitigation measures are effectively implemented during both the Developmental Phase and Operational Phase of the housing scheme. The monitoring program helps in identifying deviations from environmental standards and allows timely corrective actions.

The monitoring activities include regular inspection, measurement of environmental parameters, documentation, and reporting to the proponent and relevant authorities.

The objectives of the Environmental Monitoring Plan are given below;

- ✓ Detecting environmental changes to prevent and minimize potential negative impacts on the environment.
- ✓ Ensuring compliance with environmental laws, permits, and regulations by regular monitoring and reporting environmental parameters. This helps in meeting legal requirements and avoiding penalties or sanction.

- ✓ Assessing and managing potential risks to the environment caused by human activities. This involves evaluating the impact of these risks and implementing strategies to mitigate or manage them effectively.
- ✓ Monitoring and managing the use of natural resources such as water, air, soil, and biodiversity. The goal is to conserve these resources and maintain ecological balance.
- ✓ Assessing the impact of specific actions, projects, or processes on the environment to understand their consequences and make informed decisions regarding future actions.
- ✓ Using collected data to improve environmental performance, refine strategies, and adapt measures to achieve better outcomes over time.
- ✓ Establishing protocols and responses for emergencies or unexpected environmental incidents, ensuring a rapid and effective reaction to minimize damage.

Table 8-3 Monitoring Parameters

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
A. Development phase				
1.	Noise	Construction vehicles, machinery, generators, welding work	Noise meter	Noise levels of construction vehicles, machinery, and generators will be measured regularly by the contractor. Ear protection for workers will be enforced.
2.	Air Emissions	Construction vehicle/ machinery/ generators	Ambient particulate matter monitoring (PM ₁₀ , PM _{2.5}), smoke inspections	Smoke emissions from vehicles and machinery will be checked regularly to ensure compliance with PEQS. Water sprinkling will be used to control dust.

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
3	Water Quality	Labor camps, construction site water supply	pH, turbidity, TDS, microbial testing	Drinking water at camps and site supply will be checked quarterly to ensure safety and compliance with PEQS.
4	Wastewater	Labor camps, construction site sewage points	BOD, COD, pH, TSS	Wastewater from labor camps and construction activities will be treated and monitored quarterly to prevent environmental contamination.
5	Solid Waste	Construction site, labor camps	Visual inspection, record checking	Segregation, storage, and disposal of construction waste will be ensured. Contractor will maintain logs and dispose at approved sites
6	Soil Quality	Fuel storage, machinery maintenance areas	Visual inspection, contamination check	Areas will be monitored weekly for oil spills, leaks, or contamination. Immediate cleanup will be done if detected
7	Worker Safety	Entire construction site	Safety inspection checklist	PPE usage, signage, and safety compliance will be monitored daily.
B. Operation phase				
1.	Air Emissions	Generator rooms, vehicular areas, community areas	Ambient air monitoring for PM, CO, NOx, SOx	Monitoring will be carried out quarterly to ensure emissions comply with PEQS. Regular maintenance of

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
				generators and vehicles will be ensured.
2.	Water Quality	Main water supply, drinking water points	pH, TDS, microbial testing	Water quality will be checked monthly to ensure compliance with PEQS.
3.	Wastewater	Main sewerage discharge points	BOD, COD, pH, TSS	Monthly monitoring of wastewater will ensure proper treatment and safe disposal.
4	Solid Waste	Residential and commercial areas	Visual inspection, disposal record checks	Weekly inspection to ensure segregation, collection, and disposal at approved municipal sites.
5	Noise	Generator rooms, traffic areas, community spaces	Noise meter	Noise monitoring will be conducted quarterly; acoustic enclosures and buffer plantations will be maintained.
6	Safety Hazards	Electrical installations, community areas, roads	Safety inspection checklist	Monthly inspection for electrical safety, fire safety, traffic flow, and emergency preparedness.

8.8 ENVIRONMENTAL BUDGET

Table 8-4 Environmental Budget

Environmental Component	Amount Million PKR	Details	Remarks
A. Environmental Management Cost			
Fire and Health & Safety Measures	5	The workers are required to provide the PPEs for work site safety precaution and to avoid any safety hazard.	Amount to be included in the Project Budget.
B. Environmental Monitoring Cost			
Air, Water and Noise Monitoring	5	Monitoring will be performed as per EPA Standards	Amount to be Included in Project Budget
C. Tree Plantation Tree Plantations of Endemic /Local Species in Playgrounds, Parks and Green Belts	30	Landscaping around the project site.	Required for implementation of true spirit of EMP
Total Environmental Management, Tree plantation and Monitoring Cost in PKR (A+B+C)	40	Summing up A,B, C	Amount to be included in the Project Budget.

9 SOLID WASTE MANAGEMENT PLAN

Solid waste management is a critical component of environmental protection for any residential development. In this housing scheme (Pakpattan, 409 kanal) waste is generated from household activities, landscaping, maintenance operations, and minor repair works during the operational phase. Improper handling and disposal can lead to soil and water contamination, foul odors, vector-borne diseases, and visual pollution.

The purpose of this Solid Waste Management Plan (SWMP) is to establish a structured framework for collection, segregation, storage, transport, recycling and disposal of solid waste generated in the housing scheme. The plan ensures waste is managed in an environmentally sound and regulatory-compliant manner (Pakistan Environmental Protection Act, PEQS and municipal MSW requirements).

9.1 OBJECTIVES OF SOLID WASTE MANAGEMENT PLAN

The objectives of the Solid Waste Management Plan (SWMP) for the housing scheme are as follows:

- ☞ Prevent pollution of soil, water, and air caused by improper handling and disposal of solid waste.
- ☞ Reduce risks of vector-borne diseases, foul odors, and hazards to residents and workers.
- ☞ Encourage segregation of biodegradable and non-biodegradable waste at the source.
- ☞ Facilitate reuse and recycling of materials wherever feasible.
- ☞ Align waste management practices with national and municipal environmental regulations, including the Pakistan Environmental Protection Act and NEQS guidelines.
- ☞ Implement a structured system for timely collection, safe storage, and disposal of solid waste.
- ☞ Educate residents and staff on sustainable waste management practices and encourage active participation.
- ☞ Integrate solid waste management as part of the overall environmental management system of the housing scheme.

9.2 SOLID WASTE GENERATION, SEGREGATION, AND DISPOSAL PROCEDURES

Proper management of solid waste is essential to ensure environmental protection, public health, and regulatory compliance. The following section details the solid waste management approach for both **Developmental Phase** and **Operational Phase**.



9.2.1 Developmental Phase

9.2.1.1 Sources and Generation of Solid Waste

During construction and development activities, solid waste is primarily generated from:

1. Construction and Excavation Waste

Rubble, bricks, cement bags, concrete, and other building materials.

2. Machinery and Equipment Maintenance

Lubricants, used oil, fuel containers, packaging materials.

3. Labor Camps and Workforce Activities

Domestic waste from workers: food scraps, packaging, and plastic bottles.

4. Temporary Facilities

Waste from site offices, storage areas, and toilets.

9.2.1.2 Collection, Transportation, and Storage of Solid Waste

Proper collection, transportation, and storage of solid waste are essential to prevent environmental pollution, health risks, and nuisance to residents. A systematic approach will be adopted during both the developmental phases of the housing scheme.

Collection:

- ☞ Waste will be collected daily or as required to prevent accumulation and environmental hazards.
- ☞ Dedicated personnel or contractors will oversee collection and ensure proper segregation.

Transportation:

- ☞ Collected waste will be transported using covered vehicles to prevent spillage, scattering, and dust generation.
- ☞ Routes and schedules will be planned to minimize disturbance and maintain hygiene.
- ☞ Vehicles will be cleaned and maintained regularly to avoid contamination.

Temporary Storage:

- ☞ Designated storage areas will be established for construction and camp waste.

Storage sites will be:



1. Covered to prevent wind and rain exposure.
 2. Located away from water sources and residential areas.
 3. Equipped with impervious surfaces and drainage to contain leachate.
- ☞ Storage areas will be cleaned and disinfected regularly to control odors and pests.

9.2.1.3 Disposal Methods

Construction Debris:

Reused on-site wherever possible (for leveling, road base, or landscaping).

Non-reusable debris will be transported to authorized municipal construction disposal sites.

Hazardous Waste (oils, paints, chemicals):

Collected and handled separately.

Disposed of only at approved hazardous waste treatment or storage facilities.

Domestic Waste from Camps:

Collected separately and disposed of according to municipal solid waste regulations.

Ensures hygienic handling and prevents contamination of the surrounding environment.

