

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

BHITTAI RESIDENCY HOUSING SCHEME LARKANA



June, 2024

Submitted To:

**Sindh Environmental Protection Agency
Government of Sindh**

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Environmental Impact Assessment (EIA)		
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LIST OF ABBREVIATION

BOD	Biological Oxygen Demand
CC	Construction Contractor
CMP	Change Management Plan
CO	Carbon Mono-oxide
COD	Chemical Oxygen Demand
CSC	Construction Supervision Consultant
CESMP	Contractor's Environmental and Social Management Plan
CCMR	Community Complaints-Management Register
EA	Executing Agency
EIA	Environmental Impact Assessment
ECNEC	Executive Committee of National Economic Council
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
ESA	Environmental Social Assessment
GIS	Geographical Information System
HSE	Health Safety Environment
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
LAA	Land Acquisition Act
MMM	Mitigation Management Matrix
NCS	National Conservation Strategy
NDMA	National Disaster Management Authority
NGO	Non-Governmental Organization
NPO	No Project Option
NOC	No Objection Certificate
NOx	Oxides of Nitrogen
PEPA	Pakistan Environmental Protection Act, 1997
PEPC	Pakistan Environmental Protection Council
SEQS	Sindh Environmental Quality Standards
PM	Particulate Matter
SC	Supervisory Consultant
SOX	Oxides of Sulphur
Sq .m	Square Meter
TMP	Traffic Management Plan
TOR	Terms of Reference
WHO	World Health Organization

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EXECUTIVE SUMMARY

A. Introduction

M/S Bhittai Residency Housing Scheme Larkana intends to develop residential housing society . The geographic coordinates of the project site are 27°31'39.77"N and 68°12'33.45"E. The development of the scheme has been proposed on a piece of land measuring 13 acres and 09 Ghuntas acres.

B. Policy, Legal and Administrative Framework

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 provides screening categories of projects for which IEE or EIA needs to be conducted. The proposed project falls under *Category 'J' of Urban Development ' , 1. Housing schemes more than 15 acres to 50 acres"*.

This category requires an IEE to be conducted, as the total area required for the proposed project is 13 Acres.

Nevertheless, the Sindh Environmental Protection Tribunal ordered the project to be screened out according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2014 instead of 2021 because when the project was conceived those regulations were applicable. According to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2014, the proposed project falls *under the category 'I' of 'Urban Development and Tourism' 1 Housing schemes above 10 acres of Schedule II*. According to this category, an EIA study needs to be conducted, as the total area required for the proposed project is 13 Acres.

C. Need for the Project

There is a considerable shortage of housing in Larkana. The private sector is fulfilling this demand through building residential schemes, where the land is primarily for categories as fallow land. The proposed project is conceived to be developed with an eco-friendly approach while assuring safe and secure living for the residents.

D. Project Description

The objective of the project is to provide small size residential plots for middle and low-income groups in the city. Larkana is facing an acute shortage of housing, and the proposed project will improve the housing situation considerably.

The development of the Project has been proposed on a piece of land measuring 13 acres. The Project includes 241 residential plots, 18 Commercial plots, and social amenities like a school, community center, masjid, one park and roads.

For the housing scheme, the essential infrastructure works include Roads, storm drainage system, water supply, sanitary sewerage system, solid waste management system, electrification, streetlights, security, sui gas (natural gas) works, and soft and hard landscaping, parks, playground and other facilities will also be provided. The schedule for completion of the project is 24 months.

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E. Analysis of the Alternatives

No Project Option: If we consider no project option, then we will lose all positive impacts that will be caused due to the project, like providing residential plots to all income groups, and loss of potential employment and business opportunity. The “No Project Option” does not appear reasonable given the above facts. However, the expected negative impacts can be minimized by adopting appropriate mitigation measures.

Changing the Scope: The scope-changing option may also entail changing the architectural features and layout design of the facilities to be provided under the scheme. As per the existing scope, the scheme comprises 241 housing plots along with a host of support facilities and infrastructure.

Shifting the Project: The third alternative option could be relocating and shifting the project to some other site. However, the objective rationale for this option was found lacking on two counts. Firstly, it may be very difficult if not impossible to find a large and compact piece of land of suitable dimensions for constructing a housing project, as is the present one, near the city of Larkana. Secondly, despite relocating the project, the pertinent environmental impacts on the air, water, soil, and socioeconomic environment would remain almost similar as would be at the present site.

Based on the objective analysis, and views and opinions of the stakeholders, as detailed above, none of the alternative options, as discussed above, is feasible. Furthermore, the net socio-environmental impacts of the project, as thrashed out in this EIA study are positive in nature, which favors the construction of the project at the proposed site.

F. Environmental Baseline Conditions

In order to work out the impacts and related mitigation measures, baseline environmental conditions of the physical, ecological and socio-economic environment of the project area were studied as follows.

Physical Environment

District Larkana lies in 67° 56” 20’ to 68° 29” 34’ east longitudes and 27° 7” 31’ to 27° 56” 2’ north latitudes. This district is bounded by District Shikarpur and Khairpur on the east, district Jacobabad on the north, district Kamber Shahdadkot and Dadu on the west, and district Naushero Feroz on the south. In the context of physiographic characteristics, Larkana District can be divided into three tracts, namely, the Western Kohistan tract, the Central-Canal Irrigated tract and the Eastern Riverine tract.

Surface Water: The major surface water body in the district is the River Indus which flows along the eastern-southeastern boundary of the district. Two major irrigation canals pass through the district, namely Rice Canal and Dadu Canal.

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Ground Water: Groundwater is found to be marginally sweet and is in ample quantity in areas along the Canal. The water table also varies with the discharge in the canal and the amount of precipitation in the area.

The groundwater sample was taken from the project site and tested in the Sindh-EPA-approved laboratory (named Imperial Environmental Research Laboratory). The results indicate that the concentration of all the parameters for groundwater is well below the SEQS limits except for bacteriological contaminations. Total Coliform, Faecal Coliform and Escherichia Coli (E-Coli) were detected in the sample taken from the groundwater (hand pump 80ft). This indicates the water will need to be chlorinated before consumption.

Air Quality: The ambient air quality tests were carried out through the Imperial Environmental Research Laboratory (SEPA Approved). The results reveal that all parameters are within permissible limits of SEQS 2016 of ambient air quality. Bhittai Residency Housing Scheme Project is located on Bakrani Road at its intersection with Larkana Bypass Road 2 km away. The project area comprises various housing societies and villages, which means that there is heavy traffic on the roads during rush hours. Proper plantation on green belts and green areas will help to maintain the air quality and noise level of the project area within the limit in the future.

Noise and Vibration: The sound pressure level (dB) was frequency-weighted on A-curve (dB (A)) and time-weighted (dB (A) Leq) on an hourly basis. The hourly noise variation throughout the day reveals that noise levels are minimal and within the compliance limit of SEQS (i.e., 65 dB) at the project site.

The noise level at night time at the project site was monitored to be 44.2 dBA whereas, during the day time it was 59.3 dBA, which is within the prescribed limit of the SEQS. Ecological Environment

Flora: As the population has increased in the project area, wildlife abundance and diversity have decreased to a minimum. Among the small mammal species still found are Red foxes and rats are reported to reside in surrounding of the project area. The proposed project is located in Larkana, which is part of the lower Indus valley. As the climate of the track is arid and subtropical, the original flora of the area consists of tropical thorn forest type vegetation, in which thorny usually hard wooded species predominate with Acacia species being particularly characteristic. However, the natural vegetation has long ago been replaced completely by crops. At present, there is generally a mixture of species found on the track. The area has been used for agricultural purposes for almost a century; the natural flora has been completely replaced by cultivated species.

G. Socio-Economic and Cultural Environment

To assess the present socio-economic and socio-cultural conditions of the project area, the consultant team visited the proposed Project and consultations were carried out with the residents of the adjoining areas. During the roadside and focused group discussion, the communities were informed about the salient features of the project.

H. Public Consultation

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During this process, several personnel and inhabitants of the project area were consulted. Different aspects of the proposed project were highlighted, like impacts on the physical, biological, and socio-economic environment of the project area. Stakeholders' concerns regarding various aspects, the existing environment, and the impacts of the project were identified and incorporated in the EIA report. Generally, the people of the area stated that this project would create employment opportunities during its construction and operational phases. They were of the view that the proposed project will also provide facilities like commercial markets and schools and a better road network.

I. Environmentally Friendly Features

The planning & design of the plot cutting has been carried out, keeping in mind the natural topography, sun, and wind direction.

The project proponent has allocated about 8% of land for open spaces, parks, and playgrounds. There are a total of 1 park/ open spaces in the housing scheme. A plantation plan has been recommended to be implemented.

Soft landscaping will be introduced in the few areas where surface parking is still in use. These changes are intended to reduce the heat island effect, achieve cleaner air quality through the planting of shade trees promote efficient management of storm water runoff, and improve visual aesthetics.

Rainwater harvesting initiatives have been introduced in the proposed project with the technical help of the proponent to the residents of the scheme.

J. Impacts and Mitigation Measures

Physical Environment Impact:

Soil-related issues include soil erosion, slope stability, and soil contamination. Land clearing, leveling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles may cause these issues. Soil may be contaminated because of fuel/oils/chemical spillage and leakage and inappropriate waste (solid as well as liquid) disposal.

Construction machinery and project vehicles will release exhaust emissions containing Carbon Monoxide (CO), Oxides of Sulfur (SO_x), Oxides of Nitrogen (NO_x) and Particulate Matter (PM). In addition, various burning activities involved in road construction will cause air pollution. These emissions can deteriorate the ambient air quality near the project site. Furthermore, construction activities such as excavation, land leveling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions.

Noise and vibration will be generated by construction machinery and vehicles. Surface and groundwater resources of the project area can be contaminated by solid waste disposal, sewerage disposal, and equipment/vehicle maintenance, spillage/leakage of fuels, oils and chemicals, and campsite sanitation facilities.

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Mitigations: Soil erosion can be minimized by properly doing land clearing, leveling and grading. Excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (i.e. stone pitching).

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

Ecological Environment

Impacts: The construction crew can also indulge in tree/shrub cutting to obtain fuel wood for the camp. The loss of natural vegetation discussed above and other project activities will potentially have adverse impacts on the faunal resources and habitats of the area. Smoke, chemicals, dust particles, and noise generated by heavy machinery are scary factors for wildlife. Rodents and hedgehogs would lose their abode. In addition, the wildlife may be disturbed by illumination and the mere presence of the people.

Mitigations:

No tree cutting has been involved in the planned project. Instead, there is a provision for 1 park in the proposed Project. A plantation covers of appropriate trees/bushes, preferably evergreen, will be raised within the open green areas and along avenues, as well as medians. For providing a healthy environment and to enhance the aesthetic value of the project area, the entire layout of the Project, a proper landscape plan, will be devised and implemented.

The project staff should not be allowed to indulge in any hunting or trapping activities. Nighttime construction works not be undertaken. Illumination levels at the site should be minimized as far as possible.

Socio-Economic Environment Impacts:

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

There are no reported sites of archaeological or historical significance at Bhittai Residency Housing Scheme. In case any artifact of such significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.

Mitigations:

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Eye and respiratory diseases should be mitigated through routine health screening and training of contractor's employees. The physical injury should be mitigated through the provision of appropriate training and emergency response procedures. Protected fencing will be fixed around the construction site. Unauthorized access within the construction area will not be allowed. Vehicle speeds of 30 km/hr at the project site will be implemented.

K. Environmental Management Plan (EMP)

The purpose of the Environmental Mitigation Plan (EMP) is to minimize the potential environmental impacts due to the proposed project. EMP provides a delivery mechanism to address the adverse environmental impacts of the proposed project during its execution and operation, enhance project benefits and introduce standards of best practices to be adopted for all phases of the project.

L. Environmental Cost

The cost estimate for implementing environmental monitoring & mitigation measures during the construction and operational phase of the proposed project is Rs 4.664 Million. The monitoring cost generally consists of the equipment required for checking and testing water quality, air quality, noise levels during construction of the project, and associated workforce costs. Environmentally Friendly interventions cost estimation includes Sustainable Development Implementation, Personal Protective Equipment, Fire Fighting Equipment purchase and refilling, Soft and Hard Landscaping including - Plantation Plan cost. While Administrative Cost includes capacity building, reporting of findings of environmental and monitoring and Environmental Manager to ensure the compliance of EMMP.

M. 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 Bhittai Residency Housing Scheme is likely to cause environmental impacts mainly during its construction phase. However, these impacts can be mitigated provided the proposed activities are carried out as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented.

The EIA has made the following recommendations:

- The proponent should develop and implement an Integrated Solid Waste Management Plan for the proposed project.
- The proponent should implement the Plantation Plan as described in the EIA Report.
- Furthermore, the proponent should dedicate one of the open spaces to the development of Miyawaki Forest.
- The proponent should implement an Integrated Solid Waste Management Plan, which should include;
 - Collection of solid waste from residential and commercial buildings.

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- Segregation of solid waste into recyclable, biodegradable and non-biodegradable wastes. The recyclable wastes will be given away to recycling contractors: the biodegradable waste will be composted at the site to produce green manure, and the remaining waste will be transported to the waste disposal site.
- The implementation of the Environmental Monitoring Plan should be ensured by the contractor and proponent during the construction phase.
- Recruitment of Environmental Manager for the construction phase of the Project.
- 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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1. INTRODUCTION

1.1 General

Housing is a basic and fundamental human need, yet millions are caught in the struggle to have a roof over their head in Pakistan. Realizing the gravity of the problem and appreciating the fact, that housing is not only a social need but also a productive sector of the economy.

Since the adoption of the “Universal Declaration of Human Rights” and its subsequent reaffirmation at the 1996 UN Habitat Conference, “Adequate Shelter for All” has been recognized as a basic human need. All Governments have a responsibility to take appropriate action in order to promote the protection and ensure the proper realization of the provision of adequate housing for its citizens. The housing situation in Pakistan has continuously deteriorated over the past many years and most of the policies announced were not implemented.

Realizing the fact that Housing is one of the major pillars of the macro-economy and that there is continuous degradation of housing quality and an ever-increasing short fall in housing stock, the Government decided to review various measures and policies formulated in the past in order to come up with such policy measures which are pragmatic and implementable. The emphasis of the Government would be to focus on the fundamental requirements of creating a favorable and conducive environment in the country and to promote and facilitate this sector where the role of the Government would change from provider to facilitator. Government resolves to evolve, implement and support such measures that would ensure adequate housing for all its citizens through proper planning and management, incentives, and motivations. Special emphasis has been given to provisions of microfinance to low-income communities through such housing schemes.

1.2 Need of the Proposed Project

According to the 1998 Census, the total number of housing units throughout the country is 19.3 million. As per the Census report, the housing backlog at the time of the Census was over 4.30 million units¹. According to the Ministry of Housing, Government of Pakistan, the estimated additional requirement of housing is around 570,000 units per annum, whereas the annual supply is just around 300,000 housing units, which is resulting in a recurring annual backlog of 270,000 housing units². According to the Ministry of Housing, GoPk, the average household size in the country is 6.6 persons and the occupancy per room is 3.3 persons³. It is estimated that in order to make up the backlog and meet the shortfall in the next 20 years, the overall housing supply has to be raised to 500,000 housing units annually⁴.

Appreciating the gravity of the situation and realizing the potential of housing and construction as a productive sector of the economy, the Ministry of Housing and Works, GoPk formulated the National Housing Policy. The major emphasis of the National Housing Policy, 2001 is on

¹ National Census Report 1998, Statistics Division, GoPk, 2000

² Office Files, Ministry of Housing and Works, GoPk, 2019

³ Pakistan Housing Authority Foundation, 2019

⁴ National School of Public Policy, Lahore 2019

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resource mobilization, land availability, incentives for homeownership, incentives to developers and constructors, and promotion of research and development activities to make construction cost-effective. The underlying objective is to create affordability, especially for the middle-income and low-income groups. One of the cornerstones of the Policy is to ensure the development of housing for the poor and the needy as well as housing for the rural population through the use of different instruments like free land, cross-subsidy, concessionary finance, etc.⁵.

One of the important initiatives of the Policy is to declare housing and construction as a priority industry in category “C”. Because of this single step, the usual privileges, concessions, exemptions and remissions have become applicable to this industry in accordance with the policy of the Board of Investment (BOI) as applicable to industrial sectors.

Construction of the Bhittai Residency Housing Scheme is an instant housing project which is in line with the National Housing Policy to reduce the existing backlog by providing housing to the people of Larkana.

1.3 Objectives of the Project

The overarching objective of the project is to meet the growing requirements of housing units in Larkana for all income groups.

- To cope with the abnormally increased and pressing demand for housing units.
- To provide residential accommodation for the public of various categories of housing units as per the approved master plan.
- Construction of various support infrastructure, amenities and public utilities as per the master plan.
- Beautification and external development.
- Construction of greenbelts and grassy ground.
- To provide employment opportunities both directly (workers and employees) and indirectly by accelerating the business activities in the project area.
- The project will improve the living standards of the people and strengthen the economy.

⁵ National Housing Policy, Ministry of Housing and Works, GoPk, 2001

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1.4 An Overview of the Project

The geographic coordinates of the project site are 27°31'39.77"N and 68°12'33.45"E. The development of the scheme has been proposed on a piece of land measuring 13 acres 30 ghuntas located adjacent to the Quaid-e-Awam University of Engineering, Science & Technology Larkana.

The project includes 241 residential plots of different sizes and 18 numbers of commercial plots. The Project will also incorporate open spaces, parks, educational institutes, playgrounds, one parks, and Roads. For the development of the proposed Project, the essential infrastructure works include a storm drainage system, sanitary sewerage system, solid waste management system, electrification, streetlights, security, Sui gas works, sanitation and external electrification will provide.

1.4.1 The Proponent

M/S Bhittai Residency Housing Scheme is the project proponent of the proposed project. The proponent aims to provide organized residential and commercial plots to address the current demand in Larkana City for all income-level groups. The project is owned by:

- Mr. Farooque Ahmed S/o Munawar Ali Bhutto

The project owner(s) are responsible for the proposed project and its related activities including construction, operations, and handling of all matters including obtaining NOCs from all departments related to amenities and other legal requirements.

1.4.2 Name of the Organization Preparing the Report

M/s Indus Environmental Engineering Consultants have been appointed by M/S Bhittai Residency Housing Scheme Management to prepare an Environmental Impact Assessment of the proposed project:

1.4.3 Details of Project Study Team

The following Team of experts has been engaged for the proposed project to conduct the EIA.

Table - 1.1: List of EIA Study Team Members

S. No.	Name	Expertise / Role
1.	Farooq Ahmed Memon	Sr. Environment Expert
2.	Suresh Kumar	Environmental Expert / Deputy Manager
3.	Naeem Ali	Environmental Specialist
4	Rameez Ali	GIS Expert
5	Qayoom Ali Shah	Environment Engineer
6	Yar Muhammad	Environment Engineer
7	Nafees Ahmed	Environment Engineer
8	Zahid Ali Abbasi	Social Mobilizer/ Environment

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1.1.1 Contact Persons

In case of further details or clarifications regarding this EIA, please contact the proponent's representative or the consultant at the addresses provided in Table 1.2.

Table - 1.2: Contact Details of Project Proponent & Consultants

Project Proponent	Consultant
M/s Bhittai Housing Scheme Head Office: Airport Road, Larkana Contact Person: Mr. Farooque Ahmed	Indus Environmental Engineering Consultants Address: Office No. 304 , 3rd Floor, Al –Rehman Center, Contact: (+92)333 – 7045597; Tel: 021 – 34387770 Email: info@induseec.com ; dir@induseec.com

1.2 Details of NOC Obtained

1.2.1 Town Planning Department, Government of Sindh

The proponent of the proposed project has obtained separate approvals of residential and commercial layout plans for the proposed project through letter no. TM/1294/2020, dated 08.07.2020 Copy of residential and commercial layout plan approvals are attached as Annexure – I.

1.2.2 Larkana Municipal Corporation (LMC), Larkana

The proposed project acquired no objection certificated (NOC) for water supply and sewerage from Larkana Municipal Corporation (LMC) through NOC no: LO/LMC/70 dated 08.09.2020. The Copy of the letter of LMC to the Town planning department, letter no. LO/LMC/70 dated 08.10.2020, is attached as Annexure – VII.

1.2.3 Sukkur Electric Power Company (SEPCO)

The proposed project acquired No objection certificate (NOC) for electricity from Sukkur Electric Power Company (SEPCO). The Copy of the letter of SEPCO to the Town planning department, letter no. CEO/SEPCO/SUK/CTO/M (P&ED)/3324.25 dated 14.10.2020, is attached as Annexure - III.

1.2.4 Sui Southern Gas Company (SSGC)

The Sui Southern Gas Company (SSGC) has issued NOC to the proposed project natural gas facility in the project. The Copy of the letter of SEPCO to the Town planning department is attached as Annexure - IV.

1.3 Need for the Environmental Study

The apex Pakistani law governing the subject of the environment is the Pakistan Environmental Protection Act – 1997 (PEPA-97). Under Section 12 of the Act, the proponents of the projects must execute the IEE and/or EIA (where warranted) and get approval from a federal agency (i.e. Pak-EPA). This function has been delegated under Section 26 to provincial EPAs.

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After the 18th amendment to the constitution of Pakistan, the environment became a provincial subject, and the environmental law governing the establishment of Bhittai Residency Housing Scheme is now the Sindh Environmental Protection Act, 2014. In terms of its contents, the provincial act is the same as the national act. Under section 17 of the Act, the proponents of the project must execute the Initial Environmental Examination (IEE) and/ or EIA, where warranted and get approval from the concerned Environmental Protection Agency (EPA), which is Sindh - EPA for this project.

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 provides screening categories of projects for which IEE or EIA needs to be conducted. The proposed project falls under Category 'J' of Urban development '1. Housing schemes more than 15 acres to 50 acres" of Schedule II. This category requires an IEE to be conducted, as the total area required for the proposed project is 13 Acres 30 ghuntas.

1.3.1 Justification for EIA

Sindh Environmental Protection Tribunal Order the project has to be screened out according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2014 instead of 2021 because when the project was conceived those regulations were applicable (scan copy annexed as Annexure - V). Hereafter according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2014 the proposed project falls under the category 'I' of 'urban development and tourism' 1 Housing schemes above 10 acres of Schedule II. According to this category, an EIA needs to be conducted, as the total area for the proposed project is 13 Acres 30 ghuntas. (Screening checklist as Annexure – VI)

Hence, the EIA study has been conducted to comply with Sindh Environmental Protection Tribunal Orders.

1.4 The objective of the EIA Study

The overall objective of the EIA study is to assess the interaction of project components among each other & the environment and to analyze the anticipated environmental impacts to propose necessary mitigation measures against adverse impacts. To achieve this objective, an assessment of the existing environmental status of the project site is a prerequisite and, therefore, included in this study by collecting and reviewing the baseline data of various environmental and social attributes.

This EIA is being prepared to ensure adequate environmental and social management during the development and implementation of the proposed project. It will provide mechanisms for ensuring that potential environmental and social impacts of the current program are identified, assessed and mitigated as appropriate, through an environmental and social screening process. The EIA will therefore comply with the National and provincial EIA procedures for meeting the environmental and social management requirements, as outlined in EIA Guidelines.

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1.5 Scope of the EIA Study

These include:

- Meet the statutory requirements set forth by the Sindh Environmental Protection Act 2014.
- Comply with donor agencies' guidelines and policies of safeguards for environmental and social management of the project.
- Establish a baseline of existing environmental and social status at the project site before project initiation by collecting secondary and primary data/information on the physical, biological and socio-economic environment of the project area.
- Help the project proponents to incorporate necessary measures for the legally compliant and socially acceptable environmental performance of their project.
- Identify significant environmental and social impacts (both positive and negative) during all stages of the project implementation and propose mitigation measures for negative impacts.

1.6 Approach Adopted for EIA Study

The Consultants carried out the EIA study of the project area in a systematic manner. This included the collection of secondary data, maps and related literature, field surveys for primary data collection, public consultation, and desk studies. These are summarized below:

1.6.1 Kick-off Meeting with the Client

The Consultant team held a kick-off meeting with the proponent and project management in Karachi on dated 10 May 2024 at the beginning of the EIA study. During the kick-off meeting, all technical data regarding the proposed project was obtained.

1.6.2 Reconnaissance Survey of Project Area

A reconnaissance visit of the area was made. During this visit, experts in various disciplines including environmental and social fields visited the project site. During this visit, the experts were acquainted with the project area of the proposed project in consideration of various alternative scenarios and collected information from the locals about contact persons/notable of the area to facilitate the consultants for environmental and social surveys. During the visit, contacts were made with local notables, local administration, and public representatives during scoping sessions. The visit was also aimed at familiarizing with the physical and socio-economic environment of the project area as well as surrounding areas and identifying the critical areas of environmental and social concerns.

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1.6.3 Delineation of Area of Influence

In the proposed Project EIA, the AOI has been divided into several specific sub-areas, because not all sub-AOIs need to be studied. The following are the main parts of the AOI:

- **Construction Site:** including laying of sewerage lines, construction of roads in the scheme, additional structures, and immediate surroundings (construction camps, borrow and disposal areas, etc.);
- **Project Foot Print Area:** this is the area directly related to the boundary of the proposed scheme. As all construction activities will be conducted within, the confined boundary hence there is no direct impact on has been envisaged.

1.6.4 Secondary Data Collection

Secondary data about meteorology, land use, ecological aspects, flora and fauna, geology, demographic information, etc. were collected from the secondary sources, in addition to collecting survey maps from Survey of Pakistan; satellite imageries of the area have also been acquired by using different GIS software.

1.6.5 Field Surveys & Report Writing

Surveys were carried out to investigate the physical, biological, and socioeconomic conditions of the area. Primary data collection included the following:

Environmental Survey: In compliance with EPA guidelines, the consultants have carried out an environmental survey/field investigation of various parameters, particularly with reference to the aspects described below:

- Ambient air quality monitoring was carried out for continuous 24 hours in respect of parameters like CO, NO_x, SO_x, HC, and PM₁₀ & PM_{2.5}.
- Similarly, ambient noise level monitoring was carried out along with the sensitive receptors.
- Water samples from various sources, including canal and groundwater sources, and sim nullah in the area, were collected and analyzed for parameters as specified in SEQs 2016 from Sindh EPA certified Laboratory.

Socioeconomic Survey Socio-Economic field surveys were organized at the project site's adjacent communities. The following aspects have been covered in these field surveys:

- Socio-economic data of the project area have also been collected.

Environmental Laboratory Analysis. The environmental laboratory analysis has been conducted at different locations in the Project area.

Public Consultations Besides consultation with knowledgeable people during the reconnaissance visit of the project area, consultation with local communities through scoping sessions was carried out during the field surveys. The purpose of the scoping sessions was

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to disseminate information on the scope of the project, assess stakeholders' views and about the project and get first-hand information on the concerns of the affected population in relation to environmental and social impacts and likely mitigation options.

Design Studies Maps from the Survey of Pakistan and satellite imagery of GeoEye-1 having 0.5 m resolution were used.

Identification 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 impacts have been identified for the methodical consideration of likely or possible significant impacts on the environment because of the proposed Project. This task aimed to assess the associated risks with these impacts.

Evaluation of Impacts: Each impact identified has been evaluated against its significance in terms of its severity and likelihood of its occurrence. The impact evaluation process prioritized each potential impact and screened out 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 will form the basis for the development of the Environmental Management Plan.

Identification of Mitigation Measures: The objective of identification of mitigation measures is to identify practices, technologies, or activities that would prevent or minimize all significant environmental impacts and propose physical and procedural controls to ensure that mitigation is effective. Based on the impact evaluation performed, changes or improved practices have been suggested, where practical, in the planned activities, to prevent and control unacceptable adverse impacts resulting from normal or extreme events. Monitoring requirements will be defined and institutional arrangements for monitoring will be suggested.

Development of Environmental Management Plan (EMP): An Environmental Management Plan (EMP) has been developed for the effective implementation of the recommended mitigation measures. The EMP includes controls to minimize the identified impacts and a monitoring program to monitor residual impacts, if any, during the operation. 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.

1.7 Structure of the Report.

This Environmental Impact Assessment (EIA) Report comprises ten chapters and a summary. The chapters are as follows:

Chapter 1, Introduction, gives an introduction of the Project, the Consultants' scope of services for EIA studies and the approach adopted by the Consultants for reaching compliance with guidelines.

Chapter 2, Legal and Regulatory Framework describes national laws applicable during the implementation of the Project. Federal and provincials guidelines are required to be complied

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with during the preparation of the EIA report as well as followed during the implementation of the Project.

Chapter 3, Description of the Project, gives a rather detailed account of the Project, particularly emphasizing those project components, which are of importance in relation to environmental and social aspects.

Chapter 4, Project Alternatives Considered, provides a brief account of the country's need for housing discusses various alternatives to curb the crisis in the country, and discusses the role of the present project in this context. The chapter also deals with various alternatives considered for project layout in consideration of technical, economic and environmental aspects.

Chapter 5, Information Disclosure, Consultation, and Participation, deals with the outcome of the consultation/scoping sessions carried out with the local communities, stakeholders such as Government departments, NGOs, knowledgeable people, public representatives, etc. It discusses the concern of various tiers of the people and provides an outline of how these have been addressed within the framework of the project.

Chapter 6, Environmental and Social Baseline Conditions this chapter discusses various environmental and social entities i.e. Biodiversity, Fauna and Flora, Water, human environment, etc. before the project.

Chapter 7, Project Impacts and Mitigation Actions provides an analysis of the environmental and social impacts of the project and discusses measures to mitigate adverse impacts and enhance the environment of the project-affected areas.

Chapter 8, Environmental Management and Monitoring Plan and Institutional Requirements, provides plans and costs for the implementation of environmental management and monitoring. It proposes an organizational setup required for the implementation of mitigation actions and in light of this identifies strengthening needs institutional arrangement presently existing within and allied departments.

Chapter 9, Estimated Environmental Cost This chapter estimates an environmental cost, which comprises environmental mitigation costs during the construction and operation of the proposed project.

Chapter 10, Conclusions & Recommendations, sums up the report and the conclusions resulting from the study as well as recommendations for making the project environmentally sustainable.

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2. LEGAL AND ADMINISTRATIVE FRAMEWORKS

2.1 General

This Chapter provides an overview of the legal frameworks and environmental assessment process in Pakistan as well as a list of key environmental legislation and guidelines applicable to the proposed project. It also provides an overview of Sindh Environmental Protection Act (SEPA).

2.2 National/ Provincial Legislation

2.1.1 Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014) is a comprehensive legislation and provides the legislative framework for the protection, conservation, rehabilitation and improvement of the environment. The 'environment' has been defined in the Act as (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses 'a' to 'f'. The notable points of the law are:

- No proponent of a project shall commence construction or operation unless he has filed.
- an EIA with the Provincial Agency designated by the Provincial EPAs an EIA, and has obtained approval;
- Establishment and formation of the Environmental Protection Council;
- Prohibition of certain discharges or emissions;
- Sindh Environmental Quality Standards (SEQS) for wastewater, air emissions and noise; and
- Provincial Government can issue notices and enforce them to protect the environment.

2.1.2 Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2014

The categories are defined in the Sindh Environmental Protection Agency (SEPA) IEE and EIA Regulations, 2014. The proposed project is categorized based on the areas in Schedule II, category 'I' of 'Urban development and tourism' 1 Housing schemes above 10 acres, so it will require an EIA, and an application will be submitted to obtain a No Objection Certificate (NOC) from Sindh EPA to fulfill legal compliance.

2.1.3 Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021

The categories are defined in the Sindh Environmental Protection Agency (SEPA) IEE and EIA Regulations, 2021. Hereafter according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 the proposed project fall under the

Schedule II.

