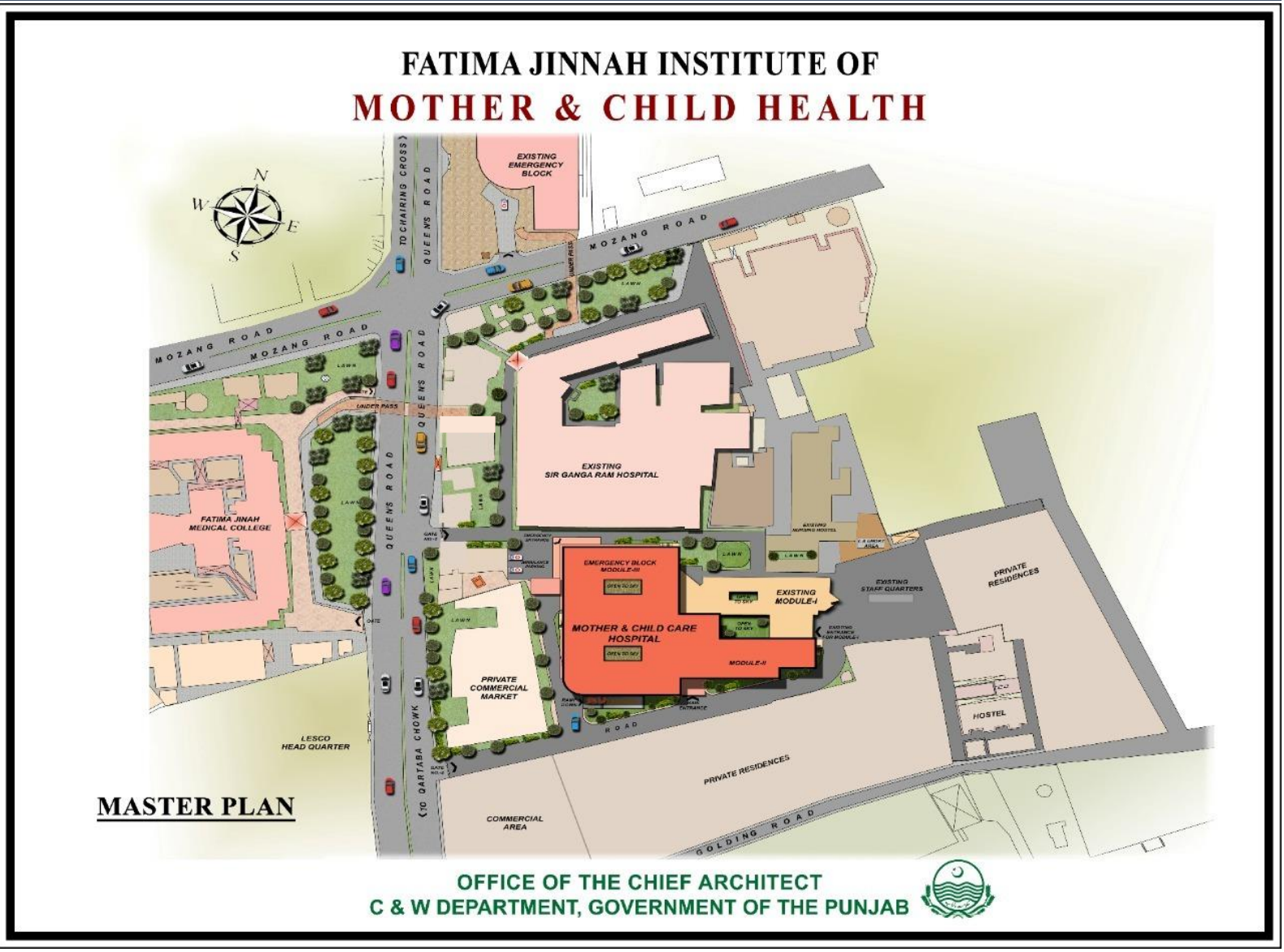
SIR GANGA RAM HOSPITAL

ENVIRONMENTAL IMPACT ASSESSMENT OF ESTABLISHMENT OF MOTHER & CHILD BLOCK, SIR GANGA RAM HOSPITAL, LAHORE



Final Report

December 2024

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Executive Summary

Title of the Project

This report presents the findings of "Environmental Impact Assessment (EIA) of the Establishment of Mother & Child Block, Sir Ganga Ram Hospital, Lahore. Lahore

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

Location of the Project

Mother & Child Block Project is located at Sir Ganga Ram Hospital, Lahore. The coordinate of the proposed project site is **31.5556° N, 74.3219° E**.

Name of Proponent

Dr. Arif Iftikhar, Medical Superintend, Sir Ganga Ram Hospital, Lahore, is the proponent of the project. Sir Ganga Ram Hospital Lahore delivers quality healthcare services to the community through an efficient and effective service delivery system that is accessible, equitable, culturally acceptable, affordable, and sustainable. Sir Ganga Ram Hospital Lahore aims to improve the health and quality of life of all, particularly women and children, through access to essential health services.

Organization Preparing the EIA Report

The proponent of the project has acquired the services of Project Procurement International, an Environmental and Management Consultancy Firm, to conduct an Environmental Impact Assessment (EIA) of the project.

Outline of the Project

Project objective: The project is geared towards the construction of Mother & Child Block within Sir Ganga Ram Hospital in order to make quality healthcare more accessible to more people by Increasing inpatient bed capacity in Lahore for Mother and Childcare, providing adequate parking spaces for clients, visitors and staff; providing more room for family outpatient and inpatient clinics, diagnostic, therapeutic centres and specialist referral centres.

Project Justification: A healthy community is dependent on a healthy mother and child. The later life of a human being is dependent on early healthcare services, immunization, proper vaccination, and post-partum care. A mother is not alone in the responsibility of raising a healthy child. It is, in fact, the responsibility of the whole society to help and facilitate them. Hence, comes the responsibility of the Primary and Secondary Healthcare Department to take specialized initiative in the light of healthy mothers and children as objectified in Sustainable Development Goals 2030.

The insight behind Mother & Child Block Project is to be specialized in the early days of a newborn, as well as mother. When a child is born, a mother is born as well. Hence combined and specialized healthcare is the need of the time if we consider we aren't late in the venture already.

The project will provide all related healthcare services to mothers and children. The target population would comprise women in their reproductive age groups, i.e., 15-49 years of age, newborns, children, and adolescents till the age of 5 years.

Apart from providing high-quality medical services, this hospital will also provide employment to many people, including training for doctors, nurses, and paramedics.

This will decrease a load of patients in the acute care hospitals and specialized institutions by promoting physical and mental health. By adopting preventive and Hygienic principles, the number of patients and diseases will decrease.

This is scale up idea of adding 550 beds for Gynae & Obs. Patients in the existing status of 902 beds of SGRH which is included with the present capacity of 227 beds for Gynae & Obs. Department. The approximate covered area of the block building is 526,780-Sft. Support services like clinical pathology, laboratory, radiology, pharmacy, CSSD, kitchen, laundry, mortuary, and blood bank are also included in the plan to ensure prompt delivery of respective services round the clock without interruption.

The project cost is estimated to be Rs 9,972.235 Million and will be completed in a period of 5 years.

Environmental Baseline Conditions

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

Physical Environment

Topography: The topographic survey shows that the project site is flat.

Geology and Soil: Project area is in the central part of Punjab plain, which is a part of the Indus Basin. The project site is underlain by alluvial deposits of Recent age deposited by the meandering course of the Ravi River. The alluvial deposits are more than 360 m thick and underlain by basement rocks of the Pre-Cambrian age.

Ground Water: Ground Water is available at a depth of 200 ft below EGL in the project area. The parameters for ground water were analyzed by EPPCD Certified laboratory ESPAK and it was observed that all parameters were within the permissible limits.

Air and Noise Quality Monitoring: Ambient air and noise quality monitoring was carried out for 24 hours at project site and it was observed that the parameters were within permissible limits.

Climate: Lahore has the same basic natural and climatic conditions that prevail in Punjab. The climate in most of the area is arid to semi-arid, characterized by four district seasons in a year. The maximum temperatures in summer are 41°C, whereas the minimum temperature in winter is 8.7°C. The average annual temperature in Lahore is 23.6°C

Ecological Environment

Fauna: The mammalian species reported from Lahore include Asiatic Jackal, Jungle Cat, Palm Squirrel, Bush Rat, Indian Mongoose, Indian Crested Porcupine, Indian Hare, Indian False Vampire, Soft Field Rat, House Mouse, Roof Rat, Asiatic House Shrew and Wild Boar.

Physical Environment

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

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

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

Construction machinery and project vehicles will release exhaust emissions containing Carbon Monoxide (CO), Oxides of Sulfur (SOx), Oxides of Nitrogen (NOx), and Particulate Matter (PM). In addition, various burning activities involved in road construction will also cause air pollution.

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

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

The quality of water may deteriorate in the area. For example, during the deep excavation, the aquifer may be hit, and water quality will be depleted. In addition, because of the preparation of construction material on-site, leachate may be produced and percolated through the soil. It may then reach the water table and contaminate the water that the local people may consume.

The activities during the construction and operational phase of the proposed project will affect the community living in the vicinity of the project site. Therefore, there is a need to implement mitigation measures during the construction and operational phase to minimize the potential negative impacts on these areas.

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

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

The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractors, or where appropriate, to reuse/recycle. The hazardous waste will be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked.

Appropriate sewage treatment mechanisms such as septic tanks of adequate sizes will be incorporated in the design for the treatment of sanitation water where the municipal sewage system is not available or does not exist.

Water quality analysis will be carried out at the project site and at the campsite quarterly during the construction phase.

Ecological Environment

Impacts: The project site preparation and construction activities may necessitate the removal of the natural vegetation and very limited loss of plant cover and productivity. The terrain of the project site is flat and level ground..

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

The covered project area is small and inhibits no wildlife, while smoke, chemicals, dust particles, and noise generated by heavy machinery during the construction period are scary factors for biota. Rodents and insects would lose their abode.

Mitigations: The management of the Mother & Child Block Project will maintain the area's existing plantation cover and aesthetic beauty.

Endeavours will be made to enhance the environment through a plantation of trees.

All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect soil fauna and ensure microbial activity in accordance with PEQS.

Special measures will be adopted to minimize impacts on birds, such as avoiding noise-generating activities. The measures to restore natural vegetation loss in the area will benefit the area's fauna as well.

After completion of the project, the proponent will rehabilitate the land by planting trees and ornamental flowers on disturbed and undisturbed areas.

Socio-Economic Environment

Impacts: The project site is located within the Hospital, which may pose some safety hazards to the patients and visitors during the project's construction phase.

Construction workers may be susceptible to eye and respiratory diseases due to their routine exposure to dust and exhaust emissions on site. Injuries could happen primarily by occupational-related accidents, animal bites, etc. Activities such as land clearing, earthworks, and construction of facilities present various occupational hazards to the workers on the project site.

There are no reported sites of the archaeological or historically significant site at the project site. However, in case an artefact of such significance is found during the construction activities, the Archeology Department, the Government of Pakistan will be informed.

Mitigations: Eye and respiratory diseases will be mitigated through routine health screening and training of contractor's employees. The physical injury will be mitigated through the provision of appropriate training and emergency response procedures. Protected fencing will be fixed around the construction site.

The provision of Personal Protective Equipment (PPE) to the workers will be ensured. Protective fencing will be fixed around the construction site.

Unauthorized access within the construction area will not be allowed. A vehicle speed of 20 km/hr at the project site will be implemented. Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.

Environmental Management Plan and Proposed Monitoring

The Environmental Mitigation Plan (EMP) aims to minimize the potential environmental impacts due to the project. The EMP reflects the commitment of Mother & Child Block Project to safeguard the environment as well as the surrounding population.

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

The contractor will prepare a Quarterly Environmental Monitoring Report of project activities carried out during the project's construction phase. These reports will be submitted to the Environmental Protection Department, Government of Punjab, to review and consider. The total estimated Environmental Mitigation and Monitoring Cost is **Rs. 8.92 million**.

Conclusion and Recommendations

Based on the overall impact assessment, more specifically, the nature and magnitude of the residual environmental impacts identified during the present EIA, it is concluded that the establishment of Mother & Child Block Project, Lahore is likely to cause environmental impacts during its constructional and operational phase. However, these impacts can be mitigated, providing that the proposed project activities are carried out, as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented.

The project will positively contribute to providing quality healthcare facilities across Punjab.

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

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List of Abbreviations

AI	Artificial Intelligence
COVID-19:	Corona Virus Infectious Disease 2019
EIA:	Environmental Impact Assessment
EMP:	Environmental Management Plan
EPA:	Environmental Protection Agency
HCWM:	Health Care Waste Management
GPD:	Gallons per Day
HSE:	Health, Safety and Environment
MCH	Mother & Child Hospital
NCS:	National Conservation Strategy
NEQS:	National Environment Quality Standards
PEQS:	Punjab Environment Quality Standards
NOC:	No Objection Certificate
PLC	Programmable Logic Controller
PEPA:	Pakistan Environmental Protection Act 1997
PEPC:	Pakistan Environmental Protection Council
PPE:	Personal Protective Equipment
ToR:	Terms of Reference
HWM:	Hospital Waste Management
BMW:	Bio-Medical Waste

List of Units

%:	Percent (age)
^{o}C:	Degree centigrade
cm:	Centimeter
dB (A):	Decibel
ft^2:	Square foot
ft^3:	Cubic foot
Km:	Kilo meter
Km/h:	Kilometer/hour
m:	Meter
m^2:	Square meter
m^3:	Cubic meter
MT:	Metric Ton
Rft:	Running Feet

1 Introduction

1.1 Project Background and Overview

Pakistan is one of the developing countries suffering from high maternal and infant mortality rates. Besides other reasons, one of the major reasons causing this is the lack of access of women and children to modern healthcare services.

Lahore district is one of the districts in the province of Punjab, Pakistan. The total area of 1772 square kilometres with a population 13,979,000. The delivery of good maternal medical care to patients is one of the ultimate goals of the health care system. Achievement of this goal is possible by the creation of state-of-the-art medical facilities with modern equipment and technologies.

This facility will ensure the availability of qualified teams of physicians, technicians, nurses, and administrative staff who are well skilled to offer the best of their services to expecting mothers, facilitate them in labour and delivery and treat other health problems of women and children (in- patient). Apart from providing high-quality medical services, this hospital will also provide employment to many people, including training for doctors, nurses, and paramedics.

Furthermore, the tremendous public benefit will be accrued from this institution, especially:

- Maternal and infant mortality rates will be decreased.
- Health standard of public will enhance.
- Better Health Facilities for mother and child.
- Prompt and scientific facility for surgical procedures.
- Provision of better health facilities at doorsteps

This will decrease the load of patients in the acute care hospitals and specialized institutions by promoting physical and mental health. By adopting preventive and Hygienic principles, the number of patients and diseases will decrease.

Support services like clinical pathology, laboratory, radiology, pharmacy, CSSD, kitchen, laundry, mortuary, and blood bank are also included in the plan to ensure prompt delivery of respective services round the clock without interruption.

Based on the above-mentioned facts, a mother & child health block must be established in District Lahore to provide quality health care in Lahore.

1.2 Nature, Size and Location of the Project

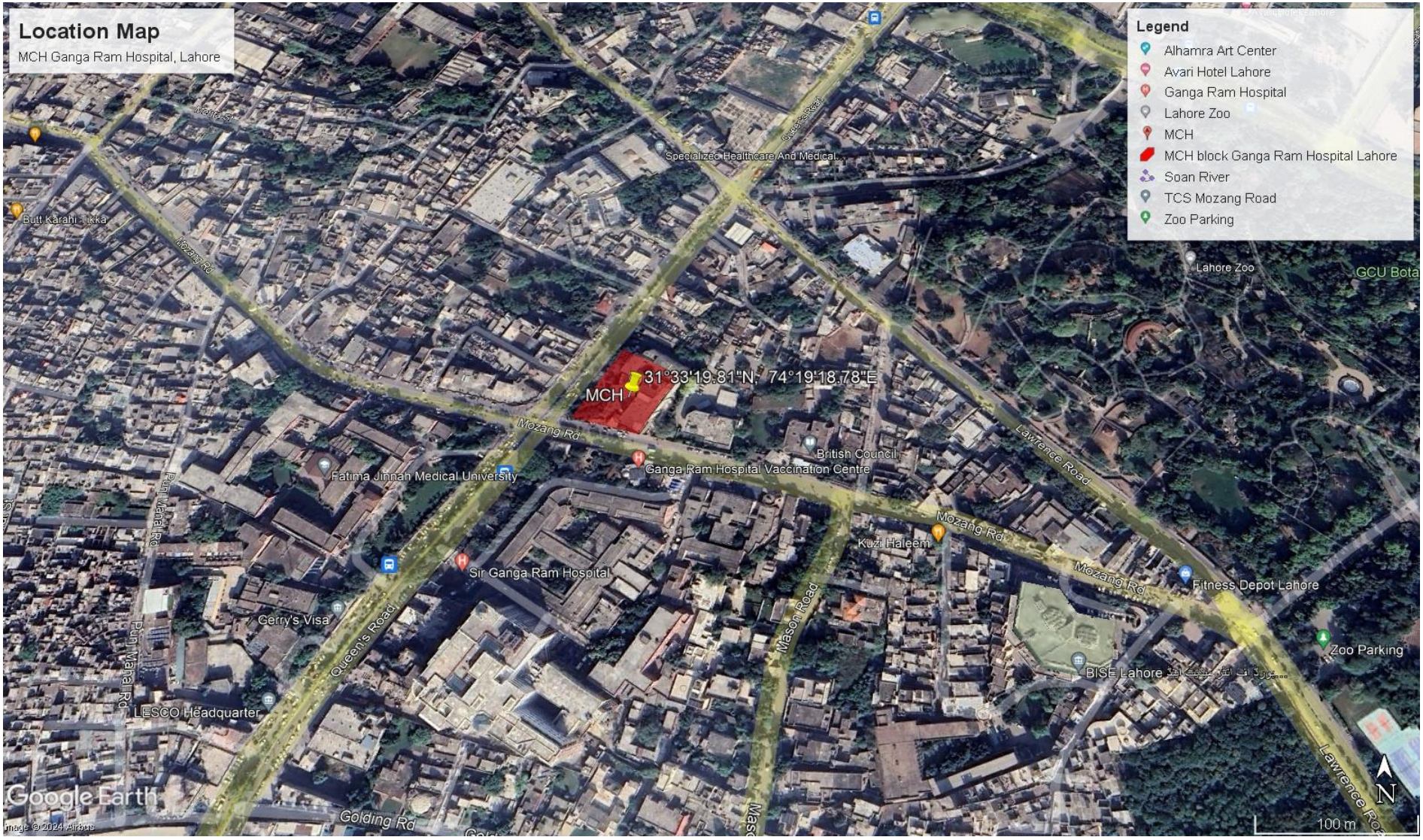
Nature: The project is the Establishment of Mother & Child Block in Sir Ganga Ram Hospital, Lahore

Size: The Mother & Child Block Project has been proposed at a piece of land having an area of 20 Kanals. The total covered area of the proposed project is approximately 526,780-Sft.

Location: Mother & Child Block Project is located at Sir Ganga Ram Hospital, Lahore. The coordinate of the proposed project is **31.5556° N, 74.3219° E**.

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

Figure 1.1: Key Location Map of Establishment of Mother & Child Block, Sir Ganga Ram Hospital Lahore



1.3 The Proponent

Sir Ganga Ram Hospital, Lahore, is the proponent of the project.

Sir Ganga Ram Hospital delivers quality healthcare services to the community through an efficient and effective service delivery system that is accessible, equitable, culturally acceptable, affordable, and sustainable.

Sir Ganga Ram Hospital aims to improve the health and quality of life of all, particularly women and children, through access to essential health services.

1.4 Name of the Organization Preparing the Report

M/s Project Procurement International (PPI), has prepared Environmental Impact Assessment of Establishment of Mother & Child Block Project, District Lahore.

The list of names, qualifications and roles of team members carrying out the EIA has been attached in **Annexure-1**.

1.4.1 Contact Persons

The authorized representative of the proponent and Environmental Consultant are the following:

Proponent's Representative	**Environmental Consultant**
Dr. Arif Iftikhar, Medical Superintendent, Sir Ganga Ram Hospital Lahore Mother & Child Block, Sir Ganga Ram Hospital, Lahore Tel: 0300-4216627	Mr. Saadat Ali Environmental Engineer 26, Second Floor, Silver City Plaza G 11 Markaz Islamabad 44000 Tel: +051 2363624 Cell: 0300 854 0195 Email: projectpi@gmail.com

1.5 Environmental Impact Assessment

According to the Punjab Environmental Protection Act 1997, (Amended 2012), section 12 (1):

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

1.6 Purpose of Report

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

The EIA is the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of a development project prior to major decisions being taken and commitments made. Furthermore, the report will enable Mother & Child Block Mother & Child Block Project, District Lahore, to obtain environmental approval for the establishment of the Mother & Child Block from the Punjab Environmental Protection Department, Government of Punjab.

1.7 Scope of EIA

The project requires the Environmental Impact Assessment to identify the environmental impacts of construction and operational phases of the proposed project of Mother & Child Block Project, District Lahore.