9.2.1.4 Monitoring and Compliance

- ☞ The EHS Officer will supervise waste management operations to ensure proper collection, segregation, transportation, storage, and disposal.
- ☞ Regular inspections will ensure compliance with the EMP, PEQS, and municipal regulations.
- ☞ Records of waste generation, handling, and disposal will be maintained for reporting and audits.

9.2.2 Operational Phase

9.2.2.1 Sources of Solid Waste

Residential Waste

- ☞ Biodegradable: Kitchen waste, food scraps, garden clippings.
- ☞ Non-biodegradable: Plastics, paper, metal, glass, packaging materials.

Community and Commercial Facilities

- ☞ Waste from offices, retail shops, community centers, parks, and recreational areas.

Maintenance Activities

- ☞ Landscaping debris, cleaning residues, minor repair waste, and street cleaning.



Hazardous Household Waste

- ☞ Expired medicines, batteries, and small household chemicals.

9.2.2.2 Estimated Generation:

- ☞ Considering a waste generation rate of 0.44 kg/person/day, the residential waste load amounts to 572 kg/day.
- ☞ In addition, approximately 60.632 kg/day of waste is expected from commercial activities and 180.18 kg/day from road sweeping and general maintenance of parks and green belts etc., bringing the total MSW generation to 812.81 kg/day (0.813 tonnes/day).
- ☞ Based on typical waste composition patterns in urban residential areas, the waste stream is expected to consist of nearly 50% biodegradable (organic/wet) waste, amounting to about 406 kg/day, and 50% dry/recyclable or residual waste, also around 406 kg/day.

9.2.2.3 Waste Segregation

Segregation at source remains mandatory and follows the two/three-bin system:

- ☞ **Green (wet):** Biodegradable waste (kitchen scraps, garden waste) ~406 kg/day.
- ☞ **Blue/Yellow (dry):** Recyclables and dry residue ~406 kg/day.
- ☞ **Red (hazardous):** Batteries, expired medicines collected separately.

Provide two household bins per house (wet & dry) and community bins to support collection.



Figure 9-1 Waste Segregation

- ☞ Awareness campaigns and training for residents and staff will ensure proper segregation.
- ☞ Signboards and labels will be installed near bins and common areas to guide proper disposal.

9.2.3 Collection, Transportation, and Storage

- ☞ To ensure efficient primary and secondary waste collection within the housing scheme, household and community bin requirements have been calculated based on actual waste generation estimates.
- ☞ Two household bins each one for wet waste and one for dry waste resulting in 400 small household bins of 30 liters capacity.
- ☞ For community level storage, 240 liter bins will be provided, each capable of holding approximately 36 kg of compacted municipal waste. Against the total estimated solid waste generation of 812.81 kg/day, the scheme will require 22 community bins (240 L). For operational reliability and to handle peak loads, the design recommendation is to install 24 community bins, based on the 0.85 tonne/day design load. Collection will follow an optimized schedule: wet waste to be collected daily in the morning, dry waste three times a week (Monday, Wednesday, Friday), commercial waste daily, and street sweeping on a daily or alternate-day basis depending on use. For efficient transfer and transport, one small 3–5-tonne tipper or compactor vehicle will be sufficient, operated by a crew comprising one driver and two collectors responsible for bin handling and sweeping tasks.



Figure 9-2Waste Collection

Temporary Storage:

- ☞ The housing scheme has allocated a dedicated waste storage area measuring **10 Marla** for efficient solid waste handling and management. This space will accommodate segregation bays for wet, dry, and bulky waste.

- ☞ To ensure environmental safety and regulatory compliance, the waste storage area will be constructed with impermeable paving, proper graded drainage leading to a leachate trap, secure fencing, appropriate lighting, and clear signage.
- ☞ To ensure efficient treatment and reduce the load on municipal disposal systems, an on-site composting facility is recommended. The composting system should be designed to handle between 400 and 500 kg/day, allowing sufficient capacity to manage daily wet waste generation while also providing a buffer for fluctuations, peak occupancy periods, or event-based increases in organic waste.



Figure 9-3 Composting

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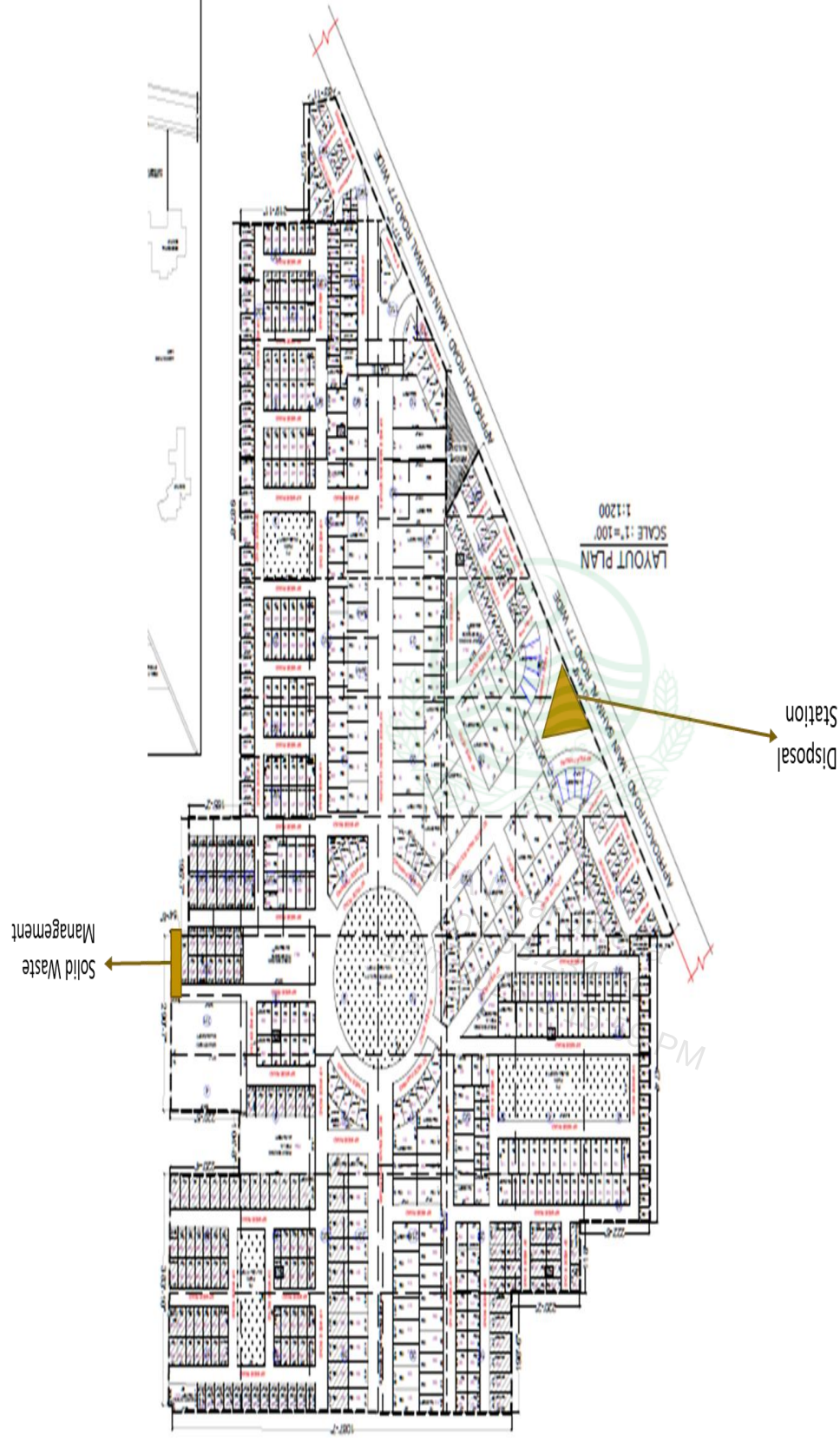


Figure 9-4 Proposed Waste Storage and Disposal Site

9.2.4 Disposal Methods

- ☞ A **1 Kanal** disposal facility has been proposed within the housing scheme to ensure the safe and efficient handling, treatment, and final disposal of all waste streams, thereby supporting proper sanitation and environmental protection for residents.
- ☞ Non-biodegradable waste will be managed through a structured system in which recyclable materials are separated and sent to an authorized recycling centers, while non-recyclable waste is transported to an approved municipal landfill sites.
- ☞ Hazardous household waste -such as batteries, chemicals, and expired medicines will be collected separately in designated red bins and transferred to authorized hazardous waste treatment or disposal facilities in full compliance with regulatory requirements.