Category 'I' of

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'Urban development and tourism'

1 Housing scheme above 10 acres.

According to this category, an EIA needs to be conducted, as the total area for the proposed project is 13 Acres 30 ghuntas.

2.3 Other Applicable Cross-Sectoral Laws in Sindh

The scope of cross-sectoral law implied by the legal definition of environment given in SEPA 2014 results in numerous laws enacted since the nineteenth century being classified as environmental laws. These include laws about forests, water resources, wildlife, land, agriculture, health and town planning. Laws that may have relevance to the environment with the brief scope of the law and their applicability are listed in Table – 2.1.

Table - 2.1: Key Applicable Cross-Sectoral Legislation in Sindh

Legal Instrument	Scope and Applicability	Relevance
Land Acquisition Act 1894	Empowers the government to acquire private land for a project of national importance and lays down the acquisition procedure.	No relevance as the land belongs to the owners of the proposed project. Copies of ownership are attached as Annexure – VII
The Sindh Forest (Amendment) Act, 2012	Regulates forest resources. Empowers the government to declare any forest area reserved or protected.	No relevance as there is no reserve or protected forest impacted in the proposed project area. The nearest forest is located at a distance of 40 kilometers
The Sindh Wildlife Protection Ordinance 1972 (Amendment 2001, 2010) Act, 2007, 2020	In addition to empowering the provincial wildlife department to establish game reserves, parks, and wildlife sanctuaries, the act regulates the hunting and disturbance of wildlife. This ordinance provides for the preservation, protection, and conservation of wildlife by the formation and management of protected areas and the prohibition of hunting of wildlife species declared protected under the ordinance. The ordinance also specifies three broad classifications of the protected areas:- a). National Parks - Hunting and breaking of land for mining are prohibited in national parks, as are removing vegetation or polluting water flowing through the park b). Wildlife Sanctuaries - Wildlife Sanctuaries are areas that are left as undisturbed breeding grounds for wildlife. Cultivation, grazing and residing are prohibited in the demarcated areas. Special permission is required for the entrance of the public. However, in exceptional circumstances, these restrictions are relaxed able for scientific purposes or for the betterment of the respective area at the discretion of the authority.	No interventions will be carried out near wild habitats. The nearest wildlife habitat is located at 50 kilometers

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	c). Game Reserves - Game reserves are designated as areas where hunting or shooting is not allowed except under special permits.	
Employment of Child Act, 1991	In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows child labour in the country. The ECA states that no child shall be employed or permitted to work in any of the occupations outlined in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out.	The contractor will be bound by this Act to disallow any child labour at the project sites or campsites.
The Sindh Occupational Safety and Health Act, 2017	The clauses relevant to the project are those, that concern health, safety and welfare of workers, disposal of solid wastes and effluents, and damage to private and public property. The Act also provides regulations for Compulsory vaccination, inoculation, and Precautions against contagious or infectious diseases at workplaces.	All these regulations will apply to the project construction's contractor.
The Antiquities Act 1975	Preservation and protection of antiquities (any object more than 75 years old). Empowers the government to declare any antiquity as protected.	There is no protected antiquity within the Study Area. Only apply to any chance find.
Sindh Cultural Heritage (Preservation) Act - 1994	The Act 1994 provides rules and regulations to preserve and protect ancient places and objects of agricultural, historical, archaeological, artistic, ethnological, anthropological and national interest in the province of Sindh.	This act may be applicable in specific situations. Only apply to any chance find
Canal and Drainage Act amended 2016	The canal and Drainage Act amended 2016, prohibits fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of the drainage.	All these regulations will apply to the project construction contractor
Sindh Solid Waste Management Board Act, 2014	Sindh Solid Waste Management Board (SSWMB) was formed under the SSWM Act of 2014. The SSWMB is responsible for the collection and disposal of solid waste and other wastes including Municipal Solid Waste, Industrial Solid Waste and Medical/Hospital Waste in the entire Province of Sindh.	All these regulations will apply to the project construction contractor

2.3.1 World Bank Environmental, Health and Safety Guidelines

World Bank Group's Environmental, Health, and Safety (EHS) Guidelines are applicable to the proposed project. In particular, contractors will be required to implement the General EHS Guidelines (April 2007)⁶.

2.3.2 Guidance Note regarding the influx of Labor

The project may face an influx of non-local labor and working conditions issues as skilled laborers might not be available in some of the proposed project sites. The project will take

⁶ World Bank Group EHS Guidelines are available at:
<http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

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concrete measures to mitigate potential labor influx-related risks.⁷ These risks require careful consideration to improve social and environmental sustainability, resilience and social cohesion. Therefore, the project will include mitigation measures such as:

- (a) Assessing living conditions of workers' camps and ensuring appropriate living conditions;
- (b) Establishing and enforcing a mandatory Code of Conduct for the workers,
- (c) Ensuring appropriate location for these camps;
- (d) Taking counter measures as indicated in the EIA to reduce the impact of the labor influx on the public services and,
- (e) Devising and implementing a strategy for maximizing employment opportunities for the local population, including women.

2.3.3 World Bank Group Gender Strategy (2016-2023)

The World Bank Group's Gender Strategy (the fiscal year 2016–23) presents gender equality as integral to smart development policy and posits that successful implementation of the strategy will help achieve the Bank Group's Goals. The strategy focuses on four objectives: human endowments, jobs, asset control and ownership, and voice and agency. To implement the strategy, capacity building for local law enforcement, Information, and awareness-raising campaigns for community members, specifically women and girls have been proposed in the EIA. Mobilizing rural communities to maximize the benefits of the project.

2.4 International Finance Corporation (IFC) Performance Standards (PS)

The Performance Standards (PS) established by IFC stipulates that the project shall meet certain requirements throughout the life cycle of investment by IFC or other relevant financial institutions, that are signatory to the Equator Principles, 2006. (Table- 2.3).

Table - 2.2: Summary of the IFC's Performance Standards and Their Triggering

Specific Areas	Performance Standards	Description	Triggered = ✓, Not Triggered= x
Social and Environmental Assessment and Management System	PS 1	The main elements of PS - 1 include: • A Social and Environmental Assessment to understand the social and environmental impacts and risks; • A Management Program for mitigating the impacts and minimizing the risks identified in the assessment; • Establishing and ensuring organizational capacity and requisite training to the staff to implement the Management Programme; • Engagement with the community to ensure free prior informed consultation (FPIC), community grievance redress constructive relationships all through the project life cycle; and • Adequate monitoring and reporting systems to measure and report the effectiveness of the Management Programs.	✓
Labour and Working Conditions	PS 2	The PS 2 is guided by the various conventions of the International Labour Organization (ILO)	✓

⁷ <https://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf>

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Specific Areas	Performance Standards	Description	Triggered = ✓, Not Triggered = x
		and outlines the minimum requirements of working conditions, protection to the workforce (including issues of child and forced labour) and ensuring occupational health and safety of both its 'employees' as well as 'nonemployees' working through contractors. The PS requires: • Establishment of a sound worker-management relationship; • Encouraging equal opportunity and fair treatment of workers; • Promoting compliance with national labour and employment laws; and • Promoting healthy and safe working conditions for workers.	
Pollution Prevention and Abatement	PS 3	The PS 3 requires a project to avoid, minimize, or reduce adverse impacts on human health and the environment by adopting pollution prevention and control technologies throughout the project life cycle. .	✓
Community, Health, Safety and Security	PS 4	The PS 4 concentrates on the responsibility that must be undertaken by the client to avoid or minimize the risks and impacts to the community's health, safety and security that may arise from project activities. The PS 4 requires a project to evaluate risks and impacts on the health and safety of the affected community during the Project life cycle and establish measures to avoid minimize and reduce risks and impacts from the Project.	✓
Land Acquisition and Involuntary Resettlement	PS 5:	The objectives of this PS are to: • Avoid or at least minimize the involuntary resettlement wherever feasible by exploring alternative project designs; • Mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by: • Providing compensation for loss of assets at replacement cost; and • Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • Improve or at least restore the livelihoods and standards of living of displaced persons; • Improve living conditions among displaced persons through the provision of adequate housing with security of tenure at resettlement sites.	x
Biodiversity Conservation & Sustainable Natural Resource Management	PS 6	This PS addresses how clients can avoid or mitigate threats to biodiversity arising from their operations as well as incorporate sustainable management of renewable natural resources. It reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote the use of renewable natural resources in a sustainable manner.	x
Indigenous Peoples	PS 7	The PS underlines the requirement of avoiding/minimizing adverse impacts on indigenous people in the project area, respecting the local culture and customs, fostering good relationships and ensuring that development benefits are provided to improve their standard of living and livelihoods.	x
Cultural Heritage	PS 8	PS 8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. PS 8 recognizing the importance of cultural heritage with an objective: • Protect cultural heritage from the adverse impacts of project activities; • Support its preservation; and	x

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Specific Areas	Performance Standards	Description	Triggered = ✓, Not Triggered= x
		Promote the equitable sharing of benefits from the use of cultural heritage in business activities.	

2.4.1 IFC EHS Guidelines

The General EHS⁸ Guidelines contain information on crosscutting environmental, health, and safety issues potentially applicable to all industry sectors. It should be used together with the relevant industry sector guideline(s).

The Environmental, Health, and Safety (EHS) General Guidelines will be applicable for this Project. (Table- 2.4).

Table - 2.3: General EHS Guidelines

1. Environmental	2. Occupational Health and Safety	3. Community Health and Safety	4. Construction and Decommissioning
1.1 Air Emissions and Ambient Air Quality	2.1 General Facility Design and Operation	3.1 Water Quality and Availability	4.1 Environment
1.2 Energy Conservation	2.2 Communication and Training	3.2 Structural Safety of Project Infrastructure	4.2 Occupational Health and Safety
1.3 Wastewater and Ambient Water Quality	2.3 Physical Hazards	3.3 Life and Fire Safety (L&FS)	4.3 Community Health and Safety
1.4 Water Conservation	2.4 Chemical Hazards	3.4 Traffic Safety	
1.5 Hazardous Materials Management	2.5 Biological Hazards	3.5 Transport of Hazardous Materials	
1.6 Waste Management	2.6 Radiological Hazards	3.6 Disease Prevention	
1.7 Noise	2.7 Personal Protective Equipment (PPE)	3.7 Emergency Preparedness and Response	
1.8 Contaminated Land	2.8 Special Hazard Environments		
	2.9 Monitoring		

⁸(www.ifc.org/ehsguidelines)

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3. PROJECT DESCRIPTION

3.1 General

The proposed project “Bhittai Residency Housing Scheme” is a residential housing scheme project. The Project aims to present a vibrant community with a safe ambience and to set a new benchmark for the city's populace to live and is expected to become the most enviable and talked housing project in Larkana. The project is spread over an area of 13 Acres 30 Ghuntas

3.2 Project Location and Accessibility

The proposed project is located at R.S. No. 42, 43 and 49/1, Deh Wah Nabi Bux, Tapo Baqa Pur, Airport Road, Larkana. The project site is directly accessible from Airport road (Bakhrani Road). The geographic coordinates of the project site are 27°31'39.77"N and 68°12'33.45"E. The project area is conveniently accessible from Larkana bypass.

- North: Quaid – e – Azam University of Engineering & Technology & Larkana Junction about 4 Km
- West: Rice Canal about 4 km away
- South: Larkana bypass road
- East: Dadu Canal about 7 km

The project location and major roads in the project area are shown in Figure 3.1 & Project Layout Plan in Figure – 3.2.

3.3 Scope of Work

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

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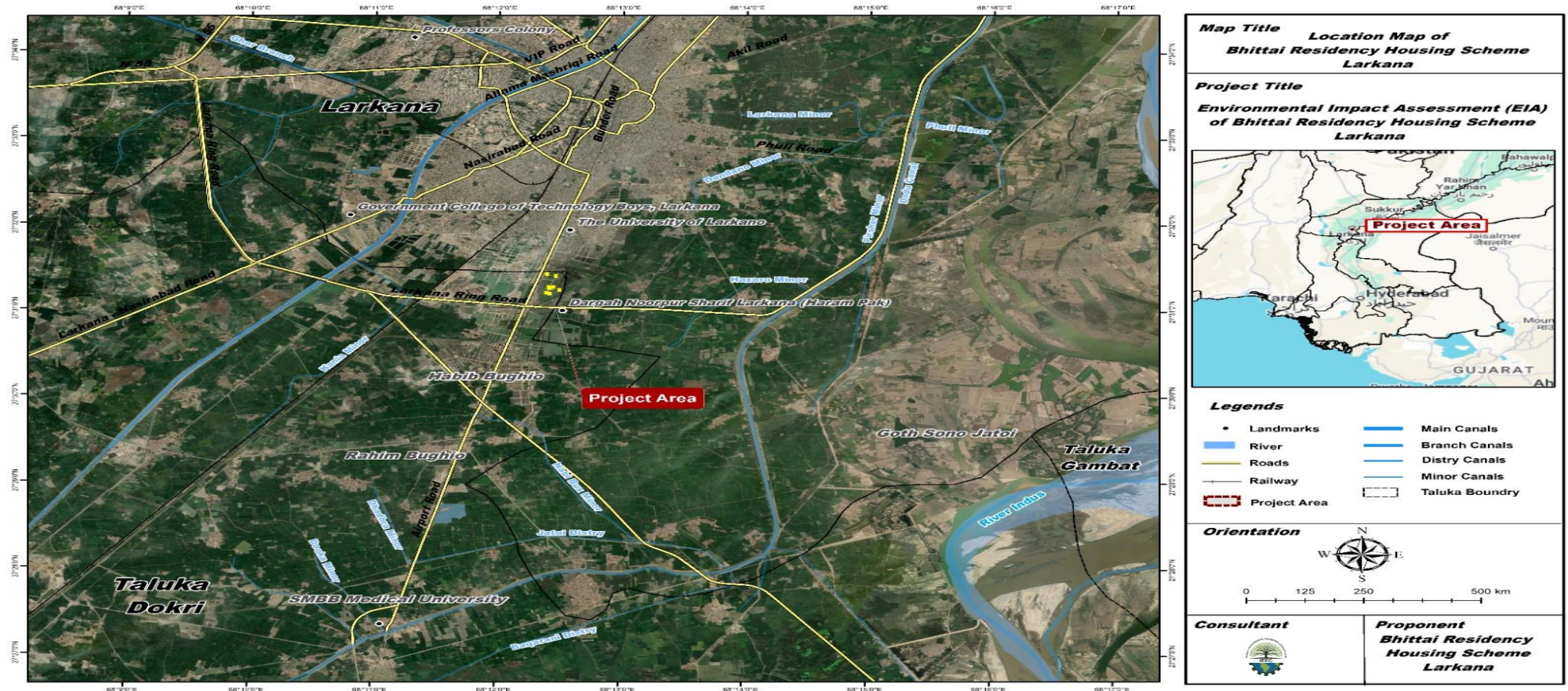


Figure - 3.1: Project Location Map

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Figure - 3.2: Project Layout Plan

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Following Table - 3.1 and Figure – 3.3 depicts the plot size and categories along with the amenities of the proposed project. The proponent of the proposed project has obtained separate approvals of residential and commercial layout Copy of residential and commercial layout plans approvals are attached as Annexure – I.

Table - 3.1: Salient Features of the Proposed Project

Sr.	In Use	Category	Number	Area (sq. ft)	%
1	Residential	1 category plots	34	1575	59.74
2		2 category plots	40	1525	
3		3 category plots	14	1475	
4		4 category plots	10	1450	
5		5 category plots	38	1425	
6		6 category plots	04	1400	
7		7 category plots	38	1375	
8		8 category plots	12	1325	
9		9 category plots	10	1314	
10		10 category plots	12	1152	
		Different size of plots	29	-	
Total = 241 Plots					
1	Commercial	1 category shops	16	1000	3.00
2		Different size	2	300	
Total = 18 Plots					
	Amenities				7.19
	Roads				30.00
	Total Area			13 acres 30 Ghutas	100.00

3.4 Land Acquisition

No Land acquisition has been involved, as the proponent owns the land. The proposed project is planned over barren land, with little vegetation. There are no any large trees or any wildlife recorded at project site. The land ownership documents and CNIC of Project Owner(s) are attached as Annexure – VII.

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3.5 Land Use Analysis

The proposed project is a residential project consist of residential plots (241) + Public Amenities, which include Park, Mosque, and School. A detailed summary of the Project is given below in Table - 3.2.

Table - 3.2: Detailed Summary of Project

Schedule of Area	In Use	Area	%
	Commercial	0.3887	2.99%
	Residential	7.762	59.74%
	Amenities	0.937	7.19%
	Roads	3.9	30.08%
	Total Area	13 Acres 30 Ghunatas	100.00

3.6 Infrastructure Development

3.6.1 Roads

The profiles of roads have been made for a design speed in no case greater than 40 km/hr and less than 10 km/hr, while having a maximum longitudinal slope of 5%. The pavements have also been given a minor cross slope of 2% for the purpose of surface drainage.

3.6.2 Storm Drainage System and Footpaths

Drainage facilities such as box / pipe culverts and longitudinal drains parallel to the roads will be provided. The storm drainage system has been designed to take runoff from the catchments areas resulting from maximum rainfall intensity as 3 inches per hour with impermeability factor as 0.8. Grating chambers have also been provided to catch surface water. The disposal of storm water will be disposed into the nearby Nullahs. Footpaths will also be provided.

3.6.3 Water Demand and Storage

The average water demand for Bhittai Residency housing scheme Larkana is 237,445 gallons per day. The main source of water supply for the residents of the proposed Project will be groundwater. There is no water supply scheme at the proposed project the household will obtain groundwater by their own source. The water requirements calculated for the proposed Project is given in Table 3.3.

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Table - 3.3: Water Balance Sheet for Project

Proposed no. of Residential Units		241
Estimated no. of person per Unit		7
Total Persons		3,787
A	Domestic Water Demand (Residential)	
	Proposed no. of Person	3,787
	Average water demand gallon/capita/day	40
	Sub Total for Residential water demand g/d	151,480
B	Institutional and Commercial Water Demand	
B-1	For Community Center/Public Building	
	Proposed no. of Person (20% of People of the total population)	757
	Average water demand g/c/d	3
	Sub Total (B-1) g/d	2,272
B-2	For Educational Institutions and Commercial Areas	
	Proposed no. of Person (15% of People of the total population)	568
	Average water demand g/c/d	8
	Sub Total (B-2) g/d	4,544
C	Average water demand	
	Total of (sub-total A-C)	158,297
D	For Peak Hour Water Demand @ plus 50% on average	
	Extra 50% of the average water demand	79,148
Total Water Demand g/d		237,445

3.6.4 Sanitary Sewerage System

The sanitary sewerage system has been designed at 80% of the average consumption of water per capita per day. Minimum diameter of pipe would be 8" with "British Standard specifications of RCC pipes.

However, 6" dia sewer shall be used for house connections. The minimum slope to the sewer line has been adopted for attaining self-cleansing velocity. Disposal of sewage has been made in the trunk sewer, which ultimately ends at Sim Nullaha located at distance of 200 meters west side of the main gate of the proposed scheme shown in Figure- 3.1. The proposed project acquired no objection certificate (NOC) for water supply and sewerage from Larkana Municipal Corporation (LMC). The Copy of letter of LMC to the Town planning department, letter, is attached as Annexure - II.

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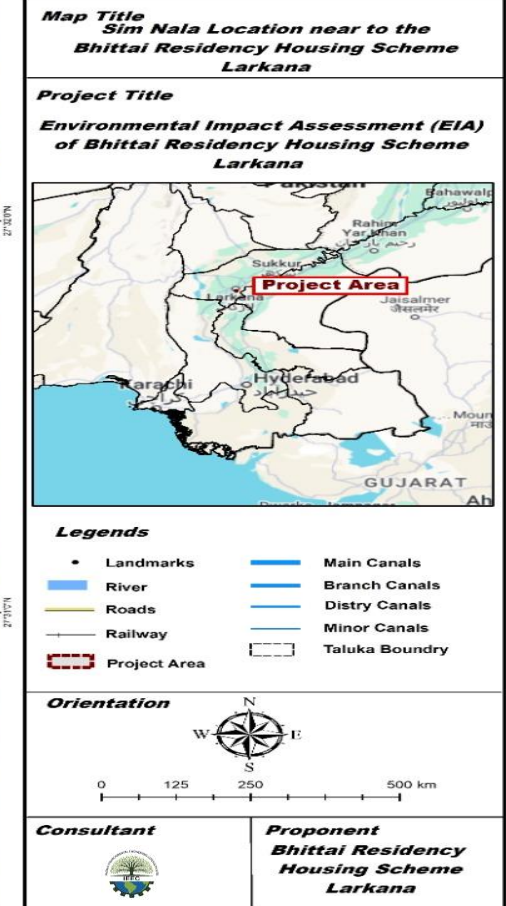


Figure - 3.3: Location Map of Sim Nullah

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3.6.5 Soft and Hard Landscaping

For providing healthy environment and in order to enhance the aesthetic value of the project area, the entire layout of the housing scheme consisting of roads, streets, avenues, commercial areas, masjids, play fields parks, nullah sides etc. shall be given proper Landscape Treatment. Keeping in view, the topographical features of the area earthwork like major / minor cutting / filling, leveling / grading by deploying earthmoving machinery as well as manual labor is to be carried out before taking up planting and turfing in the area.

For beautification of median strips of carriage ways, flowering shrubs, seasonal flowers etc. are to be added after completion of the earth work. Similarly parks and playgrounds which usually comprise hard and soft landscape operations.

Hard landscaping involves provision of pacca paths, flower boxes, concrete benches and umbrellas provision of playing equipment etc. whereas **soft landscaping** includes development of lawns raising of hedges, planting of flowering shrubs, shady trees, and seasonal/perennial flowerbeds.

3.6.6 Solid Waste Management:

As per Local Bodies Act, Larkana Municipal Corporation (LMC) is responsible for the collection and disposal of solid waste. However, in view of the limited capacity of LMC, the Government of Sindh contracted out liquid and solid waste disposal to a specially created corporation NSUSC⁹ The proponent will prepare a proper solid waste management plan for the proposed project. The collection and disposal of solid waste may be outsourced to specialized waste management companies (like NSUSC) who would collect and recycle waste at a profit on payment. Approximately 2000 kgs of solid waste per day will be generated based on the assumption of waste generation rate of 0.5 kg/c/day¹⁰.

There are five main waste sources in the scheme are residential waste, commercial waste, institutional waste, green waste and construction and demolition waste.

The solid waste management will be the responsibility of TMA. The solid waste from residential and commercial areas will be collected through bins placed at suitable locations in both residential and commercial areas.

Bins of 120 liters will be placed in the residential area whereas; bins having a capacity of 360 liters will be placed in the commercial areas. The solid wastes will be collected by sanitary workers from the bins and then loaded into mini tipper – 3-wheeler and mini tripper vehicles. All the solid waste will be used to transport to a transfer station at the solid waste management site.

3.6.7 Electrification & Street Lights

Sukkur Electric Power Company (SEPCO) shall provide electricity to the proposed project and project proponent shall provide street light facilities. The conditions and requirement for the

⁹ NSUSC: North Sindh Urban Services Corporation

¹⁰ Refer National Reference Manual: Section 8.4.6

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electrification has been mentioned in the NOC. The proposed project obtained no objection certificated (NOC) for electricity from Sukkur Electric Power Company (SEPCO). The Copy of letter of SEPCO to Town planning department, letter no. CEO/SEPCO/SUK/CTO/M (P&D)/3324.25 -dated 14.10.2020, is attached as Annexure–III.

3.6.8 Sui Gas

The Sui Southern Gas Company (SSGC) has issued NOC to the proposed project for natural gas facility in the project. The Copy of letter of SEPCO to Town planning department, is attached as Annexure - IV. The conditions and requirement for the electrification has been mentioned in the NOC.

3.6.9 Firefighting System

As the proposed project is comprises of residential units. The project will have a firefighting system, which includes the placement of fire detectors, fire intimation/alarm system, fire hydrant etc. Moreover, design of the firefighting system will be according to the Building code Pakistan and NFPA rules.

3.6.10 Safety and Security System

A high degree of general safety and security will be maintained; as the project is enclosed with a boundary wall and has only a single entrance where security guards will be appointed. The CCTV Cameras will be installed at appropriate locations to monitor the access control of the project area. Highlights of the security plan are given below:

- Adequate Lighting will be provided in the project area at night time.
- No unauthorized person will be allowed on the project premises.
- Gate pass will be issued to all visitors and project employees

3.7 Sustainable Design Elements of the Proposed Project

Proponent will assist its plot holder for sustainable architecture or design elements to energy and ecological conservation in the design of the built environment. It seeks to minimize the negative environmental and health impact of buildings, which is achieved through enhancing efficiency and moderation in the use of materials, energy, and development space.

Proponent will assist the plot owners regarding preparation of environment friendly design of houses; provide full support regarding the solar panel installation and procurement and rain harvesting technique.

The design considers the following:

- The plot setting for the housing scheme depicted that its maximization of open space design, enabling more uses on a smaller footprint and creating spaces that allow for more than one function. The planning & design of the plot cutting have been carried out, keeping in mind the natural topography, sun and wind direction.
- Project proponent has allocated about 8% of land for open spaces, parks, and playground. There are a total of two parks/ open spaces in the housing scheme. Plantation plan has been recommended to be implemented.
- Structured Parking: The proposed parking slots are aimed at providing compact and structured parking, thus replacing most of the existing surface parking in order to open

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up land for more green space. These open areas will also serves as sites for groundwater recharge.

- iv. Soft landscaping will be introduced in the few areas where surface parking is still in use. These changes are intended to reduce the heat island effect, achieve cleaner air quality through the planting of shade trees promote efficient management of storm water runoff, and to improve visual aesthetics.

3.8 Contractor's Camps

For the construction of proposed project structures and appurtenant works, camps will be established. As construction works are confined only to the working site, therefore, camps will be placed as per designated sites. During consultations, the major demand of the community was the provision of jobs during the construction phase.

Moreover, based on the experience of the previous phase, it would be safe to say that a sufficient number of labor particularly unskilled is available in the proposed project area. The proposed project contractors will hire unskilled labour. The contractor will be bound to provide jobs to local people for unskilled labor from the communities and this should be 100% if not available in the project area then may hire from outside the project area.

Only 100 to 50 workers will be hired from the nearby areas. Most of the laborers will go back to their nearby homes after completion of the daily work, including drivers/operators (tractor trolley, loader. etc.) and some semi-skilled labour. The contractor will be bound to provide facilities like kitchen/washing/bathing/latrine with septic tanks and medical checkups (including COVID related) to laborers.

3.9 Time Schedule

The development of the Bhittai Residency Housing Scheme will be completed in 12 months. The time schedule of the project has been provided in Figure 3-5.

S#	Description	1	2	3	4	5	6	7	8	9	10	11	12
1	Boundary Wall												
2	Gate House & Security Pickets												
3	Roads (VRS / Streets) Work												
4	Storm Water Drainage/Footpath Work												
5	Protection Works												
6	Sewerage System												
7	Culverts												
8	Water Supply & Rain Water Harvesting Works												
9	Sanitation Works												
10	Landscaping (Soft + Hard)												
11	E & M Works (Street Lights, Security System etc.)												
12	Irrigation System												
13	Demobilization and Handover												

Figure - 3.4: Time Schedule for Construction Phase of the Project

3.10 Project Phases

Development of the proposed project would be implemented in three phases i.e. Pre-construction/ design, Construction and operation.

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3.10.1 Pre-construction/ Design Phase

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

Geotechnical/Soil Investigation: A preliminary soil investigation of onsite soil conditions will be carried out for determining the suitability of the site to support the structures, roads maps and other development works. Extensive soil investigation will be carried out subsequently to firm up detailed working drawings.

Land Surveying: During this activity, topographical survey would be undertaken by the consultant to measure and demarcate the area, measure the ground elevation, and prepare maps, which are used during the subsequent development planning and design activities. Subsequently, engineering details will be worked out and technical drawings, specifications for equipment and material would be prepared.

3.10.2 Construction Phase

Contractor Mobilization: This component involves transportation of construction machinery and equipment to the project site, and establishment of the contractor's camp and office.

Site Preparation: Usually this activity involves operation of earth-moving machinery and substantial land clearing, leveling and grading, as well as cutting and filling activities. The development works will be carried out as per design/profile. The first task during this activity is to demarcate the road alignment and other benchmarks, with the help of drawings prepared during the pre-construction and design phase of the project, on the spot changes will be employed to avoid minimized the environmental impacts. Once markings are complete; the land will be cleared and prepared for subsequent construction activities. The whole purpose is to develop the area as per Master Plan provisions, in line with other developed sectors.

Construction Activities: The construction activities will be carried out using the conventional methodology and sequence of work. The activities will include elementary earthwork to convert the natural surface into the required profile of road works, laying of sub-base, base course and Triple Surface Treatment on roads; Storm Drainage System to systematically collect and dispose of storm water in separate system into natural Nullahs. The sewerage system will be developed to carry away sewage at outfall at sim nullaha.

Staffing: Construction crews will be the responsibility of the civil contractor and its petty contractor. It is estimated that 100 personnel will be working at site at a given time during peak construction period. These will essentially include masons, carpenter, electricians, painters, plumbers and general labors. For unskilled employment, preference will be given to local residents of the project area.

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

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Disposal of Excavated/ Construction Waste: Construction waste will be used by the contractor if possible, otherwise it will be disposed of at the designated site which will be decided at the time of award of the contract with the contractors in consultation with Larkana Solid waste Management committee and TMA .

Electricity: Temporary connections during the construction period will be obtained from SEPCO for the construction activities and camp.

Green area: Proper landscaping will be carried out to ensure the aesthetic value and avoid soil degradation.

Camp Site Sanitation Facilities: As sanitation facilities will be provided at the camp site, so the contractor will construct septic tank with soakage pit for treatment of wastewater from the camp site.

Traffic Load during Mobilization (and Demobilization) of the Contractor: All of the construction equipment and vehicles will be transported to the site via Bakrani Road.

Traffic Load for Construction Materials Supplies: It is estimated that on average 3-6 truckloads per day will be supplying different types of material to the site during peak construction period.

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

Fuels: For the construction equipment and vehicle, diesel will be required. The peak consumption of diesel would be 1,000 liters per day. The diesel will be procured from Larkana city to the project site.

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4. PROJECT ALTERNATIVE CONSIDERED

4.1 General

The consideration of alternatives to any project is one of the key aspects of an environmental study. Consideration of alternatives provides for the examination of different options to achieve a stated objective and assist the decision-makers in the choice of the best option, which has the least adverse and the greatest beneficial environmental, social, and economic consequences.

The most pertinent question to assess the feasibility and propriety of any developmental project from the environmental impact perspective is to determine whether an alternative option would be objectively a better choice than the current proposal. The comparative analysis of the environmental and economic impacts of all the possible alternative options can provide an answer to this important determinant. This very question has been objectively and analytically examined here in the light of comparison of the likely impacts on the physical, biological, ecological, health, and economic environment as well as views and reservations of the stakeholders (proponent and the likely beneficiaries/affectees).

4.2 Possible Alternatives to the Project

In the light of the objective evidence and views of the stakeholders, the below listed possible alternatives to the project are reviewed as hereunder:

- Abandonment of the project on financial and technical grounds i.e., no project option.
- Modifying the scope (Reducing and downsizing, or enhancing and upsizing) of the project.
- Shifting the project to some other location.

The above alternatives are briefly discussed below.

4.2.1 Abandonment of the Project (No Project Alternative)

The “no project” option is the ubiquitous option that can be exercised for any and every project. Exercising this option means abandonment of the project altogether and continuing with the existing position i.e., status quo.

