ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

M/S VISION HRA HOSPITALITY (PVT.) LTD

Mouza Danna Charhan Murree, District Rawalpindi

SUBMITTED BY:

MR. HAFEEZ UR REHMAN ABBASI

PREPARED BY:

ENVIRO STEWARDS COMPANY (PVT) Limited

akmal@envirostewardspk.com 0301-1199600 www.envirostewardspk.com

1st Floor, Allied Bank, A-Block Commercial Market, Canal View Housing Society, Lahore

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DISCLAIMER

The information presented herein is derived from the unique attributes of the project site as disclosed by the project proponents, stakeholders, and promoters, through provided maps, verbal communications, and all associated documentation. The veracity of the detail's rests solely with the project proponents, stakeholders, and promoters, and not with the environmental consultant. The Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) report is not subject to dispute in any court of law.

Representative: EIA & IEE Team

EXECUTIVE SUMMARY

This Environmental Impact Assessment (EIA) report presents a comprehensive overview of the key environmental and social considerations related to the commercial apartment building project, by the name of M/s Vision HRA Hospitality (Pvt.) Ltd, located at Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376, Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162 Mouza Danna Charhan Murree, District Rawalpindi, spanning a total area of 05 Kanal.

The project aims to develop a well-planned residential apartment that enhances livability, fosters economic growth, and contributes to the Sustainable Development Goals (SDGs). The main objectives of this project is to provide high-quality residential and lodging facilities for short- and long-term stays. To promote tourism and business travel by offering modern amenities and services. To generate economic growth through job creation and commercial activity in the area.

Enviro Stewards Company (Pvt.) Limited has been engaged as the environmental consulting firm responsible for preparing this assessment.

In accordance with the Punjab Environmental Protection Act and the Review of IEE & EIA Regulations, 2022, the project falls under Schedule II (list of projects requiring an EIA), Category I (Environmentally Sensitive Areas i.e., All Projects Situated in environmentally sensitive areas). As such, the preparation and submission of an EIA is mandatory to obtain the required Environmental Approval from the relevant authorities.

This report evaluates the potential environmental and social impacts of the project across its entire lifecycle. Key areas of focus include land use, water and air quality, solid waste management, traffic patterns, noise levels, and the socio-economic well-being of nearby communities. The findings are supported by field data, stakeholder consultations, and technical analysis.

To address potential adverse impacts, a range of mitigation and management measures have been proposed, aimed at minimizing harm to the environment and

surrounding population. These include best practices in construction management, pollution control, and community engagement.

Further technical details and a full description of the project, including planning and construction methodology, are provided in Chapter 05: Project Detail.

Brief of the Project

Table 1 Brief of Project

I.	**Title of Project**	M/s Vision HRA Hospitality (Pvt.) Ltd
II.	**Location of Project**	Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376, Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162 Mouza Danna Charhan Murree, District Rawalpindi
III.	**Total Area of Project**	05 Kanal
IV.	**Total Covered Area**	105540 SFT
V.	**Land Use**	Commercial
VI.	**GPS Coordinates**	33.878925N, 73.432187E
VII.	**Current Status of Project**	Constructed
VIII.	**Cost of Project**	560 million PKR
IX.	**No. of Floors**	There is ground floor, 1 to 4 Floors including 1 LG Floors.
X.	**Proponent of Project**	Mr. Hafeez Ur Rehman Abbasi
XI.	**Purpose of Project**	Sustainable & planned commercial development
XII.	**Description of Project**	The proposed apartment building comprises a ground floor, four floors, along with one lower ground (LG) floor, over the area of 05 Kanal. Each unit includes essential living spaces such as bedrooms, lounge, kitchen,

		and attached bathrooms, designed for comfortable family living. The building also features a dedicated parking area to accommodate residents' vehicles. Overall, the structure provides modern residential facilities while utilizing vertical space efficiently within an urban setting.
XIII.	**Cutting of Trees**	There is no cutting of trees involve. After construction trees also have planted.
XIV.	**Water Usage**	Approx. 10,000-12,000 liter per day of water will be used for domestic purpose
XV.	**Manpower**	20-25 person during construction and 25-35 permanent maintenance staff
XVI.	**Period of construction**	06-08 months
XVII.	**Assessed environmental issues**	Dust emissions, noise, solid waste, wastewater, traffic congestion, land use change will be the environmental issues
XVIII.	**Solid waste generation**	150-250 kg/day of solid waste will be generated during operational phase
XIX.	**Solid waste management**	On site storage collection method will be applied. After collection, it is further managed by EPA approved vendor
XX.	**Wastewater generation**	About 10-12 m^3/day of wastewater will be generate during operational phase of project
XXI.	**Wastewater management/ disposal**	After treatment in septic tanks, it will be disposed of in the sewerage system
XXII.	**Air & Noise pollution & control measures**	Dust suppression through water sprinkling, tree plantation, machinery maintenance, use of PPEs will be mitigation measures

XXIII.	**Rainwater Harvesting Plan**	Rain water harvesting system include catchment area, gutters and downspouts to collect the water, and storage tanks to hold the harvested water. This water can then be used for non-potable purposes. Detail is given in chapter 5 under the heading of 5.9 available facilities in the subheading 5.9.1.
XXIV.	**Consultant Company**	Enviro Stewards Company (Pvt.) Limited
XXV.	**Compliance**	In accordance with Punjab Environmental Protection Act & IEE/EIA Regulations 2022

Legal and Administrative Framework

These include the National Conservation Strategy (1992), National Environmental Policy (2005), Pakistan Labor Policy (2010), and the Punjab Environmental Protection Act (PEPA 1997), along with its subsequent amendment in 2012. Additionally, the project ensures compliance with the Punjab Environmental Quality Standards (PEQS), the Land Acquisition Act (1894), the Prohibition of Cutting of Trees Act (1975), the Punjab Wildlife Act (1974), the Punjab Plantation and Maintenance of Trees Act (1974), and the Antiquities Act (1975).

A thorough review of environmental documents has been conducted, underscoring the mandatory submission of an environmental assessment study report as required by the Pakistan Environmental Protection Ordinance (PEPO), 1983, and reinforced by the Pakistan Environmental Protection Act (1997). Specifically, Section 12(1) of the amended PEPA (2012) stipulates that any project involving the construction or modification of the physical environment must conduct an Environmental Impact Assessment (EIA) or an Initial Environmental Examination (IEE) and obtain approval (NOC) from the relevant provincial environmental authority.

In the preparation of the Environmental Impact Assessment (EIA) report for the said project, full consideration has been given to the PEPA (1997), the Punjab Environmental

Protection (Amendment) Act (2012), and all other applicable legal requirements from both the Pakistan and Punjab governments, including the Land Acquisition Act (1894).

Assessment of Major Impacts

During Construction Phase

The construction phase of the said project will involve significant land development and infrastructure activities, which are likely to result in several environmental impacts. These impacts will primarily include soil erosion, dust generation, noise pollution, and disruption of local ecosystems. Soil erosion may occur due to excavation and land grading, particularly during heavy rainfall, which can lead to sedimentation of nearby water bodies. The generation of dust during construction activities can have adverse effects on air quality, leading to health issues for workers and the surrounding community. Noise pollution from machinery and construction activities will likely impact both the local community and wildlife in the vicinity, especially during nighttime construction. Additionally, the project may disrupt local wildlife habitats, potentially leading to displacement of species, especially if there are areas of natural vegetation or wetland ecosystems within the project site.

During Operational Phase

Once operational, the project will generate a different set of environmental impacts primarily related to waste management, water consumption, energy use, and increased traffic. The operational phase will lead to higher water consumption due to the development's residential and commercial needs, which may put pressure on local water resources. Additionally, the disposal of solid waste and sewage from the residents and businesses will need to be carefully managed to avoid contamination of local water bodies and soil.

Energy consumption will increase as residents and businesses rely on electricity for daily activities, which may result in increased emissions if the energy source is not environmentally friendly. The demand for electricity, especially if sourced from non-renewable energy, will also contribute to the carbon footprint of the development. The

increase in vehicular traffic will lead to higher emissions of greenhouse gases and pollutants, as well as the potential for traffic congestion in the surrounding areas.

Proposed Mitigation Measures

Mitigation Measures during Construction Phase

- **Dust Control:** Water sprinkling on unpaved roads, construction sites, and material stockpiles will be carried out regularly to suppress dust. Construction materials such as sand and cement will be stored in covered areas or containers.
- **Noise Reduction:** Use of well-maintained and quieter machinery, along with limiting high-noise activities to daytime hours, will help reduce the impact on nearby communities and wildlife. Workers will be provided with protective hearing equipment where needed.
- **Erosion and Sediment Control:** Proper grading, construction of drainage channels, and installation of silt fences will help manage stormwater runoff and reduce soil erosion during excavation and site leveling.
- **Waste Management:** Construction waste will be segregated and disposed of by EPA approved vendor. Recyclable materials such as metal, wood, and concrete will be separated and reused where possible.
- **Protection of Flora and Fauna:** Vegetation clearance will be minimized, and native plants will be preserved where feasible. Construction zones will be clearly marked to avoid encroachment into ecologically sensitive areas.
- **Health and Safety:** Workers will be provided with safety gear and training. On-site medical aid and emergency response protocols will be established.
- **Traffic Management:** A traffic management plan will be implemented to control heavy vehicle movement and reduce inconvenience to local traffic, especially near residential areas.

Mitigation Measures during Operational Phase

- **Solid Waste Management:** A proper waste collection and disposal system will be established. Segregation at source and provision of designated recycling points will help reduce landfill load.

- **Sewage and Wastewater Treatment:** A septic tank will be installed to treat wastewater before its safe discharge or reuse, thereby protecting groundwater and surface water bodies.
- **Water Conservation:** Water-efficient fixtures will be installed, and public awareness campaigns will promote water-saving practices among residents. Rainwater harvesting systems may also be integrated.
- **Energy Efficiency:** Buildings will be designed with energy-efficient lighting, insulation, and ventilation. Solar panels or other renewable energy sources may be used to reduce dependency on the national grid.
- **Green Landscaping:** Native and drought-resistant plant species will be used in landscaping to reduce water use and enhance biodiversity. Green belts and parks will be maintained to improve air quality.
- **Traffic and Transportation:** Road infrastructure will be developed with dedicated pedestrian walkways and cycling lanes. Encouragement of public transport usage and smart traffic systems will help reduce emissions.
- **Environmental Monitoring:** Regular monitoring of air, water, and noise levels will be carried out to ensure compliance with environmental standards. An environmental management plan (EMP) will guide sustainable practices throughout the project's life.

Proposed Monitoring Framework

Given the requirement for an Environmental Examination due to the potential long-term, significant, or adverse environmental impacts associated with the said project, it is essential to implement a comprehensive Environmental Monitoring Program. This program will systematically monitor key environmental parameters throughout all phases of the project planning, construction, and post-construction to ensure full compliance with the Punjab Environmental Quality Standards (PEQS) and other applicable legal requirements.

The Environmental Management and Monitoring Plan serves as a strategic tool to minimize potential negative environmental effects during the development and

operational stages of the said project. It also seeks to enhance the overall project value by enforcing high standards for health, safety, and environmental protection.

The project proponent is fully committed to implementing all proposed mitigation measures during the land development, construction, and habitation phases. Environmental monitoring is a core element of this commitment and will be conducted regularly to assess compliance and performance. The specific details of the monitoring approach and frequency are provided in Chapter 07 of the report

Conclusions and Recommendations

The said project is expected to bring numerous positive impacts, particularly by creating employment opportunities, good livings and fostering new business activities. These developments are likely to contribute to increased income levels, improved social infrastructure, and overall enhancement of socioeconomic conditions in the project area. The initiative holds strong potential to stimulate local economic growth and uplift the living standards of the community.

Although some minor to low-level adverse environmental impacts may occur during the project's implementation such as temporary effects on air quality, noise levels, dust generation, and local biodiversity these are considered manageable. The proposed mitigation measures are practical and cost-effective, ensuring that any negative effects can be minimized effectively.

To ensure the environmental sustainability of the project, a robust set of mitigation and monitoring measures has been designed, along with clear selection criteria and assessment procedures for any sub-components of the development.

It is strongly recommended that the project proponent obtains the required environmental clearance, including the No Objection Certificate (NOC) from the Punjab Environmental Protection Agency (Punjab-EPA), prior to commencing any construction activities. This step is essential to ensure compliance with legal and regulatory frameworks.

1 INTRODUCTION

1.1 General

The construction and development of commercial apartment buildings are integral to addressing the growing demand for tourism. The scope of apartment development involves the planning, design, and construction of multi-story residential buildings, often with amenities such as parking and communal spaces. This trend is particularly prominent in urban areas where land availability is limited. The benefits of apartment buildings include efficient land use, higher residential density, and the provision of affordable living in metropolitan areas. They also promote the creation of vibrant, self-contained communities with easy access to work, schools, and public services.

On a broader scale, these developments often attract more businesses to the area, including shops, restaurants, and service providers, creating a thriving commercial environment. This can lead to further job creation and higher income levels for the community. First, it stimulates local economies by creating jobs in various sectors such as construction, architecture, engineering, and property management. Workers such as laborers, electricians, plumbers, and designers all benefit from the building process. Environmentally, apartment buildings can be designed to maximize energy efficiency, minimize waste, and reduce the carbon footprint compared to traditional building.

However, there are environmental concerns, such as increased water and energy consumption, traffic congestion. Additionally, the rapid development of apartment complexes can strain existing infrastructure if not properly managed. Despite these challenges, apartment building development plays a crucial role in urban planning, balancing the needs for growth, sustainability, and economic progress.

1.2 Purpose of the Report

This report has been prepared to conform to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Initial Environmental Examination or where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment, and has obtained from the Provincial Agency approval in respect thereof."

The EIA report is comprehensive, covering socio-economic, physical, and environmental aspects, including land use, forestry, crops, water bodies, biodiversity (flora and fauna), heritage, and other factors relevant to the project and its surrounding area. It meticulously details mitigation strategies intended to address and neutralize potential environmental impacts on human and environmental health in the vicinity of the project site. These strategies are applicable during both the construction phase and the regular operation of the project.

Moreover, the report serves as a crucial document for decision-makers, particularly the EPA of Punjab, providing all necessary information in the officially approved format. This facilitates an informed decision-making process regarding the issuance of the required environmental approval. Through this report, the proponent demonstrates a commitment to adhering to the Punjab Environment Quality Standards (PEQS) and maintaining a robust environmental management order throughout the lifecycle of the project.

1.3 Identification of the project and proponent

The detail of the project and proponent is given below:

Name of project	M/s Vision HRA Hospitality (Pvt.) Ltd
Location of project	Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376, Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162 Mouza Danna Charhan Murree, District Rawalpindi
Proponent name	Mr. Hafeez Ur Rehman Abbasi
CNIC	37404-0308176-9

1.4 Consultant Information

The initiator has contracted with M/s Enviro Stewards Company (Private) Limited for the execution of report for the aforementioned project, in alignment with the standards and guidelines set forth by the Environmental Protection Agency (EPA) of Punjab. To fulfill this objective, M/s Enviro Stewards Company (Private) Limited has assembled a team of experts, including environmental specialists, environmental engineers, and chemical engineers. Further information on the consultancy team is provided below:

Detail of the Consultant	
Company name	Enviro Stewards Company (Private) Limited
Address	1st Floor Allied Bank A-Block Commercial Market Canal View Society, Lahore.
Contact No.	0301-1199600

1.5 Nature, Size and Location of Project

The project under consideration involves the establishment of a facility designed to provide high-quality residential spaces. The development aims to offer modern living accommodations with a range of amenities and services, addressing the growing demand for tourist in the said area. The facility will include various apartment sizes, common areas, and essential infrastructure to support the needs of residents, named "M/s Vision HRA Hospitality (Pvt.) Ltd." This facility is to be situated at Mouza Danna Charhan Murree, District Rawalpindi, encompassing an area of 05 Kanal.