The scope of EIA of Mother & Child Block, Lahore is as follows:

- The identification and assessment of all major and minor impacts during pre-construction, construction and operational phases.
- Identification of all significant impacts that may require detailed assessment.
- Propose mitigation measures to minimize, eliminate or compensate the potential adverse impacts that may arise during pre-construction, construction and operational phases of the project;
- Public consultation with all the stakeholders of the proposed project;
- Preparation of Environmental Management Plan.
- Conclusions and recommendations; and
- Preparation of an Environmental Report for submission to Environmental Protection Agency, Government of Punjab.

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

1.8 Approach and Methodology

1.8.1 Approach for EIA

The approach for conducting EIA of Mother & Child Block Project is to follow the requirement of Punjab Environmental Protection Act 1997 (amended 2012) and Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000.

1.8.2 Kick-off Meeting with the Proponent

The kick-off meeting was held between the PPI team and proponent of Mother & Child Block Project, Lahore.

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

1.8.3 Collection of Secondary Data

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

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

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

1.8.4 Collection of Primary Data and Field Visit

The project site and adjoining areas of Mother & Child Block Project, Lahore, were visited to obtain detailed knowledge of the area's environmental conditions. During the field visits, the existing environmental conditions were studied.

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

The ambient air quality and noise monitoring at the project site were carried out. The survey team ensured that the mammals, birds and other species were observed without causing any potential disturbance. The sampling locations were randomly selected, ensuring that sufficient locations are represented from each habitat type, and the maximum number of species is recorded.

1.8.5 Analysis of Alternatives

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

1.8.6 Public Consultation

Public consultations were held with the community living in the vicinity of Mother & Child Block Project, Lahore. Different aspects of the proposed project were highlighted to the community regarding their impacts on the project area's physical, biological, and socio-economic environment and their concerns and suggestions were solicited.

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

1.8.7 Review of Legislative Requirements

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

1.8.8 Identification and Evaluation of Impacts

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

The potential impacts were identified with methodical consideration of likely or possible significant impacts on the environment for the Mother & Child Block Project. The aim of this task was to assess the associated risks with these impacts.

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

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

1.8.9 Identification of Mitigation Measures

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

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

1.8.10 Development of Environmental Management Plan (EMP)

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

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

1.9 Organization of the EIA Report

This report has been structured in the following manner:

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

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

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

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

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

Chapter 7 (Stakeholder Consultation) details the consultation carried out with various stakeholders and their opinion regarding the project.

Chapter 8 (Impact Assessment and Mitigation Measures) details the proposed project's potential environmental and social impacts on the different features of the micro and macro-environment using the matrix method.

Chapter 9(Environmental Management Plan) explains the mitigation measures proposed for the project to minimize the impacts to acceptable limits. It also describes the implementation of mitigation measures on the ground and monitoring of environmental parameters against likely environmental impacts.

Chapter 10(Conclusion) summarizes the report and presents its conclusions.

The last Chapter is followed **Annexure** that provides supporting information.

Table 1.1: Summary of Methodologies and Activities to Conduct EIA

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

2 Legislative Institutional Framework

2.1 Introduction

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

The compliance status of the Mother & Child Block Project was reviewed with reference to the legislation and existing legal framework on the environment at Pakistan and the International level as described henceforth.

2.2 Laws and Regulations

Pakistan has several laws and regulations regarding the conservation and protection of the environment. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental issues were enforced over an extended period and are context-specific. The laws relevant to the developmental projects are briefly reviewed below.

2.2.1 Punjab Environmental Protection Act, 1997 (Amended 2017)

After the 18th Constitutional Amendment in the Constitution of Pakistan, the Federal Ministry of Environment was dissolved, and the subject of the environment was handed over to provinces. EPA Punjab has formulated its own act. The major content of the act is the same as of the Pakistan Environmental Protection Act (PEPA), 1997. Minor amendments/changes have been made viz.

- The Name of the Act has been changed into “Punjab Environmental Protection (Amendment) Act, 2017”.
- For the words “Federal Government”, the word “Government” shall be substituted wherever occurring.
- For the words “Federal Agency”, wherever occurring, the words “Provincial Agency” shall be substituted; and
- For the word “National”, wherever occurs, the word “Punjab” shall be substituted.

All the other clauses, sub-clauses, sections, and sub-sections are almost the same.

The Punjab Environmental Protection Act, 1997 (Amended 2017) is the basic legislative tool empowering the Punjab government to frame regulations for the protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste.

The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration, or level more than the Punjab Environmental Quality Standards (PEQS) specified by the Punjab Environmental Protection Agency (Punjab EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act.

The requirement for environmental assessment is laid out in Section12 (1) of the Act. Under this section, "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".

Section 12(6) of the Act states that this provision is applicable only to such categories of projects as Punjab Environmental Protection Agency (Review of IEE and EIA Regulations) 2017.

2.2.2 Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2022

The Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2022 (the Regulations) prepared by the Punjab Environmental Protection Agency under the powers conferred upon it by the Act, provide the necessary details on preparation, submission, and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the regulations.

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

- Categories of projects requiring IEE and EIA are issued through two schedules attached to the Regulations.
- A fee, depending on the cost of the project, has been imposed for the review of EIA and IEE.
- The submittal is to be accompanied by an application in the prescribed format, including Schedule V of the Regulations.
- The EPA Punjab is bound to conduct preliminary scrutiny and reply within 10 days of submittal of the report, a) confirming completeness, b) asking for additional information, or c) requiring additional studies.
- The EPA Punjab is required to make every effort to complete the review process for IEE within 45 days and of the EIA within 90 days of the issue of the confirmation of completeness.
- EPA Punjab accords their approval subject to the following conditions:
- Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- Before commencing the operation of the project, the proponent is required to obtain from EPA Punjab a written confirmation of compliance with approval conditions and requirements of the IEE/ EIA.
- An EMP is required to be submitted with the request for obtaining confirmation of compliance.
- The EPA Punjab are required to issue a confirmation of compliance within 15 days of receipt of the request and complete documentation.
- The IEE/EIA approval will be valid for three years from the date of the accord.

- A monitoring report is required to be submitted to the EPA Punjab after completion of construction, followed by annual monitoring reports during operations.
- The project falls under Schedule-II of the regulations. Hence, this type of project needs an EIA to be conducted.

2.3 Punjab Hospital Waste Management Rules 2014

These rules are made by the Punjab Government to ensure the safe handling and disposal of hospital waste.

A summary of the key features of these rules are.

- The hospital superintendent shall form a waste management team comprising different professionals of the hospital
- The responsibilities of the waste management team shall be defined
- Every hospital's waste management team should hold a review at least once a month
- Hospital engineer shall be appointed, and responsibilities should be defined regard hospital waste management
- The waste management officer shall make the waste management plan for approval by the waste management team
- Proper procedures shall be followed to collect, store, transport and dispose of the hospital waste
- The rules also discuss the accidents and spillage and waste minimization and reuse strategies

2.4 Punjab Environmental Quality Standards (PEQS)

The PEQS, promulgated under the PEPA 1997 (Amended 2012), specify the following standards:

The maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.

- For power plants operating on oil and coal:
- Maximum allowable emission of Sulphur dioxide,
- Maximum allowable increment in concentration of sulfur dioxide in ambient air,
- The maximum allowable concentration of nitrogen oxides in ambient air, and
- Maximum allowable emission of nitrogen oxide for steam generators as a function of heat input.
- The maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate sets of numbers).
- The PEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided on the following website. Web site: http://epd.punjab.gov.pk/rules_regulations

- The Punjab Environmental Quality Standards (PEQS) specify the following standards:
- The maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers).
- The maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.
- The maximum allowable concentration of pollutants (02 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.
- Maximum allowable noise levels from vehicles.
- Ambient Noise and Air Quality Standards

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

2.4.1 PEQS for Liquid Effluent

The Punjab Environmental Quality Standards (PEQS) for the discharge of effluent from industry are presented in **Table 2.2**.

Table 2.1: PEQS for Liquid Effluent Discharge

Parameters	Into Inland Waters	Into Sewage Treatment
Tempereture	=<3°C	=<3°C
pH Value	6-9	6-9
Biological Oxygen Demand $(BOD)_5$ at 20°C	80	250
Chemical Oxygen Demand (COC)	150	400
▪ Total Suspended Solids (TSS)	200	400
Total Dissolved Solids (TDS)	3500	3500
Grease & Oil	10	10
Phenolic Compounds (as phenol)	0.1	0.3
Chlorides (as Cl')	1000	1000
Fluoride (as F')	10	10
Cyanide (CN') total	1.0	1.0
An-ionic Detergents (as MBAs)	2.0	20
Sulphate (SO'')	600	1000
Sulphide (S^{2-})	1.0	1.0
Ammonia (NH^3)	40	40
Pesticides	0.15	0.15
Cadmium (Cd)	0.1	0.1

Parameters	Into Inland Waters	Into Sewage Treatment
Chromium (trivalent & hexavalent)	1.0	1.0
Copper (Cu)	1.0	1.0
Lead (Ni)	0.5	0.5
Mercury (Hg)	0.01	0.01
Selenium (Se)	0.5	0.5
Nickel (Ni)	1.0	1.0
Silver (Ag)	1.0	1.0
Total Toxic Metals	2.0	2.0
Zinc (Zn)	5.0	5.0
Arsenic (As)	1.0	1.0
Barium (Ba)	1.5	1.5
Iron (Fe)	8.0	8.0
Manganese (Mn)	1.5	1.5
Boron (B)	6.0	6.0
Chlorine (Cl_2)	1.0	1.0

Source: *PEQS, Punjab Environmental Protection Agency*

2.4.2 PEQS for Gaseous Emission

The Punjab Environmental Quality Standards (PEQS) for permissible limits of gaseous emission from industry are presented in **Table 2.3**.

Table 2.2: PEQS for Gaseous Emission

Parameter	Source of Emission	Standard
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
Particulate Matter	Boilers & Furnaces:	
	Oil Fired	300
	Coal-Fired	500
	Cement Kilns	300
	Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10

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

Source: *PEQS, Punjab Environmental Protection Agency*

2.4.3 PEQS for Vehicular Emission

The Punjab Environmental Quality Standards (PEQS) for permissible limits of exhaust emissions from vehicles are presented in **Table 2.4.**

Table 2.3: PEQS for Vehicular Emission

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

Source: *PEQS, Punjab Environmental Protection Agency*

2.5.1 PEQS for Drinking Water, 2010

The Punjab Environmental Quality Standards (PEQS) for drinking water quality, 2016, are presented in **Table 2.5**.

Table 2.4: PEQS for Drinking Water Quality

Parameter	Standard values
Biological	
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample.
Treated water entering the distribution system (E. Coli or Thermo-tolerant Coliform and Total Coliform bacteria)	Must not be detectable in any 100 ml sample.
Treated water in the distribution system (E. Coli or Thermo-tolerant Coliform and Total Coliform bacteria)	Must not be detectable in any 100 ml sample. In the case of large supplies, where sufficient samples are examined, it must not be present in 95% of the samples taken throughout any 12-month period.
Physical	
Color	≤ 15 TCU
Taste	Non-acceptable
Odour	Non-acceptable
Turbidity	< 5 NTU
Total hardness	< 500 mg/L
TDS	<1000
pH	6.5- 8.5
Chemical	
Essential Organic	mg/Litre
0Alminium	≤ 0.2
Antimony	≤ 0.005
Arsenic	≤ 0.05
Barium	0.7
Boron	0.3
Cadmium	0.01
Chloride	≤ 250
Chromium	≤ 0.05
Copper	2
Toxic Inorganic	
Cyanide	≤ 0.05
Flouride	≤ 1.5
Lead	≤ 0.05
Mangnese	≤ 0.5
Mercury	≤ 0.001

Parameter	Standard values
Nickel	≤ 0.02
Nitrate	≤ 50
Nitrite	≤ 3
Zinc	5
Pesticides mg/L	
Phenolic Compounds	
Polynuclear aromatic hydrocarbons	
Radioactive	
Alpha emitters bq/L	0.1
Beta emitters	1

Source: *PEQS, Punjab Environmental Protection Agency*

2.4.4 PEQS for Ambient Air and Noise

The Punjab Environmental Quality Standards (PEQS) for Ambient Air and Noise, 2016, are presented in **Tables 2.6** and **2.7.**

Table 2.5: PEQS for Ambient Air

Pollutants	Time Weighted Average	Concentration in Ambient Air (ug/m^3)
Sulfur Dioxide (SO_2)	Annual Average* 24 hrs**	80 120
Oxides of Nitrogen as (NO)	Annual Average* 24 hrs**	40 40
Oxides of Nitrogen as (NO_2)	Annual Average* 24 hrs**	40 80
Ozone (O_3)	1 hour	130
Suspended Particulate Matter (SPM)	Annual Average* 24 hrs**	360 500
Respirable Particulate Matter (PM_{10})	Annual Average* 24 hrs**	120 150
Respirable Particulate Matter ($PM_{2.5}$)	Annual Average* 24 hrs** 1 hr	15 35 15
Lead (Pb)	Annual Average* 24 hrs**	1 1.5
Carbon monoxide (CO)	8 hrs 1 hr	5 mg/m^3 10 mg/m^3

*** Annual Arithmetic mean of minimum 1040 measurements in a year taken twice a week 24 hourly at a uniform interval.*
** 24 hourly /8 hourly values should be met 98 % of the year, 2 % of the time, it may exceed.*
Source: *PEQS, Punjab Environmental Protection Agency*

Table 2.6: PEQS for Noise

	Effective from 1st July 2013	
	Limits in dB(A) Leq	
	Day time	Night time
Residential area	55	45
Commercial area	65	55
Industrial area	75	65
Silence area	50	45

Source: *PEQS, Punjab Environmental Protection Agency*

2.5 Institutional Set-Up

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

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

The proposed project is located at Lahore. Therefore, the EIA report will be submitted to the Punjab Environmental Protection Agency, Lahore, for obtaining environmental approval for the project.

2.6 Environmental Protection Agency's Environmental Guidelines

The Punjab Environmental Protection Department has prepared a set of guidelines for conducting environmental assessments. The package of regulations, of which the guidelines form a part, includes the Punjab Environmental Protection Act, 1997 (amended 2012), Punjab Environmental Quality Standards and sectorial guidelines.

2.7 The Implication of Legislations to the project

The implication of the above-mentioned legislation for the pre-construction, construction, and operational phase of Mother & Child Block Project would be as follows:

- Sir Ganga Ram Hospital, being the proponent of the project, will ensure that construction and operational phases of the project be carried out in accordance with the EIA report and Environmental Management Plan is effectively implemented.
- The project will be subjected to four basic provisions relating to pollution control under the Punjab Environmental Protection Act, 1997 (Amended 2017), as contained in section 11, 13, 14 and 15 as follows:
  - Section 11 prohibits discharge or emission of any effluent or waste or air pollutant or noise in excess of the PEQS or the established ambient standards for air, water or land.
  - Section 13 prohibits hazardous wastes.

- Section 14 prohibits the handling of hazardous substances except under a license or in accordance with the provision of any local law or international agreement.
- Section 15 prohibits the operation of motor vehicles for each air pollutant or noise is being emitted in excess of the PEQS or the established ambient standard.

Sir Ganga Ram Hospital management will follow the Punjab Hospital Waste Management Rules, 2014.

3 Description of the Project

3.1 Introduction

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

3.2 Type and Category of the Project

The proposed project is the Establishment of Mother & Child Block Project, District Lahore, which falls under Schedule II of Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulation 2000 under the category of Urban development.

3.3 Objective of the Project

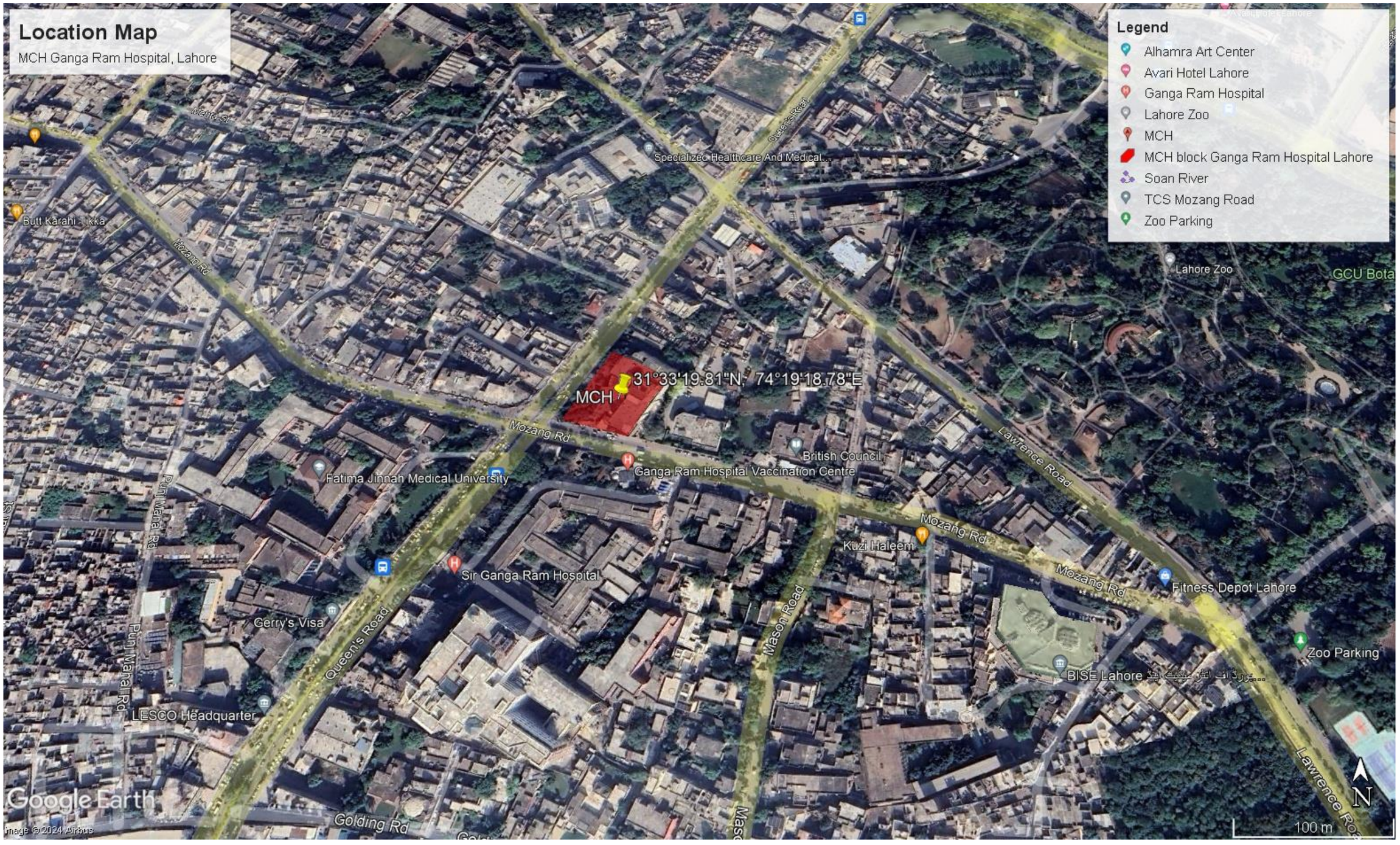
The objectives of the proposed are as follow:

- To provide ideal facilities to the increasing work load of patients in the Gynae & Obs. Department, SGRH, Lahore
- To reduce the morbidity and mortality of Mother and Child by early diagnosis and prompt treatment
- To provide training facilities, capacity building and research activities of Doctors / Postgraduate Students on latest and modern equipment. Such trainings shall be of international levels which are mandatory for the preparation of FCPS and MS Part-II, MRCOG, FRCOG trainees.
- To attend referral cases from other hospitals as well as from all over the Pakistan. These referral cases shall be benefited with latest technologies for their investigations and treatment.
- To improve access of marginalized communities to quality maternity and immediate newborn care.
- To provide routine medical and surgical services to mothers and children of the catchment population.
- To strengthen preventive services (immunization, nutrition and family planning) to children and mothers of the catchment population.
- To make available medical procedures and examinations at subsidized costs to the low socioeconomic population.

3.4 Project Location and Road Access

Mother & Child Block Project is located at Sir Ganga Ram Hospital, Lahore.The coordinate of the proposed project is 31.5556° N, 74.3219° E.

Figure 3.1: Location of Mother & Child Block Sir Ganga Ram Hospital, Lahore Project, Lahore



3.5 Description of the Project

The Sir Ganga Ram Hospital intends to establish a mother & Child Block in District Lahore. The primary objective of the proposed project is to provide a better healthcare facility to mothers and children in Lahore. The Mother & Child block will comprise a bed strength of 550 beds with a total plot area of 20 Kanal. The approximate covered area of the hospital block is **526,780-Sft**. (approx.).

This project is targeted to the public to boost their confidence in the primary health care system. This will also enable them to obtain the requisite medical treatment to enable them to live a healthy life and can play a positive role in the progress of the country. The addition of this hospital in District Lahore would improve maternal and child health services to the desired level, easing the maternal, neonatal and children mortality indices.

Support services:

Support services like clinical pathology, laboratory, radiology, pharmacy, CSSD, kitchen, laundry, control room, blood bank, and space for solar energy are also included in the plan to ensure prompt delivery of respective services round the clock without interruption.

Allied Facilities:

The project will also provide other allied facilities such as store room and parking space for 114 cars and 78 bikes in basement.