This option could save the entire project cost of millions of rupees to the exchequer. However, the objective evidence and the pertinent data do not favor this option. As has been mentioned in earlier, there is a serious shortfall of housing units in the country compared with its availability and demand. The demand for housing units is increasing with every minute passing. The “no project” option would mean further increasing this availability demand deficit in the housing sector, which the situation cannot be afforded. The available statistics indicate that there is a lot of potential in this sector of the economy that can be tapped in both the private and the public sectors.

The construction of the project is an attempt by the proponent to reduce the growing gap between the availability and demand of housing units in the country. Non-construction of the project would therefore mean worsening the situation. In order to solicit the opinion of the

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stakeholders on this point, a number of persons, urban developers, real estate agents, public functionaries, and officers of the SBCA were interviewed after explaining to them the underlying objectives of the project's construction. The majority of the interviewees favored the construction of the project as they hoped for the availability of quality housing for those who do not own a house in Larkana. None of the interviewees voted against the construction of the project. As such, this alternative of "no-action" was found devoid of any rationale, justification, or merit.

If we consider no project option then we will lose all positive impacts that will be caused due to the project; like providing residential plots to the all income groups, provision of basic infrastructure to the people that would live there, loss of potential employment and business opportunity.

4.2.2 Changing the Scope (Reducing/Downsizing or Enhancing/Upsizing) of the Project

The second alternative could be to change the project's scope in terms of the number of the housing units, the area of the individual units and the provision of the allied and support facilities and infrastructure.

The scope-changing option may also entail changing the architectural features and layout design of the facilities to be provided under the scheme. As per the existing scope, the scheme comprises 241 housing plots along with a host of support facilities and infrastructure.

4.2.3 Shifting the Project to some Other Location

The third alternative option could be relocating and shifting the project to some other site. However, the objective rationale for this option was found lacking on two counts. Firstly, it may be very difficult if not impossible to find a large and compact piece of land of suitable dimensions for constructing a housing project, as is the present one, near the city of Larkana. Secondly, despite relocating the project, the pertinent environmental impacts on the air, water, soil, and socioeconomic environment would remain almost similar in nature as would be at the present site.

Contrarily, the site owing to a number of advantages appears to be a good choice for constructing the project because not only is the barren land but also is also available and located amidst a good environment in the suburbs of Larkana. As the land is not under any other product usage, its usage for developing the housing scheme will not involve adverse land use change.

All the civic amenities and the infrastructure required for a housing scheme such as water supply, sewerage system, electricity, telephone, and natural gas is already available near the project area site. Furthermore, the construction of the project at this site does not involve the dislocation or resettlement of any population. On the other hand, relocating or shifting the project to some other site might involve land use change and or displacement and resettlement of the occupants.

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Besides, the availability of such a large piece of land may be difficult. Additionally, if the proponent buys land at a new site, the cost of the project may shoot up exorbitantly, thus rendering it economically non-viable and non-affording for the target population.

The objective analysis indicates that exercising the option of shifting the project to some other location will render the project socially and financially non-viable. Non-availability of a piece of land with requisite characteristics and features will be a major restraining and impeding factor in shifting or relocating the project. Therefore, in view of the position explained above, this alternative option of shifting the project from the current site to some other location was found not feasible.

4.2.4 Summary of the Alternative Consideration

Based on the objective analysis, and views and opinions of the stakeholders, as detailed above, none of the alternative options, as discussed above, is feasible. Furthermore, the net socio-environmental impacts of the project, as thrashed out in this EIA study are positive in nature, which favor the construction of the project at the proposed site. Therefore, consideration of the above-discussed alternative options was found not relevant to the instant project.

4.3 Conclusion

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

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5. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

5.1 General

Public Participation is a mandatory requirement of the Environmental Impact Assessment exercise under the Sindh Environmental Protection Act 2014 and the rules & regulations framed there. The public consultation & participation process provides an opportunity for those directly & indirectly affected by the project to express their concerns during the feasibility phase before the finalization of the project design. It aims to ensure that the EIA process is transparent and robust and enables sustainability in the design, implementation, operation & management of development projects.

The key objectives of public involvement are to:

- Obtain local knowledge about the microenvironment (project neighborhood) that may be useful for decisions regarding the project design and identification of potential impacts;
- Facilitate consideration of alternatives, mitigation & compensatory measures;
- Ensure that important impacts are not overlooked and benefits are maximized;

5.2 Project Background

The project site is located at Airport Road, Larkana, Sindh. It is a busy road for all buses and coaches, a major junction of all bus routes, which proceed to other city area areas. The project falls in the East region, which falls under the jurisdiction of Taluka Larkana, District Larkana. There is a need to strictly follow the procedures laid down under the environmental regulations and building control bylaws of the relevant provincial government departments and the local housing authority. The radius of the 5 km segment of the project serves some of the highly visited places of Larkana, including:

- Lahori Market
- Al-Rehman Hospital
- Quaid-e-Awam University
- White Mosque
- Bhittai Colony
- Noorpur Mazar
- Larkana Banquet
- Temple
- Imam Bargah Hussaini

5.3 Identification of Stakeholders

The main Stakeholder groups involved in an EIA and their interest are explained in the following paragraphs:-

Local People / Neighborhood: Individuals or groups in the vicinity of the project site are informed regarding the project's background and context. Due to their proximity to the project

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site, they are often the most affected stakeholder and therefore, consultation with these stakeholders is carried out throughout the project life. The consultation exercise provides the opportunity to appraise the stakeholders regarding the consultation process. It is important to foresee project impacts, and concerns and mitigate them. Further, intensive consultation during the planning stage of the project provides a basis for reducing the trust deficit and encourages confidence building.

Proponent: The main aim of the project proponent is to accomplish the objectives of the project through cost-effective and sustainable project activities. To this end, the project proponent has to recognize that strong association and responsive relations with stakeholders would go a long way to achieve the project objectives. Therefore, the proponent has to engage stakeholders at all levels from the outset; inform them regarding project goals, designs and alternatives. Moreover, they have to keep trying to create public understanding and acceptance of the proposal through a commitment to implement the promised objectives. They have to accomplish the project through general acceptance of the design and keep improving through the use of public input on alternative and mitigation measures.

Government Agencies / Other Line Departments: The government agencies and other line departments involved in the EIA process are mandated to have their policy and regulatory responsibilities addressed in the impact analysis and mitigation consideration. For the competent authority, an effective public involvement program will ensure a project proposal that effectively corporates environmental and social concerns. Moreover, in line with international standards, SEPA invites the proponent for evidence of CSR activities in the past and plans for CSR activities in the project vicinity. During the EIA review, the most important concern for SEPA is a transparent public consultation process and a strong stakeholder engagement plan that can address the concerns and suggestions of all the stakeholders.

NGOs /Interest Groups: Comments from NGOs and specific interest groups often provide a useful policy perspective on the project's methodology and implementation mechanism. For example. Due to the vast exposure of certain NGOs and interest groups, alternative measures for reaching the project goals may be advised that are more environmentally friendly and socially acceptable. Their views are also helpful when developing CSR programs and later on through monitoring and evaluation of these programs.

Other Groups; Other interest groups comprise those who are experts in their fields and can make a significant contribution to the EIA study. The advice and knowledge of the relevant institutions most directly concerned with the proposal are often sought. More often than not, a range of experts from these groups are consulted and their input is solicited based on the project requirement.

Table - 5.1: The main stakeholders for the Bhittai Residency Project:

Sr. No.	Name
1.	Local Residents
2.	Shop Owners
3.	Local Businessman
4.	Landlord
5.	Board of Revenue, District Office

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Sr. No.	Name
6.	Hospitals
7.	TMA Office, Larkana
8.	Fire brigade, Larkana
9.	Academia,
10.	Local NGOs
11.	SEPA Larkana
12.	Senior Citizen / Philanthropist

5.4 Consultation Approach & Methodology

The sampling process started in the surrounding of the project, which was located at the airport road. A random number was selected for picking up the count in the radius square of households/businesses/hospitals/ heritage buildings, for collecting data and filling out the survey forms. A set of questionnaire samples was used to collect the data, which is compiled in the report with extra care to affirm getting all stakeholders in the survey.

There is several various persons consulted and interviewed. Additionally, wherever found feasible, the public in the vicinity was also consulted to know their views and concerns over the project activities. The majority of these consultations were either one-to-one meetings or small and focused group discussions.

The Consultation was held from the 06th to the 07th of June. On the first day meeting with the local community / Neighborhood and other representatives near the project area however the remaining two days were designated for commercial. Departments, organizations, NGOs and other groups.

5.5 The Stakeholders Consultation meetings

5.5.1 Local People / Neighborhood

- **A meeting with local people / Neiborhood** was held on the 06th of june, 2024. The residents talked about the composition of the settlement near the project area. He told that the area mainly consists of residential and commercial interests, making it a busy area and very adjacent to the downtown, most people use it to rush to their destination. The main airport road connects it to other roads. Combination of middle and lower middle class residing around the project. The occupation is business, govt. employee, private, doctor, Engineer, etc. Many nearby markets are located in the area's major market, all the small and big vendors sale out the products and all the citizens of Larkana buy the goods
- **The community leader** added that there is a combination of communities living peacefully, it includes mainly Sindhi and Siraiki with different religions like Muslims and Hindus. Community members have shown their happiness for some other addition as the new residential society will be a sort of a good place for them.
- **A young man** residing in the vicinity of the project complained about encroachments in the area, especially in the city. Whereas the project area gets broad roads and wide space which is added a sign for buyers of property.

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- One of the residents, who is working beside the project is happy with the establishment of new housing and commercial scheme according to him this city is full of heritage and civilizational background and it is wonderful to see the development of the historical city.
- **The community representative** has views that the lower and middle class could not afford to buy any property as it is not affordable, so some low-price projects are welcomed as the lower middle can also afford a quality life. Taking in the view of the mentioned thing these constructions are allowed considered good housing for the city as buying a flat/apartment is rather affordable for the middle class and low-income people.
- **The landlord** shared his views, as the city area inside is already populated, so residents added that they are already facing several issues in the downtown area such as traffic congestion, noise pollution and inadequate drainage. The proposed project will only add to our problems. It has generally been seen that both the builders and the authorities responsible for monitoring the building construction and operations add to the woes of the residents due to carelessness in the implementation of construction guidelines and poor law enforcement.
- **The Resident** added that no such traffic plans were implemented in the district. The roads have grown without a Master Plan. As city area is full of problems where congested traffic and small streets make a disaster. The addition of vehicles on the already congested roads is adding to the existing problem of smooth running and parking. The need of the hour is to have a realistic demand forecast and to have several parking areas at critical sites in the new residential commercial areas. The majority of the projects have been completed in violation of the approved
- Some of the residents identified several precautionary measures that must be in place to ensure peace in the area. Most importantly, the residents want to ensure that their security and privacy are not breached. This is especially an issue for the colonies located right next to the said plot. Similarly, noise from the construction activities is bound to become a nuisance; construction should be carried out strictly in accordance with specific timings and there should be no construction activities at night. The residents should be taken into confidence regarding all development activities.
- Residents expect that the new development projects should be constructed as per law and regulation. The future planning should be properly managed which attracts the buyers to purchase the property in the newly developed area, as most residents avoid living in congested city areas.
- **Residents** suggested for salinity that persists in the vicinity of the project area, should be treated. Managing salinity involves striking a balance between the volume of water entering (recharge) and leaving (discharging) the groundwater system. The water table can be lowered by: planting, regenerating, and maintaining native vegetation and good ground cover in recharge, transmission and discharge zones, where possible.
- **The community representative** proposed recreation and beautification projects, they are also part of the government as the Municipal system should develop a separate plan for this area and engage the relevant stakeholders to address the growing civic issues, which will only become worse with further developments in the area. There are many important archaeological, historical and other important places located here and thus special attention is needed to develop this area.

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5.5.2 Commercial

- The commercial stakeholder meetings were conducted on the 06th of June 2024. The shopkeeper inquired regarding the usage of utilities by the proposed development. The water, sewerage and electric lines in the area are very old and have not been developed to sustain the burden of more development schemes. They were concerned as mostly groundwater is extremely polluted so residents will rely on it to purchase drinking water, the prices of water also increase which adds a financial burden on residents and commercial operators alike. Even though the Bhittai Residency project is a dual-type small project of a commercial and residential colony, the population will increase resulting in overcrowding and congestion.
- **The Banquet Owner's** commercial interests located near the project plot do not have any major reservations regarding the proposed project area. The offices and shops consulted did not face any major problems due to these developments, however with the trend of the new development of colonies several concerns were highlighted.
- **Shop keeper** has grievances for no provision for parking in the city area, now after the development of these new projects, they have wide area and proper arrangements of the parking area. This being an authorized action on the part of the builders, previously the residents in the neighborhood are faced with an acute traffic management problem
- For green areas, some representatives of **the business class** suggest plantations in the project area which provide cleaner air across the area. The more trees there are, the cleaner the air will be, cleaner water and natural filtration. Trees and forests can provide natural filtration, resulting in cleaner water carbon sequestration, controlled temperature, and a new habitat for wildlife
- **The businessman** proposed construction on the plot would increase the value of the property in the area which would be beneficial for owners of both residential and commercial property as well as the real estate businesses. The commercial activities carried out in the non-commercial areas are responsible for causing major damages to the infrastructure because the by-laws are not being followed in total disregard of the mandatory requirement of obtaining permission for operating their business. The residential plots are housing illegal commercial activities which are adding to the burden of congestion on road and the amenity/utility services. This is unfair concerning its unauthorized nature and causing losses to the government exchequer besides being the cause of severe civic problems.
- **Some shopkeepers** of the area have apprehensions for noise and overcrowded issues in the area, according to them, no doubt we have developed, as they will add up our business but some problems will also be faced.
 - A group of people in the commercial areas suggested that a proper security system will be provided as it is a compulsory requirement of the hour and all commercial and residential colonies must be provided with the latest security system with CCTV cameras.

5.5.3 Proponent

- The main aim of the project proponent is to accomplish the objectives of the project through cost-effective and sustainable project activities. To this end, the project proponent has to recognize that strong association and responsive relations with stakeholders would

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go a long way to achieve the project objectives. Therefore, the proponent has to strive to engage stakeholders at all levels from the outset; inform them regarding project goals, design and alternatives.

- Moreover, they have to keep trying to create public understanding and acceptance of the proposals through a commitment to implement the promised objectives. They have to accomplish the project through general acceptance of the design and keep improving through the use of public input on alternatives and mitigation measures.
- The proponent accepted to contribute to improving the living environment of the area by helping the civic authorities cope with the hazards of sewerage and solid waste in the area. The city's authorities are not able to manage the area, like many other parts of the city. If the proponent takes lead in improving the overall environment of the area, the value of both their property as well the entire area can improve.

5.5.4 Institutional Perspective

5.5.4.1 Sindh Solid Waste Management Board SSWMB)

The meeting was held on the 07th of June 2024. As per the appointment, the team reached the office. The officer added that this department is established to dispose of solid waste as previously it is the responsibility of the Taluka Municipal Committee. After the execution of this department, collection of all the waste and drainage water is the duty of this department. This refers to an ongoing commitment to safety and to protect of human health and the environment. The solid waste generated on-site is collected daily by a solid waste contractor who will collect it responsibly and move it to a dedicated area. A number of trash bins will be located inside the proposed project area on roads and streets and staff will be appointed for the collection of solid waste, disposal of the solid waste will be done by the department which is free of cost.

The representative of SSWMD shared that the upcoming projects should have the provision for treatment and disposal of their proper wastewater disposal and drainage system. As such, the infrastructure facilities are not likely to be overburdened by the construction of the upcoming new development projects. Many shops, traditional bazars, hotels and fruits and other grocery hawkers are surrounded in the project area; clinics. It should be ensured by the authorized department for proper management of the drainage system.

5.5.4.2 Workshop Owners

A series of commercial shops were visited on the 07th of June 2024. The workshop owner has shared that through the course of this project, a number of commercial and business centers, banks, hospitals, and government offices are located, signifying that this corridor is indeed at attractive metropolitan activities. People will get opportunities in a peaceful area with all facilities. This will be an attractive window due to their location in the main city center.

5.5.4.3 The Board of Revenue, Sindh

The revenue officer meets on the 07th of June, 2024. He appreciated the new addition of multiple development projects in the area and expected that they will take care of the all-rules regulations and as per law. All the demarcation of plotting must be adopted as per law. It must have proper proceeding of water along with electricity, gas and drainage and other security measures.

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The revenue Officer suggested that measures should be taken for anti-encroachment, which is a major problem in the old city and downtown. The anti-encroachment department is run by the revenue department but no role is played. It is needed to approach law enforcement agencies in the newly established areas and avoid any hassle in the project area.

5.5.4.4 Traffic Police

The meeting was held on 07th June 2024. The duty officers added that Illegal parking has become the norm around the nearby markets and shops, especially in the city area, however near the project area there is no such issue persisted. Challans by the Traffic Police are not having any major impact on traffic control in the area.

One traffic constable discussed with our team that the Traffic Police has severe reservations about additional development in the area. According to them, the area is already a mess and their staff is continuously striving to manage the traffic but the steadily increasing number of vehicles in the area and total disregard for the law are major hurdles. The authorities should have consulted us before giving approval for new development projects in the area. Even if the approvals have been given, it should have incorporated the traffic and parking concerns. It is expected that due to the wide and open area there will be no issue of traffic problems in the area.

Awareness of traffic laws is also severely lacking amongst the general public. Steps should be taken for area-wise education of traffic rules and the benefits of following basic principles of road safety. The Traffic Police is already playing its due role through a dedicated Sindh Police radio station and other media campaigns, however, all efforts have to be increased manifold. Moreover, if development is to continue at the current pace in Larkana, and in particular this area, there must be a parallel increase in the personnel of Traffic Police Wardens.

5.5.4.5 Taluka Municipal Officer

On the 06th of June, 2024 team met with TMA, They added that the development downtown is ignored as civic amenities are almost rare. People's adverse impact arises from deficiencies in infrastructure and other facilities in the rest of Larkana. The demand for utilities, such as water, sewage disposal, electricity and gas will be increased considerably for which there is no plan by the Municipal authorities, and the residents are already protesting against the proper management of traffic, cleanliness, water quality and noise pollution issues but the authorities is itself handicapped for inadequacies in the infrastructure of the authorities.

TMA officer shared that EIAs are passed with the provision that the project will have its generation energy, water supply, wastewater and solid waste disposal. The amount paid for the betterment of infrastructure goes into the exchequer of government departments and not towards the provision of infrastructure facilities, which is unfair.

5.5.4.6 Fire Brigade Department

The meeting was held on 06th of June, 2024. The fire brigade team shared that the performance of the fire department is one of the weak points of small cities' environmental performance. The dense population of the colonies is invariably unequipped to handle the fire of a high level. Larkana fire brigade is failed to recognize this said aspect of environmental

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performance. The materials of construction are invariable of polymer and plastics based and liable to catch fire. It is time that new projects should be well equipped and proper fire extinguishers should be used along with proper emergency numbers would be installed within the colony.

There is a sort of discouragement as they have no latest equipment for fire-fighting but only one vehicle is available, whereas, another vehicle requires to repair but there is no budget for it. Other concerns are late salary and having no benefits from the fire Department

5.5.5 NGOs/ Interest Groups

The meeting was held with a group of the team on the 07th of June, 2024. Hands (NGO) have added good comments for the project they found it a development addition to the Larkana city project.

- NGO representative added that it is also seen that some sort of project of beautification of the town was going on as the work shall run for more than one year which makes people in hassle due to diversion of their route and other disturbance. The project shall provide beautification to the area, and enable the residents to enjoy a sort of recreation and enjoyment.
- The team member shared that Larkana needs to have new housing colonies with modern development amenities as the rural-urban migration is a high additional factor as people are shifting from small villages. In 70 years, villages should have assumed the status of secondary cities but that was not possible because the resources were inappropriate.
- One officer has apprehension that mostly developers transfer property files without development so buyers face problems, it should be avoided
- The Community Development Officer of NGO shared that it is a practice that builders and developers have created an artificial demand to invest and structure is not maintained as per approved design their masterplans, But Larkana is lacking, could not be adopted devised at great expenses by the government at tax payer's money.
- They appreciated that project is located in the new area; it is placed at a distance from downtown which is free of noise and pollution and is an attraction for the buyers.
- The capacity of roads to handle the present volume of traffic has been exceeded, at least by 10 to 15 times. Traffic jams are the order of the day however Airport road is a wide road but added vehicles increase some volume.

5.5.6 Other Groups

5.5.6.1 Philanthropist

On the 06th of June 2024, the local philanthropist discussed with the team that proper facilities/utilities be provided in new development projects. However, Larkana the city of politicians is in an abysmal condition. One would be shocked if one happens to visit Larkana. Heaps of garbage, broken roads, lack of gas pressure, load shedding, and shortage of potable water are some of the common and far-fetched problems of the city.

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Another chronic issue is potable water, the problem water supply in Larkana is quite dilapidated. “I feel that tears are trickling down my checks because the government and the Larkana Development Authority (LDA) have failed to provide citizens with potable water which is the highly essential element and basic need of life”.

Apart from this, not a single day passes when citizens do not long for potable water. The unavailability of safe drinking water is affecting the health of people. Moreover, people are falling prey to hepatitis after consuming contaminated water and costly treatment of this disease is another woe for the people.

In view of this, I expect from new development schemes that they ensure that these projects will be problem free. Besides this, a drainage system, arrangement of solid waste, and water filtration plants must be installed to provide potable water to the residents.

5.6 Finding and Conclusion

Results of the instant EIA study show that adverse environmental impacts of the construction phase of the project (Development of a Bhittai Residency) on the physical environment, although significant, will be of no eventual consequence because of their mitigable character. The majority of the identified negative impacts of both construction and occupancy phases are also reversible in nature and can be made good in case the suggested mitigation measures are implemented in true spirit and an effective monitoring mechanism is put in place. It is noteworthy that the socio-environmental impacts of the project are positive, and beneficial for the community and the environment as a whole. The EIA study also shows that there will be no end-exploitation and consequential depletion of the local natural resources. In view of the known and limited scope and magnitude of the project, the local resources will remain conserved and available for sustainable development. The project would therefore bring in positive and healthy improvements in the socio-economic environment of the area and the availability of housing to citizens.

Photo log - Neighborhood Survey for Bhittai Residency Apartments

	
Irrigation Officer during the consultation	Consultation with Fire fighters at Larkana

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Consultation with NGO (Hands)	Consultation with the officer of SSWMB
	
Consultation with Taluka Municipal Officer	Consultation with Officer at EPA Larkana
	
Consultation with Officer at EPA Larkana	Consultation with Taluka Municipal Officer

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6. ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

6.1 General

The environmental and social baseline conditions have been established based on information gathered through structured interviews, formal and informal scoping sessions and focused group discussions with the communities of various settlements located around the proposed project area. In addition, information was also gathered from officials of various stakeholders including Government departments, Academia and NGOs. The information available from limited secondary sources has also been used for drawing inferences.

6.2 Land Resources

6.2.1 Geography

District Larkana lies in 67° 56" 20' to 68° 29" 34' east longitudes and 27° 7" 31' to 27° 56" 2' north latitudes. This district is bounded by district Shikarpur and Khairpur on the east, district Jacobabad on the north, district Qamber Shahdadkot and Dadu on the west, and district Naushero Feroz on the south.

6.2.2 Physiography

In the context of physiographic characteristics, Larkana District can be divided into three tracts, namely, the Western Kohistan tract, the Central-Canal Irrigated tract and the Eastern Riverine tract.

6.2.2.1 Western Kohistan Tract

It consists of the Kohistan area comprising the entire western side of the district. It is separated from the Central Canal-Irrigated tract by a long protective earthen Bund. The area gradually rises towards the west from sandy ground to the hilly areas of Khirthar range. This is a range of limestone hills and mountains, referred to by the old writers as the 'Hallar', but generally known as the Khirthar range. These hills extend along the completely western boundary of the district from north to south in a straight line, for about 50 to 60 kilometers with an average width of about 20 kilometers. The Khirthar range consists of an ascending series of ridges running generally north-south with broad flat valleys in-between. These ridges are locally distinguished by different names, for example, the first line of hills is known as 'Kakrio' (broken), the next as 'Karo' (black), and the third as 'Pinaro' (saffron coloured). The highest peak known as 'Kute-ji-Kabar' (dog's tomb) is 2,096 meters above sea level. These hills provide good pasture land for sheep and goat rearing.

6.2.2.2 • Central Canal Irrigated Tract

It is a low-lying, vast, flat land containing a canal irrigated area (Project Area exists). The area of the central tract is bounded by two protective bunds, one in the west, to protect from hill torrents in the rainy season and the other in the east, to protect the canal irrigated area against floodwater from Indus. All the main east bank barrage canals irrigate this tract through various distributaries.

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6.2.2.3 Eastern Riverine Tract:

It is situated between the flood protection bund of the Indus River and the main river itself. Generally known as Katcha Area, it is quite fertile due to the fresh layer of soil spread by the River Indus during monsoon floods. Most of the land is riverine and is cultivated during the winter season.

6.2.3 Topography

Sindh can be divided into four distinct parts topographically: Kirthar range on the west, a central alluvial plain bisected by the Indus River in the middle, a desert belt in the east and south-east, and the Indus delta in the south Figure - 6.1. The proposed project is located in the central alluvial plain. The geographical features of the area are described below.

6.2.4 Geology

The Quaternary deposits of extinct streams and older terrace deposits cover Larkana district. Stream deposits are dominated by the streambed and meander belt deposits. While the odd terrace deposits consist of loess and flood plain deposits of the middle terrace¹¹. Due to the physical features of the lands of the district and the well-established canal system, most of the lands are irrigated croplands. The district comprises plains with no hilly terrains. Although there are some barren lands spread all over the district, mainly in the Dokri majority of the lands are fertile and available for crops¹². Indus River flows along the eastern and southeastern border of the district.

6.2.5 Soils

Soils of the district, are classified as silty clay and loam texture. The electrical conductivity of soil has an average value of (<one dsm-1). For pH, however, is medium alkaline (pH7.6-8.3). The soils are generally brown to greyish brown with CaCO₃ percentage content between 5 to 15%. Salinity and waterlogging are common in irrigated areas, particularly near the canal.

6.2.6 Seismicity

The map shown in Figure – 6.2 indicates that the project area is falling in Zone 2A, with peak ground acceleration (PGA) varying from 0.08 to 0.16 (Pakistan Building Code of Pakistan, 2007). While proposed project area is quite away from Zone 4 which is called the High Damage Risk Zone and covers areas liable to MSK VIII.

¹¹ <https://www.scribd.com/document/172676460/Geology-of-Sindh-District>

¹² Pakistan emergency situational analysis District Larkana, Aug 2014

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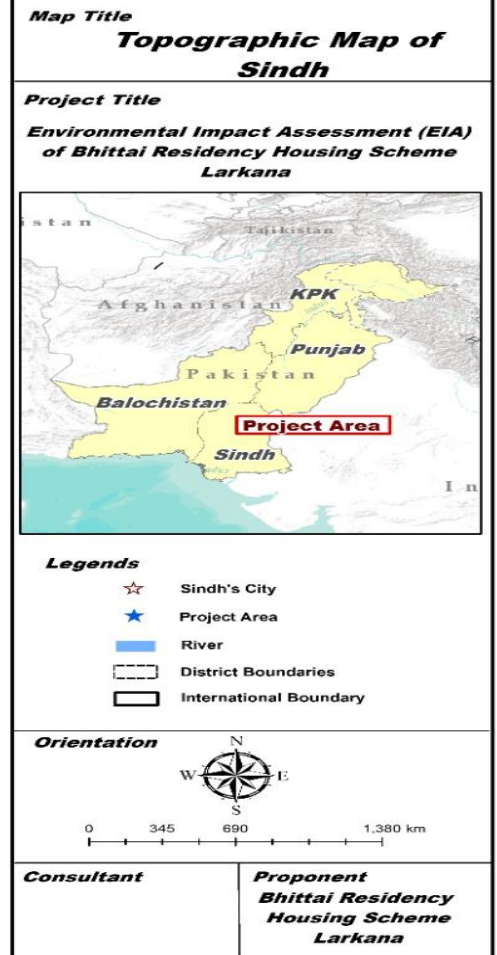


Figure - 6.1: Topographic Map of Larkana

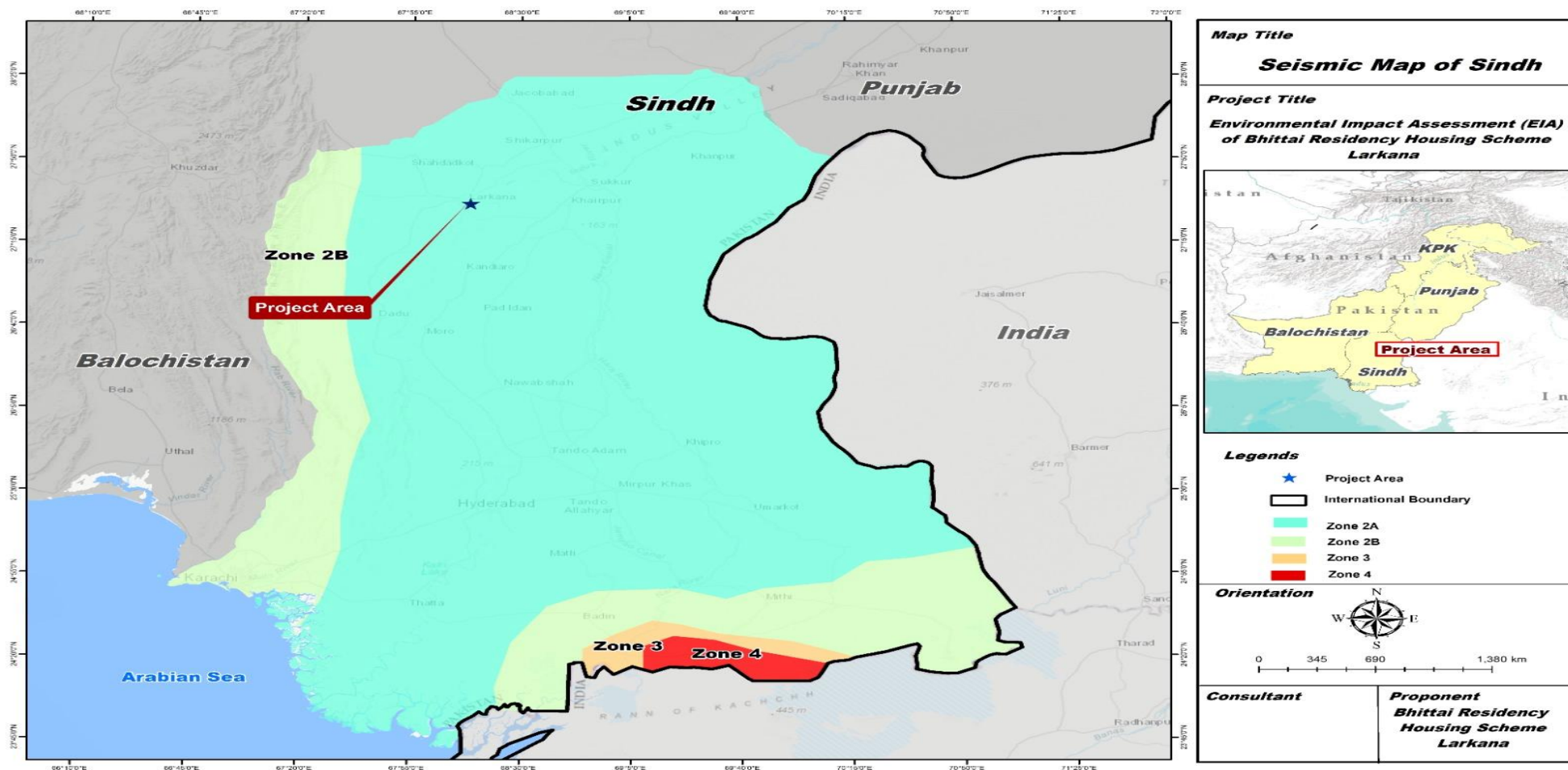


Figure - 6.2: Seismic Zones of the Project Area

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6.2.7 Climate & Rainfall

The climate of Larkana is hot and humid in summer and moderate in winter. The minimum temperature in December and January may be in the single digit with the maximum winter temperature being around 25 degree Celsius. The minimum summer temperature is around thirty degrees Celsius with the maximum temperature peaking around forty degree Celsius from April to August. The maximum summer temperature can sometimes touch 50 degrees Celsius for a short period.