The project is expected to generate employment opportunities for approximately 20-25 individuals during its construction phase. Furthermore, upon transitioning to the operational phase, it is anticipated that an additional 25-35 personnel will be employed.

Figure 1 Site Location

1.6 Scope of the EIA Study, Area of Influence, and Magnitude of Efforts

The scope of this Environmental Impact Assessment (EIA) study covers all potential environmental, social, and safety impacts associated with the said project of M/s Vision HRA Hospitality (Pvt.) Ltd. It includes the assessment of impacts during construction, operation, and decommissioning phases, focusing on air quality, noise, soil and water resources, solid and liquid waste management, traffic impacts, occupational health and safety, and socio-economic conditions.

The area of influence extends beyond the project boundary to include the immediate surroundings that may be affected by vehicular movement, emissions, or accidental leaks, as well as nearby communities and sensitive receptors. It also considers regional impacts on local infrastructure, emergency response services, and economic activities.

The magnitude of efforts involves site inspections, stakeholder consultations, baseline environmental monitoring, risk assessment, and mitigation planning. Special emphasis has been placed on safety and environmental sustainability, in line with the Punjab Environmental Protection Act, and national environmental quality standards.

2 POLICY, LEGISLATION, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 General Overview

Environmental compliance is a cornerstone of responsible development in Pakistan. As tourism accelerates, particularly in these hilly area, adhering to the established environmental regulations ensures that the project does not cause undue harm to local ecosystems or communities. The said project, is required to undergo environmental review under Section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2012). This law mandates the preparation of an Environmental Impact Assessment (EIA) for the projects listed under Schedule II of the Review of IEE and EIA Regulations, 2022.

By adhering to these requirements, the project ensures a sustainable approach to urban development that aligns with both provincial and national environmental policies, contributing positively to the broader goals of sustainable development.

2.2 Screening

M/s Vision HRA Hospitality (Pvt.) Ltd, with a project area of 05 Kanal, falls under the following classification for environmental assessment Schedule II (list of projects requiring an EIA), Category I (Environmentally Sensitive Areas i.e., All Projects Situated in environmentally sensitive areas).

In line with the Review of IEE & EIA Regulations, 2022, this classification mandates that the project must conduct an EIA for obtaining environmental approval from the Punjab Environmental Protection Agency (Punjab EPA). This ensures that the project is subject to appropriate regulatory oversight while not unduly burdening developers with excessive requirements.

2.3 Regulatory and Framework Compliance

The EIA study is guided by a range of legal, regulatory, and policy instruments that ensure environmental and planning compliance. These instruments collectively form a

comprehensive framework that governs the environmental aspects of commercial development in Punjab.

2.4 Relevant Legal and Institutional Framework

2.4.1 Punjab Environmental Protection Act, 1997 (Amended 2012)

This Act is the cornerstone of environmental law in Punjab and mandates the preparation of an IEE/EIA for any project that could significantly impact the environment. It establishes the powers of the Punjab EPA to review, approve, and monitor environmental assessments, ensuring that development activities comply with environmental protection standards.

2.4.2 Review of IEE & EIA Regulations, 2022

These regulations under the Punjab Environmental Protection Act detail the procedures for the preparation, review, and approval of environmental reports. The regulations specify timelines, content requirements, and the classification of projects according to their potential environmental impact.

2.4.3 National Environmental Policy, 2005

The National Environmental Policy sets the overarching vision for environmental governance in Pakistan, promoting sustainable development across all sectors. It emphasizes the importance of integrating environmental considerations into the planning process and provides a framework for policy alignment at both federal and provincial levels. The housing sector must ensure that it aligns with this national policy, especially regarding urban planning, waste management, and resource conservation.

2.4.4 Punjab Local Government Act, 2022

This act defines the responsibilities of local governments in land development, waste management, municipal services, and infrastructure within urban settings. Apartment buildings must coordinate with local government authorities to ensure proper planning, waste management, and service delivery.

2.4.5 Punjab Private Housing Schemes and Land Subdivision Rules, 2021

Administered by local development authorities, these rules govern the approval and development of private housing schemes in Punjab. They cover aspects such as layout design, road infrastructure, drainage systems, and the provision of essential services (water, sanitation, electricity). Compliance with these rules ensures that housing schemes meet the required standards for urban living.

2.4.6 Punjab Land Use (Classification, Reclassification, and Redevelopment) Rules, 2009

These rules regulate land use in Punjab and ensure that zoning and land classifications are in accordance with environmental and urban planning standards. The rules govern the conversion of agricultural land to residential or commercial purposes, a process crucial to housing developments. Environmental assessments must evaluate the impact of such land-use changes on local ecosystems and resources.

2.4.7 Punjab Local Government Act, 2022

This act defines the responsibilities of local governments in land development, waste management, municipal services, and infrastructure within urban settings. Housing schemes must coordinate with local government authorities to ensure proper planning, waste management, and service delivery.

2.4.8 Building Code of Pakistan (Seismic Provisions), 2007

This code applies to the structural integrity of buildings, particularly in areas prone to seismic activity. The code ensures that residential and commercial buildings within housing schemes are designed to withstand earthquakes, thereby safeguarding residents and reducing potential damage.

2.4.9 Punjab Municipal Solid Waste Management Rules, 2022

These rules regulate the collection, storage, transportation, and disposal of solid waste in Punjab. Apartment buildings are required to establish waste management systems that comply with these rules, ensuring that the project does not contribute to environmental degradation through improper waste handling.

2.4.10 Punjab Water Act, 2019

The Punjab Water Act governs water resources, including the extraction of groundwater and the management of water systems. For Apartment buildings, it is crucial to ensure that water use is sustainable, that stormwater is managed effectively, and that any new water extraction activities do not deplete local aquifers.

2.4.11 Punjab Wildlife (Protection, Preservation, Conservation and Management) Act, 1974

This law is applicable if the Apartment building is located near any protected or sensitive wildlife habitats. It governs the protection and management of biodiversity, including native plant and animal species. If the project area affects such habitats, appropriate mitigation measures will need to be implemented.

2.4.12 Forest Act, 1927

If the project site is located in or near forested areas, this Act requires that the developer obtain permission before clearing any forested land. It regulates deforestation activities and mandates the preservation of forest cover wherever possible.

2.4.13 Labor, Safety and Health Laws

These laws ensure the safety, health, and welfare of workers during construction activities. They set guidelines for workplace safety, worker health conditions, and risk management.

2.4.14 Public Consultation Guidelines, 1997

This guideline emphasizes the importance of early and inclusive public consultation with stakeholders, especially with communities living near the project site. It mandates that affected populations and municipal bodies are consulted before finalizing project plans, ensuring that the community's concerns are addressed.

2.4.15 Guidelines for Sensitive and Critical Areas

If the project site is located near sensitive or critical areas such as schools, hospitals, water bodies, wetlands, or areas of cultural heritage, these guidelines must be

followed. They ensure that the project minimizes any adverse impacts on these sensitive environments.

2.4.16 Sustainable Development Goals (SDGs) Integration

Pakistan's commitment to the Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities), and SDG 13 (Climate Action), influences the design and implementation of housing schemes. These goals encourage projects that are environmentally sustainable, socially inclusive, and economically viable.

2.5 Institutional Framework

The following institutions play key roles in regulating and overseeing environmental compliance for the project in Punjab:

- Punjab Environmental Protection Agency (Punjab EPA): Responsible for enforcing environmental laws and ensuring compliance with IEE/EIA regulations
- District Administration and Municipal Committees: Manage local governance and ensure that projects align with community needs and local laws.
- Punjab Local Government Board: Supervises local urban development and service delivery.

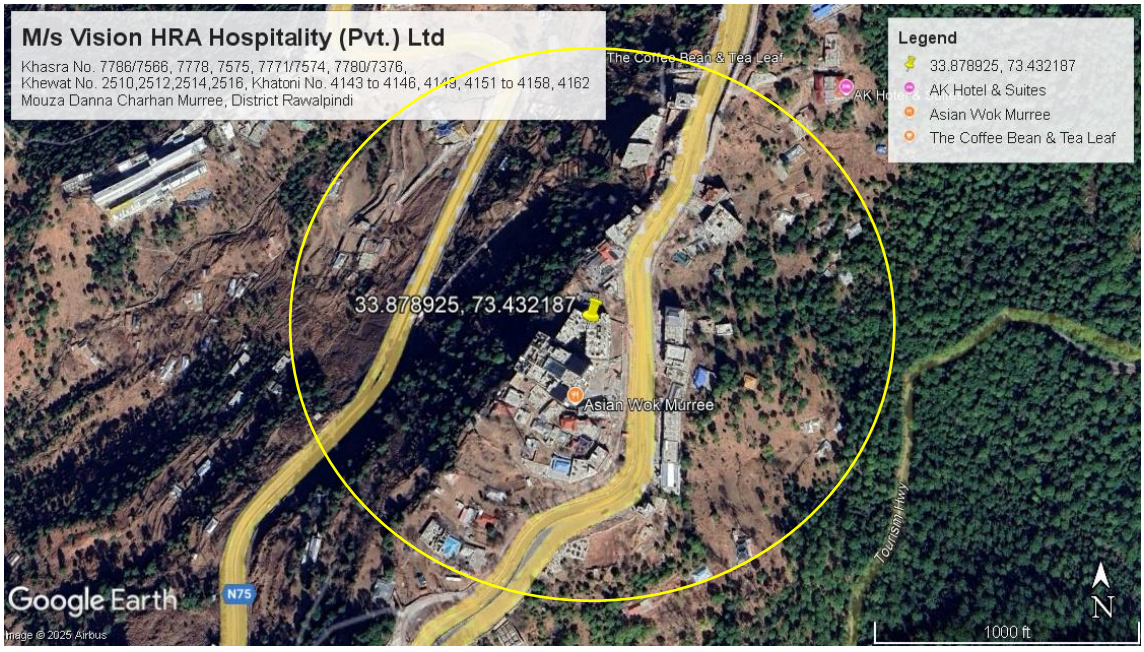
Irrigation Department, Forest Department, and Wildlife Department: Responsible for issuing NOCs related to water management, forest conservation, and wildlife protection.

3 SCOPING

The scoping in Environmental Impact Assessment involves a comprehensive assessment of the potential impacts of a project or activity, including direct and indirect impacts, cumulative impacts, and potential long-term effects. This assessment is carried out by a team of environmental and social experts, who analyze the proposed project or activity in detail and identify potential risks and impacts on various aspects of the environment, such as air quality, water quality, biodiversity, and cultural heritage. In this Environmental Impact Assessment, a public consultation process is involved, where members of the public and other stakeholders can provide feedback and raise concerns about the proposed project or activity.

3.1 Spatial and Temporal Boundaries of Environmental Assessment

Due to construction of the current project, land use changes from open land to commercial building by M/s Vision HRA Hospitality (Pvt.) Ltd. Within radius of 5-km, no industry can be seen but few commercial markets & buildings are there represents in figure given below. Current project will be installed by adopting proper mitigation measures to avoid disturbance in nearby area and local community. In current project no significant emission will be observed because in the said project there will be only the emission from vehicles. Wastewater quality will be measured to ensure PEQS.



3.2 Important Issues and Concerns Raised during Consultation

During consultation it was observed that many people were in favor of the project but some of the issues and concerns were raised. During survey following concerns of local community, Government Departments, Environmental Practitioners and Experts, nearby industries were noted:

- Local should be preferred for the job opportunities
- Proper training should be given to workers
- Noisy activities should be confined
- Air pollution should be controlled effectively
- There should be careful handling of machinery
- Wastewater should not dispose of without proper treatment
- Solid waste must be collected timely
- Gas measurement devices should be used for continuous monitoring
- A proper wastewater treatment should be adopted
- Ensure the tree plantation in the vicinity of area
- Health and safety of workers should be ensured
- EMMP should be designed and enforced with great spirit
- Respective team officers should be responsible for the implementation of management plan and actions
- Avoid the excessive use of groundwater. Limited amount of water should be use
- Cleanliness of area should be ensured
- To reduce or avoid air pollution transport vehicles should be covered in the construction phase
- Proponent shall work for betterment of community

3.3 Significant Impacts and Factors to be Determined

The factors and impacts to be determined around the project site are:

- Dust and Particulate emissions
- Wastewater generation and its treatment

- Control Air emissions
- Solid waste management
- Occupational Health and safety
- Site Security
- Check and balance of storage unit
- Traffic Management
- Hygiene management
- Community impacts
- Job opportunities for locals
- Confined noisy activities.
- Resource conservation
- Avoid excessive water consumption.
- Energy efficient techniques must be adopted
- Proper site restoration after construction
- Tree plantation at designated green areas
- Emergency preparedness

4 Alternatives Consideration

The assessment for the project includes a detailed evaluation of project alternatives to ensure environmentally sustainable and socially responsible development. The alternatives have been examined with the intent to minimize adverse impacts while meeting the core objective of providing affordable, comfortable and sustainable livings.

Alternative assessment plays a vital role in promoting more effective decision-making by identifying potential environmental and social implications at the earliest stage of planning. The alternatives considered encompass site selection, design and layout planning, environmental integration, and economic feasibility, with an emphasis on long-term sustainability and compliance with legal standards.

4.1 Site Alternatives

The proposed site for the commercial building was selected based on a combination of legal, geographic, and urban planning considerations. The land (05 Kanal) was earmarked for the commercial use and duly approved by the relevant Development Authority.

Alternative sites were not pursued for the following reasons:

* The selected site lies within the commercial land, compatible with land use as the commercial apartment building or hotel.
* Proximity to key infrastructure such as, hospitals, road networks, and public utilities supports integrated community living.
* The land is non-agricultural, free from any protected ecosystems, water bodies, or heritage sites, thus minimizing ecological and cultural disruption.

Given these locational benefits and regulatory compatibility, no alternate site was found to offer similar viability and alignment with planning regulations.

4.2 Design and Layout Alternatives

Various design alternatives were explored during the planning phase, focusing on infrastructure efficiency, aesthetic appeal, environmental compatibility, and cost-effectiveness. The chosen layout includes:

* A balanced mix of residential area and community facilities.
* Hierarchical road networks and walkways designed for safe, efficient circulation and emergency access.
* Allocation of green belts and natural lighting and ventilation
* Energy efficient design and technology usage.

A vertical layout (G+4 with basement) is space-efficient and preserves open areas, while a terraced design can utilize natural slopes to reduce excavation and blend with the environment. Layouts may include a central corridor for compactness or a courtyard to enhance natural light and ventilation. Separating commercial and residential/guest zones improves privacy and noise control. Incorporating features like green roofs, balconies, and modular units promotes sustainability and flexibility. Parking can be planned in the basement or side areas based on accessibility and terrain.

4.3 Environmental Alternatives

Environmental alternatives for the commercial building project focus on minimizing ecological impact while ensuring sustainability. Key options include:

Selecting an alternative site with less ecological sensitivity, using eco-friendly construction materials, and adopting energy-efficient building designs. Incorporating renewable energy sources such as solar panels, rainwater harvesting systems, and wastewater recycling can significantly reduce resource consumption. Alternatives to conventional HVAC systems, like passive ventilation and insulation, can lower energy demand. Additionally, preserving existing vegetation, maximizing green space, and using permeable paving can help manage stormwater and reduce the heat island effect.

These alternatives ensure the project aligns with environmental conservation goals. These features collectively minimize the project's ecological footprint while improving residential livability.