This integrated disposal approach ensures environmental safeguards, reduces pollution risks, and maintains hygienic living conditions within the community.



Figure 9-5 Landfill Site



Figure 9-6 Solid Waste Dumping

9.2.5 Monitoring and Compliance

The EHS Officer will oversee the waste management system and ensure compliance with environmental and operational requirements. A set of Key Performance Indicators (KPIs) will be monitored monthly to track the system's effectiveness. The updated total waste generation stands at 812.81 kg/day, comprising 572 kg/day residential, 60.63 kg/day commercial, and 180.18 kg/day road-sweeping and park-cleaning waste. Wet waste is estimated at 406 kg/day and will be monitored daily.

- ☞ KPIs include source segregation performance (target: $\geq 70\%$ within six months) and diversion rate (target: $\geq 60\%$ diversion during the first year through composting and recycling).
- ☞ Compost production will be recorded monthly, with an estimated output of approximately 3,480 kg/month based on processing ~116 kg/day of stabilized compost material.
- ☞ Additional KPIs include the quantity and revenue of recyclables sold monthly, missed waste collections (target: <5 per month), and community bin overflow incidents (target: <5% per month).

Comprehensive recordkeeping will include daily route logs, monthly KPI summaries, a complaints register, and disposal manifests for residual waste sent to municipal landfill sites, ensuring transparency, efficiency, and continuous improvement.



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10 OCCUPATIONAL HEALTH AND SAFETY

The OHS Plan for the Development of Housing Scheme by New Al Noor City, Pakpattan has been designed to safeguard the health, safety, and welfare of all workers, engineers, supervisors, visitors, and nearby communities during both the developmental and operational phases of the project.

10.1 DEVELOPMENTAL PHASE (PRE-CONSTRUCTION / LAND DEVELOPMENT)

This includes activities such as:

- ☞ Land clearing and site preparation
- ☞ Soil testing and geotechnical investigation
- ☞ Topographic surveys
- ☞ Boundary demarcation
- ☞ Establishment of temporary facilities
- ☞ Minor leveling and early site access arrangements

10.2 OPERATIONAL PHASE (CONSTRUCTION PHASE)

This phase involves full-scale construction activities such as:

- ☞ Excavation and foundation work
- ☞ Structural construction
- ☞ Road and utility development
- ☞ Mechanical, electrical, and plumbing works
- ☞ Finishing and infrastructure installation

These activities present a range of occupational risks requiring management through proper planning and implementation.

10.3 OBJECTIVES OF OHS PLAN

The main objectives of the OHS Plan for the housing scheme are as follows:

- ☞ Protect all employees, contractors, and visitors from occupational hazards and health risks associated with construction and operational activities.
- ☞ Minimize the likelihood of workplace accidents, injuries, and fatalities through proactive risk assessment and safety measures.



- ☞ Ensure all project activities comply with national and provincial occupational health and safety laws, including Pakistan Labour Laws and the Factories Act.
- ☞ Identify potential workplace hazards (physical, chemical, biological, and ergonomic) and implement measures to reduce or eliminate associated risks.
- ☞ Provide continuous safety training and awareness programs for workers, supervisors, and management personnel to encourage safe work practices.
- ☞ Ensure availability and proper use of PPE, safety tools, signage, and emergency response equipment at all work sites.
- ☞ Establish protocols for responding to accidents, fires, chemical spills, or medical emergencies effectively and promptly.
- ☞ Regularly monitor OHS performance, investigate incidents, and implement corrective measures to improve workplace safety standards continuously.



10.4 REGULATORY REQUIREMENTS

10.4.1 National Laws

- ☞ Pakistan Environmental Protection Act (PEPA) 1997
- ☞ Factories Act 1934 (with Punjab amendments)
- ☞ Pakistan Labor Laws relating to worker health & safety
- ☞ Explosives Act 1884 and Petroleum Act 1934 (fuel/chemical handling)
- ☞ Building Code of Pakistan – Fire Safety Provisions 2016

10.4.2 Provincial Laws

- ☞ Punjab Occupational Safety and Health Act 2019



1. Mandatory risk assessments
 2. Safe construction practices
 3. Training requirements
 4. PPE enforcement
- ☞ Punjab Local Government Act 2019
 - ☞ Punjab Environmental Protection (Amendment) Act
 - ☞ Punjab Factories Rules (Occupational safety provisions)

10.4.3 Local Regulations

- ☞ Municipal by laws concerning waste management and construction site safety
- ☞ Civil Defense / Rescue 1122 guidelines for emergency preparedness
- ☞ Local development authority construction guidelines (as applicable)

10.5 IMPACTS AND MITIGATIONS DURING DEVELOPMENTAL PHASE

Table 10-1 Impacts and Mitigations during Developmental Phase

Sr. No.	Impacts During Developmental Phase (Pre-Construction)	Mitigation Measures
1.	Physical Hazards Uneven terrain causing slips, trips, and falls Minor machinery movement (loaders, compactors)	Install fencing and warning signage Control access to authorized personnel only Trained operators for earth-moving equipment Daily checks of small machinery
2.	Environmental Health Hazards Dust from clearing and leveling Elevated noise due to machinery	Periodic water sprinkling Restrict noisy activities to daytime hours
3.	Chemical Hazards Spills or improper handling of fuels and lubricants Exposure to pesticides (if vegetation removal occurs)	Fuel stored in labelled metal containers Spill kits available on site Training on safe handling of chemicals

Sr. No.	Impacts During Developmental Phase (Pre-Construction)	Mitigation Measures
4.	Biological Hazards Rodents, insects, snakes or wild vegetation Mosquito breeding in stagnant water	Removal of stagnant water Protective gloves for vegetation clearing
5.	Ergonomic Hazards Manual lifting during surveying Long walking distances, awkward postures	Training for surveyors and technicians on safe lifting and posture
6.	Worker Protection & Welfare Risk of injury, fatigue, dehydration, illness	Mandatory PPE: helmets, safety shoes, gloves, dust masks Clean drinking water Temporary toilets Waste bins and disposal arrangements