The average annual rainfall is about 100 to 125 millimeters, more than 50 percent of which is received during the monsoon period of July and August. Dust storms are common and hot winds blow continuously for about 40 days from May-June each year. The city is situated far away from the sea is devoid of sea breeze and even evenings are quite hot. Only the First three months' data of 2024 is not available¹³. Figure – 6.3 describes the rainfall data of Larkana for the past twelve years.

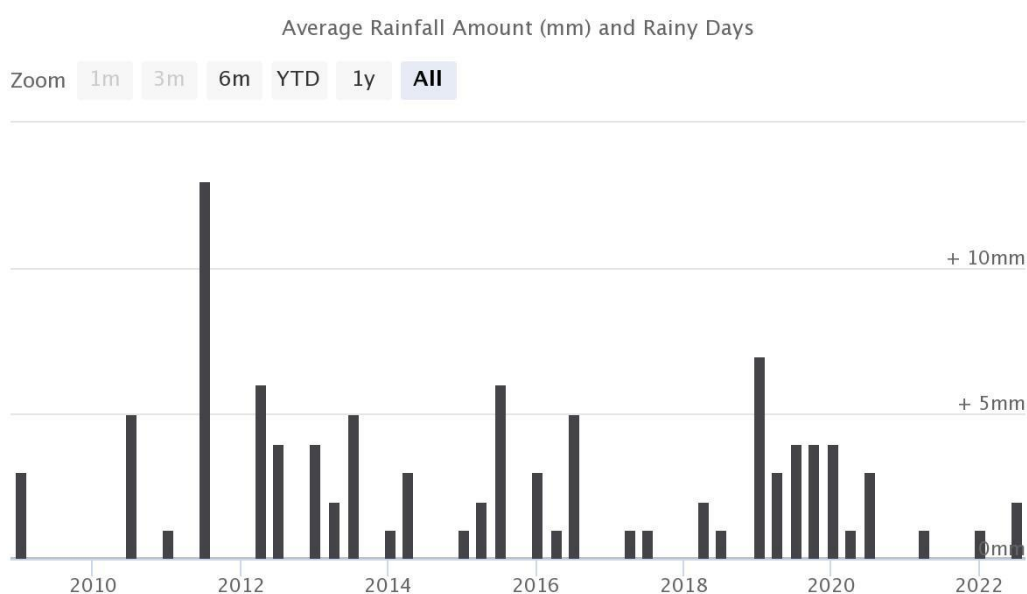


Figure - 6.3: Rainfall data of Larkana

Table - 6.1: Nearest Meteorological Stations

Name of Proposed Project Section Districts	Meteorological Station
Larkana	Larkana

¹³<https://www.worldweatheronline.com/larkana-weather-averages/sindh/pk.aspx>

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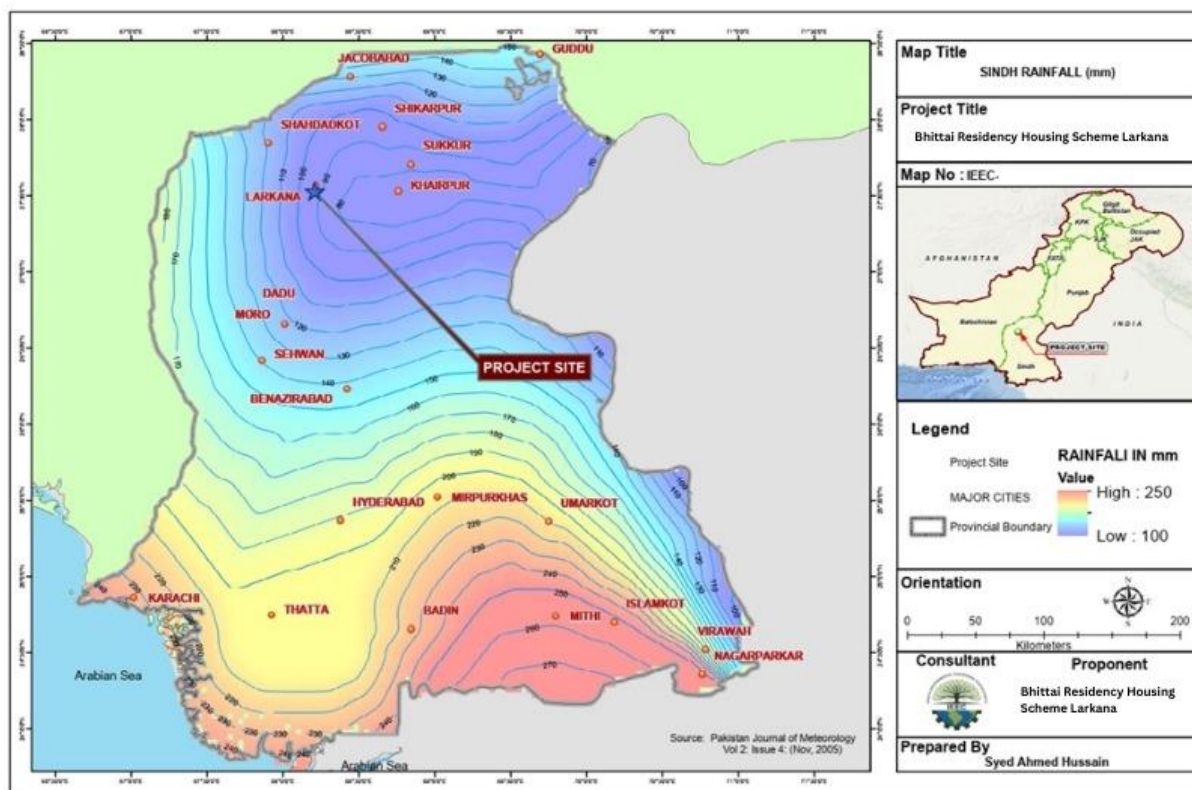


Figure - 6.4: Rainfall Map of Sindh and project area

Table - 6.2: Climatological Data of Project Area

Meteorological Stations	Rainfall (mm)		Temperature (°C)	
	Min.	Max.	Min.	Max.
Larkana	2.0	32	8	45

The mean monthly temperatures, rainfall, and evaporation at these stations are shown in Figures – 6. 4 Rainfall map of Sindh including Larkana & Figure - 6.5. The mean monthly maximum and minimum limits of climatological data are given in Table – 6.2

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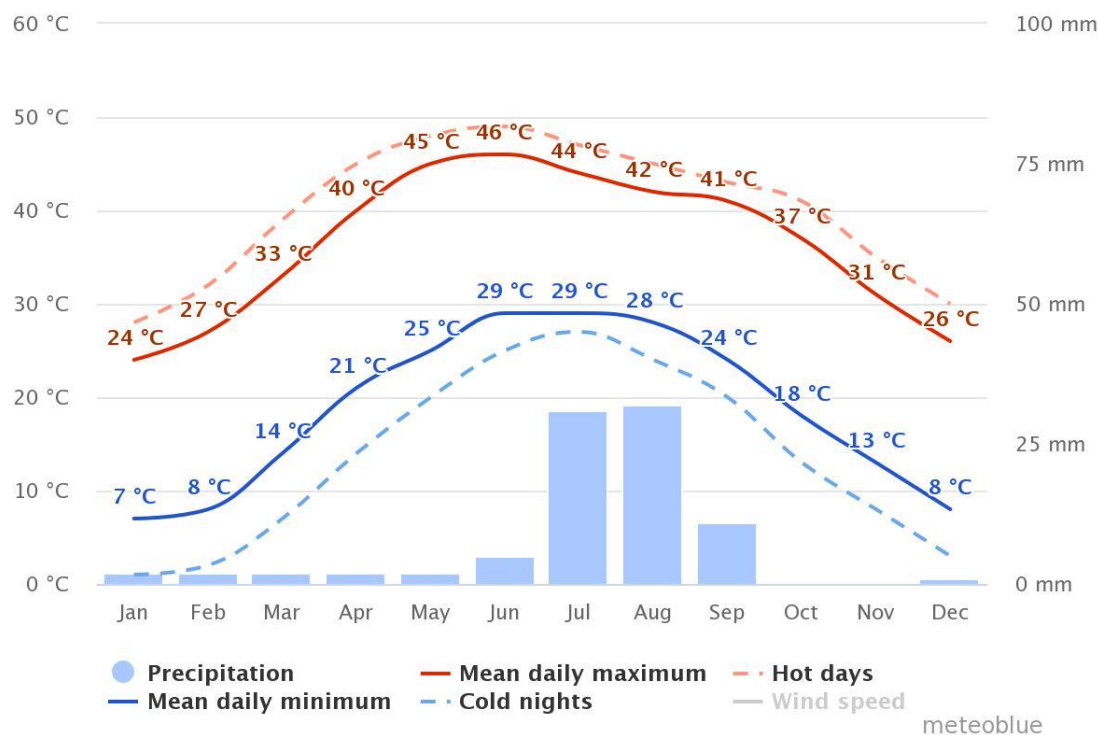


Figure - 6.5: Monthly Average Temperature & Rainfall at District Larkana

6.3 Water Resources

6.3.1 Surface Water

Sindh is one of the primary beneficiaries of the Indus Basin Irrigation System (IBIS). It has three major barrages on the Indus River that divert approximately 48 MAF of water annually to the 14 main canal commands in Sindh. These canal systems have an aggregate length of 13,325 miles and serve a gross command area of 14.391 million acres. There are about 42,000 watercourses, which have an aggregate length of about 75,000 miles.

The major surface water body in the district is the River Indus which flows along the eastern-south eastern boundary of the district. Two major irrigation canals pass through the district, namely Rice Canal and Dadu Canal. These canals originate from Sukkur Barrage at the right bank. Dadu Canal is perennial and is usually supplied water throughout the year except during January and for two weeks in April for maintenance works. The Rice canal, however, is a seasonal canal that is usually closed for about 6 months from October to March 18. After that water is provided for agriculture and drinking purpose.

Dadu canal has been designed for a normal discharge of 89.2 cumecs at the head. The main crops are cotton, sugarcane, wheat, rice, fruits and vegetables. The water availability of the Dadu Canal is highly variable due to the stochastic nature of the flow¹⁴. The Rice canal

¹⁴ "On Farm Water Management Field Manuals," Vol. I, II, and III, Ministry of Food, Agriculture and Cooperative, Government of Pakistan, Mid-Year Review, July-December 2008, Planning & Development Department, Government of Sindh, pp. 1-6.

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commands an area of nearly 5,200 acres and has been allowed to discharge 10,659 cusecs of water¹⁵. The irrigation system map of District Larkana is shown in Figure - 6.6: below.

6.3.2 Groundwater

Groundwater is found to be marginally sweet and is available in ample quantity in areas along the Canal. The water table also varies with the discharge in the canal and the amount of precipitation in the area. In periods of high discharge in the Canal, the water level in areas adjacent to the canal rises so does the water level along the canal. Precipitation being low in the area does not significantly affect the water table. Water quality in areas along and recharged by the Canal is generally sweet. Water is extracted through hand pumps; the water table in the area varies from 80 ft to 150 ft depending upon the location and elevation of the settlement. The freshwater availability map for District Larkana is shown in Figure – 6.7: below

6.3.3 Surface and Groundwater Analysis

6.3.3.1 Groundwater Analysis

The groundwater sample was taken from the project site and tested in Sindh-EPA approved laboratory (named Imperial Environmental Research Laboratory). The results indicate that the concentration of all the parameters for groundwater is well below the SEQS limits except for bacteriological contaminations. Table - 6.3 depicted the results of groundwater analysis while the scan Report of Groundwater results is provided in Annexure - VIII. The sample of groundwater was collected on 15th May 2024. The parameters were analysed according to SEQS 2016. Total Coliform, Faecal Coliform and Escherichia Coli (E-Coli) were detected in the sample taken from the groundwater (hand pump 80ft). This indicates the water will need to be chlorinated before consumption.

6.3.3.2 Surface water Analysis (Rice Canal & Sim Nullha)

A chemical analysis test of the surface water in the project site was also conducted. The samples of surface water were collected on 15th May 2024 and were received by the laboratory on 16th May 2024 for analysis. Tables - 6.4 & 6.5 depicted the results of groundwater analysis while the scan Report of Groundwater results is provided in Annexure – VIII. The parameters that were analyzed include Total Coliform, Faecal Coliform, Escherichia Coli (E-Coli), Colour, Turbidity, Total Hardness as CaCO₃, Total Dissolved Solids (TDS), pH.

¹⁵ Retrieved from <https://www.thenews.com.pk/print/378234-sindh-asks-centre-to-include-two-projects-in-cpec>

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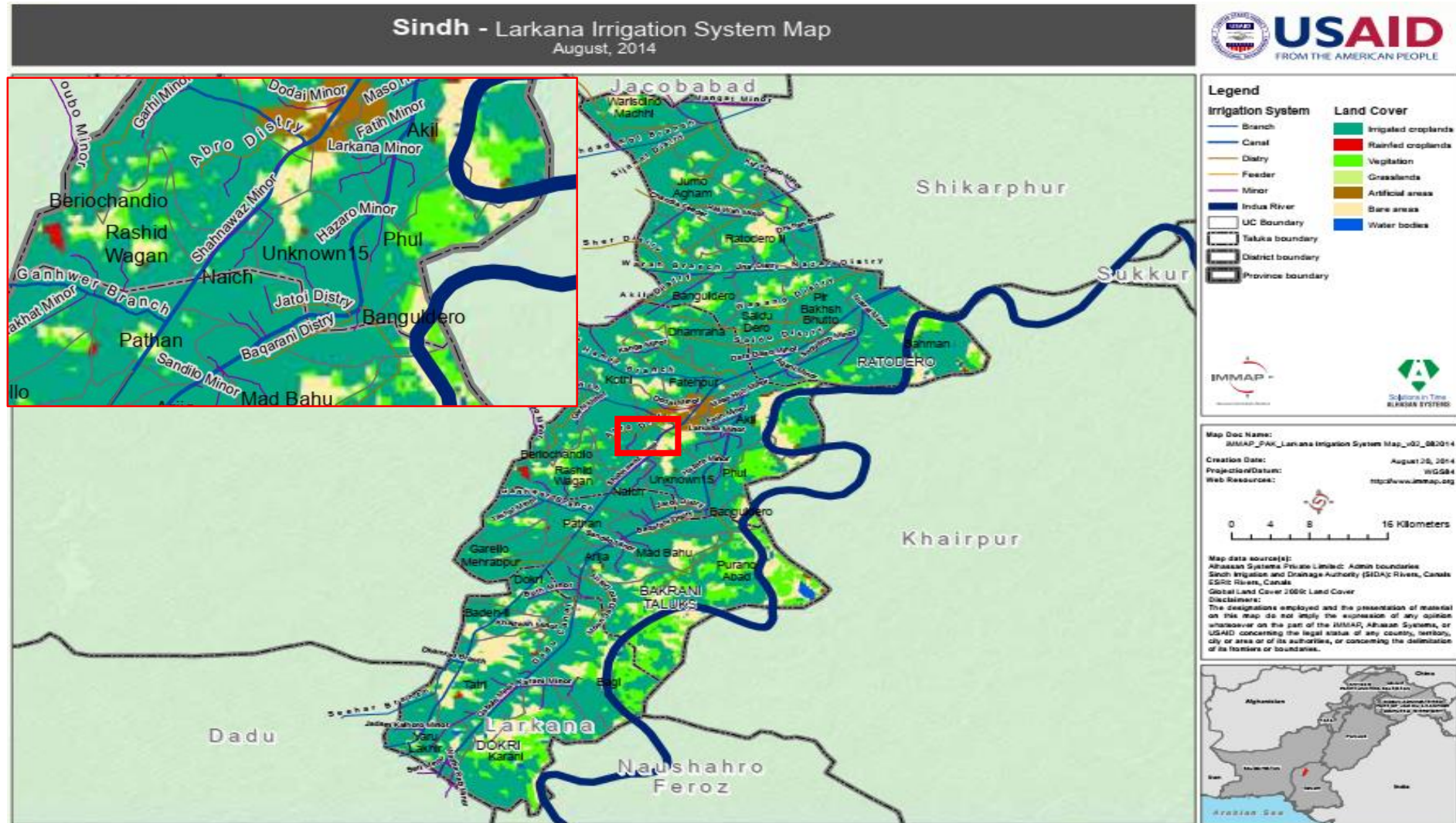


Figure - 6.6: Larkana Irrigation System Map

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Sindh-Larkana Fresh Water Availability Map Date (August 2014)

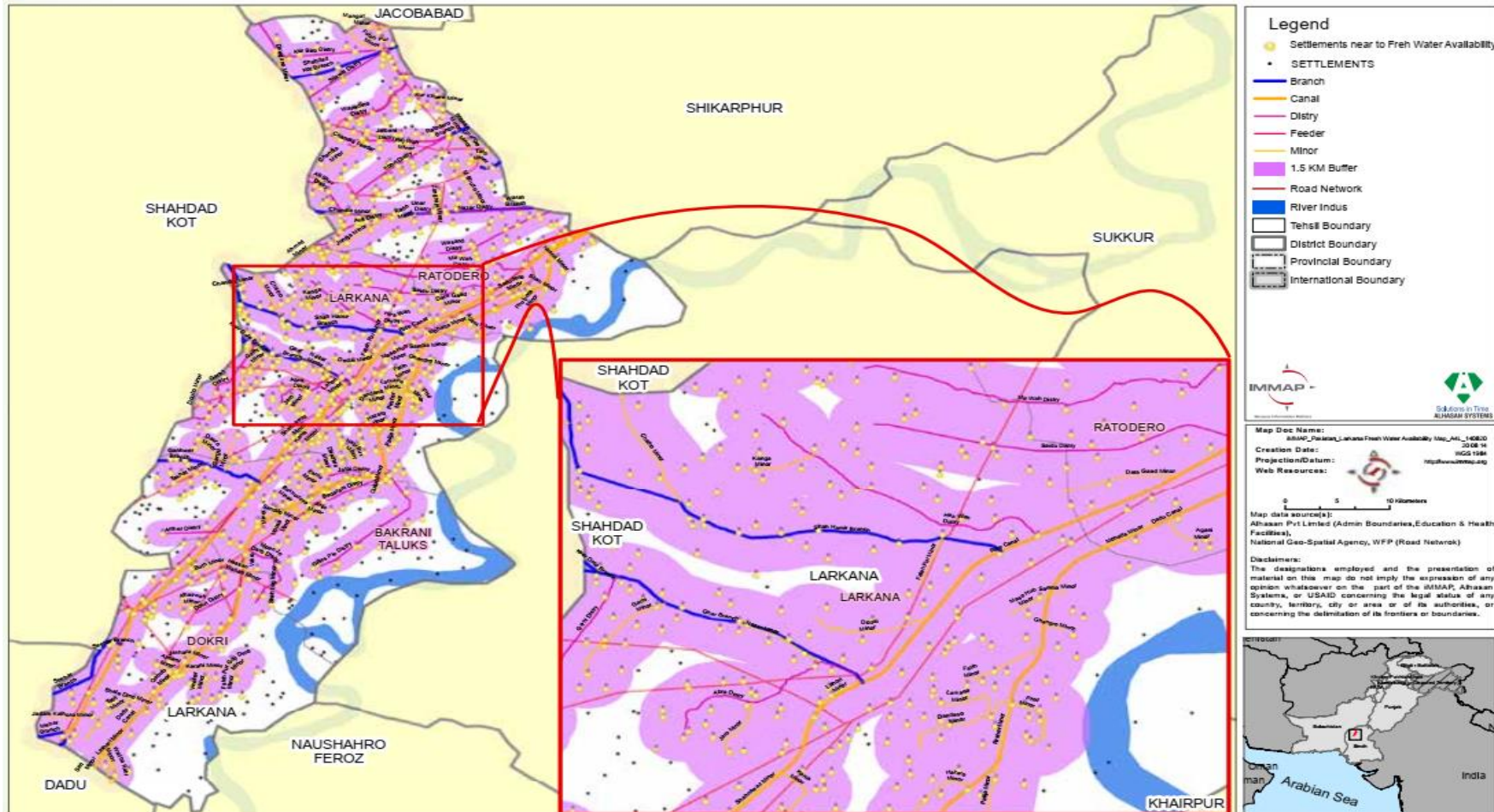


Figure - 6.7: Fresh water availability map for District Larkana

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Table - 6.3: Groundwater Analysis

S.No	Parameter	Method	Unit	SEQS Limit	Result	Remarks
1.	pH @ 25°C	APHA 4500 H*B	---	6.5-8.5	7.32	Within Limit
2.	Odor	Sensory evaluation	---	Unobjectionable	Unobjectionable	Within Limit
3.	Color	Sensory evaluation	---	Colorless	<5	Within Limit
4.	Taste	Sensory evaluation	---	Unobjectionable	Unobjectionable	Within Limit
5.	Total Hardness	Spectrophotometer Hl801	mg/l	500 mg/l	160	Within Limit
6.	Total Dissolved Solids	APHA 2540 C	mg/l	1000 mg/l	710	Within Limit
7.	Turbidity	HANNA HI98703	NTU	<5	<5	Within Limit
8.	Chloride	Spectrophotometer Hl801	mg/l	<250	180	Within Limit
9.	Aluminum	Spectrophotometer Hl801	mg/l	0.2	0.00	Within Limit
10.	Antimony	ASTM D-3697	mg/l	0.005	0.00	Within Limit
11.	Barium (Ba)	ASTM D-4382	mg/l	0.7	00	Within Limit
12.	Boron	Lovibond-85	mg/l	0.3	0.01	Within Limit
13.	Arsenic	Merck Kit	ppb	<0.05	0.01	Within Limit
14.	Cadmium	Lovibond-87	mg/l	0.01	0.00	Within Limit
15.	Chromium	Spectrophotometer Hl801	mg/l	<0.05	0.00	Within Limit
16.	Copper	Spectrophotometer Hl801	mg/l	2	0.01	Within Limit
17.	Cyanide	Spectrophotometer Hl801	mg/l	0.05	0.00	Within Limit
18.	E-Coli	APHA 9222 D	cfu	0 / 100ml	0	Within Limit
19.	Fecal Coliform	APHA 9222 D	cfu	0 / 100ml	0	Within Limit
20.	Total Coliform	APHA 9222 D	cfu	0 / 100ml	13	Out of Limit

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Table - 6.4: Surface water analysis for Rice Canal

S.No.	Parameter	Method*	Unit	SEQS Limit*	Result	Remarks
1	Temperature	SMWW 2550 B	°C	40 ≤ 3	26.1	Within Limit
2	pH	EPA 150.3	-	6.0-9.0	7.48	Within Limit
3	Biochemical Oxygen Demand (BOD)	EPA 401.5	mg/l	80	110	Out of Limit
4	Chemical Oxygen Demand (COD)	EPA 410.5	mg/l	150	260	Out of Limit
5	Total Suspended Solids (TSS)	EPA 160.4	mg/l	200	80	Within Limit
6	Total Dissolved Solids (TDS)	EPA 160.1	mg/l	3500	7820	Out of Limit
7	Oil & Grease	EPA 160.1	mg/l	10.0	2	Within Limit

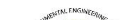
6.4 Ambient Air & Noise Monitoring

6.4.1 Ambient Air Quality Monitoring

Bhittai Residency Housing Scheme Project is located on Bakrani Road at its intersection with Larkana bypass Road 2 km away. The project area comprises various housing societies and villages, which means that there is heavy traffic on the roads during rush hours. Proper plantation on green belts and green areas will help to maintain the air quality and noise level of the project area within the limit in the future.

The ambient air quality and noise level monitoring was conducted and compared against the Sindh Environmental Quality Standards (SEQS) for Sulphur dioxide (SO₂), Oxide of Nitrogen (as NO), oxide of Nitrogen (as NO₂), Ozone (O₃), Suspended Particulate Matter (as SPM), Respirable Particulate Matter (as PM₁₀), Respirable Particulate Matter (as PM_{2.5}), and Carbon monoxide (CO), during 24 hours at the project site.

The ambient air quality tests were carried out through Imperial Environmental Research Laboratory (SEPA Approved). The results reveal that all parameters are within permissible limits of SEQs 2016 of ambient air quality as depicted in Figure – 6.7. Laboratory results of ambient air quality are attached as Annexure –IX.

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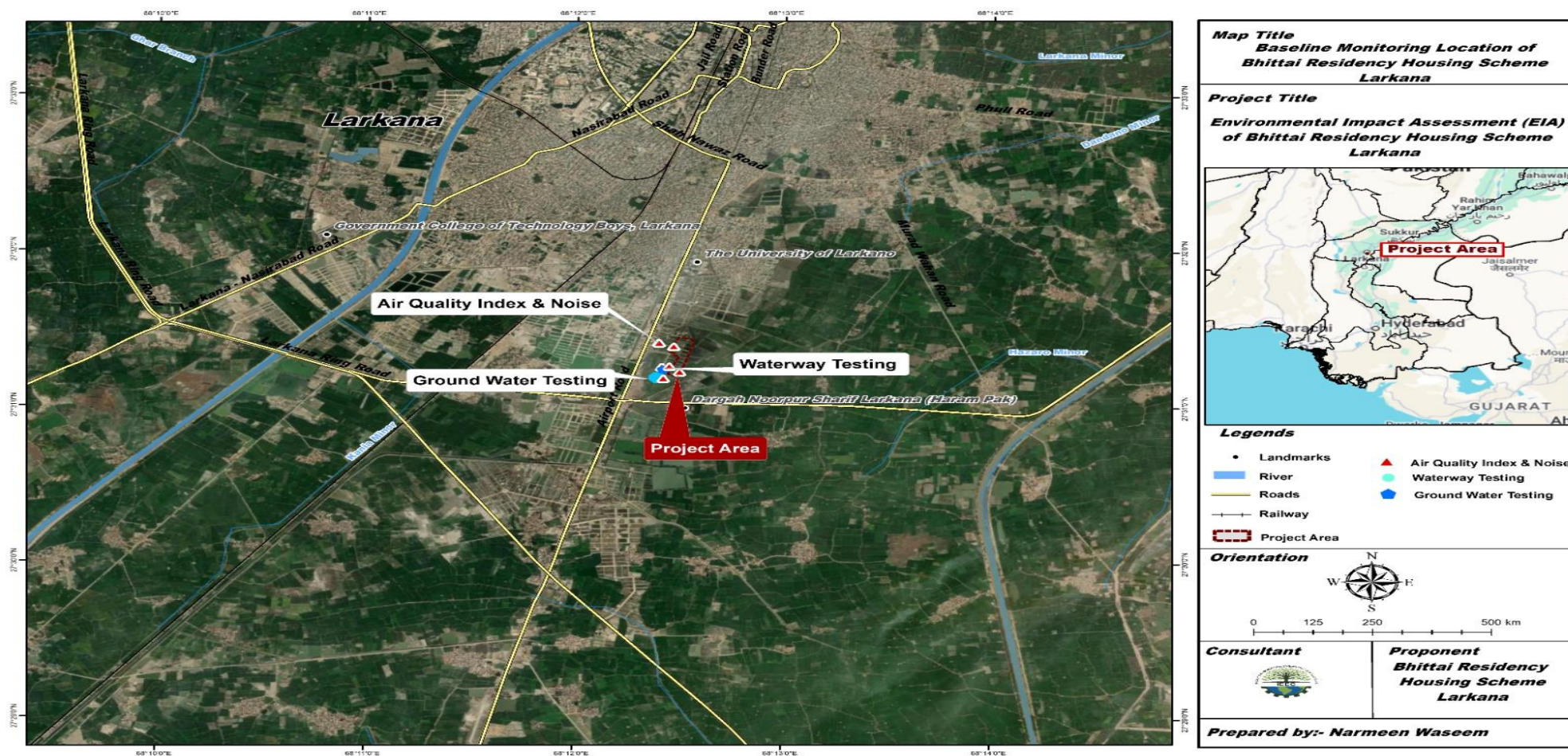


Figure - 6.8: Baseline Environmental Monitoring Map

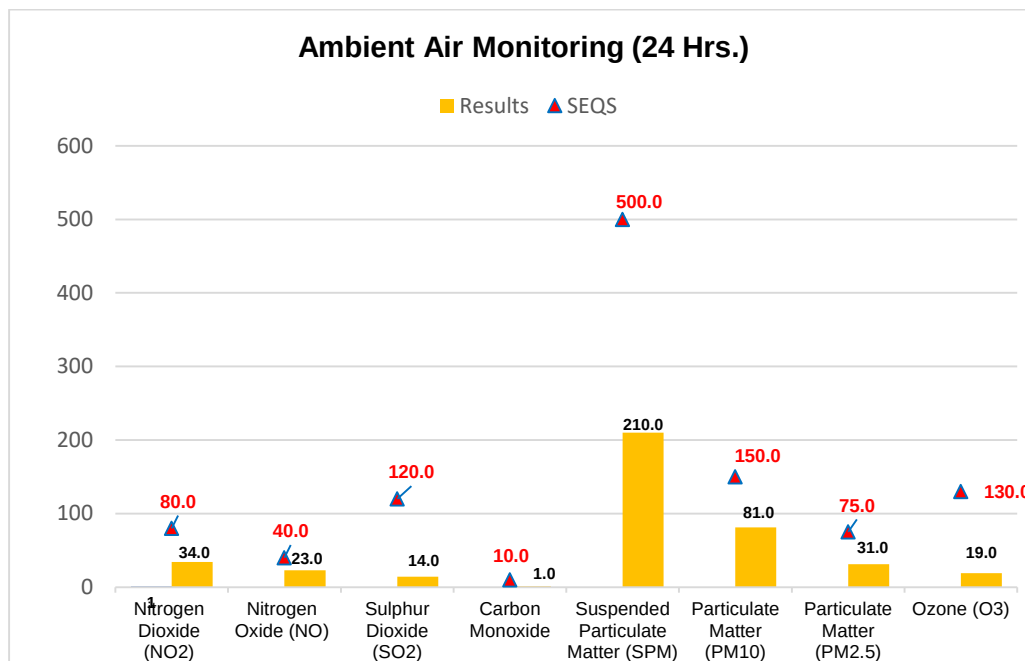


Figure - 6.9: Ambient Air Quality Monitoring Results

6.4.2 Noise Level Monitoring

Ambient noise levels were also continuously recorded at the project site for 24 hours. The sound pressure level (dB) was frequency weighted on A-curve (dB (A)) and time-weighted (dB (A) Leq) on an hourly basis. The hourly noise variation throughout the day reveals that noise levels are minimal and within the compliance limit of SEQs (i.e., 65 dB) at the project site. The noise level at night time at the project site was monitored to be 44.2 dB whereas, during the day time it was 59.3 dB, which is within the prescribed limit of the SEQs. Details are present in Figure – 6.9. Laboratory results of noise level are attached as Annexure – X.