4.4 Economic Alternatives

To enhance the project's economic viability and community benefits, several cost-effective and resource-efficient strategies were selected over conventional methods. These include the use of energy-efficient LED street lighting to reduce long-term operational costs

The incorporation of water conservation measures such as rainwater harvesting and low-flow plumbing fixtures.

Additionally, the project is designed to generate employment opportunities for local engineers, architects, laborers, and service providers, thereby supporting the local economy.

These measures not only lower construction and operational expenses but also deliver long-term economic and social value, making the project more sustainable and inclusive.

5 PROJECT DESCRIPTION

This Chapter presents the detailed project description along with project cost, land acquisition, implementation schedule, workforce and water requirements, etc.

The proposed commercial apartment/hotel project in Murree holds significant importance due to its strategic location in a popular tourist destination and its potential to meet the growing demand for quality lodging and residential services. The development will not only enhance the local hospitality and real estate sectors but also promote sustainable urban growth by incorporating energy-efficient design, water conservation, and waste management systems. It will provide economic uplift through job creation, improve infrastructure, and contribute to the overall aesthetic and functional development of the region, all while respecting the ecological sensitivity of the hilly terrain.

5.1 Objective of Project

The main objectives of the project are:

- ✓ To provide modern, well-equipped residential and lodging facilities for tourists and long-term residents.
- ✓ To promote sustainable construction through eco-friendly materials, rainwater harvesting, and energy-efficient systems.
- ✓ To support local economic development by generating employment opportunities during and after construction.
- ✓ To enhance the architectural landscape of Murree with a well-planned, multi-purpose building.
- ✓ To ensure efficient use of land while maintaining green spaces and open areas.
- ✓ To implement safe, climate-responsive, and earthquake-resistant infrastructure suitable for the hilly region.

5.2 Location & Site Layout

5.2.1 Site Location

The said commercial building by M/s Vision HRA Hospitality (Pvt.) Ltd, is located in the suburban periphery within the administrative jurisdiction of District, Punjab. The project area spans approximately 05 Kanal.

Location of project Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376, Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162 Mouza Danna Charhan Murree, District Rawalpindi

5.2.2 Site Coordinates

The GPS coordinates of the project site are 33.878925N, 73.432187E. Site location map is attached below.

5.3 Land use of the site

The surrounding land is currently used for commercial purposes that aligns with the required land use.

5.4 Road Access

The project site is well-connected through paved roads namely Islamabad-Murree Expressway, specifically providing direct and reliable access to the area. This road infrastructure is vital for facilitating the transportation of construction materials, machinery, and workforce during the development phase, and will also support smooth vehicular access. The road access enhances the project's feasibility and aligns with sustainable planning objectives. A detailed road access map is included to illustrate the site's connectivity with the surrounding transport network.


M/s Vision HRA Hospitality (Pvt.) Ltd
Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376,
Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162
Mouza Danna Charhan Murree, District Rawalpindi
Legend
33.878925, 73.432187
AK Hotel & Suites
Asian Wok Murree
The Coffee Bean & Tea Leaf
The Coffee Bean & Tea Leaf
33.878925, 73.432187
Asian Wok Murree
Tourism Hwy
N75
Google Earth
Image © 2025 Airbus
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1000 ft

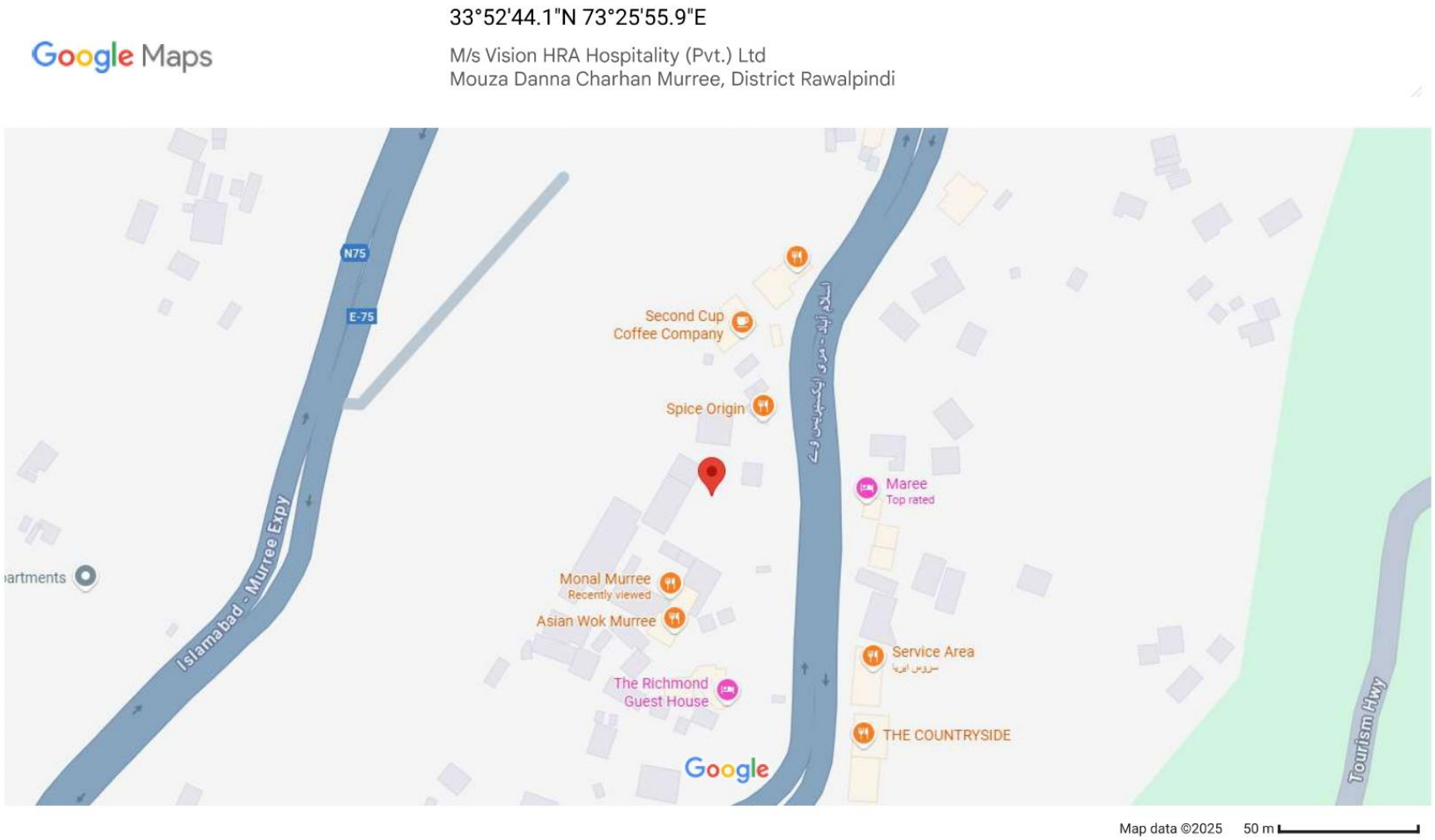


Figure 2 Rod Access Map

5.5 Vegetative Features of Site

The project site features sparse to moderate vegetation, primarily consisting of native grasses, scattered shrubs, and a few trees like kikar and sheesham. No rare or protected plant species are present, and the area has historically been used for intermittent agriculture. Plantation will be done and detail is given in the chapter of environmental management plan.

5.6 Magnitude & Cost of Project

The said project spans a total area of 05 Kanal, marking it as a significant feature in the tourism region. The project carries an estimated total capital investment of 560 million PKR, covering land development, infrastructure construction, utilities installation, and operational setup. The financial plan includes all costs associated with ensuring operational safety and environmental protection, eliminating the need for separate allocations for these aspects. Strong emphasis will be placed on the safe management of equipment and operations through rigorous and proactive practices. This integrated financial and operational planning underscores the project's commitment to both economic viability and environmental responsibility.

5.6.1 Cost Breakdown

- **Land Acquisition**

Land Cost: PKR 100 million

- **Construction Works**

Infrastructure Development (Structure, Foundation, Roof, Finishing): PKR 320 million

Sewerage & Drainage System: PKR 5 million

Electrical Infrastructure (Internal wiring, transformer, lighting, backup systems): PKR 10 million

Subtotal: PKR 335 million

- **Public Area Facilities & Development**

Landscaping & Green Belts: PKR 5 million

Parking Area & Walkways: PKR 6 million

Security Systems (CCTV, access control): PKR 3 million

Community/Common Areas (Reception, Lounge, Lobby): PKR 6 million

Subtotal: PKR 20 million

- **Environmental Management & Safety**

Rainwater Harvesting System: PKR 4 million

Waste Management (bins, segregation, temporary storage): PKR 4 million

Firefighting & Emergency Response Systems: PKR 5 million

Environmental Mitigation Measures (noise, dust, energy control): PKR 7 million

Subtotal: PKR 20 million

- **Professional Services & Contingencies**

Architectural, Structural & MEP Design Fees: PKR 15 million

Project Supervision & Administration: PKR 10 million

Legal, Approvals, and Contingencies: PKR 10 million

Subtotal: PKR 35 million

Total Project Cost: PKR 560 million

5.7 Proposed Schedule of Implementation

Stage I: Preliminary Phase

The land will be cleared, surveyed, and prepared for construction activities. Initial documentation and preliminary planning will also be undertaken.

Stage II: Design and Approval Phase

During this phase, the detailed design of the building will be completed, and necessary approvals and NOCs from regulatory authorities will be obtained.

Stage III: Construction and Infrastructure Development Phase

Once approvals are in place, heavy machinery will be mobilized to the site. Core construction activities, including road networks, sewerage, water supply, and electrification works, will be initiated and completed.

Stage IV: Marketing, Sales, and Operations Phase

Upon substantial completion of infrastructure, marketing and plot sales will launch. Employees will be recruited, operational staff will be trained, and the project will transition into the possession handover phase, where operations will officially commence.

Table 2 Schedule of Implementation

ACTIVITY	TIME FRAME							
	Four Week	Four Week	Four Week	Four Week	Four Week	Four Weel	Four Week	
Preliminary Phase								
Design Phase								
Approval Phase								
Construction Phase								
Infrastructure Development								
Marketing and Plot Sales Launch								
Completion of Infrastructure Works								
Possession Handover & Operations Start								
Possession Handover & Operations Start								

5.8 Description of Project

5.8.1 Project Overview

The M/s Vision HRA Hospitality (Pvt.) Ltd commercial apartment building, located at Khasra No. 7786/7566, 7778, 7575, 7771/7574, 7780/7376, Khewat No. 2510,2512,2514,2516, Khatoni No. 4143 to 4146, 4149, 4151 to 4158, 4162 Mouza Danna Charhan Murree, District Rawalpindi, Punjab, is a planned commercial building designed to meet the growing demand for quality living. Spanning total area of 05 Kanal. Total covered area of the project is 105540 SFT. No. There is ground floor, 1 to 4 Floors including 1 lower Ground.

5.8.2 Key Facilities & Functional Areas

i. Residential and Community Facilities

Residential Area: A variety of rooms to cater to different socio-economic groups, ensuring an inclusive community environment.

Commercial Areas: Strategically placed markets and shops to serve residents' daily needs and promote local businesses.

Community Facilities: Including mosques, graveyard, schools, health centers, and playgrounds for social and civic development.

ii. Utilities and Services

Water Supply & Sewerage System: A well-planned water distribution network and sewerage system to provide hygienic living conditions.

Electricity and Gas Supply: Provision of electricity connections and space allocated for potential gas infrastructure installation.

Solid Waste Management: Dedicated collection points and waste transportation systems to manage municipal waste efficiently.

iii. External Development Features

Road Network Wide internal roads with streetlights and green medians for safe and aesthetically pleasing transport.

Green Spaces Parks, green belts, and tree-lined streets enhance environmental quality and promote a healthier lifestyle.

Stormwater Management Rainwater harvesting pits and drainage systems to prevent waterlogging and promote groundwater recharge.

5.8.3 Activities Related to Project

The following activities will be part of project execution:

- Transportation and storage of construction materials during the development phase.

- Handling and safety protocols for construction materials and equipment, ensuring compliance with environmental and labor safety standards.
- Installation of safety signage across construction and public areas.
- Traffic Management Plans during construction and operational phases to prevent congestion.
- Rainwater harvesting systems to manage stormwater sustainably.
- Installation of firefighting systems at public buildings (e.g., community centers, mosques).
- Development of parks and tree plantation across designated green areas.
- Waste management plan including solid waste collection points and regular disposal systems
- Sewerage and drainage system installation with environmentally sound disposal mechanisms.

5.9 Available Facilities

1. **Workforce**

Manpower demand estimation is an essential component to facilitate deployment of manpower. Project will be constructed in phases. Tentative workforce required for said project during the construction phase will be about 35-50 workers/employees. Unskilled labor should be hired locally.

2. **Source of Water**

It is supposed that water tanks will be used by the contractor on the site for construction activities. The source of water during the operation phase for the said project will be the ground water.

3. **Water requirement**

The water consumption for the operational phase is estimated to be 10,000-12,000 liters/day of the said Project.

4. **Solid waste**

The solid waste generation is estimated to be 150-250 kg/day which will be collected at designated place.

5. **Power requirement / power source**

The main source of electricity/electric power will be Water & Power Development Authority (WAPDA).

6. **Health, Safety, and Environmental Controls:**

The facility will implement standard operating procedures (SOPs) for hygiene, emergency response, and safety. All workers will be provided with personal protective equipment (PPE), and training will be conducted regularly. Fire safety measures will include extinguishers, alarms, and a dedicated open emergency assembly area within the site boundary.

7. **Personnel Protective Equipment (PPE)**

To safeguard workers during both construction and operational phases, the following personal protective equipment will be provided, tailored to the specific activities undertaken:

- Protective goggles
- Leather or rubber safety shoes
- Gloves
- Face masks
- Helmets
- Overcoats

These measures emphasize the project's dedication to maintaining high standards of workplace safety, environmental protection, and operational efficiency, aligning with best practices and regulatory requirements.

5.9.1 Proposed Rainwater harvesting system

1. Rainfall Estimation

Murree Tehsil receives approximately 1,500 mm (1.5 m) of annual rainfall.

Project Area Details:

Total area: 27,225 SFT (5 Kanal)

Roof area (catchment): 17,500 SFT

Location: Muree, District Rawalpindi

Total Rainwater Harvestable (Runoff Volume):

We'll focus on the rooftop area (17,500 ft^2):

Convert to m^2:

17,500 ft^2 × 0.0929 = ~1,625 m^2

Rainwater collected annually:

Volume = Area × Rainfall × Runoff coefficient

Assuming a **runoff coefficient of 0.85** for RCC flat roof:

Rainwater = 1,625 m^2 × 1.5 m × 0.85 ≈ 2,071 m^3/year

= 2,071,000 litres/year

~ 5,672 litres/day (average)

This is the potential rainwater harvest, depending on seasonal rainfall. Peak harvesting will occur during the monsoon months.