The plan shall envisage the concept of modern curative, preventive and specialist services starting with the building design to cater for prompt resuscitation, intensive care, monitoring, infection control, dedicated operation theatres and appropriate patient accommodation for patients. This facility comprises of the following floors with their respective bed's distribution.

Table 3.1: **Floors and No of Beds for Mother and Child Block, Lahore**

Floor	No. of Beds
1	58
2	59
3	90
4	20
5	80
6	86
7	107
8	50
Total	550

Key Design Features includes:

- Dedicated entrances
- Emergency block, Pead's block, opd block
- Emergency egress and fire escape (as per ibc 2009 1016.1)
- Cavity walls and double-glazed windows to provide better thermal comfort and lower

The Layout Plan of the proposed Mother & Child Block Project, Lahore, is shown in **Figure 3.2**:

Figure 3.2: Masterplan of Mother & Child Block Sir Ganga Ram Hospital, Lahore Project, Lahore

3.6 Land use analysis

The Mother & Child Block Lahore will comprise a bed strength of 550 beds with an area of 20 Kanal. The project comprises the following floors and departments.

Table 3.2: **Breakdown of Floors for Mother and Child Block, Lahore**

Floors	Departments / Facilities	Beds
Basement II	Parking, Cars 114, Motorcycle 78, control room for MGPL, control room for HVAC	--
Basement I	Central Medical Gas Pipeline Manifold room + Parking Cars 110, Motorcycle 78, General Cafeteria	--
Ground Floor	Emergency deptt. Comprising of Emergency O.Ts (04), delivery suites, induction ward, nursery, Pre-Operative & Post-Operative ward, resuscitation room, triage rooms, doppler ultrasound room and main reception.	58
First Floor	ICU+HDU, 08-Elective O.T's, Family Labor Rooms.	59
Second Floor	Neonatology Unit, Feto-Maternal Unit. 06-Private Rooms, Molecular Lab.	90
Third Floor	OPD Clinics for Four Super specialities, Uro-Gynae Deptt, Radiology Deptt. 10 Private Rooms.	20
Fourth Floor	Paediatric Surgical Unit, Reproductive endocrinology and infertility. 10 Private Rooms.	80
Fifth Floor	Gynae/Obs Units III & IV, Multipurpose Hall. Administrative Offices, Committee Rooms.	86
Sixth Floor	Gynae/Obs Units I & II Administrative Offices, Committee Rooms.	107
Seventh Floor	Breast Oncology, Gynae Oncology, Chemotherapy, CSSD, Medicine Store, Linen Store.	50
Roof Top	Laundry, Bio-Medical workshop, Control Room	--
Total		**550**

3.7 Operation Phase of the Mother & Child Block Project, Lahore

Pakistan is one of the developing countries suffering from high maternal and infant mortality rates. Besides other reasons, one of the major reasons causing this is the lack of access of women and children to modern healthcare services. The delivery of good maternal medical care to patients is one of the ultimate goals of the health care system. Achievement of this goal is possible by the creation of state-of-the-art medical facilities with modern equipment and technologies.

Apart from providing high-quality medical services, this project will also provide employment to many people, including training for doctors, nurses, and paramedics.

Furthermore, the tremendous public benefit will be accrued from this institution, especially:

- Maternal and infant mortality rates will be decreased.
- The health standard of the public will enhance.
- Better Health Facilities to mother and child.
- Prompt and scientific facility for surgical procedures.
- Provision of better health facilities at doorsteps

This will decrease the load of patients in acute care hospitals and specialized institutions. By adopting preventive and hygienic principles, the number of patients and diseases will decrease.

Technical Parameters:

The operational plan of Mother & Child Block shall envisage the concept of modern curative, preventive and specialist services starting with the building design to cater for prompt resuscitation, intensive care, monitoring, infection control, dedicated operation theatres and appropriate patient accommodation for patients.

Key Design Features:

- Dedicated entrances
- Emergency block, paeds block, opd block
- Emergency egress and fire escape (as per ibc 2009 1016.1)
- Cavity walls and double-glazed windows to provide better thermal comfort and lower
- Operational and maintenance cost of HVAC
- Change rooms and lockers for doctors, patients, and staff
- Clean and dirty utilities provided in all wards
- Dirty and sterilized corridors are also provided in operation theatres
- Ramps with 1:12 ratio (as per ADA)
- 10'-0" wide corridors
- Accessible toilets (ANSI a117.1)
- Structural provision of 02 additional floors for future expansion

3.8 Project Cost:

The project cost is estimated to be Rs 9,972.235 million**.**

3.9 Land Acquisition

As the project is being Constructed on government-owned land, there is no issue of land acquisition or resettlement of the community due to the project.

3.10 Vegetation Features of the Site

The project area is an urban settlement, having a low proportion of forested land. The terrain of the project site is flat and level ground.

Every effort will be made to avoid cutting of trees. The commonly found vegetation (Trees, Shrubs, Grasses) in the project site, as well as within the project area, include species given in **Table 3.3**.

Table 3.3: **List of trees at the Project Site**

Sr.#	Botanical Name	Local Name
1	Albizia lebbeck	Shireen
3	Dalbergia sissoo	Sheesham
4	Zizyphus spp	Beer
5	Capefig	Surs
6	Acacia nilotica	Kicker
7	Pongamia Pinata	Sukhchain
8	Arecaceae	Palm
9	Syzygium cumini	Mulberry-Shahtoot
10	Zizyphus maurantiana	Jangali Ber

3.11 Government Approvals

Presently, the only approval required is from the Environmental Protection Agency, Government of Punjab, to start construction of the 550 Bedded Mother and Child Block Project, Lahore.

3.12 Schedule of Implementation

The construction of the project will be completed in a period of 5 years.

Table 3.4: Time Schedule for Mother & Child Block Mother & Child Block Project, Lahore

Activity/Month	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51
Construction works Commencement Date																	
Mobilization of Contractor																	
Sub/Super Structural Works																	
Architectural Finishing and MEP Works																	
Testing and Commissioning																	
Snag list																	
Handing/Taking over																	

3.12.1 Water Demand

The estimated domestic water demand of the Mother & Child Block Project, Lahore per day is 49,168 Gallons per day. The existing capacity of Sir Ganga Ram Hospital, Lahore is sufficient to meet this additional water demand.

Table 3.5: Daily Water Requirements

No	Occupancy	Recommended Daily Water Requirement	Daily Water Consumption	Daily Water Requirement
	Number	Gal/Day/Person	Gal/day	Gal/day
1	878	56	49,168 GPD	49,168 GPD
			Total Water Requirement	**49,168 GPD**

3.12.2 Water Drainage System

The drainage system of the Mother & Child Block, Lahore, will relate to the drainage network of Lahore Municipal Corporation. Solid Waste Management

The Government of Punjab has outsourced the hospital waste disposal to Arar Group. The solid waste generated during the construction phase of the project will be properly disposed of to ensure health safety. A garbage room shall receive the daily waste material for final disposal through garbage vans. The solid waste will be collected by the hospital staff and handed over to the Arar Group for final disposal.

For the proper management of the infectious waste, a yellow room will be constructed where the infectious wastes will be stored in a yellow bag. The temperature of the yellow room will be maintained at 4ºC for not more than 24 hours. The infectious waste will be transferred to a designated transfer facility of Arar Group, from where it will be disposed of using an incinerator or microwave shredder.

The solid waste management of the Mother & Child Block Project, Lahore, will comply with all the clauses of the Hospital Waste Management Rules, 2005. These include:

- Formation of the waste management team
- Preparation of waste management plan
- Waste segregation
- Waste collection
- Waste transportation
- Waste storage
- Waste disposal
- Accidents and spillages
- Waste minimization and reuse
- Inspection
- Hospital waste management advisory committee

3.13 Facilities to be provided at Mother & Child Block Mother & Child Block Project, Lahore

The proposed project will be comprised of the following components to be considered in the design:

3.13.1 Electricity Supply

The Project will be provided electricity supply from Lahore Electric Power Station.

The lights proposed for the buildings will be Surface Mounted Device, LED, CFL, Spotlight, Fluorescent light, Decorative Lights, Mirror Lights, etc., and for daylight saving, open lights have been provided for optimum lighting levels and energy saving.

The general principles that underpin the lighting scheme for the hospital project are listed below:

- Maximize the opportunities afforded by natural light as daylight harvesting.
- Provide adequate and appropriate levels of light for the functions and activities of different areas.
- Provide a balance between functionality, colour, texture and contrast.
- Provide an appropriate expression of the architecture within the building and outside of the building.
- Use low energy technologies wherever possible and appropriate without compromising visual comfort and utility.
- Integrate with other systems to provide for the requirements of emergency lighting, fire alarm, security and cleaning, etc.
- Integration with ceiling systems and mechanical designs.
- Use of long-life sources to assist in the reduction of maintenance costs.
- Limit the number of lamps and equipment types to assist in the reduction of maintenance costs.
- Use automated lighting control, presence detection and similar facilities to manage energy.

3.13.2 Traffic Plan and Transportation

A proper traffic management plan will be prepared to ensure safety, which will be then implemented by Hospital Management. The traffic plan should include the following:

- The traffic at the main gate will be controlled with the help of security guards. Traffic cones will be placed to direct the traffic in the desired direction, and speed breakers will control the speed of traffic.
- The main roads will be one-way roads. To control the speed of traffic, road blockers will be placed at a distance of about 500 meters. At some places, speed breakers will be constructed.
- At least two security guards will be deputed to allow smooth flow of the traffic and to check traffic violators, i.e., over speeding, adopting the wrong route and not wearing a helmet etc.
- To avoid overspeeding in the streets, speed breakers will be constructed.

- Signboards will be displayed at different locations on the roads to direct the traffic in their desired direction.

In order to ensure that the traffic plan is strictly adhered to by the community, the following measures will be undertaken:

- Route cards both in Urdu and English will be prepared and distributed with the information leaflets among residents, parents, drivers etc.
- Fast-moving Lanes will be marked by placing separators.
- To smoothly regulate traffic, one-way signboards will be placed during closing hours from 1330- 1430 and 1600- 1730 hours at all critical points such as schools, Masjids etc.
- "No Parking" boards will be displayed in and around all the streets where previously vehicles will be parked.
- Availability of traffic sergeant will be coordinated with traffic police.

3.13.3 Hospital Waste Management Plan (HWMP):

A WMP shall be prepared by a WM Officer for approval by the WM Team and shall be based on internationally recognized environmental management standards such as the International Organization for Standardization 14000 series.

The HWMP shall include:

1. a plan of the hospital showing the waste disposal points for every ward and department, indicating whether each point is for risk waste or non-risks waste, and showing the sites of the central storage facility for risk waste and the central storage facility for non-risk waste.
2. Details of the types, numbers and estimated costs of containers, waste bags and trolleys required annually.
3. Timetables include the frequency of waste collection from each ward and department.
4. Duties and responsibilities for each of the different categories of the hospital. Staff members who shill generate hospital waste and be involved in the management of the waste.
5. An estimate of the number of staff members required for waste collection.
6. Procedures for the management of waste require special treatment, such as autoclaving before final disposal.
7. Contingency plans for storage or disposal of risk waste in the event of breakdowns of incinerators or of maintenance or collection arrangements.
8. training courses and programmes on waste management; and
9. Emergency procedures.
10. Representatives of a local MC responsible for the collection and disposal of waste from the hospital shall be consulted in preparing and finalization the WMP.
11. The WMP shall be regularly monitored, reviewed, and revised and updated by the Waste Management Team as and when necessary.

Table 3.6 shows Hospital Solid Waste Management and Disposal plan

Table 3.6: Hospital Solid Waste Management and Disposal plan

Component	Actions/recommendations
Waste Minimization, Reuse, and Recycling	Consider practices and procedures to minimize waste generation without sacrificing patient hygiene and safety considerations Use of efficient stock management practices and monitoring e.g. • For chemical and pharmaceutical stocks, Small/frequent orders for products that spoil quickly and strict monitoring of expiry dates • Complete use of the old product before new stock is used • Maximization of safe equipment reuse practices, including Reuse of equipment following sterilization and disinfection (e.g. sharps containers)
Waste Segregation	Waste should be identified and segregated at the point of generation. • ***Non-hazardous waste***, such as paper and cardboard, glass, aluminium and plastic, should be collected separately and recycled. Food waste should be segregated for composting. • ***Infectious and/or hazardous wastes*** should be identified and segregated according to their category using a colour-coded system • Other segregation considerations include the following: Avoid mixing general health care waste with hazardous health care waste to reduce disposal costs; Segregate waste containing mercury for special disposal. Aerosol cans and other gas containers should be segregated to avoid disposal via incineration and related explosion hazard; Segregate health care products containing PVC to avoid disposal via incineration or MW Shredders and subsequent harmful air emissions
On-site Handling, Collection, Transport and Storage	• Seal and replace waste bags and containers when they are approximately three-quarters full. Full bags and containers should be replaced immediately. • Identify/label waste bags/containers properly prior to removal. • Transport waste to storage areas on designated trolleys/carts, which should be cleaned/disinfected regularly; Waste storage areas should be located within the facility & sized to the quantities of waste generated, with the following design considerations: • Hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply. • Secured by locks with restricted access. • They are designed for access and regular cleaning by authorized cleaning staff and vehicles. • Protected from the sun and inaccessible to animals/rodents. • Equipped with appropriate lighting and ventilation. • Segregated from food supplies and preparation areas. • Equipped with supplies of protective clothing, and spare bags/containers • Store mercury separately in sealed and impermeable containers in a secure location. • Store cytotoxic waste separately from other waste in a secure location. • Store radioactive waste in containers to limit dispersion, and secure behind lead shields.
Transport to Outside facilities for treatment	If the proponent does not have an onsite waste treatment facility now, therefore, during operation, solid waste segregation, collection, and storage shall be the responsibility of the hospital, whereas waste transportation to treatment facility and treatment shall be the work of a contracted biomedical waste handler. Therefore, the proponent shall: • Appoint a waste handler who is licensed by NEMA and permitted by the local government to handle, transport and treat biomedical wastes at approved treatment sites using recommended treatment procedures given by the legal framework and respective government agencies. • The contractor shall transport waste destined for off-site treatment facilities according to the guidelines for transport of hazardous wastes / biomedical wastes in EPA HWM Rules 2014.

	• Packaging for infectious waste should include an inner, watertight layer of metal or plastic with a leak-proof seal. Outer packaging should be of adequate strength and capacity for the specific type and volume of waste. • Packaging containers for sharps should be puncture-proof. • Waste should be labelled appropriately, noting the substance class, packaging symbol (e.g., infectious waste, radioactive waste), waste category, mass/volume, place of origin within the hospital, and final destination. • Transport vehicles should be dedicated to waste and the vehicle compartments carrying waste sealed.

3.14 Project Phases

The construction of the Project will be implemented in three phases, i.e., Pre-construction/ Design, Construction, and Operation.

3.14.1 Pre-construction/Design Phase

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

Geotechnical/Soil Investigation: An extensive soil investigation of the project site will be carried out. The topographical survey will be undertaken by the surveying consultant to demarcate the area and measure the ground elevation.

Subsequently, engineering details will be worked out, and working drawings, specifications for equipment and material will be prepared.

Selection of Contractor: Once the engineering details become available, M/s Project Procurement International (PPI) will start to work on the project.

3.14.2 Construction Phase

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

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

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

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

Staffing: Construction crews will have the responsibility of the civil contractor and its petty contractor. It is estimated that a maximum of 100 personnel will be working at the site at a given time during the peak construction period.

These will essentially include masons, carpenters, electricians, painters, plumbers, and general labourers. For unskilled employment, preference will be given to residents of the project area. **Table 3.7** details the staffing requirement during the construction phase of the project.

Table 3.7: Staff for the Construction Phase of the Project

No.	Description	For construction
1	Technical staff	10
2	Skilled workers (technicians, plumbers, labour)	30
3	Unskilled labour/ helper	60
	Total	**100**

Source: *PPI Estimates, 2024*

Following steps will be taken for effective management of construction crew:

- A complaint cell for the workforce will be established, where they can register their reservations related to work.
- M/s Sir Ganaga Ram Hospital, Lahore will develop an effective system of communication/consultation and will ensure that the staff concerns are addressed.
- Employees will be discouraged from working excessive hours and/or missing break periods (this may involve a detailed job evaluation).
- Child labour will be avoided.
- Incidents of bullying, sexual and racial harassment will be monitored, and, where necessary disciplinary actions will be taken.
- Clear job descriptions will be developed for the workforce, and it will be ensured that the individual is matched to them.

Construction Machinery:

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

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

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

Construction Material: The construction material will include cement, sand, crush, bricks, steel bars, paint, piping material, electrical material and finishing material. The Bills of Quantities of the material will depend upon the construction activities.

Cement Mixing Plant: With the construction and operation of the concrete mixing plant, air quality, noise nuisance, water quality and visual impact induced by the barge's transportation minimized significantly. All sensitive receivers around the project site and along the site would

benefit from the reduction—control discharge of highly alkaline wastewater, dust, and excess noise.

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

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

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

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

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

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

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

Traffic Load for Construction Materials Supplies: It is estimated that, on average, 8-10 truckloads per day during the peak construction period will be supplying different types of construction materials to the project site during the peak construction period.

Other Supplies Water: During the construction phase, a maximum of about 5,000 gallons per day of water will be required for construction activities and human consumption. The water supply will be arranged through water tankers.

Fuels: For the construction equipment and vehicle, diesel will be required. The peak consumption of diesel would be 1000 litres per day during the peak construction period.

3.14.3 Operational Phase

The Project Manager, Mother & Child Block Project, Lahore, will be responsible for the operation and maintenance of the project during the operational phase of the project.

4 Project Alternatives

4.1 Background

An analysis of available alternatives is necessary to establish that the most suitable management and technology options will opt for the project.

4.2 Management Option

The two significant alternative management options are the 'No Project Option' and 'Build as Proposed Option', were considered.

4.2.1 No Project Option

The 'no-action alternative, which serves as a baseline for comparative analysis, is included where the environmental impact of taking the proposed action is high compared to the impact of not taking the proposed action. The No project alternative option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. Under the No project option, the proponent's proposal would not receive the necessary approval from authorities. The proposed construction would not be implemented. This option would, however, involve several losses both to the proponent and the community.

The No Project Alternative option is the least preferred from the socio-economic and partly environmental perspective due to factors such as the economic status of the people would remain unchanged; The local skills would remain under-utilized (in terms of labour provision); Increased poverty and crime in the area due to lack of job opportunities; and the health sector would continue to suffer due to lack of enough and high-quality health services in the Lahore District area.

4.2.2 Build as Proposed

A major issue is the lack of capacity in terms of staffing and financial resources that restrain the ability of the hospital to provide efficient healthcare. Therefore, the existing setup is overburdened by the patient influx. The project is targeted to the public to boost their confidence in the primary health care system. This will also enable them to obtain the requisite medical treatment to enable them to live a healthy life and can play a positive role in the progress of the country. Moreover, this facility in these areas would provide health services to the desired level, easing the burden due to large patient influx, scarcity of resources: human resource deficiency and nonfunctional equipment.

Therefore, building as proposed is the best option. However, the negative impacts due to the project construction and operation can be minimized, controlled, or eliminated if the proposed mitigation measures, as suggested in the EIA report, are effectively implemented.

4.3 Site Alternatives

Relocation of the proposed Mother & Child Block Project is also one of the alternatives in ensuring the environmental status of the area is not affected. But it is quite clear that as per the current situation, the proposed Mother & Child Block project cannot be relocated because the proponent currently owns the proposed site of development; hence getting an alternative site could be a very expensive venture. Hence this is not an economically viable alternative and will be away from the approach of the people and vulnerable patients.

Apart from that, it is a prerequisite that hospitals should be established near or adjacent to the main road so that they can be easily accessible. The Mother & Child Block at the allocated project site will be easily accessible to patients from all corners of the project area. Therefore, no alternative site has been considered for the project.

4.4 Economic Alternative

The proposed project will harness the substantive role by enhancing the bed capacity and will improve access of marginalized communities to quality maternity and immediate newborn care. The immediate benefits of the proposed project are the provision of routine medical and surgical services to mothers and children of the catchment population. The land use will be changed from vacant land into a Mother & Child Block Mother & Child Block building which will return more benefits during the operational phase as compared to the current land use of the project site.

The Mother & Child Block Mother & Child Block Project, Lahore will provide aesthetically pleasing state-of-art health institutions in the district and will ensure excellence in operative and post-operative patient care to minimize infant and child mortality figures in the region. The net present value of future benefits exceeds the initial investment cost for the proposed project, which is an indication of the economic feasibility of a project, considering all the mitigation measures suggested as part of this EIA report are implemented during construction as well as operational phase of the project.

4.5 Environmental Alternative

The proposed project site is in an urban setting, in the middle of government, private institutions and colleges. There may be potential environmental and human health impacts of the proposed project during the construction phase of the project. However, the proposed project has been planned to introduce the concept of green building and to contribute towards sustainable development. All the sustainable features required for a green building have been incorporated into the building design. Following green features is part of the proposed project.

- Energy Efficiency and Renewable Energy.
- Water Efficiency.
- Environmentally Preferable Building Materials and Specifications.
- Waste Reduction.
- Toxics Reduction.
- Indoor Air Quality.
- Smart Growth and Sustainable Development.