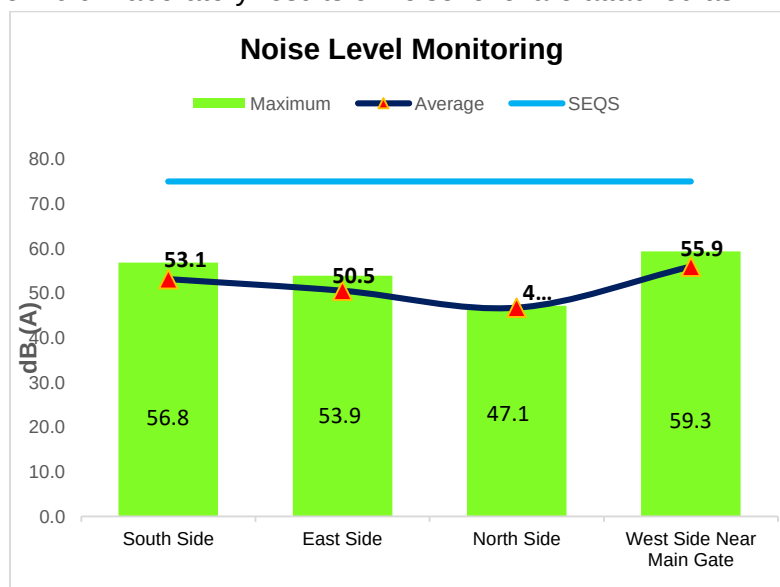


Figure - 6.10: Noise Level Monitoring at Project Area

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Baseline Environmental Monitoring Photolog



Surface Water Sampling



Ambient Air Monitoring from Bhittai Residency



Drinking water Sample from Bhittai Residency



Ambient Noise Monitoring from Bhittai Residency



6.5 Biological Resources

This report presents the findings of ecological surveys for the proposed area. The following broad categories have been identified for this report focusing on the proposed project area.

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6.5.1 Fauna of the Proposed Project Area

As the population has increased in the project area, wildlife abundance and diversity have decreased to a minimum. Among small mammal species still found are Red foxes and rats are reported to have resided in the surrounding project area. Snakes and lizards also inhabit the project site. The black rat (*Rattus rattus*), also known as the ship rat, roof rat, or house rat, is a common long-tailed rodent. Among the birds, Eagle (*Aquila rapax*), Hawk (*Accipiter badius*), Kite (*Milvus migrans*), Parrot (*Psittacula krameri*), Partridge, Common crow (*Corvus splendens*) and several varieties of waterfowls are reported. Various species of migratory birds visit the region during the winter from Russia and Siberia. They live on wetlands on the right bank of the Indus River, near Moen-Jo-Daro.



Aquatic habitat



Small Laughing Dove



Indian rose ring Parakeet



House Sparrow



Jungle Babbler



Common Myna

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Treepie



Hoopeo



Physical marks of Sand lizard



Lissemys punctata

Figure - 6.11: Fauna Observed at Study Area

6.5.2 Flora of Project Area

The proposed project is located in Larkana, which is part of the lower Indus valley. As the climate of the track is arid and subtropical, the original flora of the area consists of tropical thorn forest type vegetation, in which thorny usually hard wooded species predominate with *Acacia* species being particularly characteristic. However, the natural vegetation has long ago been replaced completely by crops. At present, there is generally a mixture of species found on the track. The area has been used for agricultural purposes for almost a century; the natural flora has been completely replaced by cultivated species. The dominant floral species include *Acacia modesta*, *Acacia nilotica*, *Dalbergia sissoo*, *Ziziphus nummularia* and plantations of *Eucalyptus globulus* and *Populus*. The *Azadirachta indica* (Neem), *Zizyphus vulgaris* (Bir), *Tamarix orientalis* (Jujuba lai) and *Capparis aphylla* (Kirir) are among the more common trees. Mango, Date palms and the more recently introduced Banana, Guava, Orange and Chiku are the typical fruit-bearing trees.

6.5.3 Endemic and Endangered Species

As far as the proposed project area is concerned, none of the endemic or endangered species of both flora and fauna was recorded from the proposed project area site.

6.6 Human Resources / Socio-Economic Set-up of the District

This section provides an overview of the socio-economic conditions and cultural mores in the project area of influence both primary and secondary impact zones. During the desk/ office study, available reports/ documents were comprehensively studied. The previous data has now been updated through supplementary field visits Through the field survey/visits,

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interviews with the residents, shopkeepers, notable of the community/tribal leaders, etc. were held and observations were taken after giving due consideration to the desk/ office study results. Investigations were conducted by using qualitative and quantitative research methods comprising a collection of primary and secondary data, public consultation and discussions with experts from line agencies and non-governmental organizations. The information collected from all the sources has been synthesized in this chapter and described in the following.

6.6.1 Target Population

The survey team ensured the collection of field data from the population in the vicinity of the proposed project area the study area will be up to 2 km from the proposed project site. The field team of the consultant collected the information by recording interviews with the dwellers in the study area.

6.6.2 District Larkana

Larkana City covers a total area of approximately 25 square kilometres. It is located on latitude 27° 33' 36" North and longitude 68° 13' 35" East, with an average elevation of 147 meters from the mean sea level. It lies on the south bank of Ghar Canal at a distance of 64-kilometer south-west of Shikarpur, 85 kilometers west of Sukkur and 24 kilometers north of Moen-Jo-Daro.

As per the 1998 census, the total geographical area of Larkana District was 7,423 sq. k.m. The district consisted of seven talukas namely; Larkana Ratodero, ShahdadKot, Warah, Qambar, Miro Khan and Dokri. There were one Municipal Corporation, 4 Municipal Committees, and 6 Town committees.

In 2005, the Government of Sindh bifurcated the district, forming a new district called Qamber-Shahdadkot. Therefore, the present Larkana District administratively consists of four talukas namely;

- i. Dokri (reconstituted)
- ii. Bakrani (newly created)
- iii. Larkana
- iv. Ratodero

6.6.3 Administrative Setup

District Larkana is situated in the upper part of the Sindh province. Larkana has the privilege of being the seat of one of the oldest civilizations in the world, the Indus Valley Civilization. Moen Jo Daro, which means "Mount of Dead" was one of the largest settlements of the Indus Valley civilization and is designated as a UNESCO World Heritage Site, is situated 32 km away from the city of Larkana on the west bank of the Indus River. The city of Moen Jo Daro was built in 2600 BC during the peak of the Indus civilization. Larkana enjoys significant importance in the political history of Pakistan as two prime ministers and a chief minister belonged to this district. District Larkana has its district headquarters in Larkana city. This district has four talukas, named: Larkana, Dokri, Rato Dero and Bakrani. It has 44 union councils and 184 mouzas (revenue villages). Out of these mouzas, 153 are rural, 14 are urban, 3 are partly urban and 14 are un-populated mouzas

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6.6.4 Demography

According to the Provisional Census Results of 2017, Larkana District has a population of 1,524,391 (778,249 males, 746,093 females and 49 transgender) with an average annual growth rate of 2.23 % from 1998 to 2017. District Larkana, like the majority of the other districts in Sindh, is rural by its characteristics as 71 percent of the population resides in the rural area as compared to the 29 percent that resides in the urban areas.

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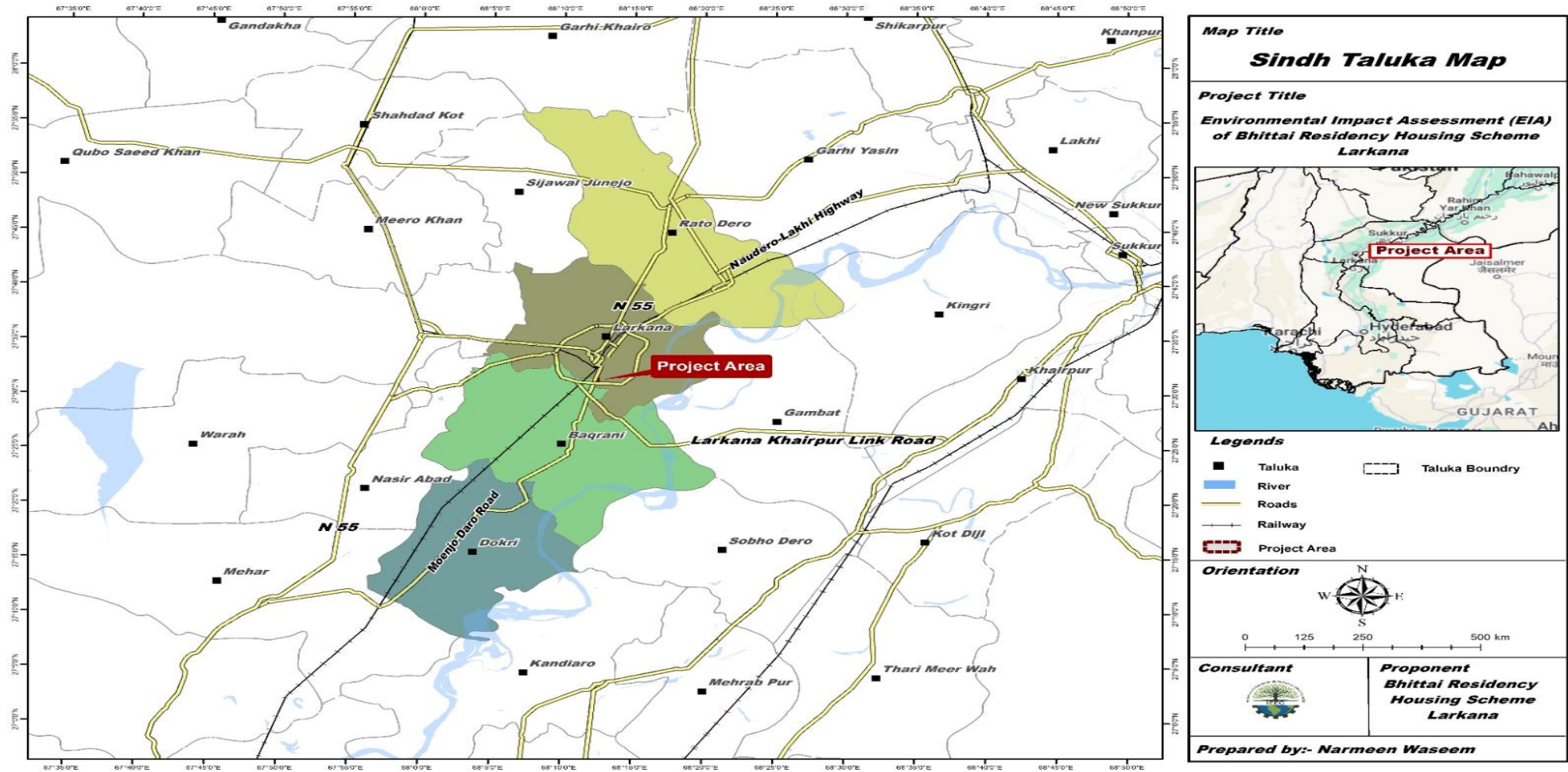


Figure - 6.12: Larkana District at Glance

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The Rural population of Larkana District is 59 % and urban population is 41 % of the total population. According to the national-level census conducted by the Government of Pakistan in 2017, the total population of Sindh is 47,893,244 and the total population of Larkana District is 1,524,391¹⁶, approximately 3.18 % of the population of Sindh Province.

Table - 6.5: Population Growth rate in Larkana District

Administrative Units	Population in 2017	Population in 1998	1998-2017 annual growth rate	Source
Larkana District	1,524,391	1,001,608	223	<i>Pakistan Bureau of Statistics (2017)</i>
Rural	822,754	596,129	1.71	
Urban	701,637	405,479	2.92	

6.6.5 Economy

The economy of Larkana is largely shaped by extensively cultivated areas in Larkana District producing rice, wheat and mustard among crops and Guava among fruits. There is a very small industrial area mainly accommodating agro-based processing industries such as rice mills, flour mills and ice factories with some service industries to support the main industries. Rice is a major agricultural product of Larkana. Rice contributes 10-14% to the total production of food crops in Pakistan. The share of Sindh province in total rice production of Pakistan is slightly over 30%. Hence, the share of rice production in Larkana district in the total production of rice in Pakistan is about 11%. Larkana district identifies as a regional rice production center in Sindh. Rice production is the major source of income and plays a major role in the development of the district. It is also a major source of foreign exchange earnings. Tomato and guava are the second largest agricultural products in Larkana district. Cold storage and warehouses are required to reduce wastage and boost the consumption of seasonal products like tomatoes and guava.

6.6.6 Agriculture

The principal crops during rabi are wheat, matter, gram and oil seeds and in Kharif paddy and jawar. In addition to these crops, there are subsidiary crops known as zaid rabi, zaid kharif and dobari. Guava fruit is the identity of Larkana; Ratodero and Larkana are famous for the abundance of guava orchards. Fertile land surrounds Larkana covered with Rice crops, fruits and some vegetables, for example, guava, and tomato. However, the unique crop of Rice is sown and harvested dominantly in the area of Larkana. A major chunk of this crop is then exported to other countries as well. Apart from rice, lotus root (also known as "Beah in Sindhi") is very famous and a popular delicacy used as a vegetable. Sugarcane is also cultivated in the area and processed in sugar mills at Nau Dero.

The importance of agricultural potential in Larkana district could be realized from the historical data on crops. Rice, oil seeds and barley are major crops. Rice, alone, forms nearly one-third of the total rice production of Sindh province.

There are two main crop seasons; "Kharif" and "Rabi" in Larkana District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November-December and ends in April-May. Some of the crops cultivated in Larkana district would have

¹⁶ Source: [PESA-DP-Larkana-Sindh.pdf \(reliefweb.int\)](#)

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more significance commercially; these are Rice, Oilseeds, Barley, and Gram. ‘Sugdasi’ variety of rice has a special fragrance (aroma) and taste and therefore it enjoys a premium over the market price of other rice varieties grown in Larkana rice growing tract.

Table - 6.6: Major Crops in Larkana

Sr. No.	Crops	Area (Hectares)
01	Rice	106,000
02	Wheat	51,923
03	Guava	4,500
04	Tomato	6,250
05	Vegetables	2,350
06	Other Crops	1,500

Source: Agriculture, Supply & Prices Department, Government of Sindh 2018

6.6.7 Livestock

Livestock is one of the major sub-sector of Agriculture and the backbone of our economy. It contributes roughly one-third of the total share of Agriculture GDP. Its main by-products including hides and skins have substantial potential as semi-finished products. Substantial growth in livestock products via milk, meat, beef, mutton, poultry and eggs has been noticed for many years. It has been estimated that over three-fourths of farm power comes from animals, and they are used for most of the farm operations. Bullocks provide the draft power on the farm and in transport around the villages¹⁷.

6.6.8 Industry

Larkana is surrounded by vast areas of fertile farmland producing rice, wheat, rape/mustard seeds, tomatoes and guava. Industrial activity is very limited and relates to mainly rice processing, flour milling, and engineering relating to the operation and maintenance of agricultural machinery. Ten kilometers beyond the city, sugar cane is also produced supporting the lone sugar mill in the area.

The following are the industries, considering locally available raw materials and human resources:

- Rice husking and milling
- Fruits and vegetable processing units
- Dairy products
- Grain mill products and animal feeds
- Flour mill
- Bakery products
- Ice plants
- Agricultural machinery manufacturing unit
- Light engineering
- Auto parts manufacturing
- Small electrical tools and allied products unit
- Packaging Industry.

¹⁷ ADDENDUM-2018, “URBAN DEVELOPMENT STRATEGY FOR LARKANA” (2013-2018) pg. nos. 11-13

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6.6.9 Road Network Infrastructure

Larkana is a tertiary-level social service center for a large hinterland in north Sindh. Thus, it has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road network. Indus Highway connects Larkana with the national network; Ratodero Road is planned to provide road connectivity with Karakorum Highway and Makran Coastal Highway ultimately linking China and Central Asian Republics with Gwadar Port. Besides a network of regional roads connects it to secondary cities and market towns. Private transporters run passenger buses and vans on all the regional routes.

Larkana Mohenjo Daro Highway which accedes around 155 Km long and intersects Khairpur Road. It is a wide road and is mostly used for all traffic to and from Larkana for commercial and passenger vehicles. Dokri Larkana Road is nearby which is crossing the main city, which connects further to Mehrabpur Road. Another major link road is Mohan-jo-Daro Road

Dokri Chowdaghi Road is located near the city and a distance of a few kilometers Dokri Badah Road is located which is a distance of around four kilometers from the project area. Besides this other major roads are:

- Bakhrani Road
- Bakhrana Tower Road
- Airport Road
- Tank Road
- Station Road
- Ghanti Phatak Road
- Qaim Ali Shah Road
- Monument Tower Road
- VIP Road
- Murtaza House Road
- SP Road
- Shaikh Zaid Road (Kamber)
- Rato Dero Road
- Shaikh Zaid Road (Larkana)
- Canal Bridge/Nishtar Road

6.6.10 Education

District Larkana has a high literacy rate and is the birthplace of renowned doctors, engineers, writers, and politicians who serve their services sincerely for the betterment of the area and the larger area of upper Sindh. There are various government schools separately for girls and boys at primary, higher and secondary levels. Moreover, well-established institutions of higher education such as the University of Sindh Campus, Quaid-Awam- Engineering Collage, Chandka Medical College, SZABIST campus are also located in Larkana. In the past decade, a number of private schools that provide quality education have also emerged. There is a famous library namely Shahnawaz Bhutto Public Library, which was commenced in 1984 and is greatly valued as it provides educational facilities to the public. Moreover, Larkana has big Madrassas where children acquire religious education in huge numbers. As per Sindh Education Profile, there are 1158 schools in Larkana district. There are 1021 Primary Schools, 55 middle Schools, 09 elementary schools, 59 Secondary schools and 14 Higher Secondary

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schools. The following table gives details of schools, enrollment and number of teachers posted in Larkana district;

Table - 6.7: Provision of Education in Larkana

Sr. No.	Type of Schools	No. of Schools	Enrollment	No. of Teachers
01	Primary Schools	1,021	158,612	4,925
02	Middle Schools	55	8,735	322
03	Elementary Schools	09	3,527	105
04	Secondary Schools	59	48,868	1,408
05	Higher Secondary Schools	114	25,748	707
06	Total	1,158	245,490	7,467
<i>Source: Sindh Education Profile, Sindh Education & Literacy Department, Govt. of Sindh</i>				

6.6.11 Health Facilities

Larkana is known for having good health facilities which especially cater to women and children in an emergency. The following government and private health facilities are available in the district.

- Civil Hospital
- Teaching Hospital
- Shaikh Zaid Hospital for Women
- Shaikh Zaid Hospital for Children
- LINAR Hospital / Nuclear Medical Center
- Government Hospital (Mohallah Murad Wahan)
- Railway Hospital
- Red Crescent Hospital
- Police Dispensary

In the target healthcare facilities, the representatives reported mostly Fever, Cough, Flu, and Diarrhea, but since 2019, HIV-positive cases have seen a remarkable increase in the district Larkana.

Moreover, Larkana District Administration is quite active in preventive health measures and from time to time has run various campaigns such as:

- Polio Eradication
- National Program for FP & PHC Larkana
- Malaria Control Program
- Epidemiological Data Collection
- TB Control Program DOTS
- Leishmaniosis
- Leprosy Control Program
- Aids Awareness Program.

The following table indicates the present situation of healthcare facilities in Larkana District;

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Table - 6.8: Healthcare Facilities in Larkana District

Medical Facilities	Govt. Semi-Govt. and Local Bodies Health Facilities	Available Doctors	Beds
Total	62	393	4,925
<i>Source: Health Profile of Sindh (District wise) 2016, Bureau of Statistics, P&DD Govt. of Sindh,</i>			

6.6.12 Irrigation Network

The source of irrigation in Larkana district is mainly reliant on a canal irrigation system with 1474 water courses, nearly 400 water courses with the lining of 30% area under various projects, in non-perennial areas the crops during Rabi season are irrigated through tube wells. The detail of major canals of the Larkana District is as under:

Table - 6.9: Major Canals of Larkana District

Sr. No.	Canals
01	Rice Canal (Non-perennial)
02	Warah Branch Canal
03	Dadu Canal
04	N.W Canal
<i>Source: Agriculture, Supply & Prices Department, Government of Sindh 2018</i>	

Localities like Agani, Akil, Sanhani and Meher Wada are benefited from the river Indus passing through the eastern boundaries of the district¹⁸. The position of the irrigation network for other talukas is given below:

Table - 6.10: Irrigation Network of Larkana District

Sr. No.	Taluka	Area (Hectares)
01	Dokri	Rice Canal, Dadu Canal
02	Miro Khan	Warah Branch, Shahdadkot Branch
03	Kamber	Nalas
04	Ratodero	Ratodero Branch, Sijawal Branch, Warah Branch, Rice Canal, Dadu Canal
05	Shahdadkot	Shahdadkot Branch, Nalas/Flood Protective Bunds
06	Warah	Warah Branch

The network of barrage canals irrigates the entire area of the district between the two protective bunds. These are Rice Canal, Dadu Canal, Kirthar Canal and Warah Branch. Out of these only Rice canal is non-perennial, while the others are perennial canals. The Rice Canal runs through the district for 76 kilometers, the Dadu Canal for 80 kilometers, the Warah Canal for 84 kilometers and the Kirthar Canal for 60 kilometers. The Katcha Area of Larkana, within the protective bunds, is brought under cultivation during Rabi season, which is termed as “sailabi” cultivation. Similarly, on the other side of the protective bund towards the Kohistan tract, a large area is brought under cultivation when there are sufficient rains. Some areas are also being cultivated through recently installed tube wells.

¹⁸ Addendum-2018, “Urban Development Strategy For Larkana” (2013-2018) Pg. No. 8

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6.6.13 Transportation Network

6.6.13.1 National and Regional Linkages

The transportation system of Larkana comprises road, rail and air of which road and air are used exclusively for inter-city movement.

6.6.13.2 Air Service

Larkana has direct flights to and from Karachi as well as via Sukkur. The Moen-Jo-Daro Airport is located near the historical site of Moen-Jo-Daro which is a major tourist attraction. The airport is 28 km to the south of the city with only 20 minutes drive through the newly constructed dual carriageway road.

6.6.13.3 Railway

The City is also linked with the national network of Pakistan Railways through Quetta- Karachi railway line via Kotri. It used to be a Junction for change over to the Qamber-Jacobabad branch line which is now abandoned. In the glorious days of Pakistan Railways, the railway station was the main gateway to Larkana and occupied a very central location in the heart of the city. With the decline of railways, it has lost its previous significance and only two passenger trains; Bolan Mail and Khushhal Khan Khatak Express; stop here.



6.6.13.4 Fire Fighting System

The Fire Brigade Station is situated in the TMA office Larkana. This station is consisting of two functional and four out-of-order fire vehicles. While there is a current need for five sub-stations to accommodate ten fire vehicles. The TMA has a very low budget for the maintenance of vehicles and at times has no diesel in the stock to run the vehicles.

6.6.14 Utility Services

6.6.14.1 Water Supply

After the defunct of North Sindh Urban Services Corporation (NSUSC), Larkana Municipal Corporation (MC) is mandated to provide the services of water supply, sewerage, drainage and solid waste management under the SLGA 2013. However, Larkana MC does not provide water services in Larkana city as there is no piped water supply system in the city. Inhabitants have their shallow wells. The underground water of the city has turned into high TDS water; hence a canal water scheme from Dadu Canal is under consideration. All households and other establishments use groundwater accessed through tube-wells or shallow wells with 0.5 horsepower pumps or even hand pumps¹⁹.

The water table is quite high and ranges between 4 to 10 feet with seasonal fluctuations. During summers (May to September), when Rice Dadu Canal have water, the water table

¹⁹ ADDENDUM-2018, "URBAN DEVELOPMENT STRATEGY FOR LARKANA" (2013-2018) pg. no. 35

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risers to 4 feet, while in winters, when the canals are dry, the water table goes down to 10 feet. Tube wells are however sunk up to 200 feet in depth.

6.6.14.2 Sewerage and Drainage

Sewerage and Drainage are Larkana's biggest problem and from administration to common citizens every one considers, wastewater and stormwater drainage a matter of the highest priority. The lack of drainage not only causes extreme inconvenience to residents after every rain, but the standing water causes damage to the infrastructure, which is already in poor condition.

6.6.14.3 Solid Waste Management

District Larkana lacks in proper general/domestic and hospital waste management system at urban and rural levels. Hospital wastes were not being carried properly by sanitary workers of Municipal Committees due to a lack of knowledge to dispose of them properly. The sanitary workers don't segregate the general and hospital wastes even hospital workers could not segregate the hazardous and nonhazardous wastes. Mainly their final disposal at the landfill sites. Open burning of waste is a common practice in the district.

The government of Sindh established Sindh Solid Waste Management Board (SSWMB) through an act in 2014. The Board has the right over solid waste-related issues, assets, funds and liabilities of the Councils and shall possess sole rights on all kinds of solid waste within the limits of all Councils. SSWMB Act also indicates that during the transition period, the existing Operations of Solid Waste Management will continue by the Councils. SSWMB has not yet taken over the functions of solid waste management at Larkana. Thus, currently, Larkana Municipal Corporation is looking after solid waste management in Larkana city²⁰.

6.6.14.4 Energy (Electricity & Gas)

The distribution company SEPCO (Sukkur Electric Power Company) to the people of the district. SEPCO consists of three operation circles namely Sukkur, Larkana and Dadu. Load shedding is a major issue for the area people because there are 8 to 10 long hours of load shedding which affect the trade and business of the Larkana and surrounding area. Gas is available in the project area. It was observed that the people are not satisfied also with the supply of gas in the area.

6.6.15 Rivers and Streams

The mighty River Indus flows through the province of Sindh, for a total length of approximately 1,400 km out of which 109 km flows along Larkana district boundary.

A network of canals irrigates the entire area of the district within the protective bunds. Two major irrigation canals pass through the district, namely Rice Canal and Dadu Canal. These canals originate from Sukkur Barrage at the right bank. Dadu Canal is perennial and is usually supplied water throughout the year except during January for two weeks for maintenance works. The Rice canal, however, is a seasonal canal, which is usually closed for about 6 months from October to March²¹. Dadu canal has been designed for a normal discharge of 89.2 cusecs at the head. The main crops are cotton, sugarcane, wheat, rice, fruits and

²⁰ Addendum-2018, "Urban Development Strategy For Larkana" (2013-2018) Pg. No. 37

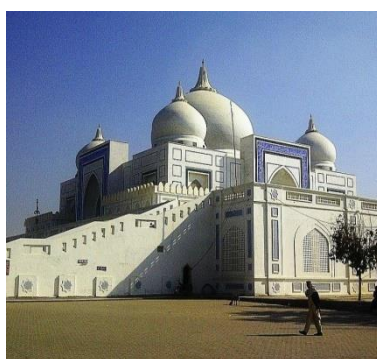
²¹ <https://irrigation.sindh.gov.pk/sukkur-barrage>

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vegetables. The water availability of the Dadu Canal is highly variable due to the stochastic nature of the flow²². The Rice canal commands an area of nearly 5,200 acres and has been allowed to discharge 10,659 cusecs of water²³.

6.6.16 Historical and Cultural Sites

Larkana is famous for its many famous historical civilizations places, the most ancient ruins are Mohan-jo-Daro, which lies on the flat alluvial plain of the Indus, about 20 km away from the city. The site contains the remnants of one of two main centers of the ancient Indus civilization (c. 2500–1700 BCE), the other one being Harappa, some 400 miles (640 km) to the northwest in Pakistan's Punjab province. Some other famous sites in Larkana are Bhutto Family Mausoleum, Eid Gah Mosque, and Jamia Mosque.



6.7 Description of Socio-economic Baseline

6.7.1 Description of Micro Environment:

The proposed project “Bhittai Residency Housing Scheme” is located at surveys No. 35, 36, 37(P), 38(P), 473, 475, 777, 799, 801, 802, & 804, Deh Wah Nabi Bux, Tapo Baqa Pur, Airport Road, Larkana. The project site is directly accessible from Airport road (Bakhrani Road), which extends from Airport to Larkana city. The geographic coordinates of the project site are 27°31'39.77"N and 68°12'33.45"E. The below Photographs show the project Location.

	
Project site	Backside of Project site

²² “On Farm Water Management Field Manuals,” Vol. I, II, and III, Ministry of Food, Agriculture and Cooperative, Government of Pakistan, Mid-Year Review, July-December 2008, Planning & Development Department, Government of Sindh, pp. 1-6.

²³ Retrieved from <https://www.thenews.com.pk/print/378234-sindh-asks-centre-to-include-two-projects-in-cpec>.

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Project Entrance	Airport Road
	
Quaid E Awam University	Larkana Banquet
	
Al-Rehman Medical & Maternity Center	

6.7.2 Ethnicity

A newly developed area comprising a mixture of residential and commercial setups. A mixture of Hindu and Muslim religions was found, there is tolerance between these settlements who live peacefully and respect each other. Several tribes live around Abro, Jatoi, Brohi, Solangi, Chandio and Bhutto. Most people speak the Sindh language; however, some Baloch and Urdu-speaking populations are also found.

6.7.3 Education Facilities

Educational facilities in the vicinity of the Project area are excellent. There is access to all levels of education because of the efficient and effective management system to facilitate and promote higher education. The literacy rate among females is comparable with males. Training in technical skills is equally adequate. Quaid-e-Awam University is adjacent to the project area whereas Chandka Medical College is also located at a distance of a few kilometers.

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6.7.4 Health Facilities

The project site has good health facilities and health conditions are better. Common health issues are prevalent among the residents of the project area including hypertension, heart attack, diabetes, liver problems, malaria, and general fever due to the general environment and poor conditions of people. General health facilities are available but not accessible for all. There are private clinics and hospitals in the center and its nearby areas, while the main hospitals are located in the center of the city. However, few clinics are located at a distance from the project site.

6.7.5 Local Road Network in and Around Project

The urban structure of Larkana does not conform to any standard street pattern, due to the organic growth in the past. The overall city depicts a semi-radial structure, whereas newly developed parts of the city present a gridiron pattern. The road network of Larkana as such does not have any clear-cut hierarchy. A general hierarchal pattern of the city roads and streets close to the proposed project is shown in Figure 6.12.

6.7.6 Recreational Facilities

Now the city is served with sufficient recreational spaces like; parks, clubs, playgrounds, stadiums and theatres. These facilities lack a zoo, amusement park and Water Park, etc. However, the existing facilities are not well maintained and there is no financial mechanism to make them self-sustaining like charging visit fees.

6.7.6.1 Public Parks

Larkana had been famous for its gardens and had been known as the Eden of Sindh. Although it has lost some of its green glory, Larkana still has several gardens and parks to provide passive recreation to its residents.