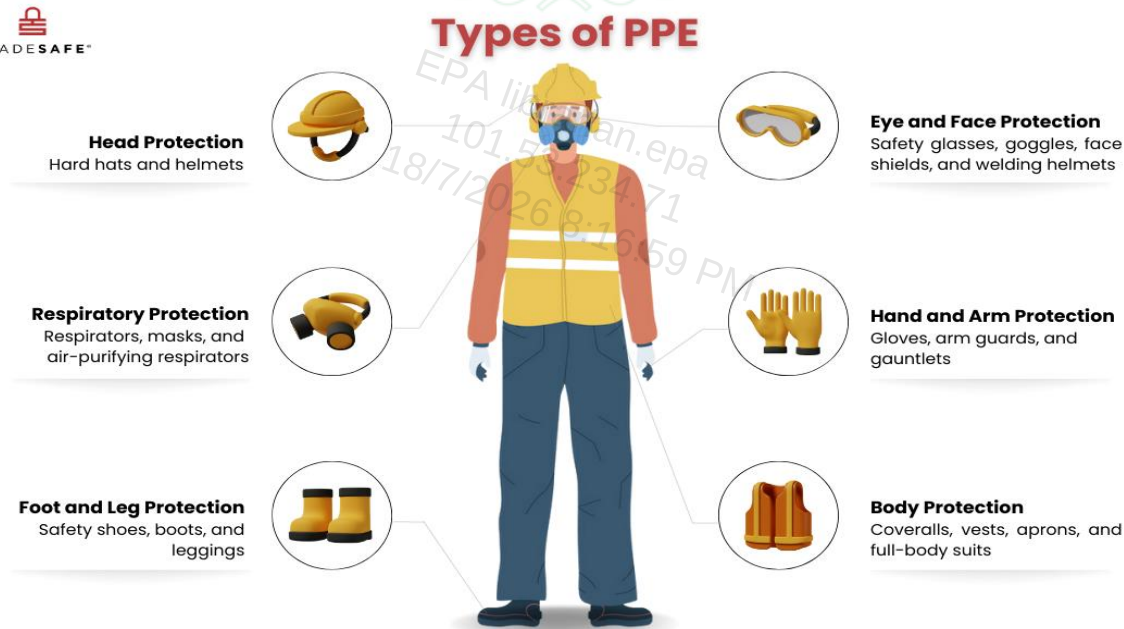


Figure 10-1 Personal Protection Equipment

Table 10-2 Impacts and Mitigations during Operational Phase

Sr. No.	Impacts During Operational Phase	Mitigation Measures
1	Slips, trips, and falls in residential areas, parks, walkways, and community spaces due to uneven surfaces, wet areas, or obstacles.	Proper landscaping and pavement design. Clear warning signage in areas prone to hazards. Regular maintenance and inspection of walkways, staircases, and park pathways. Prompt cleaning of spills or water accumulation.
2	Fire hazards from electrical faults, standby generators, cooking activities, or community facilities.	Installation of fire alarms, extinguishers, and fire-fighting equipment at strategic locations. Regular inspection and maintenance of electrical systems and generators. Safe operation protocols for generators, stoves, and electrical appliances. Training and awareness programs for residents on fire safety and emergency evacuation.
3	Noise exposure from standby generators, community activities, or maintenance operations.	Installation of noise barriers or enclosures around generators. Regular maintenance to minimize excessive noise from machinery. Scheduling noisy activities during daytime to reduce disturbance. Monitoring noise levels periodically to ensure compliance with PEQS standards.
4	Exposure to wastewater or sewage during plumbing maintenance, leakage, or cleaning of drains.	Properly designed and functional sewage treatment systems. Routine inspection and maintenance of drainage and plumbing networks. Provision of PPE (gloves, boots, masks) for staff handling wastewater. Immediate cleanup of leaks or spillages to prevent contamination.
5	Handling of hazardous household materials such as batteries, chemicals, and cleaning agents.	Educate residents on safe handling, storage, and disposal of hazardous materials. Provide labeled collection points for hazardous household waste.

Sr. No.	Impacts During Operational Phase	Mitigation Measures
		Workers handling hazardous materials to use appropriate PPE. Ensure hazardous waste is disposed of at authorized facilities.



Figure 10-2 Road Signs

11 TREE PLANTATION PLAN

The incorporation of a tree plantation plan within an EIA is of paramount importance for several compelling reasons. Trees play a pivotal role in environmental sustainability, acting as natural carbon sinks, enhancing biodiversity, and mitigating the impacts of climate change. A well-designed tree plantation plan contributes significantly to offsetting carbon emissions associated with a project, thereby fostering a more balanced and ecologically friendly footprint. Beyond their role in carbon sequestration, trees contribute to soil stabilization, preventing erosion and promoting water retention. They also provide habitat for diverse wildlife, supporting biodiversity conservation. Moreover, trees contribute to the improvement of air quality by filtering pollutants and releasing oxygen, thereby enhancing the overall health and well-being of surrounding communities. Integrating a tree plantation plan into the EIA showcases a commitment to ecological stewardship and reflects a proactive approach toward environmental sustainability, aligning the project with broader conservation goals and community well-being.

11.1 REGULATORY REQUIREMENTS

Tree plantation within the New Al-Noor City Housing Scheme must comply with national and local environmental regulations and policies to ensure sustainability and biodiversity conservation. The following regulatory requirements will be followed:

- Pakistan Environmental Protection Act (PEPA) 1997
- Local Municipal / Tehsil Regulations
- Forest and Wildlife Conservation Laws
- Urban Development and Planning Guidelines

11.2 OBJECTIVES OF TREE PLANTATION

The tree plantation program within the housing scheme aims to enhance environmental quality, community well-being, and sustainability:

- ☞ Trees provide shade and reduce heat in residential streets, parks, and open spaces, mitigating the urban heat island effect.
- ☞ Trees store carbon in their biomass, helping reduce atmospheric carbon dioxide levels and contributing to climate change mitigation.



- ☞ Trees improve the visual appeal of the housing scheme, creating attractive streetscapes, parks, and green areas.
- ☞ Trees can yield useful products such as fruits, nuts, timber, and medicinal plants for residents and the local community.
- ☞ Tree plantation and maintenance create employment opportunities for people living in and around the housing scheme.
- ☞ Trees act as natural air filters by trapping dust, pollutants, and particulate matter, while releasing oxygen through photosynthesis.
- ☞ Trees help maintain healthy watersheds, reduce surface runoff, and minimize flood risks in the housing scheme area.
- ☞ Tree roots prevent soil erosion, protecting landscaped areas, gardens, and embankments.
- ☞ Strategically planted trees safeguard roads, sidewalks, and buildings against wind and potential soil instability.
- ☞ By absorbing carbon dioxide and releasing oxygen, trees contribute to lowering greenhouse gas levels.
- ☞ Trees can serve as effective windbreaks, providing comfort to residents and protecting homes and open spaces from strong winds.

11.3 ROLES AND RESPONSIBILITIES

For the tree plantation program of the Housing Scheme, responsibilities are distributed among key stakeholders to ensure effective implementation and maintenance. The management of New Al-Noor Housing Scheme will oversee the plantation activities, ensure the survival and maintenance of saplings, report progress, and coordinate with relevant regulatory bodies for approvals. A team of **10-20 Malis (gardeners)** will be hired to carry out day-to-day plantation tasks, including watering, pruning, pest control, and general maintenance of the trees and green spaces. The residents of the housing scheme will actively participate in planting drives, assist with watering, protection, and routine care of the saplings, and report their status to the management. Meanwhile, the Punjab Environmental Protection Agency (EPA) will monitor environmental compliance, ensuring that the plantation activities align with environmental mitigation measures and contribute to the development of a sustainable green cover within the housing scheme.

Table 11-1 Roles and Responsibilities

Sr. No.	Responsible Person	Responsibilities
1.	Management of New Al-Noor Housing Scheme	Implements tree plantation within the housing scheme, ensures sapling survival, maintenance, and reporting; coordinates with regulatory bodies for approvals.
2.	Malis / Gardeners	Perform day-to-day plantation activities, watering, pruning, pest control, and routine maintenance of trees and green spaces.
3.	Residents	Participate in tree planting drives, assist in watering, maintenance, and protection of saplings, and report survival status to management.
4.	Punjab Environmental Protection Agency (EPA)	Monitors environmental compliance, ensures plantation aligns with environmental mitigation and green cover requirements.

11.4 AREA ENHANCEMENT PLAN

The proposed housing scheme incorporates an extensive tree plantation plan to enhance environmental quality, improve aesthetics, and promote a healthy living environment. Trees will be planted along all main roads, internal streets, and the central greenbelt to create shaded walkways and reduce dust pollution. Dense plantation is proposed around the main playground and parks to provide natural cooling, improve air quality, and support biodiversity. Native and climate-resilient species will be prioritized to ensure long-term sustainability with minimal maintenance. Additionally, green buffers will be established near designated public and commercial areas to create a pleasant and environmentally friendly atmosphere throughout the scheme.



Figure 11-1 Proposed Tree Plantation

11.5 TREES RECOMMENDED

Tree species are recommended for the plantation are the indigenous species of Pakpattan.

Table 11-2 Recommended Trees

	
Acacia nilotica	Dalbergia sissoo
	
Eucalyptus camaldulensis	Ziziphus mauritiana
	
Ficus religiosa	Bombax ceiba

11.5.1 Maintenance Activities

Routine Work

- ☞ Daily/alternate-day watering of plants & lawns.
- ☞ Removal of litter and debris from green areas.
- ☞ Weekly grass cutting to prevent pest growth.
- ☞ Trimming of shrubs and trees every 2–3 weeks.

Seasonal Work

- ☞ Organic fertilization and eco-friendly pest control.
- ☞ Replacement of dead or diseased plants.
- ☞ Seasonal plantation drives (summer/winter).



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12 TRAFFIC MANAGEMNT PLAN

12.1 INTRODUCTION

This Traffic Management Plan (TMP) has been developed for the project of Development of Jinnah Garden Phase-I by FECHS. The plan outlines measures to manage vehicular movement safely and efficiently during both the developmental and operational phases of the project. It focuses on minimizing congestion, ensuring public safety, and maintaining smooth traffic flow within and around the project area while reducing environmental and community disturbances.

12.2 OBJECTIVES OF TRAFFIC MANAGEMENT PLAN

The main objectives of the Plan are to:

- Ensure the safety of workers, residents, and the general public.
- Maintain smooth and uninterrupted traffic flow within and around the project site.
- Minimize inconvenience to local communities and existing road users.
- Regulate the movement and parking of construction and heavy vehicles.
- Ensure adequate signage, road markings, and communication with all stakeholders.

12.3 INSTITUTIONAL REQUIREMENTS

During the developmental phase of the project, **the Contractor** will be responsible for implementing the TMP in its entirety. This includes ensuring that all construction vehicles and machinery are properly maintained, operated safely, and comply with the prescribed movement schedules to avoid congestion and accidents. The contractor will also ensure the installation of appropriate signage, deployment of flagmen, and enforcement of speed limits within the project site.