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

4.6 Conclusion

No alternative site has been identified. If the project is not implemented, then all positive impacts related to the proposed project will be lost. So, the best option is to ‘build as proposed’ by mitigating its potential negative impacts.

5 Description of the Existing Environment

5.1 Introduction

This chapter describes the existing environment of the project area. In order to assess the impacts and related mitigation measures, existing environmental conditions of the physical, biological and socio-economic environment of the project area were studied.

5.2 Lahore

Lahore commands a strategic political and administrative role as the capital of Punjab Province and the second-largest city in Pakistan. Lahore District lies between 31º15" and 31º42" N, 74º01 and 74º39" E. It is situated in the northeastern part of Pakistan, with its centre lying within 25 km of the international border with India.

Lahore occupies a focal position in the Upper Indus Plain and is located along the eastern bank (left bank) of River Ravi. Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. Lahore city covers a total area of 1,014 km² and is still growing.

Lahore is ranked as a beta-world city and is one of Pakistan's wealthiest cities, with an estimated GDP of $84 billion (PPP) as of 2019.

Lahore is the historic cultural centre of the Punjab region and is the largest Punjabi city in the world. The city had a long history and was once under the rule of the Hindus, Shahis, Ghaznavids, Ghurids, and the Delhi Sultanate.

Lahore was central to the independence movements of both India and Pakistan, with the city being the site of both the declaration of Indian Independence and the resolution calling for the establishment of Pakistan. Following the independence of Pakistan in 1947, Lahore became the capital of Pakistan's Punjab province.

Lahore's modern cityscape consists of the historic walled City of Lahore in the northern part of the city, which contains several heritage sites. Lahore has more Mughal-era monuments than Delhi, India, and structures from this era are now among the most iconic features of Lahore.

Lahore is one of Pakistan's most liberal and cosmopolitan cities. It exerts a strong cultural influence over Pakistan. Lahore attracts people from all over Pakistan for labour, educational and professional purposes.

5.3 Physical Environment

5.3.1 The topography

Lahore commands a strategic political and administrative role as the capital of Punjab Province and the second-largest city in Pakistan. Lahore District lies between 31.5204° N, 74.3587° E. It is situated in the north-eastern part of Pakistan, with its centre lying within 25 km of the international border with India. It occupies a focal position in the Upper Indus Plain and is located along the eastern bank (left bank) of River Ravi. Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. Lahore city covers a total land area of 404 square kilometers (156 sq mi) and is still growing.

At the time of investigations, project land was mainly covered with some trees, grass, shrubs and fill material at places. A topographic survey plan for the proposed project site was provided by PPI.

5.3.2 Geology and Soil Texture

The project area is located in the central part of Punjab plain, which is a part of the Indus Basin. The project site is underlain by alluvial deposits of recent age deposited by the meandering course of the Ravi River. Surface deposits in the project area consist of Chung formation, which is composed mainly of loess deposits of the upper terrace. These are underlain by floodplain deposits of the middle terrace, which have extensive lateral and vertical extensions in the Lahore region. Along the course of the Ravi River (west of the project area), streambed and meander-belt deposits are present. The alluvial deposits are more than 360 m thick and underlain by basement rocks of the Pre-Cambrian age.

Site-specific exploration down to 50 m depth below EGL reveals subsurface stratigraphy to comprise overburdened soils. Layers of fine-grained soils constituting silty clay to lean clay and granular soils in the form of silty sand to poorly graded sand are present down to the maximum explored depth.

5.3.4 Seismicity

According to Chapter 20 of ASCE 7-16, the site is classified for seismic design based on standard penetration resistance (N), undrained shear strength (Su) and shear wave velocity (vs). Site Class A (hard rock) through E (soils requiring site response analysis) is assigned to the site based on average properties exhibited by top 30 m depth as per Table 20.3-1 of the Code. Considering the nature of subsurface material and scope of works, results of downhole seismic testing in terms of shear wave velocity (vs) have been employed for evaluation purposes. Through analysis of data available for overburden soils, Site Class D, i.e., Stiff Soil, has been assigned to the project site

Seismic risk is directly associated with potential seismic events that may take place in the project area. BCP; SP-2007 accounts for this hazard by dividing the country into different seismic zones and assigning a range of Peak Ground Acceleration (PGA) to each zone. The assigned value of PGA has a 10% probability of exceedance in fifty (50) years. As per BCP; SP-2007, Lahore region has been assigned Zone 2A with recommended PGA to vary from 0.08 to 0.16 g. In the absence of any site-specific seismic hazard analysis, seismic hazard definitions as per BCP SP-2007 may be considered in the design of all the structures planned to be constructed at the project site.

5.3.8 Climate

Lahore has the same basic natural and climatic conditions that prevail in Punjab. The climate in most of the area is arid to semi-arid, characterized by four district seasons in a year: winter from mid-November to February; spring from mid-March and April; summer from May to mid-September; and autumn from mid-September to mid-November. The maximum temperatures in summer are 41°C, whereas the minimum temperature in winter is 8.7°C. The average annual temperature in Lahore is 23.6°C.

5.3.5 Air Quality and Noise Level Monitoring

The ambient air quality and noise level monitoring was conducted and compared against the Punjab Environmental Quality Standards (PEQS) for Sulphur dioxide (SO2), Oxide of Nitrogen (as NO), oxide of Nitrogen (as NO_2), Ozone (O3), Suspended Particulate Matter (as SPM), Respirable Particulate Matter (as PM_{10}), Respirable Particulate Matter (as $PM_{2.5}$), and Carbon monoxide (CO) during 24 hours at the project site.

The ambient air and noise level monitoring was conducted from 11th to 12th October 2024 for 24 hours at the project site

The ambient air quality and noise monitoring was carried out by EPCCD Punjab Certified laboratory, ESPAK. All the parameters monitored were within the permissible limits.

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

A summary of ambient air quality and noise levels results are given in **Table 5.1** below:

Table 5.1: Summary of Ambient Air Quality and Noise Results at the Project Site

S. No	Parameters	Limit Values (PEQS - 24 Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m³ (8 Hours)	1.9 mg/m³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO_2)	120 µg/m³	13.4 µg/m³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O_3)	130 µg/m³ (1 Hour)	22.6 µg/m³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m³	13.0 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO_2	80 µg/m³	25.5 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter $PM_{2.5}$	35 µg/m³	46.3 µg/m³	Particulate Sensor	Exceeding Prescribed Limits
7	Particulate Matter PM_{10}	150 µg/m³	224 µg/m³	Particulate Sensor	Exceeding Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m³	622 µg/m³	Particulate Sensor	Exceeding Prescribed Limits
Noise Quality Monitoring					
1	Day Time	55db	51db	Within Limits	
2	Night Time	40db	35db	Within Limits	

5.4 Surface Water

There is wastewater drain passing near north of the project site.

5.5 Groundwater

The source of water in the project area is groundwater, which ranges from approximately 250 ft to 600 ft deep. The proposed project will also install bore wells to extract water during the operational phase. The Lahore aquifer is composed of unconsolidated alluvial soil of up to 400 m in thickness. Clay and silt formations occur as discontinuous layers with limited lateral extent and thickness of generally less than 5 m.

The aquifer under and around Lahore city is about 400 m deep with high transmission of about 2,100 m^2/day (assuming 80 m thickness contributing to groundwater flow). Groundwater is rapidly depleting because of unprecedented groundwater abstraction in comparison to the natural recharge, which is decreasing both in quantity and quality with the passage of time. The reduction in recharge is mainly caused by the desiccation of the Ravi River and land use change to urbanization. Unregulated abstraction, without any recharging efforts and surface supplies, has led to the lowering of the water table at an annual depletion of the rate of 0.45 to 1.50 m. The maximum depth of the water table reached 46 m in 2014.

Annual groundwater withdrawal is about 1161 MCM. Currently, the recharge to groundwater is estimated as 1013 MCM (including inflows from boundaries) in comparison to the abstraction of 1161 MCM. Thus, recharge to the aquifer is less by about 15% as compared to groundwater abstraction. The quality of shallow water has deteriorated over the years, and therefore, the deep aquifer is under threat of pollution from the top shallow groundwater.

A chemical analysis test of the groundwater in the project site was conducted. The samples of groundwater were collected on 11th October 2024 for analysis.

It was found that all these parameters are within the permissible limit.

The laboratory report detailing the groundwater reports is attached in **Annexure-6**.

Table 5.2: Summary of Groundwater Chemical Analysis Test at the Project Site

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	---	ND	SMWW 9222 B	---
2	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9222 H	Within Limits
3	E. Coli	Must not be detectable in any 100mL sample	ND	SMWW 9222 H	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	pH*	6.5-8.5	7.0	SMWW 4500H*B	Within Limits
7	Turbidity	<5 NTU	0.1 mg/L	SMWW 2130B	Within Limits
8	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
9	Total Dissolved Solids (TDS)*	<1000 mg/L	531 mg/L	SMWW 2540C	Within Limits
10	Total Hardness as $CaCO_3$*	<500 mg/L	453 mg/L	SMWW 2340C	Within Limits
11	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl G	---
12	Chloride (as Cl^-)*	<250 mg/L	26 mg/L	SMWW 4500Cl^-B	Within Limits
13	Fluoride (F^-)*	≤1.5 mg/L	0.3 mg/L	U.S. EPA 9214	Within Limits
14	Cyanide (CN^-)	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
15	Nitrate (NO_3^-)	≤50 mg/L	23 mg/L	SMWW 4500NO_3^-B	Within Limits
16	Nitrite (NO_2^-)	≤3 mg/L	0.1 mg/L	SMWW 4500NO_2^-B	Within Limits
17	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	---
18	Aluminum (Al)	≤0.2 mg/L	ND	SMWW 3111	Within Limits

19	Antimony (Sb)	≤0.005 mg/L	ND	SMWW 3111	Within Limits
20	Arsenic (As)	≤0.05 mg/L	ND	SMWW 3114 B	Within Limits
21	Barium (Ba)	0.7 mg/L	ND	SMWW 3111	Within Limits
22	Boron (B)	0.3 mg/L	ND	SMWW 4500-B B	Within Limits

5.6 Ecological Environment

The project area falls under Tropical Thorn Forest; however, the natural vegetation has been replaced by agricultural crops. The terrain of Lahore is quite flat and level. It has mostly agricultural flat fields.

5.6.1 Flora and Fauna

The project area is an urban settlement, having a low proportion of forested land. The terrain of the project site is flat and level ground. Every effort will be made to avoid cutting of trees and any damage to fauna.

5.7 Socio-economic and Cultural Environment

This section describes the socio-economic and cultural environment of the project area. **Figure 5.11** shows the environmental receptors present within a 1 Km radius of the project site. There are private hospitals, clinics, hostels, residential area, and their commercial area in the radius.

To assess the present socio-economic and socio-cultural conditions of the project area, a survey was conducted of nearby settlements. For this purpose, socio-economic data were collected from the neighbouring developments and residents of the area. The following are the details of the present socio-cultural and socio-economic conditions of the areas located in the project area.

Language**:** The main languages in the project area are Urdu, English, Punjabi, Pashto, and Saraiki, while a few people speak other languages too. The most widely spoken languages are Urdu and Punjabi.

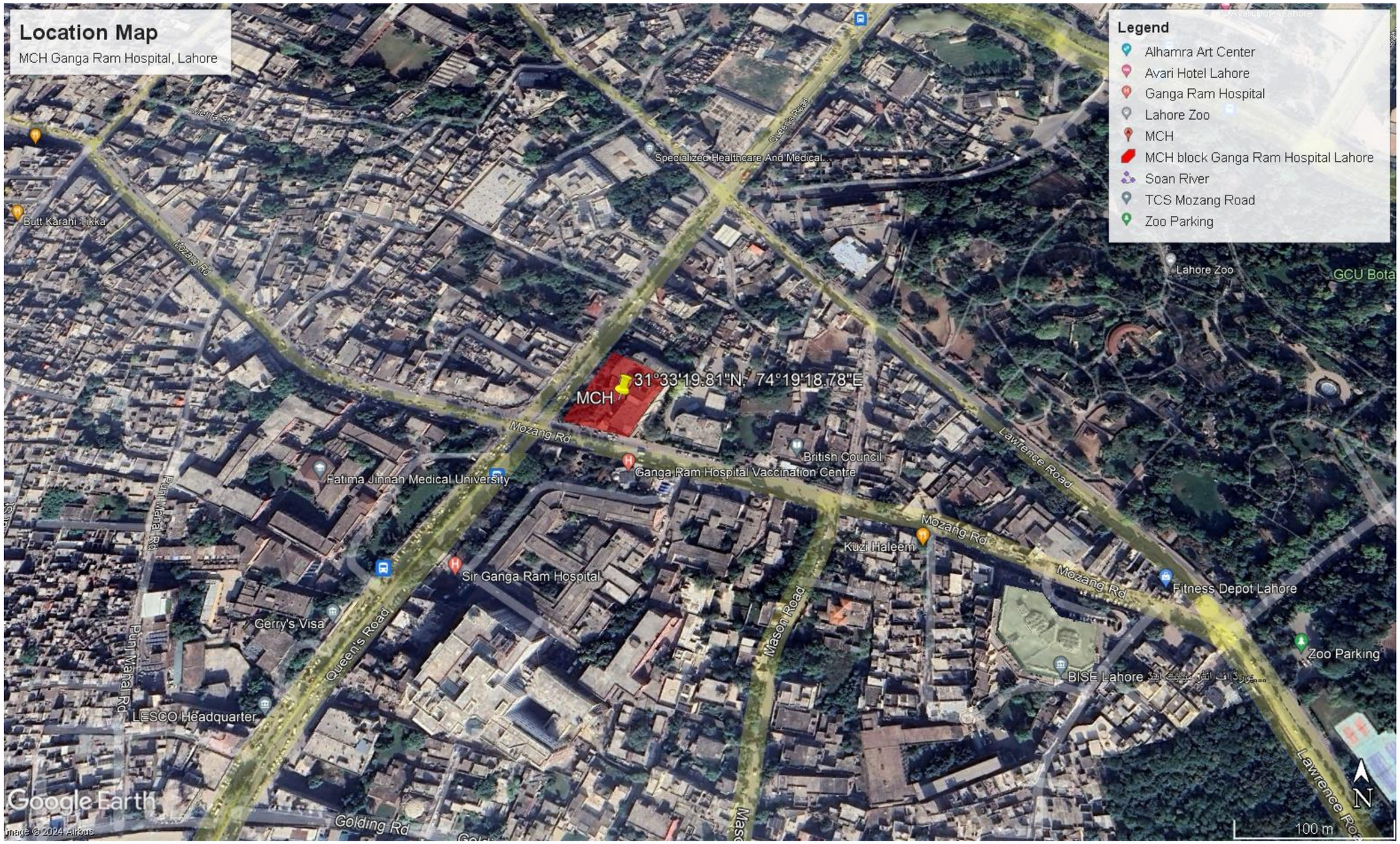
Education: There are many educational institutions for boys and girls present in Lahore with all basic infrastructure and highly qualified staff. There is a combination of private and public schools in the project area, such as Government Higher Secondary School Lahore, Smart School and Forces School and Academy etc.

Drinking-Water Supply: The source of drinking water in the project area is groundwater, as many of the villages and colonies in the vicinity of the project site has installed bore wells to extract drinking water. The groundwater level ranges 100-150 ft in the Project Area.

Employment: Most of the people in the project area are labour and farmers. Some people grow vegetation and others work in the heavy machinery.

Religious and Archaeological Sites: There are no religious or archaeological sites located in the immediate vicinity of the project site. However, if an artifact is found, the Pakistan Archaeological department will be notified.

Figure 5.1: Project Area Map



6 Stakeholder Consultation

6.1 Introduction

During the EIA processing, the stakeholders were involved in the public consultation to know their opinions, concerns, issues and suggestions regarding the project.

This chapter provides details of public consultations carried out with the community and stakeholders at different levels.

6.2 Approach to Public Consultation

The public consultation process has been approached to involve the community and stakeholders from the earliest stages. Public consultation has taken place during the planning and design phase of the project. The focus of attention has been the community living adjacent to the Mother & Child Block Project, as well as staff, patients and visitors who may be affected by the project.

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

Much of the public consultation process has revolved around concerns for the mitigation of construction and operational phase impacts.

The stakeholders involved in the process were the Proponent Mother & Child Block, Doctors, Patients ,Punjab EPD, UET Lahore, Private Hospitals, and community living around the project site.

6.3 Objectives of Consultation

The overall objective of the consultation with the stakeholders is to verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the project.

- The objectives of the public consultation process are:
- Provide key project information to the stakeholders, and solicit their views on the project's potential or perceived impacts,
- Identification of potential problems and needs,
- To devise the way for collaborative problem solving,
- Develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to influence the project design in a positive manner, and
- Ensure that views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing or offsetting negative impacts and enhancing the benefits of the proposed project.

6.4 Categories of Stakeholders Contacted

Potential stakeholders for consultation and participation were identified, and discussions were held with the community living in the project area of impact, pedestrians, vendors and business/shop owners. Moreover, government and private employees, private hospitals and local public representatives were also contacted.

6.5 Major Stakeholders Involved

The stakeholders contacted during the survey belonged to different categories of people, as shown in **Table 6.1**.

Table 6.1: Categories of Stakeholders Interviewed in the Project Area

No.	Stakeholder Category
1	Staff, visitors and patients and the public in the vicinity of the project site
3	Government Organizations
4	Environment and Social Experts (Public and Private Institutes/Academia, Environmental Consultants)
5	Community living adjacent to the Mother & Child Block Project

6.6 Scoping Session

During the public consultation process, both primary and secondary stakeholders were consulted. Consultation with the primary stakeholders was in the form of informal meetings and interviews.

The consultation with the secondary stakeholders was formal since most of them are government functionaries or professionals.

During these interviews, a simple, non-technical description of the project was given, along with an overview of the project's likely impacts on people and the environment. Following the project description, a discussion was held so that people could voice their concerns.

The community was aware of the project, but they were well-informed about the project during the public consultation. The negative and positive impacts were communicated to them.

Moreover, the stakeholders are worried about the Infectious Hospital Waste disposal system as the handling and disposal of infectious waste in Pakistan is carried out without proper planning. The absence of incinerators in many hospitals can cause many serious threats to the people and community living near the disposal area. Therefore, a proper management plan should be devised to handle and dispose of the infectious solid waste.

Furthermore, the stakeholders highlighted the importance of the sewerage treatment plant during the operational phase of the proposed project. A wastewater treatment plant plan should be proposed at the Mother & Child Block Project.

On the other hand, there were also persons who gave positive gestures towards the project because the proposed project would provide employment opportunities as well

as the local community will not have to take the patients to expensive hospitals in Islamabad and Lahore. Those who were aware of the project indicated their support as it will provide employment opportunities and enhance the overall healthcare of the community.

6.7 Issues Discussed

Following issues were discussed during the stakeholder consultation:

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

6.8 Major Stakeholders and their Apprehensions

Meetings with major stakeholders were organized to discuss project-specific issues and their potential impacts on the local and regional environment.

Stakeholders consulted, and their valuable suggestions and comments are described hereunder:

Date & Time	Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
Proponent's Environment Management Team			
29/06/2024	Dr. Ijaz Sheikh, Project Director	Sir Ganga Ram Hospital	▪ The development of the Mother & Child Block at Sir Ganga Ram Hospital is a critical step towards enhancing healthcare services for women and children in Lahore. ▪ It is commendable that the project also includes provisions for staff accommodation, which will greatly support the hospital's workforce. ▪ As the project director, I would like to emphasize the importance of minimizing any disruptions during the construction phase. Proper management practices should be in place to ensure that ongoing hospital operations and patient care are not adversely affected. ▪ A robust and well-implemented Environmental Management Plan (EMP) is essential to mitigate any environmental impacts during both the construction and operational phases. The EMP should cover noise and dust control, waste management, and protection of the surrounding community.
Other Government Agencies			
10/07/2024	Mr. Zill-e-Huma, Manager Environment and Public Health	Islamabad	▪ Environmental Impact Assessment is one of the key aspects to determine the environment and social impact of the project. ▪ IDAP has successfully completed several high-profile projects related to healthcare.
Responsible Authority			
15/08/2024	Mr. Hasnain, Environmental Inspector	Lahore	▪ It is very good project for residents of Punjab and Pakistan in general as a Government Run Hospital will provide quality healthcare whereas private owned Hospitals are not in the reach for middle- and lower-income classes. ▪ It is necessary to have a robust Hospital Waste Management Plan particularly all arrangements for Hospital Waste Treatment and Disposal.
Environmental Practitioners and Academia			
29/06/2024	Dr. Yasir Qayyum Gill Lecturer, UET Lahore	UET, Lahore	▪ The establishment of the Mother & Child Block Project is a very good initiative to provide adequate affordable gynae care facilities to the low-income population as patient care should be the priority of the government. ▪ To reduce the negative effect of the project on the environment, a plantation plan should be part of the project. ▪ I would suggest that the proposed project should be designed in such a way that changes to the topography and landscape of the project area should be as minimum as possible.