6.7.6.2 Clubs

The city has several clubs providing community recreation, passive as well as active, to its members. • Officers Club • Citizens Club • Ladies Club • Nizamani Labour Hall • Pakistan Medical Association House (under construction)

6.7.7 Worship Sites

Despite having 98.5% Muslim population, Larkana caters to religious buildings for other religions also. There are 45 Mosques, 20 Imam Bargahs, 02 Hindu Temples and 02 Churches in Larkana. The names of some famous religious places are as follows:

- Eid Gah Jamia Masjid
- Lahori Jamia Masjid
- Qasmia Masjid
- Allah Wari Masjid
- Jafri Imam Bargah
- Shia Madarsa
- St Joseph Catholic Church
- Protestant Church

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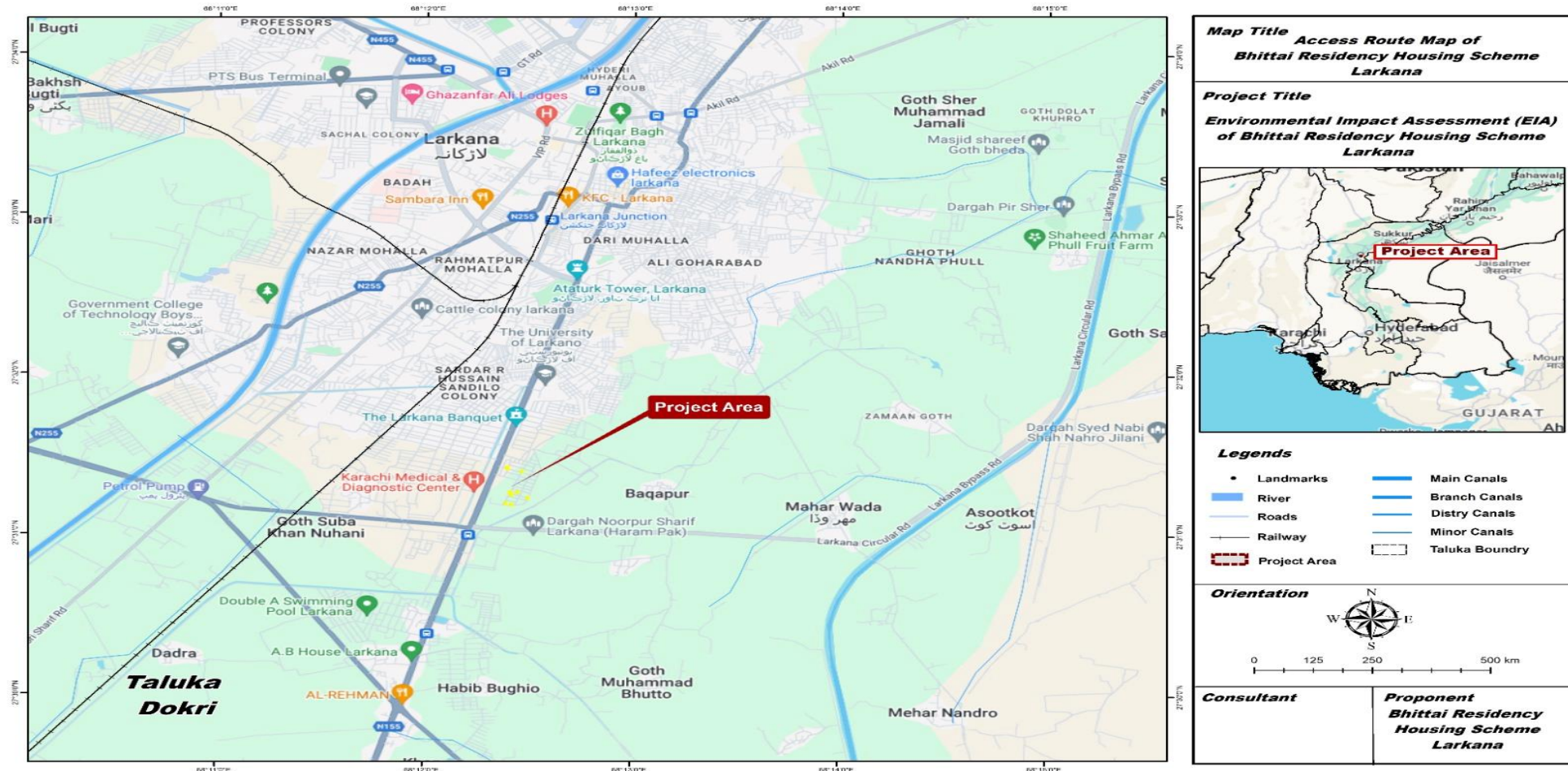


Figure - 6.13: Road Network Map of the Project Area

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Syeds, Pirs and Murshads are treated with special reverence and the tombs of some of the famous Pirs attract a large number of devotees throughout the year, but in very large numbers during annual gatherings (Urs).

6.7.8 Languages

95% population, followed by Urdu, speaks the native Sindhi language. However, a vast majority of the population understands Urdu. Sindhi Language is well developed and has a rich tradition in literature and poetry. All the revenue record in Sindh province is in Sindhi. During the Kalhora rule especially during the rule of Mian Sarfraz Ahmed Khan Kalhoro, Sindhi Language rose to its peak and remained the official language and medium of instruction for a long time.

6.7.9 Gender Analysis

As in most rural parts of Larkana, the socio-economic well-being of women in the project area is middle and lower middle class. This section describes the roles and responsibilities of women in the project area and area of influence. Their access to and control over resources, access to health, education and means of livelihood are addressed.

Information regarding the status of women in the project area was obtained through interaction with female members of the community by gender specialists, as some get purdah (seclusion from outsiders and they do not frequently interact with men outside their immediate family circle) was observed in the project area.

6.7.9.1 Societal Role and Authority

Women have no authority, males direct them and male has the dominating role in domestic decisions. A woman is involving in marriages related decisions but the male head of the house finally does it. Traditionally, man is the authority and they give all codes of conduct, even in the decision of health and education all done by males. The combined family system prevails, as the majority of the family adopts traditional background, so mostly they support the combined family system.

6.7.9.2 Decision Making

Decision-making is in the hands of male members of the family. They control even the household budget. Male members for whom they visit the nearest town or city also do household purchases. However, combine decisions are sought in marriage. In urban slums, (project areas) women are expected to have an opinion and share their views on the main decisions.

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7. PROJECT IMPACTS AND MITIGATION

7.1 General

This chapter describes the potential impacts of the Project on the environmental and social setting of the project area. The chapter also deals with the proposed actions for mitigation requirements of the Project.

Environmental Impact Assessment has been carried out in line with guidelines issued by the Sindh – EPA. The assessment has generally been based on the factual site condition in light of experience gained from similar projects and discussions held with the local communities and knowledgeable people.

7.2 Project Area and Study Area (Area of Influence)

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

7.2.1 Project Area

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

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

7.2.2 Study Area

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

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

7.3 Impact Characteristics²⁴ (Assessment of Significance)

The assessment of effects and identification of residual significance takes account of any incorporated mitigation measures adopted due to any impact of Project activities and is largely dependent on the extent and duration of change, the number of people or size of the resource

²⁴Source: Handbook of Environmental Impact Assessment, Volume II, Judith Petts, 1999. Blackwell Science Ltd.

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affected, and their sensitivity to the change. Impacts can be both adverse and beneficial and the methodology defined below has been applied to define both beneficial and adverse impacts of the project.

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

7.3.1 Magnitude

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

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

The magnitude of impacts will generally be identified according to the categories outlined in Table – 7.1.

Table - 7.1: Impact Characteristics Criteria

Impact Characteristics	Category
Nature of the Impact	Direct: The environmental parameter is directly changed by the project. Indirect: The environmental parameter changes as a result of the change in another parameter.
Duration of the impact	Short term: Lasting only till the duration of the project such as noise from the construction activities. Medium-term: Lasting for a period of a few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil. Long term: Lasting for a period much greater than medium-term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.
Geographical Location of the impact	Local: Within the area of the project i.e. operation site and access road. Regional: Within the boundaries of the project area. National: Within the boundaries of the country.
Timing	Construction Operation
Likelihood of the impact	Qualitatively measured on a scale of: Almost certain: Impact is expected to occur under most circumstances. Likely: Impact will probably occur under most circumstances. Possibly: Impact may occur at some time. Unlikely: Impact could occur at some time. Rare: Impact may occur but only under exceptional circumstances.
Consequence severity of impact	Rated as:

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

7.3.2 Sensitivity

The sensitivity of a receptor will be determined based on the review of the population (including proximity/numbers/vulnerability) and the presence of strategic/sensitive features on the site or in the surrounding area. Criteria for determining the sensitivity of receptors are outlined in Table 7-1. Each assessment will define sensitivity about the topic.

7.4 Project Impact

7.4.1 Project Impact Matrix

Table - 7.2: exhibits the impacts of the Project in the form of a matrix. This illustrates the impacts of various components of the Project during construction as well as operation phases on various physical, biological and social environmental parameters qualitatively. The evaluation ranking of effects on various environmental parameters has been indicated with symbols denoted as “O” for insignificant or none, “L” for low, “M” for medium and “H” for a high while the type of effect is designated as “A” for adverse and “B” for beneficial. Likewise “NA” denotes not applicable and “ND” for not determined.

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Description	PHYSICAL			BIOLOGICAL		SOCIAL AND SOCIO-ECONOMIC				
	Soils (Erosion/Stability)	Air Quality	Surface and Groundwater	Flora	Fauna	Noise and Vibration	Land Acquisition and Compensation Issues	Safety Hazard, Public Health and Nuisance	Employment	Historic and Archeological Sites
Project Siting										
Project Site, Land Use and Design	LA	LA	LA	LA	O	LA	O	MA	HB	O
Visual Impacts	O	O	O	MB	O	O	O	LA	HB	O
Construction Phase										
Land Acquisition	O	O	O	O	O	O	O	O	O	O
Contractor Mobilization	O	LA	O	O	O	MA	O	LA	LB	O
Construction Camp Establishment	LA	LA	LA	LA	LA	LA	O	LA	MB	O
Construction Camp Operation	O	LA	LA	LA	LA	LA	O	LA	MB	O
Site Preparation	MA	LA	LA	MA	LA	LA	O	LA	MB	O
Construction Works	LA	LA	LA	MA	LA	MA	O	LA	MB	O
Laying of Services	LA	LA	LA	LA	O	LA	O	LA	MB	O
Construction Materials Supply	LA	LA	O	O	LA	LA	O	LA	MB	O
Construction Crew Transportation	O	LA	O	O	LA	LA	O	LA	MB	O
Solid Waste Disposal	LA	LA	LA	O	LA	O	O	O	O	O
Waste Effluent Disposal	O	LA	MA	LA	MA	O	O	LA	O	O
Demobilization of Contractor	O	LA	O	O	O	LA	O	LA	O	O
Operation Phase										
House	O	O	O	LB	O	O	O	O	MB	O
Operation of Park	LB	O	LB	MB	O	O	O	O	MB	O
Hospital	O	O	O	LB	O	LA	O	O	MB	O
Waste Effluent Disposal	O	O	LB	O	O	O	O	O	MB	O
NA : Not Applicable ND : Not Determinable HA : High Adverse MA : Medium Adverse LA : Low Adverse O : None or Insignificant LB : Low Beneficial MB : Medium Beneficial HB : High Beneficial										

Table - 7.2: Project Impact Matrix

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In general, the impact assessment has been made specific to the areas likely to be affected directly by the Project components. As settlements exist near the major construction areas, the impacts in respect of health and safety hazards will be significant for the local communities. Similarly, from the public receptor point of view, the impacts of noise and air pollution hazards will be significant. The risks in respect of these parameters will also be there for the crew working at the site. In consideration of these factors, and assuming that the contractors will take every precaution for protecting the workforce from the construction hazards through providing safety equipment and imparting training to the workforce, the level of impact from these parameters has been kept at “Medium” adverse to Low Adverse.

The preceding paragraphs have provided a generalized overview of the Project Impact Matrix, while a detailed account of the effects of the Project on various environmental and social parameters, particularly with reference to potential effects of the Project is given in the subsequent sections.

7.4.2 Rapid Environment Assessment (REA) Checklists

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

Table - 7.3: Rapid Environmental Assessment (REA) Checklist

Instructions: • This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department • This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department. • This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) Participation, and (v) gender and development. • Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.			
SCREENING QUESTION	YES	NO	REMARKS
A. Project Planning			
Is the project area adjacent to or within any of the following environmentally sensitive area?			
❖ Protected area		✓	
❖ Wetland		✓	
❖ Mangrove		✓	
❖ Estuarine		✓	
❖ Buffer Zone of the protection area		✓	
❖ Special area for protecting biodiversity		✓	
B. Potential Environmental Impacts			
Will the project cause.			
❖ Loss of precious ecological values (e.g. rules of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of the hydrology of natural waterways, Regional flooding and drainage hazards.		✓	

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SCREENING QUESTION	YES	NO	REMARKS
❖ Loss of archaeological, historical or cultural monuments?		✓	
❖ Dislocation or involuntary resettlement of people?		✓	
❖ Disruption/destruction of tribal groups/indigenous peoples?		✓	
❖ Environmental degradation from increased pressure on land?	✓		Only during the construction phase
❖ Conflicts on water supply rights and related social conflicts?	✓		Confined only during the construction stage
❖ depletion of dissolved oxygen by large quantities of Decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds?		✓	
❖ Increased incidence of waterborne or water-related Diseases?	✓		During the construction phase particularly in the monsoon seasons
❖ Deterioration of water quality?		✓	
❖ Alteration of water quality due to evaporation, lowered temperatures during low flow periods, silt concentration in density currents, low dissolved oxygen, and high levels of iron and manganese?		✓	
❖ Salinization of floodplain lands?		✓	
❖ Decrease in floodplain agriculture?		✓	
❖ Environmental problems arising from uncontrolled human migration into the area, made possible by access roads and transmission lines?		✓	
❖ Impediments to movements of people and animals?	✓		During construction, diversion will be made.
❖ Potential social conflicts arising from land tenure and land use issues.		✓	
❖ Labor-related social problems especially if workers from different areas are hired?	✓		Problems will be there but will be mitigated.

A –Impacts and Mitigations during Design and Construction Stage

7.5 Pre-Construction Impacts

7.5.1 Project Sitting Impacts

The impacts associated with the project 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 operation phases, in the sense that the construction and operation impacts are associated with the activities such as land clearing, and waste disposal, whereas the sitting impacts relate to the mere presence of a facility at the given location. For the proposed project, the following two aspects of the project sitting were considered:

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

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7.5.2 Project Site, Land Use and Design

The project site of Bhittai Residency Housing Scheme Project land use and its design should be in line with the SBCA rules. The unmitigated impact associated with not following the approved layout plan or its design does not meet the minimum requirement of a housing society in Larkana is characterized as follows.

Nature	Spatial Scale	Duration	Significance	Reversibility	Pathway
Negative	Local	Short term	Low	Reversible	Cumulative

Mitigation Measures

Project Site: In order to reduce soil erosion, water sprinklers will be used. Excessive extraction of groundwater will be restricted in order to provide time for the aquifers to be recharged.

Land Use: The land use of the proposed Project is in line with other housing projects in Larkana.

Design: The proponent has designed the plot cutting on a sustainable basis and all utilities like water, natural gas, sanitary sewerage, drainage and electrification would be provided as per respective design standards being followed.

7.5.3 Visual Impact

The proposed Project is being developed either in an area where already new housing schemes are under construction or in the planning stage. There is a need to maintain much of its natural landscape and vegetation. This natural landscape has an aesthetic value, although not very significant importance, but indeed is a valuable asset of the area.

Nature	Spatial Scale	Duration	Significance	Reversibility	Pathway
Direct	Local	Short term	Medium	Irreversible	Cumulative

Mitigation Measures

For the project, the visual impact will be minimized at different levels, as described below.

- The design of the proposed project should be adopted in a manner that minimizes the changes in the topography, landscape and damage to the natural vegetation. The planning and Design section of TMA has allocated the provision of 4 parks and 14.40% of the total land for Bhittai Residency Housing Scheme, Larkana is allocated for the provision of parks and open spaces.
- A plantation plan has been proposed by the consultant and should be implemented in the proposed Project.

7.5.4 Cumulative Impacts

It is apprehended that as a result of the development of the Project, a cumulative negative impact on the site will occur, involving population influx to the project site.

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Mitigation Measures

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

7.6 Construction Phase Impacts

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

Physical Environment

- Soil degradation and contamination
- Air quality deterioration
- Surface and Ground water contamination
- Solid Waste

Biological Environment

- Loss of vegetation
- Damage to Wildlife

Social Environment

- Land acquisition
- Noise and vibration
- Safety hazards, Public health and nuisance issues
- Sites of Archaeological or Historical Significance

These impacts are characterized in Table 7.2 and can be readily pre-empted and mitigated. The mitigation measures recommended in this section will need to be incorporated into the construction of the project. These impacts and their respective mitigation measures are discussed below:

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7.6.1 Soil Degradation and Contamination

The soil-related issues include soil erosion, slope stability, and soil contamination. The land clearing, leveling and grading, excavation and filling, construction activities and maintenance of equipment/vehicles may cause these.

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

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	Irreversible	Certain

Mitigation Measures

The followings mitigation measures will minimize soil erosion and contamination:

- Land clearing, leveling and grading be minimized and carried out in a manner to minimize soil erosion.
- Excavated slopes will not be left untreated/unattended for long durations, especially near water bodies. Appropriate slope stabilization measures will be taken as per the design. 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 areas around Nullahs.
- Vehicles and equipment will not be repaired at the project site. An unavoidable, impervious sheathing will be used to avoid any soil contamination.
- For the domestic sewage from the contractor's camp, septic tanks with soaking pits will be constructed having adequate capacity. Waste oils will be collected in drums and sold to the recycling contractors.
- The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) should be sold to recycling contractors, or where appropriate reused/recycle it. The hazardous waste should be kept separate and handled according to the nature of the waste.
- While storing, hazardous waste should be marked. Domestic solid waste will be disposed of in a manner that does not cause soil contamination/water contamination (one of the options available is to dispose of the recyclable material, and the remaining waste at a suitable location).

7.6.2 Air Quality Deterioration

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

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pollution. These emissions can deteriorate the ambient air quality near the project site. Furthermore, construction activities such as excavation, land leveling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions. During the operational phase, traffic may increase and will cause more air pollution.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	reversible	Likely

Mitigation Measures

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

- 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.
- The Contractor shall effectively manage dust-generating activities such as topsoil removal during periods of high winds or during more stable conditions.
- Water spraying must be employed to suppress dust generation on roads, stockpiles and other exposed areas.
- Diesel-powered machinery and vehicles must also be switched off when not engaged in any work.

7.6.3 Surface Water and Groundwater Contamination

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

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

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	reversible	Likely

Mitigation Measures

- Protection of the groundwater reserves from any contamination.

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- Water required for construction should be obtained in such a manner that water availability to the local community remains unaffected.
- Prohibit the washing of vehicles and machinery at the project site.
- Concrete should be brought in concrete movers and used.
- Rainwater harvesting shall be practiced for the collection of stormwater from the roofs and pavements for possible horticultural use.
- The mitigation measures recommended for forestalling soil contamination would also prevent surface and groundwater contamination.

7.6.4 Loss of Vegetation

The project area has no natural vegetation. Hence, the site preparation and construction activities may not involve the removal of the natural vegetation from the areas where roads, culverts and other buildings will be constructed.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
N/A	N/A	N/A	N/A	N/A	N/A

Mitigation Measures

- Although no vegetation loss is anticipated Hence for the betterment of the environment the following mitigation measures will minimize any unforeseen negative impacts on the floral resources of the area:
- Endeavors will be made to compensate for the loss by enhancing the environment, through the plantation of trees and ornamental plants.
- Bhittai Residency Housing Project has the provision of one park. The vegetation and trees are in three concentrated pockets on the project site. One of the concentrated pockets of vegetation does fall partially in a proposed area of the park.
- A plantation cover of appropriate trees /bushes will be raised within the open available spaces and along roads. Ornamental trees, bushes and climbers have been included to improve the scenic and aesthetic value of the sectors. A mixture of shady trees with heavy foliage will be required to counter the air and noise pollution, possibly along the roads, where underground or overhead cables do not interfere with the plantation plan.
- The selection of species to be planted may not be strictly confined to the proposed plantation plan, as local factors such as the available quantity of irrigation water and edaphic limitations will also govern the choice of plants. It is further recommended that if possible a small nursery may be established comprising of fast-growing trees.
- An average space of 10 ft. x 6 ft. will be maintained. However, the plant-to-plant distance might vary depending upon the site conditions and/or the growth characteristics of the tree species.

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- 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 following SEQs 2016 promulgated under Sindh Environmental Protection Act 2014.
- The construction crew will be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood will not be allowed.
- Some grass species should also be introduced into the project area due to their soil binding capacity.

7.6.5 Damage to Wildlife

The project site is adjacent to housing societies / urban land which provides very limited habitat for wildlife. The loss of natural vegetation discussed above and other project activities will potentially have adverse impacts on the faunal resources and habitats of the area as well. Smoke, chemicals, dust particles, and noise generated by heavy machinery are scary factors for wildlife. Rodents, hedgehogs, etc. would lose their abode.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	reversible	Likely

Mitigation Measures

- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- The measures to restore natural vegetation loss in the area will benefit the area's fauna as well.
- The project staff should not be allowed to indulge in any hunting or trapping activities.
- Night-time construction work should not be undertaken.
- Illumination levels at the site should be minimized, as far as possible.

7.6.6 Noise and Vibration

The project will also cause an increase in the noise levels during the construction phase, causing a nuisance to residents. The noise will emanate mostly from heavy vehicles and machinery operating within the site. The vibration will also be generated from the movement of heavy vehicles and the usage of plant machinery. The expected noise levels from the operation of equipment and machinery are provided in the following table.

Table - 7.4: Noise Levels Generated from Construction Equipment

Name of Source	Noise Level at 16 m (50 ft.) from source in dB (A)
Back Hoe/Loader	85
Concrete Mixer Truck	81

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Name of Source	Noise Level at 16 m (50 ft.) from source in dB (A)
Mobile Cranes	81
Dump Truck	89
Generator	75
Pile Driver	101
Jackhammer	90

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	reversible	Certain

Mitigation

All machinery and equipment shall be well maintained and fitted with noise reduction devices. All vehicles and equipment used by the Contractor shall be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. The Contractor shall pay due consideration to the vibration impacts of plant machinery.

7.6.7 Traffic Snarl up along Project Area (construction phase)

The project area is accessible from three main routes by road i.e. Bakrani Road, Larkana Bypass Rad, & Airport road: The construction activities will impose traffic load on eastern and southern routes. Heavy vehicles will be used to transfer plant and equipment, construction materials, fuel and cement, etc.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Regional	Short term	High	reversible	Certain

Mitigation

To facilitate vehicular movement during the construction period the following recommendations are made:

- A detailed traffic management plan will have to be prepared by the contractor and vetted by supervision consultants and implemented accordingly.
- Designated parking areas with appropriate space should be arranged.
- Drivers must adhere to the speed limits.
- Monitor the vehicle to reduce the likelihood of queuing or causing congestion.
- Badges or logos must be displayed on contractors' vehicles that belong to the project.

7.6.8 Safety Hazards, Public Health and Nuisance

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

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

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These effects could possibly be mitigated by routine health screening and training of contractor's employees.

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

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

Accidents: During the operational phase, as the traffic will increase, it may cause accidents and become a safety problem. Excessive illumination at the construction site may potentially cause light pollution, creating a public nuisance.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Short term	Medium	reversible	Likely

Mitigation Measures

- Protected fencing will be fixed around the construction site. Unauthorized access within the construction area will not be allowed.
- The local community will be educated regarding the safety hazards at the site.
- The mitigation measures discussed under air quality deterioration, and soil and water contamination will address the public health concerns as well.
- Defensive driving practices will be inculcated in the project drivers through training, posters and other similar measures.
- Vehicle speeds of 30 km/hr at the project site will be implemented.
- Appropriate light diffusers and reflectors will be used, if required, to minimize the public nuisance caused by light pollution.
- A proper traffic plan will be prepared and implemented during the operational phase.

7.6.9 Sites of Archaeological or Historical Significance

There are no reported sites of archeological or historical significance on the land being impacted by the proposed Project. However, in case any artifact of such significance is found during the construction activities, the Archeology Department, Government of Pakistan will be informed.

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Mitigation Measures

There are no cultural sites located within the study area and no impacts on archaeological sites are envisaged. However, the Contractor will be required to instruct the construction crews and site supervisors in respect of archaeological site recognition, conservation procedures, and temporary site protection. In case of a chance finding during excavation, the contractor will protect the site and notify the Engineer who will inform the Department of Archaeology & Museums through the proponent and hand over such sites to the department if instructed by the Engineer/proponent

7.7 Human Resources

This section describes the impacts of the proposed project on local communities, construction workers, indigenous and vulnerable people as well as on structures and sites of cultural and religious significance.

7.7.1 Socio-economic Impacts

The construction activity would involve people of labor class frequenting the area for the entire length of the construction period. People who associate very closely with a certain set of cultural values inhabit the surrounding residential area. The significance of the impact is considered moderate.

Mitigation Measures

By adopting the following measures, the impact would be finally of low significance:

- In case, people from outside the area are engaged in the construction or operation of the project activities, this might result in cultural conflict with the local communities. Therefore, it is imperative to engage the local workforce as much as possible, and also develop and implement a strong community communication and participation plan;

7.7.2 Gender Issues

The rural women actively participate in outdoor socio-economic activities such as livestock rearing, working in crop fields, fetching drinking water, etc. Their privacy may suffer due to the project activities. Moreover, it will cause hindrance to the mobility of local women for working in the field, herding livestock, bringing drinking water, picking fuel wood, etc. The induction of outside labour may create social issues due to the unawareness of local customs and norms.

Mitigation Measures

Mitigation measures regarding gender issues include the following:

- The Contractor will have to select the specific timings for the construction activities particularly near the settlements, to cause the least disturbance to the local population, particularly women considering their peak movement hours.

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- The contractor will take due care of the local community and sensitivity towards local customs and traditions will be encouraged. The contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions, particularly with reference to women.
- During construction activities, if the privacy of the nearby households is affected, the Contractor will inform the house owner to make some 'parda' arrangements.

7.7.3 Safety Hazards

The occurrence of accidents/incidents during construction activities, particularly during excavation activities is a common phenomenon. The safety of the general public residing close to excavation work will particularly be at stake. The local people, particularly the children and women, may get injuries or even fatalities. Contractor staff while working on heavy machinery may get injuries.

Mitigation Measures

Mitigation measures regarding the safety hazards will include the following:

- The Contractor will ensure the provision of medical services, medicines, first aid kits, and vehicles at the campsite and working place. For this purpose, the contractor will install, staff, equip and operate a clinic on site.
- The contractor will cordon off the work areas to control access by local communities.
- The storage of all solid waste shall be practiced to prevent the attraction, harbourage, or breeding of insects or rodents, and to eliminate conditions harmful to public health or which create safety hazards, odours, unsightliness, or public nuisances.
- The contractor will brief local communities on on-site dangers and post signs around construction sites and access roads alerting the community to dangers.

7.7.4 Health & Safety of workers

Health risks and work safety problems may result at the workplace if the working conditions provide an unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material.

Mitigation Measures

Contractors all shall ensure that:

- reasonable steps are taken to protect any person on the site from health and safety risks;
- the construction site is a safe and healthy workplace;

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- PPE will be distributed to workers as appropriate – including hearing protection, dust goggles and protective footwear;
- For work near water, sharp drops will be fenced and flotation equipment within easy access;
- machinery and equipment are safe;
- adequate training or instruction for occupational health and safety is provided;
- adequate supervision of safe work systems is implemented;
- The contractor will carry out daily inspections and weekly audits to ensure the works area is safe and hygienic for farmers and community members passing through or using the areas.
- Induction and regular toolbox talks on proposed project EHS requirements will be held. Emergency preparedness and response plan and emergency escape routes shall be identified and all the workers will be made aware of them;
- Signs to improve the understanding of all the health safety instructions and precautions for workers are provided. Signage will be in languages appropriate to the workforce employed.

7.7.5 COVID 19 risks

The movement into the area of construction workers from outside the local area has the potential for the spread of infection – in particular, COVID-19. The Project Implementation Unit and Construction Supervision will work with contractors to ensure that the risk of COVID-19 is assessed and measures are taken in line with the donor's Guidance on managing risk from COVID-19 on construction sites. Guidance is being updated regularly as knowledge of COVID-19 improves.

Mitigation

The following prescriptions are based on good international practice, using guidance from World Health Organization (WHO), and national guidance from the UK and Canada and a review of other national government public information on COVID-19. These include:

- Develop and communicate a work plan on safe working for COVID-19. Such a plan will be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time.
- Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice.
- Avoid concentration of workers - limit the capacity of common areas such as changing rooms to allow the minimum separation of 2 meters and organize one-way systems.

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- The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all times. This is essential if locally hired workers are involved. Workers hired from local communities must be in crews segregated from workers from outside the local area. This will apply to work site activities, meals, washing/toilets and training activities.
- Discourage the sharing of items such as cups, glasses, plates, and tools.
- Provide workers with the conditions and means necessary for frequent hand washing (soap, water, or alcohol gel) with a posted hand washing protocol at site entries.
- Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or in the crook of their arm.
- Dispose of tissues in a lined and covered waste bin and wash hands afterward.
- Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient numbers, along with instructions, procedures, training and supervision.
- Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms.

7.8 Operational and Maintenance Stage

7.8.1 Surface and Groundwater Water Contamination

During the operational phase, the groundwater will be used. The quantity of water used during the operational phase is given in Table – 3.3: The quantities of required water are from direct groundwater usage that will ultimately impact the level of the groundwater resource, which may reduce, over time.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Long term	Medium	reversible	certain

Mitigation

In order to reduce the impact on groundwater resources following measures will be adopted.

- There will be proper lining and engineered structure to avoid leakage.
- Rainwater harvesting should be done and incorporated into the design for housing with the help of the project proponent. It is a simple technique of catching rainwater and storing it in underground aquifers. Rainwater harvesting helps increase the water table, improve the quantity of groundwater and reduce tube well-pumping costs. It is recommended that the rooftop rainwater in all the buildings should be harvested from underground tanks.

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- Water conservation techniques should be adopted in buildings such as installing water-saving gadgets and eco-devices.

7.8.2 Waste Water Disposal

Daily wastewater generation during the operational phase will be around 70% of total water demand as depicted in Table - 3.3. This wastewater poses threat to fresh water resources, especially to nearby water bodies. Additionally, it may deteriorate the quality downstream and may also be a threat to the local flora and fauna.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Long term	Medium	reversible	certain

Mitigation

The domestic wastewater will be collected from septic tanks into a collection pond and then disposed of the nearby Sim Nullah where all wastewater is disposed. There is a need for educating residents on the proper use of sewerage disposal systems to avoid blockages that may lead to burst pipes.

7.8.3 Impacts on Air Quality

Odor: During the operational phase, the sewerage, if not properly maintained, could produce an objectionable odor. Uncollected garbage may also result in the production of odour and this will affect residents leaving on the windward side of the development.

Nature	Spatial Scale	Duration	Significance	Reversibility	Likelihood
Direct	Local	Long term	Low	reversible	Likely

Mitigation

There shall be proper operation and maintenance manuals for the waste prepared by the Engineers and regular inspections need to be conducted by both the project proponent and the Local Authority. A waste collection system must be put in place to remove waste regularly and disposing it at designated sites.

Odour will be reduced by developing a green belt. Eucalyptus species would be used as a very good belt and also be used as per odour source. Herbs (*Mentha spicata*, the common name is Mint or Podina.) would also be used for counteracting odour in addition to green belts.

7.8.4 Solid Waste Management

Bhittai Residency Housing Scheme is likely to generate solid wastes of different types. This will create a nuisance in the areas if proper solid waste management procedures are not adopted and facilities for collection/storage of solid waste and disposal are not provided. Two main types of waste will be generated during the operational phase of the project. These include *domestic waste* from houses, community centers, mosques commercial areas, etc and *medical waste* from the hospital.

Mitigation Measures

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The implementation of composting program is also recommended. This will provide on-site recycling of the biodegradable waste and grass clippings. It will also provide natural fertilizer or green manure, to be used in the Bhittai Residency Housing Scheme landscapes.

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

The solid waste generated by the residents of the Project shall be collected in the waste bins, and placed at all houses and containers will be placed at various locations keeping in view the design criteria. The solid waste in the containers will be collected through the TMA vehicles and finally will be disposed of at the proposed disposal site.

The Waste Management Plan shall be drafted by the Waste Management Officer for approval by the waste management team of the TMA, and shall be based on internationally recognized environmental management standards such as the ISO 14000 series. All these activities will be performed by the TMA.

Fire is one of the hazards in a housing facility. Fires can cause loss of life and property. However, at the same time fires have the potential to severely harm the people in the vicinity and affect the environment.