During the operational phase, the **Management** will take over the responsibility of enforcing internal traffic rules and maintaining road safety standards. The management will ensure that proper traffic signage, speed limits, and parking regulations are observed within the housing scheme. Additionally, they will oversee the maintenance of internal roads, ensuring they remain in good condition to facilitate smooth vehicular movement for residents and service vehicles.

12.4 TRAFFIC CHARACTERISTICS

The traffic characteristics are given below;

Table 12-1 Traffic Characteristics

During Development Phase	During Operation Phase
Heavy vehicles: Dump trucks, loaders, graders, excavators, and concrete mixers. Medium vehicles: Pickups, small delivery vans, and tractors transporting construction materials. Light vehicles: Cars and motorcycles used by engineers, supervisors, and site management staff	Construction-related traffic: Small and medium vehicles used for delivery of building materials and labor transport. Residential traffic: Private cars, service vehicles, delivery vans, and visitors' vehicles.

12.5 TRAFFIC MANAGEMENT DURING DEVELOPMENTAL PHASE

This phase will involve infrastructure development activities such as road construction, sewerage and drainage installation, water and gas supply and electrification works, and boundary wall construction.

12.5.1 Potential Impacts During Developmental Stage

The potential impacts of traffic during developmental stage of housing scheme are given below;

- Temporary traffic congestion on access routes due to construction vehicle movement.
- Road safety hazards for pedestrians and nearby residents.
- Dust and noise emissions caused by vehicular activity.
- Damage to existing access roads due to frequent movement of heavy vehicles.

12.5.2 Mitigation Measures During Developmental Stage

Table 12-2 Mitigation Measures for the Development Stage

Potential Impacts	Mitigation Measures
Traffic Congestion	Movement of heavy vehicles will be scheduled during off-peak hours to minimize interference with local traffic.
Road safety hazards	Proper signage, flagmen, and speed limit enforcement (maximum 20 km/h) will be ensured at all site entry and exit points.
Dust emissions	Regular sprinkling of water will be carried out on unpaved and access roads.
Noise generation	Vehicle movement will be limited to daytime hours; all machinery will be properly maintained.
Road surface damage	Designated access routes will be used; damaged sections will be promptly repaired.
Parking and waiting issue	Designated parking and waiting areas will be provided within the project premises to prevent roadside congestion.

12.6 TRAFFIC MANAGEMENT DURING OPERATIONAL PHASE

The operational phase will include the construction of residential buildings and occupancy by residents of New Al-Noor City. During this phase, both construction-related and residential traffic will be present within the housing scheme.

12.6.1 Potential Impacts During Operational Stage

The potential impacts of traffic during operational stage of housing scheme are given below;

- Increased vehicular movement within the housing scheme.
- Temporary obstruction due to material unloading and small-scale construction activities.
- Parking congestion near residential plots.
- Road safety risks for residents, particularly children and pedestrians.

Table 12-3 Mitigation Measure for Mitigation Measures

Potential Impacts	Mitigation Measures
Increased internal traffic	Internal roads will be designed with sufficient width, turning radius, and appropriate traffic signage.
Safety concerns for residents	Construction zones will be physically segregated from occupied residential areas with barricades and warning signs.
Parking Congestion	Designated parking spaces will be provided for residents, visitors, and construction vehicles.
Dust and debris on internal roads	Periodic cleaning of internal roads; vehicles carrying materials will be covered with tarpaulins
Long-term safety	The housing society will enforce traffic regulations and internal speed limits (15–20 km/h).

12.7 SIGNAGE AND COMMUNICATION

Effective signage and communication are essential components of traffic management during both the developmental and operational phases of the project. Properly designed and strategically placed traffic signage will help regulate vehicle movement, ensure safety, and facilitate smooth transportation within and around the project site.

12.7.1 Developmental Phase

During the developmental (construction) phase, temporary yet clear signage will be installed to guide construction vehicles, workers, and visitors. Warning and information signs such as **“Construction Area Ahead,” “Slow Down,” “Men at Work,” “No Entry,” “Diversion,” and “Speed Limit 20 km/h”** will be displayed at all major entry and exit points and along internal roads. Reflective safety signs and cones will be used, especially during low visibility conditions or night-time operations. Directional boards will be placed to manage the entry and exit of heavy vehicles and to segregate construction and administrative zones.

Communication between site supervisors, drivers, and laborers will be ensured through handheld radios and mobile communication to coordinate vehicle movement, avoid traffic congestion, and respond quickly to any road safety issues. Regular toolbox meetings and awareness sessions will be conducted for drivers and workers to reinforce road safety protocols and TMP compliance.



12.7.2 Operation Phase

In the operational phase, permanent traffic signage will be installed throughout the housing scheme to maintain smooth and safe vehicle circulation. These will include **“Speed Limit (15–20 km/h),” “Pedestrian Crossing,” “No Parking,” “One Way,” and “Children Crossing”** signs. Directional boards and street name signs will also be placed at appropriate locations for resident and visitor guidance. Reflective road markings, zebra crossings, and signboards will be maintained regularly by the management to ensure visibility and effectiveness.

Information regarding traffic rules, parking policies, and emergency contact numbers will be displayed at the main entry gate and community notice boards. The management will also ensure effective internal communication through the society’s office, community announcements, and complaint handling mechanisms to address any traffic or road safety concerns promptly.

12.8 EMERGENCY ACCESS AND SAFETY

Emergency access and safety arrangements are critical to ensure the protection of workers, residents, and visitors during both the developmental and operational phases of the project. The plan aims to maintain unobstructed emergency routes, provide quick response mechanisms, and minimize risks associated with construction and residential activities.

12.8.1 Developmental Phase

During the developmental phase, clear and accessible emergency routes will be established and maintained at all times to facilitate the movement of ambulances, fire trucks, and rescue vehicles in case of any incident. These routes will be distinctly marked and kept free from parked vehicles, construction materials, or debris. Safety signage such as **“Emergency Exit,” “Fire Assembly Point,” and “First Aid Station”** will be installed at visible locations.

All construction personnel and vehicle operators will be briefed about emergency response procedures through safety inductions and regular drills. A fully equipped first aid box will be available at the site office and major work zones, while trained first aiders will remain present during working hours. Fire extinguishers will be installed near fuel storage areas, workshops, and other high-risk zones. In addition, coordination will be maintained with local emergency services such as hospitals, fire stations, and the Rescue Department to ensure timely assistance during emergencies.

12.8.2 Operational Phase

During the operational phase, permanent emergency access routes will be designated within the housing scheme and maintained in good condition for use by emergency response vehicles. These routes will be appropriately signposted with “**No Parking – Emergency Route**” signage to prevent blockage. The internal road layout will be designed to allow easy maneuvering of large emergency vehicles such as fire tenders and ambulances.

Emergency contact numbers of local hospitals, fire stations, and security services will be displayed prominently at the society’s main gate, community centers, and residential blocks. Security personnel will receive periodic training in emergency traffic diversion, evacuation procedures, and coordination with local authorities. The management will ensure the availability of firefighting equipment, first aid facilities, and a 24-hour security control room for prompt response to any emergency situation.

12.9 Monitoring Activities

Table 12-4 Monitoring Activities

During Development Phase	During Operation Phase
• Daily inspection of access routes by the Site Engineer or Safety Officer. • Weekly monitoring reports on traffic flow and road conditions. • Coordination with Traffic Police for external route management and safety compliance.	• Monthly inspection of internal roads, signage, and safety arrangements. • Resident feedback will be collected to identify and resolve traffic-related issues. • The management will conduct periodic review meetings to ensure compliance with TMP measures.

13 SHADOW IMPACT PLAN

13.1 BACKGROUND

The proposed project is a high-rise commercial building named “New Al-Noor City” located within the Pakpattan housing scheme, comprising office spaces, shops, and other commercial units. While providing modern commercial facilities, the building’s operation can create secondary or indirect impacts on the surrounding environment, infrastructure, and local community.

13.2 OBJECTIVES

The primary objective of the Shadow Impact Plan is to systematically **identify, assess, and mitigate** the impacts associated with the operational phase of the high-rise commercial building within the Pakpattan housing scheme. These impacts include environmental, social, economic, and health and safety effects that may arise due to the building’s presence and use, such as increased traffic, energy and water consumption, solid waste generation, wastewater discharge, air and noise pollution, and pressure on local infrastructure and community services.

This plan aims to ensure that all potential shadow impacts are thoroughly evaluated in terms of their significance, likelihood, and spatial and temporal extent, allowing for the implementation of appropriate preventive and corrective measures. It also focuses on promoting sustainable operational practices, such as energy and water efficiency, proper waste management, storm-water control, green landscaping, and adoption of environmentally friendly technologies, to minimize the building’s ecological footprint.