Date & Time	Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
			▪ To reduce carbon footprint, it is necessary to use other sources of energy such as solar. ▪ Proper PPEs should be given to the workers during the construction phase. ▪ Signages should be installed at the project site to avoid any accident or injury.
29/06/2024	Dr Asif Ali, Cardiologist	Islamabad	▪ There are very limited government mother and child hospitals having all the advanced healthcare facilities in Lahore; only private hospitals with high fees are available here. ▪ The people of Lahore belong mostly to a middle-class family due to which they cannot afford private hospitals and clinics. ▪ The establishment of the government mother and child hospital in Lahore is very necessary, and government should establish it as soon as possible.
29/06/2024	Mr. Aslam Lab Attendant, Diagnostic Center	Lahore	▪ There is surely a need for a government hospital in Lahore, and it should encompass all the health care facilities. ▪ We receive various samples for testing at our Diagnostic Center from all the private hospitals in Lahore, due to which the workload increases. ▪ Therefore, the proposed hospital should contain laboratories and facilitate the samples of other hospitals too.

6.9 Consultation with the Communities (Affected and Wider Communities)

The general consultation included workers, patients and community members at and around the project site of the Mother & Child Block Project to find out their opinion about the project.

During the roadside discussion, the community adjacent to the hospital was informed about the salient features of the project, its location, and its activities.

The respondents were both male and female. The list of people consulted during public consultation is attached in **Annexure 5.**

The viewpoints of respondents are as follows:

- The locals were very happy that a state-of-the-art Hospital will be developed in the area. This will be beneficial for the city as a whole.
- Some of the residents had apprehensions about the construction phase of the project that it would cause dust and noise pollution. They also suggested that the construction phase should be carried out with great care to the nearby settlements.
- The hospital waste is infectious. Hospital waste should be burned properly in the incinerator, and the ashes should be disposed of in a proper way.
- There should be a monitoring system for the hospitals, as well. As sometimes, it is observed that hospitals dump or burn their infectious waste in the open, which is very harmful to the environment.
- Hospital should be affordable so that everyone can get care for mother and child including middle-class and underserved communities.

The community should not be disturbed in any way by the operation and construction activities.

- Proper Plantation should be done to beautify the area.
- The workers at the construction site should be equipped with PPEs, and they should be properly trained.
- Residents of the adjoining area were very positive about the project as they will have easy access to the hospital.

The summary of the stakeholders and public consultation is provided in **Table 6.2**, which also includes the mitigation measures to address the major concerns of the stakeholders.

Table 6.2: Summary of Concerns and how they have been addressed in the EIA

Main Concerns of the Stakeholders	Address of the Stakeholders	Addressed in the EIA
• During the construction phase, dust should not be emitted into the surrounding areas. • Noise generation activities should be minimized. • A wastewater treatment Plan needs to be developed to properly manage the wastewater. • Trees should be planted to compensate for the trees that will be cut down during the construction phase. • No one should get hurt or injured during the construction phase. • The infectious hospital waste should be managed properly • The contractor should take measures to reduce traffic congestion on Road • The project should provide job opportunities to the local community on a regular basis	• The contractor will spray water on the soil to minimize fugitive dust emission. • The contractor will keep the vehicles and construction machinery properly tuned, and silencers should be used. • The proponent of the project will prepare a wastewater treatment plan. • A plantation plan will be prepared in which indigenous and native trees will be planted. • The contractor will make sure that every worker is using Personal Protective Equipment (PPEs) during the construction phase of the project. • The proponent will implement a hospital waste management plan to dispose of the infectious hospital waste. • The contractor will ensure that construction material arrives at the project during nighttime. • The local population of Lahore will be provided job opportunities.	• Construction Phase Mitigation measures have been proposed (EIA chapter 7) • Mitigation measures have been proposed (EIA chapter 7) • Wastewater treatment and management plan has been prepared (EIA chapter 8) • A plantation plan for the proposed project has been prepared (EIA chapter 8) • Mitigation measures have been proposed (EIA chapter 7) • The suggestion has been noted and will be considered by the proponent. • Mitigation measures have been proposed (EIA chapter 7) • The proposed project will provide employment opportunities to the local people of Lahore during the construction as well as operational phase. (EIA chapter 7) • The suggestion has been noted and will be considered by the proponent.

Figure 6.1: Pictorial Presentation of Public and Stakeholders Consultation for Project

7 Impact Assessment and Mitigation Measures

7.1 Introduction

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

7.2 Environmental Screening of the Proposed Project

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

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

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

The environmental screening matrix (unmitigated) of the establishment of Mother & Child Block, Lahore Project is provided in **Table 7.1**.

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

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

Table 7.1: Environmental Screening Matrix (un-mitigated) of the Mother & Child Block, Lahore Project

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

Description	Physical			Biological		Social and Socio-economic				
	Soil Contamination	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
Construction Materials Supply	-1	-1	N	0	0	-1	N	-1	+1	N
Construction Crew Transportation	0	-1	N	0	0	-1	N	-1	+1	N
Solid Waste Disposal	-2	-1	-2	-1	-1	-1	N	-1	0	N
Waste Effluent Disposal	-1	-1	-2	-1	-1	0	N	-1	0	N
Demobilization of Contractor	-1	-1	0	0	0	-1	N	-1	0	N
Operation Phase										
Operational Phase of the project	-1	0	-1	0	0	0	N	-2	+1	N
Solid Waste	-2	0	-2	0	0	0	N	-2	+1	N

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

7.2.1 Environmental Impact Characterization

During the environmental impact assessment process, the predicted impacts are characterized as follow:

- Nature (direct/indirect)
- Duration of impact (short term, medium-term, long-term)
- Geographical extent (local, regional)
- Timing (project phase: before, during and after construction)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely, rare)
- Impact consequence severity (severe, moderate, mild)
- Significance of impact (high, medium, low)

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

Table 7.2: Impact Characterization of the establishment of Mother & Child Block , Lahore

Categories	Characteristics
Nature	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter changes as a result of a change in another parameter.
Duration of impact	Short-term: Lasting only for the duration of the project, such as noise from the construction activities. Medium-term: Lasting for a period of a few months to a year, the project before naturally reverting to the original condition such as loss of vegetation due to the clearing of the construction site, contamination of soil or water by fuels or oil. Long-term: Lasting for a period much greater than medium-term impact before naturally reverting to the original condition, such as loss of soil due to soil erosion and air emissions.
Geographical extent	Local, regional (spatial dimension)
Timing	Construction and operation
Reversibility of impact	Reversible: When a receptor resumes its pre-project condition. Irreversible: When a receptor does not or cannot resume its pre-project condition.
Likelihood of the impact	Almost Certain: Impact expected to occur under most circumstances Likely: Impact will probably occur under most circumstances Possibly: Impact may possibly occur at some time Unlikely: Impact could occur at some time Rare: Impact may occur but only under exceptional circumstances
Impact consequence severity	Major: When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; it has long-term effects (period of years) on socio-economic activities of significance or regional level. Moderate: When an activity causes long-term (period of years) reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of

Categories	Characteristics
	flora or fauna; has short-term effects (period of months) on socioeconomic activities of significance on a regional level. Minor: When an activity causes short-term (period of few months) reversible damage to an environmental feature; sight reversible damage to a few species of flora or fauna within a population over a short period; has short-term (period of months) effects on socio-economic activities of local significance. Negligible: When no measurable damage to the physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.
Significance of impact	Categorized as High, Medium, or Low Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative of statutory requirements.

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

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

7.3 Pre-Construction/Design Phase Impacts

7.3.1 Project Location Impacts

The impacts associated with the project location (sitting) are those which relate to its location at the designated site. These impacts are different from those which are associated with the project's construction and operational phases. The construction and operational impacts are associated with the activities such as land clearing, waste disposal, whereas the sitting impacts relate to the mere presence of a facility at the given location.

For the proposed project, the aspect of the project site, land use and design have been considered.

7.3.2 Project Location, land use and design

The land use and design should be in accordance with the building codes and bylaws of the District Administration for the construction of high-rise buildings in Lahore.

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

The extraction of water to meet the construction as well as operational needs of the project might put pressure on groundwater resources.

In addition, more solid waste will have to be collected, transported, and disposed of at the dumping site as there is no landfill site in Lahore. The proposed project can contribute to the landfill crisis indirectly.

The unmitigated impact associated with not following the Master Plan of Lahore or its design does not meet the minimum requirement of District Administration for construction of building in Lahore are characterized as follows:

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

Mitigation Measures

Project Site: The proposed project is located at Sir Ganga Ram Hospital, Lahore.

Land Use: The land use of the Mother & Child Block will be in accordance with the Building by-laws of the District Administration. The land-use plan of the Mother & Child Block, Lahore, will be approved by District Administration.

Design: The proposed Mother & Child Block, Lahore has been designed in accordance with existing building bylaws, and the following mitigation measures are proposed for earthquake and firefighting:

- The Building Bye-Laws and Codes of District Administration will be strictly adopted.
- Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the building.
- The adequate internal and external water distribution system will be designed, with a standby system for sufficient water, which could also supply adequate quantity for firefighting.
- Adequate space will be provided for parking firefighting vehicles at the front and backside of the Mother & Child Block Mother & Child Block , Lahore Project. The designated space will be able to withstand the load of the firefighting vehicle, which is 30-40 tons.
- Sufficient access points should be provided for access of firefighting staff to enter into Mother & Child Block Mother & Child Block , Lahore Project.
- Provision for pumping out water from the basement will be kept to meet any emergency in case of water flooding the basement.
- The water supply system will fulfil the water supply, and groundwater extraction will be used as a backup.
- Solid waste reduction, reuse, and recycling will be encouraged during the operational phase of the project.
- Adequate water storage for firefighting will be provided in the building. The pumps for firefighting will maintain constant pressure in the system.

- Orifice plates will be provided at the hose cabinets to control pressure at the required level as per the manufacturer's requirements.

Visual Impacts

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

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

Mitigation Measures

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

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

Residual Impacts

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

The Mother & Child Block, Lahore, is being constructed at the Sir Ganga Ram Hospital. The project will not have any impact on demographic patterns and the disruption of social and cultural values. The socio-economic impacts of the construction of Mother & Child Block, Lahore are anticipated as being positive.

The unmitigated impacts associated with the Project sitting, land use and design are characterized as follows:

- Nature: Indirect
- Duration: Long-term
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood: Possibly
- Consequence: Moderate
- Impact significance: Medium

7.4 Construction Phase Impacts

Various construction activities will invariably create environmental disturbances, which may have temporary impacts on the physical, biological, and social environment of the area and nearby communities during the construction phase. Such impacts include the following:

- Physical Environment
- Soil erosion and degradation
- Air quality deterioration
- Water Quality (Surface and groundwater)
- Biological Environment
- Loss of Vegetation
- Damage to wildlife
- Socio-economic Environment
- Noise and vibration
- Safety hazards, Public health and nuisance issues
- Sites of Archeological or Historical Significance

7.4.1 Soil Erosion and Degradation

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

The soil may be contaminated because of improper handling of fuel, oil, chemical and solid waste or untreated wastewater from the construction site. Extraction of stone or gravel and removal of topsoil from the project site may potentially lead to soil erosion.

This contaminated soil may adversely affect the natural vegetation in the area.

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

Mitigation Measures

- Appropriate management of topsoil will be done to prevent the loss of soil fertility.
- Construction activities will be carried out in a manner to minimize soil erosion.
- Land clearing, levelling and grading be minimized.

- Excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken as per the design (i.e. Stone pitching).
- Temporary measures, such as the construction of temporary walls reinforced with brick lining bordering the construction areas to contain debris and spoil, will also be undertaken to avoid soil erosion and water contamination.
- The stone and gravel will not be extracted from the project area.
- Vehicles and equipment will not be repaired at the project site. If unavoidable, an impervious shield will be used to avoid any soil contamination.
- Waste oils (if any) will be collected in drums and sold to the recycling contractor.
- The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be used as appropriate or to be sold to a recycling contractor.
- All temporary structures established during the construction phase for the temporary purpose will be demolished, the land levelled and re-contoured to the original condition or better. All debris and any other material will be removed from the site.

Residual Impacts

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

7.4.2 Air Quality Deterioration

The construction machinery and project vehicles will release exhaust emissions containing Carbon Monoxide (CO), Oxides of Sulfur (SOx), Oxides of Nitrogen (NOx) and Particulate Matter (PM).

Impacts of air emissions may be carried over long distances depending upon the wind speed, direction, temperature of the surrounding air and atmospheric stability.

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

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

- Nature: Direct
- Duration: Temporary
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood Certain
- Consequence Moderate
- Significance of Impact: High Negative

Measures and Mitigation

- Construction machinery and vehicles will be kept in good working condition and properly tuned in order to minimize exhaust emissions.
- Fugitive dust emissions will be minimized by spraying water on the soil, where required and appropriate.
- Vehicular traffic on unpaved tracks will be avoided as far as possible.
- To minimize the occupational health hazard, proper personal protective gear, i.e. masks, shall be provided to the workers who are engaged in dust generation activity.

Residual Impacts

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

7.4.3 Water Quality (Surface and Groundwater)

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

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

The quality of water may deteriorate in the area. During the deep excavation for the foundation of buildings, the aquifer may be hit, and the quality of water will be depleted. Because of the preparation of material on-site, the leachate may be produced and percolate through the soil and reach the water table and contaminate it that may be consumed by the local people.

The unmitigated impact associated with the water quality of the area is characterized as follows:

- Nature: Direct
- Duration: Long-term
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood: Possibly
- Consequence: Severe
- Impact significance: Moderate
- Timing: Design Phase

Measures and Mitigation

- During construction, the wastewater generated from the septic tank will be properly drained into the sewerage line of the hospital.

- The solid waste generated will be reused where possible. If not reused, they will be disposed of at the solid waste disposal site of the Municipal Corporation, Lahore.
    - Residual Impacts
    - If the recommended mitigation measures are effectively employed, the residual impacts of the project activities on the water quality of the area will be negligible.

7.4.4 Loss of Vegetation

The project site preparation and construction activities may necessitate the removal of the natural vegetation.

The unmitigated impacts of the proposed activities on the loss of vegetation of the area are characterized below.

- Nature: Direct
- Duration: Long Term
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood Certain
- Consequence Moderate
- Significance of Impact: Insignificant Impact

Mitigation Measures

- Mother & Child Block, Lahore, will maintain the existing plantation cover and aesthetic beauty of the area.
- Endeavours will be made to enhance the environment through a plantation of trees.
- All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect the soil.
- The construction workforce will be provided with LPG as cooking and heating (if required) fuel. The burning of fuelwood will be strictly prohibited.
- Ornamental trees and bushes have been included in the plantation plan, which will improve the scenic and aesthetic value of the area.

Residual Impact

The trees planted under the plantation plan will take some time to grow and mature. This impact cannot be fully mitigated, and the residual impact would be medium, at least in the medium term. In the longer run, however, the planted trees and vegetation will enhance the environment of the Hospital.

7.4.5 Damage to Wildlife

The project site is small and inhibits no wildlife, while smoke, chemicals, dust particles, and noise generated by construction machinery during the construction period are scary factors for biota. Rodents and insects would lose their abode.

Impacts on wildlife may arise from the following project activities:

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

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

- Nature: Direct
- Duration: Medium to long-term
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood Certain
- Consequence Moderate
- Significance of Impact: Significant Impact

Mitigation Measures

- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- Special measures will be adopted to minimize impacts on birds, such as avoiding noise-generating activities.
- The measures to enhance natural vegetation in the area will benefit the area's fauna as well.
- The project staff will not be allowed to indulge in any hunting or trapping activities.
- Appropriate diffusers will be used to restrict the illumination within the project site.
- Nighttime construction works will not be undertaken.

Residual Impact

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

7.4.6 Noise and Vibration

Due to the movement of heavy machinery and vehicles, there would be excessive noise and vibration. Other construction activities which may result in intermittent noise and vibration include excavation for foundation, lifting and unloading of the construction materials, use of air compressors, concrete mixing plants, generators, and light towers.

The unmitigated impacts related to the noise and vibration caused by the project are characterized below:

- Nature: Direct

- Duration: Temporary
- Geo extent: Local
- Reversibility: Irreversible
- Likelihood Certain
- Consequence Moderate
- Significance of Impact: Moderate negative

Mitigation Measures

- To mitigate these impacts, noise barriers will be constructed in sensitive areas.
- Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation.
- Nighttime traffic and construction activities will be avoided. Mother & Child Block Mother & Child Block, Lahore Staff Management will be taken in confidence if such work is unavoidable.

Residual Impact

Despite the above mitigation measures, there will be some residual impacts of the project on the noise and vibration of the area. The significance of these residual impacts is expected to be low.

7.4.7 Disposal of Construction Waste/Excavated Material

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

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

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

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

Mitigation Measures

- Management of construction activities will be done in a way to ensure minimal degradation to the soil around the project site.

- Dumping of excavated waste and waste generated from the construction camp will be done at a designated site approved by the municipal corporation Lahore.
- The contractors will be bound by contractual obligations to take care of the waste generated from the construction activities.
- Proper planning and implementation for collection, storage and disposal of construction waste will be ensured.

Residual Impact

Following the above mitigation measures, there will be low residual impacts of the project on the faunal resources of the area.

7.4.8 Traffic Management

The proposed project site is accessible via Queens Road. During the construction phase, the movement of heavy machinery and transportation of construction material and equipment may cause traffic problems.

The vehicle traffic during the construction phase of the project is expected to be 8-10 round trips for construction material supplies and the movement of the construction crew during the peak construction period per day.

The unmitigated impacts associated with vehicular traffic are characterized below:

- Nature: Direct
- Duration: Short Term
- Geo extent: Local
- Reversibility: Reversible
- Likelihood: Certain
- Consequence: Mild
- Significance of Impact: Medium

Mitigation Measures

- The number of trips from the project site will be minimised through astute planning.
- The project vehicles will avoid peak vehicular traffic time (morning and evening).
- The project vehicles will comply with Lahore Traffic Police rules and follow the timings set for the movement of heavy vehicular traffic.
- The movement of vehicles carrying construction materials will be restricted during the nighttime to reduce traffic load and inconvenience to the local residents.
- There will also be a provision of caution signs on the access road to alert users on construction activities in progress in order to prevent the occurrence of incidents.
- Project vehicles shall not be fitted with pressure horns.
- The speed of vehicles will be regulated during the construction phase.
- Designated parking areas will be provided for the different types of project vehicles within and around the project sites.

- Traffic Management Plan will be introduced to manage the smooth flow of vehicular traffic and to avoid traffic jams and long queues.

Residual Impacts

With the implementation of the above-mentioned mitigation measures, the residual impacts of the project related vehicular traffic on Queen Road will be negligible.

7.4.9 Safety Hazards, Public Health and Nuisance

The project may pose some safety hazards to the hospital staff, patients and visitors.

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

Dust and Pollen Allergy: One of the main problems people may face the dust and pollen allergy.

Eye and Respiratory Diseases: Construction workers may be susceptible to eye and respiratory diseases due to their routine exposure to dust and exhaust emissions on the project site.

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

Physical Injuries: Injuries could happen primarily by occupational-related accidents, animal bites, etc. Activities such as land clearing, earthworks, and construction may pose various occupational hazards to the workers on site.

Psychological Disorders: Some workers may suffer from depression and anxiety disorders due to working and accommodation conditions and their relationships with fellow workers. The psychological well-being of some members of the community may be affected due to disturbances created by the project activities.

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

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

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

Mitigation Measures

- Protected fencing will be fixed around the construction site. Unauthorized access to the construction area will not be allowed.

- The local community, hospital staff, patients and visitors will be educated regarding the safety hazards at the project site.
- Defensive driving practices will be inculcated in the project drivers through training, posters and other similar measures.
- Vehicle speeds of 5 km/hr at the project site will be implemented.
- Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.
- Personnel injuries risks can be mitigated through the provision of appropriate training and emergency response procedures.
- The contractor will ensure better working conditions for its employees.
- Regular routine health screening of the contractor staff will be carried out.
- Firefighting equipment will be made available at the construction site.
- The construction site office will have first-aid kits.
- The construction crew will be provided awareness of the transmissible diseases (such as HIV/AIDS, Hepatitis B and C).
- All safety precautions will be taken to transport, handle and store hazardous substances such as fuel.

Residual Impacts

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

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

7.4.10 Solid Waste Management

Waste generation and disposal during the construction phase may result in loss of aesthetic value of the project area. Therefore, solid waste generated during the construction phase will be managed by M/s Sir Ganaga Ram Hospital, Lahore to ensure safe disposal.

The unmitigated impacts related to waste generation are characterized below.

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

Mitigation Measures

- Wastes will not be disposed of in the open.

- On-site burning of waste materials will be prohibited.
- Dedicated waste segregation units/containers will be built or placed at different locations of the project site.
- Recyclable wastes, including glass, tins, and metal scrap, will be provided to recycling contractors in nearby localities. It will be ensured that the wastes are recycled or reused properly, without having any effect on the environment.
- Food waste and combustible packaging wastes that have no reuse will be stored temporarily onsite within designated waste segregation areas and burnt in a burn pit specially developed for this purpose.
- The solid waste generated during the construction phase will be collected in the waste bins and disposed of at the designated site.
- Waste material shall be properly segregated and separated to encourage the recycling of some useful waste materials, i.e., some demolished stone and concrete materials can be used as backfills.
- Use of an integrated solid waste management system through hierarchy options, i.e., source reduction, recycling, composting and reuse, shall be encouraged. This will facilitate the proper handling of solid waste during the operation stage.