Mitigation Measures

The risk involved in the fire hazards can be reduced by adopting the following measures

- For all engineering designs, NFPA (National Firefighting Protection Association) codes need to be followed.
- Training of residents on fire extinguishers and evacuation procedures.
- Standard fire and smoke detection and protection devices such as alarms. to be provided.

7.9 Positive Impacts of the Project

7.9.1 Provides Residential plots

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

7.9.2 Reduce Dependency on private schemes to provide housing

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

7.9.3 Provides Infrastructure

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

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7.9.4 Reduce the housing problem in Larkana

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

7.9.5 Provide Employment Opportunities

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

7.9.6 Improve Living Standards and Strengthen the Economy

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

7.10 Study Limitations

This study was focused mainly on the social, economic, and environmental implications of the proposed housing scheme on the people that live near the project area. Nonetheless, the Consultant is cognizant of the fact the Project would have broader benefits to the region and the entire country.

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8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 General

This section outlines the implementation mechanism for Environmental Management Plan (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

The Environmental Management Plan (EMP) will provide a delivery mechanism to address the adverse environmental impacts of the Project, during its execution and operation, to enhance project benefits and 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 the earlier 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, engineers and contractors, and provide means of effectively communicating environmental issues among them.

8.3 Management Approach

8.3.1 Pre-Construction and Construction Phase

The organizational roles and responsibilities are summarized below:

8.3.1.1 Project Proponent

The overall responsibility for compliance with the Environmental Management Plan of the project. The proponent will also be responsible to implement various mitigation actions prescribed in the EIA report. The proponent will also be subject to certain liabilities under the environmental laws of Pakistan, and under their contracts. Furthermore, the proponent will implement Environmental Monitoring Plan, which has been prepared for the construction phase.

8.3.2 Operational Phase

The magnitude of environmental impacts during the operational phase will be significant, therefore, the proponent will have to implement various mitigation actions as described in the operation phase. Furthermore, keeping in view the magnitude of environmental impact, an Environmental Monitoring Plan has been proposed.

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8.4 Organizational Structure and Responsibilities

8.4.1 Construction Phase

8.4.1.1 Primary Responsibility:

The proponent will have an overall responsibility to ensure the proper implementation of EMP throughout the project.

8.4.1.2 Field Management and Quality Control

Carrying out construction activities in an environmentally sound manner during the construction phase will be the responsibility of the proponent for implementing the EIA and EMP recommendations.

8.4.1.3 Environmental Monitoring:

The proponent will make necessary arrangements to monitor the key environmental data during the construction phase. These will include the quantity of water used, record of waste produced, record of waste disposal and project-related vehicular traffic.

8.4.2 Operational Phase

The proponent will assume the main responsibility for the environmental performance of the Project during the operational phase. An environmental monitoring plan has been developed as part of the Project. The key environmental parameters, such as water consumption, waste disposal, water quality, traffic count, and noise, the performance of sewerage disposal and the status of implementation of the plantation plan will be monitored regularly. The environmental monitoring reports will be produced and shared with the concerned authorities if required.

8.5 Environmental Improvement Cell and Responsibilities

The proposed Project will form up an Environmental Improvement Cell, which will be responsible for the environmental management and supervisory affairs during the construction and operational phases of the proposed Project. The responsibilities of the Environmental Improvement Cell are as follows:

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

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8.6 Contractual Provisions

Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and thus EMP will form part of their contracts. The contractor shall be responsible for implementing the mitigation measures and monitoring various environmental parameters. The contractor would be made accountable through contract documents and/or other agreements of the obligations and importance of the environmental and social components of the Project. The contractor(s) would be required to prepare the following plans:

- Camp Management Plan
- Traffic Management Plan
- Pollution Prevention Plan (both Air & Noise)
- Drinking - Water Management Plan
- Waste Disposal Plan
- Fire Fighting Plan
- An Emergency Response Plan,
- An Occupational Health, Public Health and Safety Plan.

8.7 Plantation Plan

Trees and shrubs play a major role in improving the urban landscape and helping protect the city environment. Trees and shrubs meet different needs for food, shelter, energy and aesthetics in the city. Urban woodlands and forest areas beyond the city offer respite if only for a while, from the pressure of daily life. The skillful choice of trees and shrubs together with manipulation and design of space in urban development and land management for people or wildlife leads to the creation of a stimulus environment.\

Trees growing in their natural environment survive without our help but trees grown near buildings or roads need a skillful selection of species and good care to make them worth and safe for life and property. The selection of trees and shrubs species for Urban (Larkana city) Areas essentially depends on the objectives of the tree and shrub plantation plan:

The following are the best choice of species for different green sites in the project area.

Greenbelts – aam (*mangifera indica*), amaltas (*cassia fistula*), babul (*acacia nilotica*), ber (*zizphus mauritiana*), ipil ipil (*leucaena leucocephala*), jaman (*syzygium cumini*), jangle jalebi (*pithecolobium dulce*), neem (*azadirachta indica*), pipal (*ficus religiosa*), shisham (*dalbergia sissoo*), simal (*bombax cieba*),

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Median Strips - Alstonia, Amaltas, large stromia. Brochicotton, Citrus, Washingtonia Palms
Shrubs: - Ficus hawi, Bougainvillea, Casia glauca, Plambago, Hypericum, Hamelia pattens, Jatropha, Erithrina blacki, Hibiscus, Psuedonia, Silvery, Duranta, Roses.

Streets - Neem, Arjun, Silver Oaks, Ficus Pelicon, simal, Date Palm, Almltas, Kachnar, siris. gul mohar

Parks/Playfields - Ficus pelican, Sukh chain, Michelia, Hibisucs, Ficus hawi

Parking Areas - Bakain, Sukh Chain, Ficus Retusa, Bischofia

Nullahs/Drains - Salix, Poplar, Jaman, Arjun Hypericum

House Fronts - Alstonia, Ponsitea, Ashok, Gauva, Moraya, Palms, Duranta, Roses

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

8.8 Training Plan

The Contractor shall include a training plan which details the program for the delivery of training, demonstrating training shall be carried out initially at induction of staff and repeated intermittently throughout the project, to cover the subjects included in the following Table – 8.1.

Table - 8.1: Training Subjects for Inclusion in Contractors' Training Plan

Subject	Target Audience
Handling, use & disposal of hazardous material	Construction workers with authorized access to hazardous material storage areas and required to use hazardous material during their works
Waste Management	All staff (construction and camp staff)
Efficient & safe driving practices, including road & vehicle restrictions	Drivers & mobile plant operators
Actions to be taken in the event of major or minor pollution event on land	All construction staff
Pollution prevention: Best practice	All staff
Health & Safety: Safe way to work & hazard awareness	All construction staff
Health & Safety: Safe use of plant & equipment	Operators of plant & equipment
Health & Safety: Working at height	All construction staff
Health & Safety: Working near/on water	All construction staff
Health & Safety: Use of PPE	All construction staff
Emergency procedures and evacuation	All staff
Fire fighting	All staff

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Subject	Target Audience
Culturally sensitive awareness raising on HIV/AIDS, COVID and the spread of sexually transmitted diseases. Awareness raising on risks, prevention and available treatment of vector-borne diseases	All staff
Cultural sensitivities of the local population	On induction of all migrant staff
Sustainable Environmental Management	All staff

8.9 Grievance Redressal System

The Manager (Env) will maintain a Community Complaints-Management Register (CCMR) to document complaints brought forward by the local community and to ensure that these are appropriately redressed under the project's M&E system. The Manager (Env) will report to the proponent. The information recorded in the register will include the date of the complaint and particulars of the complainant; a description of the grievance; the follow-up action required; the person responsible for implementing the action; and a target date for its completion.

A small grievance redressal committee will be constituted to deal with the issues. The Committee will comprise 3 members, including the Manager (Env), and a representative of the community. The committee will resolve the grievances at the local level and the client will be informed in writing by the Manager (Env) about the grievance and its resolution. However, grievances, which could not be resolved by the Committee at the local level, will be referred to the client along with the findings of the Committee. A satisfactory mechanism to solve such cases (independent authority not being part of the project) will still have to be established. (Figure – 8.1)

The Manager (Env) will work towards resolving the grievances recorded in the CCMR in conjunction with the proponent within seven days. After this deadline, any unresolved issues will be forwarded to the client. The client will, in turn, seek to resolve outstanding issues referred to him within seven days. In all cases, the Proponent's response will be formally communicated to the complainant in writing. Any observations made by Local NGOs will also take into consideration in the redressal process.

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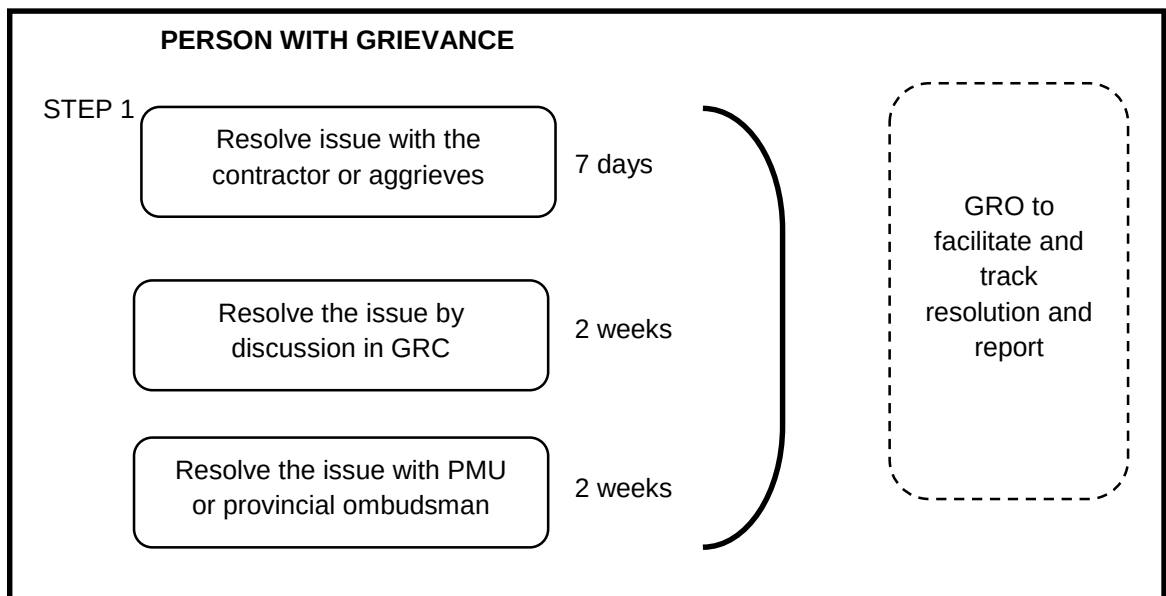


Figure - 8.1: Steps of the Grievance Redress Process

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Table - 8.2: Environmental Management Plan (EMP)

Resources	Sr. #	Environmental Impact/ Source	Description	Mitigation Measures	Mitigation Strategy	Responsibilities		Indicator Key Performance
						Execution	Monitoring	
PRE CONSTRUCTION & CONSTRUCTION CONSIDERATIONS								
1. Land Resources	1.1	Land Acquisition	No land acquisition involves. All land belongs to the project proponent.	NA	NA	NA	NA	NA
	1.2	Slope Instability	These will be subject to natural weathering and become increasingly prone to erosion.	• Good engineering practices will help in controlling soil erosion.	Grading, compaction, pitching, retaining structures.	Contractor	Proponent	Non Compliance with Waste Management Plans.
	1.3	Disposal of excavated material	• Land pollution will be activated due to haphazard disposal of debris spoil material.	• Identification of re-use of excavated material on site, to reduce off-site effects. • All excavated materials need to be disposed of in designated sites as decided by the Contractor within the construction limits.	Prepare a comprehensive Waste Management Plan, Erosion and Sediment Control Plan.	Contractor	Proponent	Non Compliance with Waste Management Plans.
	1.4	Soil Contamination	• Land may be contaminated by the spillage of chemicals like fuels, solvents, oils, paints and other construction chemicals and concrete.	• The contractor will be required to train its workforce in the storage and handling of materials like furnace oil, diesel, petrol and chemicals, etc., that can potentially cause soil contamination.	Compliance with Fuels and Hazardous Substances Management Plan.	Contractor	Proponent	Non Compliance with Waste Management Plans.
2. Water Resources	2.1	Hazardous Material and Waste in water bodies	• Water pollution from the storage, handling and disposal of hazardous materials and general Construction waste and accidental spillage.	• Follow the waste management plan prepared by the contractor. Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, or underground.	Compliance with SEQS for on-site waste disposal facilities.	Contractor	Proponent	Non-compliance with waste management plan.

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Resources	Sr. #	Environmental Impact/ Impact Source	Description	Mitigation Measures	Mitigation Strategy	Responsibilities		Indicator Key Performance
						Execution	Monitoring	
	2.2	Discharge from construction sites in water bodies	During construction both surface and groundwater quality may be deteriorated due to construction activities in or near water body, sewerages from construction sites and work camps.	- Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials. - Divert runoff from undisturbed areas around the construction site. - Stockpile materials away from drainage lines. - Prevent all solid and liquid wastes from entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transporting them to the approved waste disposal site or recycling depot. - Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off-site or into approved bounded areas on site. Ensure that the tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done at every exit of each construction vehicle to ensure the local roads are kept clean.	Compliance with SEQS/SEPA Guidelines for on-site waste disposal facilities.	Contractor	Proponent	Non-compliance with waste management plan.
	2.3	Use of Local Water Supplies	Local water supplies through the springs may be affected due to the implementation of the	As per Local Government Act, the contractor will seek approval from the local government for the exploitation of the water resources	Easy access to good water quality.	Contractor	Local Government / Proponent	Approved Plan.

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Resources	Sr. #	Environmental Impact/ Source	Description	Mitigation Measures	Mitigation Strategy	Responsibilities		Indicator Key Performance
						Execution	Monitoring	
			project both in quantity as well as quality.					
3. Ambient Air Quality	3.1	Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	- Fit vehicles with appropriate exhaust systems and emission control devices, in compliance with the SEQS. Maintain these devices in good working condition. - Operate the vehicles in a fuel-efficient manner. - Cover haul vehicles carrying dusty materials moving outside the construction site. - Impose speed limits on all vehicle movement at the worksite to reduce dust emissions. - Control the movement of construction traffic. - Water the construction materials before loading and transport. - Service all vehicles regularly to minimize emissions. - Limit the idling time of vehicles to not more than 2 minutes.	Contractors' traffic management plan. Compliance with SEQS.	Contractor	Proponent	Non-compliance with waste management plan and SEQS.
	3.2	Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	- Fit machinery with appropriate exhaust systems and emission control devices. - Maintain these devices in good working condition.	Enforcement of air standards as per SEQS.	Contractor	Proponent	Non-compliance with SEQS.

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Resources	Sr. #	Environmental Impact/ Source	Description	Mitigation Measures	Mitigation Strategy	Responsibilities		Indicator Key Performance
						Execution	Monitoring	
				• Focus special attention on containing the emissions from generators. • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites. • Service all equipment regularly to minimize emissions.				
	3.3	Construction activities	• Dust generation from construction sites, material stockpiles and access roads are a nuisance in the environment and can be a health hazard	• Water the material stockpiles, access roads and bare soils on an as-required basis to minimize the potential for environmental nuisance due to dust. • Increase the watering frequency during periods of high risk (e.g. high winds). • Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on the soil, where required and appropriate. • Reschedule earthwork activities or vegetation clearing activities, which were practical, if necessary to avoid periods of high wind and if visible dust is blowing off-site. • Restore disturbed areas as soon as practicable by vegetation/grass turfing.	Enforcement of air standards as per SEQS.	Contractor	Proponent	Non-compliance with SEQS.
4. Noise and Vibration Management	4.1	Construction vehicular traffic	• Noise quality will be deteriorated due to vehicular traffic.	• Maintain all vehicles in order to keep them in good working order following manufacturers' maintenance procedures.	Enforcement of Noise standards as per SEQS.	Contractor	Proponent	Lack of any non-compliance reports.

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						Execution	Monitoring	
				• Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.	Follow Sindh-EPA and WHO guideline values for community noise in specific environments.			
	4.2	Construction machinery	• Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	• Generators and vehicles will have exhaust mufflers (silencers) to minimize noise generation. • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines). • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. • Install acoustic enclosures around generators to reduce noise levels. • SEQS compliance will be ensured.	• Enforcement of noise standards by the contractor. • Follow Sindh-EPA and WHO guideline values for community noise in a specific environment. • Use ear pads to protect against damage to the ear when the noise level is more than 65 dBA.	Contractor	Proponent	Lack of any non compliance reports.
	4.3	Excavation and hauling		• Controlled excavation and orderly dumping of excavated material under cover of moisture Ensure blasting during the daytime.	Enforcement of noise standards by the contractor.	Contractor	Proponent	Lack of any noncompliance reports
5. Biological Environment	5.1	Destruction of Vegetation	No tree will be cut	Green areas and green belts along with the 4 parks have been planned in the housing scheme	• Vegetation and reforestation and tree plantation under annual tree plantation campaigns of the provincial governments	Contractor	Proponent	Non compliance – with approved Plan.
	5.2	Endangered Species	N/A	N/A	N/A	N/A	N/A	N/A

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						Execution	Monitoring	
	5.3	Impacts on Fauna near the construction area.	- The location of construction activities can result in the loss of wildlife habitat and habitat quality, - Impact on birds' habitat and their active nests.	- Limit the construction works within the designated sites allocated to the contractors. - check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal - Not be permitted to destruct active nests or eggs of migratory birds. - No tolerance policy regarding tree removal during the bird breeding season. If works must be continued during the bird-breeding season, a qualified biologist will conduct a nest survey prior to the commencement of works to identify and locate active nests.	Creating awareness and Imparting training for the construction crew to avoid loss of fauna, birds and animals' habitats.	Contractor	Proponent	Non compliance with approved Plan. –
	5.4	Construction Camps and Wild Life	Illegal poaching	Provide adequate knowledge to the workers regarding the protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.	Creating awareness and imparting training to construction crew to avoid loss of fauna, & flora habitat.	Contractor	Proponent	Non compliance with approved Plan. –
6. Social Impact	6.1	Standard of living of people	Social disruption and decrease in the standard of living of resettled people.	Uplift the standard of living by ensuring access to parks, and provision of health and social services.	There should be Social uplift program prepared by the contractor.	Contractor	Proponent	Lack of any noncompliance reports; lack of any complaints.
	6.2	water supply	Reduction or stress on water resources of community needs.	The contractor will use groundwater by boring it on the source.	Easy access to good water Quality.	Contractor	Proponent	Lack of any noncompliance reports; lack of any complaints.

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Resources	Sr. #	Environmental Impact/ Impact Source	Description	Mitigation Measures	Mitigation Strategy	Responsibilities		Indicator Key Performance
						Execution	Monitoring	
	6.3	Impacts on Local Communities/ Work force	• Effect on general mobility. • Accessibility of the local population to the valley access road.	• The contractor will ensure that the mobility of the local communities, particularly women and children and their livestock is not hindered by the construction activities.	Ease the mobility of the local community.	Contractor	Proponent	Lack of any noncompliance reports; lack of any complaints.
	6.4	Social disruption	• The presence of outside construction workers inevitably causes some degree of social disruption.	• The Contractor will be required to maintain close liaison with the local communities to ensure that any potential conflicts related to common resource utilization for the project purposes are resolved quickly.	Strictly follow the code of conduct of the workforce.	Contractor	Proponent	Lack of any noncompliance reports; lack of any complaints.
	6.5	Safety and noise hazards	• The nighttime working will be having intrinsic problems relating to safety and noise hazards for the communities.	• It is desirable that nighttime working may be avoided at places where settlements are very close to the construction sites. • The Contractor will share the plan and schedule of night-time working with the proponent for approval. • The contractor will ensure that blasting is not carried out in the near vicinity of the settlements and village tracks that are very frequently used. Here only excavators will be used. • Effective construction controls by the Contractor to avoid inconvenience to the locals due to noise, smoke and fugitive dust. The contractor will frequently sprinkle water at the work areas and haul tracks to avoid the generation of fugitive dust. • The frequency of sprinkling will be determined by the weather condition. During long spells of hot and dry	Follow Sindh-EPA and WHO guideline values for community noise in specific environments.	Contractor	Proponent	Lack of any noncompliance reports; lack of any complaints.

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						Execution	Monitoring	
				weather, the sprinkling will be done at 2 to 3 hours intervals.				
	6.6	Loss of Income	N/A	N/A	N/A	N/A	N/A	N/A
	6.7	Gender Issues	- The rural women actively participate in outdoor socio-economic activities such as livestock rearing, bringing water, etc. which may also be affected by the project activities. - The induction of outside labor may create social and gender issues due to the unawareness of local customs and norms.	- The Contractor will have to select specific timings for the construction activities particularly near the settlements, so as to cause the least disturbance to the local population, particularly women. - Contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions, particularly with reference to women.		Contractor	Proponent	
	6.8	Indigenous and Vulnerable Households	N/A	N/A	N/A	N/A	N/A	N/A
	6.9	Safety Hazards	Occurrence of accidents/incidents during construction activities.	- Complying with the safety precautions for construction workers as per International Labour Organization (ILO) Convention No. 62, as far as applicable to the project contract. - Protective fencing to be installed around the Camp to avoid any accidents. - The camp staff will be provided fire-fighting training and firefighting equipment will be made available at the camps.	An HSE management plan will be prepared.	Contractor	Proponent	Non compliance with approved plan

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						Execution	Monitoring	
				- All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. - Plenty of dungarees, gum boots, masks and gloves, etc. will be available as PPE				
	6.10	Religious, Cultural and Historical Sites	- No historical or archaeological site has been observed along the Project corridor. - Disturbance from construction works to the cultural and religious sites, and contractors' lack of knowledge on cultural issues cause social disturbances.	N/A - Do not block access to cultural and religious sites, wherever possible. - Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections. - Take special care and use appropriate equipment when working next to a cultural/religious institution. - Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offense to recommence work in the vicinity of the site until approval to continue is given by the relevant authority. - Provide separate prayer facilities to the construction workers.	N/A Ease the mobility of the local community.	N/A Contractor	N/A Proponent	N/A Lack of any noncompliance reports; any complaints.

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							Execution	Monitoring	
					• Show appropriate behaviour with all construction workers especially women and elderly people. • Allow the workers to participate in praying during construction time. • Resolve cultural issues in consultation with local leaders and supervision consultants. • Establish a mechanism that allows local people to raise Grievances arising from the construction process.				
OPERATION CONSIDERATIONS									
1. Impacts on Physical Environment	1.1	Surface and Groundwater Contamination		The quantities of required water are from direct groundwater usage that will ultimately impact the level of the groundwater resource, which may reduce, over time	Rainwater harvesting helps increase the water table, improve the quantity of groundwater and reduce tube well-pumping costs. It is recommended that the rooftop rainwater in all the buildings should be harvested from underground tanks. • Water conservation techniques should be adopted in buildings such as installing water-saving gadgets and eco-devices.	Project Proponent will ensure that proper operation and maintenance	Proponent	SEPA	Non compliance with the approved plan
	1.2	Waste Water Disposal		Daily wastewater generation during the operational phase will be around 189956 gallons/day. This wastewater poses threat to freshwater resources, especially to nearby water bodies.	The domestic wastewater will be collected from septic tanks into a collection pond and then disposed of near Sim Nullah where all wastewater is disposed. There is a need for educating residents on the proper use of sewerage disposal systems to avoid blockages that may lead to burst pipes	Both the Project Proponent and the Local Authority	Proponent	SEPA	Non compliance with the approved plan

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						Execution	Monitoring	
			Additionally, it may deteriorate the quality downstream and may also be a threat to the local flora and fauna.					
	1.3	Impacts on Air Quality	*Uncollected garbage may also result in the production of odour. *The emission from burning of waste if not properly handled	*A waste collection system must be put in place to remove waste regularly and disposing it at designated disposal sites. * Odour will be reduced by developing a green belt. Eucalyptus species would be used as a very good belt and also be used as per odour source. Herbs (<i>Mentha spicata</i>, the common name is Mint or Podina.) would also be used for counteracting odour.	Project Proponent will ensure that proper operation and maintenance	Proponent	SEPA	Non compliance with approved plan -
2. Impacts on Social Environment	2.1	Employment Creation	It is the policy of the developer to give employment priority to local people in the project area as long as they have the relevant skill.	For those without skills, training will be given during the construction phase and as such, some will be taken on a permanent basis, especially in the area of maintenance.	Project Proponent will ensure that proper operation and maintenance	Proponent	SEPA	Non compliance with the approved plan -
	2.2	Stimulation of Development	The establishment of the housing scheme will create a pull factor for investments to occur in the area.	This will ensure that developments are being done in line with Local Development Plans.	Project Proponent will ensure that proper operation and maintenance	Proponent	SEPA	Non compliance with approved plan -
	2.3	Public Health and Safety (Mosquito Breeding)	Mosquito breeding is largely contributed by the stagnancy of the water in the ponds or canals.	The use of mosquito nets and mosquito repellents is essential	Project Proponent will ensure that proper operation and maintenance	Proponent	SEPA	Non compliance with the approved plan -

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Table - 8.3: Environmental Monitoring Plan

Sr. No.	Feature / Issue	Parameter/S Monitored	Frequency	Location	Responsibilities	
					Implementation	Supervision
CONSTRUCTION PHASE						
1.	Muck Disposal	• Reuse of spoil/muck within Project areas where possible.	Daily	Project site	Contractor	Proponent /SEPA
		• Correct disposal of surplus spoil/muck in designated areas.	Daily	Disposal areas		
2.	Erosion and Sediment	• Extent of erosion and sedimentation.	Daily	Project site	Contractor	Proponent /SEPA
		• Topsoil stripped and covered or seeded if stockpiled for longer than one month or during the monsoon.	Weekly	Project site		
		• Batter stability.	Weekly	Project site		
3.	Water Quality	• Wastewater treated prior to discharge. • As per SEQs of Sindh- EPA.	Quarterly Quarterly	Project site	Contractor	Proponent /SEPA
4.	Waste Management	• Waste materials reused or recycled on-site where possible.	Monthly	Project site	Contractor	Proponent /SEPA
		• Non-recyclable wastes disposed of appropriately	Monthly	Project site		
5.	Hazards/Risk	• Workers are provided with appropriate safety equipment and regular safety training.	Weekly	Project site	Contractor	Proponent /SEPA
		• Storage of hazardous goods in bounded areas or secure sheds.	Weekly			
			Weekly At time of use			

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Sr. No.	Feature / Issue	Parameter/S Monitored	Frequency	Location	Responsibilities	
					Implementation	Supervision
		• Use of hazardous goods according to manufacturers' specifications.				
6.	Workers Health and Safety	• Enforcement of workforce rules and Regulations.	Weekly	Project site	Contractor	Proponent /SEPA
		• Provision of alternative fuels for cooking, heating and light.	Weekly	Workforce camps		
		• Provision of adequate and well-maintained services and facilities.	Weekly	Project site		
7.	Noise and Vibration	• Maintenance of equipment in accordance with manufacturers' specifications.	Monthly	Project site	Contractor	Proponent /SEPA
8.	Air Quality	• Air quality in confined areas.	Monthly	Project site	Contractor	Proponent /SEPA
		• Water sprayed regularly to minimize dust generation.	Weekly			
		• Exhaust emissions from machinery – visual inspection.	Weekly			
9.	Traffic/Access	• Enforcement of speed limits on Project roads.	Weekly	Access and approach roads.	Contractor	Proponent /SEPA
		• Noise.	Monthly			
		• Traffic Signs.	Weekly			
10.	Complaints	• All complaints.	Weekly	Project site	Contractor	Proponent /SEPA
FOR OPERATION PHASE						
1.	Drinking- Water Quality	•As per SEQS of Sindh - EPA	Quarterly	Project Site	Proponent	SEPA.

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Sr. No.	Feature / Issue	Parameter/S Monitored	Frequency	Location	Responsibilities	
					Implementation	Supervision
2.	Waste disposal	As per Guidelines	Annually	Project site	Proponent	Proponent /SEPA
3.	Waste Water Discharge	•As per SEQS of Sindh - EPA	Quarterly	Project site	Proponent	Proponent /SEPA
4.	Plantation	As per the tree plantation plan	Quarterly	Project Site	Proponent	Proponent /SEPA

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

9. ESTIMATED ENVIRONMENTAL COST

9.1 General

This chapter deals with the cost related to the environmental aspects of the project. This also includes the cost of additional works incorporated in the design for minimizing environmental hazards. Environmental costs are based on the environmental setting, social aspect and HSE implementations of required neutralizing of the impacts, arising from the construction of the project.

9.2 Environmental Monitoring Cost

The monitoring cost generally consists of the equipment required for checking and testing water quality, air quality, noise levels during construction of the project, and associated workforce costs. The unit rates for different parameters provided in Table - 9.1 are competitive for the year 2024.

9.3 Environmentally Friendly interventions

Cost estimation includes Sustainable Development Implementation, Personal Protective Equipment, Fire Fighting Equipment purchase and refilling, Soft and Hard Landscaping including - Plantation Plan cost.

9.4 Administrative Cost

Administrative Cost includes capacity building, reporting of findings of environmental and monitoring and Environmental Manager to ensure the compliance of EMMP

9.4.1 Reporting

Reporting cost comprises the cost required for the report preparation of all monitoring procedures and their findings to the proponent for the SEPA.

A detail of all these costs with their unit rates is given in Table - 9.1.

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Table - 9.1: Cost for Environmental & Social Monitoring

Item No.	Item	Affected Entity	Frequency	Unit	Average Rate (Rs.)/unit*	Quantity	Estimated Amount (Rs.)
A. Environmental Monitoring Cost During Construction Phase (12 months)							
1	Surface Water	SEQS	Once every in three months	No.of samples	15,000	4	60,000
2	Drinking Water	SEQS	Once every in three months		15,000	4	60,000
3	Ambient Air	SEQS	Bi - annually		35,000	2	70,000
4	Ambient Noise	SEQS	Monthly from three points		1,500	36	54,000
5	Machinery Stack +Noise Monitoring	Generators & Construction	Monthly		15,000	12	180,000
Sub Total - A							424,000
B. Environmental Improvement/ Env. Friendly interventions							
6	Sustainable Development Implementation					Lumpsum	1,000,000
7	COVID-19 Test for staff and worker for two rounds					Lumpsum	50,000
8	Personal Protective Equipment					Lumpsum	100,000
9	Fire Fighting Equipment purchase and refilling					Lumpsum	50,000
10	Soft and Hard Landscaping - Plantation Plan					Lumpsum	2,000,000
Sub Total - B							3,200,000
C. Administrative Cost							
11	Training/Capacity Building					Lump sum	100,000
12	Reporting, etc.					Lumpsum	100,000
13	Environmental Manager for one year					Lump sum	840,000
Sub Total - C							1,040,000
TOTAL OF (A TO C)							4,664,000

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

This Chapter presents the assessment of the possible environmental impact of Bhittai Residency Housing Scheme; Larkana. The study presents the purpose of the EIA as to the description of the site, the impact of the project during and after implementation and the mitigation measures.