Furthermore, the plan seeks to protect the well-being of the local community and maintain a harmonious relationship between the high-rise commercial building and its surrounding neighborhood. It emphasizes continuous monitoring, stakeholder engagement, and proactive management of indirect impacts, ensuring that the building operates in a safe, efficient, and environmentally responsible manner, while supporting social and economic benefits for the wider area.

13.3 SCOPE OF THE PLAN

- Immediate vicinity of the building, including adjacent roads, utilities, local settlements, public spaces, and drainage systems (500–1000 m radius).
- Covers the operational phase after construction and occupancy.
- Environmental, social, economic, and health & safety impacts associated with the building’s operation.

13.4 METHODOLOGY

A comprehensive methodology has been adopted for preparing this Plan. The building design, anticipated occupancy levels, and operational requirements has been thoroughly reviewed to understand the functional and infrastructural



needs of the proposed high-rise commercial building. Detailed analyses of projected energy consumption, water demand, wastewater generation, and solid waste quantities has also been carried out to estimate the building's long-term resource requirements and potential environmental load.

The consultations were held with local stakeholders, and service providers. Their feedback has been incorporated into the assessment to reflect ground realities and service availability.

Furthermore, a comprehensive impact assessment was conducted using both qualitative and quantitative tools, including risk matrices, comparative analysis, and scenario-based evaluations. These assessments helped identify potential shadow impacts and determine the significance and likelihood of each impact under different operational conditions.

13.5 IDENTIFICATION OF IMPACTS AND DETAILED MITIGATION MEASURES

13.5.1 Environmental Impacts



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Table 13-1 Environmental Impacts of High Rise Commercial Building

Sr. No.	Impact	Consequence	Mitigation Measures
1.	Energy Demand Elevators, lighting, HVAC, and commercial equipment	Increased load on local electricity network; higher carbon emissions	• Use energy-efficient LED lighting • Variable-speed HVAC and elevators • Smart meters to monitor consumption • Consider solar PV panels on rooftop; • Implement energy-saving policies (automatic shutdown after office hours).
2.	Water Demand Water use for offices, shops, restrooms, cleaning, landscaping	Pressure on municipal supply; depletion of groundwater.	• Install low-flow faucets • Dual-flush toilets • Sensor-based water taps • Reuse greywater for toilet flushing • Landscaping • Regular monitoring of water consumption
3.	Wastewater Sewage from commercial units and restrooms	Contamination of local drains; burden on municipal treatment	• Connect to municipal sewer system • Periodic monitoring of effluent quality • Ensure proper maintenance of plumbing systems.
4.	Solid Waste	Overflow at municipal collection points; littering; soil and water contamination	• Implement waste segregation at source (organic, recyclable, non-recyclable)

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Sr. No.	Impact	Consequence	Mitigation Measures
	Packaging waste, office trash, food waste from commercial areas		- Regular collection schedule with authorized municipal contractor. - Compost organic waste
5.	Urban Heat Island Effect Concrete and asphalt surfaces, rooftop	Increase in local temperature; higher cooling demand	- Green roofs and vertical greenery; - Reflective or light-colored building materials - Tree plantation around building - Shaded outdoor spaces.
6.	Stormwater Runoff Impermeable surfaces like rooftops, paved parking, walkways	Soil erosion; burden on municipal drainage	- Permeable paving for walkways and parking - Rooftop water retention and drainage - Maintain clear drainage channels.
7.	Air Quality Vehicle emissions from visitors, delivery trucks, and HVAC systems	Increase in pollutants (PM _{2.5} , NO _x); respiratory problems for nearby residents	- Encourage electric or low-emission delivery vehicles; - Planting green belts around building - Regular maintenance of generators and HVAC systems; - Monitor local air quality quarterly.
8.	Noise Pollution	Disturbance to nearby residents and schools; stress and sleep disruption	- Soundproofing mechanical equipment rooms - Use low-noise generators - Install noise barriers



Sr. No.	Impact	Consequence	Mitigation Measures
	Commercial activities, HVAC units, generators, deliveries		• Limit delivery times to daylight hours • Conduct periodic noise monitoring.

Table 13-2 Social Impacts of High Rise Commercial Building

Sr. No.	Impact	Consequence	Mitigation Measures
9.	Traffic Congestion High visitor, employee, and delivery vehicle flow	Road congestion, longer travel time, increased accident risk	• Dedicated entry/exit points for commercial building • Designated parking areas • Encourage carpooling or shuttle services; • Stagger commercial operating hours • Coordinate with municipal traffic management.
10.	Public Space Pressure Parking, pedestrian movement, local amenities	Overcrowding; conflicts with nearby residents	• Reserve sufficient on-site parking • Provide pedestrian walkways and safety crossings • Clear signage; • Integrate public amenities (benches, shaded waiting areas).
11.	Population Density Increase	Strain on nearby services (healthcare, shops, utilities); lifestyle conflicts.	• Coordinate with local authorities for expansion of services

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Sr. No.	Impact	Consequence	Mitigation Measures
	Daily inflow of workers and visitors		Promote community engagement
12.	Security & Safety Risk of fire, elevator malfunction, or emergencies	Dependence on municipal emergency services; risk to occupants and nearby residents	- Install fire alarms - Water sprinklers - Emergency exits - Smoke detectors - Conduct fire drills - Hire on-site security personnel - Coordinate with local fire department for emergency preparedness.
13.	Social Interaction Impacts Crowding, commercial activity vs residential lifestyle	Noise complaints; minor disputes with local residents	- Establish communication channels (community liaison officer) - Schedule deliveries during non-peak hours - Awareness campaigns for commercial tenants.



Table 13-3 Economic Impacts of High Rise Commercial Building

Sr. No.	Impact	Consequence	Mitigation Measures
14.	Local Business Growth Shops, restaurants, services for building users	Economic opportunities; employment generation	- Promote local vendors in the commercial space - Prioritize hiring local staff - Offer vendor guidelines for sustainable practices.
15.	Operational Costs Maintenance of elevators, HVAC, waste disposal, security	Financial burden for building management and tenants	- Implement preventive maintenance schedules; - Energy and water conservation - Centralized waste management - Optimize HVAC and elevator usage.

Table 13-4 Health & Safety Impacts of High Rise Commercial Building

Sr. No.	Impact	Consequence	Mitigation Measures
16.	Air Quality Impacts Vehicle and generator emissions; HVAC system	Respiratory health issues	- Monitor air quality quarterly - Promote electric delivery vehicles - Maintain HVAC filters - Plant trees and greenery for air purification.

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Sr. No.	Impact	Consequence	Mitigation Measures
17.	Noise & Vibration Continuous commercial activity, deliveries, HVAC	Stress, sleep disruption, complaints	• Soundproof equipment • Limit noisy activities to daytime • Install vibration dampeners • Monitor noise levels.
18.	Fire & Emergency Risk High-rise occupancy increases fire risk	Potential casualties, property damage	• Sprinkler system • Fire exits, alarms • Emergency lighting • Conduct evacuation drills quarterly • Coordinate with local fire department • Maintain fire-fighting equipment.

13.6 MONITORING PLAN

Table 13-5 Monitoring Plan

Parameters	Monitoring Frequency	Responsible Party
Energy Consumption	Quarterly	Environmental Officer
Water Usage	Quarterly	Environmental Officer
Wastewater Quality	Quarterly	Environmental Officer
Solid Waste Management	Daily	Environmental Officer
Air Quality	Quarterly	Environmental Officer
Noise Levels	Quarterly	Environmental Officer
Traffic & Parking Flow	Ongoing	Security Officer
Fire & Safety Systems	Quarterly	Safety Officer
Public Complaints & Feedback	Ongoing	Community Liaison Officer

13.7 REPORTING & COMMUNICATION

- ☞ Quarterly reports on operational shadow impacts, mitigation effectiveness, and monitoring results.
- ☞ Public grievance system to collect feedback from residents and visitors.
- ☞ Reports submitted to municipal authorities and EPA for compliance verification.
- ☞ Annual review of mitigation measures for improvement

13.8 CONCLUSION

The high-rise commercial building within the Pakpattan housing scheme will provide modern commercial services and economic benefits. However, its operation creates indirect impacts on traffic, utilities, environment, health, and community services. Through systematic mitigation, monitoring, and reporting, these shadow impacts can be effectively managed, ensuring safe, sustainable, and community-friendly operation.