Residual Impact

The residual impacts after the implementation of the above measure will be very low if solid waste is collected and disposed of properly.

7.4.11 Sites of Archaeological or Historical Significance

There is no such archaeological and historical site in the project area.

7.5 Operational Phase Impacts

In the operation of the Mother & Child Block, Lahore will interact with different components of the environment. For the successful operation of the project, proper planning is required to minimize the environmental impacts as well as public awareness is also very important.

For smooth operation and less environmental and health impacts, training of the hospital staff is quite important.

The impact of the operation of the Mother & Child Block, Lahore, on the surrounding environment will be associated with the issue of infectious waste storage and emissions. The Project may result in the following adverse impacts.

- Solid Waste Management
- Hospital Waste Management
- Safety Hazards, Public Health and Nuisance
- Traffic Congestion

7.5.1 Solid Waste Management

Municipal solid waste will be generated during the operational phase of the proposed project. If not properly managed, it can create a nuisance for the patients, staff and visitors at the hospital and can contaminate the soil.

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

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

Mitigation Measures:

Solid Waste Management will also be an important issue during the operational phase of the Mother & Child Block, Lahore. A solid waste management facility or yellow room will be established where the solid waste will be collected and handed over to Arar Group for final disposal. The hospital waste will be categorized into two different groups, i.e., infectious waste and non-infectious waste.

- These wastes will be segregated at the source by a designated team at the hospital.
- The workers who will be responsible for the collection and handling of hospital waste will be provided with all the Personal Protective Equipment.
- The infectious wastes will be stored in a yellow bag for not more than 24 hours.
- Both infectious and non-infectious waste will be handed over to the ARAR Group for proper disposal.

Residual Impacts

The residual impacts of the implementation of the above measures will be low if infectious hospital waste is collected, segregated, and disposed of properly.

7.5.2 Increased Water demand

Increased water usage is anticipated after the construction of the Mother & Child Block, and it's, therefore, important to adopt water conservation best practices. The Hospital is connected to a wastewater Treatment Plant and is supplemented by a borehole on site.

Mitigation measures

- Borehole water abstractions should be as per the Water Resources Management Authority Rules.
- Conduct a hydrogeological survey for the area.
- Implement water-saving devices for domestic water use, e.g., dual flush toilets, automatic shut-off taps, etc.
- Portable water should not be used for irrigation purposes, and landscapes must be designed to absorb rainwater run-off rather than having to carry it off-site in storm water drains.
- Indigenous vegetation to be used for landscaping to minimise watering requirements.
- Cleaning methods utilised for the cleaning of vehicles, floors, containers, yards etc., must aim to minimise water use.
- Maintenance of proper pressure within fire water systems to limit water use.

- Practice rainwater harvesting where possible.

7.5.3 Increased Effluent Waste and Surface/Storm Runoff Generation

The proposed project will lead to increased demand for sewage disposal. The surface runoff from the building roof and the paved ground will lead to increased volume and velocity of storm water or run-off flowing from the proposed project site. This will, in turn, lead to increased amounts of storm water entering the drainage system, potentially resulting in an additional flow.

Mitigation measures

- Ensure that sewerage discharge pipes are not blocked or damaged since this can lead to the release of the effluent, resulting in land and water contamination. This will be done through continuous and regular inspection and maintenance of the system. Blockage or damages will be fixed expeditiously.
- Ensure that no surface wastewater is directed into the sewer system to avoid overloading the sewerage system.
- Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated.
- Harvest rainwater from the roof for non-portable uses, e.g., cleaning and watering plants.

7.5.4 Public Health and Safety Hazards

During the operational phase of the proposed project, infectious waste will be generated from the hospital, which will need proposal disposal.

The workers who are in direct contact with the infectious hospital waste could be affected if the personal safety measures are not ensured.

The health hazards for staff are by far the most significant potential risk associated with the healthcare facility operation.

Safety hazards in healthcare facilities are generally associated with the handling of sharps (needles, cutters), gases, and other similar equipment. Open burning of hospital waste also poses safety risks for the staff carrying out this activity. These hazards include the risk of cuts, pricks, gas poisoning, burning, and other bodily injuries. The healthcare facility staffs, as well as the patients, are susceptible to these safety hazards.

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

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

Measures and Mitigation

In order to ensure a safe and healthy environment, the infectious hospital waste storage facility needs to carry out the following measures:

- The infection control protocol[1] will be strictly implemented to minimize health risks for the staff and patients.
- Proper management of hospital waste can minimize the risks both within and outside healthcare facilities. The first priority is to segregate wastes, preferably at the point of generation, into reusable and non-reusable, infectious and non-infectious components.
- Other important steps are the institution of a sharps management system, waste reduction, avoidance of infectious substances whenever possible—ensuring worker safety, providing secure methods of waste collection and transportation, and installing safe treatment and disposal mechanisms.
- Strict compliance with the procedures specified in the Punjab Hospital Waste Management Rules of 2014 (and other similar standards), in close coordination with the infection control protocol mentioned above.
- Infectious Hospital waste will be incinerated on a daily basis. If not, the infectious hospital waste (yellow bag) will not be stored for more than 24 hours.
- The infectious waste storage facility will be marked properly, and unauthorized personals will not be allowed there.
- While dealing with the storage facility, workers will wear personal protective equipment like a gas mask, gloves, safety shoes etc.
- Housekeeping around and inside the incinerator facility area will be ensured.
- Vaccination of the staff, particularly for Hepatitis A and B and tetanus.
- It will be ensured that a reliable and safe drinking water source is available at the facility. Water will be periodically tested against the national standards for drinking water.
- Thick/puncture resistant plastic bags to collect Hospital Waste and rigid/puncture-proof boxes to dispose of needles/other sharps will be used.
- Accidental events will be reported and recorded to avoid future accidents.

Residual Impacts

There will be a moderate level of the residual impact of safety hazards associated with the operational activities.

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

7.5.5 Traffic Management

During the operational phase of the Mother & Child Block Lahore, the movement of vehicles may increase traffic congestion at Queens Road.

The characterization of the unmitigated impacts associated with vehicular traffic is as follows:

[1] A set of 13 infection control protocols have recently been prepared under the Infection Control Management Project, National MNCH Program.

- Nature: Direct
- Duration: Short Term
- Geo extent: Local
- Reversibility: Reversible
- Likelihood: Certain
- Consequence: Mild
- Significance of Impact: Medium

Mitigation Measures

- A traffic management plan will be prepared to avoid traffic jams/public inconvenience.
- Mother & Child Block, Lahore should prepare a Traffic Impact Assessment Report of the Project, which should discuss the "with" and "without" project scenarios. The conclusion and recommendations of the TIA Report should be implemented.

Residual Impacts

With the implementation of the mitigation measures, the impact of the Mother & Child Block Project operation on the traffic congestion will be greatly reduced, and residual impacts are expected to be low to medium.

7.6 Positive Impacts of the Project (Potential Environment Enhancement Measures)

The project will greatly enhance the socio-economic condition as well as the environmental condition of the project area.

7.6.1 Socio-Economical Benefits

The proposed project will act as a catalyst to improve the socio-economic situation of the district in the long term. By providing easy accessibility to a state-of-the-Art hospital facility, the local communities will gain access to prompt health care. This will help in reducing the mortality rate due to the unavailability of proper medical amenities. Such an initiative also helps in reducing the out-migration trend of the population towards the developed and overburdened cities, which in return encourages balanced growth of the province.

7.6.2 Employment

The Mother & Child Block Project will generate new jobs for technical and non-technical professionals. Many gazettes and non-gazette posts will be advertised for the smooth running of hospital operations. For maintenance of the hospital, numerous minimum wage jobs will also be made available to the poor, uneducated population.

7.6.3 Business Opportunity

The proposed project will provide business opportunities in the area thus, boosting up the local economy during the construction phase of the project.

7.6.4 Environmental Benefits

The proposed project will be a state-of-the-art facility with an infrastructure that would have a minimal negative impact on the environment. The facility will have the latest waste disposal

system and integrated environmental management system to mitigate the adverse effects of the construction and running of the hospital.

No major tree cutting is involved while the project and best landscaping practices are proposed for enhancing the green impact of the project. The project is not located in an environmentally sensitive area & no archaeological site is in the project vicinity.

As the project is being constructed on government-owned land, hence there is no question of resettlement or compensation to the Affected People (AP). In this perspective, the project has minimal environmental impacts.

7.6.5 Summary of major impacts and mitigation measures

Table 7.3: Summary of Impacts and Mitigation measures

Impact	Mitigation Measures
Pre-construction Phase Impacts	
Project Site and Design	The negative environmental impacts related to the land-use change could be effectively minimized by making provisions for the plantation of trees and landscaping within the Mother & Child Block Lahore.
Construction Phase	
Air Quality Deterioration	The project site will be monitored throughout to keep a record of air quality and any change in it. Vehicular traffic on unpaved tracks will be avoided as far as possible. For dust control, there will be a sprinkling of water at the project site.
Surface Water and Groundwater Contamination	Protection of the groundwater reserves from any contamination. Excavation will be done under the supervision of the site engineer, so he can decide up to which limit excavation will be done. Prohibit the washing of vehicles and machinery in the project area.
Damage to Faunal Resources	There will be a negligible impact of the proposed project on flora and fauna. The implementation of the plantation plan will benefit the area's flora and fauna as well.
Noise and Vibration	To mitigate these impacts, noise barriers will be constructed in sensitive areas. Construction equipment and vehicles will have exhaust mufflers (silencers) to minimize noise generation.
Safety Hazards, Public Health and Nuisance	There will be proper checks and balance on construction activities. There will be proper control of oil spillage and leakage of vehicles
Sites of Archaeological or Historical Significance	There are no reported sites of archaeological or historical significance on the land acquired for the project.
Operational Phase	
Safety Hazards, Public Health and Nuisance	The infection control protocols will be strictly followed to minimize health and safety risks. Proper Management of hospital waste will be made. PPEs will be worn while handling infectious hospital waste. Good housekeeping will be ensured. Workers regularly health inspections will be ensured. Accidental events will be reported and recorded.

Impact	Mitigation Measures
Solid Waste Management	Solid Waste generated during the operational phase will be collected, segregated, stored, and disposed of at a designated site by the Municipal Corporation of Lahore.
Hospital Waste Management	The hospital waste will be categorized into two different groups, i.e., infectious waste and non-infectious waste. The workers who will be responsible for the collection and handling of hospital waste will be provided with all the Personal Protective Equipment. The infectious wastes will be stored in a yellow bag for not more than 24 hours. The infectious waste will be handed over to the contractor for proper disposal. The non-infectious waste will be disposed of along with the solid waste produced in the housing society.
Traffic Congestion	A traffic management plan will be prepared to avoid traffic jams/public inconvenience at Queen Road.

8 Environmental Management Plan

8.1 Introduction

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

To minimize the effects of adverse impacts, the EIA has recommended mitigation measures. These mitigation measures include the use of alternative technologies, management and physical control or compensation in monetary terms.

The proposed mitigation measures have been based on the understanding of the sensitivity and behaviour of environmental receptors in the project area. The legislation controls that apply to the project and a review of good industry practices while operating in sensitive environments.

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

For the effective implementation and management of mitigation measures, an environmental management plan (EMP) has been prepared. The EMP satisfies the requirement of the Punjab Environmental Protection Act, 1997 (amended 2017).

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

8.2 Purpose and Objectives of EMP

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

The primary objectives of the EMP are to:

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

8.3 Management Approach/ Institutional Capacity

8.3.1 Pre-Construction and Construction Phase

The organizational roles and responsibilities are summarized below:

a) Mother & Child Block, District Lahore

The overall responsibility of supervision of all the project activities rests with the project proponent, Mother & Child Block Mother & Child Block , Lahore.

M/s Sir Ganaga Ram Hospital, Lahore will ensure monitoring of environmental compliance at the hospital level.

b) Project Manager

The Project Manager, M/s Sir Ganaga Ram Hospital, Lahore, will be responsible for environmental compliance during the design and construction phases of the project.

The Project Manager, Mother & Child Block Mother & Child Block, will carry out field activities and will be responsible for implementing various mitigation actions prescribed in the EIA report relevant to the contract. The Project Manager will make sure the Environmental Monitoring Plan is being followed and complied with on the project site. The management of Mother & Child Block will monitor the implementation of the EMP and the EIA report.

c) EPD Punjab

The Environmental Protection Department, Government of Punjab, will periodically visit the project site to monitor the compliance of environmental protection measures detailed in the EIA report.

8.3.2 Organizational Structure and Responsibilities

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

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

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

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

The Project Manager, Sir Ganga Ram Hospital will be responsible for ensuring the overall environmental soundness of all construction activities. He will ensure the implementation of EMP and EIA.

Environmental Monitoring: Sir Ganga Ram Hospital will make necessary arrangements through Engineering Consultant to monitor the key environmental data during the construction phase.

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

8.3.3 Operation Phase

Sir Ganga Ram Hospital will assume the main responsibility for the environmental performance of the Mother & Child Block Project during its operational phase.

An environmental monitoring plan has been developed as part of the Mother & Child Block Project. The key environmental parameters, such as solid waste management, infectious hospital waste management, sewerage treatment plant, traffic count, noise, and status of

implementation of plantation plan, will be monitored on a regular basis. The environmental monitoring reports will be produced and shared with the concerned authorities if required.

8.4 Legislation and Guidelines

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

The Punjab Environmental Protection Act, 1997 (2012) is the basic environmental legislation. The act also requires that no person shall emit pollutants or noise in amount, concentration or level that exceeds the Punjab Environmental Quality Standards (PEQS). The PEQS will be followed throughout the construction and operational phases of the project.

8.5 Environmental Improvement Cell and Responsibilities

During the construction phase of the Mother & Child Block Project, will form up an Environmental Improvement Cell, which will be responsible for the environmental management and supervisory affairs during the construction and operational phases of the project. The responsibilities of the Environmental Improvement Cell are as follows:

- To ensure implementation of all the proposed mitigation measures during the installation, commissioning, and operational phase of the project.
- Capacity building of the staff regarding environmental improvement and awareness.
- To develop operational guidelines and implementation schedules.
- Receiving complaints from the community. To ensure that the proposed project is implemented in an environmentally friendly manner, causing the least harm to the existing environment.

8.6 Approvals

Mother & Child Block Project will obtain environmental approvals from the Environmental Protection Department, Government of Punjab.

8.7 Contractual Provisions

Adherence to the requirements of the EMP and EIA in terms of environmental mitigation will be required from the civil works contractor, and thus EMP will form part of their contract agreements signed.

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

8.8 Environmental Mitigation Matrix

An Environmental Management Matrix has been developed, which is given in **Table 8.1**.

This Environmental mitigation matrix provides details about potential environmental impacts, where the impact will happen, where the impact will occur, mitigation measures, responsibility and parameters for monitoring.

Table 8.1: Environmental Mitigation Matrix of Installation of Mother & Child Block Project

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
Pre-construction Phase Impacts						
Seismic activities may damage structures, environment, health, and lives	At the mother & Child Block Lahore Project site.	After an earthquake with an intensity higher than design.	The project will be designed in accordance with the revised seismic codes	Engineering Consultant	Engineering Consultant,	Land
Construction Phase						
Contamination of soil and groundwater	At the project site.	Construction of campsite and buildings.	▪ A Septic tank with a soakage pit will be constructed for domestic wastewater from the construction camp. The outflow from the septic tank will relate to the sanitary sewerage system of the hospital to prevent contamination of soil and groundwater. ▪ Vehicles and equipment will not be repaired at the project site. If unavoidable, an impervious shield will be used to avoid any soil contamination. ▪ Waste oils (if any) will be collected in drums and sold to the recycling contractor. ▪ Solid waste will not be disposed of in the open, and on-site burning of solid waste will be not allowed.	Contractor	Engineering Consultant,	Water and Soil

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ Waste bins/containers will be placed at appropriate locations. ▪ The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be used as appropriate or to be sold to a recycling contractor. ▪ All preventive measures will be adopted to control the spill-over of chemicals and other effluents on the ground to protect the soil.			
Soil Erosion	At the project site.	Construction of campsite and land levelling for construction activities.	▪ Campsite area to be kept the minimum. ▪ The construction of a campsite in the levelled area will minimize disturbance to the soil. ▪ Construction activities are carried out in a manner to minimize soil erosion. ▪ Land clearing, levelling and grading be minimized. ▪ The exposed surface will be re-surfaced and stabilized as soon as possible. ▪ Existing pathways and access roads will be used as much as possible. ▪ Appropriate slope stabilization measures will be taken as per the design (i.e., Stone pitching). ▪ Temporary measures, such as the construction of temporary walls reinforced with brick lining bordering the construction areas to contain debris and spoil, will also be undertaken to avoid soil erosion and water contamination.	Contractor	Engineering Consultant,	Land

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ The hazardous waste will be kept separate and handled according to the nature of the waste. While storing, hazardous waste will be marked.			
Air Quality Deterioration	At the project site	Construction of campsite and buildings	▪ Construction machinery and vehicles will be kept in good working condition and properly tuned in order to minimize exhaust emissions. ▪ Fugitive dust emissions will be minimized by spraying water on the soil, where required and appropriate. ▪ Vehicular traffic on unpaved tracks will be avoided as far as possible.	Contractor	Engineering Consultant,	Air Quality Report
Ground Water Quality	At the project site	Construction of campsite and buildings	▪ The solid waste generated will be reused where possible. If not reused, they will be disposed of at the hospital designated solid waste disposal site from where the municipal committee will take it.	Contractor	Engineering Consultant,	Water Quality Report
Loss of Vegetation	At the project site	Construction of campsite and buildings	▪ Removal of vegetation cover will be kept at a minimum. ▪ Un-necessary clearing will be avoided. ▪ Tree plantation will be carried out after the completion of construction activities. ▪ The construction workforce will be provided with LPG as cooking and heating (if required) fuel. The burning of fuelwood will be strictly prohibited.	Contractor	Engineering Consultant,	Plantation plan implementation
Damage to Wildlife	At the project site	Construction of campsite and buildings	▪ The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.	Contractor	Engineering Consultant,	Ambient Air and Noise Monitoring

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ The measures to enhance natural vegetation in the area will benefit the area's fauna as well. ▪ The movement of construction machinery and equipment will be restricted to work areas only to avoid necessary disturbance of the wildlife.			
Noise and Vibration	At the project site	Construction of campsite and buildings	▪ Construction equipment and machinery will have exhaust mufflers (silencers) to minimize noise generation. ▪ Noise construction activities will be carried out only during normal working hours. ▪ It will be ensured that the generator, vehicles and other potentially noisy equipment used are in good condition. ▪ The use of pressure horns will not be allowed inside the hospital premises. ▪ Nighttime traffic and construction activities will be avoided. The Medical Superintendent of the hospital will be taken in confidence if such work is unavoidable.	Contractor	Engineering Consultant,	Noise Monitoring
Health and Safety of the workforce	At the project site	Construction of campsite and buildings	▪ All occupational and health, and safety requirements for the workforce will be adhered to. ▪ Special safety measures will be adopted during the lifting and unloading of the infectious waste. ▪ Protected sheet/fencing will be fixed around the construction site. Unauthorized access to the construction area will not be allowed.	Contractor	Engineering Consultant,	Health and Safety Environment Report

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ To minimize the occupational health hazard, proper personal protective gear, i.e. masks, shall be provided to the workers who are engaged in dust generation activity.			
Public Health, Safety and Nuisance	At the project site	Construction of campsite and buildings	▪ The hospital staff will be educated regarding the safety hazards at the project site. ▪ Defensive driving practices will be inculcated in the project drivers through training. ▪ Vehicle speeds of 20 km/hr at the project site will be implemented. ▪ Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.	Contractor	Engineering Consultant,	Public Health and Safety
Site Restoration	At the project site	Upon completion of construction activities	▪ All equipment and machinery at the project site will be demolished. ▪ All temporary structures will be demolished, the land levelled and re-contoured to the original condition or better. All debris and any other material will be removed from the site.	Contractor	Engineering Consultant,	Demobilization of contractor
Operational Phase						
Hospital Waste Generation	At the hospital	During Operation and maintenance period	▪ The infection control protocol will be strictly implemented to minimize health risks for the staff and patients. ▪ The hospital waste will be properly managed.	Engineering Department, Mother & Child Block Project	Mother & Child Block Project Lahore	Infectious solid waste

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ The infectious waste storage facility will be marked properly, and unauthorized personals will not be allowed there. ▪ While dealing with the waste, workers will wear personal protective equipment like a gas mask, gloves, safety shoes etc. ▪ Thick/puncture resistant plastic bags will be used to collect Hospital Waste and rigid/puncture-proof boxes to dispose of needles/other sharps.			
Traffic Congestion	Hospital Road/Jail Road	During Operation and maintenance period	▪ Traffic management plan to be developed. ▪ Traffic control measures, including speed limit, are to be enforced. ▪ Mass awareness regarding traffic rules	Engineering Department, Mother & Child Block Project	Mother & Child Block Project Lahore	Traffic
Public Health and Safety hazards	At the hospital	During Operation and maintenance period	▪ The infection control protocol will be strictly implemented to minimize health risks for the staff and patients. ▪ Proper management of hospital waste can minimize the risks both within and outside healthcare facilities. ▪ Strict compliance with the procedures specified in the Punjab Hospital Waste Management Rules of 2014 (and other similar standards), in close coordination with the infection control protocols mentioned above. ▪ Infectious Hospital waste will be incinerated on a daily basis. If not, the infectious hospital waste (yellow bag) will not be stored for more than 24 hours.	Engineering Department, Mother & Child Block Project	Mother & Child Block Project Lahore	Public Health and Safety Hazard

Potential Environmental Impact	Where the impact is likely to happen	When the impact likely to occur	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			▪ The infectious waste storage facility will be marked properly, and unauthorized personals will not be allowed there. ▪ While dealing with the storage facility, workers will wear personal protective equipment like a gas mask, gloves, safety shoes etc. ▪ Housekeeping around and inside the incinerator facility area will be ensured. ▪ Vaccination of the staff, particularly for Hepatitis A and B and tetanus. ▪ Thick/puncture resistant plastic bags to collect Hospital Waste and rigid/puncture-proof boxes to dispose of needles/other sharps will be used.			