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

10.2 Conclusions

The major conclusions of the EIA are:

- The objective of the project is to provide residential plots for high, middle and low-income groups in the city. Larkana is facing an acute shortage of housing and the proposed project will improve the housing situation considerably.
- The development of the Project has been proposed on a piece of land measuring 13 acres 30 ghuntas.
- The Project includes a total of 241 residential plots, 18 Commercial plots, and Social amenities like a school, community center, masjid, one parks and roads.
- For the housing scheme, the essential infrastructure works include Roads, storm drainage system, water supply, sanitary sewerage system, solid waste management system, electrification, streetlights, security, sui gas (natural gas) works, and soft and hard landscaping, parks, playground and other facilities will also be provided.
- The schedule for completion of the project is 12 months.
- The project construction and operation activity can potentially affect the natural resources with the low to medium intensity of the area. These adverse impacts can be largely reduced by implementing the appropriate mitigation measures, which have been discussed in this report.
- The potential impacts during the construction phase include loss of natural vegetation, increased threat to wildlife, increased traffic load on Bakrani Road and soil erosion and contamination, deterioration of ambient air quality caused by the exhaust emission and kicked up dust, noise pollution, damaged infrastructure, safety hazards and public health concerns for the nearby communities.
- The significant environmental management issues during the operation phase include sewerage disposal, solid waste and noise pollution, vehicular traffic and water consumption.
- The mitigation measures have been identified in Chapter 7 for impacts expected during the different phases of the project.
- Based on the recommended mitigation measures in Chapter 7, the impacts identified will be reduced with residual impacts having insignificant levels.

10.3 Recommendations

- The Proponent should develop and implement an Integrated Solid Waste Management

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Plan for the proposed project.

- The Proponent should implement the Plantation Plan as described in the EIA Report. Furthermore, the Proponent should dedicate one of the open spaces to the development of Miyawaki Forest.
- The Proponent should implement an Integrated Solid Waste Management Plan, which should include;
 - Collection of solid waste from residential and commercial buildings
 - Segregation of solid waste into recyclable, biodegradable and non biodegradable wastes. The recyclable wastes will be given away to recycling contractors: the biodegradable waste will be composted at the site to produce green manure, and the remaining waste will be transported to the waste disposal site.
- The contractor and proponent should ensure the implementation of the Environmental Monitoring Plan during the construction phase.
- Recruitment of an Environmental Manager for the construction phase of the Project.

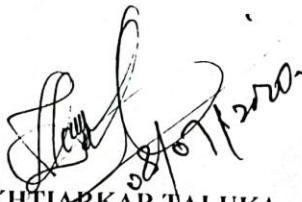
Based on the overall impact assessment, more specifically, the nature and magnitude and mitigation of the environmental impacts identified during the present EIA, it is concluded that Bhittai Residency Housing Scheme Larkana is likely to cause environmental impacts mainly during its construction phase and low to medium impact during the operational phase. However, these impacts can be mitigated provided the proposed activities are carried out as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented.

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

There are many positive impacts of the project, while most of the adverse impacts are mitigatable. The project will improve much-needed housing facilities. Therefore, the project is recommended for construction. The project area people will benefit from the project.

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Annexure I: Approval of Layout Plan from Town Planning Department

	OFFICE OF THE MUKHTIARKAR TALUKA LARKANA NO.TM/1294 of 2020 Dated: 28-07-2020 <u>"Say No to corruption"</u>
<u>RUBKARI</u>	
This is to certify that "BHITTAI RESIDENCY AIRPORT ROAD LARKANA", S.No.42 area (05-20) whole, S.No.43 area (08-12) out of share 76 paisa area (06-12), S.No.49/1 area (01-38) whole total area (13-30) acres deh Wah Nabi Bux Bhutto, Taluka Larkana stands mutated vide Entry No.307 & 308 both dated: 09-02-2018 are free from all encumbrances, as reported by the Tapedar of the beat.	
This certificate is issued for approval of Layout Plan for above mentioned scheme from the office of Director Town Planning Hyderabad, so that further necessary action could be made accordingly to ownership right from Revenue Record.	
 MUKHTIARKAR TALUKA LARKANA	

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

NO:TM/ 1445 of 2020
Larkano Dated: 12/10/2020

To,

The Assistant Director (IHQ)
Town Planning Department
Hyderabad.

Subject: **TO CONFIRM/VERIFY THE OWNERSHIP DOCUMENTS.**

Reference: Your office letter No.DTP/LRK/1217 dated: 01-10-2020.

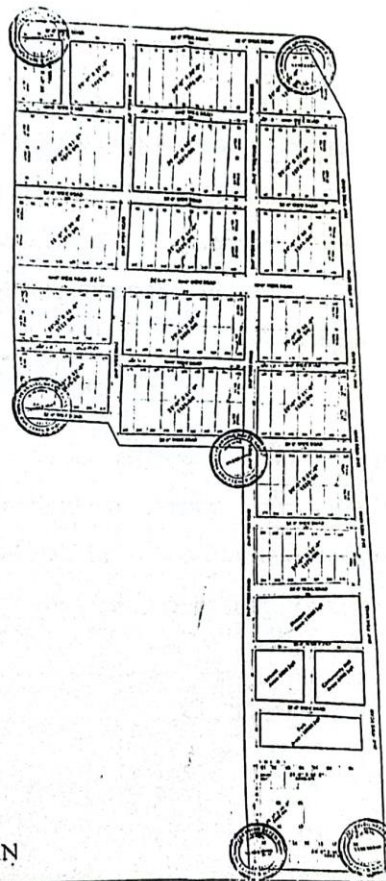
With reference to your office letter, cited reference above, the undersigned called report from Tapedar of the beat, who has reported that S.No.42, 43 and 49/1 admeasuring area (13-30) acres, Situated at Deh Wah Nabi Bux, Tapo Abra, Taluka & District Larkana stands entered in the name of Farooque Ahmed S/O Munawar Ali Bhutto vide Entry No.307 & 308 both dated: 09-02-2018 of VF VII-B.

This is for your kind information.


MUKHTIARKAR
TALUKA LARKANA

BHITTAI RESIDENCY HOUSING SCHEME LARKANA

APPROVED
14-06-2024



LAYOUT PLAN

PROPOSED LAYOUT PLAN OF
BHITTAI RESIDENCY HOUSING
SCHEME R.S NOS 42 05 AC 20-GH
43 06 AC 12 GH PART, 49/1 1 AC
38 GH, TOTAL MEASURING
AREA 13-ACRE, 30-GHUNTA
(598590-SQ)
DEH WAH NABI BUX, TAPO
ABRA, TALUKA LARKANA.

SCHEDULE OF PLOTS

DETAILS OF COMMERCIAL PLOTS

1) 25'-0" x 40'-0" -----	1000.00 SFT -----	16 PLOTS
2) DIFFERENT SIZE -----		02 PLOTS
TOTAL PLOTS -----		18 PLOTS

DETAILS OF RESIDENTIAL PLOTS

1) 25'-0" x 63'-0" -----	1575.00 SFT -----	34 PLOTS
2) 25'-0" x 61'-0" -----	1525.00 SFT -----	40 PLOTS
3) 25'-0" x 59'-0" -----	1475.00 SFT -----	14 PLOTS
4) 25'-0" x 58'-0" -----	1450.00 SFT -----	10 PLOTS
5) 25'-0" x 57'-0" -----	1425.00 SFT -----	38 PLOTS
6) 25'-0" x 56'-0" -----	1400.00 SFT -----	04 PLOTS
7) 25'-0" x 55'-0" -----	1375.00 SFT -----	38 PLOTS
8) 25'-0" x 53'-0" -----	1325.00 SFT -----	12 PLOTS
9) 24'-0" x 56'-0" -----	1314.00 SFT -----	10 PLOTS
10) 24'-0" x 48'-0" -----	1152.00 SFT -----	12 PLOTS
DIFFERENT SIZE -----		29 PLOTS

TOTAL RESIDENTIAL PLOTS ----- 241 PLOTS

SCHEDULE OF AREA

USE	AREA	%
COMMERCIAL	17400 SQ	2.99 %
RESIDENTIAL	377440 SQ	63.74 %
ROADS	43000 SQ	7.19 %
ROADS	16000 SQ	2.68 %
TOTAL	598590 SQ	100.00 %

OWNER

[Signature]

FAROOQ AHMAD S/O MUNAWAR ALI BHUTTO
ARCHITECT

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

LARKANA MUNICIPAL CORPORATION, LARKANA

No. LO/LMC/- 70

Dated: 08.11.2020

To,

Mr. Farooque Ahmed S/O Munwar Ali Bhutto,
Resident of Sabzi Mandi, Muhalla New Sarwar Colony Larkana

Subject: RUBKARI FOR APPROVAL OF LAYOUT PLAN FOR SIKNI PLOT COMMERCIAL/RESIDENTIAL "BHITTAI RESIDENCY AIRPORT ROAD LARKANA" S.NO.42 AREA (05-20) WHOLE, S.NO.43 AREA (08-12) OUT OF SHARE 76 PAISA AREA (06-12), S.NO.49/1 AREA (01-38) WHOLE TOTAL AREA (13-30) ACRES DEH WAH NABI BUX BHUTTO, TALUKA LARKANA.

Reference: Your application dated: -03-2020.

The Municipal Corporation Larkana has no objection if the approval/permission may be given to the owner of S.No.42 area (05-20) whole, S.No.43 area (08-12) out of share 76 paisa area (06-12), S.No.49/1 area (01-38) whole total area (13-30) acres deh Wah Nabi Bux Bhutto, Taluka Larkana may convert into commercial, as per layout plan.

All the development work i.e Drainage system, solid Waste Management Water Supply, Electricity & Sui Gas etc will be done/completed by the applicants/owners of Housing scheme.

On completion all reserved amenity plots/area will be handedover to the Municipal Corporation Larkana as per Rules & regulation of Municipal Corporation Larkana.

This NOC is issued on the request of applicant, if any disputes arisen on the ownership the applicants will responsible for all consequences.



[Signature]
MUNICIPAL COMMISSIONER
MUNICIPAL CORPORATION
LARKANA 08/11/2020

C.C to:-

I. The Director, Town planning Department, Government of Sindh, Hyderabad.

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

Annexure II: NOC from Larkana Municipal Corporation (LMC)

LARKANA MUNICIPAL CORPORATION, LARKANA

No.I.O/LMC/- 70

Dated: 08.11.2020

To,

Mr. Farooque Ahmed S/O Munwar Ali Bhutto,
Resident of Sabzi Mandi, Muhalla New Sarwar Colony Larkana

Subject:

RUBKARI FOR APPROVAL OF LAYOUT PLAN FOR
SIKNI PLOT COMMERCIAL/RESIDENTIAL "BHITTAI
RESIDENCY AIRPORT ROAD LARKANA" S.NO.42
AREA (05-20) WHOLE, S.NO.43 AREA (08-12) OUT OF
SHARE 76 PAISA AREA (06-12), S.NO.49/1 AREA (01-38)
WHOLE TOTAL AREA (13-30) ACRES DEH WAH NABI
BUX BHUTTO, TALUKA LARKANA.

Reference: Your application dated: -03-2020.

The Municipal Corporation Larkana has no objection if the approval/permission may be given to the owner of S.No.42 area (05-20) whole, S.No.43 area (08-12) out of share 76 paisa area (06-12), S.No.49/1 area (01-38) whole total area (13-30) acres deh Wah Nabi Bux Bhutto, Taluka Larkana may convert into commercial, as per layout plan.

All the development work i.e Drainage system, solid Waste Management Water Supply, Electricity & Sui Gas etc will be done/completed by the applicants/owners of Housing scheme.

On completion all reserved amenity plots/area will be handedover to the Municipal Corporation Larkana as per Rules & regulation of Municipal Corporation Larkana.

This NOC is issued on the request of applicant, if any disputes arisen on the ownership the applicants will responsible for all consequences.



[Signature]
MUNICIPAL COMMISSIONER
MUNICIPAL CORPORATION
LARKANA 08/11/2020

C.C to:-

1. The Director, Town planning Department, Government of Sindh, Hyderabad.

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

Annexure III: Copy of letter from Sukkur Electric Power Company



SUKKUR ELECTRIC POWER COMPANY

Tel: 071-9310044
Fax: 071-5620237

Office Of The
Manager (P&D)
SEPCO, Sukkur

No. CEO/SEPCO/SUK/CTO//M(P&D)/ 3524.25

Dated: 11/10/2020

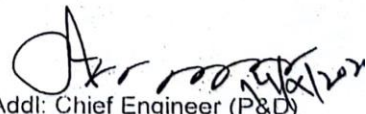
Director
Town Planning Department
Government of Sindh
Hyderabad.

SUBJECT: NO OBJECTION CERTIFICATE (NOC) FOR ELECTRIFICATION (CERTIFICATION) IN RESPECT OF APPROVAL OF PROPOSED LAY OUT PLAN "BHITTAI RESIDENCY HOUSING SCHEME" OVER R.S NO. 42,43 AND 49/1 ADMEASURING AREA 13 ACRES, 30 GHUNTAS, SITUATED AT DEH WAH NABI BUX TALUKA AND DISTRICT LARKANA.

Reference: Your office letter No.DTP/LRK-262 dated 27.11.2019.

With reference to above referred letter regarding NOC in respect to utility facility of electricity for proposed layout plan of above subject housing scheme, in the name of Mr. Farooque Ahmed S/o Munawar Ali Bhutto, SEPCO has no objection for approval of lay out plan subject to following conditions:

- The provisional NOC is valid only for the Scheme as intimated through your office letter. If the plan is altered in any way, this NOC will be treated as cancelled.
- This NOC is valid only for the land on which the scheme/project is being developed, is converted to Commercial Status by concerned department.
- This NOC is being issued for approval of subject project.
- Sponsor will have to observe the existing 11KV Line standard clearance from houses/building to ensure safety of life and property.
- Present system conditions are likely to be on maximum loading. System might be overloaded at the time of completion of the project. Therefore extension of the line, shifting of HT/LT old poles and reconductoring of line (if required) shall be carried out at the cost of builder/developer.
- SEPCO reserves the right to utilize the HT/LT/ substations for its system improvement work or to provide electricity to other consumers.
- Sponsor will make the payment of all electricity dues on premises if any, and will submit dues clearance certificate alongwith application of electrification in SEPCO.
- The sponsor will have to pay all charges such as rehabilitation of system charges in case the said project is going to be fed from existing system of the SEPCO, grid sharing charges etc according to their load requirement at the time of approval of electrification for entire scheme.
- The sponsor will have to complete all the departmental formalities.
- This NOC is provisional subject to the availability of required load on-132KV Grid Station/11KV feeder at the time of electrification/completion of the project.
- Resolution of Right of way problems/issues shall be responsibility of the sponsor of project.
- If the commulative/Total load of schemes of the sponsor is more than 5 MW, then the sponsor will be bound to provide 04 acres of land to SEPCO, free of cost, for construction of 132KV Grid Station.


Addl: Chief Engineer (P&D)
SEPCO Sukkur

CC:

- Mr. Farooque Ahmed S/o Munawar Ali Bhutto (Applicant)
✓ Master file

Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Annexure IV Copy of letter of Sui Southern Gas Company (SSGC)


SUI SOUTHERN GAS COMPANY LIMITED
 Dated: 23 September, 2020

SALES/ NOC/005/165

Office Superintendent (HQ),
Town Planning Department,
Hyderabad

Subject: NO OBJECTION CERTIFICATE

Dear Sir,

Kindly refer to your letter No. DTP/LRK-265 Hyderabad Dated 27-11-2019 for issuance of No Objection Certificate (NOC) in respect of approval of proposed Layout Plan of project "Bhittai Residency Housing Scheme" over R.S. Nos. 42, 43 and 49/1, measuring 13 acres and 30 Ghuntas, situated at Deh Wah Habi Bux, Taluka & District Larkana.

In this connection, we have no objection for approval of above-referred proposed layout plan in accordance with the laid down procedure of relevant competent authority subject to fulfilling the following conditions.

- Gas supply to above project will be subject to prevailing GOP / Company policy and the availability of gas at that time.
- The payment towards gas network will be charged on 100% recoverable basis along with all charges relating to individual gas connections as per GOP/company policy.
- On the basis of NOC, sponsors / residents will not be entitled to claim gas connection from SSGC.
- The sponsors will provide all required documents, approved/ proposed construction plan and / or completion plan duly approved by the competent authority (SRCA / HDA / Town Planning / Cantonment Board or any Authority / Civic Agency), whichever authority has the jurisdiction.
- The sponsors will provide required NOC, Road cutting permissions from relevant Authorities to SSGC at their cost.
- Customer will be required to clear right of way for SSGC Gas Mains and to arrange open end free passage for SSGC work. They will also maintain safety distance applicable to gas main existing or near the premises.
- Customer will provide safe and separate space for installation of meters as per SSGC requirement.
- The above conditions may be reviewed, modified by SSGC in future. SSGC reserves the right to withdraw/cancel NOC at any stage.
- PNG may be supplied (subject to availability) to said project as per prevailing GOP policy and tariff notified by OGRA/competent authority.

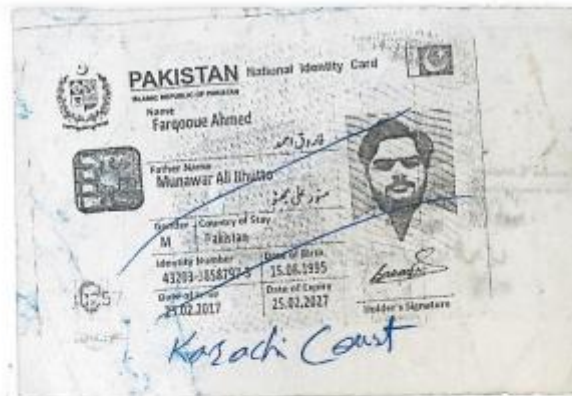
Kindly confirm for our record that above conditions are acceptable to you.

Yours truly,


 Salahuddin Zafar
 ADGM (Sales)



Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
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Annexure V: Copy of Sindh Environmental Protection Tribunal Order



HOW TO VERIFY THIS DOCUMENT

Option 1. Scan it through any bar code reader or cellphone QReader Software
Option 2. Directly verify it from website <http://shc.gov.pk/cfms-dc.php>
Document Code: E95F25F787C4D5B7D60CE95CEDBB5152

ORDER SHEET

IN THE SINDH ENVIRONMENTAL PROTECTION TRIBUNAL, KARACHI

Complaint No. 21 of 2018

✓ Sindh Environmental Protection Agency Complainant

Versus

M/s Bhittai Residency Housing Scheme and another..... Respondents

Date of hearing: Order with signatures of Chairman & Member (s)

11.01.2022

For framing of charge,

11.01.2022

Mr. Altaf Ali, authorized officer of complainant/SEPA,

Ms. Ifat Rana, APG for the State,

Mr. Mr. Muhammad Daud, advocate for respondent alongwith respondent No.2
Munawar Ali Bhutto.

Certified True Copy



Nisar Muhammad Shalkh, Chairman:- This complaint u/s 26 of Sindh Environmental Protection Act, 2014 was filed by SEPA through its authorized officer Altaf Ali, Environmental Inspector/I.O on the ground that the respondents have initiated a housing scheme at Larkana namely M/s Bhittai Residency Housing Scheme without carrying out IEE/EIA and without obtaining its approval from the Agency which is the violation of the provisions of section 17 of the said Act.

2. Mr. Muhammad Daud, counsel for respondents contends that no construction of any House has been commenced at project site and no notice was ever served upon respondents for compliance of the provisions of the Act, 2014. He further submitted that the respondents are still ready to make due compliance of the law as ordered by this Tribunal. Mr. Altaf Ali, authorized officer of complainant while admitting that no construction of any house is yet started in the Housing Scheme of respondents, submits that the complainant has no objection for disposal of this complaint if the compliance of law is made by the respondents by filing and seeking IEE/EIA report for approval of their project. Learned APG also submits that

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Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

Verified True Copy



they have no objection if due compliance is allowed to be made by respondents according to law.

3. It appears from record that the charge is not yet framed in this complaint case which is even not admitted in terms of section 204 Cr. PC, therefore, in view of the above undertaking of respondent No.2 and no objection of authorized officer of complainant/Agency for disposal of this complaint after due compliance, the respondent No.2 is directed to file the required IEE/EIA study report before the complainant/Agency within one month. After completing all necessary formalities the Agency shall decide the matter within a period of 90 days, according to the law.

5. By consent of the parties, this complaint is adjourned to 17.02.2022 when they shall submit their compliance report for further hearing/order.

Sd/-
MEMBER TECHNICAL

Sd/-
MEMBER LEGAL

Sd/-
CHAIRMAN

[Signature]
ASSISTANT REGISTRAR
Sindh Environmental Protection Tribunal
Karachi

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Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

Annexure VI: Screening Criteria to Determine Env. Category of the proposed Project

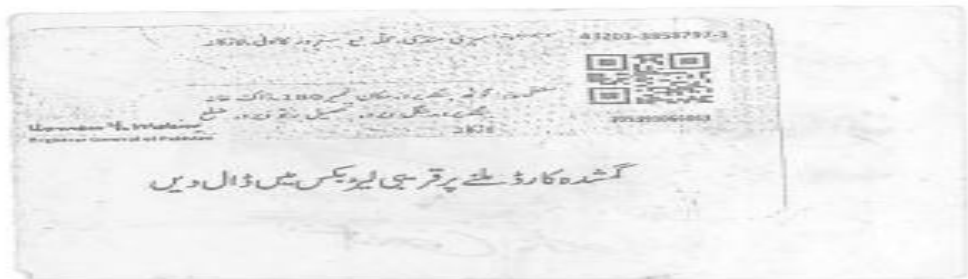
Title of Project: Bhittai Residency Housing Scheme Larkana			
Scope of Works: Civil works includes Earthworks, road, drainage line, plot cutting, parks.			
Duration: 12 Months			
Client Project: M/S Bhittai Residency			
Section: B Assessment			
Environmental Issues			
No Tree cutting involved			
No Land acquisition involved			
Most of the impact during construction stage and particular during plot cutting or establishment of social amenities but for short period and reversible nature as well as localized.			
- There are also no physical cultural resources at or near the proposed site, which may likely to be affected by construction activities. - No any forests observed near the site. - Ambient Air quality is clear and noise level are under SEPA standard. Water quality is not fit for human consumptions bacteriological contaminations have been observed.			
Section C: The categories are defined in the Sindh Environmental Protection Agency (SEPA) IEE and EIA Regulations, 2014."			
Type of Project: Urban development and tourism'			
Type of Project	Category	Applicable (Yes/No)	Comments
The proposed project is categorized based on the serving areas in Schedule II, 1 "Housing schemes above 10 acres	Schedule-II	The project spread over 13 acres 30 ghuntas	Project is falling in schedule-II. Hence EIA envisages
Section D: World Bank Operational Policies that might Apply			
Safeguard Policies	Triggered (Yes/No)	Explanation	
Environmental Assessment OP/BP/GP 4.01	Yes		
Natural Habitats OP/BP 4.04	No		
Forest OP/BP 4.36	No		
Pest Management OP/BP/4.09	No		
Physical Cultural Resources OP/BP 4.09	No		
Involuntary resettlement OP/BP 4.12	No		
Project in International Waterways OP/BP 7.50	No		
Projects in Disputed Areas OP/BP 7.60	No		

Environmental Impact Assessment (EIA)		
Bhattai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

غیر زرعی مقصدن لاء کم آیل، منظور کیل یا مخصوص کیل زمین جو رجسٹر
 ضلعو: لکڑی، سال: 2021
 تعلقو: لکڑی، زمین جو تفصیل: 1036/42/51

سرکاری زمین				خانگی زمین				
کھڑی مقصد زمین کم آیل منظور کیل یا مخصوص کیل	مدت	رقم وصول کیل مالکائی جی چالان نمبر تاریخ سمیت	ایراضی منظور کیل انکمن اکرن پر	سروری نمبر	گورن جو پٹ چیکو سروری نمبر پر شامل نہ کیل آھی	ایراضی غیر زرعی کمن لا کم آیل ایراضی پلاٹ نمبر جیکڑ هن ڈنل انکمن ۽ اکرن پر	سروری نمبر کیل ایراضی انکمن ۽ اکرن پر	لا جو ن نمبر مست
12	11	10	9	8	7	6	5	4
					تالیق	1/3-30	5-20	1036
				2.99%	کھیتی باڑی	1-12	8-12	51
				59.74%	ہاؤسنگ	1-38	1-38	2
				7.19%	امنیت برائے			
				30.08%	دوبلی گھرنے			
				100%				

ENTRY SCANNED
 Vide No. 1267410
 Date 12-1-2024
 Through R.R.C. Hyderabad
 Mutation Fee recovered
 Challon No. 13
 at NSP Main Br. Larkana



Environmental Impact Assessment (EIA)		
Bhittai Residency Housing Scheme - Larkana		
Doc. No	IEEC/2024/06/EIA	

Annexure VIII: Water Analysis Report – (Ground, Surface & Sim Nullah)



Imperial Environment Research Laboratory

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Lab Report Ref. No.	IERL/Bhittai Residency/Larkana/06/2024	Invoice No.	IERL/BR/LR/Q75/2024
Sample ID:	Surface Water	Site ID.	EMR-BR-Larkana-Karachi
Report to:	M/s Bhattai Residency Housing Scheme	Reporting Date	29/05/2024
Sampling Date:	15/05/2024	Grab/Composite	Grab
Sample Type	Sim Nala (Runlet Water)	Location	Bhittai Residency, main airport road, Larkana, Sindh
Sample Collected/Submitted by:	IERL Representative	Coordinates	27°31'14.6"N 68°12'25.5"E

Analytical Test Report of Surface Water Quality Monitoring

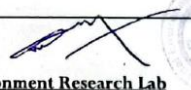
S.No.	Parameter	Method*	Unit	SEQS Limit*	Result	Remarks
1	Temperature	SMWW 2550 B	°C	40 ≤ 3	26.1	Within Limit
2	pH	EPA 150.3	-	6.0-9.0	7.48	Within Limit
3	Biochemical Oxygen Demand (BOD)	EPA 401.5	mg/l	80	110	Out of Limit
4	Chemical Oxygen Demand (COD)	EPA 410.5	mg/l	150	260	Out of Limit
5	Total Suspended Solids (TSS)	EPA 160.4	mg/l	200	80	Within Limit
6	Total Dissolved Solids (TDS)	EPA 160.1	mg/l	3500	7820	Out of Limit
7	Oil & Grease	EPA 160.1	mg/l	10.0	2	Within Limit

❖ SEQs, Sindh Environmental Quality Standards for Drinking Water.

Terms & Conditions:

The report is valid for the current batch (sample).

This Report is not valid for any other certification, or court matters.

 Sample Analyzed by	 Head of Imperial Environment Research Lab
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Annexure IX: Ambient Air Monitoring



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Lab Report Ref. No.	IERL/Bhittai Residency/Larkana/06/2024	Invoice No.	IERL/BR/LR/Q75/2024
Sample ID:	Air Quality	Site ID.	EMR-BR-Larkana-Karachi
Report to:	M/s Bhittai Residency Housing Scheme	Reporting Date	29/05/2024
Sampling Date:	15/05/2024	Sampling Duration:	Spot Monitoring
Sample Type	Ambient Air Quality (Main Gate)	Location	Bhittai Residency, main airport road, Larkana, Sindh
Sample Collected/Submitted by:	IERL Representative	Coordinates	27°31'15.3"N 68°12'25.0"E

Analytical Test Report of Ambient Air Quality Monitoring

Date	Time	SO ₂	NO	NO ₂	CO	O ₃	PM _{2.5}	PM ₁₀	SPM	Lead
15-05-2024	08:00 am	9.66	15.84	26.85	6.16	5.18	27.32	115.22	223.08	0.001
	09:00 am	9.43	14.22	25.29	6.20	5.45	26.36	117.32	198.88	0.001
	10:00 am	9.55	14.26	26.15	6.75	5.16	27.78	118.35	119.10	0.001
	11:00 am	9.01	15.52	26.78	6.35	6.77	26.22	112.54	115.68	0.001
	12:00 pm	9.22	14.36	25.54	7.80	5.64	37.41	121.87	116.46	0.001
	01:00 pm	9.34	16.12	26.78	6.45	6.30	26.79	115.22	199.34	0.001
	02:00 pm	8.96	14.84	26.42	6.46	6.32	29.95	110.98	200.68	0.001
	03:00 pm	9.52	16.86	26.49	6.10	5.15	31.54	123.12	203.22	0.001
	04:00 pm	8.40	15.25	25.43	6.36	5.28	31.26	119.01	202.92	0.001
	05:00 pm	9.35	14.42	26.29	6.35	5.92	28.92	121.52	194.40	0.001
	06:00 pm	9.66	14.77	26.88	7.52	5.63	27.48	117.46	181.55	0.001
	07:00 pm	8.55	15.47	26.68	6.37	6.21	26.56	118.33	213.38	0.001
16-05-2024	08:00 pm	7.22	14.26	27.70	6.40	5.38	29.38	122.69	196.68	0.001
	09:00 pm	8.46	15.70	26.78	7.21	6.58	29.70	120.54	177.28	0.001
	10:00 pm	8.10	15.35	26.83	7.28	6.68	28.35	121.66	188.56	0.001
	11:00 pm	8.35	14.15	26.86	6.68	5.28	28.57	117.98	184.40	0.001
	12:00 am	7.98	14.51	25.69	7.54	5.62	29.23	118.36	187.30	0.001
	01:00 am	8.90	15.62	26.47	6.47	5.40	30.00	120.64	194.12	0.001
	02:00 am	7.23	15.47	26.22	7.18	6.97	30.65	118.78	190.54	0.001
	03:00 am	8.30	14.35	26.33	7.19	5.96	29.98	122.65	188.68	0.001
	04:00 am	9.96	15.26	26.24	6.75	5.80	31.22	120.54	191.24	0.001
	05:00 am	9.54	14.55	27.42	8.42	6.24	29.44	122.02	190.55	0.001
	06:00 am	9.18	15.34	25.45	7.74	5.63	30.26	122.32	184.48	0.001
	07:00 am	9.87	15.26	26.22	7.53	6.79	29.25	121.94	176.22	0.001
SEQS Limits:		120	40	80	10	130	75	150	500	1.5
Unit		µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
Maximum		9.96	16.86	27.7	8.42	6.97	37.41	123.12	223.08	0.001
Minimum		7.22	14.15	25.29	6.1	5.15	26.22	110.98	115.68	0.001
Average		8.88	15.105	26.41	6.914	5.902	29.50	119.04	182.98	0.001

❖ Sindh Environmental Quality Standards for Air Quality.

❖ SEQS= Sindh Environmental Quality Standards

 Sample Analyzed by	 Head of Imperial Environment Research Lab
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Terms & Conditions:

Report is valid for current batch (sample).
This Report is not valid for any other certification, or court matters.



Annexure X: Noise Level Monitoring



Imperial Environment Research Laboratory

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Lab Report Ref. No.	IERL/Bhittai Residency/Larkana/06/2024	Invoice No.	IERL/BR/LR/Q75/2024
Sample ID:	Noise Quality	Site ID.	EMR-BR-Larkana-Karachi
Report to:	M/s Bhittai Residency Housing Scheme	Reporting Date	29/05/2024
Sampling Date:	15/05/2024	Sampling Duration:	Spot Monitoring
Sample Type	Ambient Noise Quality	Location	Bhittai Residency, main airport road, Larkana, Sindh
Sample Collected/Submitted by:	IERL Representative		

Analytical Test Report of Ambient Noise Quality Monitoring

Sr. #	Sampling Site Location	Coordinates	Min dB(A)	Max dB(A)	Average dB(A)	SEQS Limit	Remarks
1.	South Site	27°31'15.2"N 68°12'28.1"E	52	58	55	63	Within Limit
2.	Main Gate Entrance Area	27°31'11.2"N 68°12'21.1"E	50	58	54	66	Within Limit
3.	North Site	27°31'25.3"N 68°12'38.2"E	52	54	53	62	Within Limit
4.	West Site	27°31'31.1"N 68°12'22.1"E	50	52	51	64	Within Limit

❖ Sindh Environmental Quality Standards for Ambient Noise.

❖ SEQS=Sindh Environmental Quality Standards

 Sample Analyzed by	 Head of Imperial Environment Research Lab
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Terms & Conditions:

Report is valid for current batch (sample).

This Report is not valid for any other certification, or court matters.