14 STAKEHOLDER CONSULTATION

Stakeholder consultation is of paramount importance in the EIA process as it facilitates inclusive decision-making, fosters transparency, and enhances the overall quality of the assessment. Involving stakeholders, including local communities, governmental bodies, non-governmental organizations, and affected parties, ensures that diverse perspectives, concerns, and local knowledge are taken into account. This inclusive approach contributes to the identification of potential environmental and social impacts that might not be evident from a solely technical or regulatory standpoint. Stakeholder consultation is a way to involve both the primary and secondary stakeholders in making decisions about the project. Stakeholder engagement builds trust, allows for the exchange of valuable information, and empowers communities by giving them a voice in the decision-making process. Moreover, it helps to align the project with the needs and expectations of the local population, minimizing conflicts and fostering a sense of shared responsibility for environmental stewardship. In essence, stakeholder consultation transforms the EIA into a more robust and credible tool, enhancing the sustainability and social acceptance of proposed projects.

14.1 OBJECTIVES OF STAKEHOLDER CONSULTATION

In 1992, the United Nations Conference on the Environment and Development (UNCED) supported the idea of involving the public in decision-making, and this was outlined in one of the key documents of the conference called Agenda 21.

Agenda 21 is a comprehensive plan for global actions focused on sustainable development and deals with how people interact with the environment. It highlights the importance of including the public in making decisions about the environment to achieve sustainable development.

The objectives of stakeholder consultation in the context of EIA are multi-faceted, aiming to foster meaningful engagement, inclusivity, and informed decision-making. Some key objectives include:

- ☞ Ensure the inclusion of diverse stakeholder perspectives in the decision-making process, promoting a more comprehensive understanding of potential environmental and social impacts.
- ☞ Provide a platform for stakeholders to express their concerns, values, and local knowledge related to the project, contributing to a more nuanced understanding of potential impacts and benefits.

- ☞ Gather valuable insights and feedback that can be integrated into the project design, helping to address and mitigate potential adverse impacts and enhance positive contributions.
- ☞ Establish trust among stakeholders by being transparent, responsive, and open to dialogue. Building trust is essential for the successful implementation of the project and its long-term acceptance by the community.
- ☞ Fulfill regulatory requirements by actively engaging with stakeholders, demonstrating a commitment to compliance with environmental and social standards, and addressing concerns raised during the consultation process.
- ☞ Facilitate an open and inclusive dialogue to build understanding and acceptance of the project within the affected communities, minimizing potential conflicts and fostering a sense of shared responsibility.
- ☞ Integrate local knowledge and community input to enhance the overall sustainability of the project, aligning it with the needs and aspirations of the affected stakeholders.
- ☞ Disseminate accurate and accessible information about the project, its potential impacts, and proposed mitigation measures to ensure that stakeholders are well-informed and can actively participate in the decision-making process.
- ☞ Consider the needs and interests of all affected parties, including vulnerable or marginalized groups, to ensure that the benefits and burdens of the project are distributed equitably.
- ☞ Create a platform for addressing conflicts and disputes, allowing for the resolution of issues through open communication and negotiation.

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Figure 14-1 Stakeholder Management

By achieving these objectives, stakeholder consultation contributes to the overall success and sustainability of the project, enhancing its social, environmental, and economic outcomes while fostering positive relationships with the communities it impacts.

14.2 PROPONENT ENVIRONMENT MANAGEMENT TEAM

A comprehensive discussion on all conceivable impacts and corresponding mitigation measures related to the project was conducted with both the proponent and project management. In this collaborative dialogue, a thorough examination of potential environmental, social, and economic implications of the project took place. The proponent and management, demonstrating a proactive commitment to responsible practices, assured the incorporation of all suggested mitigation measures to effectively control and address any discrepancies that may arise during the project's implementation. Their pledge to embrace these measures underscores a dedication to environmental stewardship and sustainable practices. By actively engaging in this discourse, the proponent and management not only exhibit a commitment to regulatory compliance but also demonstrate a broader responsibility to the well-being of the community and the preservation of the surrounding environment. This collaborative approach ensures that the project aligns with best practices, fostering a positive impact on the environment and minimizing any potential adverse effects.

14.3 THE RESPONSIBLE AUTHORITY

The Proponent assumes the crucial role of the responsible authority, pledging to undertake all necessary measures both prior to the commencement of the project and throughout its operational phases. This commitment encompasses a comprehensive approach to project management, ensuring that all regulatory requirements, environmental standards, and best practices are diligently adhered to. Before project initiation, the Proponent commits to conducting thorough assessments and implementing necessary preparatory measures to mitigate potential impacts. This includes adopting robust environmental management strategies, obtaining required permits, and addressing any concerns raised during stakeholder consultations. Throughout the operational phase, the Proponent maintains an ongoing commitment to environmental sustainability and regulatory compliance. This involves continuous monitoring, prompt response to emerging issues, and the implementation of adaptive management practices. By assuming the mantle of responsibility, the Proponent not only safeguards the project's integrity but also prioritizes the well-being of the environment, local communities, and all stakeholders involved. This proactive stance ensures that the project operates within the parameters of environmental and ethical standards, reflecting a dedication to responsible and sustainable project execution.

Table 14-1 Stakeholders and Their Roles and Responsibilities

Stakeholders	Roles
Proponent/Responsible Authority	The discussion with the proponent proposed the mitigation measures and alternatives to control any disparity in the project.
Environmental Expert	The consultants from the ESPAK survey the project site to gather relevant information and to record the local community stance and behaviors regarding the project. And also the evaluation of socio-economic impacts of the project has been done.
Government Departments	The consulted government department includes Environmental protection agency, wildlife, planning, and development. The

Stakeholders	Roles
	departments overviewed the proposed projects and its socio-economic impacts.
Local affected communities	The surveys determined the extent of community that could be affected and their verdict about the proposed project.

14.3.1 Other departments and agencies

A comprehensive impact analysis was conducted in collaboration with key stakeholders, including project management, the local community, educational institutes, health institutions, hospitals, and non-governmental organizations (NGOs). This inclusive approach sought to gather diverse perspectives and insights related to the implementation of the project. The engagement process involved scoping sessions, focused group discussions, and wayside consultations, providing a multifaceted platform for dialogue and information exchange. Through these forums, all pertinent issues associated with the project were thoroughly examined, including potential environmental, social, and economic impacts. The proactive involvement of stakeholders, representing various sectors of the community, ensured that a holistic understanding of the project's implications was achieved. This collaborative effort not only fostered transparency but also allowed for the incorporation of valuable local knowledge and concerns into the impact analysis. By actively engaging with stakeholders through diverse communication channels, the project management demonstrated a commitment to responsible and inclusive decision-making, setting the stage for a well-informed and socially accepted project implementation process.

14.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

Our dedicated team undertook a comprehensive site visit, engaging in extensive discussions with a broad spectrum of project stakeholders. This inclusive approach involved reaching out to residents from nearby villages and beyond, ensuring a diverse representation of perspectives to assess the socio-economic impacts of the project. The community demographic was richly diverse, encompassing individuals from various professions, such as those employed in different fields, business owners, doctors, expatriates, military personnel, and educators. In a conscious effort to ensure gender inclusivity, consultations with women were prioritized to gather their unique perspectives on how the project could contribute to the improvement of the area. While some women openly shared their thoughts, it was evident that social norms in the area made many feel hesitant, creating discomfort with speaking or being photographed. This nuanced understanding

allowed our team to respect and navigate the cultural sensitivities of the community. The local community, nonetheless, proved to be a wellspring of information, offering valuable insights into the project and expressing predominantly positive views regarding its potential for development. This holistic approach to stakeholder engagement not only highlights the diverse fabric of the community but also underscores the importance of cultural sensitivity in ensuring meaningful and respectful interactions during the assessment of socio-economic impacts.