8.9 Solid Waste Management Plan

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

The civil work contractor will be responsible for the disposal of solid waste generated by the project.

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

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

Operational Phase: The Government of Punjab has outsourced the hospital waste disposal to Arar Group. Two categories of solid ease will be generated during the operational phase of the proposed project.

Municipal Solid Waste: The municipal solid waste generated by the hospital will be stored at the hospital waste storage area from where the Arar Group will collect it.

Infectious Waste: The infectious waste produced will be collected and stored in yellow bags for not more than 24 hours. The infectious waste will be transferred to a designated transfer facility of Arar Group, from where it will be disposed of using an incinerator or microwave shredder.

8.10 Hospital Waste Management

The main categories of EPA Punjab Hospital Waste Management Rules 2014 include:

- **"Hospital waste"** includes both risk waste and non-risk waste.
- **"Infectious waste"** means waste contaminated by any type of pathogens such as bacteria, viruses, parasite or fungi and includes cultures from laboratory work, waste from surgeries and autopsies, waste from infected patients, discarded or disposable materials and equipment which have been in contact with such patients and infected animals from laboratories.
- **"Pathological waste"** includes tissues, organs, body parts, fetuses, blood and body fluids.
- **"Pharmaceutical waste"** includes expired or unused pharmaceutical products, spilled contaminated pharmaceutical products, surplus drugs, vaccines or sera, and discarded items used in handling pharmaceuticals such as bottles, boxes, gloves, masks, tubes, or vails;
- **"Radioactive waste"** includes liquid, solid and gaseous waste contaminated with radionuclides generated from in-vitro analysis of body tissue and fluid, in-vivo body organ imaging and tumour localization, and investigation and therapeutic procedures.
- **"Risk waste"** means infectious waste, pathological waste, sharps, pharmaceutical waste, genotoxic waste, chemical waste, and radioactive waste.
- "sharp" includes whether infected or not, needles, syringes, scalpels, infusion sets, saws and knives, blades, broken glass, and any other item that could cut or puncture; and (r) "waste management" includes waste segregation, waste collection, waste transportation, waste storage, waste disposal and waste minimization and reuse

- **Sharps:** Sharp waste. e.g., needles, infusion sets, scalpels, knives, blades, broken glass that may cause punctures and cuts. This includes both used and unused sharps.
- **Genotoxic Waste:** Waste containing substances with genotoxic properties. e.g., waste containing cytostatic drugs (often used in cancer therapy), genotoxic chemicals.
- **Chemical waste:** Waste containing chemical substances, e.g., laboratory reagents; film developer, disinfectants (disinfectants) that are expired or no longer needed solvents
- **Waste with high content of heavy metals**: Batteries, broken thermometers, blood-pressures gauges, etc.
- **Pressurized containers**: Gas cylinders, gas cartridges, aerosol cans.
- **General solid waste**: Waste generated from offices, kitchens, packaging material from stores.
- **Microorganisms**: Any biological entity, cellular or non-cellular capable of replication or of transferring genetic material.

Responsibility for waste management:

Every hospital shall be responsible for the proper management of the waste generated by it till its final disposal in accordance with the provisions of the Act and the rules 16 to 22. These constitute a grave risk if they are not properly treated or disposed of or are allowed to mix with other municipal waste. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal.

Waste Management Plan (WMP):

A WMP shall be prepared by a WM Officer for approval by the WM Team and shall be based on internationally recognized environmental management standards such as the International Organization for Standardization 14000 series.

The WMP shall include:

- a plan of the hospital showing the waste disposal points for every ward and department, indicating whether each point is for risk waste or non-risks waste, and showing the sites of the central storage facility for risk waste and the central storage facility for non-risk waste.
- Details of the types, numbers and estimated costs of containers, waste bags and trolleys required annually.
- Timetables include the frequency of waste collection from each ward and department.
- Duties and responsibilities for each of the different categories of the hospital. Staff members who shill generate hospital waste and be involved in the management of the waste.
- An estimate of the number of staff members required for waste collection.
- Procedures for the management of waste require special treatment, such as autoclaving before final disposal.
- Contingency plans for storage or disposal of risk waste in the event of breakdowns of incinerators or of maintenance or collection arrangements.
- training courses and programmes on waste management; and
- Emergency procedures.
- Representatives of a local MC responsible for the collection and disposal of waste from the hospital shall be consulted in preparing and finalization of the WMP.

- The WMP shall be regularly monitored, reviewed, and revised and updated by the Waste Management Team as and when necessary.

Table 8.2 shows Hospital Solid Waste Management and Disposal plan

Table 8.2: **Hospital Solid Waste Management and Disposal plan**

Component	Actions/recommendations
Waste Minimization, Reuse, and Recycling	Consider practices and procedures to minimize waste generation without sacrificing patient hygiene and safety considerations Use of efficient stock management practices and monitoring e.g. • For chemical and pharmaceutical stocks, Small/frequent orders for products that spoil quickly and strict monitoring of expiry dates • Complete use of the old product before new stock is used • Maximization of safe equipment reuse practices, including Reuse of equipment following sterilization and disinfection (e.g., sharps containers)
Waste Segregation	Waste should be identified and segregated at the point of generation. • ***Non-hazardous waste***, such as paper and cardboard, glass, aluminium and plastic, should be collected separately and recycled. Food waste should be segregated for composting. • ***Infectious and/or hazardous wastes*** should be identified and segregated according to their category using a colour-coded system • Other segregation considerations include the following: Avoid mixing general health care waste with hazardous health care waste to reduce disposal costs; Segregate waste containing mercury for special disposal. Aerosol cans and other gas containers should be segregated to avoid disposal via incineration and related explosion hazard; Segregate health care products containing PVC to avoid disposal via incineration or MW Shredders and subsequent harmful air emissions
On-site Handling, Collection, Transport and Storage	• Seal and replace waste bags and containers when they are approximately three-quarters full. Full bags and containers should be replaced immediately. • Identify/label waste bags/containers properly prior to removal. • Transport waste to storage areas on designated trolleys/carts, which should be cleaned/disinfected regularly; Waste storage areas should be located within the facility & sized to the quantities of waste generated, with the following design considerations: • Hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply. • Secured by locks with restricted access. • Designed for access and regular cleaning by authorized cleaning staff and vehicles. • Protected from the sun and inaccessible to animals/rodents. • Equipped with appropriate lighting and ventilation. • Segregated from food supplies and preparation areas. • Equipped with supplies of protective clothing, and spare bags/containers • Store mercury separately in sealed and impermeable containers in a secure location. • Store cytotoxic waste separately from other waste in a secure location. • Store radioactive waste in containers to limit dispersion, and secure behind lead shields.
Transport to Outside facilities for treatment	If the proponent does not have an onsite waste treatment facility now, therefore, during operation, solid waste segregation, collection, and storage shall be the responsibility of the hospital, whereas waste transportation to treatment facility and treatment shall be the work of a contracted biomedical waste handler. Therefore, the proponent shall: • Appoint a waste handler who is licensed by NEMA and permitted by the local government to handle, transport, and treat biomedical wastes at approved

	treatment sites using recommended treatment procedures given by the legal framework and respective government agencies. • The contractor shall transport waste destined for off-site treatment facilities according to the guidelines for transport of hazardous wastes / biomedical wastes in EPA HWM Rules 2014. • Packaging for infectious waste should include an inner, watertight layer of metal or plastic with a leak-proof seal. Outer packaging should be of adequate strength and capacity for the specific type and volume of waste; • Packaging containers for sharps should be puncture-proof; • Waste should be labelled appropriately, noting the substance class, packaging symbol (e.g. infectious waste, radioactive waste), waste category, mass/volume, place of origin within the hospital, and final destination; • Transport vehicles should be dedicated to waste and the vehicle compartments carrying waste sealed.

8.11 Wastewater Management Plan

During the operational phase of the 550 Bedded Mother & Child Block, various wastewater will be generated:

Blackwater (sewage) will be generated from the washrooms and kitchen of the hospital, which will contain a high concentration of faecal matter and urine, food residues, and toxic chemicals.

Greywater (sullage) will be generated from washing, bathing, laboratory processes, laundry or technical processes such as cooling water or the rinsing of X-ray films.

Stormwater will be generated from the hospital roofs, grounds, and paved surfaces.

The wastewater generated should be treated by taking into consideration the following wastewater management plan:

Two separate collection systems for sewage and stormwater should be constructed where the wastewater will be collected.

The medical laboratory waste should be pretreated by using acid-base neutralization, filtration or autoclaving options.

The blackwater should be pretreated with lime milk (hydrated calcium oxide or calcium hydroxide).

Blood should be pretreated by using a thermal method or disposed of directly to the septic tank if safety measures are used.

After pretreatment, the heavy solids should be removed from the wastewater through primary treatment processes, i.e., sedimentation.

After the primary treatment, the wastewater should be treated by using indigenous bacteria to remove the dissolved and suspended biological matter.

Finally, the wastewater should be treated with chlorine to further reduce the remaining pathogens, suspended solids and other chemical contaminants.

After the treatment, sludge will be produced, which should be treated in the anaerobic digestor or used for composting.

The treated water should be released in any water body or should be used for horticulture purposes.

8.12 HSE Management Plan

- Health Safety and Environment (HSE) induction/orientation will be provided to the workforce at the project site.
- Assembly points will be established for the gathering of the workforce regarding the daily HSE Toolbox Talk at the project site.
- HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.
- Special education sessions will be conducted properly at the project site.
- The daily walkthrough will be conducted at the project site.
- All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special, Safety Gloves, Masks etc.).
- Proper and safe scaffolding will be provided at the site for safe work at height.
- All the construction machinery will be inspected properly at the site.
- All cranes and lifting gears will be inspected/checked on a regular basis.
- Inspection and Tagging system will be maintained at the project site.
- Safety signage will be provided at the project site.
- Fire posts will be established at the project site at an easy approach location.
- HSE Signboard will be installed at the project site for emergency response.
- Regular First Aid Center, along with all required medicines 24/7, will be available at the project site.

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

- First Aid Boxes: First aid boxes will be provided at the construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plast, healing balms, pyodine, spirit, painkiller, etc.
- Dispensaries: Medical facilities will be established by the contractor. A dedicated room will be established as a dispensary and first aid services at the construction site.
- PPEs: The site Engineer and HSE Manager will be responsible for providing PPEs to all workers.
- Safety Signs: Relevant safety signboards will be displayed on the worksites to make aware of / train workers about safety rules. Mainly safety signs include signs of speed limits, electric spark, etc.
- TBTs: Toolbox Talks (TBTs) will be delivered on a regular basis, and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.

- Barricading: The contractor will put up barricade tape at all the active work sites. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet.
- Training: Safety training will be delivered by the HSE Manager to achieve its objectives. Training will be conducted for capacity building of employees/workers/labour / sub-contractors to make them well effective to respond to any kind of emergency situation.

The breakup cost for the safety of workers is described in **Table 8.3.**

Table 8.3: Estimated Cost for the Implementation of Environmental Monitoring Plan for Establishment of Mother & Child Block Project

No	Item	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Personal Protective Equipment (A)				
1	Dust Masks	14,400	10	144,000
2	Safety Shoes	300	2000	600,000
3	Gloves	7,200	200	1,440,000
4	First Aid Box	2	3,000	6,000
5	Ear Plugs	600	50	30,000
6	Safety Helmets	300	1000	300,000
7	Safety Jackets (Hi Vis)	600	500	300,000
Others (B)				
8	Provision of Dust Bins	30	500	15,000
9	Warning Tape	50	500	25,000
10	Safety Cones	20	1000	20,000
11	Safety Sign Boards	40	1500	60,000
12	Raincoat	100	1000	100,000
			Total (A + B)	**3,040,000**

- Time Required for Construction Period = 3 years
- Number of Labor Required during peak Construction = 100
- Personal Protective Equipment PPEs
- Dust Mask: 1 Dust Mask to be used in a week by each labourer
- Safety Shoes: 1 Safety shoe for 1 year for each labourer
- Gloves 2 pairs of gloves for each labourer for each month
- First Aid Box 1 first aid box for every 50 labourer
- Ear Plug 1 set of the earplug to be used for 6 months for each labourer
- Safety Helmet 1 safety helmet for each labourer for 12 months
- Safety Jackets 2 safety Jackets (Hi-Vis) for each labourer for 12 months

- Dust Bin: Rough estimate
- Water Sprinkling the whole construction period
- Rain Cost: 1 Raincoat for each labourer

8.13 Traffic Management and Construction Material Transportation Plan

- The construction material will be transported to the project site via Queens Road as per requirement and ease of access.
- 10 km/hr speed limited will be being maintained at the project site.
- All the light vehicles, cars, jeeps etc., are being parked in a designated area.
- Speed breakers will be followed properly.
- The experienced and license holders (drivers and operators) will be hired for transportation.
- All the heavy machinery will be checked properly and inspected on a regular basis.
- Speed limit signboards have been installed at the project site.
- All the headlights, backlights, indicators etc., of vehicles and machines, will be checked and maintained regularly.
- All the warning lights, reverse back alarms will be maintained properly.

8.14 Emergency Preparedness, Response and Site Evacuation Plan

- The contractor will always be ready for response in any kind of emergency at the project site.
- Special assembly points will be established at the project site (offices and site).
- The emergency siren will be installed at assembly points.
- Contact numbers of the emergency response team will be circulated at the project site.
- Close coordination will be carried out with 1122 in the case of any serious injury/accident.
- Close coordination will be carried out with all law enforcement agencies (police) in case of an aggressive mob of people in the shape of any kind of protest.
- An emergency response drill will be carried out once a month for the provision of awareness to the workforce at the project site.
- First Aid Box will be available at the project site around the clock.
- Experienced and qualified paramedic staff will be available at First Aid Post at the site under the command of the HSE Manager.
- All the new entrants will be oriented by HSE Manager regarding the required awareness towards the infectious and risky situation and control.
- The entire workforce will be provided with all mandatory PPEs for a risk-free environment.
- Special in-house training (TBT) will be conducted by the HSE Manager regarding awareness of any emergency condition and control.

- Proper water sprinkling will be carried out at the service road along with the project site for dust control to avoid any hazardous and risky situation which a cause of transport emergency can be.

8.15 Fire Fighting Plan

- The construction site will be equipped with fire extinguishers as well as communication equipment for contacting the appropriate emergency response teams.
- At all the project sites, emergency alarms will be installed. Persons will be nominated to ring the emergency alarm in case of an emergency situation or any emergency risk.
- All the workers will be trained and well communicated on how to respond to the emergency alarm and reach the assembly point immediately. Workers will be trained to respond to an emergency alarm, as discussed below:
- If the alarm rings for 20 seconds, only once, then it is a less severe emergency. If it rings for 20 seconds thrice after intervals, then it is medium to a severe high emergency, but it can be much severe, and If it rings for 60 seconds or more continuously, then the emergency situation is most difficult so, everyone should respond to it immediately, evacuate the workplace and move towards the assembly point.
- Proper evacuation routes will be designated, nominated, and well communicated to all. All the workers will be trained to follow the particular evacuation routes and reach the assembly point in case of an emergency situation.

8.16 Plantation Plan

The plantation plan recommends planting 3,000 plants having 4-5 feet in height and 1.0 to 1.5 inches stem diameter within the boundary of the Sir Ganga Ram Hospital.

The management of the proposed Project will ensure the provision of staff and a budget for the implementation of the plantation plan.

The plantation of recommended indigenous species will be carried out at 8-10 feet among rows (in case of multiple rows). The recommendations about the new plantations are based upon the calculations that these will not be less than ten times than the cut trees during the developmental phase.

The plantation plant consists of trees, shrubs, and indoor plants, which are recommended for the Proposed Project.

On the completion of the construction of the building of Proposed Project, the plantation will be carried out along the walking track around the building. The project site will be made green and beautiful with ornamental, evergreen, and shady tree species.

Trees (20 ft. and above): A total of 7 trees comprising shady, flowering, and fruit trees have been recommended for plantation along eastern, northern, and western boundaries as well as green areas of the Proposed Project.

Table 8.4: Recommended Trees for Mother & Child Block Mother & Child Block Project

Sr.#	Botanical Name	Local Name	Description
1	*Azadirachta indica*	Neem	A deciduous, shady tree has medicinal importance

2	*Bombax ceiba*	Seemal	A large flowering tree having good timber
3	*Cassia fistula*	Amaltas	A tree has twice blossomed in a year with a beautiful yellow flower
4	*Eugenia jambolana*	Jaman	It is an evergreen fruit tree large size fruit tree with good quality timber wood
5	*Mangifera indica*	Aam	A fruit tree with a large shade
6	*Moringa oleifera*	Sohanjna	A medicinal plant in arid and semi-arid regions has a lot of nutritious value
7	*Psidium guajava*	Amrood	A fruit plant which can easily be grown in a semi-arid climate

Shrubs (under 20 ft.): A total of 6 evergreens, flowering, and ornamental shrubs having a variety of colours have been recommended for gardens and landscaping at Proposed Project.

Table 8.5: Recommended Indoor Plants for Mother & Child Block Mother & Child Block Project

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

Plantation Plan Cost

A total number of 3,000 trees will be planted. The cost of plantation includes the cost of equipment, initial planting (including restocking during the first 3 years) and maintenance cost for the first four years of plantation. The total estimated cost of implementation of the plantation plan is Rs.1.285 million. The cost of raising one plant and its maintenance for 4 years is Rs. 1285.

The tentative cost of equipment is given below in **Table 8.6.**

Table 8.6: Tentative Cost of Equipment

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

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

Table 8.7: Estimated Cost of Unit Plantation (4,000 Plants) for 1st Year

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Clearance of Site (2,000 plants)	3,000	5/plant	15,000
2	Layout/ unit	3,000	2/plant	6,000
3	Digging of Pits	3,000	50/pit	150,000
4	Average cost per unit plant	3,000 plants	215/plant	645,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	3,000 plants	10/plant	30,000
6	Plantation of plants with ball of earth/unit	3,000	30/plant	90,000
7	Addition of Manure 1 cft. / Pit	3,000 cft.	Lump Sum	50,000
8	Hand watering 100 times Approx. x4,000=400,000	300,000	1/watering	300,000
9	Weeding 4 times 4,000x4=16,000	12,000	5/plant	60,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
	Total			**1,396,000**
	Say			**1,400,000**

Table 8.8: Estimated Unit Cost of Plantation of (400 Plants) & Maintenance for 2nd Year in case of 20% Mortality

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
3	Re-Digging of Pits	600	50/pit	30,000
4	Average cost per unit plant	600 plants	215/plant	129,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	600 plants	10/plant	60,000
6	Plantation of plants with ball of earth/unit	600	30/plant	18,000
7	Addition of Manure 1 cft. / pit	1,000 cft.	Lump Sum	25,000
8	Hand watering 100 times Approx. x4,000=400,000	300,000	1/watering	300,000
9	Weeding 4 times 4,000x4=16,000	12,000	5/plant	60,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
	Total			**672,000**

Table 8.9: Estimated Cost of Plantation Unit (200 Plants) & Maintenance for 3rd Year

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
3	Re-Digging of Pits	300	50/pit	10,000
4	Average cost per unit plant	300 plants	215/plant	43,000
5	Carriage/unit of plants from Nursery to Site including loading/unloading	300 plants	15/plant	3,000
6	Plantation of plants with ball of earth/unit	300	30/plant	6,000
7	Addition of Manure 1 cft. / pit	1,000 cft.	Lump Sum	25,000
8	Hand watering 50 times Approx. x4,000=200,000	150,000	1/watering	150,000
9	Weeding 3 times 4,000x3=12,000	9,000	5/plant	45,000
10	Miscellaneous/ Contingencies	Nil	Lump Sum	50,000
	Total			**332,000**
	Say			**335,000**

Table 8.10: Estimated Cost of Maintaining 4,000 plants for 4th Year

Sr. #	Activity	Quantity	Rate (PKR)	Amount (PKR)
1	Hand watering 50 times 4,000x50=100,000	200,000	1/time	200,000
2	Weeding	3000	5/unit	15,000
3	Trimming/pruning of plants	3,000	5/unit	15,000
4	Miscellaneous			50,000
			Total	**280,000**

Table 8.11: Total Cost of Plantation Plan for Four years

Activity	Amount (PKR)
Estimated Cost of Unit Plantation (4,000 Plants) for 1st Year	1,400,000
Estimated Unit Cost of Plantation of (400 Plants) & Maintenance for 2nd Year in case of 20% Mortality	672,000
Estimated Cost of Plantation Unit (200 Plants) & Maintenance for 3rd Year	335,000
Estimated Cost of Maintaining 4,000 plants for 4th Year	280,000
Total	**2,687,000**

Table 8.12: Final Cost per Tree Planted

Activity	Amount (PKR)
Cost for maintenance of cultivated plants for 4 years	2,687,000
Cost of equipment	100,000
Total cost	2,787,000
Cost for raising one plant and its maintenance for 4 years	**929**

8.17 Restoration and Rehabilitation Plan

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

Following measures will be adopted for site restoration and rehabilitation:

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

8.18 Project Monitoring

The Mother & Child Block Project will make necessary arrangements to monitor the key environmental data during the construction and operational phases for the first three years after the operational phase. These will include the quantity of water used, a record of waste produced, a record of waste disposal, and project-related vehicular traffic.