2. System Components

Catchment Surface

RCC flat roof (properly graded for slope)

Conveyance System

- PVC/HDPE downpipes from rooftop drains
- Grated inlets leading to collection points

Filtration System

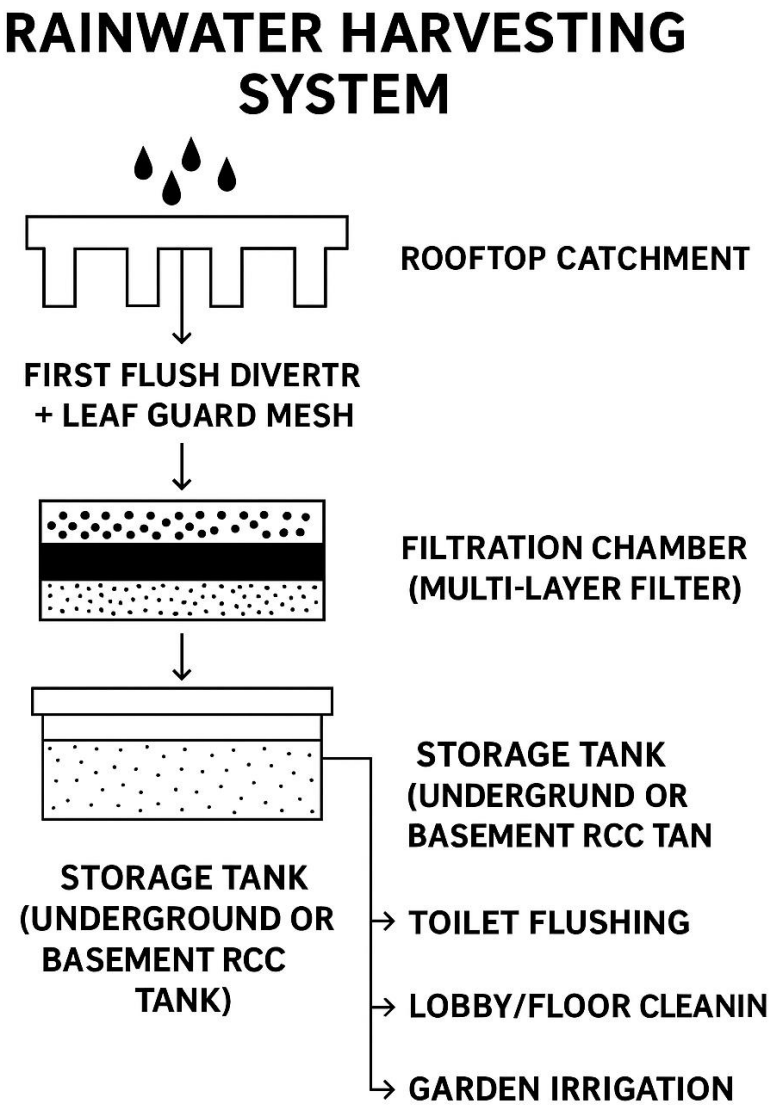
- First flush diverter to discard initial dirty rainwater
- Gravitational filter with layers: pebbles, gravel, sand, charcoal

Storage Tanks

- Ground-level HDPE/brick RCC tanks
- Capacity recommendation:
    - For 5–7 days use buffer: 40,000–50,000 litres
    - Single or distributed tanks can be used based on building layout

3. Flow-Sheet Diagram

Here is the step-by-step schematic description of the proposed rainwater harvesting system:



4. Effective Utilization Plan

Purpose	Frequency	Remarks
Toilet flushing	Daily	Saves freshwater
Outdoor area cleaning	Daily/Weekly	For parking and open corridors
Garden/greenbelt irrigation	Seasonal	During dry spells
Fire/emergency backup	When needed	Secondary use if water supply fails

5. Operation & Maintenance Plan

Monthly: Clean filter media, inspect piping

Seasonally: Flush and clean tanks, test first flush system

Pre-monsoon: Check entire system, ensure all filters and diverters are operational

Annually: Disinfect storage tanks and descale piping if needed

5.10 Restoration and Rehabilitation Plan

The project is located within a commercial area, but given the nature of the development, there are no significant concerns related to displacement or disruption to local residents. The project is designed to avoid the need for relocation or demolition of any existing structures, ensuring minimal impact on the surrounding community. Therefore, there is no immediate need for restoration, rehabilitation, or relocation. The development will proceed in alignment with sustainable practices within the designated area. Over its estimated 25-year operational lifespan, all civil structures and infrastructure will undergo periodic renovations to maintain operational efficiency and safety standards, without requiring extensive rehabilitation or affecting the residential community.

5.11 Safety Signs/Safety Boards

Safety signage plays a crucial role in accident prevention and risk communication at the workplace. These signs and symbols, designed to be easily understood by all employees, are essential for conveying important safety information and instructions.

The project will ensure that safety signs, symbols, and boards are prominently displayed across all departments, facilitating a culture of safety and awareness among workers and staff. This approach not only helps in mitigating hazards but also reinforces the project's commitment to maintaining a secure and health-conscious work.

5.12Government Approvals and Leases

Compliance with environmental regulations is paramount, necessitating approval from the Environmental Protection Agency (EPA) of Punjab, as per Section 12 of the Punjab Environmental Protection (Amendment) Act 2012. The preparation of this report for submission to EPA Punjab is a critical step towards securing the necessary governmental endorsements to commence construction, underscoring the project's adherence to legal and environmental mandates.

6 DESCRIPTION OF ENVIRONMENT

An environmental baseline study is intended to establish a database against which potential impacts can be predicted and managed subsequently. The EIA of the project covers a comprehensive description of the project area, including regional resources which are expected to be affected by the project, as well as those which are not expected to be directly affected by the construction and operation of the project.

A site visit was conducted to survey the field area for collection of relevant data. Interviews were conducted with the public and stakeholders of the project area to seek the public opinion on the implementation of the project. Various Governmental and Non-Governmental Organizations (NGOs) were also visited for the collection of relevant data and their views on the project were recorded for incorporation into the EIA report. The environmental impacts of any activity or process will be assessed based on deviation from the baseline or normal situation. The following components form part of the baseline:

- Physical Environment
- Ecological Environment
- Socioeconomic Environment

6.1 Physical Environment

The following section provides an overview of the information on physical environment of the proposed Project study area collected from primary as well as secondary sources. The major parameters covered include Physiographic and Topography, Geology, Soil, Seismicity, Climate and Meteorology, Ambient Air & Noise, Water Resources, Solid Waste, and Land Use.

6.1.1 Topography

The topography of Murree District is defined by its rugged and mountainous landscape, forming part of the outer Himalayan foothills in northern Punjab. The terrain features steep slopes, narrow valleys, rolling hills, and forested ridges, with altitudes ranging from approximately 2,000 to 2,300 meters above sea level. The

elevation varies significantly over short distances, creating a complex and sensitive terrain that is both ecologically significant and geotechnically unstable in certain areas.

This hilly topography supports dense coniferous forests, primarily composed of pine and oak species, contributing to the region's natural beauty and ecological richness. However, the steep gradients also make the area highly susceptible to soil erosion, slope instability, and landslides, particularly during the monsoon season when heavy rainfall increases runoff and reduces slope stability.

The natural drainage pattern is defined by numerous small streams and seasonal nullahs that flow through the valleys, feeding into larger river systems. These watercourses are critical for the local hydrology but also pose a risk of flash flooding when drainage systems are overwhelmed.

6.1.2 Geology

The geology of Murree District is predominantly influenced by its location within the outer Himalayas, comprising a complex and tectonically active zone. The region is mainly underlain by sedimentary rock formations belonging to the Murree Formation, which dates back to the Miocene epoch. This formation primarily consists of red to purple-colored sandstones, siltstones, and claystones, which are often interbedded and moderately to poorly consolidated.

These rocks have been heavily folded, faulted, and uplifted due to ongoing tectonic activity associated with the collision of the Indian and Eurasian tectonic plates. As a result, the area is seismically active and prone to geological hazards such as earthquakes and landslides. The geological structures in the region, including thrust faults and shear zones, contribute to slope instability, especially in areas of steep terrain and intense weathering.

Weathering processes in the Murree hills have led to the development of a loose soil mantle over the bedrock, particularly on upper slopes, which increases susceptibility to erosion and mass movement during heavy rainfall. Additionally, localized

occurrences of colluvium and alluvium deposits are found in valley bottoms and along streambeds, consisting of mixed silt, sand, and gravel.

6.1.3 Soil & Mountains

The soils are mostly alluvial or gravel caps. The northern part of the metropolitan area is in the mountainous terrain of the Margalla Hills, which are a part of the Lower and Outer Himalayas. These also include the Hazara and Kala Chitta Ranges. The Margalla Hills reach 1,600 m altitude near Islamabad, and consist of many ridges. Tilla Charouni, at 1,604 m (5,263 ft), is the highest point of Margalla Hills in the Islamabad Territory.

The Murree and Kotli Sattian Hills are on the east of the Capital Territory.

6.1.4 Seismic Activity

The district belongs to zone 2A of the Seismic Zone Map of Pakistan, which means there will be minor to no damage to property due to earthquakes.

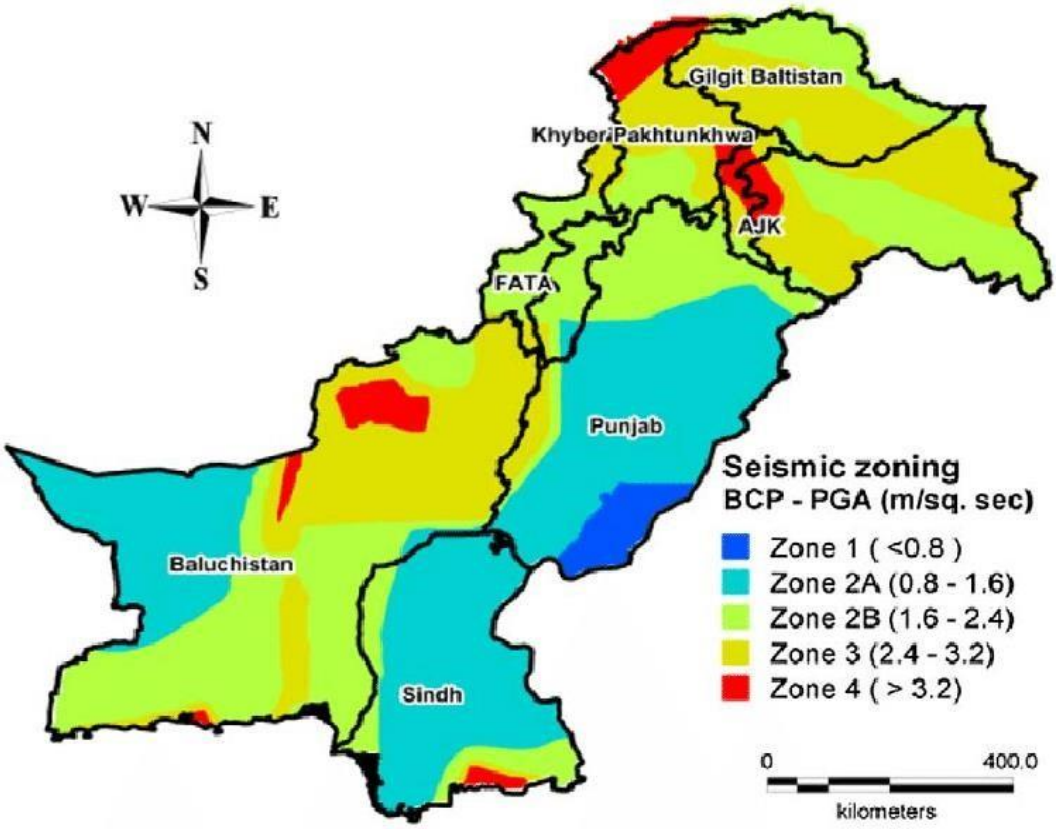


Figure 4 Seismic Zone of Pakistan

6.1.5 Climate

Murree District experiences a humid subtropical climate with distinct seasonal variations, influenced by its elevation and position along the outer Himalayan foothills.

The climate is characterized by cool summers, cold winters, and a prolonged monsoon season, making it one of the most popular hill stations in Pakistan due to its moderate and pleasant weather.

Temperature

The temperature varies significantly with altitude and season.

- Summers (May to August) are mild and pleasant, with average daytime temperatures ranging between 18°C to 25°C.
- Winters (December to February) are cold, with temperatures frequently dropping below 0°C, especially at night. Snowfall is common during the peak winter months, often ranging from 20 cm to over 100 cm annually in higher elevations.

Rainfall

Murree receives significant rainfall throughout the year, with the highest concentration during the monsoon season (July to September).

- The average annual precipitation ranges between 1,400 mm to 1,800 mm.
- Monsoon rains are often intense and can trigger flash floods, soil erosion, and landslides, especially on deforested or disturbed slopes.

Humidity and Wind

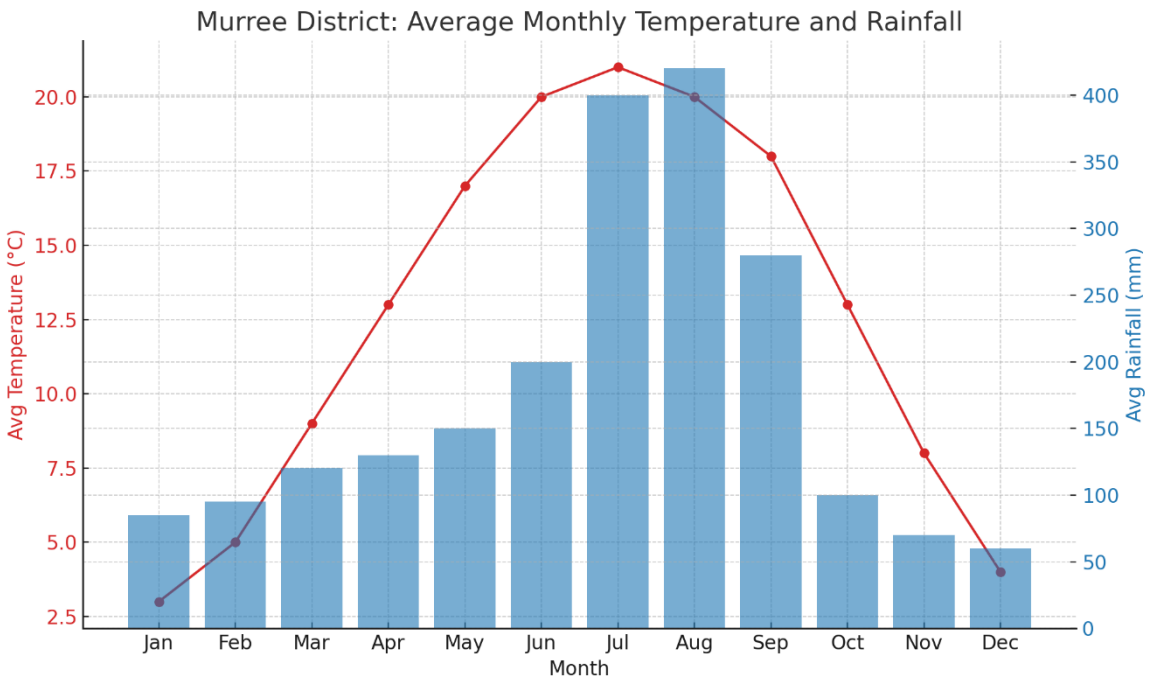
Humidity remains relatively high during the monsoon months and drops during winter. Light to moderate winds are typical throughout the year, but strong gusts may occur during storms or transitional weather.

Climate Sensitivity

Due to its location and elevation, Murree is highly sensitive to climatic variations. Climate change impacts such as erratic rainfall patterns, increased frequency of extreme weather events, and temperature fluctuations pose risks to both natural

ecosystems and human settlements. These factors must be considered in the planning and design of infrastructure projects.

Table 3 Average Weather



Here is a graph showing the average monthly temperature and rainfall in Murree District:

- The red line represents the average temperature (°C), which ranges from around 3°C in January to 21°C in July/August.
- The blue bars show average monthly rainfall (mm), with the monsoon peak in July and August reaching up to 400+ mm, indicating a high risk of landslides and soil erosion during this period.