14.5 DISCUSED POINTS

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

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

14.6 AFFECTED AND WIDER COMMUNITY

Table 14-2 Summary of Issues Raised by Stakeholders

Issue	Aspect / Concern Raised by Stakeholders	Project Proponent Commitments
Air Emissions	Dust and particulate matter from construction, excavation, and movement of construction vehicles affecting nearby settlements	Regular water sprinkling on exposed areas, covering of material during transport, periodic air quality monitoring as per PEQS standards
Noise Pollution	Noise from construction machinery, generators, and vehicle movement affecting nearby residents	Limit construction and heavy machinery operation to daytime hours; installation of noise barriers where needed; periodic noise monitoring
Traffic and Logistics	Increased movement of construction vehicles causing congestion and risk to local traffic	Schedule construction vehicle movements during off-peak hours; provide temporary traffic management and warning signage
Waste Management	Generation of construction debris, domestic waste from workers, and sewage potentially affecting surroundings	Segregation of waste at source; proper collection, storage, and disposal at municipal or authorized sites; regular cleaning of campsites

Issue	Aspect / Concern Raised by Stakeholders	Project Proponent Commitments
Water Usage	Use of water for construction activities affecting local water supply	Efficient water use; sourcing water from TMA-approved connections; reuse of water where feasible
Visual Impact	Dust, material storage, and temporary structures affecting site aesthetics	Proper storage of construction materials; maintenance of clean site; planning for parks and green belts to enhance aesthetics
Worker Health and Safety	Exposure to dust, noise, and machinery hazards during construction	Provision of PPE (helmets, gloves, masks, safety shoes); safety training; first-aid facilities; monitoring and enforcement of safety protocols
Cumulative Impact	Potential cumulative environmental impacts on air, noise, and traffic due to other nearby developments	Incorporate cumulative impact assessment in EMP; coordinate with local authorities and nearby communities



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15 GRIEVANCE REDRESS MECHANISM

A Grievance Redress Mechanism is a structured system established to address and resolve complaints, concerns, or issues raised by individuals or entities regarding their experiences or interactions. This mechanism typically involves clear channels for lodging complaints, whether through written communication, online platforms, or dedicated grievance officers. Once a grievance is registered, the mechanism ensures a systematic and fair investigation of the matter, taking into account all relevant information and perspectives. Timely resolution and effective communication with the aggrieved party are essential components, helping to restore trust and rectify any perceived injustices. An efficient Grievance Redress Mechanism not only safeguards the rights and interests of individuals but also contributes to organizational transparency, accountability, and continuous improvement in service delivery.

15.1 OBJECTIVES OF GRIEVANCE REDRESS MECHANISM

The objectives of a GRM are designed to provide an effective and transparent process for addressing and resolving complaints or grievances raised by individuals or entities affected by a project or organization. The key objectives of a Grievance Redress Mechanism include:

- ☞ Ensure that the grievance redress process is easily accessible to all stakeholders, providing a straightforward means for individuals or communities to voice their concerns.
- ☞ Promote a fair and impartial mechanism that treats all grievances with equal consideration, regardless of the stakeholder's background, status, or affiliation.
- ☞ Establish a system that addresses grievances in a timely manner, minimizing delays and providing prompt resolution to concerns to prevent prolonged dissatisfaction.
- ☞ Foster transparency in the grievance redress process, ensuring that stakeholders are informed about the status of their complaints and the steps taken to address them.
- ☞ Hold the organization or project accountable for addressing and resolving grievances in accordance with established policies and procedures.
- ☞ Utilize the grievance redress process as an opportunity for organizational learning, collecting feedback to identify areas for improvement in project implementation or organizational practices.
- ☞ Empower affected individuals or communities by giving them a voice in the decision-making process and acknowledging the importance of their concerns.

- ☞ Serve as a mechanism for resolving conflicts and disputes in a constructive manner, minimizing the potential for escalation and promoting harmonious relationships.
- ☞ Use insights gained from the grievance redress process to enhance project design, implementation strategies, and overall organizational practices for continuous improvement.
- ☞ Ensure that the grievance redress mechanism aligns with legal requirements, industry standards, and the principles of social responsibility.
- ☞ Strengthen community engagement by demonstrating a commitment to addressing concerns and maintaining open communication channels.

By achieving these objectives, a Grievance Redress Mechanism contributes to building trust, fostering positive relationships with stakeholders, and enhancing the overall social and environmental sustainability of a project or organization.

15.2 COMPONENTS OF GRM

GRM typically involves several basic steps to address and resolve complaints or grievances effectively. While specific procedures may vary depending on the organization or context, the following are common steps in a basic GRM:

- ☞ Individuals submit their grievances through designated channels, which may include online platforms, written communication, or direct contact with a grievance officer.
- ☞ The received grievance is formally registered in the system, assigning a unique identifier. This step ensures proper tracking and documentation of each complaint.
- ☞ A preliminary assessment is conducted to determine the nature and severity of the grievance. This step helps in categorizing grievances and prioritizing them based on urgency.
- ☞ A thorough investigation is carried out to gather relevant information and facts related to the grievance. This may involve interviews, document reviews, or other means of inquiry.
- ☞ Clear and timely communication is maintained with the aggrieved party throughout the process. Regular updates and feedback are provided to keep them informed about the progress of the investigation.

- ☞ Once the investigation is complete, appropriate measures are taken to address the grievance. This may involve corrective actions, policy changes, compensation, or other forms of redress, depending on the nature of the complaint.
- ☞ The resolution is communicated to the aggrieved party, and feedback is sought to ensure their satisfaction. Follow-up may be conducted to confirm that the resolution has been implemented and to monitor any lingering concerns.
- ☞ The entire process, from grievance registration to resolution, is documented for record-keeping and reporting purposes. This documentation aids in analyzing trends, identifying systemic issues, and improving the overall grievance-handling process.

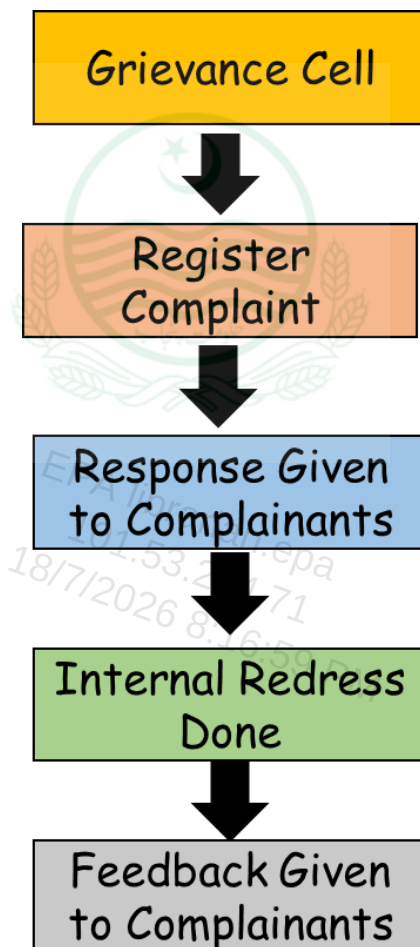


Figure 15-1 Grievance Redress Mechanism

16 CONCLUSION AND RECOMMENDATION

Based on the study conducted for EIA of the project, the following recommendations are made:

- ☞ Plantation as far as permissible and within the scope of the project to be carried out.
- ☞ Sustainable development approach through conservation of natural environment is followed.
- ☞ Environmental aspects of the project should be well taken care through implementation of the Environmental Management Plan as recommended in this report.
- ☞ The project management may adopt “cleaner and greener environment” as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.



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Glossary

Air quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Area	Area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates contaminate	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.

Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the earth and its life
Ground water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Land acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Parking	A parking garage is a building, or an area under a building, where cars can be parked.
Project area	The area specified by the funding and/or implementing agency according to the official gazette notification and includes the areas within the administrative limits of the provincial government.
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.

Resettlement	Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOS, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.



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REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

1. Information and data provided by project proponents;
2. Project Pre-Feasibility Study Report;
3. Technical Design Data related to the project.
4. Information gathered through discussions with the project related persons of the project proponent;
5. Information collected from the Technical documents of various suppliers of machinery/equipment.
6. National Environment Quality Standards for Ambient Air August 2016;
7. Punjab Environment Quality Standards Noise Levels August 2016;
8. Punjab Environment Quality Standards for Drinking Water August 2016;
9. Pakistan Environmental Protection Act, 1997;
10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:
 - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
 - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
 - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.
- i. Environment related Laws in Pakistan and the Province of Punjab;
- ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
- iii. Google earth, maps.
- iv. Guidelines for Public Consultations - These guidelines cover:
 - Consultation, involvement and participation of Stakeholders
 - Techniques for public consultation (principles, levels of involvements, tools, building trust)
 - Effective public consultation (planning, stages of EIA)

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- where consultation is appropriate)
 - Consensus building and dispute resolution.
1. workplace safety and health act 2011
 2. Land Acquisition Act (LAA) of 1894
 3. The forest Act 1927
 4. Pakistan Penal Code, 1860
 5. Provincial Wildlife Act, 1974
 6. Drugs Act 1976



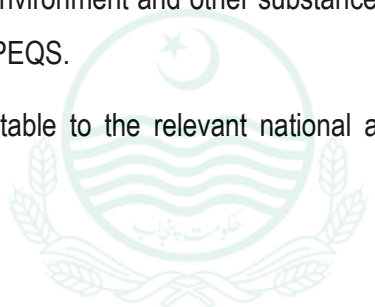
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TERM OF REFERENCES

1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial's laws & regulations including but not limited to:
 - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
 - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab



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