The Project coordinator, Mother & Child Block Project, will monitor project activities while working in the project area. He will keep a record of all non-conformances observed and report these along with actions to the Mother & Child Block Project for further action. He will also have to report any impacts anticipated along with his recommendations for further action.

8.19 Environmental Monitoring Plan

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

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

The various purposes of the environmental monitoring plan are:

- To evaluate the effectiveness of mitigation measures.
- To respond to the unanticipated environmental impacts when the project is under implementation.

- To make regulations and improve management and environmental controls based on the monitoring data. Environmental Protection Department, Punjab is entrusted with the overall responsibility of monitoring the environment in Punjab.

An Environmental Monitoring Plan for the establishment of Mother & Child Block Project has been provided in **Table 8.13**. The plan will be used as a management and monitoring tool for the implementation of the mitigation measures required by the EIA. The plan entails the required mitigation measures recommended in the EIA.

Table 8.13: Environmental Monitoring Plan for Establishment of 550 Bedded Mother & Child Block Project

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards	Implementation
Air Quality	Construction	SO_2, NO, NO_2, O_3, SPM, PM_{10}, $PM_{2.5}$, Pb and CO	At one location in Mother & Child BlockProject site	PM_{10}, for continuous 8 hours, on a quarterly basis	PEQS	Civil Work Contractor
Roadside Plantation	Construction	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out	(1) One month after the plantation (2) One year after the plantation 1 month, 3 months, 6 months, and 12 months after planting	75 % survival rate	Civil Work Contractor
Noise Levels	Construction	dB (A)	At a central location in Mother & Child BlockProject	Twice in 8 hours at a selected site on a quarterly basis.	EPA Ambient Noise standards	Civil Work Contractor
Water Quality	Construction	pH, BOD, COD, TDS, TSS, DO, coliforms, hardness, nitrate, chloride, sulphate, hydrocarbon,	At two locations, i.e., start and end of the Project site	Quarterly	PEQS	Civil Work Contractor
Plantation	Operation (First three years)	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out	(1) 2.5 years after plantation	75% survival rate	Horticulture Department
Solid Waste Management	Operational phase	Infectious hospital waste	Solid Waste Management facility	Quarterly	PEQS	Hospital Staff

Key:

dBA = decibels (measured in the audible range)

PEQS = Punjab Environmental Quality Standards

Table 8.14 shows the estimated cost for the EMP.

Table 8.14: Estimated Cost for the Implementation of Environmental Monitoring Plan for the establishment of Mother & Child Block Project, Lahore

Environmental Monitoring Activities	Units/ No. of Samples	Unit Cost specification	Cost (Rs)
Construction phase			
Ambient air quality monitoring Quarterly basis for 3 years	12	@ 35,000 per sample for 24 hr monitoring	420,000
Ambient water quality monitoring Quarterly basis on one location for 3 years	12	@ 15,000 per sample	180,000
Noise levels, quarterly basis for three years	12	@ 5,000 per sample	60,000
Environment , Health Safety Engineer	3 years	@ 50,000	1,800,000
		Total	**2,460,000**

Source: *PPI Estimates, 2024*

8.20 Training Schedule

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

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

Sir Ganga Ram Hospital will be primarily responsible for providing training to all project personnel. Lump-sum fees of Rs. 100,000/= should be kept for the training management plan. Framework for the environmental and social training program is being provided in **Table 8.15.**

Table 8.15: Framework for Environmental & Social Training Program of Establishment of Mother & Child Block Project

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

8.21 Environmental Budget

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

The summary of the cost of monitoring the environment and mitigation cost is shown in **Table 8.16**.

Table 8.16: Summary of Environmental Budget

Activity	Basis	Estimated Cost (Rs)
Environmental Monitoring Cost	Ambient Air, Noise and Water Quality Monitoring & Cost of Hiring Environmental Engineer for 42 Months	5,460,000
Plantation Plan	Implementation of plantation plan	2,687,000
Health & Safety of Workers	PPEs and site safety equipment for 150 employees	2,689,500
Estimated Cost of energy efficiency	water faucet, energy-efficient LEDs, rainwater harvesting system	17,500,000
Cost of Environmental Training	For the whole construction period	1,000,000
	Grand Total	**29,336,500**

8.22 Reporting/Communication and Documentation

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

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

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

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

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

Reporting: The monitoring body will produce daily, weekly, monthly and another periodic report, as well as a final report of the project based on the information collected. The proponent

site representative and the contractors will also prepare a weekly environmental report. Copies of the proponent will be provided to the proponent and contractor's higher management.

8.23 Change Management Plan

The EIA for Mother & Child Block Project recognizes that changes in the EMP may be required and therefore provides a Change Management Plan to manage such changes.

The overall responsibility for the preparation of change management statements will lay with the project Manager, Mother & Child Block Project. However, if major changes are envisaged, then the environmental consultant will review the entire process and formulate the Change Management Plan to be implemented by the Project Manager, Mother & Child Block Project.

8.24 Quarterly Environmental Monitoring Report

The contractor will prepare a Quarterly Environmental Monitoring Report on project activities carried out during the specified period of the proposed project.

Sir Ganga Ram Hospital will submit the Quarterly Environmental Monitoring Report of the project to the Environmental Protection Agency, Government of Punjab. A format of the Quarterly Environmental Monitoring Report has been provided in **Annexure 8.**

8.25 Post Project Monitoring

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

9 Conclusion and Recommendations

9.1 Introduction

This chapter presents the assessment of the possible environmental impacts of the establishment of the Mother & Child Block Project. The study presents the purpose of the EIA as to the description of the site, the impact of the project during and after implementation, the mitigation measures, and residual impacts.

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

9.2 Conclusions

The major conclusions of the EIA are:

- The Sir Ganga Ram intends to construct Mother & Child Block Project in Lahore. The primary objective of the project is to ensure service delivery by trained, skilled and well-equipped staff with the provision of consultant / expert opinion from disciplines of obstetrics, gynaecology, pediatric and neonatology..
- The Mother & Child Block will comprise a bed strength of 550 beds with a total plot area of 20 kanal . The approximate covered area of the block building is 526780-Sft.
- With the increased demand for mother and child health care in the Lahore district, there is a need to make quality mother and child healthcare more accessible to provide additional capacity with specialized referral centres and associated enabling infrastructure. More importantly, it is vital to optimally utilize existing land within such premises.
- Other necessary services include clinical pathology, laboratory, radiology, pharmacy, CSSD, kitchen, laundry, mortuary and blood bank are also included in the plan to ensure prompt delivery of respective services round the clock without interruption.
- The estimated cost of the project is Rs 9,972.235 million and will be completed in 5 years.
- The potential impacts during the construction phase include loss of flora (shrubs and grass only), soil erosion and contamination, water contamination, deterioration of ambient air quality caused by the construction activities.
- The significant environmental management issues during the operational phase include air pollution, sewage disposal, solid waste and noise pollutions, and ash disposal.
- The project construction and operational activities can potentially affect the people living in the vicinity of the project site. These adverse impacts can be largely reduced by implementing the appropriate mitigation measures, which has been discussed in this report.
- The mitigation measures have been identified for impacts expected during the different phases of the project.

Based on the recommended mitigation measures in chapter 7, the impacts identified will be reduced, with residual impacts having insignificant levels. **Table 9.1** presents the assessment of the residual impacts (mitigated).

9.3 Recommendations

- A plantation plan has been proposed in the EIA report, which will be developed and implemented for the establishment of the Mother & Child Block Project.

Based on the overall impact assessment, more specifically, the nature and magnitude of the residual environmental impacts identified during the present EIA, it is concluded that the establishment of Mother & Child Block Project is likely to cause environmental impacts during its construction and operational phase. However, these impacts can be mitigated by the implementation of proposed mitigation measures. Sir Ganga Ram Hospital will ensure the effective implementation of mitigation measures during the construction and operational phase.

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

Table 9.1: Impact Matrix – Residual Impacts (Mitigated)

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

Description	Physical			Biological		Social and Socio-economic				
	Soil	Air Quality	Surface and Ground Water	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historical or Archeological Sites
Construction of Buildings	0	0	0	0	0	-1	N	-1	+1	N
Construction Materials Supply	0	0	N	0	-1	-1	N	-1	+1	N
Construction Crew Transportation	0	0	N	0	-1	-1	N	-1	+1	N
Solid Waste Disposal	-1	0	-1	-1	-1	N	N	0	0	N
Waste Effluent Disposal	0	0	-1	0	0	N	N	0	0	N
Demobilization of Contractor	0	0	0	0	0	-1	N	0	0	N
Operation Phase										
Operation of Proposed Project	N	0	0	0	-1	0	N	0	+1	N
Solid Waste	0	0	0	0	0	0	N	0	+1	N

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

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

Name	Project Position	Qualification and Experience	Tasks Assigned
Mr Saadat Ali	Team Leader/ Environmental Engineer	▪ Postgraduate Diploma in Sanitary Engineering, International Institute for Hydraulic and Environmental Engineering, 1984 ▪ B. Sc. Civil Engineering, Engineering College, University of Peshawar, 1978	▪ Overall management of the project (Supervision, site visits, guidance, inputs and suggestion, recommendation and discussion and report presentations). ▪ To review overall environmental issues and mitigation measures. ▪ To prepare a draft and final EIA reports.
Mr Ali Abdullah	Enviro-Civil Engineer	▪ M. Sc. Environmental Engineering, Newcastle University (2016) ▪ B. Sc. Civil Engineering, The University of Lahore, Lahore (2010-2014)	▪ Suggest mitigation measures for impacts that affect the environment. ▪ Identification of site for baseline data collection for water, wastewater, noise, soil, traffic and ambient air quality.
Ms. Amna Saeed	Environmental Engineer	▪ University of Engineering and Technology (UET), Lahore (2018-2022)	▪ Secondary data collection for desk review ▪ Research tools preparation for field study ▪ Fieldwork for baseline data collection in the area under study ▪ Public Consultation
Ms. Gulshan Sikandar	Environmental Engineer	▪ MS Environmental Engineering, National University of Sciences and Technology (NUST) H-12, Islamabad (2024) ▪ BS Environmental Engineering, University of Engineering and Technology (UET), Taxila (2017)	▪ Baseline data collection and analysis ▪ Draft Report Writing

Annexure-2: Terms of Reference

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

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

Annexure-3: References

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Annexure-4: Glossary

Air pollution	Air is a composition of several gases, mostly nitrogen and oxygen and smaller amounts of water vapour, carbon dioxide, argon and other trace gases. Air pollution occurs when harmful chemicals and particles are emitted to the air – due to human activity or natural forces – at a concentration that interferes with human health or welfare or that harms the environment in other ways.
Ambient air quality	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.
Anatomical Waste	Anatomical waste is a subtype of pathological waste, materials that are recognizably human or animal body parts, such as an amputated limb.
Archaeology	The study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.
Biodiversity	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.
Bye-law	A rule made by a local authority to govern activities within the area it controls. Examples include bye-laws covering waste disposal, traffic or public events or signs.
Carbon dioxide (CO_2)	A colourless gas that is naturally produced by animals and people in the exhaled air and the decay of plants.
Carbon monoxide	A highly poisonous, odourless, tasteless and colourless gas that is formed when carbon material burns without enough oxygen.
Climate	The pattern of weather in a particular region over a set period of time, usually 30 years.
Cytotoxic & Cytostatic Waste	Cytotoxic and cytostatic waste includes medicines in tablet, liquid, cream or aerosol form. Cytotoxic and cytostatic medicines are medicines that are either toxic, carcinogenic, mutagenic or toxic for reproduction.
Clinical Waste	Clinical waste is the term used for waste generated from healthcare and similar activities that may pose a risk of infection, e.g. bandages, swabs.
Conservation	Preserving or protecting animals and resources such as minerals, water and plants through planned action (such as breeding endangered species) or non-action (such as not letting taps run unnecessarily).
Deforestation	The reduction of trees in a wood or forest due to natural forces or human activity such as burning or logging.
Effluent	Liquid wastes such as sewage and liquid waste from industries.
Energy efficiency	Actions to save fuels, for example, better building design, changing production processes, developing better transport policies, using

	better road vehicles and using insulation and double glazing in homes.
EIA	An environmental impact assessment (EIA) is an analytical process that systematically examines the possible environmental consequences of the implementation of projects, programs and policies.
EMP	An environmental management plan (EMP) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.
Fauna	The animals of a particular region, habitat, or geological period.
Flora	The plants of a particular region, habitat, or geological period.
Habitat	The area occupied by a community or species (a group of animals or plants), such as a forest floor, desert or seashore.
Initial Environmental Examination	Initial environmental examinations describe the environmental condition of a project, including potential impact, formulation of mitigation measures, and preparation of institutional requirements and environmental monitoring.
Landfill	A site that is specially designed to dispose of waste and operates with a license granted by the Environmental Protection Agency (EPA).
Medical Waste	Medical waste is any kind of waste that contains infectious material. E.g. anything that is soaked in blood, any waste produced in the patient's room.
Offensive/Hygiene Waste	Any waste that is not infectious and does not contain pharmaceutical or chemical substances, and is likely to cause offence to the senses is an offensive waste.
PEQS	The Punjab Environmental Quality Standards (PEQS) are quality standards to regulate the air emissions and effluents of industry and other big polluters.
Pyrolytic Combustion	Pyrolysis is the thermal decomposition of materials at elevated temperatures in an inert atmosphere. Pyrolysis is considered as the first step in the combustion process, and extreme pyrolysis leaves mostly carbon as the residue, which is called carbonization.
Noise Pollution	Noises that disturb the environment and people's ability to enjoy it, for example, continually sounding house alarms, loud music, air conditioning or other electrical units and aircraft or motor engines.
Seismology	The branch of science is concerned with earthquakes and related phenomena.
Topography	The arrangement of the natural and artificial physical features of an area.

Annexure-5: List of People Met During EIA Study

S. No		Name of Person	Designation
1		Dr. Ijaz Shiekh	Project Director, Mother and Child Hospital, Lahore
2	Stakeholders	Ms. Zill-e-Huma Faizi	Manager Environment and Public Health, Infrastructure Development Authority Punjab
3		Dr. Yasir Qayyum Gill	Lecturer, UET, Lahore
4		Dr. Asif Ali	Cardiologist
5		Mr. Aslam	Lab Attendant, Diagnostic Centre, Lahore

No.		Name	Age	Gender	Education	Designation/ Profession	Area
6	Public Consultation	Mr. Gulraiz Shiekh	23	Male	Bachelors	Teacher	Neela Gumbat
7		Mr. Wasim Sakhawat	36	Male	Masters	Business	Johar Town
8		Mr. Shiekh Aqeel	40	Male	Class 8th	Shopkeeper	Sanda
9		Mr. Shahid Afridi	26	Male	F.Sc	Shopkeeper	Valencia Town
10		Mr. Khan	50	Male	N/A	Landowner	Lahore
11		Mr. Mumtaz Khan	55	Male	N/A	Landowner	Lahore
12		Mr. Muhammad Shah	23	Male	Class 8th	Driver	Lahore
13		Mr. Muhammad Toheed	45	Male	N/A	Security Guard	Lahore
14		Mr. Muhammad Sabir	25	Male	N/A	Cook	Lahore
15		Mr. Qazi Asim	36	Male	Graduate	Business	Lahore
16		Mr. Muhammad Shehbaz	30	Male	Graduate	Private Job	Lahore

Annexure-6: Lab Testing Report

ESPAK

ENVIRONMENTAL SERVICES PAKISTAN

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)

Reference Number: ESPAK/00208I/24/AA/07920/00362 **Date:** 17/10/2024

Name of Industry/Client: Project Procurement International

Address: Office #26, 2nd Floor, Silver City Plaza, G11 Markaz, Islamabad

Project Location: Sir Ganga Ram Hospital (Mother & Child Block, Lahore)

Nature of Sample: Ambient Air **Validation Officer:** Muhammad Nadeem, Research Officer

Date of Sample Collection: 11/10/2024 **Monitoring Location:** Near Main Gate (GPS: 31°33'20.9"N 74°19'20.1"E)

Sample Collected/Sent By: Mehmood Aslam, Analyst (Field), ESPAK

Date of Completion of Analysis: 12/10/2024 **Grab / Composite:** Continuous 24- Hours

S. No	Parameters	Limit Values (PEQS- 24Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m³ (8 Hours)	1.9 mg/m³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO_2)	120 µg/m³	13.4 µg/m³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O_3)	130 µg/m³ (1 Hour)	22.6 µg/m³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m³	13.0 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO_2	80 µg/m³	25.5 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter $PM_{2.5}$	35 µg/m³	**46.3 µg/m³**	Particulate Sensor	Exceeding Prescribed Limits
7	Particulate Matter PM_{10}	150 µg/m³	**224 µg/m³**	Particulate Sensor	Exceeding Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m³	**622 µg/m³**	Particulate Sensor	Exceeding Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Ambient Air, 2016

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

- **The report should be reproduced as a whole and not in parts.**
- **The responsibility of the ethical use of this report lies with the client.**
- **The values represent sample conditions when monitoring/testing was carried out.**
- **The report data is not intended to be used legally by the client.**

1. **Sample Analyzed By:** Mehmood Aslam, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 17/10/2024

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

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ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA & PUNJAB EPD CERTIFIED

NOISE MONITORING REPORT

Reference Number: ESPAK/00208I/24/N/07920/00733 **Date:** 17/10/2024

Name of Industry/Client: Project Procurement International

Address: Office #26, 2nd Floor, Silver City Plaza, G11 Markaz, Islamabad

Project Location: Sir Ganga Ram Hospital (Mother & Child Block, Lahore)

Nature of Sample: Noise

Date of Sample Collection: 11/10/2024

Sample Collected/Sent By: Mehmood Aslam, Analyst (Field), ESPAK

Validation Officer: Muhammad Nadeem, Research Officer

Date of Completion of Analysis: 12/10/2024

Grab / Composite: Continuous - 24 Hours

Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (PEQS)	Noise Level dB(A) Leq	Remarks
1	Near Main Gate (GPS: 31°33'20.9"N 74°19'20.1"E) - Day Time	55 dB(A)	51 dB(A)	Within Prescribed Limits
2	Near Main Gate (GPS: 31°33'20.9"N 74°19'20.1"E) - Night Time	40 dB(A)	35 dB(A)	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Noise in Silence Zone, 2016 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am).

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

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2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 17/10/2024

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/00208I/24/GW/07922/00833 **Date:** 17/10/2024

Name of Industry / Client: Project Procurement International

Address: Office #26, 2nd Floor, Silver City Plaza, G11 Markaz, Islamabad

Project Location: Sir Ganga Ram Hospital (Mother & Child Block, Lahore)

Nature of Sample: Groundwater from Bore

Date Sample Received: 12/10/2024 **Grab / Composite:** Grab

Date of Sample Collection: 11/10/2024 **Validation Officer:** Muhammad Nadeem, Research Officer

Sample Collected / Sent By: Mehmood Aslam, Analyst (Field), ESPAK

Date of Completion of Analysis: 17/10/2024

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	----	ND	SMWW 9222 B	-----
2	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9222 H	Within Limits
3	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9222 H	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	pH*	6.5-8.5	7.0	SMWW 4500H+B	Within Limits
7	Turbidity	<5 NTU	0.1 mg/L	SMWW 2130B	Within Limits
8	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
9	Total Dissolved Solids (TDS)*	<1000 mg/L	531 mg/L	SMWW 2540C	Within Limits
10	Total Hardness as $CaCO_3$*	<500 mg/L	453 mg/L	SMWW 2340C	Within Limits
11	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl G	----
12	Chloride (as Cl^-)*	<250 mg/L	26 mg/L	SMWW 4500Cl^-B	Within Limits
13	Fluoride (F^-)*	≤1.5 mg/L	0.3 mg/L	U.S. EPA 9214	Within Limits
14	Cyanide (CN^-)	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
15	Nitrate (NO_3^-)	≤50 mg/L	23 mg/L	SMWW 4500NO_3^-B	Within Limits
16	Nitrite (NO_2^-)	≤3 mg/L	0.1 mg/L	SMWW 4500NO_2^-B	Within Limits
17	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	----
18	Aluminum (Al)	≤0.2 mg/L	ND	SMWW 3111	Within Limits
19	Antimony (Sb)	≤0.005 mg/L	ND	SMWW 3111	Within Limits
20	Arsenic (As)	≤0.05 mg/L	ND	SMWW 3114 B	Within Limits
21	Barium (Ba)	0.7 mg/L	ND	SMWW 3111	Within Limits
22	Boron (B)	0.3 mg/L	ND	SMWW 4500-B B	Within Limits

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