6.1.6 Ground Water

Groundwater in Murree District exists primarily within fractured bedrock aquifers and weathered rock zones, typical of hilly and mountainous terrain. Unlike plain areas with extensive alluvial deposits, Murree lacks deep, continuous aquifers. As a result, groundwater availability is limited, discontinuous, and highly dependent on local geology, slope, and rainfall recharge.

The main sources of groundwater recharge are rainfall and snowmelt, which infiltrate through cracks, joints, and weathered zones in the sedimentary rocks of the Murree Formation. The average annual rainfall of approximately 1,400–1,800 mm plays a crucial role in sustaining springs, shallow wells, and tube wells that serve as the primary water sources for both domestic use and small-scale developments.

Groundwater yields in the region are generally low to moderate. In many areas, especially on ridge tops and steep slopes, shallow wells may dry up during dry seasons, and water extraction from deep boreholes is often not feasible or economically viable due to the hard rock geology and low permeability of subsurface formations.

Water quality is usually acceptable for domestic use, although localized contamination from poorly managed sanitation systems, septic tanks, or waste dumping sites has been reported. There is also growing pressure on the aquifer system due to increased population, tourism, and unregulated construction

6.1.7 Surface Water Hydrology

Murree District features a well-defined yet delicate surface water hydrology, shaped by its mountainous terrain, high rainfall, and forested slopes. The area is part of the Soan River catchment, which eventually drains into the Indus River system. Surface water in Murree primarily consists of perennial and seasonal streams (locally known as "nullahs"), springs, and rainwater runoff channels that flow through the narrow valleys and steep slopes of the region.

Key streams in the region include the Mall Nullah, Bhurban Stream, and Dewal Nullah, among others, which play a vital role in draining the upland watershed. These streams are rain-fed and highly seasonal, with flows peaking during the monsoon season (July to September) when rainfall intensifies. During this period, the area is prone to flash floods and rapid runoff, especially in zones with deforestation, poor drainage design, or disturbed slopes.

The region also contains numerous natural springs and small freshwater reservoirs, which are vital for the local water supply. These surface water bodies also contribute to groundwater recharge and support biodiversity and ecosystem services.

However, Murree's surface water systems are increasingly under stress due to urban expansion, unregulated construction, solid waste dumping, and poor sewage management. Many watercourses are at risk of contamination from domestic effluents, surface runoff, and tourism-related pollution, which can degrade water quality and ecosystem health.

6.2 Ecological Environment

Following is the description of the baseline ecological environment of the area.

6.2.1 Flora

The flora of Murree District is rich and diverse, owing to its location in the Himalayan moist temperate zone. The region is characterized by dense forest cover comprising both coniferous and broad-leaved species that play a vital ecological role in slope stabilization, water regulation, and habitat provision.

Dominant tree species include:

Category	Scientific Name	Common Name
Coniferous Trees	*Pinus roxburghii*	Chir Pine
	Pinus wallichiana	Blue Pine
	Cedrus deodara	Himalayan Deodar
	Abies pindrow	Silver Fir
Broadleaf Trees	*Quercus incana, Q. dilatata*	Oak species
	Acer caesium	Maple
	Aesculus indica	Horse Chestnut
Shrubs/Understory	*Berberis lycium*	Berberis
	Dodonaea viscosa	Dodonaea
	Rosa spp.	Wild Roses
	Rubus fruticosus	Blackberry
	Lonicera spp.	Honeysuckle

These forests not only enhance the natural beauty of the region but are crucial for preventing soil erosion, maintaining groundwater recharge, and supporting biodiversity. However, Murree's natural vegetation is under growing pressure from human activities such as deforestation, illegal wood cutting, overgrazing, and unplanned urban expansion. These threats have led to forest degradation, habitat loss, and increased vulnerability to environmental hazards such as landslides and flash floods. In the context of development, it is imperative to minimize disturbance to native vegetation through careful site planning, restricted tree cutting, and implementation of compensatory plantation programs. Conservation of existing green belts and buffer zones should also be prioritized to preserve the ecological balance of the region.

6.2.2 Fauna

Murree District supports a diverse assemblage of fauna due to its forested hills, cool temperate climate, and relatively undisturbed natural habitats.

Common Mammal Species in the Project Area

Common Name	Scientific Name	Remarks
Rhesus Monkey	*Macaca mulatta*	Common near populated areas
Indian Leopard	*Panthera pardus fusca*	Elusive predator; indicator of healthy forest ecosystem
Indian Pangolin	*Manis crassicaudata*	Nocturnal, insectivorous; **Endangered** (IUCN)
Red Fox	*Vulpes vulpes*	Widely distributed
Jackal	*Canis aureus*	Opportunistic omnivore
Wild Boar	*Sus scrofa*	Common in forested and agricultural areas
Porcupine	*Hystrix indica*	Nocturnal rodent with sharp quills

All play important roles in maintaining the ecological balance by controlling pests and recycling organic matter.

Murree is also rich in avifauna, with a wide range of resident and migratory bird species.

Common Avifauna in the Murree Region

Common Name	Scientific Name	Remarks
Khalij Pheasant	*Lophura leucomelanos*	Resident forest bird
Himalayan Monal	*Lophophorus impejanus*	Colorful, high-altitude pheasant
Woodpeckers	–	Several species; cavity nesters
Partridges	–	Ground-dwelling game birds
Bulbuls	–	Common in forest edges and gardens
Sparrowhawks	–	Small birds of prey
Mynas	–	Social, vocal, and widespread

These birds contribute to the ecosystem through seed dispersal, pollination, and insect population control. Seasonal migrations also bring in diverse bird species that use Murree's forests and water bodies as temporary habitats. Reptilian and amphibian fauna are represented by species such as the garden lizard (*Calotes versicolor*), skinks, geckos, and a variety of frogs and toads, particularly abundant during the monsoon season.

6.2.3 Endangered Species

Murree District is home to several wildlife species of conservation concern including:

Wildlife Species in Murree

Common Name	Scientific Name	IUCN Status	Remarks
Indian Pangolin	*Manis crassicaudata*	Endangered	Threatened by poaching and habitat loss; protected under national laws

Indian Leopard	*Panthera pardus fusca*	Vulnerable	Faces local endangerment due to habitat shrinkage and human-wildlife conflict
Himalayan Monal	*Lophophorus impejanus*	Near Threatened	Colorful pheasant species; declining due to habitat degradation
Khalij Pheasant	*Lophura leucomelanos*	Least Concern (globally)	Locally significant; affected by hunting and habitat disturbance

The presence of these species highlights the ecological sensitivity of the area, emphasizing the need for wildlife impact assessment and protective measures in any development activity.

6.3 Socio-economic Information

The objectives of the current study are as follows:

- To conduct a detailed assessment of the project's social impacts and collect relevant socio-economic data.
- To evaluate community needs with a focus on environmental and infrastructural concerns.
- To identify both adverse and beneficial socio-economic and public health effects of the project.
- To propose remedial actions aimed at improving socio-economic conditions in the area.
- To analyze the current socio-economic situation, particularly in relation to environmental conservation and sustainable development.

6.3.1 Demographic Profile

Murree District, located in the Rawalpindi Division of Punjab, has a population density of approximately 620 persons/km^2, with a near-equal gender distribution—50.6% male and 49.4% female. The region has both urban and rural populations, but much of it

comprises small towns and scattered hillside settlements. The population is steadily increasing due to migration and tourism-driven development.

6.3.2 Economic Conditions

The economy of Murree is largely driven by tourism, with supporting sectors including hospitality, retail businesses, transportation, and handicrafts. A significant portion of the local population is also engaged in government services, small businesses, and seasonal employment tied to tourism. Agriculture and livestock farming occur on a small scale due to the hilly terrain and limited arable land.

6.3.3 Agriculture

Agriculture in Murree is limited and primarily consists of small-scale farming of maize, potatoes, and seasonal vegetables. The region falls within the Northern Dry Mountains Agro-Ecological Zone, where farming is mostly rain-fed due to the lack of large-scale irrigation infrastructure. Fruit orchards—including apple, apricot, walnut, and cherry—are cultivated in some areas and contribute modestly to local livelihoods.

6.3.4 Religion

The population is overwhelmingly Muslim, accounting for over 98% of the total, with a small minority belonging to other religious communities. Religious practices are deeply embedded in daily life, with local mosques and shrines being central to community activities.

6.3.5 Languages and Major Castes

The primary languages spoken are Punjabi (Potohari dialect) and Urdu. Some communities also speak Kashmiri and Pashto. Major castes and ethnic groups in Murree include Abbasi, Gujjar, Jat, Rajput, Awan, Dhund, and Satti, many of whom are indigenous to the hilly regions of northern Punjab.

6.4 Quality of Life Values

6.4.1 Customs

Murree's residents maintain strong ties to cultural traditions and caste-based social structures. Visiting shrines, participating in local festivals, and observing religious rituals are common. Hospitality and communal bonding are highly valued.

6.4.2 Electric Supply

Electricity is supplied by IESCO (Islamabad Electric Supply Company), and the project site is connected to the national grid, ensuring adequate power availability.

6.4.3 Telephone Facilities

The project area has access to both landline and mobile communication networks, with reliable coverage from major telecom providers. Internet services are also available, although signal strength may vary with terrain.

6.4.4 Educational Facilities

Several government and private schools exist within Murree District, but higher education institutions are limited and mostly located in Rawalpindi or Islamabad. Within a 3–5 km radius of the project site, basic educational facilities are available for both boys and girls.

6.5 Site Suitability

The selected site for the commercial apartment/hotel project is situated in a naturally sensitive hilly region of Murree, known for its ecological richness, scenic value, and tourism potential. While the area requires careful planning due to its forested surroundings, variable slopes, and susceptibility to soil erosion and land stability issues, the selected site lies within a partially developed zone with existing infrastructure such as road access, electricity, and water supply.

The project footprint avoids dense forest patches and steep, unstable gradients, reducing the likelihood of major environmental disruption. Furthermore, the design incorporates sustainable features such as slope protection measures, controlled

stormwater drainage, rainwater harvesting, and landscaping that preserves natural vegetation where possible.

With strict adherence to environmental regulations, implementation of mitigation measures, and regular monitoring through an Environmental Management Plan (EMP), the site is considered suitable for responsible and low-impact development. The project has the potential to support eco-friendly tourism and generate local economic benefits, while minimizing adverse effects on the surrounding natural landscape.

7 IMPACTS AND MITIGATION MEASURES

This chapter provides a review of the potential impacts of the commercial building located at Mouza Danna Charhan Murree, District Rawalpindi over an area of 05 Kanal. The estimated cost for the subject project will be about 560 million PKR. These impacts could be both positive and negative and have been classified accordingly by a thorough review of the construction and operational phases of the project. This assessment numerates the magnitude of these impacts with the aid of environmental checklist and presents effective mitigation measures to counter their adverse nature.

7.1 Purpose of Environmental Mitigation Measures

Environmental mitigation measures are essential for ensuring the sustainable operation of the asphalt manufacturing unit, aligning with environmental compliance, and safeguarding ecological integrity. The rationale behind these measures is dissected through a series of critical inquiries:

i. Identification of the Problem

The core issue arises when environmental resources are exploited unsustainably, leading to significant degradation. Such exploitation diminishes the environment's resilience and carrying capacity, severely impeding its natural recovery processes. In the context of the proposed project, this could manifest as pollution, habitat disruption, or resource depletion, directly impacting the local ecosystem's health and functionality.

ii. Timing for Addressing the Problem

The environmental impacts of the project will become apparent from the onset of construction activities and continue throughout the operational phase. These effects are not confined to the project site but may extend to surrounding areas influenced by project activities. Early identification and timely intervention are crucial for preventing long-lasting or irreversible damage. Mitigation efforts should be initiated at the planning stage and integrated into all phases of the project lifecycle.

iii. Location for Mitigation Efforts

Mitigation strategies should be applied at the source of the environmental impact. This means implementing measures directly within the project site and, as necessary, in adjacent areas that might be affected by project-related activities. Focusing on the origin of potential problems ensures targeted and effective mitigation, reducing the overall environmental footprint of the project.

iv. Approach to Addressing the Problem

Addressing environmental issues necessitates adopting eco-friendly practices and technologies throughout the project's development and operation. Mitigation plans should include:

- Resource Efficiency: Minimizing the use of natural resources and promoting recycling and reuse to reduce waste.
- Pollution Control: Implementing advanced pollution control technologies and practices to minimize emissions, effluents, and waste generation.
- Habitat Protection: Avoiding or minimizing impacts on natural habitats and biodiversity, including the development of green belts and conservation areas.
- Community Engagement: Involving local communities and stakeholders in decision-making processes to ensure that mitigation measures address their concerns and benefit the local environment and population.
- Monitoring and Compliance: Establishing rigorous monitoring systems to assess the effectiveness of mitigation measures and ensure compliance with environmental regulations.

7.2 Impact Identification Methodology

The methodology for identifying potential environmental impacts associated with the proposed facility involves a comprehensive approach. It includes:

Review of Project Activities: Detailed examination of all phases of the project to understand the range of activities and their potential environmental interactions.

Environmental Study: Assessment of the surrounding environment to identify sensitive areas, ecological value, and any existing vulnerabilities.

Literature Review: Analysis of existing studies, reports, and publications related to similar projects to draw parallels and learn from past experiences.

Expert Judgment: Utilization of insights from environmental experts to predict potential impacts based on their expertise and knowledge of similar projects.

7.3 Approaches for Mitigation Measures

Mitigation of environmental impacts involves several strategies:

* **Avoid:** Altering project plans such as route or site adjustments to protect ecological or archaeological features.
* **Replace:** Creating equivalent ecological habitats elsewhere if the original habitat is disturbed.
* **Reduce:** Implementing measures like filters, cyclones, noise barriers, and visual screening to lessen impacts.
* **Restore:** Rehabilitating the site post-operations to their original state or better.
* **Compensate:** Providing support to displaced communities or individuals through relocation, facilities, or financial means.

7.4 Impacts and Mitigation Measures due to Location

Development will permanently alter the existing land use from open land to commercial usage, impacting the rural character of the area. Construction activities will generate dust and noise, potentially affecting nearby communities and air quality temporarily. Movement of construction materials and, later, residential traffic could increase congestion on local access roads.

Mitigation Measures

Allocate green areas, parks, and open spaces within the project to maintain environmental balance. Sprinkle water on unpaved areas during construction to control dust emissions. Use noise barriers or schedule high-noise activities during

daytime hours to minimize disturbance. Ensure that construction machinery is fitted with appropriate noise suppression equipment. Implement landscaping plans that use native tree and shrub species.

7.5 Impacts and Mitigation Measures in Construction Phase

i. Air Pollution

Impacts:

During the construction phase, significant dust emissions are expected from activities such as land clearing, excavation, movement of vehicles, and material handling. Construction machinery powered by diesel engines will also release particulate matter (PM), carbon monoxide (CO), and nitrogen oxides (NOx) into the atmosphere, potentially deteriorating local air quality. Dust may cause respiratory problems among workers and nearby residents if left uncontrolled.

Mitigation Measure:

Dust emissions, one of the major concerns, will be controlled through regular water sprinkling on all unpaved roads, open construction sites, and storage areas, particularly during dry and windy conditions. Additionally, construction material transport vehicles will be covered with tarpaulin sheets to prevent dust dispersion. Machinery and equipment will be regularly maintained to ensure that emissions remain within permissible limits, reducing air pollution.

ii. Noise Pollution

Impacts:

Construction activities, including excavation, operation of heavy machinery, and material transport, will generate high noise levels, potentially affecting the quality of life of nearby residents and creating stressful working conditions for laborers. Prolonged exposure to elevated noise levels can cause hearing loss and increase stress.

Mitigation Measure

Noise pollution will be mitigated by limiting noisy construction activities to daytime hours, especially in proximity to residential areas. Construction machinery will be fitted with silencers and sound-dampening equipment to minimize noise levels. Workers will be provided with ear protection gear such as earmuffs and earplugs, and a noise monitoring program will be initiated to ensure compliance with National Environmental Quality Standards (NEQS).

iii. Soil Erosion and Degradation

Excavation, land leveling, and uncontrolled surface runoff during construction can cause soil erosion, leading to sediment deposition in local water bodies and loss of fertile topsoil. The disturbed soil surface becomes highly vulnerable to erosion by wind and water.

Mitigation Measures

To prevent this, temporary stormwater drainage channels and sediment control pits will be constructed around the site. Excavated soil will be stored properly with protective coverings to minimize erosion. Re-vegetation and re-compaction of exposed areas will be done promptly after construction activities to stabilize the soil.

iv. Water Pollution

Impacts:

During the construction phase, accidental spills of fuels, lubricants, and other hazardous substances could pollute nearby surface water resources or groundwater. In addition, improper disposal of wastewater from construction camps and equipment washing areas could contaminate water bodies.

Mitigation Measures

To mitigate this, all chemicals and fuels will be stored in designated areas with secondary containment. Mobile toilets and septic tanks will be provided for workers, and wastewater will be managed through proper drainage and treatment systems.

Construction sites will be designed to minimize runoff carrying pollutants into natural drainage courses.

v. Solid Waste Generation

Impacts:

Solid waste will be generated from packaging materials, construction debris, leftover concrete, discarded steel, wood, and plastic materials. Improper disposal of such waste can create land pollution, visual nuisance, and health hazards.

Mitigation Measure:

A proper waste management plan will be implemented where waste materials will be segregated into reusable, recyclable, and non-recyclable categories. Authorized vendors will be hired for the collection, recycling, and disposal of waste. Efforts will also be made to reuse construction material, such as wood and scrap metal, to minimize waste generation.

vi. Occupational Health & Safety

Impacts:

The construction phase will expose workers to numerous health and safety risks, including falling from heights, injuries from machinery, exposure to hazardous chemicals, and accidents due to inadequate site safety. Without proper precautions, these risks could result in serious injuries or fatalities.

Mitigation Measure:

A comprehensive Health and Safety Management Plan (HSMP) will be developed and enforced. Workers will be provided with personal protective equipment (PPE) such as helmets, safety boots, gloves, high-visibility jackets, and safety harnesses. Regular safety training sessions will be conducted, and first-aid kits and emergency medical services will be readily available onsite.

vii. Flora and Fauna Disruption

Impact:

Site preparation activities may require the removal of trees, shrubs, and other vegetation, leading to habitat loss for small wildlife species. The clearing of vegetation could also contribute to soil erosion.

Mitigation Measures:

To mitigate these impacts, vegetation clearance will be minimized as much as possible. Trees of significant ecological or aesthetic value will be preserved. After construction, compensatory plantation with native species will be undertaken to restore green cover and re-establish ecological balance in the area.

viii. Plantation Impact Assessment

The building project site, consists mainly of open land with limited existing plantation, including a few scattered shrubs and small trees. Satellite imagery and on-site observations confirm that no dense or structured plantations currently exist within the project boundary. However, green patches are visible in surrounding areas, particularly toward the northeast and southeast.

Potential Impacts:

Vegetation Disturbance: Minor vegetation may be removed during land development, especially in zones designated for infrastructure such as roads and utilities.

Dust Emissions: Dust generated from earthworks, vehicle movement, and material handling may temporarily affect surrounding greenery, particularly during dry or windy conditions.

Soil Compaction: Heavy machinery could compact soil, potentially affecting soil fertility and plant growth in adjacent areas.

Mitigation Measures:

Controlled and phased clearing of vegetation, preserving mature trees where feasible. Frequent water sprinkling during construction to suppress airborne dust. Use of green

mesh barriers around the construction area to protect adjacent green patches. Post-construction plantation of native, shade-giving, and pollution-tolerant species along internal roads, plot boundaries, and open spaces. Development of green belts and community parks within the scheme to enhance overall greenery and reduce environmental footprint.

Summary of Impact Assessment during construction phase:

Environmental Component	Nature of Impact	Duration	Significance	Reversibility
Soil Erosion	Adverse	Short-term	Moderate	Reversible
Air Quality	Adverse	Short-term	Moderate	Reversible
Noise Levels	Adverse	Short-term	Moderate	Reversible
Ground and Surface Water Quality	Adverse	Short-term	Low	Reversible
Solid Waste Generation	Adverse	Short-term	Moderate	Reversible
Flora (Vegetation Loss)	Adverse	Short-term	Moderate	Partially Irreversible
Employment Opportunities	Beneficial	Short-term	High	Not Applicable
Health & Safety	Adverse	Short-term	High	Reversible

7.6 Impacts and Mitigation Measure During Operational Phase

i. Air Pollution

Impact:

During the operational phase, continuous vehicular movement by residents, visitors, and service providers within the apartment building may lead to the deterioration of ambient air quality. Dust emissions from internal roads, open plots, and landscaping activities can also contribute to particulate matter (PM) levels, impacting both human health and the surrounding environment.

Mitigation Measure:

To control air pollution, a comprehensive greenbelt development plan will be implemented, with the plantation of indigenous trees and shrubs along internal roads, parks, and open spaces. Paved roads and footpaths will help reduce dust. Residents will be encouraged to adopt environment-friendly practices such as carpooling and using fuel-efficient vehicles. Regular road cleaning with water sprinkling, especially in dry seasons, will be carried out to minimize dust generation.

ii. Solid Waste Generation

Impact:

During the operational phase of the commercial apartment/hotel project, solid waste generation becomes a significant concern due to daily residential and hospitality activities. The waste primarily includes food scraps, packaging materials, plastics, paper, and other domestic refuse from guests, staff, and service areas. If not properly managed, this can lead to unpleasant odors, visual pollution, health hazards, and attract disease vectors such as rodents and insects. Moreover, improper disposal may contribute to environmental degradation, including soil and water contamination, especially in a hilly region like Murree where runoff can carry waste into natural drainage systems. However, with a structured solid waste management system involving segregation at source, timely collection, storage, and disposal through authorized waste handlers or municipal services, the impact is reversible and

manageable. Integration of recycling and composting can further reduce the burden on the environment.

Mitigation Measure:

To effectively manage solid waste during the operational phase, a comprehensive set of mitigation measures should be implemented. Waste segregation at source is essential, with separate bins provided for biodegradable, recyclable, and non-recyclable materials across all floors and service areas.

A regular collection schedule should be maintained by trained staff, and waste should be temporarily stored in a clean, enclosed, and well-ventilated facility to prevent odor, pest attraction, or leakage. The project should partner with authorized waste collection services to ensure proper transportation and disposal. Recycling and composting practices should be encouraged to reduce landfill burden, with biodegradable waste potentially composted for use in on-site landscaping.

Staff must be trained in hygienic waste handling procedures, and awareness materials should be displayed for both employees and guests to promote responsible behavior. Regular monitoring and documentation of waste generation and disposal will support continuous improvement and regulatory compliance.

iii. Water Resource Depletion

Impact:

The operation of the commercial apartment/hotel will increase water demand for guest use, cleaning, landscaping, and utility services. This may place pressure on local groundwater resources, which are already limited due to the hilly terrain and variable recharge rates.

Mitigation Measure:

Water conservation strategies will be prioritized, including the installation of low-flow fixtures, dual-flush toilets, and water-efficient appliances. A rainwater harvesting system will be implemented to supplement non-potable water needs and reduce dependence on groundwater. Treated greywater from the wastewater treatment

system will be reused for landscaping and cleaning where feasible. Awareness signage will be displayed to encourage guests and staff to conserve water.

iv. Wastewater Generation

Impact:

The daily activities of residents and guests will generate domestic sewage which, if not properly treated, could contaminate soil and groundwater, especially on sloped terrain.

Mitigation Measure:

A centralized sewerage system will be installed, linking all building units to a compact, modern wastewater treatment plant (WWTP). Treated effluent will meet Punjab Environmental Quality Standards (PEQS) before being discharged or reused in landscape irrigation. The system will be regularly maintained and monitored to prevent overflows or leakages, particularly during rainy seasons.

v. Noise Pollution

Impact:

Noise from guest activities, vehicular traffic, service operations, and commercial functions may disrupt the peace of the surrounding environment, especially in a naturally quiet hill station like Murree.

Mitigation Measure:

Noise-reducing landscape buffers such as trees and hedges will be planted along the periphery and near service roads. Commercial areas will be acoustically insulated and planned to minimize disturbance to residential and quiet zones. The use of generators and outdoor equipment will be restricted to specific hours, and noise levels will be monitored to ensure compliance with PEQS standards.

vi. Traffic Congestion and Safety Issues

Impact:

The movement of hotel guests, service vehicles, and delivery traffic may result in congestion within the premises and on access roads, leading to safety hazards and

delays.

Mitigation Measure:

The internal road layout has been designed with adequate width, turning radius, and designated parking areas. Separate drop-off and loading zones will be provided to streamline movement. Pedestrian walkways and ramps will ensure safe access for visitors. Speed calming measures such as signage and bumps will be implemented to manage vehicle speed and protect pedestrians.

vii. Visual and Aesthetic Impacts

Impact:

Poorly maintained building façades, unmanaged waste, or neglected green areas could negatively impact the visual harmony and overall appeal of the site, which is critical in a tourist-focused region.

Mitigation Measure:

A dedicated maintenance team will ensure the regular upkeep of landscaped areas, walkways, and building exteriors. Native plant species will be used in landscaping to maintain year-round greenery with minimal water use. Architectural guidelines will be strictly enforced to preserve a uniform and aesthetically pleasing design throughout the property.

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Summary of Impact Assessment during operational phase:

Environmental Component	Nature of Impact	Duration	Significance	Reversibility
Solid Waste Generation	Adverse	Long-term	High	Reversible
Wastewater Generation	Adverse	Long-term	High	Reversible
Water Resource Depletion	Adverse	Long-term	Moderate–High	Reversible
Air Quality (from generators, vehicles)	Adverse	Long-term	Moderate	Reversible
Noise Pollution	Adverse	Long-term	Moderate	Reversible
Energy Consumption	Adverse	Long-term	Moderate	Reversible
Traffic Congestion & Safety	Adverse	Long-term	Moderate	Reversible
Visual and Aesthetic Quality	Beneficial or Adverse	Long-term	Moderate	Reversible
Public Health & Sanitation	Adverse	Long-term	Moderate	Reversible
Employment Opportunities	Beneficial	Long-term	High	Not Applicable
Economic Uplift	Beneficial	Long-term	High	Not Applicable
Tourism Promotion	Beneficial	Long-term	High	Not Applicable
Land Use Efficiency	Beneficial	Long-term	Moderate	Not Applicable
Urban Heat Island Effect	Adverse	Long-term	Low–Moderate	Reversible
Natural Drainage Disruption	Adverse	Long-term	Low–Moderate	Reversible
Stormwater Runoff	Adverse	Seasonal	Moderate	Reversible

7.7 Environmental Enhancement Measures

In addition to mitigating negative environmental impacts, the project will adopt several proactive environmental enhancement measures aimed at improving the overall ecological value, aesthetics, and sustainability of the site and its surroundings.

Native Landscaping

Indigenous, drought-tolerant plant species will be used for landscaping to conserve water, maintain ecological balance, and enhance the site's natural beauty.

Green Roofing and Vertical Gardens

Portions of the rooftop will be converted into green roofs or vertical gardens to reduce heat absorption, improve insulation, and support urban biodiversity.

Rainwater Harvesting Expansion

Beyond basic compliance, rainwater harvesting systems will be expanded to collect rooftop runoff and recharge shallow aquifers through soakage pits and recharge wells.

Solar Energy Integration

Solar panels will be installed to supplement energy needs, particularly for corridor lighting, outdoor areas, and water heating, thereby reducing reliance on fossil fuels.

Eco-Awareness and Education

Informational signage and digital displays will be placed throughout the building to educate guests and staff about water and energy conservation, waste segregation, and biodiversity.

Waste Recycling Station

A small-scale recycling unit will be introduced to encourage segregation and recovery of reusable materials (plastic, glass, paper), reducing landfill pressure.

Bird-Friendly Features

Nesting shelves, birdbaths, and low-reflective window treatments will be added to support local avifauna and prevent bird collisions.

Aesthetic Lighting and Night Sky Protection

Energy-efficient, downward-facing lighting will be used to prevent light pollution and preserve the natural nightscape, especially important in a scenic hill station like Murree.

8 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

The Environmental Management and Monitoring Plan (EMMP) is a crucial component of the project's overarching strategy to ensure environmental sustainability and compliance throughout the construction and operational phases of said project. The primary aim of the EMMP is to effectively manage and mitigate adverse environmental impacts identified in the report, promoting environmental stewardship and sustainable development practices.

8.1 Objectives of the Environmental Management Program

The objectives of the EMMP are multi-faceted, focusing on the comprehensive management of environmental aspects associated with the project:

- Defining Roles and Responsibilities
- Mitigation Measures
- Monitoring Mechanism
- Communication and Documentation
- Training and Capacity Building
- Management and Implementation

By addressing these objectives, the EMMP serves as a comprehensive guide for the project team to not only comply with regulatory requirements but also to adopt best practices in environmental management. This initiative-taking approach to environmental protection will help to minimize the project's ecological footprint, promote sustainability, and contribute positively to the local community and environment.

Table 4 Environmental Management Plan

Sr. #	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
Construction Phase				
1.	**Soil Erosion & Contamination** Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on roadside and excavation of earth/cutting operations whereas contamination of soil may be caused by oil and chemical spills at asphalt plant sites, equipment washing yards, camp sites and temporary construction site office. This impact is, however, temporary and low adverse in nature	• Excess spoil should be reused where possible and residual spoil can be disposed of at designated site to prevent erosion • Loss of topsoil can be avoided by stripping and storing topsoil prior to construction, then re-using it to cover the completed cell • Confining excavations to the specified spots as per the approved engineering drawings. Unnecessary excavations need to be avoided;	Construction Contractor	Proponent
2.	**Air Quality and Dust** Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending	• All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions	Construction Contractor	Proponent

	upon the wind speed, direction, temperature of surrounding air and atmospheric stability. Besides, multifarious construction activities and increased vehicular traffic (construction vehicles) would also contribute to the localized airborne dust. The Suspended Particulate Matter (SPM) of the size smaller than 10 micrometre (PM_{10}) tends to remain suspended in the environment for much longer and persistent time and is an environmental hazard. The objectionable impacts of settling of the suspended dust would be its dry deposition on vegetation, motor vehicles, structures, and other exposed surfaces. Similarly, exhausts from generators can also have impacts on air quality in the vicinity. The deteriorated ambient air quality may cause health hazards to the residents of nearby residential colonies. The overall impact on the quality of air during the construction phase will be high adverse, however, it will be temporary and	• Preventive measures against dust should be adopted for on-site mixing and unloading operations; • Construction materials (sand, gravel, and rocks) and spoil materials will be transported through trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with the PEQS for carbon emissions and noise; • Regular water sprinkling of the site should be carried out to suppress excessive dust emission(s); • Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions		

	limited to the project's implementation phase only.			
3.	**Visual Aesthetics & Landscape Changes** Visual intrusion from large piles of excavated and construction material is one of the possible adverse impacts during the construction phase of the project. This impact is considered to be temporary and low adverse in nature.	• Material stockpiles should be removed as soon as work is completed and the area re-landscaped. During work, these stockpiles should be covered with tarpaulin and watered regularly.	Construction Contractor	Proponent
4.	**Noise and Vibration** The noise and vibration will be produced due to the operation of construction machinery equipment. Sources of noise and vibration during construction are heavy machinery. Noise and vibration are perceived as one of the most undesirable consequences of construction activity. The above machinery is expected to generate noise levels that would be severe in the Project Area. The noise and vibration may cause health hazards to the residents of nearby residential areas and	• The most common way to reduce the noise levels of common construction equipment is through worksite modifications. • All workers who need to work within the zone must wear hearing protection	Construction Contractors	Proponent

	sensitive receptors e.g. hospitals, educational institutes and mosques etc.			
5.	**Solid Waste Generation** Different type of waste is likely to be generated during the construction phase of the proposed Project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires. Whereas, hazardous waste can be comprised of paints and construction chemicals. All these, if left unattended, can become a source of nuisance and environmental pollution in the Project Area.	• Waste disposal plan must be reviewed during the entire construction phase • Solid Waste generated during construction will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan; • Construction waste such as waste wood can be recovered and recycled into wood for new building projects, and cement, bricks, and plaster can be crushed and reused in other construction and building projects	Construction Contractor	Proponent
6.	**Wastewater Generation** Wastewater will be generated at the construction site by the workers. If the generated wastewater is not properly	• Proper monitoring to check the compliance of PEQS will be carried out	Construction Contractors	Proponent

	treated or disposed of, this may contaminate the surface water sources			
7.	**Flora & Fauna** No negative impact on the ecological environment will take place on account of cutting of any trees in the project area and clearing of vegetation from the site.	• Trees and ornamental plants shall be planted along the project boundary which will increase the aesthetic value of the site and will combat pollution. • Landscaping seemed to be a powerful mitigation activity with a positive impact.	Construction Contractors	Proponent
OPERATIONAL PHASE				
8.	**Air quality** Air quality of the Project Area may be affected in the operational phase mainly due to increased vehicular movement. Deteriorated air quality may result in causing public health risks, nuisance and other potential adverse impacts on bio-physical environment	• Regular vehicle checks to control/ensure compliance with PEQS. Vehicles with excessive smoke emissions should be monitored and penalties should be imposed in case of non-compliance. • Roadside tree plantations as applicable and feasible under local climatic conditions. Plants should be selected in accordance to their ability to absorb emissions;	Regular Monitoring	Proponent
9.	**Noise** During the operational phase, the noise levels are anticipated to increase mainly due to traffic related noise pollution.	• Penalties should be imposed for the use of vehicles having faulty silencers; and • People should be educated to promote using of less horns e.g. by placing signboards at road side	Regular Monitoring	Proponent

10.	**Wastewater** Improper operation and maintenance of sewerage system may lead to illegal ingress of municipal solid waste into manholes/sewers, deposition of silt/sludge reducing capacity of sewers significantly, choking of sewer resulting in stagnant of wastewater in the streets or in low lying areas. Stagnant wastewater may cause inconvenience to pedestrians, foul smell, and unhygienic environment and health issues.	• Solid waste bins/containers should be placed at appropriate location along the roads and in streets to avoid entrance of solid waste into sewers. • Residents should be educated not to throw solid waste in wastewater sewers. • Installation of treatment system for the treatment of wastewater that will be septic tank in this case.	Regular Monitoring	Proponent
11.	**Solid Waste** Solid waste management is a critical issue in the operational phase. Improper management of solid waste and accumulation of solid waste due to non-collection give rise to various severe issues to environment and health. Presence of solid waste heaps results in degradation of soil and land, choking of sewers if got way, create obnoxious odour	• An efficient and responsive general municipal solid waste collection, disposal, and management system should be strictly implemented • Waste bins should be provided at various convenient locations in the parks and the marketplaces for solid wastes by the passers-by. They should be regularly emptied and replaced, if found damaged and unserviceable. • Throwing of garbage and solid wastes onto greenbelts or vacant places should	Regular Monitoring	Proponent

		be prohibited and fine should be imposed in the case of noncompliance		
12.	**Fauna** There is no protected area, game reserve, game sanctuary, or national park in the project area so, no major impact on wildlife and livestock in the area is expected through noise, vibration, and any type of normal activity in the project area. This impact is Insignificant.	• Maintenance of the green areas and the protection of saplings to ensure better environmental conditions • Use of fertilizers should be strictly monitored in order to avoid any incident. Natural nutrients should rather be preferred	Regular Monitoring	Proponent

Table 5 Environmental Monitoring Plan

ENVIRONMENTAL MONITORING PLAN			
Receptors	**Monitoring Parameters**	**Monitoring & Reporting Frequency**	**Responsibility**
Water Resources/ Water Quality	Monitoring of Physical, Chemical and Biological parameters and its compliance with PEQS, 2016 for surface water and drinking water.	• Once before the start of construction activities; • On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase; and • Visual inspection daily.	Proponent/ Management
Soil Contamination	Soil contamination due to effluent / surface runoff and uncontrolled solid waste disposal activities at sites.	• Once before the start of construction activities; • On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase	Proponent
Dust Emissions	Monitoring of PM_{10} and $PM_{2.5}$ and its compliance with PEQS, 2016 for Ambient Air.	• Once before the start of construction activities; • On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase	Proponent
Noise Pollution	Monitoring of Noise Level and its compliance with PEQS 2016 for Noise.	• Once before the start of construction activities;	Proponent

		• On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase	
Ecological Resources	Disturbance to natural habitat and uncontrolled floral cutting which can be avoidable.	• Start of construction activities; • Visual inspection daily / weekly during construction phase • Annually for at least one year during O&M	Proponent
Safety of workers	Medical record of workers	• On quarterly basis during the construction phase.	• Contractor
Restoration of work sites	Site cleared and no solid and construction waste along the alignment	• After completion of construction work	• Contractor

8.2 Plantation Plan

To enhance environmental sustainability and aesthetic appeal, the proposed project includes the plantation of approximately 1,000 to 1,500 trees and shrubs within and around the site. The plan emphasizes shade-providing, ornamental, and native species, ensuring long-term ecological balance and improved air quality.

8.2.1 Key Features

Boundary Plantation: Fast-growing, pollution-tolerant species such as Neem and Peepal will be planted along the perimeter for screening, dust control, and noise reduction.

Ornamental Trees and Shrubs: Selected for visual appeal, seasonal flowering, and biodiversity support.

Native Species Priority: Focus on low-maintenance, drought-tolerant plants suited to climate.

8.2.2 Maintenance Plan

- **Watering**: Efficient irrigation to meet species-specific needs and minimize water wastage.
- **Pruning & Trimming:** Regular maintenance to ensure healthy growth and landscape aesthetics.
- **Annual Evaluation:** Yearly health assessments with prompt replacement of dead or unhealthy plants.

8.2.3 Landscaping Considerations

- **Sustainability:** Use of natural fertilizers and drought-resistant species to reduce resource consumption.
- **Seasonal Variety:** Integration of flowering plants for year-round color and visual interest.
- **Soil Health:** Maintenance of fertility using organic methods to support long-term plant growth.

Recommended Species

S. No.	Common Name	Scientific Name	Benefits
1.	Neem	*Azadirachta indica*	Air purification, drought-tolerant
2.	Peepal	*Ficus religiosa*	Shade-providing, improves air quality
3.	Kikar	*Acacia nilotica*	Native, soil enrichment, fast-growing
4.	Shisham	*Dalbergia sissoo*	Timber value, soil stabilizer
5.	Siris	*Albizia lebbeck*	Fast-growing, nitrogen-fixing
6.	Dherek	*Melia azedarach*	Ornamental, pollution control
7.	Bakain	*Melia azadirachta*	Aesthetic, hardy tree
8.	Mulberry	*Morus alba*	Provides shade, supports bird habitat
9.	Amaltas	*Cassia fistula*	Seasonal flowers, ornamental
10.	Bottlebrush	*Callistemon citrinus*	Attractive flowers, pollution absorber

8.3 Training of Workers

Prior to the commencement of project activities, an environmental and social training and technical support program will be implemented for the said project. This program is essential to strengthen institutional capabilities and ensure effective management of environmental and social aspects throughout the project lifecycle.

Building environmental awareness and providing relevant technical knowledge to the Contractor's workforce is crucial for the successful execution of the Environmental Management Plan (EMP). Without adequate training, the workforce may lack the understanding and skills necessary to implement the required environmental protection measures effectively.

Management will be responsible for engaging a Technical Assistance (TA) consultant to design and deliver comprehensive environmental and social training sessions.

The key objectives of the TA program will be:

- To assist in the development and establishment of effective environmental and social management systems;
- To deliver targeted training to senior management, contractors, subcontractors, and supervision consultants involved in environmental and social planning and management during both construction and operational phases; and
- To conduct specialized training modules covering monitoring techniques for air quality, water quality, and noise pollution.

Table 6 Training Schedule

Participants	Date, Time & Location	Training Topics	Schedule	Responsible Authority
Staff of project and the contractor	As specified	Introduction to project EIA/IEE and EMMP EMMP communication, documentation, monitoring, and reporting requirements	Every month	Project Manager
All site personnel	As specified	Site induction training on HSE system and Environmental sensitivities of the project area Communication of environmental problems	After every week	Project Manager

		to corresponding officials		
Drivers	As specified	Road safety Road restrictions Vehicle restrictions Waste disposal. Defensive driving	After Every 3 months	Project Manager
Camp Staff	As specified	Camp operations. Waste disposal. Good housekeeping	Monthly	Project Manager

8.4 Environmental Management Team

The successful implementation of the Environmental Management and Monitoring Plan (EMMP) for the project hinges on the coordinated efforts of a dedicated environmental management team. This team comprises various functionaries, each with distinct roles and responsibilities throughout the construction and operational phases of the project.

8.4.1 Key Members of the Environmental Management Team:

Proponent:

Serves as the project proponent and owner of the Environmental Management Plan, overseeing its execution during both construction and operational stages.

Project Contractor(s):

Act as executors of the EMMP during the construction phase, responsible for integrating environmental mitigation measures into project activities.

Operational & Maintenance & Health, Safety, and Environment Team:

Execute the EMMP during the operational phase, ensuring ongoing compliance with environmental standards.

Environmental Protection Agency (EPA), Punjab:

Functions as the regulatory body for reviewing and monitoring the project's compliance with environmental remediation and mitigation measures outlined in the report.

8.4.2 Responsibilities of Functionaries:

a) Project Management:

Charged with overall environmental supervision, monitoring progress, overseeing mitigation measure implementation, documentation, training program development, and reporting on EMMP status.

b) Project Contractor

Responsible for adhering to all EMMP provisions, and environmental codes of conduct, and ensuring workers are equipped with and trained in the use of Personal Protective Equipment (PPE).

c) Environmental Protection Agency (EPA):

Reviews and monitors the project's adherence to the EIA's remedial and mitigation strategies.

8.5 Environmental Budget

Table 7 Environmental Budget

Environmental Component	Quantity	Amount Pak Rs.	Details/Basis
Landscaping/Plantation	1000-2000 approx.	03 million	Cost includes plantation and maintenance up to three years
Solid waste management	L.S	03 million	Lump Sum
Health & Safety Measures	L.S.	02 million	Lump sum
Wastewater management	L.S.	03 million	Lump sum
Miscellaneous Cost	L.S.	5.3 million	Lump sum
Air Quality Monitoring	2	10,000	2 samples @ 5000/sample
Water Quality Monitoring	2	10,000	2 samples @ 5000/sample
Noise Level Monitoring	2	10,000	2 samples @ 5000/sample
Soil Tests	2	10,000	2 samples @ 5000/sample
Training		30,000	Lump sum
External Monitoring		100,000	
Total Environmental and Social Management Cost		**18 million PKR**	

9 STAKEHOLDER CONSULTATION

Stakeholder consultation is a critical component in the environmental assessment process for the proposed project. It fosters communication among diverse groups, facilitating information exchange, feedback collection, and collaborative decision-making.

9.1 Benefits and Objectives of Stakeholder Consultation

Engaging with stakeholders offers several advantages, including improved project understanding, identification of environmental concerns, and incorporation of local insights into project planning. Key objectives include:

- **Enhancing Understanding:** Clarifying the project's aims and potential impacts to ensure stakeholders are well-informed.
- **Addressing Concerns**: Identifying and resolving stakeholder issues to prevent opposition and build consensus.
- **Building Trust:** Establishing a foundation of trust and cooperation between the project Proponent and stakeholders.
- **Informed Decision-Making:** Leveraging stakeholder input to make informed decisions regarding project design and implementation.

9.2 Identification and Classification of Stakeholders

A comprehensive stakeholder identification process was undertaken to recognize all parties with a personal stake in the project, classified as:

- **Industries:** Businesses and institutions directly affected or influential to the project outcome.
- **Local Communities:** Residents and groups in proximity to the project site are likely to experience its direct impact.

9.3 Methodology for Consultation

The consultation process involved a dynamic exchange of ideas through discussions, meetings, and field visits, aimed at:

- **Scoping Sessions:** Initial meetings to define project scope and identify key stakeholder concerns.
- **Focus Group Discussions:** In-depth conversations with local communities and government representatives to gather detailed feedback.
- **Location-Based Meetings:** Engagements held at various sites to ensure broad stakeholder participation and input.

This stakeholder consultation process underscores the project's commitment to environmental stewardship, community engagement, and sustainable development. By incorporating stakeholder feedback into the process, the project aims to achieve a balance between development objectives and environmental conservation, fostering positive relationships with all affected parties.

9.4 Views, Concerns, and Suggestions of Various Stakeholders

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated from along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided, if any, to the extent possible in the case of clearance green zones should be established within the facility.
- Indigenous trees around the facility should be planted to control air pollution and as the compensation of construction activity.
- The project will become the source of income for local to earn their livelihood easily and honorably, so locals should be preferred.
- For the solid waste management and waste disposal, proper disposal techniques should be adopted.

- Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions.
- Employment opportunities will be generated and locals should be hired on the priority basis.
- The air pollution is one of the major impacts from which Punjab is being affected at the large scale. So, ambient air quality should be monitored regularly and air pollution expected to generate from the operation should be mitigated.
- Good relations with the local communities will be promoted by encouraging
- Contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
- Noise generated activities should be carried out during day hours.

9.5 Environmental Management Team and Experts

Sr. #	Managers	Responsibilities
1.	**Contract Manager**	• Implementation of EMP • Environmental issues identification during pre-construction phase. • Communication EMP to all employees.
2.	**Contractor**	• Ensure that the control measures identified during environmental surveys are implemented as they are relevant to their work/visit. • Ensure that the project management team is notified of any non-conformance of control measures or environmental incidents where the environment has been put at risk.
3.	**Site Manager**	• Ensure site material and safe handling of hazardous waste. • Controlled access arrangement to avoid hazards. • Emergency egress arrangements to avoid any unfortunate incident. • First aid facilities/services should be readily available on-site.
4.	**Site HSE Advisor**	• Ensure good standards of workmanship. • Engaged health and safety to devise site waste management plan to be followed and implemented. • Daily checks & weekly checks. • Regular consultation with workers.
5.	**Site Environment Advisor**	• According to legislation and consent develop EMP. • Ensure application of EMP. • Conduct regular site inspection.
6.	**Public Contact Officer**	• First point of contact for members of the public. • Arrange and manage public forums. • Maintain relation with stakeholder

9.6 The Responsible Authority for EMP Implementation

The successful implementation of the Environmental Management Plan (EMP) is a pivotal aspect of ensuring the environmental integrity and sustainability of the proposed unit. The ultimate responsibility for overseeing and ensuring the effective execution of the EMP lies with the project Proponent.

Appointment of an HSE/Project Manager

To facilitate this, the project Proponent will appoint a Health, Safety, and Environment (HSE)/Project Manager possessing the necessary qualifications and expertise. This individual will assume the role of Environmental Manager, tasked with the comprehensive management of all health, safety, and environmental conditions as per the Punjab Environmental Quality Standards (PEQS).

Responsibilities of the HSE/Project Manager

As Environmental Manager, the HSE/Project Manager's responsibilities will encompass a broad spectrum of duties, designed to ensure that the project not only complies with all relevant environmental regulations but also adopts best practices in environmental stewardship.

9.7 Environmental Practitioners and Experts

Consultation with Environmental Practitioners and experts was done, and the following comments and suggestions were noticed.

Table 8 Environmental Consultant Team

Sr. No.	Name	Designation	Comment/ Suggestions
1.	Sara Fatima	Senior Environmentalist	• She said that the project will have a positive impact on the economy, but its construction should be done in an environmentally friendly way. • Basic facilities should be provided to local community

2.	Zia Ur Rehman Farooqi	Ph.D. Scholar Environmental Sciences	• Tree plantation in designated green zones should be conducted. • Proper disposal of the solid waste • HSE management measures should be adopted and implemented effectively
3.	Dr. Hina Ahmed Malik	Ph. D Environmental Sciences	• He said that locals should be preferred for employment. • Value addition of area. Proper mitigation measures must be adopted while construction and operation of this project
4.	Engr. Kanza Fatima	Junior Environmentalist	• Waste must be collected and disposed of properly. • Ensure the use of PPE's during the operational activities. • Wastewater should be treated. • Ensure the tree plantation
5.	Engr. Aleeza Kanwal	Environmental Specialist	• Health and safety department and trained people should be there in case of any emergency. • Periodic monitoring of every fire extinguisher (expiry date, type)
6.	Engr. M. Bilal	Environmental Engineer	• It should be ensured that the pollution abatement technique

9.8 Other Departments and Agencies

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc, in their offices, for instance.

Sr. No.	Designation	Concerns
1.	**Environment Protection Department (EPD)**	
	General Manager	• Solid waste should be managed in Environmentally friendly manner. • Wastewater should be treated effectively & approval should be acquired from concerned agency before disposing off in nearby drain. • HSE* at the site should be managed effectively. • No impact is being foreseen due to the selected location. • Locals should be given job opportunity.
	Environmental Inspector	
2.	**Social Welfare Department (SWD)**	
	Deputy Director Officer	• Final goods should be affordable for the locals. • The proposed product should facilitate locals and they should be economical. • Job opportunities should be given to the locals. • Wages should be given according to the work assigned to them.

		• Life insurance of the workers should be given as well as all the facilities should be given as per labor laws.
3.	**Irrigation Department**	
	Subdivision	Following comments were suggested: • Untreated wastewater should not be disposed of in the nearby drains without proper treatment. • Beneficial as job opportunities will be available to the residents.
	Executive Engineer	
4.	**Forest Department**	
	District Forest Officer	Following recommendation were suggested by the forest department: • Plantation and landscape activities should be conducted on a broader scale. • Proper drainage system must be available at site

9.9 Key finding of the consultation

The study findings depict that people perceive overall positive social impacts by development of the M/s Vision HRA Hospitality (Pvt.) Ltd. Their attitude towards the construction of this commercial building is highly positive with the expectation that locals are provided with jobs especially where unskilled labor is required. Majority of the people is convinced for positive sign for development in area and they correlate this change with the pace of their upward social mobility and progress. However, they want to carry out the project activities with proper mitigation measures.

10 CONCLUSION & RECOMMENDATION

10.1 Conclusion:

The Environmental Impact Assessment (EIA) of the project in **Murree, district Rawalpindi** has been carried out in accordance with the Punjab Environmental Protection Act (PEPA), 1997 (Amended 2012). The assessment included detailed baseline data collection, impact analysis, stakeholder consultations, and the formulation of mitigation measures.

The project is expected to contribute positively to the socio-economic development of the area by creating employment opportunities, improving local services, and supporting related industries. However, like any development activity, it may also pose environmental and social risks, particularly during the construction phase, such as dust generation, noise, waste disposal, and safety hazards.

These impacts have been assessed as **predictable and manageable**, provided that the Environmental Management Plan (EMP) is implemented in full. No protected areas were identified in the vicinity of the project site, and the majority of the concerns raised by local stakeholders have been addressed through design modifications and proposed mitigation measures.

Based on the findings of the EIA, it is concluded that **the project is environmentally and socially feasible** by adopting proper measures and plans, and is not likely to cause any significant or irreversible adverse impact on the environment or public health if proposed measures are strictly implemented.

10.2 Recommendations

- Strictly implement the mitigation and monitoring measures outlined in the EMP during all phases of the project.

- Ensure compliance with best practices for noise and dust control, site safety, traffic management, and waste handling during the construction phase.
- Develop a robust waste management system for proper collection, treatment, and disposal of solid and liquid waste, especially during operation.
- Establish a system for regular environmental monitoring (air, water, noise, soil, etc.) and submit compliance reports to Punjab EPA as required.
- Maintain continuous communication with local communities through a designated Community Liaison Officer and grievance redress mechanism.
- Train staff and workers on environmental, health, and safety (EHS) protocols to minimize risks and improve compliance.
- Prepare and implement an emergency response plan tailored to site-specific risks such as fire, spills, or equipment failure.
- Ensure adherence to all relevant environmental, labor, and safety regulations of Pakistan.

In light of the above, it is recommended that the project may be granted **Environmental Approval** subject to the effective implementation of the proposed Environmental Management Plan.

GLOSSARY

Accommodate	(of a building or other area) provide lodging or sufficient space for. "The cottages accommodate up to six people
Assessment	The action of assessing someone or something. "The assessment of educational needs"
Aspects	A distinct feature or element in a problem
Adverse	- Preventing success or development; harmful; unfavorable. "Taxes are having an adverse effect on production"
Authorized	- having official permission or approval. "An authorized dealer"
Amendment	a minor change or addition designed to improve a text, piece of legislation, etc. "an amendment to existing bail laws
Ambient Air	Ambient air quality refers to the quality of outdoor air in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution
Archaeological	the scientific study of material remains (as fossil relics, artifacts, and monuments) of past human life and activities
Annunciation	A formal public statement
Baseline	The existing conditions against which impacts of the proposed action and its alternatives can be compared.
Crushing	Deform, pulverize, or force inwards by compressing forcefully. "You can crush a pill between two spoons"
Containers	An object for holding or transporting something. "The cakes will keep for up to two weeks if kept in an airtight container"
Compliance	Acting according to certain accepted standards
Discrepancies	A difference between conflicting fact, claims or opinions
Disposal	the action or process of getting rid of something
Dumped	Deposit or dispose of (rubbish, waste, or unwanted material), typically in a careless or hurried way

Effluent	Any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor
Environmental impact statement (EIS)	A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.
Emission	The production and discharge of something, especially gas, or radiation." The effects of lead emission on health"
Evaluated	Estimate the nature, value, quality, ability, extent or significance
Graded	Arranged in a sequence of grades or ranks; "stratified areas of the distribution"
Generation	The production or creation of something
Incinerator	A furnace or a container for burning waste materials
Inadequate	Not capable or competent; lacking
Implementation	The process of putting a decision or plan into effect; execution
Intends	To have in mind as something to be done or brought about, plan to design or mean for a particular purpose, use, recipient, etc.
Landfill site	for the disposal of solid waste in which refuse is buried between layers of dirt to fill in or reclaim low-lying ground
Legislation	Law enacted by a legislative body
Mobilization	To release or make available, as cells or chemical substances
Mitigation	The action of lessening in severity or intensity
Noise	Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities
Potential	Having or showing the capacity to develop into something in the future

Pedestrian	A person who goes or travels on foot; walker
Proponent	The person who proposes or intends to undertake a project
Sanitary	Relating to the conditions that affect hygiene and health, especially the supply of sewage facilities and clean drinking water
Segregate	Set apart from the rest or from each other; isolate or divide. "Disabled people should not be segregated from the rest of society
Settlement	An official agreement intended to resolve a dispute or conflict. "Unions succeeded in reaching a pay settlement
Ton	A short or net ton is equal to 2,000 pounds; a long or British ton is 2,240 pounds; a metric ton is approximately 2 to 205 pounds
Transportation	The action of transporting someone or something or the process of being transported. "The era of global mass transportation"
Ultimate	Being or happening at the end of a process; final. "Their ultimate aim was to force his resignation"
Violations	the action of violating someone or something
Working place	From the out by side of the last open crosscut to the face
Flora	All the plant life in a particular region or period
Fauna	All the animal life in a particular region or period
Demarcated	Separately clearly, as if by boundaries
Screening	The display of a motion picture
Substitutions	An event in which one thing is substituted
Smelting	extract from its ore by a process involving heating and melting
Regulations	An authorized rule
Recycling	process of converting waste materials into new materials and objects
Stakeholders	A person or organization with an interest or concern in something
Rehabilitation	The conversion of waste land into land suitable for use of habitation or cultivation

LIST OF ABBREVIATIONS

AA	Ambient Air
APHA	American Public Health Association
AOI	Area Of Influence
BOD_5	Biological Oxygen Demand
CMS	Convention On Migratory Species
COD	Chemical Oxygen Demand
dB(A)	Decibel
EA	Environmental Assessment
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EPD	Environmental Protection Department
PEPA	Pakistan Environmental Protection Act
EPA	Environmental Protection Agency
ESIA	Environmental And Social Impact Assessment
ESA	Environmental And Social Assessment
ESMP	Environmental/Social Management Plan
EMP	Environmental Management Plan
EC	Electrical Conductivity
GIS	Geographical Information System
GOP	Government Of Pakistan
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HSE	Health Safety & Environment
HWMS	Hazardous Waste Management System
EIA	Environmental Impact Assessment
I & D	Irrigation And Drainage
IAIA	International Association for Impact Assessment
IWM	Industrial Waste Management
IUCN	International Union for Conservation of Nature
KM	Kilometers
LGO	Local Government Ordinance
MW	Mega Watt
MEAS	Multilateral Environmental Agreements
MSDS	Material Safety Data Sheets
NEQS	National Environmental Quality Standards

PMD	Pakistan Meteorological Department
PPE	Personal Protective Equipment
PEQS	Punjab Environmental Quality Standards
NEAP	National Environmental Assessment Plan
NWFP	Northwest Frontier Province
Q&EHS	Quality, Environment, Health & Safety
O & M	Operation And Maintenance
PKR	Pak Rupees
PAP	Project Affected People
PEPC	Pakistan Environmental Protection Council/Punjab
PSC	Project Steering Committee
QA/C	Quality Assurance/Quality Control
RAP	Resettlement Action Plan
ROG	Reactive Organic Gas
SWM	Solid Waste Management
TDS	Total Dissolved Solids
UNFC	United Nation Framework Convention on Climate Change
UNCC	United Nation Convention to Combat Desertification
UNEP	United Nations Environmental Programs
GOP	Government Of Pakistan
WHO	World Health Organization
R&R	Rehabilitation And Resettlement
WWTP	Waste Water Treatment Plant

LIST OF INDIVIDUALS AND THEIR FEEDBACK

Sr.#	Name	Concerns
1	Kamran Ali Khan	During the survey in the study area following concerns of the local community were noted: • Air pollution should be controlled effectively, such as emissions generated from power-generating activities. • Solid waste should be collected timely and avoid the spreading of waste. • Locals should be preferred for the job opportunities. • Wastewater should be treated prior to final disposal in a nearby drain. • Solid waste should be managed effectively by adopting the standard practices of the area. • The cleanliness of the area should be ensured. • An effective EMMP should be designed and enforced with true spirit. • The health of the workers should be ensured. • Planation should be carried out on an extensive scale. • Construction activity should be carried out during day hours. • Noisy activities should be confined.
2	Muhammad Waqas	
3	Qaiser Farooq	
4	Ghulam Mujtaba	
5	Mehboob Alam Shahid	
6	Muhammad Latif	
7	Mazhar Hussain	
8	Shahbaz Khan	
9	Waseem Ahmed	
10	Rab Nawaz	
11	Allah Yar	
12	Ahmed Saeed	
13	Muhammad Jabbar	
14	Muhammad Ramzan	
15	Kamran	

SOURCE OF DATA

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- Guidelines for the preparation and review of Environmental Reports, October 1997
- Review of IEE/ EIA Regulation, 2022
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- Water and Sanitation Agency (WASA), Lahore.
- RED Data Book of IUCN
- www.wsask.ca/Global/Water%20Programs/Water%20Conservation/SWA
- Water_Efficiency_on_the_Farm_Booklet_WEB.pdf
- https://en.wikipedia.org/wiki/Murree_District
- https://www.weathercrave.com/weather-forecast-pakistan/city-18583/weather-forecast-murree

List of Names, Qualifications and Roles of Team Members Carrying Out the IEE/EIA Study

Sr. #	Name	Qualification
Team Leader		
1.	Miss. Sara Fatima	M.Phil. Environmental Sciences
Environmental Scientist		
3	Mr. Zia Ur Rehman Farooqi	Ph.D. Environmental Sciences (Scholar)
4	Hafiz Zeeshan Safdar	M.Sc. Analytical Chemistry
5	Mr. Saffi Ahmed	M.Phil. Environmental Sciences
Environmental Engineers		
6	Engr. Kanza Fatima	B.Sc. Environmental Engineering
7	Engr. Aleeza Kanwal	B.Sc. Environmental Engineering
Sociologist		
8	Ahmed Raza	M. Phil Sociology

TERMS OF REFERENCES

Terms of References (TOR) for the Environmental Examination process are designed to ensure compliance with the regulatory framework and facilitate a thorough review of the project's environmental implications. These terms are outlined as follows:

1. Review Fee Payment:

As stipulated in Regulation 7 of the Review of IEE and EIA Regulations, 2022, the proponent is required to submit a nonrefundable review fee to the Environmental Protection Agency (EPA) at the time of submitting the IEE/EIA report. The specific amount of this fee is determined by the rates specified in Schedule III of the regulations.

2. Submission of Required Documents:

The proponent must provide all necessary documents and details essential for the completion of the EIA/IEE report. This includes, but is not limited to, technical studies, environmental impact analyses, mitigation strategies, and any other information pertinent to assessing the project's environmental footprint.

3. Financial Responsibility for Fines and Penalties:

The proponent shall bear full responsibility for any fines or penalties levied by the EPA Punjab or the Environment Tribunal. This includes violations of environmental standards, non-compliance with regulatory requirements, or any other infractions identified during the review or implementation phases of the project.

4. Accuracy and Validity of Information:

The proponent is responsible for ensuring the correctness and validity of all information and documents provided to the consultant for onward submission to EPA Punjab. The consultant facilitating the process will not bear any responsibility for inaccuracies or omissions in the information supplied by the proponent. It is imperative that the proponent conducts thorough due diligence to guarantee that all submitted materials accurately reflect the project's potential environmental impacts and proposed mitigation measures.

These Terms of References are critical to ensuring that the process is conducted in a transparent, accurate, and regulatory-compliant manner. Adherence to these terms will facilitate a comprehensive environmental review of the project, enabling informed decision-making by the EPA Punjab and contributing to the sustainable development and environmental stewardship goals of the region.

In M/s Vision HRA Hospitality (Pvt.) Ltd

Proponent

Mr. Hafeez Ur Rehman Abbasi

Consultants

Enviro Stewards Co. (Pvt.) Ltd